

# **The Toledo Institute for Development and Environment (TIDE): 12 Years of Experience in Enhancing Community Participation in the Establishment and Management of Protected Areas in Southern Belize**

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## **ABSTRACT**

The Toledo Institute for Development and Environment (TIDE) was established in 1997, in Punta Gorda, southern Belize, as a grassroots initiative in response to growing concerns over the slaughter of manatees, illegal fishing and degradation of the marine environment. Since its inception, TIDE has grown in strength, gaining both national and international recognition. An early success was the establishment of the Port Honduras Marine Reserve (PHMR) in January 2000 and a co-management agreement with the Fisheries Department. The management of PHMR has taken an ecosystem-based approach, relying heavily on the support and participation of community members. All PHMR staff is employed directly from stakeholder communities and in numerous cases they are ex-fishers of PHMR, converted to conservation through many of TIDE's education and outreach campaigns. No Take Zones, covering 5% of the total reserve area, were established at the inception of the marine reserve and provide both a refuge to commercially important species, such as the spiny lobster and queen conch, and help to minimize human impacts on coral reefs, seagrass beds and mangroves. These ecosystems and populations are regularly monitored by TIDE with assistance from community researchers. Through continued education and outreach campaigns, such as the Community Stewards Program, TIDE has built up local support and guardianship for the marine reserve and through increased surveillance and patrols has provided protection to marine habitats and populations. Nevertheless, improvements can be made. The current paper will discuss the background of TIDE and PHMR, highlight some of TIDE's successes and discuss lessons learned and areas for improvement.

KEY WORDS: Marine Protected Area, Gulf of Honduras, Caribbean

# **El Instituto de Toledo para el Desarrollo y Ambiente (TIDE): 12 Años de Experiencia en la Mejora de la Participación Comunitaria en la Creación y Gestión de Áreas Protegidas en el sur de Belice**

El Instituto de Toledo para Desarrollo y Ambiente (TIDE) fue creado en 1997, en Punta Gorda, al sur de Belice, como una iniciativa comunitaria en respuesta a la creciente preocupación por la matanza de manatíes, pesca ilegal y la degradación del ambiente marino. Desde su creación, TIDE ha crecido en fuerza, ganando reconocimiento nacional e internacional. Uno de los primeros logros de la organización fue el establecimiento de la Reserva Marina Golfo de Honduras (RMGH) en enero del 2000 y un acuerdo de co-manejo con el Departamento de Pescadería. El manejo de la RMGH está enfocado en ecosistemas, dependiendo grandemente del apoyo y participación de los miembros de la comunidad. Todo personal de la RMGH es contratado directamente por comunidades interesadas y en numerosos casos estos empleados son ex-pescadores de RMGH, convertidos a la conservación a través de campañas educativas y alcance comunitario. Zonas de No Extracción, las cuales cubren un 5% del área total de reserva fueron establecidas al inicio de la gestión y proveen un refugio para especies comercialmente importantes, como la langosta y el caracol reina, ayudando a minimizar los impactos humanos sobre los arrecifes de coral, praderas marinas y manglares. Estos ecosistemas y poblaciones son regularmente monitoreados por TIDE con la asistencia de investigadores comunitarios. Mediante educación y campañas de divulgación, como el Programa Comunitario de Custodios Ambientalistas, TIDE ha reforzado apoyo local y defensa para la reserva marina y a través del aumento en patrullaje y vigilancia proveyendo protección a los hábitats y poblaciones marinas. Sin embargo, se pueden hacer mejoras. El presente documento discutirá el fondo de TIDE y PHMR, destacar algunos de los éxitos de TIDE y discutir las lecciones aprendidas y áreas de mejora.

PALABRAS CLAVES: Áreas Marinas Protegidas, el Golfo de Honduras, el Caribe

## **TIDE — Amélioration de la Conservation Marine par la Participation de Communauté**

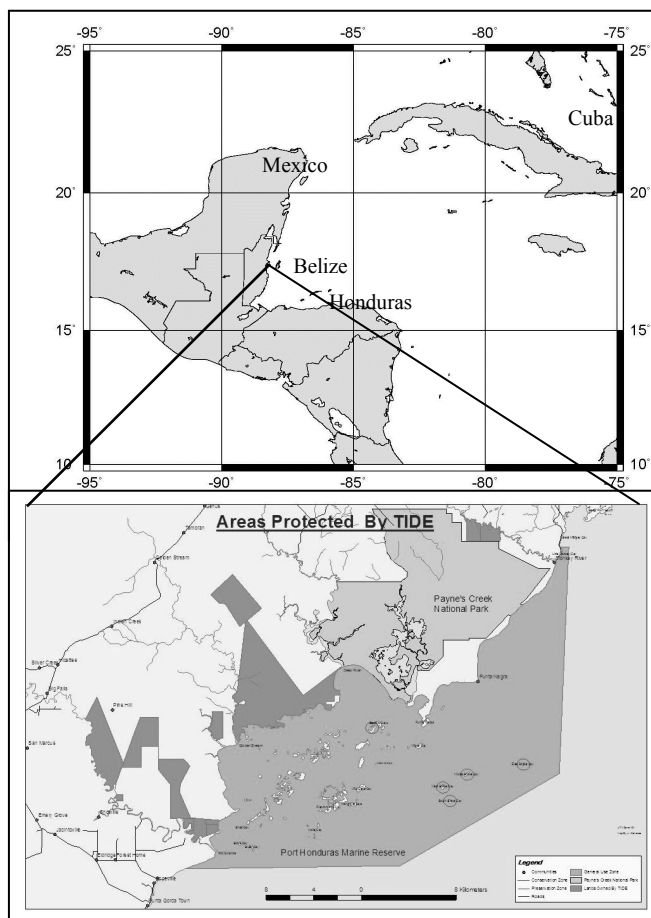
L'Institut de Toledo pour le Développement et l'Environnement (TIDE) a été établi en 1997, à Punta Gorda, Belize du Sud, comme une initiative populaire en réponse à la croissance des inquiétudes sur l'abattage de lamantins, de la pêche illégale et de la dégradation de l'environnement marin. Depuis son origine, TIDE s'est développé, en gagnant la reconnaissance tant nationale qu'internationale. Un premier succès était l'établissement du Port Honduras Marine Reserve (PHMR) en janvier 2000 et un accord de co-gestion avec le Département de pêcheries. La gestion de PHMR a pris une approche basée sur l'écosystème, en dépendant lourdement sur le soutien et la participation des membres de la communauté. Tout le personnel PHMR est employé directement des communautés parties prenantes et dans de nombreux cas, ils sont des ex-pêcheurs de PHMR, convertis à la conservation par de nombreuses formations de TIDE et des campagnes de proximité. Des zones no-take, en couvrant 5 % de la zone de réserve totale, ont été établies à l'origine de la réserve marine et fournissent tant un refuge aux espèces commercialement importantes, telles que la langouste et le lambi et aident à minimiser les impacts humains sur les récifs de corail, les lits d'algues et les mangroves. Ces écosystèmes et populations sont régulièrement contrôlés par TIDE avec l'assistance des chercheurs de communauté. Par une éducation continue et des campagnes de proximité, telles que le Programme Stewards Community, TIDE a renforcé le soutien local et la tutelle pour la réserve marine et par une surveillance accrue et des patrouilles a fourni une protection aux habitats marins et aux populations. Néanmoins, des améliorations peuvent être faites. Pendant cette présentation, nous accentuerons certains des succès de TIDE et discuterons des leçons apprises et les domaines d'amélioration.

MOTS CLÉS: Zone marine protégée, Golf du Honduras, Caribéen

## INTRODUCTION

The Toledo Institute for Development and Environment (TIDE) was established in 1997, in Punta Gorda, southern Belize (Figure 1), as a grassroots initiative in response to growing concerns over manatee poaching, illegal fishing, degradation of the marine environment, illegal logging, destructive farming methods, and other types of unsustainable development. From the outset, TIDE's mission has been "to foster community participation in resource management and sustainable use of ecosystems within the Maya Mountain Marine Corridor of southern Belize for the benefit of present and future generations". Shortly after its foundation, TIDE identified what is now known as the Maya Mountain Marine Corridor (MMMC) as a high priority conservation action site (Robinson *et al.* 2004). The MMC is a magnificent natural area covering approximately one million acres of land and 1,000 square miles of seascape, and extends from the crest of the Maya Mountains in south west Belize to the southern tip of the Belize Barrier Reef System (Robinson *et al.* 2004). Since its inception, TIDE has grown in strength, it now co-manages Port Honduras Marine Reserve (PHMR) with the Fisheries Department, and Payne's Creek National Park (PCNP) with the Forest Department, and manages over 30,000 acres of Private Protected Lands (PPL) (Figure 1), which all lie within the MMC.

TIDE, led by a Board of Directors, and with a staff of 26 full-time and 10 part-time employees, works closely with local, national, regional and international partners on many aspects of conservation, sustainable development and capacity building. TIDE receives funding from various sources, including grants, foundations and park user fees. The majority of funds in recent years have come from international non-governmental organisations and international and national foundations and trusts, although user fees from the park do form a small contribution. The primary focus of TIDE has been on the coastal communities of Monkey River, Punta Negra and Punta Gorda but in recent years this has expanded to include an increasing number of inland communities whose activities impact the watersheds that flow into the Port Honduras Marine Reserve. TIDE works with each community to promote sustainable development and build local capacity to facilitate responsible management and a sense of ownership of natural resources. An early success for TIDE was the establishment of the Port Honduras Marine Reserve in January 2000, however the past nine years have brought a number of challenges. The focus of the current paper will be on the enhancement of marine conservation through community participation within PHMR, lessons learned and areas for improvement.



**Figure 1.** Location of Belize within Central America and the location of TIDE's Protected Areas in southern Belize, including Port Honduras Marine Reserve, Payne's Creek National Park and Private Protected Lands.

### Port Honduras Marine Reserve

**Background** — The Port Honduras Marine Reserve (PHMR) lies off the coast of southern Belize, starting from 8km north of Punta Gorda Town, the reserve extends north to the mouth of Monkey River and 25 km eastward to encompass the Snake Cayes (Figure 1). The Reserve was declared a marine protected area in 2000 after extensive community consultation by TIDE with the buffering communities and stakeholders during 1998 and 1999 (Avila *et al.* 2005). PHMR was established under a co-management agreement with TIDE and the Fisheries Department of the Government of Belize. The Marine Reserve covers an area of 414 km<sup>2</sup> and is composed of three zones. The General Use Zone covers 95% of the reserve and regulated extractive activities (commercial, sport, subsistence and recreational fishing) are permitted within this area. The Conservation Zone covers 4% of the reserve and no-take recreational activities (snorkelling, diving, swimming, kayaking) are allowed within this area. The Preservation Zone makes up the final 1% of the

reserve where entrance is restricted to researchers only (with a permit), or those in an emergency. As such, a total of 5% of the seascape of PHMR is enclosed within a no-take area. Furthermore, gill nets, long lines, beach traps, and spear fishing are banned throughout the entire reserve. The no-take zones were established to provide a refuge to commercially important species, such as the spiny lobster and queen conch, to help minimize human impacts on coral reefs, seagrass beds, and mangroves to enhance the value of the area for recreational and tourism activities and to provide areas that are preserved in their natural state. These ecosystems and populations are regularly monitored by TIDE with the assistance of community researchers.

PHMR is primarily estuarine in character which is the result of the seven major watersheds that flow into it; Deep River, Golden Stream, Indian Hill Lagoon, Middle River, Monkey River, Punta Ycacos Lagoon, and the Rio Grande (Heyman *et al.* 1999). During the rainy season, the water column becomes highly stratified, with fresh, often very turbid water at the surface, and freshwater plumes frequently extending as far as the Snake Cayes. The Marine Reserve incorporates four distinct ecosystems; coastal and tidal wetlands, marine lagoonal habitats comprised of mangroves and seagrass beds, mangrove islands with associated shallow banks, and the Snake Cayes fringing reef system (Sullivan *et al.* 1995). These ecosystems are home to many species, such as the Caribbean spiny lobster (*Panulirus argus*) and the queen conch (*Strombus gigas*), that have considerable commercial benefit to the buffer communities (Punta Gorda, Punta Negra, Monkey River and the Cayes) and the economy of Belize. PHMR also provides an important nursery habitat for a great diversity of marine and coastal fishes, many of commercial benefit (Heyman *et al.* 1999). Essentially two different finfish populations exist in PHMR, near-shore estuarine and reef-associated (Sullivan *et al.* 1995). Extensive surveys of these habitats have revealed over 118 finfish species, six of which were observed only at sites around the Snake Cayes (Sullivan *et al.* 1995, Harborne 2000, Robinson *et al.* 2004). PHMR also contains 138 mangrove cayes, arranged in three, nearly shore-parallel lines and resting on shallow carbonate banks, separated by deep channels paralleling the cayes (Heyman *et al.* 1999). A total of 61 stony coral species have been observed in the waters of Belize, with eight unusual coral sightings on the reefs of the Snake Cayes (Fenner 1999).

*Challenges* — A number of challenges have confronted TIDE in the management of PHMR over the years, however there are two major ones that have dominated, the first being the control of fishing within the reserve. Traditionally, the primary activity within PHMR has been fishing (both commercial and subsistence) which includes fishing by foreign nationals from neighbouring Honduras and Guatemala (Cho-Ricketts 2006). Belizean fishers cite the illegal fishing by these foreign nationals as one of the

biggest threats to the fish stocks and the area (Cho-Ricketts 2006). Fishing is allowed within the General Use Zone with the correct permit issued by the Fisheries Department of Belize. The permits are restricted to Belizean Nationals, however fishers from Guatemala and Honduras obtain Belizean papers, despite being resident in Guatemala and Honduras, which allow them to fish in Belizean waters. The foreign fishers then export their catch illegally and land it in Guatemalan or Honduran ports. Understandably, Belizean fishers, who catch their fish within PHMR and sell to local Belizean markets, are frustrated that they are restricted to fishing in certain areas and are working hard to protect the local fish stocks, yet foreign nationals are permitted to fish in Belize and export their products. Unfortunately, TIDE has become the focus of their anger and many fishers resent TIDE for allowing the foreign fishers entry into the reserve, even though they are legally entitled to enter and fish, only exporting their product is illegal. This resentment has evolved over the years into distrust and has impacted many of TIDE's projects within the area. TIDE has been advocating for a change in the laws related to the issuing of fishing permits for PHMR for a number of years, with minimal success. However, a joint venture currently being led by the Environmental Defense Fund (EDF) is investigating the possibility of catch shares, set quotas or special licenses for PHMR. It is hoped that this new approach will prevent foreign nationals from obtaining Belizean fishing licenses, and PHMR will be solely for the use of Belizean fishers selling within Belizean markets.

An additional challenge faced by TIDE was the lack of a comprehensive monitoring program for the first four years the reserve was in existence and then the inconsistency in data collection once the program was established. The first detailed study of the ecosystems and species within PHMR was undertaken in 1995 (Sullivan *et al.*) as part of a site characterization of the Port Honduras Area as a view to declaring it a marine reserve. The next comprehensive assessment did not take place until 2003 when an extensive baseline study of the ecosystems and commercial species was conducted by Robinson *et al.* (2004) to provide a foundation for the monitoring program to be implemented by TIDE. The monitoring program was established with the aim of assessing and monitoring the health of the fisheries, habitats and water quality of PHMR, and was coupled with regional Meso-American Barrier Reef initiatives and national monitoring programs for *Strombus gigas* and *P. argus* (Cushion 2004). Unfortunately, the monitoring program established in 2004 was implemented inconsistently for the first few years, with large gaps between sampling periods and insufficient data collected at many sites. Nevertheless, the monitoring program has become more comprehensive since 2007 and has been extended to include additional sites and activities both inside and outside the no-take zones. Furthermore, as of 2008, the data collected during past and current surveys

have been analysed and are being fed back into the management of the reserve in order to assist in prioritising monitoring and research programs. The analysis of the data and incorporation of the information into management has led to a more integrated approach to the conservation of PHMR, and is greatly assisting in the revision of the Management Plan for the reserve.

### Success for PHMR

Despite the challenges, TIDE has seen a number of achievements within the nine years since the inception of PHMR. Through hard work and perseverance, a number of programs and activities have seen significant accomplishments and continue to be a success today.

*Community Participation* — Full-scale management and enforcement of PHMR has been a building process since its formal designation, relying heavily on the support and participation of community members. All PHMR staff is employed directly from stakeholder communities and in numerous cases they are ex-fishers of PHMR, converted to conservation through many of TIDE's education and outreach programs. Currently, PHMR has a Marine Manager plus five full-time and two part-time rangers who patrol the reserve 24 hours a day, 7 days a week to enforce the laws of the reserve, minimise illegal activity and educate all the users of the area. Over 850 patrols are conducted each year within PHMR. Effective management of PHMR is dependent on reliable data produced from monitoring of the ecosystems and fisheries within the reserve. Since 2004, over 38 researchers from the buffer communities have been trained in SCUBA diving and monitoring protocols. These community researchers assist TIDE's two Marine Biologists with the biological monitoring program on a regular basis throughout the year. In return for their time, the researchers receive food and board during the monitoring activity plus a small stipend and experience for their curriculum vitae. Furthermore, utilising the skills and knowledge of members of the buffer communities greatly benefits the work of TIDE. These community members have a vast knowledge of the area in which they live and this information guides TIDE's monitoring program. The community researchers also take the knowledge and skills they learn during the monitoring activities back to their family and friends, which allows conservation and awareness to filter down into the communities.

*Biological Monitoring Program* — The Biological Monitoring Program, established in 2004, has continued to grow and expand, and it now provides an ecosystem-based approach to the management and conservation of the natural resources within PHMR. At present, the monitoring program incorporates the following activities. Water quality (temperature, salinity, dissolved oxygen, conductivity and turbidity) is measured at 17 sites across PHMR on a

monthly basis. *S. gigas* and *P. argus* populations are surveyed at 16 and 12 sites, respectively, at the start and end of the closed seasons. Benthic cover, coral health and reef fish populations are assessed twice a year at eight sites. Seagrass beds (species percent cover, density, grass height, grazing evidence) are assessed at two sites on a quarterly basis and mangrove community structure and productivity are surveyed at one site on an annual basis. Since January 2009, a fisheries stock assessment has been implemented for all finfish species, *S. gigas* and *P. Argus* populations, utilising catch landings at local markets in Punta Gorda and Monkey River and the Rio Grande Fisheries Cooperative in Punta Gorda. It is important to remember that such a comprehensive monitoring program would not be possible without the assistance of the community researchers.

Moreover, as of 2008, an adaptive management approach has been adopted for PHMR and the data collected during past and current surveys are being analysed and fed back into the management of the reserve in order to assist in prioritising monitoring and research programs. The analysis of the data and incorporation of the information into management has led to a more integrated approach to the conservation of PHMR, and is greatly assisting in the revision of the Management Plan for the reserve. Specifically, analysis of *S. gigas* and *P. argus* population data has highlighted inconsistent and minimal differences in abundance between populations within the General Use Zone and No-Take Zones, suggesting that the No-Take Zones are having limited effects on enhancing these fisheries. As a result, consultations are currently taking place with stakeholders and resource users of PHMR to assess the possibility of increasing the No-Take Zones, and where the new areas should be placed. Furthermore, with intermittent data sets extending as far back as 1995, when (Sullivan *et al.*) completed their first surveys, a detailed picture of changes within the ecosystems and populations of PHMR is being constructed, with a view to assessing the efficacy of PHMR and its No-Take zones.

Additionally, in 2008, TIDE was one of six organisations that signed a charter to develop a Conservation Action Strategy (CAS) for the Maya Mountain Marine Corridor (MMMC), spanning approximately one million acres of land and 1000 acres of seascape. The other organisations included the Government of Belize's Forest and Fisheries Departments, Ya'axché Conservation Trust (a local non-governmental organisation), and two international organisations, Fauna & Flora International and The Nature Conservancy. Through extensive consultation with local communities and other stakeholders, this strategy identified the greatest threats to the biodiversity of the area and formulated a five year integrated plan for addressing these threats. TIDE is utilising the Conservation Action Strategy to further guide its work plans, and formulate an integrated monitoring program for resource protection from

the ridge of the Maya Mountains to the reefs of the Snake Cayes and Sapodilla Cayes.

*Educational programs* — TIDE has established a number of educational programs for both adults and children that have been very successful in raising awareness of marine conservation and getting community members involved in environmental projects, enforcement activities and the monitoring program.

The most recent program is the Community Stewards Program, which has seen 15 participants selected from the buffer communities of Monkey River, Punta Negra, Punta Gorda, and San Marcos, brought together each month to receive training and information regarding the management of TIDE's three protected areas and the Maya Mountain Marine Corridor. The training has included terrestrial and marine ecosystems, computer skills, fire management, marine laws and terrestrial laws, GPS handling training, communication skills, and an educational exchange with protected areas in Guatemala. In addition, the Stewards have been educated about the threats faced by the ecosystems of the Toledo district, the benefits of conserving these ecosystems for future generations and how to convey this to their communities. Through feedback from current participants, the program has provided them with a wealth of information on PHMR and TIDE's other protected areas. However, the information was much more detailed than previously provided which has enabled the stewards to further understand the reasoning behind TIDE's work and the laws that are in place within the protected areas. The program has provided the Stewards with a sense of pride and ownership of the natural resources, and provided them with the knowledge, skills and tools to increase awareness about conservation within their communities. Furthermore, the Stewards feel empowered to educate other community members on how they too can play a role.

A more long-running program that incorporates adults and children in conservation activities is the Freshwater Cup, which takes place every year. Adults and children from within the buffer communities of TIDE's protected areas are invited to form a soccer team and in order to enter the league each team must also submit plans for an environmental project related to marine, terrestrial or freshwater conservation. Each project is assessed by TIDE and the teams receive guidance in the implementation of these projects. In the past, projects have included beach and underwater cleanups and planting of trees along the riparian buffer zone. To successfully compete in the league, the environmental projects must be underway prior to the start of the soccer league. Teams compete in the adult and junior leagues throughout May and June, and the program culminates in a grand final at the end of June. First, second and third place teams from each league win cash prizes for their respective communities or schools and prizes in recognition of their environmental projects. The Freshwater Cup program has won international recognition

from UNESCO and funding from the Social Investment Fund for the 2009 program.

Since 2007, TIDE have also organised an annual Youth Conservation Contest, where local organisations are invited to participate in the contest, which focuses on a different theme each year (e.g., coral reefs in crisis, climate change). Each organisation must select a candidate, a final year student from any school within Belize, and assist that candidate in preparing a short sketch and presentation related to the theme of the event. All candidates are invited to Punta Gorda for the contest, which is held in the local Parish Hall. Each candidate performs on stage and judges, selected by the various organisations participating, score the students based on various criteria. First, second and third place winners are awarded a scholarship for college. Each year, over 350 people from local communities turn out to watch the students perform and also to learn about different environmental problems and projects that are affecting the marine environment in Belize.

### **Lessons Learned**

Despite the overall success of TIDE and PHMR over the past nine years, there have been a number of areas where improvements can and are being made. Following consultations with communities in 2004 and again in 2009, it has been made clear that there has been a loss of trust between communities and TIDE, in particular with the fishers of PHMR. The problems stem from a number of areas. The first being the resentment of TIDE for allowing foreign nationals to fish within PHMR. The second is a lack of communication, or unclear and conflicting messages, being relayed to the fishers and their communities. One particular incident was the closing of a grant early by the donors, which was completely beyond the control of TIDE. However, this message was not conveyed to the communities and they believed that TIDE kept the money and decided against implementing the alternative livelihoods programs in their communities. Unfortunately, the distrust and resentment has continued due to a lack of regular communication and outreach with the communities. A community survey in 2009 highlighted the fact that communities perceive TIDE's outreach as poor and would like to see an improvement, through regular meetings, newsletters and the TIDE radio show. Furthermore, communities would like the meetings to be held on weekends and evenings rather than during the week, which has been the case in the past. TIDE has taken all of these points on board and is working hard to rebuild the bridges with the communities and fishers.

A number of lessons have been learnt over the years, with the most important ones being to be honest with the communities and stakeholders. Do not make promises that you cannot keep, in terms of programs and funding, as this builds distrust between the organisation and the communities, which then leads to a lack of cooperation from stakeholders. Also, if a project/grant closes early, hold a

meeting in each community and explain exactly what happened, especially if it was beyond the control of the organisation, so that they can understand why the activities stopped.

On a more positive note, combining sport and conservation is a great way to motivate adults and children and to achieve a number of small community projects in a short time-frame. Employing people directly from the buffer communities has enormous benefits. These people have a vast knowledge of the area in which they live and this information can guide monitoring and research programs as well as enforcement and education activities. The employees and community researchers also take the knowledge and skills they learn during these programs back to their family and friends, which allows conservation and awareness to filter through into the communities. Another lesson learnt is to use the data collected during monitoring activities and implement adaptive management. For many years, data has been collected and entered but no further work has done. Since 2008, analyzing the data has helped to focus research and management activities to areas that need it most, ensuring the most critical areas receive the attention they need and that the reserve continues to be effective in preserving the natural resources of the area.

### CONCLUSIONS

TIDE has worked hard to create a marine reserve that both protects the natural resources within it, but that is also accessible to the buffer communities and tourists. Although many achievements have been made in recent years, there is still a long way to go until a balance between conservation and resource users is reached for PHMR. Stakeholders have been involved each step of the way, however, there have been problems and areas where improvements can be made. TIDE is fully aware of its mistakes and is working hard to improve its relationship with community members, in particular fishers. A joint venture led by EDF is currently investigating the possibility of catch shares, quotas or special licenses for PHMR, in the hope that the fisheries can be solely for the use of Belizean fishers. In addition, adopting an adaptive management approach is improving the management of the reserve and has already highlighted the need to re-zone PHMR in order to preserve the ecosystems and populations for future generations.

Through continued education and outreach campaigns, such as the Community Stewards Program, TIDE is building up local support and guardianship for the marine reserve and through increased surveillance and patrols is providing protection to marine habitats and populations. Employing and educating community members has instilled a sense of pride and ownership in the reserve and its natural resources, which enables them to increase awareness about the benefits of conservation and empowers them to educate other community members on how

they can play a role too. By involving communities in many aspects of its work, TIDE ensures that their voice is heard and their opinions matter.

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