



The Rising TIDE

2013 Annual Report



Vision
Toledo's healthy ecosystems support biodiversity, communities and sustainable development

Mission
To engage stakeholders in the sustainable management of natural resources within the Maya Mountain Marine Corridor of southern Belize for the benefit of all

Letter from the Director



I always look forward to highlighting TIDE's major accomplishments. Investing in planning for community development in the coastal communities of the Port Honduras Marine Reserve, implementing infrastructure projects to achieve conservation and development goals, using scientific data and local knowledge to inform natural resource management, partnering to achieve national conservation goals, adding 1,110 acres of rainforest to our protected lands, and building the capacity of staff and community members were all rewarding in 2013.

We are excited about the progress we made in building the capacity of stakeholders in resource management, and in providing fishing families with supplemental livelihood opportunities and high school scholarships. The relevant service and skills-oriented training sessions provided to youth, women, and men are already being applied to generate additional income in households. I look forward to seeking additional funds and implementing similar plans in communities buffering our terrestrial protected areas.

Community development plans, business plans, and marketing strategies for coastal communities, and the Punta Gorda dumpsite study, all completed in 2013, will guide TIDE, our partners and potential investors as we reduce poverty and create a green economy in Toledo.

Our accomplishments would not have been possible without the commitment and expertise of our board of directors, hard-working staff, community stewards and researchers, the Government of Belize, our funders and the valuable expertise of a growing pool of local and international volunteers. Our deepest gratitude goes to our donors, partners, and friends who believe in our mission and are investing in the future of southern Belize.

From data collection on the critically endangered hicatee, ridge-to-reef water quality monitoring, and an in-depth fisheries assessment, we are pleased with our robust science program that informs sound management of the Maya Mountain Marine Corridor, and engages young community researchers to care for and appreciate the amazing resources we safeguard for future generations.

Thank you for your generous support!
Celia Mahung, Executive Director



Leading Community Participation in Conservation

Located in southern Belize's Toledo District, The Toledo Institute for Development and Environment (TIDE) was established in 1997 as a community-based response to manatee poaching and marine degradation and has grown into one of Belize's leading non-government conservation organizations.

We use a "ridge to reef" approach within the Maya Mountain Marine Corridor, where we engage communities to be stewards of the environment. TIDE is respected for its innovation through the years - whether leading the Debt for Nature Swap with The Nature Conservancy and Government of Belize, winning awards for its Freshwater Cup environmental football tournament, pioneering Managed Access fisheries in the Caribbean, or planning for climate change adaptation.

For over 10 years, TIDE has co-managed Port Honduras Marine Reserve and Payne's Creek National Park with the Belize government. We also directly manage over 22,000 acres held in trust for the people of Belize. Together, these areas form some of the most pristine habitat in the entire Meso-American Complex.

Our dedicated staff of 40 FTE includes office and field staff, local community researchers and stewards, and a grow-

ing pool of international volunteers. We work across four program areas with a budget of just over US \$1M. Resource Protection maintains biodiversity in the protected areas we are responsible for; Environmental Education & Outreach empowers local residents to be environmental stewards; Research & Monitoring informs policy and management action; Sustainable Development supports the needs of local people who are at the heart of our conservation efforts. Read more on our strategic plan and finances on page 18.

Board of Directors (2013)

- Gabriel Roches: Chair - retired public officer
- Alistair King: Vice-Chair - King Energy & Fabrigas Energy, Ltd.
- Eric Moore: Treasurer - Ministry of Works in Toledo
- Dr. Phillip Morgan: Port of Honduras Marine Reserve Advisory Council representative - University of Belize
- Dale Gomez: Payne's Creek National Park Advisory Council representative - Thomas Gomez & Sons, Ltd.
- Alexander Garbutt, Sr. - Local fisherman & Monkey River tour guide
- Marie Aleman - Retired teacher
- Celia Mahung: Ex-officio - TIDE Executive Director

PORT HONDURAS MARINE RESERVE

100,000 acres co-managed with Belize Fisheries Department since 2000

PHMR lies along the coast of Toledo and encompasses inshore, patch and fringing coral reefs, seagrass beds and 138 mangrove cays, supporting incredible biodiversity and important fisheries. It protects numerous species threatened with extinction, such as the West Indian manatee, great hammerhead shark, hawksbill, green and loggerhead turtles. The coastal mangroves between Deep River and Punta Ycacos are thought to be one of only three major nursery grounds for the goliath grouper remaining in the world. The Reserve is managed for sustainable use, including Managed Access fishing, while protecting wildlife and habitats.

PAYNE'S CREEK NATIONAL PARK

38,000 acres co-managed with Belize Forest Department since 2004

PCNP features hypersaline, saline, brackish and freshwater habitats, mangroves, broadleaf forest, and savannah. It protects a great diversity of wildlife, including all five of Belize's cat species and at least 310 species of birds. 20 of these are endangered or vulnerable, including the goliath grouper, black howler monkey, and yellow-headed parrot. Non-extractive activities are encouraged in the park, such as tourism, fly-fishing, and education trips. Wild fires are a major threat and we use prescribed burns to control fires, allowing the endangered neotropical pine savannah to regenerate.

TIDE PRIVATE PROTECTED LANDS

22,000 acres held in trust for the people of Belize

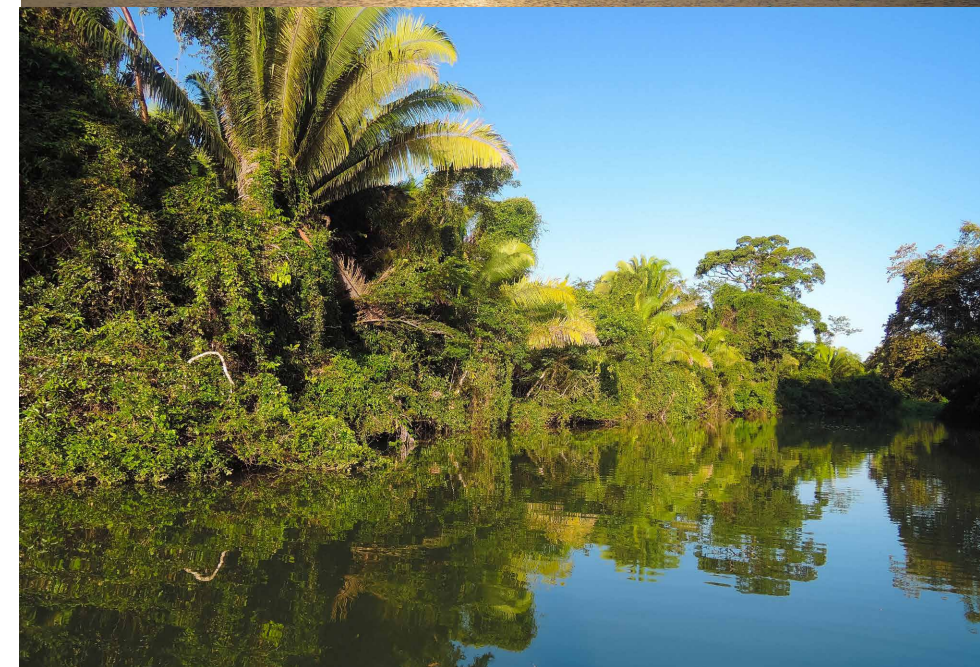
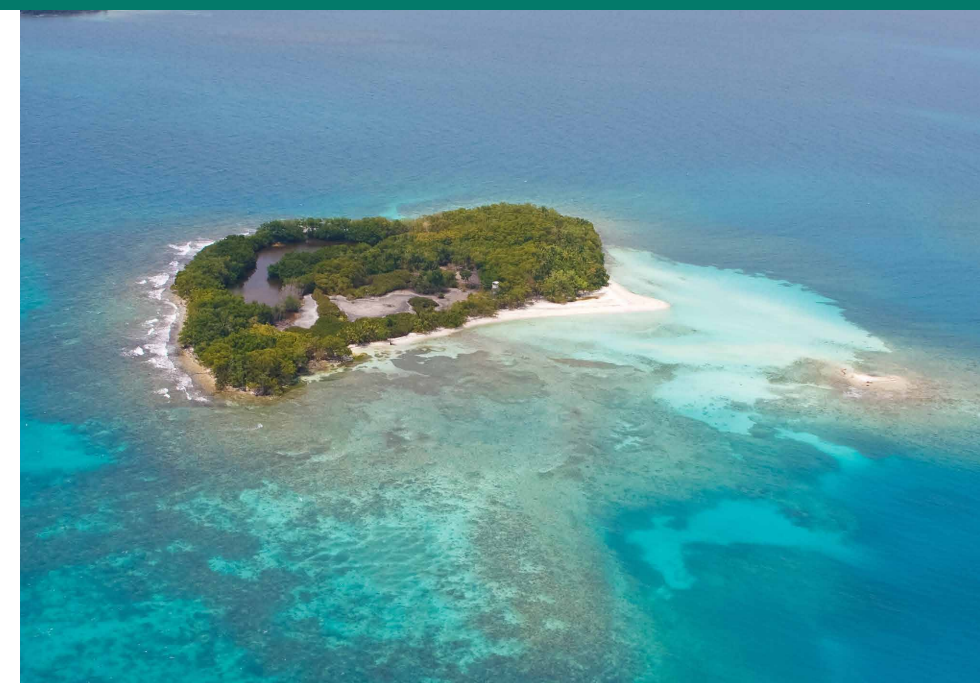
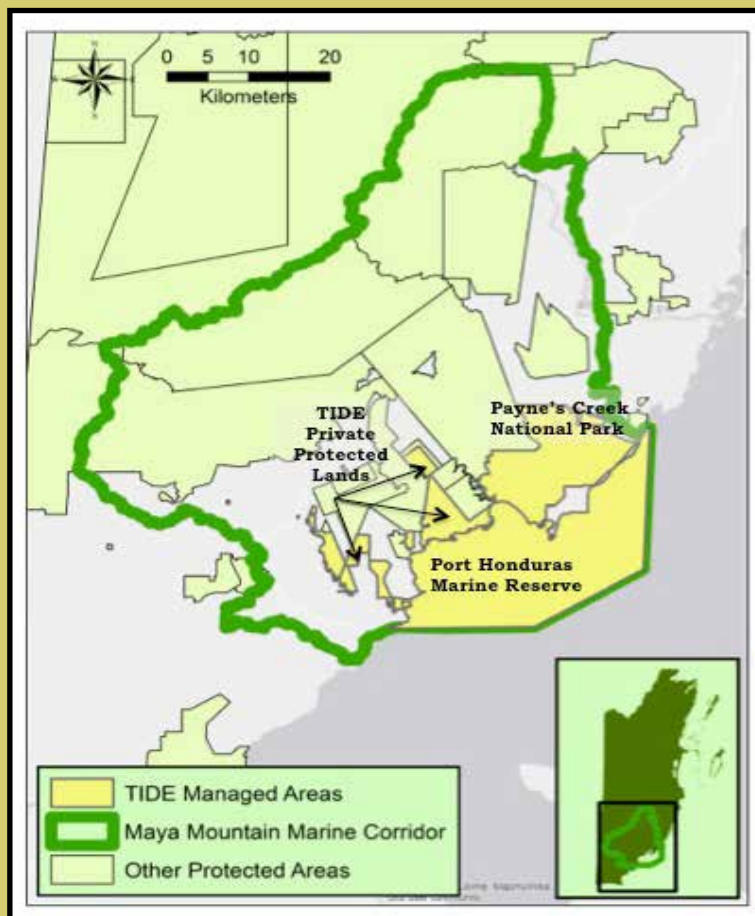
In 2001, TIDE was chosen to manage 11,000 acres of broadleaf forest under a "Debt for Nature Swap" between the governments of Belize and the US. TIDE has since increased these holdings, which it holds in trust for the people of Belize and manages for conservation. Several forested blocks connect other protected areas in the Maya Mountain Marine Corridor, forming a large, unfragmented moist tropical forest that protects the watershed and serves as a corridor for important species such as jaguar, white-lipped peccary, and Baird's tapir. The parcels also contain coastal plain broadleaf, riparian, and mangrove forests.

**Maya Mountain Marine Corridor:
A biodiversity hotspot**

The Maya Mountain Marine Corridor (MMMC) stretches from the pristine old-growth rainforest of the Maya Mountains to the Snake Cayes at the southern end of the Belize Barrier Reef Complex. This magnificent natural land and seascape is remarkable for its natural diversity and pristine state. Part of the Mesoamerican Biodiversity Hotspot, it is home to more than 220 tree species and over 350 species of birds. It supports at least 48 globally threatened or endangered species including jaguar, Baird's tapir (Belize's national animal), West Indian manatee, yellow-headed parrot, hawksbill turtle, and staghorn coral.

Fully 75% of the MMC's 830,000 acres is legally protected and over 90% of the land is still forested. 12 protected areas represent tropical rainforests, pine savannahs, coastal wetlands, seagrass beds and coral reefs.

Millions of tons of carbon are stored in the MMC's ecosystems, helping mitigate global climate change. With over 12 feet of rainfall annually, the highlands are intimately tied to the lowlands and the coral reef downstream via six rivers that empty into the Port Honduras Marine Reserve. These waterways and the surrounding forests act as a corridor for animals such as jaguars, peccaries, and tapirs, that can migrate freely from the mountains to the coastal lowlands. A mangrove coast dotted with over 100 small cays is one of the richest habitats in the Caribbean, providing a nursery ground from which fish are restocking the entire Mesoamerican Reef, as far away as Mexico and Honduras. The intact mangroves and seagrass beds filter and clean water from upstream, protecting the Belize Barrier Reef -- the world's second longest after Australia's Great Barrier Reef. Marine life includes manatees, dolphins, turtles, sharks and the amazing goliath grouper, which can weigh over 700 pounds.



TIDE is safeguarding resources for present and future generations through enforcement, education, and environmental management

Upholding laws and educating resource users

Ranger patrols in the protected areas we manage are an essential part of the day-to-day operations at TIDE. Rangers don't just enforce the law, they also educate users. Port Honduras Marine Reserve rangers conducted 910 patrols in 2013, resulting in two arrests, both leading to prosecution. Rangers gave out nine warnings for fishing without a commercial license and confiscated 16 illegal gillnets. Demarcation buoys were installed to mark the boundary of the Reserve, and rangers continued to build a sea wall to prevent erosion of Abalone Caye.



Educating people using resources in the protected areas is a key component of upholding laws (shown here: Delbert Pop and Eugenio Ah at TIDE Private Protected Lands).

Rangers for Payne's Creek National Park and the TIDE Private Protected Lands conducted over 550 patrols. They continue to discover hunting just outside PCNP boundaries and new trails into the private lands. They erected 12 park rules signs and used GIS to map patrol routes and hotspots of illegal activity. This, combined with use of satellite camps, enabled patrols to become more cost-effective, saving over 150 gallons of gas per year.

Managing fire

Fire can be friend and foe to Belizean pine savannas. Pine trees need occasional fire to kill competing vegetation. Yet, if the fire is too frequent, young pines do not have time to grow tall enough to survive the flames. Eventually, savanna becomes grassland, devoid of species such as yellow-headed parrots and endemic cycad palms.

Payne's Creek National Park rangers fight fire with fire. As part of the Southern Belize Fire Working Group (TIDE, Forest Department, Ya'axché Conservation Trust and private logging concessionaires), they use carefully controlled prescribed burns to prevent wildfire. As a result, the savanna is regenerating.

In 2013, the Southern Belize Fire Working Group and University of Belize conducted four prescribed burns in PCNP, totaling around 6,000 acres. 95% of pines of height 1 meter and above survived – a great success ratio compared to 60-70% normal for this type of burn. Park staff assisted Thomas Gomez & Sons Lumber Ltd. with a 150-acre prescribed burn to foster regeneration in pine stands and protect the sawmill. TIDE and Ya'axché Conservation Trust teamed up to provide fire management

training to nearby communities. Over 40 participants from Big Falls, San Miguel, Indian Creek, Silver Creek, Golden Stream, Medina Bank, Trio, and Bella Vista villages learned how to prevent escaped agricultural fires.

Protecting wildlife and restoring habitat

Endangered yellow-headed parrots are a conservation target in Payne's Creek National Park. After success with artificial nest boxes in 2012, rangers installed 10 more in 2013. Artificial nests are a substitute for natural ones, many of which have been destroyed by wildfire and poachers. The parrots have taken to the nest boxes with three chicks fledging in 2012 and another five in 2013.

TIDE has been working with two Maya community groups to



Planting trees along riverbanks is just one of the ways that TIDE rangers help preserve and create wildlife habitat.

plant trees along the upper reaches of the Rio Grande for nine years now. We partner with Xucaneb in Columbia village and C'ac'alanel Car Sa' Nima in San Miguel. Meanwhile, we have been replanting riverbanks downstream within our own Private Protected Lands. Together, we have reforested approximately 12 miles of riverbank to a width of 66 feet.

Tree planting has positively contributed to Toledo's clean rivers and healthy coral reefs, as trees along the banks trap sediment and prevent erosion. It has also restored habitat for forest and aquatic species. Rangers have observed an increase in gibnut, tapir, jaguar, and multiple bird species, including orioles, montezuma orepndula, and tiger herons. Rio Grande is one of the last strongholds for the critically endangered Central American river turtle (known locally as "hicatee"), and the fig and inga trees we have planted provide an important food source, while reforesting riverbanks maintains a deep river channel, hypothesized to be preferred hicatee habitat.

Replenishment zones in PHMR

There are currently five replenishment (no-take) zones in the Port Honduras Marine Reserve, each extending a half-mile radius around one of the cayes. Four zones are open to tourism and one is off limits except for research and emergency rescue. Together, these zones make up 3.2% of the reserve. The remaining 96.8% is a "general use" zone, in which fishing is allowed under Managed Access regulations and gear restrictions

Experts recommend at least 20% of fishing grounds be protected within replenishment zones to conserve biodiversity and maximize catches over the long term. After three years of consultation, fishers are in support of an expansion of PHMR replenishment zones to 5.1% of the Reserve, a 60% increase!

The new zones now cover at least 20% of PHMR's coral reefs. Furthermore, the shape of the new zones will aid enforcement. We have submitted official recommendations to the Fisheries Department and the new zones should come into effect soon, benefitting biodiversity and fishers.



TIDE managers Seleem Chan and Joe Villafranco discuss replenishment zone expansion, important for repopulation of fish, conch, lobster, and sea cucumber

Managed Access fisheries

For the past three years, TIDE has piloted Managed Access fisheries management in the Port Honduras Marine Reserve. Managed Access aims to ensure fishery sustainability by allowing only traditional users access for commercial fishing. Since its inception, the number of commercial fishers using PHMR has decreased by >50% to 112, reducing fishing pressure and improving the fishery. As the government plans to implement Managed



Access in all of Belize's marine reserves over the next few years, the pilot in PHMR and one at Glover's Reef provide valuable 'lessons learned'.

Under Managed Access, fishers are actively involved in the management and protection of fisheries by providing feedback to the Fisheries Department via Community Managed Access Committees as well as data on their catches. These data are used to improve fisheries management and ensure the long-term sustainability of the fishery.

To encourage data submission, TIDE trained and employed a Managed Access coordinator and six 'community stewards' to help fishers record their data. We also ran an advertisement on local TV and provided incentives to those who regularly submitted data. These measures resulted in the proportion of fishers submitting data increasing from 30% to 70%, although, unfortunately, submission has declined again since some of these measures ended.

In 2013, TIDE hosted three forums, with the Fisheries Department in attendance, to maintain two-way communication with fishers. Our research and monitoring team reported on the status of the fisheries, including results from fishers' catch data. Fishers had the opportunity to express their concerns and ideas regarding Managed Access operations. For example, there is a need to regulate recreational fishing as some fishers are currently conducting commercial fishing under the guise of recreational. TIDE also helped fund two days of boat navigation and sea safety training for Managed Access fishers.

1,110 acres of land purchased for conservation

TIDE and partners have saved an additional 1,110 acres of broadleaf tropical forest, situated along the banks of the Rio Grande in the Maya Mountain Marine Corridor. With financial support from the Quebec Labrador Foundation and other generous donors, TIDE teamed up with a couple from New Zealand to purchase the land. Leanne and Craig Knox gave up their life in London and moved to Toledo to start a new life in the jungle!

The area is home to at least 20 endangered or threatened species, such as jaguar, Baird’s tapir, Yucatan black howler monkey, and hicatee – the Central American river turtle. The ecological importance of this area cannot be overemphasized as the forest directly affects the health of the coral reefs downstream, acting as a filter for water draining into the Port Honduras Marine Reserve. The forest trees also store thousands of tons of carbon, helping to reduce global climate change. Through the purchase and protection of this large parcel, TIDE and our partners have completed a vital link in Belize’s Southern Biological Corridor. TIDE researchers and rangers will team up with the Knoxes, who are avid conservationists, to monitor and protect the biodiversity of this beautiful and important piece of rainforest.



BUILDING STAFF CAPACITY: GIS, fire management, and more

Geographic Information Systems (GIS) is a powerful tool that can reveal spatial patterns across a geographic region. As part of our KfW grant, science intern Julia Baker started training TIDE rangers and research personnel to use various GIS techniques in their work. One way we are applying this technology is to map ranger patrols and illegal activities in our protected areas. To this end, some of our rangers and protected area managers also received additional training in the Spatial Monitoring and Reporting Tool (SMART). Rangers will use this information to better plan patrols to combat illegal activities and increase cost-effectiveness.

Other staff trainings included:

- 14 members of the Southern Belize Fire Working Group participated in a TIDE-run fire management refresher course



and prescribed burns in Deep River Forest Reserve

- Rangers Leonard Williams and Edwin Cabrera learned basic conservation finance from the University of Belize Environmental Research Institute under the National Protected Areas Secretariat’s National Training Program for Protected Areas Management
- Our terrestrial manager and education coordinator attended a two-day workshop for climate change mitigation and adaptation by the Southern Environmental Association and WWF
- The Conservation Leadership Programme afforded several staff with training in research and monitoring of critically endangered hicatee (see page 12)



TIDE staff Mario Muschamp and Gail McNab set boundary fires (black lines) at Payne’s Creek National Park

TIDE is empowering local residents to be environmental stewards of the Maya Mountain Marine Corridor

Our education programs aim to foster environmental stewardship in the Maya Mountain Marine Corridor through an appreciation of the natural world and by building human capacity to develop while managing natural resources sustainably.

Freshwater Cup

TIDE’s flagship environmental education program continues to be the Freshwater Cup, a football competition with a twist – each participating team must plan and complete an environmental project to protect freshwater resources to qualify for the football tournament. Now in its 10th year, the Freshwater Cup has gained local and international recognition, winning the 2012 Olympic Award for Integrating Sport and Sustainable Development and being showcased as a model initiative for coral reef stewardship by the Australia Caribbean Coral Reef Collaboration (<http://climateandreefs.org/case-studies/>).

We met our primary objective for 2013, which was addressing gender inequality by raising the number of female teams from 7 to 10. We also increased opportunities to play sports in disadvantaged communities by making equipment available and teaching male and female community members how to coach, with training provided by the Football Federation of Belize. In 2013, 24 teams participated in the Freshwater Cup, including 8 high school teams (new in 2013). Friends and family of each team of 18 children get directly involved with the environmental projects, magnifying the reach and benefits. This year’s winning environmental project was by Trio School, who developed an eco-park for the Bladen River Branch. San Miguel School’s reforestation project and Bladen School’s organic garden were also commended.



Our award-winning Freshwater Cup gets youth to create environmental projects and involve their community in exchange for playing in a locally famous football tournament.



In 2013, we started the Saltwater Cup volleyball tournament for the coastal communities of Monkey River, Punta Negra, and Cattle Landing. These communities were interested in doing environmental projects and playing sports but given their small size there were not enough participants for football teams.

Beach cleanups
TIDE organizes at

least two major beach cleanups per year to get local communities to steward their natural resources. We also participate in the International Coastal Beach and Waterways Cleanup, this year working with Belize Scouting Association to get 35 different groups - primary and high schools, clubs, interest groups, and community members - to pick up over 6,000 pounds (around 500 bags) of garbage. Data on what types, how much, etc. on the garbage collected during cleanup is sent to Ocean Conservancy for compiling into a report. Together these cleanups involved over 1,500 people.

Summer camp and school visits

TIDE’s annual summer camp gives primary school children an opportunity to learn to swim, develop teamwork, enjoy healthy outdoor activities, learn about their environment, and foster a love for nature.

In 2013, we held day camps in 8 communities buffering the protected areas we manage. 170 children



Programs such as Freshwater Cup, beach clean-ups, and Summer Camp give local adults and children an opportunity to learn about and steward Toledo's biodiversity.

ages 8-12 participated along with 28 volunteer facilitators, many of whom are recipients of high school scholarships through TIDE.

Building off of the 2013 international theme of water cooperation, our 2013 theme was "Healthy Rivers Equal Healthy Reefs". Children learned the importance of the connection between rivers and the reef, since much of the pollution to the reef comes from inland via rivers (mostly Honduran and Guatemalan rivers as southern Belize's watersheds are still beautifully forested). Children learned about basic river ecology, the water cycle, and stewardship of watersheds.

The finale of each camp was a field trip to a Toledo protected area. Children from inland communities visited the coral reef, while those from the coast visited the rainforest inland. These trips, along with four more involving another 80+ students, gave the students a sense of the connections between themselves and the wider landscape.

Many of these children would not otherwise get to see the amazing coral reef right on their doorstep. Witnessing the reef for the first time always leaves a lasting impression, and makes children want to protect it.

Other education activities

In 2013, we gave hand-washing lessons in select schools as part of a UNICEF grant focused on childhood development and protection of freshwater resources. Children learned proper techniques to stop the spread of germs.

TIDE's Education Coordinator presented TIDE's work, the types of positions we offer, and more about the local environment at career fairs at Toledo Community College and Julian Cho Technical High School, as well as to clubs and visiting school groups.

Sea to Shore Alliance asked us to organize schools to have children create posters and essays on manatees. Three schools, members of the Toledo Tour Guide Association, and University of Belize students came to the TIDE compound for a fun day of learning about West Indian manatees and developing educational materials.



BUILDING STAFF CAPACITY: Bird Sleuths

TIDE's Education Director Norman Budna and ranger Andrew Williams attended "Bird Sleuth" training at Ya'axché Conservation Trust's Golden Stream Corridor Preserve to develop skills in teaching youngsters about bird conservation. Norman and Andrew are implementing a grant from the Neotropical Bird Club focused on raising awareness of endangered yellow-headed parrots in communities surrounding Payne's Creek National Park. They will also collaborate with Belize Bird Rescue on a rehabilitation and reintroduction program to release young yellow-headed parrots back into the wild.

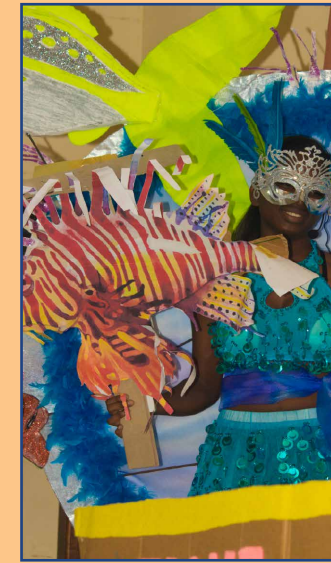


TIDE Fish Festival weekend

Our annual Fish Festival is an opportunity to give back to the community, build awareness and raise funds. We highlight major accomplishments and recognize community members who have significantly contributed to sustainable development in Toledo. In 2013, we celebrated the theme of "Sustainable Fishing, Secure Livelihoods" and enjoyed our biggest Fish Fest yet, with over 1,000 attending.

Around 190 people attended the Friday night Seafood Gala and enjoyed delicious seafood canapés (including invasive lionfish), food and drink, plus live entertainment.

On Saturday night, Youth Conservation Competition participants took the stage with their creative presentations, as they competed for associate degree scholarships. This educational competition allowed the contestants, the live audience of over 300, and TV audience of over 5,000 to learn about the competition's theme, "Sustainable Fishing, Secure



Livelihoods", as well as the work of each student's sponsoring school or organization. We awarded a total of BZ\$3,300 in university scholarships, with first place going to Analee Chuc, representing Sustainable Harvest International.

Thanks to our grand 2013 sponsors: Belize Tourism Board, Environmental Defense Fund, Love FM, Simon Quon Company, Ltd, National Institute of Culture and History, KfW German Cooperation, and MAR Fund.

Toledo Fish Fest is the grand finale of the weekend, kicking off at 6:00 am with 15 fishing boats leaving TIDE's wharf for the fishing tournament. In 2013, Roland Alford took first place for the biggest fish. The afternoon was filled with activities for kids and adults such as cast net throwing, coconut husking, and volleyball, to name a few. Many vendors sold seafood dishes, as well as other Belizean favorites. Musical entertainers closed off this exciting 3-day festival, with drumming by Chukuru & the Tribal Vibes, and Makoy Garcia.

Thanks to everyone who made 2013 a smashing success!



TIDE assesses ecosystem health and threats to biodiversity to provide the data needed to make sound management decisions

At TIDE we are dedicated to science-based management. At the landscape level, we map ecosystems and monitor fresh and marine water quality. At the ecosystem level, we monitor the health of coral reefs, mangroves, seagrass beds, tropical broadleaf forest and pine savanna. We monitor commercial fisheries of conch, lobster, sea cucumber, and fin fish, as well as endangered species, such as the hicatee turtle and yellow-headed parrot. Close monitoring of potential threats, like water quality, hunting, fishing, climatic factors, and the invasive lionfish are also essential. Based on the findings of our on-going monitoring, we develop one-off research projects to answer specific questions or provide new baseline data, which are often carried out by visiting researchers.

TERRESTRIAL & FRESHWATER SYSTEMS

Hicatees

2013 was a great for Hicatee conservation. For the first time in Belize's history two active nests were discovered along the Rio Grande! Read more about our research and work to save this critically endangered species on page 12.

Yellow-headed parrots

Yellow-headed parrots are beautiful, intelligent birds but often captured for the pet trade. With most poaching occurring in the forest reserves surrounding Payne's Creek National Park, TIDE expanded the artificial nest box program to offer greater protection and increase survival for this endangered species. (See page 4)

We monitored breeding success in artificial and natural nests. Of 19 nest boxes, five were used, with 10 eggs laid and five chicks successfully fledging. We observed 14 natural nests. In the six within reach of proper monitoring, 16 eggs were laid, 13 hatched, and nine chicks fledged.



Terrestrial biologist Elmar Requena discovers hicatee turtle eggs. Join us in preventing the extinction of this loveable creature by liking the "Save the Hicatee River Turtle" Facebook page.

Birds, mammals, and amphibians

In both the dry and wet seasons, we monitored amphibians for the first time in Payne's Creek National Park to establish a baseline for the presence/absence of species. We found seven species: red eye tree frog, white lipped frog, Stouffers and Mexican tree frogs, Rio Grande leopard frog, cane toad and Gulf Coast toad.

Monitoring of birds and mammals is conducted along 1,000m transects to determine species abundance and diversity. Rangers record all birds seen or heard every 200m and all signs of mammals along the entire length of the transect. Our rangers are highly skilled and experienced in recognizing literally hundreds of bird species by sight and song. In 2013,



Rio Grande Tree Frog & Yellow-headed Parrot (by Charles Britt)

Ranger Andrew Williams installs a yellow-headed parrot nesting box to help this critically endangered bird survive

more signs of jaguar were noticed.

MARINE SYSTEMS

TIDE is a leader in fisheries management in Belize. We have robust datasets on fish, lobster, conch, water quality and coral health going back five to ten years. Now we are taking our science for fisheries management science to a new level and 2013 saw the beginning of several exciting new studies.

Fisheries Assessment

We conducted a comprehensive assessment of the most economically important export species in PHMR – conch, lobster, and sea cucumber. The full report, the PHMR Commercial Benthic Species Audit: 2009-2013, is available on our website (www.tidebelize.org). The main findings and management recommendations are summarized here:

- Replenishment zones are working. All three species were more abundant within replenishment zones than in the general use zone.
- There was a dramatic but temporary reduction in conch in

July 2011, coinciding with an algal bloom that affected the southern coastal waters of Belize.

- Almost 100% of caught conch was of legal size, indicating excellent compliance with the law by fishers. However, shell length may not be the best available measure to set size limits. Size limits are intended to allow all individuals to grow to maturity before they can be caught, enabling reproduction. Unfortunately, our observations suggest that as much as 90% of conch in fishers' catches are actually juvenile. This is because fast-growing individuals can reach legal shell length before they are sexually mature. Shell lip thickness is probably a much better indicator of maturity. We will test this in 2014-15 and share the results with the Fisheries Department to ensure the fishery remains viable.
- The average size of conch and lobster has been increasing since July 2011, while the population has been decreasing, indicating an aging population with few juveniles coming through. To allow stocks to recover, we recommend a temporary reduction in catch quotas in PHMR.
- We also recommend a temporary moratorium on sea cucumber until sustainable catch quotas can be determined to prevent a collapse in stocks.



Community researcher Willie Caal prepares for lobster monitoring (top left), Sea Cucumber in PHMR (bottom left), fisher with catch (above)

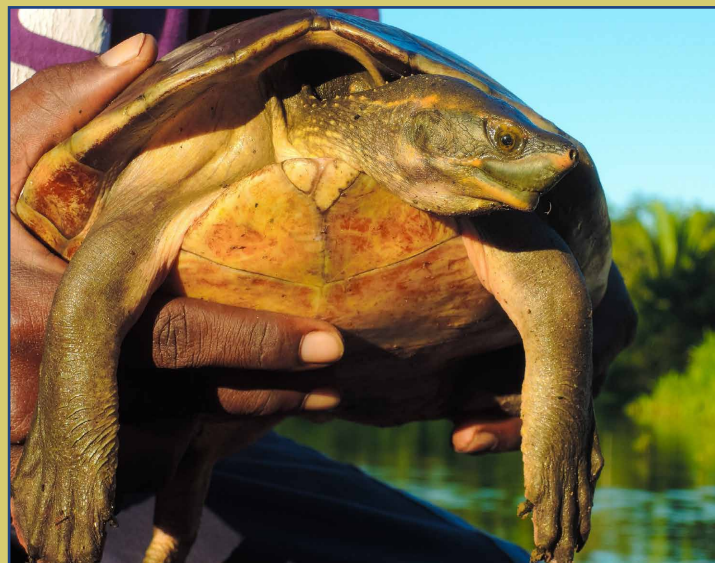
Saving the hicatee turtle

The Conservation Leadership Programme (CLP) develops future conservation leaders by providing awards, training and mentorship. Nine young conservationists from TIDE, Ya'axché Conservation Trust and SATIIM teamed up and won a 2013 Future Conservationist Award from the CLP. Their project, "Ecological and Distribution Assessment of Hicatee in Southern Belize", is conducting research and education on critically endangered Central American river turtles (*Dermatemys mawii*) within the Rio Grande River.

Dialogue with local communities is a critical part of this work. Interviews with hunters revealed that catches of hicatee are declining, their occupied range has shrunk and that many hunters would actually support a longer closed season.

The team learned how to handle turtles and use radio telemetry and GIS to track them. Their research will provide new information on this data deficient species.

The CLP chose TIDE terrestrial biologist and team leader Elmar Requena for a Conservation Leadership Award and sent him to Calgary, Alberta for a conference with participants from 19 other countries. The training included project planning, leadership, education & outreach, climate change, media, and teamwork; all with a goal of teaching the rest of the team and improving the ability to implement the project. "I learned a lot," said Elmar. "Being a leader and follower in a blind dance to learn to trust your teammate, using sticky notes to make sure every person is heard during a brainstorm... I've put the lessons into practice. The training assisted my work and also my personal life. It has built my confidence, helped me get over being shy, so I can present my ideas." If dressing up in a hicatee costume during the La Ruta Maya race in Belmopan is any indication, we'd say it worked!



Mesoamerican Barrier Reef Surveys

We continued to collaborate with conservation organizations from Honduras to Mexico, to collect data on >100 fish and coral species as part of the Healthy Reefs Initiative. Our data will appear in the 2014 "Healthy Reefs Report Card", which helps guide policy and management.

Habitat mapping

In 2013, we started a habitat mapping project in Port Honduras Marine Reserve. We used remote sensing, ground truth verification, and local knowledge to determine the area of major habitats: mangrove, sea grass, coral reef, sand, and mudflats. This information will enable more accurate estimations of commercial species populations and improve fisheries management. Habitat mapping will also provide information on critical habitats for endangered species, such as manatees, and the best locations for alternative livelihood initiatives such as seaweed farming.

Turtle Monitoring

For several years TIDE has monitored three species of endangered marine turtles – hawksbill, green, and loggerhead – to determine their abundance and peak nesting seasons in PHMR. In 2013, we found ten turtle nests on Punta Ycacos and two on south Snake Caye. Sadly, all had been damaged or destroyed, either by humans or natural predators.

Community researchers conduct monthly beach profiling to keep tabs on turtle habitat. Based on rates of beach erosion, we know which areas to monitor more closely to protect turtles. Areas monitored include Punta Ycacos, Punta Negra, Brion Point, South and West Snake Cayes, all favored nesting sites for endangered marine turtles.

On three occasions we brought hatchlings – the first live baby sea turtles we've seen – to Abalone Caye during the day and released them in their original locations at night to avoid predation and increase survival.

To save more turtles in the future, we plan to take advantage of volunteers on our new Ridge to Reef Expeditions program. They will enable us to carry out more extensive monitoring to better predict hatching dates and improve nest protection.



Community researchers help relocate newborn sea turtles to safety.

Research projects increase our knowledge



RIO GRANDE DUMP:

Chantelle Halverson from University of Victoria in Canada used three methods to identify the extent to which the Rio Grande dump site may/may not be impacting the Rio Grande River

and the species within. With a grant for lab work in Canada and a creative appeal she:

- Analyzed contaminants in sediment, algae and bivalves at multiple sites upstream and downstream of the dump site, showing increasing contamination up the food chain.
- Conducted carbon and nitrogen stable isotope analysis, which determined nutrient pathways through the food web. The site most likely contaminated had distinct isotopic signatures similar to samples from the dump site.
- Created an aquatic invertebrate catalog, observing a difference in species composition above and below the dump site.

Chantelle also used her artistic talents to "up-cycle" materials from the dump site to create TIDE's first garden, complete with a fence made of discarded soda bottles!



DOLPHINS:

Jorge Rojas from ECOSUR con-

ducted our first baseline population study on dolphins in Port Honduras Marine Reserve. Each dolphin has distinct markings on its dorsal fin, so by photographing fins Rojas was able to identify individual dolphins and groups, and track movements in the reserve. Computer software digitally recognized photos and compared the newest dorsal fin photograph with the catalog of previously identified individuals. Out of 18 trips into the reserve, Rojas saw dolphins 11 times. He observed a group of 16 bottlenose dolphins and a group of about 25 spotted dolphins. A key finding was that the area of PHMR near Payne's Creek National Park and the Deep River estuary is a hot spot for dolphins. Oil company Providence Energy is proposing to conduct seismic surveys that would traverse Deep River and Payne's Creek, areas also important for West Indian manatees and critically endangered goliath grouper.

REEF INVADERS: Lionfish are an invasive fish species wreaking havoc in the Caribbean. Following up on our 2012-13 research in partnership with Southern Environmental Association and Blue Ventures, we again brought two students from Texas A&M to characterize the lionfish invasion. Results indicate the invasion began later in PHMR than areas further north, and that as the invasion has progressed lionfishes diet switched from juvenile fish to shrimp, possibly as a result of rapid depletion of small fish populations in affected areas. These data can inform fisheries management and guide catch quotas. The Caribbean is no longer in a position to plan eradication measures. Lionfish are here to stay and the challenge is now to minimize the population.

Thankfully, it is delicious to eat and available in local markets and restaurants! Learn more about TIDE's efforts to reduce the pressure of lionfish on native species on our website. <http://tidebelize.org/article/jul-2013/lionfish-report-2013>



Developing Our Staff: Diving and data analysis

Several staff members developed their SCUBA diving skills: five more rangers are now open water divers, four community researchers are now advanced open water divers, and four more staff are now rescue divers!

Science director James Foley attended Fisheries Adaptive Management workshops in Belize City and San Francisco, CA (funded by Environmental Defense Fund) to enable field staff to do higher level fisheries data analysis and help design Managed Access.



Faces of the Future: TIDE Community Researchers

TIDE’s community researchers are young people (aged 18-25) from the Toledo district who have a love for the environment and an interest in protecting it. They have become an integral part of TIDE’s research and monitoring efforts, helping with water quality monitoring, underwater surveys, turtle monitoring, and more.

Our community researchers receive great training and learn countless new skills to help them succeed in the future. “I’ve learned to do testing in the lab, to scuba dive, to do beach profiling, and to interact with my co-workers,” said researcher Allana Barillas. “Now I can identify more fish, corals, mangroves, and birds” Said Willie Caal, who has been a community researcher for 3 years.

Community Researchers are an example to their peers and communities, inspiring others to be stewards of the local environment. Involving stakeholders in environmental management is the essence of TIDE’s mission and monitoring environmental health not only provides extremely important data, it is also a practical way to get people involved in caring for the Maya Mountain Marine Corridor.

TIDE’s program is a stepping stone for researchers in pursuit of their calling. Caal is at University of Belize, studying natural resource management. “Training I received as a community researcher, such as GIS and marine ecology, has helped me a lot in school,” he said.

Caal and other veteran researchers trained the new 2014 trainees in seafloor monitoring, fish and coral identification, and had the opportunity to share their skills with Blue Ventures in northern Belize.

“People might think that we only care about research and numbers, but there’s a lot of passion in the TIDE research department, said science director James Foley. “We really care about getting people involved and empowering them to make a difference.”



Community researcher monitoring and culling Lionfish in PHMR



“I’ve learned so much about the ecosystem and have more of a commitment to doing things to benefit the environment.” - Willie Caal



Community researcher Fernando Rabatu with turtle eggs

“Some of us had spears and some of us had bags. Whenever we saw a lionfish, we struck it and put in the bags...trips like those are fun and you are saving the environment at the same time.”
- Allana Barillas

TIDE supports Toledo communities through volunteer opportunities, local involvement in management decisions, and alternative livelihood programs

Without the support and involvement of communities, TIDE could not achieve its mission. It is integral that we in turn support the communities around the protected areas we manage, by including community members in decisions that affect them and helping to develop sustainable livelihoods.

Conservation of Marine Resources in Central America

The “Conservation of Marine Resources in Central America” project, funded by PACT, MAR Fund, and the German development bank (KfW), involves marine or coastal protected areas in the four Meso-American reef countries: Mexico, Belize, Guatemala, and Honduras. We continued the work started in 2012 for this five-year project, including:

- Granted 22 high school scholarships to children of fishers. These youths will have greater opportunities open to them, and be able to make more informed decision regarding managing fisheries sustainably
- Built much-needed infrastructure in coastal communities, including a wharf for the village of Punta Negra, and a sanitary garbage disposal box at the Punta Gorda fish market
- Trained nine fisherman wives in food handling and catering so they can generate additional income through catering
- Trained 10 women in craft-making from natural resources to provide supplemental incomes



Martin Reyes stands by his chicken coop in Punta Gorda

- Trained 20 business owners in Punta Gorda and Monkey River in tourism management and hospitality
- Hired Major Gilbert Swaso to train nine Managed Access fishers in boat navigation and seamanship techniques. Fishers learned to navigate using charts, correct ways to fuel a boat and use life jackets, and how to identify a vessel at night to avoid collisions
- Continued a chicken-rearing project started in 2012 with 17 families benefiting from additional household income (partially funded by MAREA)

In addition, we commissioned three critical studies related to community development in the coastal communities surrounding Port Honduras Marine Reserve - Punta Gorda, Monkey River, and Punta Negra:

1. Development and updating of community development plans through consultation with local government, key individuals, and organized groups.
2. Business plans for microenterprises – a fruit-drying business in Punta Gorda, restaurant in Punta Negra, and sports fishing in Monkey River. These business propositions followed a feasibility study of potential businesses in Toledo in 2012 and are ideas directly from these communities. Implementation began in 2014.
3. Tourism Development Strategy for Southern Coastal Communities. This strategy was based on ideas from the Toledo Tour Guide Association and other tourism industry stakeholders. Like the community development plans, it belongs to the communities and anyone investing in tourism in the area (available upon request).



Mirtha Mendez of Punta Gorda shows her jewelry made from natural resources (above).



TIDE and C'ac'alanel Car Sa Nima trained 23 members of the San Miguel community in fruit tree grafting aimed at expanding organic cacao-based agroforestry and planted 1,000 more trees along the banks of the Rio Grande River.

Community researcher training

For the last three years TIDE has been training local youths in environmental monitoring, including SCUBA and ecological surveys. TIDE hires the best performers to conduct monthly environmental monitoring. Five people completed the program in 2013, with seasoned community researchers helping train the new recruits. We trained four established community researchers to PADI Advanced Open Water level. The Australia-Caribbean Coral Reef Collaboration highlighted our community researcher program as a model of best practice.

High school scholarships

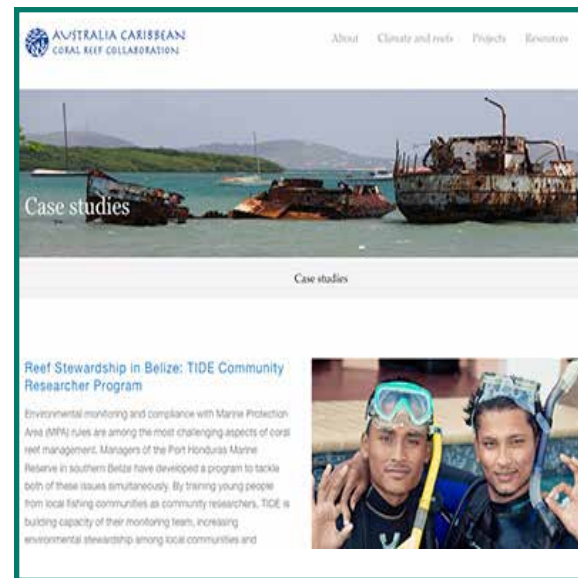
For 13 years, TIDE has supported families in the Maya Mountain Marine Corridor by providing high school scholarships for tuition and/or books. For the 2013-14 academic year, we sponsored 42 students in Punta Gorda Town, Forest Home, Elridge Ville, Jacinto Ville, San Miguel, Monkey River, Punta Negra, Silver Creek, and Big Falls. We encourage scholarship recipients to engage in TIDE activities, such as beach cleanups, Summer Camp and Fish Fest to gain environmental awareness and knowledge. TIDE is grateful for the donors who supported this program: MAR Fund-KfW, Mass Audubon, Oak Foundation, Dr. James Lord, and Ranger Foundation.

Community stewards

TIDE trains community members interested in managing natural resources as "community stewards". Community stewards have implemented environmental projects, given lessons in schools, assisted with research, and educated their peers. In 2013, five stewards assisted Managed Access fishers to record data on their catches and fishing effort, providing crucial data for fisheries management and enabling the fishers to fulfill the requirements for their Managed Access license. TIDE aims to involve stewards in MPA enforcement in 2014 after providing additional training.

Rio Grande riverbank restoration

Working in partnership with the community group C'ac'alanel Car Sa Nima (meaning "riverfish protectors" in Qek'chi Maya), TIDE continued efforts that began in 2009-10 to reforest 4 km of riverbank along the San Miguel branch of the Rio Grande. We planted 1,000 more trees that will sequester carbon, act as a wildlife corridor, and maintain the health of the Rio Grande River, its downstream communities, and the Mesoamerican Reef. We trained 23 farmers in fruit-tree grafting to provide income and agro-forestry support, and established a tree nursery to produce seedlings for sale and help sustain the group.

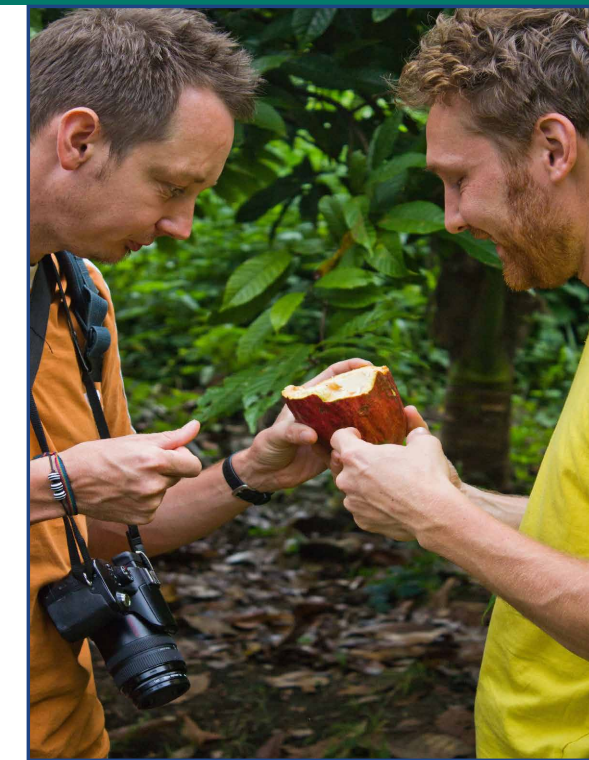
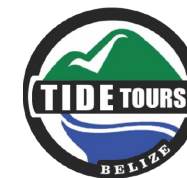


TIDE TOURS

Unspoiled Toledo District is the ideal place to get back to nature. TIDE Tours offers ecotravel in Toledo with proceeds supporting TIDE's work and local guides. In 2013, we took 300 guests on popular tours, including a cacao farm tour and chocolate-making demonstration at Ixcacao, snorkeling in Port Honduras Marine Reserve, kayaking the Rio Grande, and exploring Hokeb Ha Cave and Lubantuun Maya ruins. Our clients not only enjoy tours with our well-qualified guides but they appreciate that their fee is directly contributing to conservation. All visitors who evaluated TIDE Tours on Trip Advisor have rated us as "excellent" on every tour. If you are looking for great travel experiences, visit our website at www.tidetours.org and create the ultimate Belize eco-adventure.

TIDE Tours also coordinates study-abroad programs for universities in the US and Canada. These mix study (eco-tourism, health, and environmental studies) with outdoor fun and adventure in and around Toledo.

In 2013, TIDE Tours coordinated and participated in a workshop by ArtCorps, where participants came up with creative ideas for using art to effect social change. TIDE Tours also coordinated training for tour guides by the South Wales Caving Club on cave safety. TIDE Tours continued to participate in Toledo's popular festivals, including the Chocolate Festival and TIDE's Fish Festival.



TIDE Tours offers eco-adventures that directly help TIDE's work. Tours include Ixcacao Chocolate Farm shown here. See www.tidetours.org/tours for more.

RIDGE TO REEF EXPEDITIONS

To further our conservation efforts in the Maya Mountain Marine Corridor, TIDE is launching a fee-based volunteer program called Ridge to Reef Expeditions (<http://fromridgetoreef.com/>). TIDE hosts volunteers on group expeditions or individual placements, giving them hands-on training to produce real conservation results.

Ridge to Reef participants receive training and experience in SCUBA diving, sea turtle nest protection, marine mammal monitoring, coral reef health monitoring, habitat mapping, lionfish control, jaguar tracking, amphibian monitoring, reforestation, environmental education for children, and much more. The participants' work contributes to our conservation objectives and their fees support conservation and community development.

Ridge to Reef Expeditions gives participants a unique and adventurous way to enjoy the biodiversity of southern Belize and gain valuable career experience. This program is endorsed by the National Oceanic and Atmospheric Administration's Coral Reef Conservation Program (<http://coralreef.noaa.gov/getinvolved/volunteeropp/>).

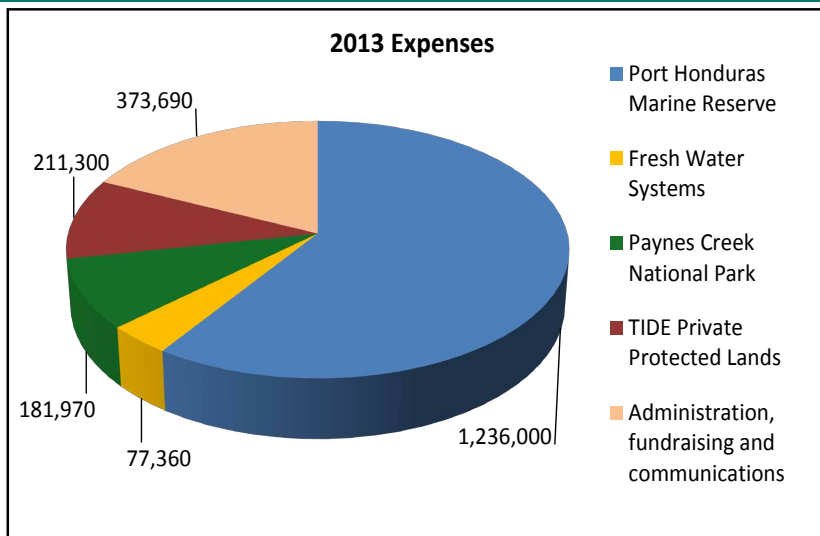
All the planning done in 2013 paid off as we ran our first eight-week expedition in July 2014. Find Ridge to Reef Expeditions on Facebook and follow the action as it unfolds.



Ridge to Reef Expeditions offers hand on conservation experience and amazing adventure at the same time: <http://fromridgetoreef.com>

2013 expenses were BZ\$2,080,320 (US\$1,040,160), comprised of 59% PHMR, 23% freshwater and terrestrial, 18% admin, communications, and fundraising. Major expenses included a new building at our headquarters and our contribution to the purchase of 1,110 acres of forest by the Rio Grande (see page 6).

2013 income was BZ\$2,341,180 (US\$1,170,590), comprised of 49% public grants, 40% private grants, 10% individuals, events, and earned income. We are so grateful for the support of our generous funders in 2013, including Belcampo Lodge, Conservation Leadership Programme, Cell Signalling Technology Inc., MAREA Program, COMPACT, DNS-GOB, Environmental Defense Fund, Idea Wild, Gulf and Caribbean Fisheries Institute, Marfund-KfW, Massachusetts Audubon Society, Neotropical Bird Club, New England Bio Labs Foundation, Oak Foundation, PACT, Quebec Labrador Foundation, Ragnar-Carstam, Rainforest Alliance, Summit Foundation, Turtle Conservation Fund, UNICEF, University System of New Hampshire, US Fish and Wildlife Service, WWF, plus 63 donors to two crowd-funding campaigns, numerous other generous individuals, and 82 Fish Fest sponsors.



"TIDE was showcased in the recent MAR Fund board meeting as a poster child for the KfW Phase 1 project. We applaud... the hard work and dedication TIDE has put into the environment. Such commendable work needs to be exemplified... Congratulations to you and your team in raising the bar in the field of protected areas in the MAR region!"

- Natalie Rosado, Ag. Executive Director of PACT, Belize

New Strategic Plan

We are proud to announce our new strategic plan for 2015-2019. The plan follows a 'theory of change' showing how we expect our interventions to lead to the desired outcome: that Toledo has healthy ecosystems and functioning ecosystem services supporting biodiversity and providing benefits to local communities.

- Key aspects are:
- A strategic approach to sustainable economic development, generating opportunities for local people through environmentally friendly businesses;
 - Strengthening our landscape-based approach, managing all three protected areas as one unit, and working more closely with our stakeholders;
 - Raising the standard of environmental education by teaching teachers.

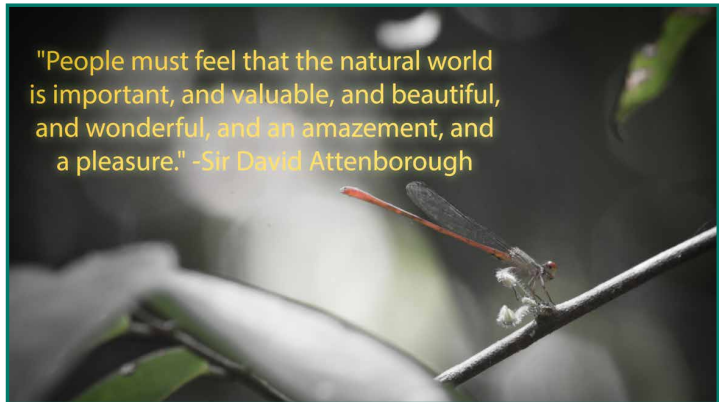
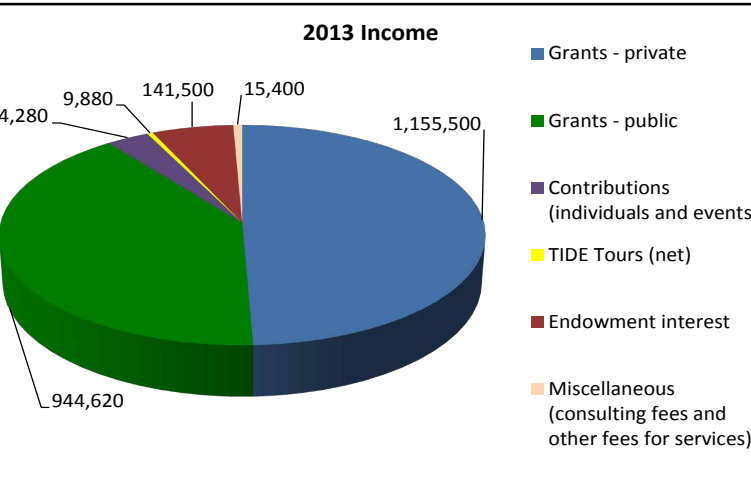


Photo Craig Knox



"Over the years, TIDE has become one of PACT's most outstanding partners. Through our partnership, TIDE has enabled PACT to increase its support to protected areas and conservation in Southern Belize. Despite having limited resources for the magnitude of their work, the TIDE team has proven to be a very committed and hardworking group of individuals, making their organization a leader in Toledo's sustainable development."

- Nayari Diaz-Perez, Acting Grants Director, Protected Areas Conservation Trust (PACT), Belmopan, Belize

Special thanks to BRC printing for supporting TIDE's efforts in 2013

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“On a recent visit to Belize ... we were incredibly impressed with TIDE’s work and its staff. The professionalism of the organization, the diversity of its programs, the sheer physical scale of the terrestrial and marine protected areas it stewards--especially relative to its limited financial resources--and the critical importance of its overall efforts in Belize, were truly inspiring to us.”

– Henry Tepper, President of Mass Audubon, USA

Make a difference today!

Want to ensure the incredible Maya Mountain Marine Corridor stays healthy for both people and wildlife? Make a gift to support TIDE’s cutting-edge community based conservation work today.

Give online at tidebelize.org/page/donate or mail your donation to the address below. You are making an impact that will last millenia.

Thank you!

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