

# PORT HONDURAS MARINE RESERVE



# ANNUAL REPORT

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## Manager's Overview

I am delighted to present the annual enforcement report for the Port Honduras Marine Reserve (PHMR) for 2023. This report encapsulates the key activities from January to December, covering enforcement, community development, education, research, communications, governance, and stakeholder engagement within the reserve. The dedicated reserve enforcement staff have upheld their commitment to ensuring successful protected area management by meeting conservation targets.

During the period, the team conducted a total of 610 patrols, representing a slight increase from the previous year. Consequently, they recorded 12 infractions, issued 4 verbal warnings, and removed 3 gill nets and 1 lobster shade from the reserve. Additionally, the team arrested 3 individuals for fishing within the conservation zone near East Snake, leading to successful prosecution. They also rescued an individual stranded on East Snake Caye after being separated from their sailboat. Furthermore, the ranger team provided support to other enforcement teams at TIDE through joint patrols. Working relationships with government agencies in 2023 such as the Belize Coast Guard, Belize Fisheries Department, Belize Police Department, Department of Environment, Coastal Zone Management Authority and Institute, Belize Defense Force and the Belize Forest Department have continued to be improved upon.

We extend our heartfelt appreciation to the numerous donors who persist in supporting TIDE's effective management practices and enforcement of sustainable marine resource usage by stakeholders. TIDE deeply values their ongoing financial contributions, technical guidance, and steadfast dedication over its 26-year history. Special recognition goes to PHMR's dedicated rangers, Edwin Cabrera, Aaron Garbutt, Byron Usher, and Mark Jacob, for their unwavering commitment to conserving and safeguarding PHMR's natural ecosystems and marine biodiversity. We also extend gratitude to all our resource users who consistently demonstrate outstanding stewardship of the reserve. A particular acknowledgment is owed to the Belize Coast Guard for their exceptional support throughout 2023, assisting in enforcing reserve regulations and ensuring the safety of our staff and resource users. It has been an honor and a rewarding experience collaborating with everyone in 2023, and we eagerly anticipate the opportunities and accomplishments of 2024.

Sincerely,



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Ryan A. Moore

Protected Areas Manager

Toledo Institute for Development and Environment

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## 0.0 List of Abbreviations

PHMR	-	-	-	-	Port Honduras Marine Reserve
TIDE	-	-	-	-	Toledo Institute for Development and Environment
BFD	-	-	-	-	Belize Fisheries Department
BCG	-	-	-	-	Belize Coast Guard
SMART	-	-	-	-	Spatial Monitoring and Reporting Tool
MPA	-	-	-	-	Marine Protected Area
GIS	-	-	-	-	Geographic Information Systems
MMMC	-	-	-	-	Maya Mountain Marine Corridor
SI	-	-	-	-	Statutory Instrument
RZ	-	-	-	-	Replenishment Zone
MA	-	-	-	-	Managed Access
FWC	-	-	-	-	Fresh Water Cup
PACT	-	-	-	-	Protected Areas Conservation Trust
TEC	-	-	-	-	TIDE Environmental Club

## 1.0 Administration

### 1.1 Staffing for PHMR

No.	Names	Position
1	Ryan Moore	Marine Manager
2	Edwin Cabrera	Head Ranger
3	Aaron Garbutt	Ranger
4	Byron Usher	Ranger
5	Mark Jacob	Ranger
7	Olivero Garcia	Temporary Ranger
8	Evander Paquiul	Temporary Ranger

**Table 1: Showing PHMR Enforcement Staff**

No.	Names	Position
1	Anthony Rash	Marine Biologist
2	Tanya Barona	Senior Marine Biologist

**Table 2: Showing PHMR Research and Monitoring Staff**

## **2.0 Background of the Port Honduras Marine Reserve**

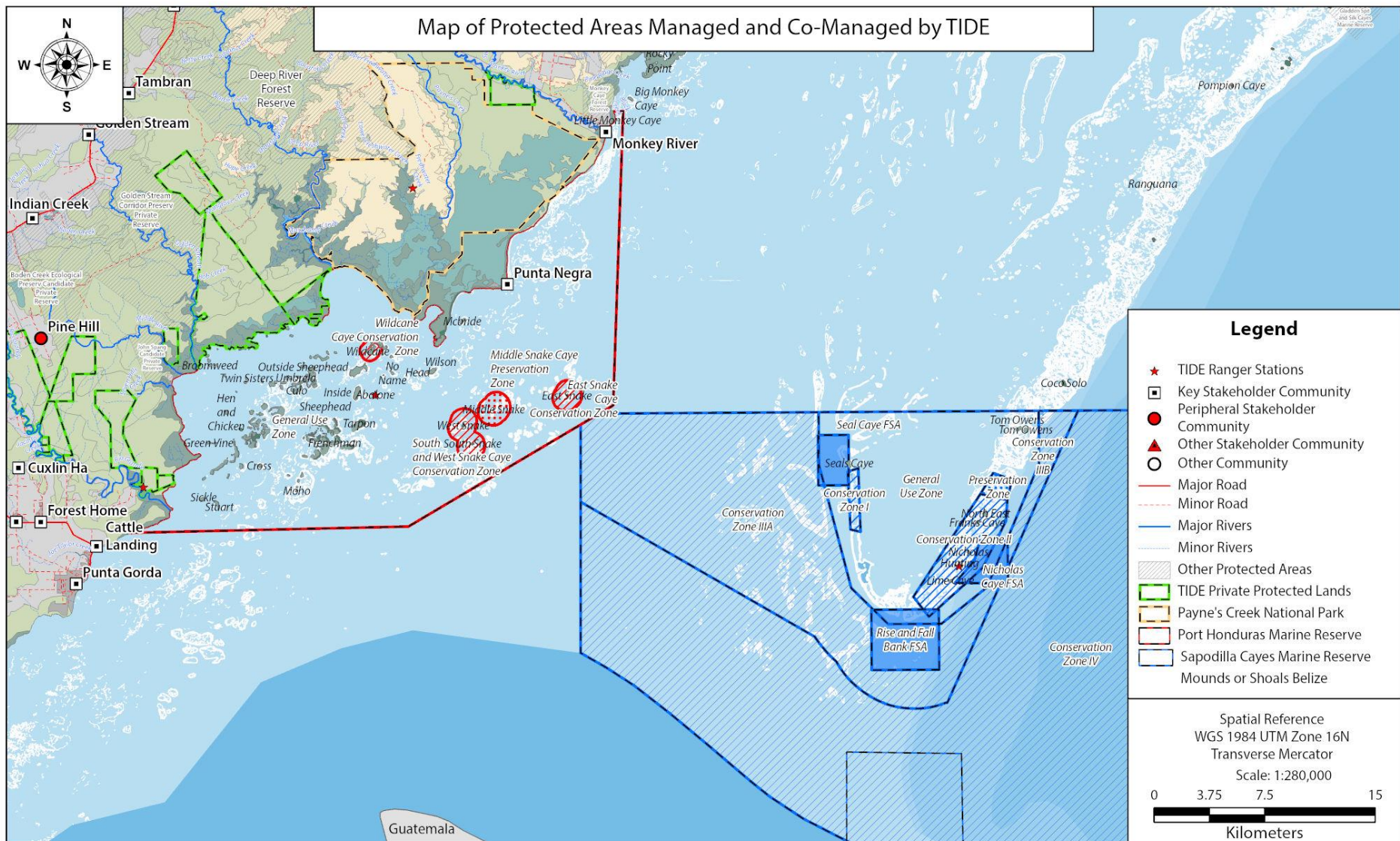
### **2.1 Introduction**

The PHMR was declared by the Government of Belize on the 25<sup>th</sup> of January 2000. It is actively co-managed by TIDE with the governing authority being the Fisheries Department. PHMR is a semi-estuarine system that covers approximately 160 square miles and is an integral part of the MMMC in southern Belize. The reserve is located just off the coast of Punta Gorda and extends north up to Monkey River Village. PHMR comprises coastal wetlands, seabed, mangroves, lagoons, savannahs of Payne's Creek National Park and national lands within the area known as Port Honduras. The general boundaries of the reserve are the Rio Grande in the south, Monkey River in the north, the Snake Cayes in the east and the coastal wetlands in the west. There are two buffer communities that are located adjacent to the reserve which are Monkey River Village and Punta Negra Village with Punta Gorda Town lying just outside.

The reserve is rich in biodiversity, containing approximately 138 small mangrove cayes, which provide essential habitat and nursery for juvenile aquatic species. Other critical habitats include seagrass beds, hard bottom communities of coral and/or rubble, and soft bottom communities. A large portion of the reserve is covered by seagrass, which also provides essential habitat and food for juvenile fish species, sea turtles and manatees. Also, within the reserve are fringing reefs, coral patches and coral heads which provide a refuge and food for marine animals.

Residents who directly depend on the reserve for their livelihood engage in commercial fishing, tour guiding and fly-fishing guides. Of the number of fresh produce extracted from the reserve, it is quite common to advertise the product originating from Punta Gorda to as far as Corozal in the north. The most popular species include groupers, snappers, grunts, and the barracuda. Many Belizeans from Punta Gorda frequent the reserve with the most popular activities being recreational fishing, snorkeling, and swimming. The reserve hosts over 500 vessels in and around the reserve annually engaging in numerous activities. It is also quite frequent for sailing vessels from Guatemala to stop in and enjoy safe harbor in the New Haven Lagoon or the Snake Cayes on their way to and from Placencia.





**Figure 1: Map of the protected areas managed and co-managed by the TIDE**

## **2.2 PHMR's Strategic Plan and Goals**

**The PHMR management strategy is based on five major goals:**

1. To protect the physical and biological resources of the Port Honduras Marine Reserve
2. To provide education and research
3. To preserve the value of the area for fisheries and other important genetic resources
4. To develop recreational and tourism services that will enhance the economic and social benefits of the area without causing environmental damage
5. To strive for sustainable financing

## **2.3 Zoning Plan and Regulations**

Three zones were established for the purpose of the regulation and control of the reserve:

### **1. General Use Zone (95% of the Reserve)**

Established to provide opportunities for uses and activities (e.g. fishing for conch, lobster, and finfish) under a stringent monitoring scheme.

### **2. Conservation Zone (4% of the Reserve)**

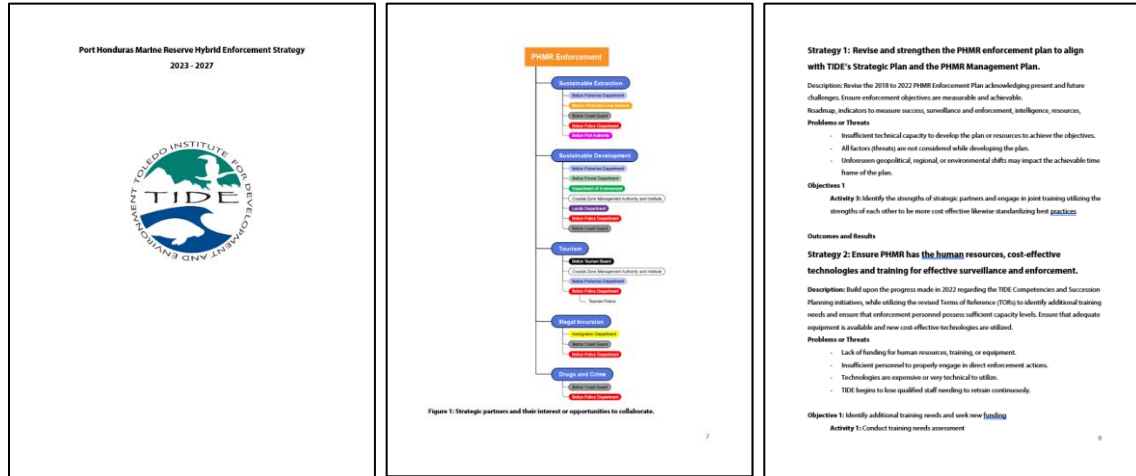
Established to provide an area free from commercial fishing to prevent overexploitation of fishery stock, provide an undisturbed area for recruitment of species, and enhance the value of the area for recreational and tourism activities. These areas are located 0.805-kilometers (half a mile) radius around Wildcane Caye and 0.805-kilometers (half a mile) radius around East, West, and South Snake Cayes.

### **3. Preservation Zone (1% of the Reserve)**

Established to provide areas within the marine reserve that are reserved in an entirely natural state and to protect areas of particularly fragile habitat or with threatened or rare species. Neither fishing nor recreation are permitted in this area. This area is located 0.805-kilometers (half a mile) radius around Middle Snake Caye.

### 3.0 PHMR Activities Accomplished in 2023

Through a MAR Fund project under the Belize Marine Fund, TIDE was able to develop a Hybrid Enforcement Strategy which seeks to incorporate new technologies into traditional methods of enforcement leveraging the strengths of both.



**Figure 2: Showing excerpts from the Hybrid Enforcement Strategy**

This strategy was developed along with personnel from the Belize Coast Guard and the Belize Fisheries Department who work directly with the rangers at Port Honduras. The team identified 6 major strategies after reviewing the PHMR Management Plan, and a past Fisheries Enforcement Strategy. These include:

1. 1. Revise and strengthen the PHMR enforcement plan to align with TIDE’s Strategic Plan and the PHMR Management Plan.
2. Ensure PHMR has the human resources, cost-effective technologies and training for effective surveillance and enforcement.
3. Strengthen collaborative enforcement partnerships against illegal activities both within and outside PHMR.
4. Strengthen the capacity of the enforcement team to properly document and report on enforcement actions to improve prosecution success.
5. Strengthen collaboration towards more effective control of transboundary incursions.
6. Strengthen implementation of tourism regulations through collaboration with BTB and the tourism police.

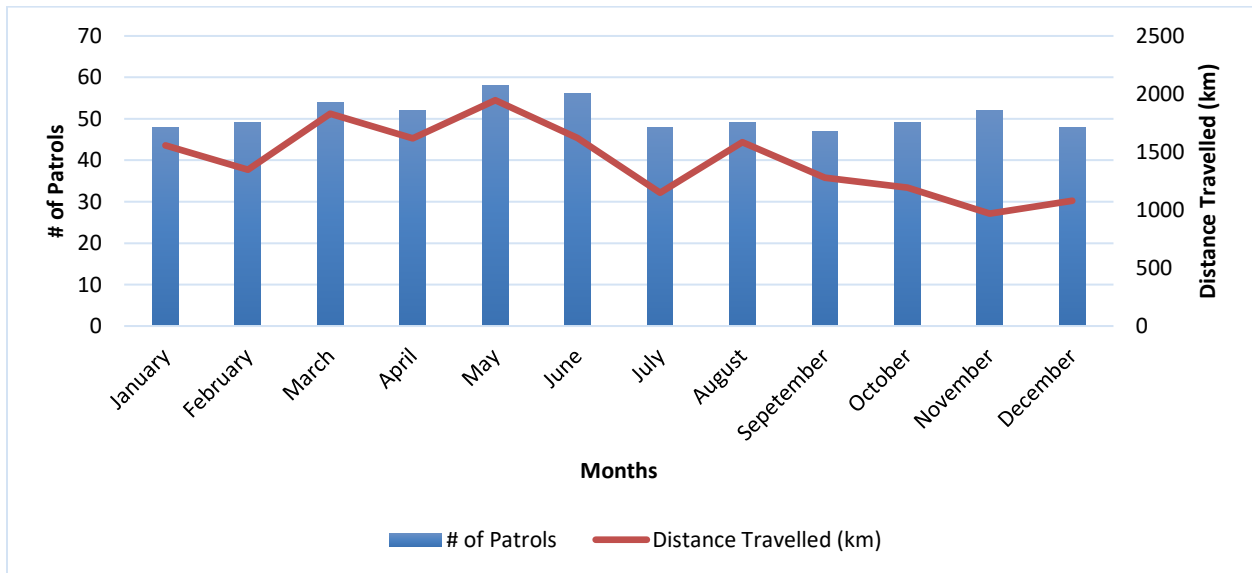
Following the development of this strategy, TIDE will develop an Enforcement Plan which will focus on achieving these objectives to safeguard the thriving ecosystem of PHMR, ensuring it continues to offer valuable services and resources to benefit Belizeans, achieved through the prevention, deterrence, and elimination of unlawful activities.

### 3.1 Patrols and Surveillance

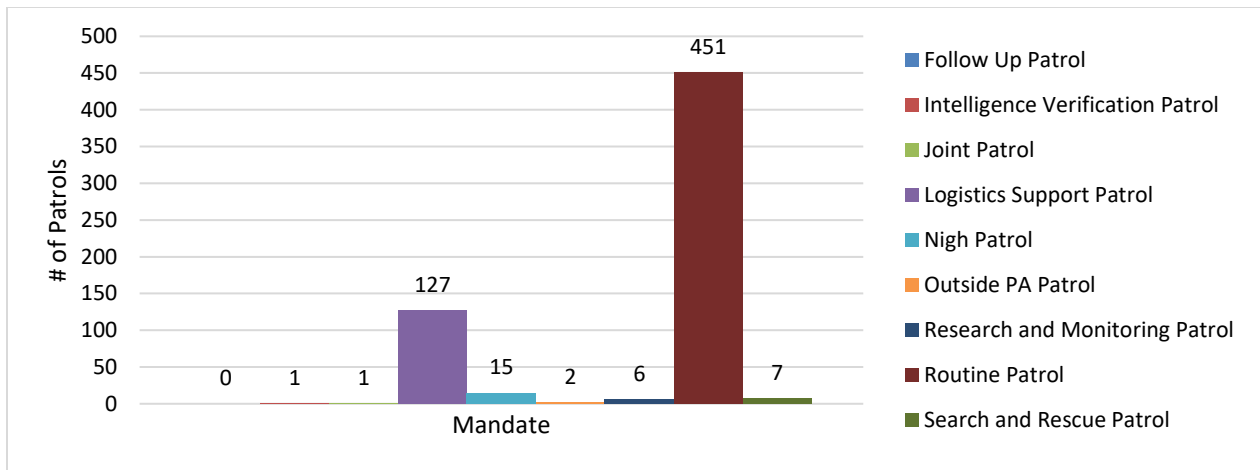
A total of 610 patrols were conducted for the period January 2023 to December 2023. The rangers travelled ~17,171km and averaged ~1431km per month. This totaled ~1173 hrs. at sea patrolling with an average of ~98 hrs. per month. This was done by consuming ~3259 gallons which averaged ~62 gallons per week.



**Figure 3: Showing the Enforcement Team interacting with a vessel near Punta Gorda**

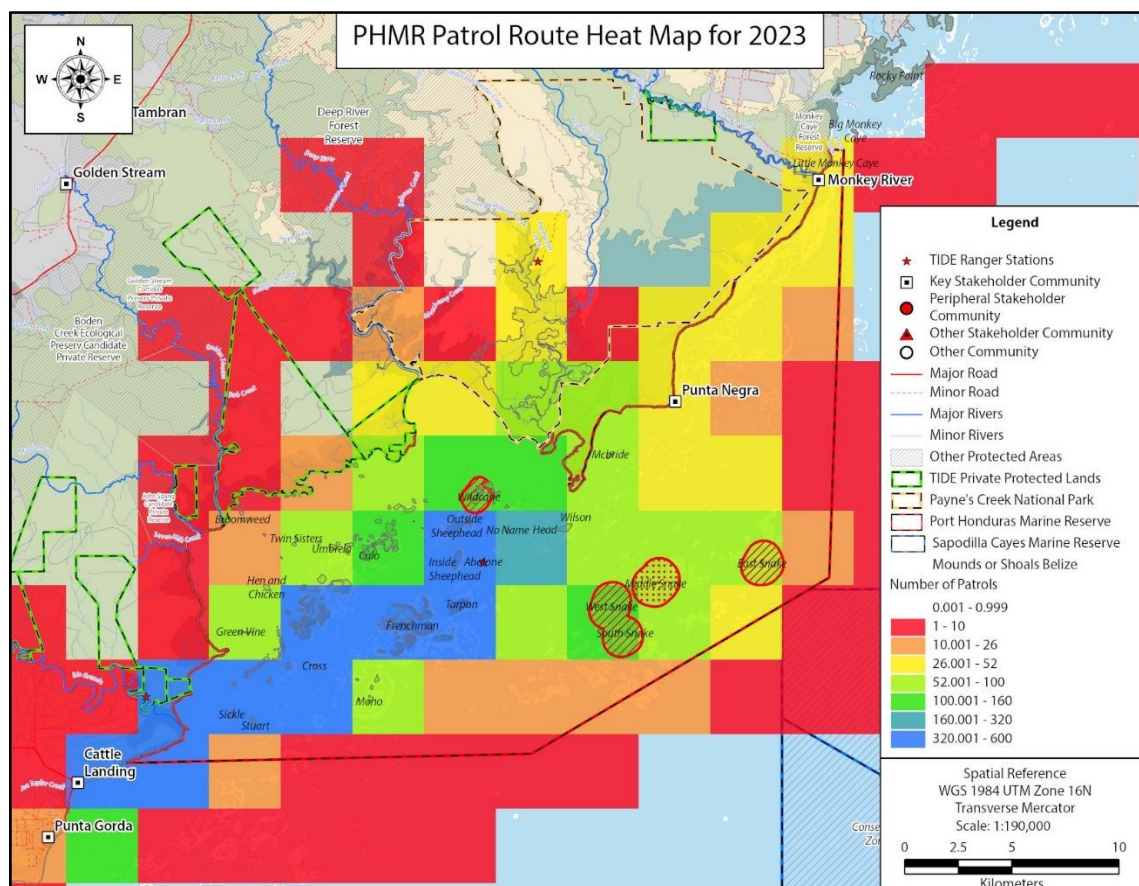


**Figure 4: Showing the number of patrols and distance travelled (km) by month in 2023**



**Figure 5: Showing patrols by mandate for 2023**

An average of ~51 patrols were conducted each month focusing on the conservation and preservation zones around the Snake Cayes and the most eastern islands which are the primary habitats for conch and lobster. This number was an increase in comparison to the previous year. Other priority areas included the coastline leading



**Figure 6: Showing a Patrol Heat Map showing where patrols were focused in 2023**

up to Monkey River Village, the river mouths which empty into PHMR and the conservation zone around Wildcane Caye.

Following the development of the new Hybrid Enforcement Strategy and capacity building in the use of drones, the team has been effectively utilizing drones during their patrols, which enables them to extend their visibility to distant critical zones such as conservation areas, with ease. They have also been deploying the underwater drone to look for any unlawful fishing nets or ghost nets. By the end of the project in August 2023, a total of 12 aerial drone patrols have been conducted (that are each over 1km and five minutes in length). Mostly these have been done from Abalone Caye ranger station to view the surrounding area for vessels however two patrols were conducted to West Snake Caye Conservation Zone which were over 10km. Overall, the aerial drone has travelled 60.9km which is the equivalent of 11 gallons of fuel or \$143 saved to date (based on the average fuel consumption of the vessel being 5.5km/gallon).



***Figure 7: Showing the Enforcement Team observing a vessel using the Drone***

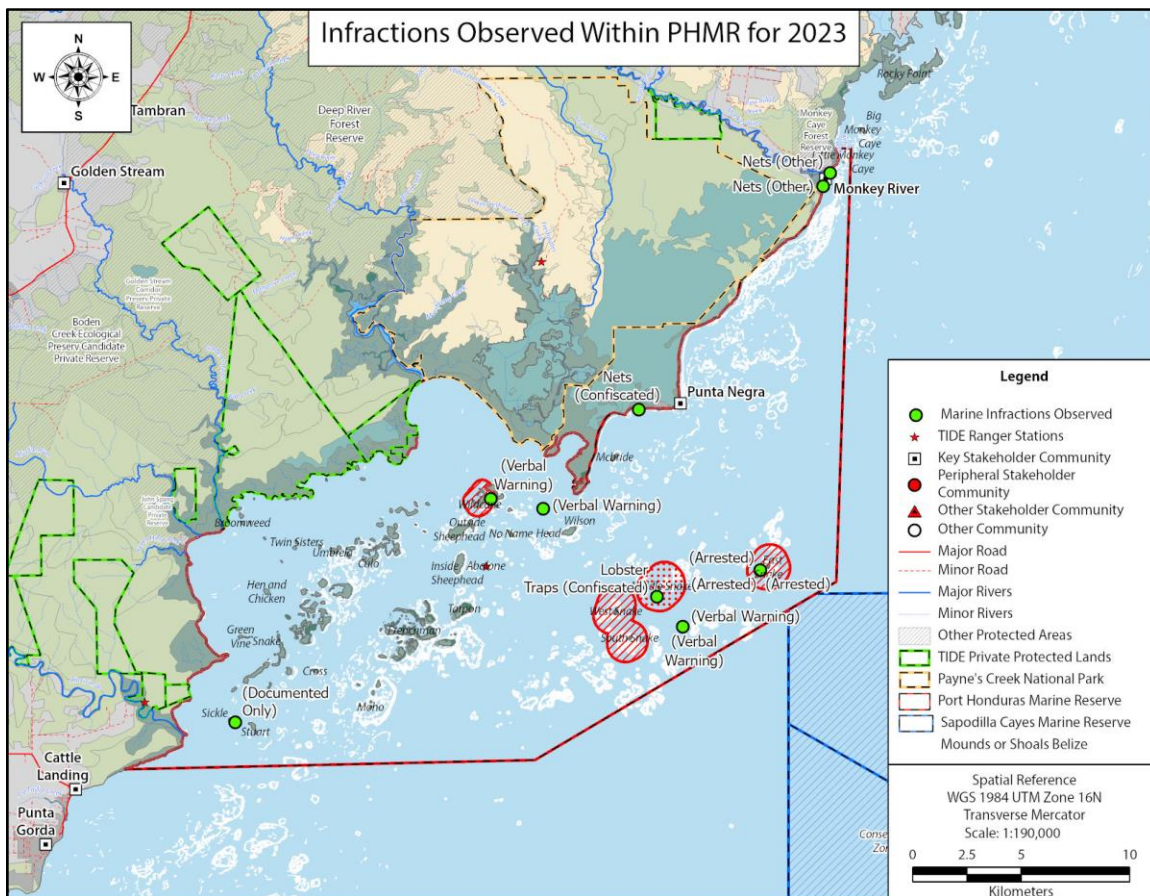
So far, the systems are not in place to track underwater drone patrols, which the rangers have been doing alongside patrols in the vessel, however by using the underwater drone the team was able to locate and remove one lobster shade that was deployed within the Middle Snake Caye conservation zone and therefore illegally set. They were also able to locate one lobster shade which seems to have damaged corals while it was set.



**Figure 8: Showing a lobster shade which may have damaged a coral when it was deployed**

### 3.2 Patrol Infractions for 2023

The patrols in PHMR yielded 4 verbal warnings, 3 gill nets and 1 out of season lobster trap was removed from within the reserve. 3 Individuals were also arrested during a night patrol within the conservation zone around East



**Figure 9: Showing infractions within PHMR for 2023**

Snake Caye . Overall they were levied charges for “Commercial Fishing in conservation Zone IV”, contrary to Section 14 Fisheries Resources (Sapodilla Cayes Marine Reserve) Regulation of 2020 read with Section 15 (2) (a) of the Fisheries Resources Act, No 7 of 2020 and "fishing without a valid boat license to fish" contrary to section 34 (1) of the fisheries act chapter 210 of the subsidiary laws of Belize revised edition 2003, read along with section 15 (2) (a) of the fisheries resources act, No 7 of 2020.” The total fines amounted to \$4,020 for fishing offences for 2 individuals and the third individual was further detained pending charges for falsifying social security documents. The outcome for those charges was not received. Additionally, the vessel Less, the engine and its contents were forfeited to the Government of Belize.



**Figure 10: Showing the vessel Less which was encountered near East Snake Caye**

### **3.3 Advisory Committee Meetings**

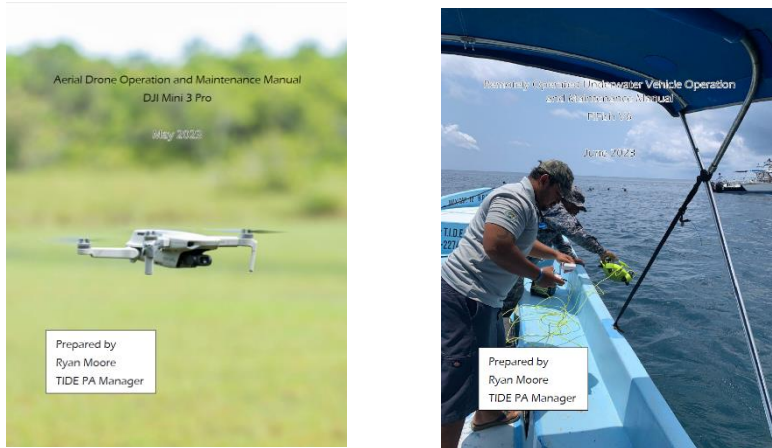
On April 13, 2023, the meeting was held with attendance from most members except Ms. Eloydia Cuevas from Monkey River Village Council and Mr. German Lopez from the Forest. The highlight of this meeting was the analysis of the Fish market survey data which was collected under the EU project during 2017 – 2020. Katie King-Smith, TIDE Intern, gave a brief summary of the data which culminated her work, which also included market visits to sensitize fishers who participated in the survey. Her work was guided by meetings held with Mr. Roy Polonio who has been interested in this topic for quite some time.



### 3.4 Maintenance of Patrol Equipment

The upkeep of the patrol equipment such as the regular cleaning of the patrol vessel, and regular servicing of the outboard engine (engine oil, oil filter change, gear oil change, freshwater wash, and re-greasing) were done by rangers; major repairs and any technical problems were done by a mechanic in Punta Gorda Town. To improve the capacity of rangers a session was held with the mechanic which also standardized practices in February. This was done for the SCMR rangers however the PHMR rangers also benefitted from the training.

In 2023, two manuals were developed for the maintenance and operation of the underwater and the aerial drone.



**Figure 11: Showing the Aerial and Underwater Drone Manuals cover page**

### 3.5 Infrastructure Maintenance



**Figure 12: Rangers and the Belize Coast Guard personnel working to refurbish the Dock.**

The upkeep of the ranger station was done by the rangers and personnel from the Belize Coast Guard (BCG) stationed at PHMR. Additionally, the dock and steps were refurbished through a combined effort. I would like to

personally Mr. Aaron Garbutt who I believe in 2023 took on many initiatives. The head ranger Edwin Cabrera and rangers Byron Usher and Mark Jacob were also instrumental in their efforts in these activities as well.



**Figure 13: Showing rangers from TPPL assisting in the installation of signs at West Snake Caye**

As a part of the MARFund project, 3 signs were developed by the manager which were later installed at Abalone Caye and West Snake Caye. The signs were to be installed at the Joe Taylor marina however currently there is a proposed bridge which would impact the location of the sign so it will be installed after that bridge is completed.



**Figure 14: Ranger Aaron Garbutt working on the front steps**



**Figure 15: Showing the new wastewater treatment system**

Additionally, with funds from the Protected Areas Conservation Trust (PACT), we were able to refurbish our wastewater treatment facilities. These systems ensure that the proper treatment of wastewater occurs before it is released into the marine space. Our visitors and guests at Abalone Caye also benefit significantly from having these modern amenities centrally located in the marine reserve.

### **3.6 Trainings Accomplished by PHMR Enforcement Staff**

Several training sessions occurred in February 2023 focusing on SMART, Engine Maintenance, Fisheries Regulations, Emergency First Responder Training, Navigation and Self Defense. These sessions were led by the PHMR Manager, the Belize Coast Guard, Belize Fisheries Department, and the local Red Cross.



**Figure 16: Showing rangers attending training sessions at TIDE**

In addition to these trainings through a MAR Fund Project under the Belize Marine Fund, rangers were trained to operate drones and scuba dive in order to implement a Hybrid Enforcement Strategy which was developed also as part of this project.



**Figure 17: Showing rangers being trained to operate underwater drone and conducting dive training**

### 3.7 Training needs and accomplishments for PHMR enforcement staff

	<b>Needed Trainings</b>	<b>Plans</b>
1.	Engine Maintenance Training	Continuous, occurred in February 2023
2.	SMART Training	Continuous, occurred in February 2023
3.	Fisheries Regulations Training (continuous)	Continuous, occurred in February 2023
4.	Navigation Training	Occurred in February 2023
5.	Arrest Techniques Training (practical)	Occurred in February 2023
6.	PADI Scuba Diver Training	Occurred in 1 <sup>st</sup> half of 2023
7.	Special Constable Training	Postponed, scheduled for March 2024
8.	Underwater Drone Training	Occurred in March 2023
9.	Conflict Resolution Training	Occurred in January 2023

**Table 3: Showing training needs for PHMR Management Staff**

Although numerous trainings were undertaken in 2023, it is important for the rangers to be continuously trained to ensure that they are operating at the highest levels and their capacities are continuously enhanced.

### 3.8 Partnerships

The PHMR staff continue to work with local and partner organizations, these partners include the Fisheries Department, the Belize Coast Guard, the Police Department, the Belize Defense Force and the Tour Guide and Fishermen Associations from the buffer communities of the reserve.

This year hosted an exchange with the Bonefish and Tarpon Trust in PHMR whereby the Vice President for Conservation and Public Policy was able to discuss potential partnerships with TIDE to secure the conservation of sports fishing species. Although nothing has yet to come to fruition, TIDE is open to hosting these visits in order to ensure that the species we work to protect are advocated for on the international stage.



**Figure 18: Showing TIDE personnel and Bonefish and Tarpon Trust personnel meeting at Abalone Caye**



**Figure 19: Showing BCG personnel conducting a site visit at PHMR**

In the 2<sup>nd</sup> half of 2023, TIDE hosted Commander Monima from the Belize Coast Guard who will head the new operations base in Big Creek. He conducted a site visit at Port Honduras and Abalone Caye whereby he was able to inspect the accommodations of the BCG personnel stationed there. He, on behalf of the Belize Coast Guard, has committed to continue to support this important partnership ensuring the continued presence of BCG personnel benefitting the stakeholders of PHMR.

### 3.9 Management Effectiveness



**Figure 20: Showing PHMR Managers and Stakeholders engaging in the MEE Assessment**

TIDE conducted a Management Effectiveness Assessment through the support of the IUCN lead KFW project titled, "Linking the Central American Landscape." In this exercise, numerous stakeholders were identified who contribute directly or indirectly to the management of the PHMR. The overall score attained was 69.1% just a 0.03% reduction from the previous year which is classified as "Good" in the indicator scale. Through the lifetime of this project, TIDE has set the goal of being listed within the internationally renowned Green List. To achieve this TIDE will be engaging in numerous activities funded through this project targeting weaknesses identified through Management Effectiveness Assessments. Although TIDE has not yet implemented any of these activities, we hope to do so in the second quarter of 2024 through the signing of an MOU with IUCN.

### 3.10 Signing of Co-Management Agreement



**Figure 21: Showing TIDE Board Chairperson and Executive Director along with the CEO of the Ministry of Blue Economy signing the co-management agreement for PHMR and SCMR.**

In October of 2023, TIDE was able to sign the co-management agreement with the Ministry of Blue Economy for the Port Honduras Marine Reserve and the Sapodilla Cayes Marine Reserve. Through this official agreement, TIDE can continue the good work we had set out to do in 1997 along with bringing in under our arms and good guidance a new protected area.

## 4.0 Communications

There were multiple communications produced which highlighted our work with the use of Drones in enforcement and our rangers who were trained to conduct scuba diving. In addition to these videos, several Facebook posts highlighting the different fishing seasons and world environmental days were produced.



Rangers at TIDE need to be well trained in a variety of disciplines to carry out... Innovative Approaches in Belize's Conservation Organizations...

*Figure 22: Showing a few videos produced in 2023 highlighting our work at PHMR*

## 5.0 Erosion of Abalone Caye

### 5.1 Abalone Caye Erosion

Abalone Caye continues to suffer from erosion brought on by climate change. Unfortunately, no long term solution has been identified, and in 2023 the rangers continued to do their own landfilling with assistance from the Belize Coast Guard using conch shells.

In the second half of 2023, a barge used for landfilling was sighted traversing Port Honduras where we met with the person in charge who informed us that it would be possible to conduct an assessment for restoration at Abalone Caye. After a site visit with Mr. Magana, Mr. Chavarria and an engineer from the company, they assessed that Abalone Caye would require an investment of around \$300,000 which would also include some dredging within PHMR for the material. At this time, we do not foresee undertaking this activity.



*Figure 23: Rangers and BCG throwing conch shells to help with erosion at Abalone Caye*



## 5.2 Punta Ycacos Ranger Station



**Figure 24: Proposed Punta Ycacos Ranger Station**

In 2023, the owners of a well-known property at the point of Punta Ycacos reached out to Mr. Magana indicating that he had appreciated the presence of the rangers out at PHMR while he and his family vacationed there. He indicated that he was interested in donating the property to TIDE for use as a ranger station. Ms. Caroline Oliver, TIDE’s Program Director, indicated that for us to properly plan the refurbishing of the building TIDE would at a minimum require a plan and estimate. This activity was led by the manager who, through assistance from local contractors, came up with a figure near \$140,000 BZD. To note about the property is that it is approximately 14 acres in size and strategically located near a very active sea turtle nesting beach. It also boasts magnificent views of the conservation zones out at the Snake Cayes as well.

## 6.0 Community Education and Outreach

### 6.1 TIDE Environmental Clubs



**Figure 25: Showing outreach to clubs and radio show with club members**

TIDE's Environmental Clubs continue to be TIDE's focus for outreach in communities. These are used as mediums to share TIDE's work which includes topics such as fire management, mangrove, and reef importance. Club A total of two hundred fifty-three youth from 12 clubs in buffer communities participated in 45 clean-ups, Reef Week, TIDE Summer Camp, club games, 10 exchange visits, mangrove and coral sessions in 2023. A total of 35 meetings were held throughout the year with all active environmental clubs. Collaboration with other NGOs made further engagement possible for youth in these communities.

## 6.2 Environmental Clean-ups



**Figure 26: Showing some club members engaging in clean up in Punta Gorda**

There were 45 organized clean-ups within 12 communities in 2023. This resulted in a total of 350 bags of trash being removed and disposed of properly at the local landfills, whilst a few clubs repurposed some waste in their communities as flowerpots. Most of the waste was removed by the Trio Environmentalist Strikers followed by the Big Falls Eco-Warriors however we also had clean up sessions held by the scholarship students and summer camp participants.

## 6.3 Reef Week



**Figure 27: Showing radio show participation and a field visit with WWF Smart Coast Ambassadors**

Four environmental clubs and six coastal teams were engaged in Reef Week 2023 which focused on the theme "For Health, Wealth and Pleasure, Our Reef is a Treasure!" through community clean-ups, talk-shows, and one

sporting tournament coordinated with the Toledo Football Association. A total of 90 females participated in a U13 Soccer tournament which included 3 games for each team and sessions to learn about TIDE's work in Coral and Mangrove Protection. Reef Week activities and outreach sessions engaged the youth for three months on sensitization of mangroves and reefs as barriers to coastal protection. The ambassadors shared information about their clean-up and a field trip held in PHMR using Sunshine Raydio and PGTV, they had five (5) one hour talk shows.

#### **6.4 Summer Camp**



**Figure 28: Summer Camp engagement sessions in Punta Gorda**

TIDE's Annual Summer Camp of 2023 focused on the theme: "Uniting Community and Conservation for a Brighter Tomorrow!". Four Summer Camps took place in TIDE's buffer communities, with participation from 99 school children aged 10 – 13. Each camp took place over a period of one week, and Toledo Environmental Club leaders facilitated the camps in the communities of Punta Gorda, Eldridge, San Marcos, and Trio Village. A total of 15 facilitators, guided by TIDE's Education and Outreach Coordinator, ensured that all the camps were a great success. In addition to the educational and recreational activities organized, all campsites also participated in community clean-ups, during which a total of 18 bags of trash were removed from the environment and disposed of in their community landfill. TIDE's 2023 Summer Camp was made possible thanks to support from Mass Audubon.

## 6.5 Environmental Awareness Day



**Figure 29: Showing 25<sup>th</sup> Anniversary Environmental Display Competition**

Under the theme, “Uniting Community and Conservation for a Brighter Tomorrow!” TIDE The competition took place during TIDE’s anniversary celebrations in October, and participating classes and groups created 9 informative and interactive displays that showcased the theme. Belize Tourism Industry Association PG, Community Policing Unit and the Nature Conservancy-Raptor research were also present sharing their work in Toledo. During the event, an estimated 600 students and adults visited the booths, which included many students from St. Peter Claver School, Bethel SDA Primary, St. Benedict RC, PG Methodist and third and fourth form students from Julian Cho Technical High School.

## 6.6 Outreach to Fisherfolks

PHMR stakeholders were reached via one organized boat-to-boat session, phone calls and one on one house visits. Through these sessions, we were able to meet 58 commercial fisherfolk who customarily use the reserve for their livelihood. The house visits enabled one on one discussions with the fisherfolk and their families and focused on sharing regulations of the area and ways to improve the relationship with PHMR staff. Fisherfolks echoed the respect they receive from rangers and are glad to see rangers patrolling within the area. They hoped for more patrols at night and within the conservation zones of the reserve, but they understand the challenges associated with night patrols.



**Figure 30: Showing Outreach with fisherfolks during the opening of the Lobster Season**

## 7.0 Community Development

### 7.1 TIDE's Scholarship Program

For the new school year 2023-2024, the Education and Outreach Coordinator (Mr. Federico Caal) and Ishiamae Gomez, Receptionist, with the added responsibility of managing the scholarship students had engaged in primary school visits with the aim of recruiting new students to join TIDE's Scholarship Program. They visited six primary schools to recruit students from 5 target communities namely Cuxlin Ha, San Marcos, Indian Creek, Golden Steam, and Bella Vista. The reason for selecting these communities is that although they have been identified as buffer communities the students had not been benefitting from TIDE's Scholarship Program.

The program for the school year 2023-2024 had 11 students who received tuition scholarships, 8 who received uniforms and 49 students who received book scholarships (18 males and 31 females).

Students are enrolled in the following areas of study: Arts, Agriculture, Business, Hospitality Management, Industrial Technology, Science, and Tourism at six (6) different high schools namely: Belize Adventist College Corozal, George Town Technical, Independence, Julian Cho Technical, Providence and Toledo Community College. Below is a breakdown of the number of students for each form/year.

- 1st form - (22)
- 2nd form - (15)
- 3rd form - (6)
- 4th form - (6)

Since the Government of Belize offers a stipend of \$200.00 towards registration fees for first and second-form students, we assisted 11 first-form students with the balance for tuition.

From the previous cohort, seven (7) 4<sup>th</sup> Form students graduated in the school year 2022 – 2023. TIDE is grateful to Mass Audubon for their continued support of this program which supports families and youth throughout the Toledo District.



**Figure 31: Showing Head Ranger Edwin Cabrera presenting to scholarship students**

## 8.0 Research and Monitoring

Research and monitoring continue to be an integral part of the management effectiveness of the Port Honduras Marine Reserve (PHMR). Monitoring for the year 2023 included lobster surveys, conch surveys, sea cucumber surveys, coral health surveys, reef fish surveys, reef benthic habitat surveys and coral bleaching surveys. A detailed analysis of these surveys can be found in PHMR's Biological Report(s) for 2023.

Reintroduced in 2020 was the monitoring of Turtle Nests. This was led in the field by Mario Muschamp and rangers from the PCNP and TPPL teams. They monitored along the Punta Ycacos coastline up to Monkey River where they made frequent checks during routine patrols. For the 2023 turtle nesting season, there were ~10,841 eggs laid at 83 nesting sites. Of those ~7,7732 hatchlings emerged successfully or 71.3% of the total. ~2,457 eggs were infertile and ~313 eggs were damaged by roots. 13 nest sites were partially inundated with partial successes. 6 nest sites were completely predated and 1 site was partially predated. 4 of the total sites were predated by grey foxes and 3 sites by racoons.



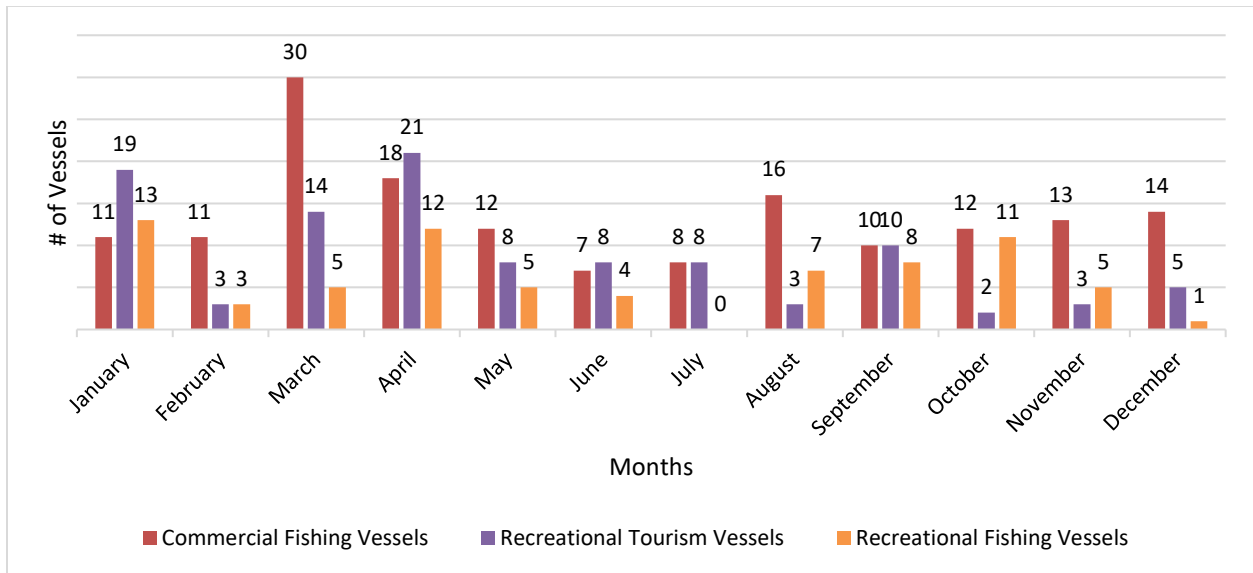
**Figure 32: Showing a screenshot of the dashboard used to present data to the public**

For more information since 2020 please visit the dashboard located at URL:

<https://tide-belize.maps.arcgis.com/apps/dashboards/1e5d6ac2189e456e85f2747e1f2c2165>

## 9.0 Commercial Fishing, Recreational Fishing and Tourism in PHMR

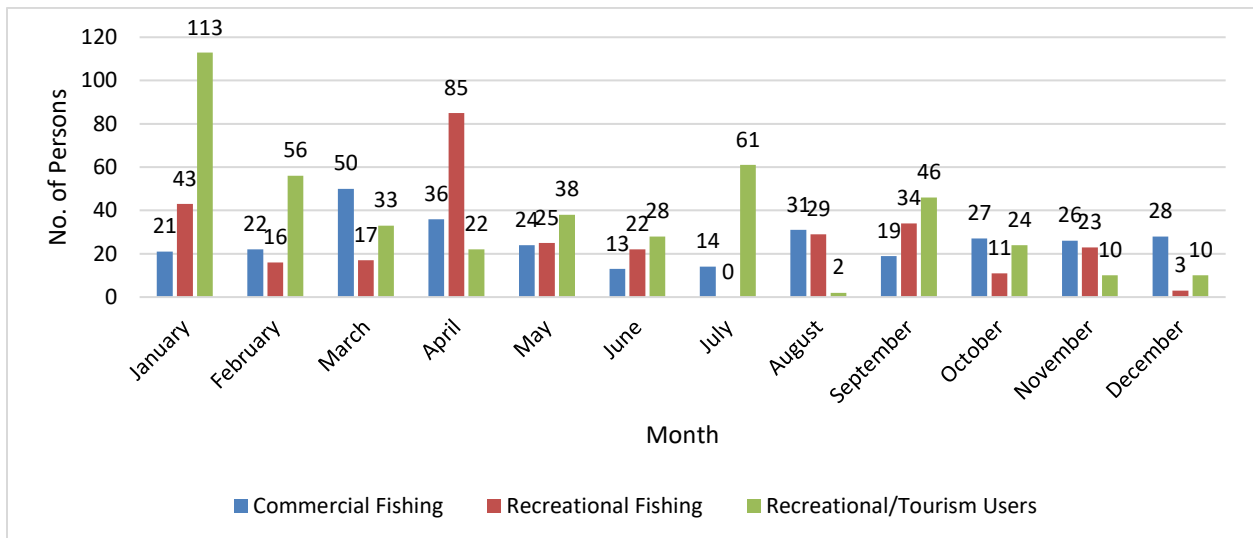
### 9.1 Vessels in PHMR



**Figure 33: Showing vessels sighted in PHMR for 2023**

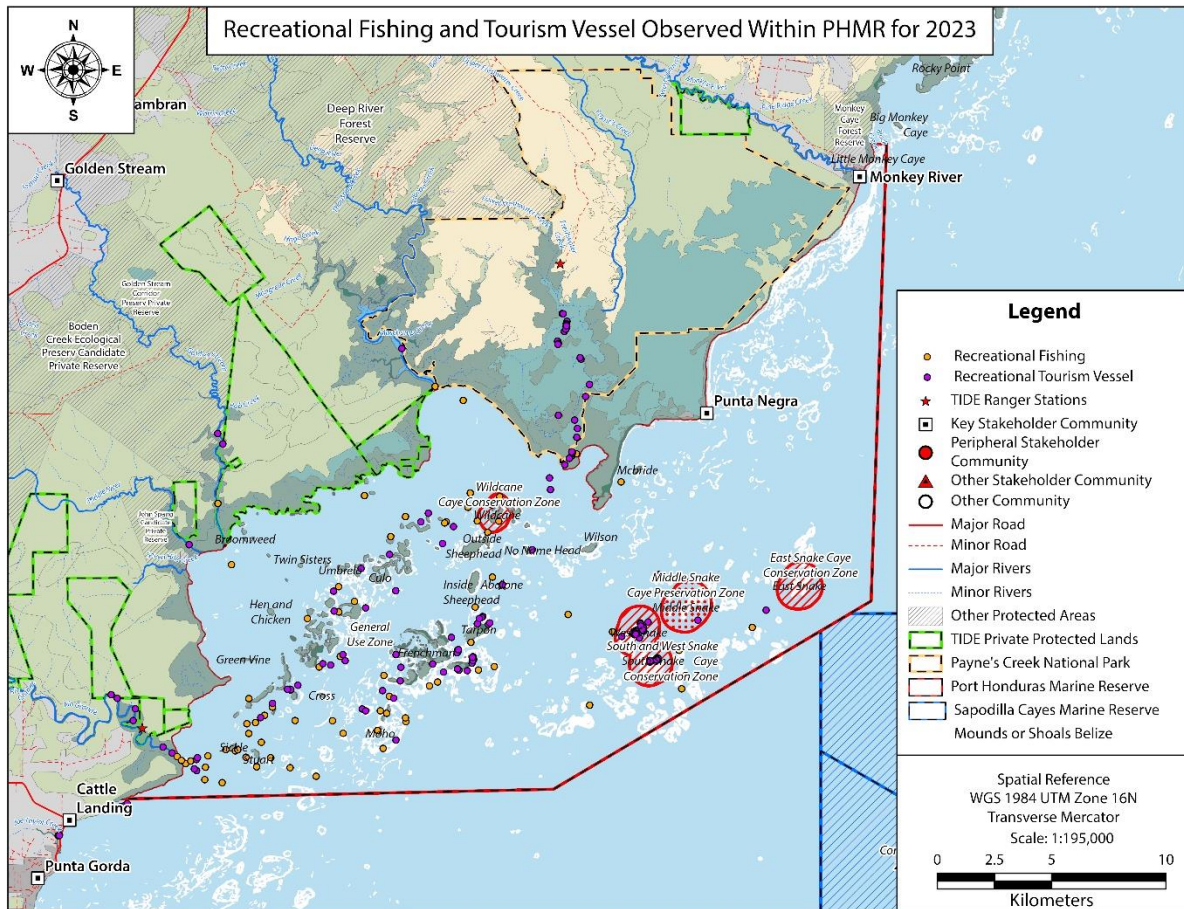
In 2023 the rangers through the Spatial Monitoring and Reporting Tool (SMART) logged over 444 vessels in the reserve an increase from the previous year. Of these vessels, 162 were commercial fishing vessels, 104 were recreational tourism vessels and 178 were recreational fishing vessels or other vessels either transiting the area or conducting other activities.

### 9.2 Commercial, Recreational and Tourism Users in PHMR



**Figure 34: Showing the resource users observed by month for 2023**

In 2023 TIDE Port Honduras Marine Reserve enforcement team, through SMART, logged 311 commercial fishers, 308 recreational fishers and 443 tourism users in the reserve (not counting the locals on the tourism vessels). It is important to note that the numbers which arose during Covid have now returned back to their traditional forms of employment showing a decrease in commercial fisherfolks and increases in tourism-related activity users.



**Figure 35: Showing Commercial fishing vessels in PHMR for 2023**

The map above shows the approximate location of commercial fishers within PHMR (*The GPS coordinates are taken at the location of the patrol vessel unless the rangers are directly interacting with the commercial fishers*).

- |                 |                 |                    |
|-----------------|-----------------|--------------------|
| Akeem Williams  | Ashton Martin   | George Ramirez     |
| Alex Leonardo   | Oswaldo Rax     | George Ramirez     |
| Alex Williams   | Avelardo Cuevas | Guillermo Alvarado |
| Allan Buchub    | Byron Paiz      | Guillermo Casimero |
| Alonzo Raymundo | Carlos Ramirez  | Gerson Coleman     |
| Angel Paiz      | Dervi Williams  | Jason Garbutt      |
| Angel Aleman    | Felix Arzu      | Joash Ramirez      |
| Anthony Coleman | George Alford   | Joel Casimiro      |

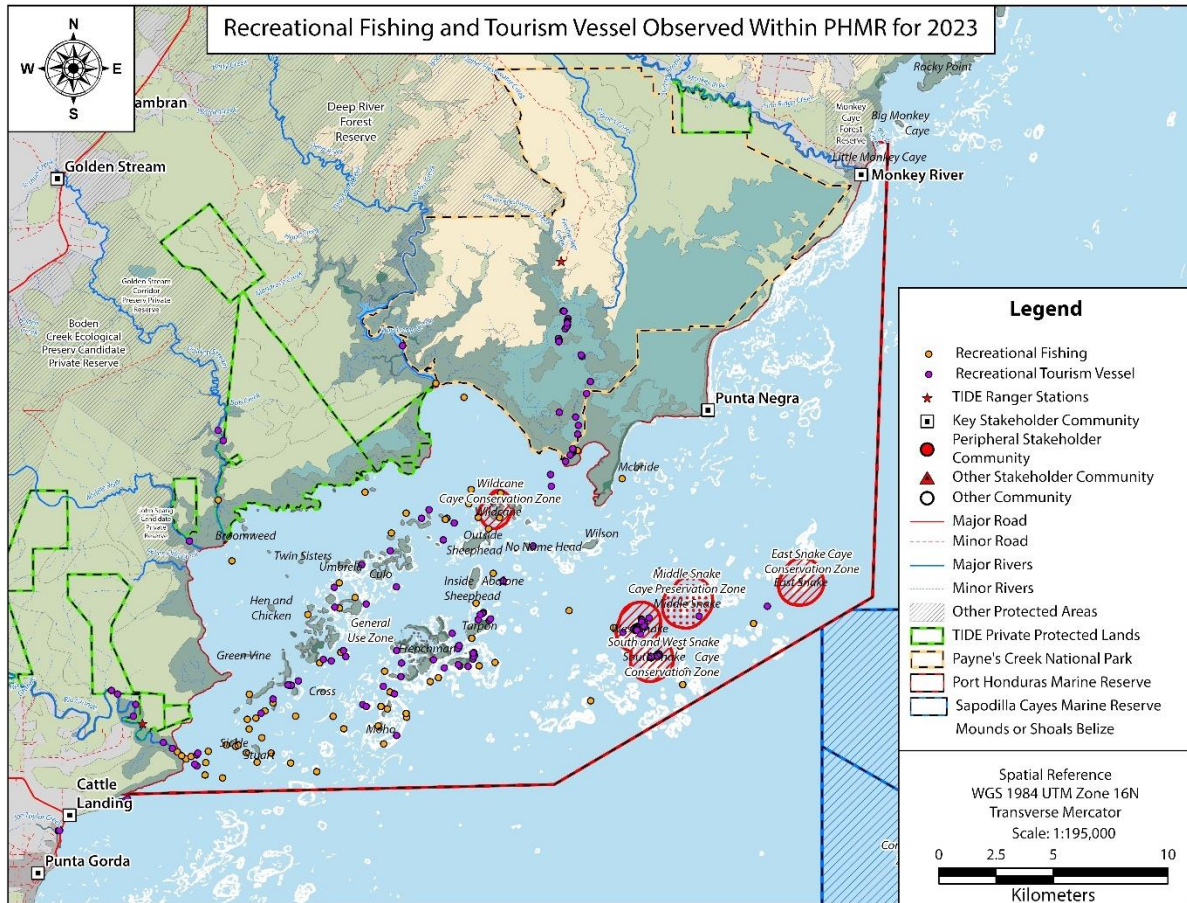


Jose Vejos	Narcisio Martinez	Ray Arzu
Justin Garbutt	Olga Rax	Ray Jacob
Leslie Williams	Oliver Garbutt Sr.	Ruben Paiz
Marcos Zuniga	Oliver Garbutt Jr.	Walton Parham
Milton Garbutt	Oliver Rojas	Wilfred Dennis Usher
Minor Parez	Percival Gordon	Winston Thompson
Mynor Melgar	Peter Williams	Yonardo Cus

**Table 6: Showing commercial fishers sighted in PHMR for 2023**

## 10.0 Recreational Tourist Visitation to PHMR

Overall, the Port Honduras Marine Reserve saw ~2550 foreign visitors in 2023, this number was derived through ticket sales. This represents a significant increase over previous years due to a significant number arriving due to TIDE Tour's Ridge to Reef program.



**Figure 36: Map Showing Recreational and Tourism vessels sighted in the reserve by Rangers and logged using SMART**

The map above shows that most of the reserve is being used for both recreational fishing and tourism related activities. Areas north of the reserve show little to no activity for these types of vessels, although it must be noted that there are fewer patrols in these areas and many of these vessels are coming from PG and it would not be economically feasible to travel that far. From the map, it can be shown that multiple recreational fishing vessels can be seen around the snake cays in the conservation zone although no fishing is allowed. It must be noted that although these vessels are primarily conducting recreational fishing, it is customary for the individuals to also stop by at the cays to either have lunch, snorkel and/or swim as a part of their daily visit.

## 11.0 The TIDE Team

### 11.1 Board of Directors

Mr. Gabriel Roches (Chairman)	Retired Public Officer (Public Health)
Mr. Jeremy Enriquez (Director)	National & International Relations
Ms. Nancy JudyAnn Gomez	Business Representative
Dr. Jay Coombs (Director)	Academia
Mrs. Marie Aleman (Vice-Chair)	Entrepreneur/Community Representative
Ms. Eloydia Cuevas (Director)	PCNP Advisory Council Representative
Mr. Alex Leonardo (Director)	PHMR Advisory Council Representative
Mrs. Asad Magana (Secretary)	Executive Director (Ex-Officio)

### 11.2 TIDE Office Staff

#### 11.2.1 Management Staff

Asad Magana	Executive Director
Leonardo Chavarria	Development Director
Stephene Supaul	Operations Manager
Caroline Oliver	Program Manager
Ryan Moore	Protected Areas Manager
Mario Muschamp	Terrestrial Manager
Federico Caal	Environmental Education Officer/ Community Development Officer
Cecillia Guerrero	Project Manager

#### 11.2.2 Administrative Staff

Darius Avila	Accountant
Kimberly Lawrence	Financial Administrator
Alaine Noralez	Accounts Clerk
Ishiamae Gomez	Front Desk
Paul Etienne	Information Technology Officer

### 11.3 PHMR Advisory Committee

Mr. Alex Leonardo	Association of Tour Guides in Toledo
Mr. Armando Ramirez	Rio Grande Fisherman Cooperative
Hon. Michael Espat	Area Representative
Mrs. Paula Jacobs	Chairperson Punta Negra Village Council
Mr. Roy Polonio	University of Belize-Toledo Campus
Mr. Lyndon Rodney/Victor Vasquez	Fisheries Department-PG
Mr. Charles Selgado	PG Town Council
Mr. Eloydia Cuevas	Monkey River Village Council
Mr. Asad Magana	Executive Director
Mr. Mario Muschamp	Terrestrial Manager
Mr. Ryan Moore	Marine Manager

### 11.4 TIDE Private Protected Lands Staff

George Teul	Ranger
Reymundo Chen	Ranger
Jose Hernandez	Ranger
Lenard Teul	Ranger

### 11.5 Payne's Creek National Park Staff

Mario Muschamp	Terrestrial Manager
Leonard Williams	Head Ranger
Augustin Sho	Ranger
Octavio Caal	Ranger
<b>Norman A. Williams</b>	<b>March 2023, Rest in Piece</b>

### 11.6 Sapodilla Cayes Marine Reserve

Evander Paquiul	Site Manager
John Aranda	Head Ranger
Alex Young	Ranger
Renon Baizar	Ranger
Erwin Noralez	Ranger

## **12.0 Conclusion and Recommendations:**

In 2023, PHMR experienced a successful year, achieving over 100% (600) of planned patrols with a total of 610 patrols completed. This marked a slight increase from the previous year's 568 patrols, primarily due to heightened fuel costs driven by external factors throughout most of the year. To enhance efficiency, the team continued to optimize fuel consumption, averaging approximately 62 gallons per week. Notably, coverage of the reserve remained robust, with at least 70% of the area receiving at least one patrol per week.

The implementation of a Hybrid Enforcement Strategy, supported by funding from MARFund, facilitated further advancements in drone utilization. Building upon previous efforts, the acquisition of a new aerial and underwater drone enabled continued progress. The manager developed operation and maintenance manuals and provided comprehensive training to all rangers in drone operation.

As we look ahead, we anticipate further implementation of additional components of the strategy to modernize our methods in response to an evolving environment. We also hope that others will benefit from this valuable resource, which can serve as a guide for their enforcement endeavors.

### **Review of the objective set out in 2022**

**Planned Activity:** Develop a 6-month training/orientation plan to rapidly increase the effectiveness of new rangers.

**Summary:** Although the training plan was not developed, TIDE has identified funding through BFSF to conduct a review throughout the MPA Network which includes PHMR. This objective has also been included in the Hybrid Enforcement Strategy.

**Planned Objective:** Develop an Enforcement Strategy and an Enforcement Plan.

**Summary:** This activity was partially accomplished with the development of the strategy, however, we have yet to develop the plan.

**Planned Objective:** Update the SMART Report to include temporal analysis and the predictive patrol feature of SMART 7.

**Summary:** We have reviewed this feature of SMART 7, however, we believe that in its current form, it will not improve upon our methods. We will continue to keep informed if any improvements occur.

**Planned Objective:** Increase Management Effectiveness guided by the gaps identified in the previous assessment.

**Summary:** We have decreased negligibly, however, we have yet to implement any of the activities under an IUCN project which will tremendously boost our score.

**Planned Objective:** Incorporate research and monitoring activities where possible to increase the capacity of rangers.

**Summary:** Aaron and Mark received dive training up to Advance Open Water and are ready to be trained in the methods, Edwin continues to assist the research team as a diver and captain.

**Planned Objective:** Continue to build staff capacity and introduce new technology to be more cost effective in the management of the protected areas.

Summary: A total of 12 aerial drone patrols have been conducted (that are each over 1km and five minutes in length) travelling a total of 60.9km which is the equivalent of 11 gallons of fuel or \$143 saved to date (based on the average fuel consumption of the vessel being 5.5km/gallon).

Planned Objective: Increase the use of signage around the reserve and produce and distribute a brochure to ensure that stakeholders are knowledgeable of the rules of the park.

Summary: Partially accomplished with signs installed at West Snake Caye and Abalone Caye. No brochures were produced and distributed. A design exists however we lack the funding to produce them.

Planned Objective: Advocate for the introduction of regulations for recreational fishers.

Summary: As a part of the Blue Bonds agreement CZMAI have begun the revision of the sports fishing regulations which TIDE has participated in at all events held in Punta Gorda. We anticipate that within the coming year, there shall be a new regulation drafted.

Planned Objective: Continue the development of Managed Access Implementation at the national scale.

Summary: Unfortunately, there have been no new discussions at the national scale regarding managed access.

The team remains committed to continuing the advancement of these core objectives and those set out within the Hybrid Enforcement Strategy.

TIDE and the team at Port Honduras Marine Reserve remain committed to ensuring that the ecosystems and the services provided to the numerous stakeholders are maintained for years to come. We would like to express our deepest gratitude to all those who have made the management of PHMR a success in 2023.

## 13.0 Appendix

### Appendix 1: Financials

**Toledo Institute for Development and Environment  
Port Honduras Marine Reserve  
Income & Expense Report  
January through December 2023**

Ordinary Income/Expense	
Income	
4001 · Grants	470,000.00
<b>Total Income</b>	<b><u>470,000.00</u></b>
Expense	
3001 · Equipment	24,426.77
3005 · Buildings	
5001 · Salaries/Wages & Benefits	212,329.05
5002 · Travel & Transportation	288.37
5003 · Cleaning & Sanitation	475.60
5006 · Insurance, Licensing & Permits	4,300.37
5007 · Postage & Delivery	218.35
5008 · Professional Fees	9,145.00
5009 · Public Awareness & Env. Ed.	16,258.37
5010 · Repairs and Maintenance	25,730.83
5011 · Supplies	9,592.45
5012 · Training	13,558.53
5014 · Board/Advisory Board Expense	2,123.40
5015 · Utilities	2,929.68
5016 · Telephone, Comm. & Internet	5,320.13
5017 · Bank Charges	368.75
5019 · Reserves & Parks Improvement	773.15
5020 · Net Working	13,053.87
5025 · Institutional Strengthening &	8,215.48
5026 · Research & Monitoring	28,805.45
5027 · Recruitment	356.13
5029 · TIDE Scholarship program	11,255.58
5035 · Surveillance, Patrol & Enforce	48,504.30
5036 · Disaster Preparedness & Management	588.00
5037 · Community Development	19,673.78
5038 · Development & Fundraising	8,045.32
<b>Total Expense</b>	<b><u>466,336.71</u></b>
<b>Net Ordinary Income</b>	<b><u>3,663.29</u></b>
<b>Net Suplus(Excess)</b>	<b><u>3,663.29</u></b>