



The Rising TIDE

2012 Annual Report



Table of Contents

Research and monitoringpg 2

Managed Access....pg 6

PACT/MAR Fund/ KfW projectpg 7

Environmental

Education and Outreachpg 8

Increasing capacitypg 9

Resource Protectionpg 10

Other TIDE happeningspg 11

Funding and Expenditurepg 12

Letter from the Executive Director

Celia Mahung

Dear friends and colleagues,

At TIDE, we are aware that we need community support for conservation and we are aware that conservation has had both positive and short-term negative economic impacts on our communities. We have been trying for some time now to raise money to do more economic development in Toledo and that is why I am so pleased that we have finally secured this kind of funding from the German development bank, KfW, through the MAR Fund.

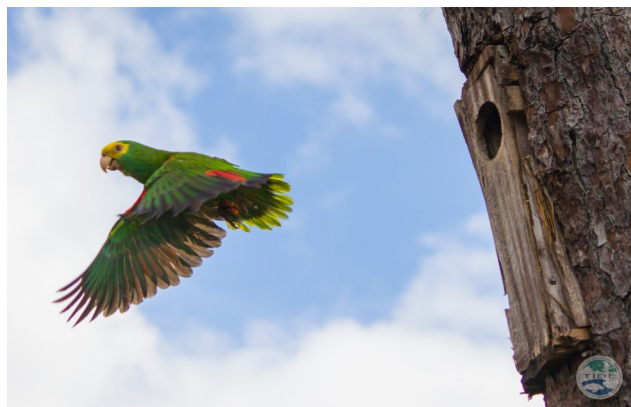
Under this new five-year project we have the opportunity to invest in green businesses that make wise use of natural resources .

In 2012, we began small projects to boost economic development (more on page 11). In 2013, you won't see much activity – we will mainly be planning. Consultants will work with Monkey River, Punta Negra and Punta Gorda to create plans for community development and green businesses.

In 2014 and 2015, we should be able to invest in some of those business propositions to get them off the ground.

I am not going to promise too much. In the past, we had a bad experience with a multi-national project that was cut short due to failings in the other partner countries. It could happen again and I cannot promise to bring economic development to Toledo. What I do promise is that TIDE is working hard for our communities and that with your support, we believe Toledo can prosper from wise use of its natural resources.

I would like to thank my staff and board of directors, the Advisory Councils, Community Managed Access Committee, our partners in government, NGO partners, funders and everyone in the community who has supported us – schools, community stewards, community researchers, everyone who attended one of our many consultation meetings last year and all the Managed Access fishers who completed their license applications on time and filled out their catch data sheets. Thank you!



Yellow-headed parrot at Payne's Creek National Park

TIDE's Mission:

"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"

Research and Monitoring

Yellow-headed parrots approve of home improvements

TIDE is battling to conserve the endangered yellow-headed parrot (*Amazona oratrix*) in Payne's Creek National Park by installing artificial nest boxes. These beautiful, intelligent parrots nest inside holes in pine trees but good nest sites are scarce due to fires destroying many nesting trees and poachers destroying more by cutting them down to capture parrot chicks.

In 2012, with expertise from parrot biologist Michael Keys, TIDE installed ten artificial nest boxes and created five artificial cavities. By the end of the nesting season (June), seven out of the ten nest boxes had been used, six eggs were laid and three chicks successfully fledged. In early 2013, we installed another ten nest boxes and at the time of going to press we had another 14 healthy looking chicks. A big thank you to Thomas Gomez & Sons for kindly building and donating the nest boxes.



Yellow-headed parrot chicks in one of TIDE's nest boxes

Big cats on film

Even for our rangers, who spend most of their time in the bush, it is rare to see any large wild cats, let alone a jaguar. The rangers always knew these elusive predators were out there because they would see their tracks every single day, but it wasn't until the introduction of camera traps in 2012 that they witnessed these majestic creatures up close and personal.

These are not just pretty pictures though. We are partnering with Panthera, Ya'axché Conservation Trust, SATIIM and the Forest Department to conduct a study of jaguars and their prey throughout the Southern Biological Corridor, which connects the Maya Mountains with forests in Guatemala. The study will enable us to determine the movements of jaguars through the landscape and identify critical areas of land that will keep large mammal populations connected and healthy.

Besides jaguars, the camera traps also caught pictures of 15 other mammal species, including pumas, ocelots, armadillos and Belize's national animal, Baird's tapir, indicating a rich, balanced diversity of species.



Jaguar caught on camera on TIDE lands

Water quality monitoring

We are excited to be implementing the first integrated water quality monitoring (WQM) program in the Maya Mountain Marine Corridor (MMMC). As of 2012, river data are now analysed with marine data, improving understanding of the interconnectivity of land and sea.

In 2012, nitrate levels were relatively high in Monkey River, while in the Rio Grande phosphates were more prevalent. These results concur with the differing uses of each river, with Monkey River being more impacted by agricultural land usage and Rio Grande impacts being due to cleaning products from washing and bathing in rivers. High nutrient concentrations around the mouth of Deep River may be due to nutrients

Research and Monitoring



coming from the river. Multi-depth temperature and salinity measurements indicate that upwelling of deep water in the sea is occurring. This could also be the source of these nutrients. We plan to monitor water quality in Deep River in future to find out.

Results will be used to inform management and policy, and to improve stakeholder awareness of the wider impacts of human activities in the Rio Grande and Monkey River. WQM methods trialled by TIDE, as well as Ya'axche Conservation Trust, in the MMMC can serve as a model as Belize develops a national program.

Fisheries assessment

To keep Port Honduras Marine Reserves (PHMR)'s fisheries sustainable, TIDE monitors conch, lobster and finfish underwater and in fishers' catch. By assessing stocks, we can tell whether populations are stable, increasing or declining. By assessing catch, we can tell how well fishers are following regulations. By assessing stocks, catch and environmental conditions together, we have a much more informative picture. We can understand the relationships between stocks, fishing and the environment. This will inform fisheries management, helping to optimize catches over the long term and keep ecosystems healthy.

Conch: Looking at the conch fishery, the first thing we notice is that fishers are obeying size limits – the vast majority of conch caught between 2009 and 2012 were of legal size (Figure 1, page 4). Secondly, average conch shell length has remained stable since 2009, both in catches (Figure 1a) and underwater (Figure 2a). If we looked no further, we would conclude that the fishery is sustainable.

However, shell length is not a good indicator of maturity – young conch can have quite large shells and old conch can have quite small shells. What we are really interested in when

we set a size limit is not the size of the animal but its sexual maturity. Size limits are meant to protect juveniles until they can reproduce.

Contemporary research has shown shell lip thickness to be a much better indicator of sexual maturity. A study in the Bahamas found the minimum lip thickness for reproductive maturity was 12mm for females and 9mm for males. In PHMR, a large proportion of the catch is below 9mm (Figure 1b).

An even greater concern is that the average lip thickness of uncaught and caught conch has decreased since 2010 (Figures 1b and 2b). The proportion of harvested conch with lip thickness less than 9mm (and therefore probably juvenile) has increased from 30% in 2009 to 90% in 2012. Mature conch are rapidly being fished out!

TIDE is now undertaking research to determine lip thickness at maturity in PHMR.



Community researcher doing a coral survey

Lobster: Lobster abundance was stable between 2009 and 2012 (data not shown).

Lobsters in replenishment zones were generally larger than in the general use zone (Figure 3). Since 2009, the average size of lobsters in the general use zone has increased.

The size of lobsters in the catch was stable between 2009 and 2012 and only a small proportion of caught lobster were under the legal size limit. These results suggest that the lobster fishery in PHMR is currently sustainable.

Research and Monitoring

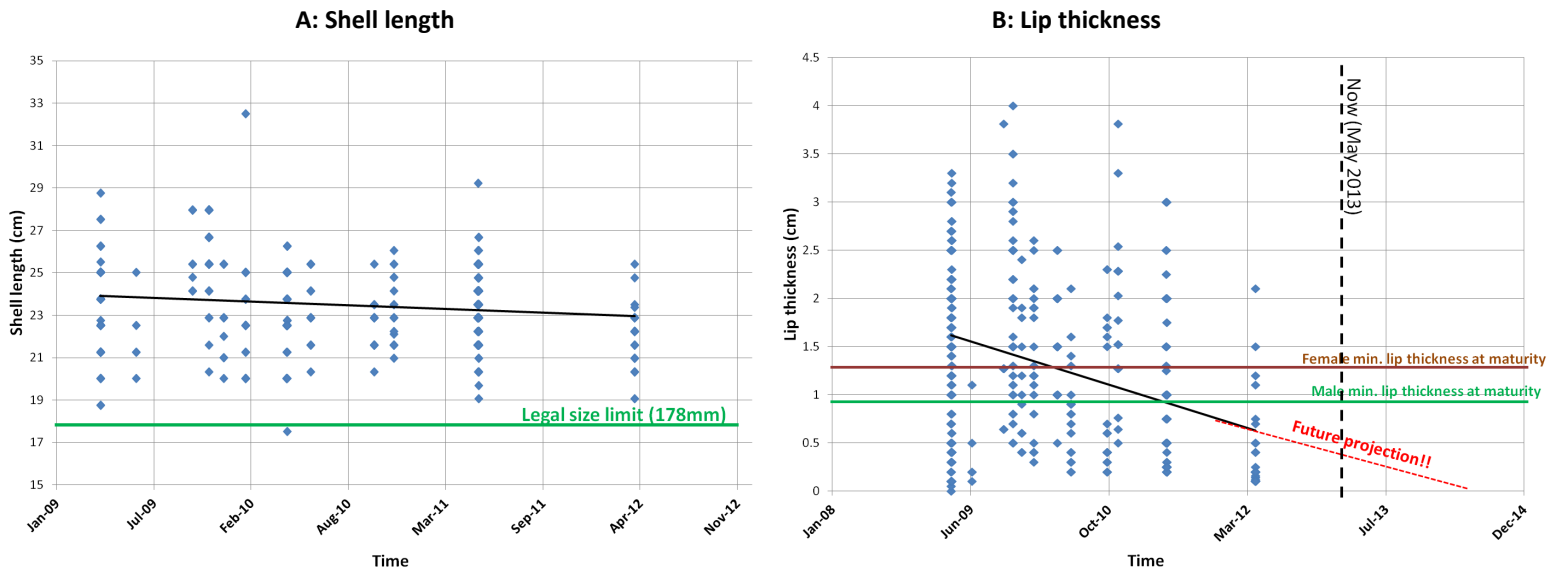


Figure 1: Distribution of conch shell length (A) and lip thickness (B) in fishers' catch from the Port Honduras Marine Reserve from 2009 to 2012. Grey lines show trends over time (lines of best fit). The green line in the shell length graph indicates the legal size limit (178 mm shell length). The brown and green lines in the lip thickness graph indicate lip thickness at sexual maturity for female (brown) and male (green) conch as determined by Stoner *et al.* (2012) in the Bahamas.

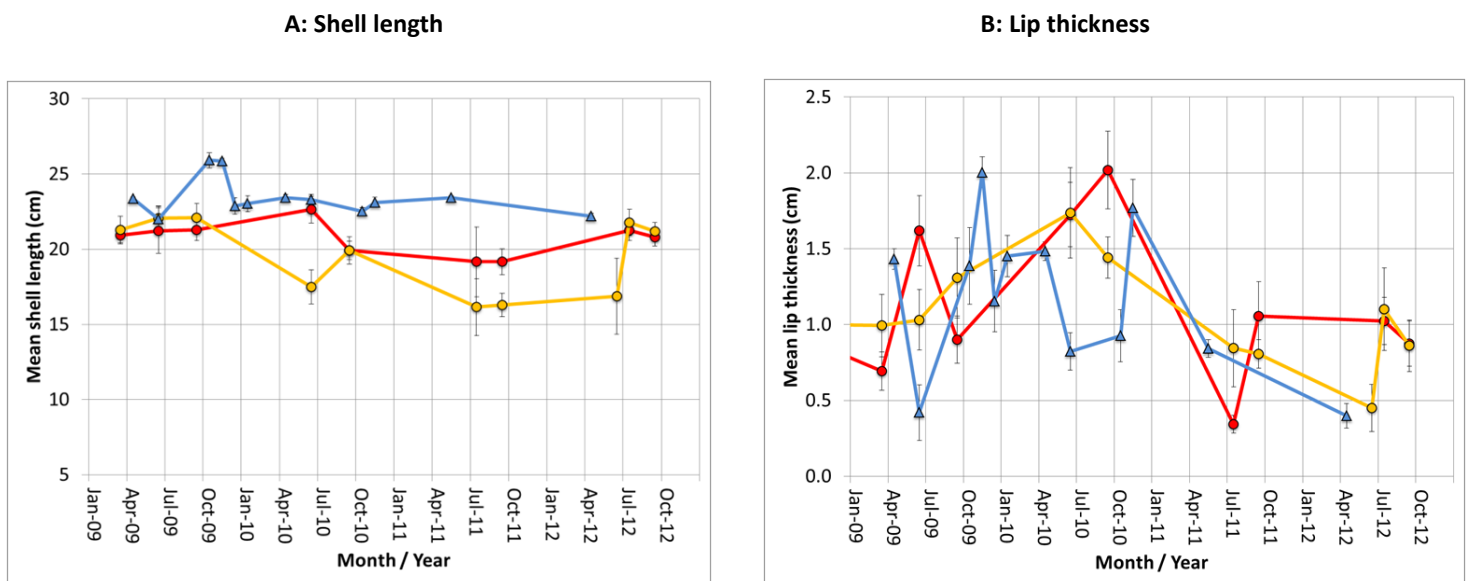


Figure 2: Mean shell length (A) and lip thickness (B) of conch in Port Honduras Marine Reserve **replenishment zones** (red), **general use zones** (yellow) and **fishers' catch** (blue) from 2009 to 2012. Underwater populations were sampled each year, around the beginning and end of the closed season, which is from 1st July to 30th September. Catches were sampled throughout the open season. Error bars show standard error of the mean.



Research and Monitoring

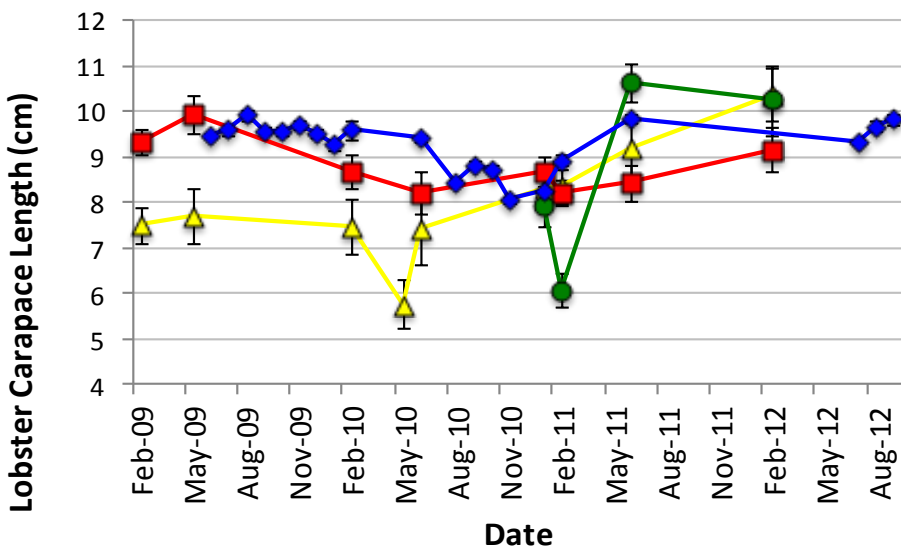


Figure 3: Mean carapace length lobster in Port Honduras Marine Reserve replenishment zones (red), general use zones (yellow), fishers' catch (blue) and outside of the reserve (green) from 2009 to 2012. Error bars show standard error of the mean.

Coral reef composition and health: TIDE has been monitoring the life on the surface of the reef at eight sites in PHMR since 2003. Looking back over the last decade, we see a gradual increase in the percentage of live coral cover (Figure 4).

The reef with the greatest live coral cover (22%) is at East Snake Caye (data not shown). It also had the lowest macro-algal cover (6%), another sign of health. East Snake Caye is also remarkable for its relatively high densities of critically endangered staghorn and elkhorn coral and the fact that no lionfish has been observed there despite many survey dives.

In the 2010 Report Card on the Health of the Mesoamerican Reef, East Snake Caye was the only site in the entire Mesoamerican Reef with “very good” health. By 2012, its health had dropped to just “good” because of a decline in reef fish. Local fishers have reported that since the introduction of Managed Access in 2011, foreign fishers (who can no longer fish legally within the reserve) have been making illegal nighttime incursions targeting replenishment zones. In response, we have stepped up nighttime patrols in replenishment zones.

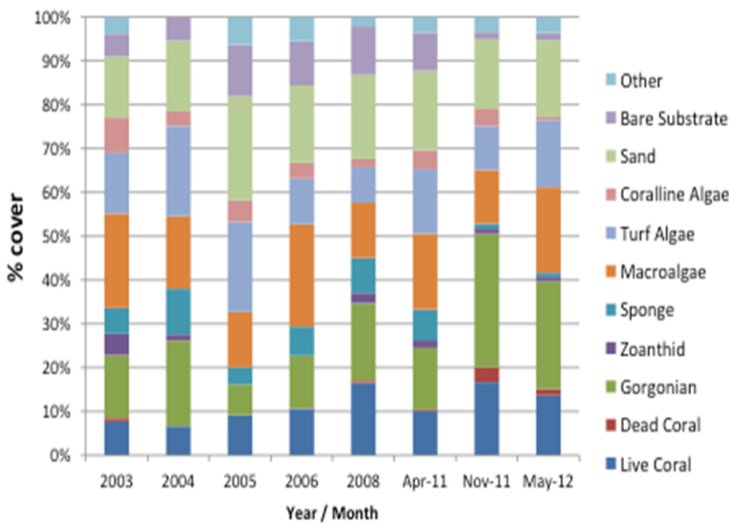


Figure 4: Coral reef composition in PHMR over time. Eight coral reef sites (five within replenishment zones and three in the general use zone) were sampled using the MBRS method on each occasion.

Managed Access

Good results for Managed Access

Belize has some of the most progressive fisheries management in Central America. To stay ahead of the game and keep Belize's marine ecosystems healthy, the Fisheries Department has implemented a new form of management in partnership with TIDE, the Wildlife Conservation Society and the Environmental Defence Fund.

This is Managed Access.

Successfully implemented at hundreds of locations worldwide, Managed Access (MA) protects stocks by identifying traditional fishers using an area and granting only them access to fish commercially in that area. The aim is to ensure fishery sustainability and secure the livelihoods of fishers for the long term. In mid-2011, the Port Honduras Marine Reserve (PHMR) and Glover's Reef Marine Reserve became the first two Marine Protected Areas (MPAs) in Belize to implement MA.

Toward the end of 2012, an independent assessment of MA produced the following main findings:

Strengths:

- Support for MA among fishers is increasing
- Fishers approved of the long consultation process leading up to MA
- The process of selecting which fishers qualify for licenses has been fair and transparent
- Illegal trans-boundary fishing in PHMR has declined remarkably - by roughly 50%
- 83% of interviewed PHMR fishers believe their catches increased between 2011 and 2012. However, only 33% believed this was due to MA.



Stakeholders at a Managed Access forum in November

Weaknesses:

- MA fishers report that foreign fishers are now making illegal incursions at night and targeting replenishment zones to maximise product extraction. Our monitoring supports this and TIDE has responded by conducting more night patrols.
- Some "recreational" fishers have been found with commercial quantities of product.

The success of the pilot projects in PHMR and at Glover's Reef have influenced the Fisheries Department's decision to implement MA in all Belizean MPAs over the next three years, a major step toward sustainable fisheries in Belize!



Ms. Denise Garcia, TIDE's MA Coordinator, talking to a stakeholder

PACT/MAR Fund/KfW Project

Exciting new project

In 2012, TIDE was proud to begin a new five-year project from PACT, the MAR Fund and the German development bank, KfW. Entitled “Conservation of Marine Resources in Central America”, it is a multi-national project involving one marine or coastal protected area in each of the four Mesoamerican Reef countries: Mexico, Belize, Guatemala and Honduras. The Port Honduras Marine Reserve (PHMR) was selected for Belize by the Fisheries Department.

The project aims to conserve the Mesoamerican Reef System through three main approaches:

1. Strengthen protected areas management.
2. Develop sustainable economic uses of marine and coastal resources.
3. Facilitate exchange of ideas and best practices between the four countries.

So how will this project benefit PHMR and its buffer communities?

Firstly, it will improve the management of PHMR, helping to protect resources for future generations. Secondly, it will provide opportunities for local people to become involved in the management of the marine reserve, access training and develop 'green' businesses.

In 2012, the project enabled TIDE to achieve several aims including the following:

- Refurbish the ranger station at Abalone Caye
- Train five PHMR rangers in law enforcement, first aid, navigation and engine maintenance
- Conduct ranger patrols in PHMR
- Run field trips to PHMR for 15 school children
- Support seven fishers to establish chicken-rearing enterprises



Field trip to PHMR

However, the majority of the project funds will be spent in 2013-2015. In 2013, the plan includes the following:

- Install demarcation buoys to mark PHMR boundaries
- Create community development plans for Punta Gorda, Punta Negra and Monkey River
- Create a new strategic plan for TIDE
- Feasibility studies and business plans for potential businesses
- Train ten people in Monkey River and Punta Gorda in craft making



The newly restored Abalone Caye

Environmental Education and Outreach

The rise and reign of the lionfish

At the annual TIDE Fest in October, lionfish (*Pterois volitans*) was tasted by over 150 Toledo residents. Lionfish look alarming with their long spines but the meat is good to eat, comparable to grouper or snapper. Only the spines are venomous but they are easy to remove safely when you know how.

Lionfish is an invasive species that is becoming an increasing problem in Belizean waters. Native to the Indo-Pacific, the lionfish was probably released into the Caribbean in Florida in 1985. It has multiplied rapidly since its arrival. The secrets of its success include:

- Rapid reproduction rate
- Rapid growth and early sexual maturity
- Feeding on almost anything, including juvenile snappers and lobsters
- Having no native predators in this area

The result of these factors is a population that is spiralling out of control. **It is thought that they could reduce the recruitment of native fishes by almost 80%.**

The one saving grace is that lionfish is delicious to eat. Support your local fisheries - help eradicate this species from our waters by asking for lionfish at your local restaurant and market! In Punta Gorda, you can eat lionfish at Gomier's Restaurant, Asha's Culture Kitchen and Driftwood Café.



Lionfish caught in PHMR

Scoring awards

Our annual football and environmental competition, the Freshwater Cup, was once more successful in promoting environmental stewardship in Toledo by enabling over 300 children to carry out their own environmental projects. 2012 was an Olympic year and, excitingly, TIDE won the International Olympic Committee's Sport and Sustainable Development Trophy. The award was for "an outstanding organisation" that integrates sport and sustainable development. The award was presented by Governor General of Belize, Dr. Colville Young in Belize City.



Mr. Norman Budna with the International Olympic award



The winning girls team at TIDE's Freshwater Cup



Increasing capacity

Fire management

This year we enabled five personnel from the Southern Belize Fire Working Group – two TIDE rangers, one Ya'axché Conservation Trust ranger and two personnel from local logging concessionaires the Wood Depot and Thomas Gomez & Sons Ltd. – to receive training in fire management at the Everglades National Park, Florida, USA. They learned how to use fire to restore pineland savannahs and brought new techniques back to Belize.

Fire is the number one threat to the biodiversity of Payne's Creek National Park and one of the main actions our Payne's Creek ranger team takes is to manage wildfires in and around the national park. In 2012, the team conducted prescribed burns in neighbouring Deep River Forest Reserve in partnership with Thomas Gomez & Sons Ltd.

Community researchers

Our research and monitoring team trained five new community researchers in 2012.

This program is extremely important as it involves our local youths who represent fishing communities in research and monitoring programs which inform management. This allows better collaboration and participation from local fishers.

These young people from Punta Gorda, Punta Negra and Monkey River are now qualified in various scientific techniques and as PADI Open Water divers. They have been employing their new skills to collect data for several research and monitoring programs in the PHMR. This year was the first time the training occurred in-house

We are continuing this program in 2013.



Members of the Southern Belize Fire Working Group receiving training in Florida



Community researcher training in scuba diving

High school scholarships

High-school scholarships (books, fees or both) were provided to 22 Toledo students for the school year 2012/2013 by James Albert Foundation (10 students), Oak Foundation (7), Mass Audubon Society (4) and Dr. James Lord (1).

Bird ecology

Ms. Gail McNab, our research assistant, had an exciting trip to Mass Audubon's International Intern Program in Massachusetts, USA. There she got to learn about bird biology, bird conservation and how to guide birding trips from some of the best ornithologists in North America as well as tell them about Belizean birds and culture.



Resource Protection

Fighting crime

TIDE marine rangers conducted over 900 patrols in the Port Honduras Marine Reserve in 2012, resulting in the destruction of 20 gillnets and the prosecution of two foreign fishers for fishing in Belize without a license. Since Managed Access (MA) is new, fishers who broke the MA rules were informed and given verbal warnings. From 2013 onward, fishers are expected to know the rules. The ranger team will **not** give verbal warnings and a strict “three-strike rule” will apply.



Head Ranger Kenworth Martin checking fishing licences in the Port Honduras Marine Reserve

Terrestrial rangers conducted over 450 patrols. Unfortunately they have started to see evidence of increased hunting on the Private Protected Lands, especially at night, so measures are being taken to address this.



Ranger Santiago Cucul on patrol in the Private Protected Lands

Riparian reforestation

Rivers are the arteries of the Maya Mountain Marine Corridor. They connect the mountains, the forests and the sea and they flow through the heart of most Mayan communities. Toledo is blessed with clean rivers and TIDE wants to keep it that way.

We are working with community-based environmental organizations Xucaneb (meaning “A Sacrifice” in Q’ekchi) and C’ac’alanel Car Sa’ Nima’ (Q’ekchi for “Fish Watcher’s Group”) to reforest riverbanks in San Pedro Columbia and San Miguel villages. These groups value their rivers and are taking steps to protect them by planting trees to stabilise the banks and provide food for fish and other animals.

Thanks to education by TIDE, villagers understand the connections between their local area and the global environment. A man from San Pedro Columbia phrased it beautifully when he said:

“We need to protect trees because they communicate with the sky.”



Riparian reforestation using Ceiba (cotton) trees



Other TIDE Happenings

Abalone Caye restoration

The restoration work on Abalone Caye that started in 2011 is showing promising results. An artificial reef was erected in 2011 and we believe that it has not only slowed but perhaps even stopped the severe coastal erosion of the caye. This erosion threatened not only the caye itself but also the Port Honduras Marine Reserve Ranger Station.

An added bonus is that between the reef and the island, fish abundance and diversity has increased as it is a rare, sheltered spot isolated in an open sea. This new lagoon has become a great educational tool that provides safe and easy access for school children to snorkel and learn about marine life.



Fish in the new Abalone Caye lagoon

Once the erosion problem had been addressed, restoration work started on the ranger station itself to reinforce and stabilize the building. It had a major infrastructure overhaul with sections of it being replaced and the store room renovated. The dock was also reconstructed.



Repairs to the dock at Abalone Caye

International Youth Forum on Biodiversity

In October, our marine biologist, Mr. Marlon Williams, went to India to represent Belize at the International Youth Forum on Biodiversity (Go4BioDiv). The theme was 'Conserving coastal and marine biodiversity for sustaining life and livelihoods'. He was nominated due to his passion and first-hand knowledge of the situation of resource use and conservation.

Supplemental livelihoods/ community development

This year, TIDE has fully funded tour guide training for two people and helped 17 fishers benefit from a chicken-rearing project that will allow them to diversify their livelihood, giving them options besides fishing. TIDE has also completed the refurbishment of the Rio Grande Fishermen Cooperative facility, with a vacuum sealer to increase the shelf life of fish products and add value to them. A new freezer was provided and the ice machine was repaired so that income can also be made from selling ice.

We have also started work on a dock for Punta Negra Village, to be completed in 2013. In Punta Gorda Town, two barber shops were constructed. This is providing jobs for two young barbers, who, in exchange, have agreed to provide free hair cuts for disadvantaged children.



Chicken-rearing enterprise

Climate change adaptation

We created a climate change adaptation strategy for the Port Honduras Marine Reserve with expert input from community representatives and the Nature Conservancy.

Funding and Expenditure

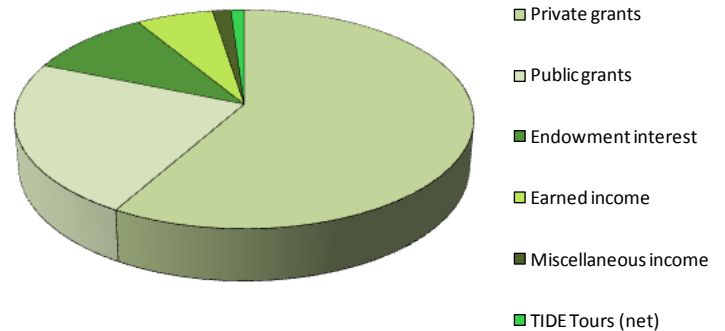
Financial information

In 2012, TIDE received a total of US\$1,018,000 in revenues. Of this, 58% came from grants from private trusts and foundations, 23% from public grants, 10% from an endowment fund for the management of the TIDE Private Protected Lands and 9% from earned income, including TIDE Tours.

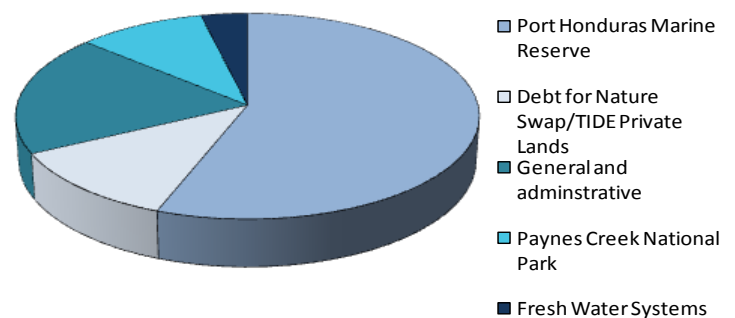
In total, TIDE's expenditure in 2012 added up to US\$909,000. When broken down by program, most of this was spent within the Port Honduras Marine Reserve. This included investments in sea defences and other infrastructure at the Abalone Caye ranger station. Overall, our main expenses were salaries, public awareness and environmental education, ranger patrols and community development.

We would like to thank all of our funders, including Oak Foundation, the Summit Foundation, MAR Fund and KfW, Belcampo Lodge, COMPACT, UNICEF, GCFI, USAID MAREA, The Nature Conservancy, Environmental Defense Fund, Massachusetts Audubon Society, Seacology, PACT, New England Biolabs Foundation, Miller S. and Adelaide S. Gaffney Foundation, and Melinda Gray Ardia Environmental Foundation.

Revenues



Expenses by program



Children enjoying themselves at TIDE's annual summer camp