

Conservation Measures Framework and
Monitoring and Evaluation Plan for

The Pedro Bank Management Programme
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1. Introduction

It is estimated that the Caribbean Region is home to approximately 10% of the world's coral reef biodiversity. This project entitled "Management and Conservation of Reef Biodiversity and Reef Fisheries Pilot Project – Pedro Bank" was developed as part of the Caribbean Large Marine Ecosystem (CLME) Project, PIMS-2193 funded by the Global Environment Facility. The focus of the GEF project is to assist Caribbean countries to improve management of shared living marine resources (LMRs), most of which are considered to be fully or over-exploited, through an ecosystem-level approach. The major objective of the CLME Reef Biodiversity and Fisheries Pilot Project is to promote the ecosystem-based approach and strengthen the assessment, management, and governance frameworks required to promote the ecological integrity of Caribbean reef systems and their ability to withstand environmental shocks and stresses.

The Nature Conservancy (TNC) began working in the Caribbean in 1974 and is the largest non-governmental conservation organization working across the Caribbean. A 2-year eco-regional assessment for the Caribbean was completed in 2005, in which all of the region's marine, terrestrial and freshwater ecosystems were characterized and prioritized, ultimately resulting in a decision for TNC to focus its efforts on large-scale marine conservation strategies and partnerships with governments and key stakeholders. One of its main initiatives currently is the Caribbean Challenge. The Caribbean Challenge is the result of unprecedented regional cooperation among eight sovereign nations to protect and effectively manage nearly 21 million acres of marine and coastal resources in networks of parks and protected areas across the Caribbean by 2020. Objectives of the Caribbean Challenge that are directly related to this project are "Expanding marine protected areas to include at least 20% of coastal-marine areas" and "Increasing the capacity of Caribbean island nations to adapt to climate change".

Pedro Bank (Jamaica) is one of the three main demonstration sites selected for the CLME Project. This Bank is regionally and nationally important because of its history, its socio-economic value and its significant biodiversity. The Bank, which has a total area of approximately 8,040 km², is Jamaica's largest artisanal and commercial fishing ground, and is the largest and one of the most productive ecosystems in the world for Queen Conch, making it a site of international fisheries importance. It is composed of a variety of marine habitats such as sand, coral reefs, deep reefs, sea grass beds, and three coral cays known as the Pedro Cays (Northeast Cay [18 acres], Middle Cay [10 acres] and Southwest/Bird Cay [36 acres]). Because of its size and distance from mainland Jamaica and its relatively intact biological systems, it is one of the country's last remaining healthy marine ecosystems. The Pedro Cays are regionally important seabird nesting and roosting areas (masked boobies, roseate terns and others) and also provide several endangered turtle species such as hawksbills and loggerheads with nesting grounds. This notwithstanding, the Pedro Bank and Cays have suffered from years of severe neglect and weak management characterized by heavy human population density resulting in substandard living and sanitary conditions; poorly organized fishers with limited skills; over-fishing and unsustainable fishing practices; little or no fisheries management and enforcement; limited governance frameworks and legislation to support sustainable management and conservation and no formal biodiversity protection and monitoring.

The Pedro Bank Reef Biodiversity and Fisheries Pilot, executed by The Nature Conservancy (TNC) focused on the development and implementation of an ecosystem-based project which incorporated principles of resiliency and sought to protect and enhance important ecological areas which provide vital ecosystem services and serve as important fish nurseries and feeding grounds. It targeted the marine resources, stakeholders (including the fishing community and entities responsible for the management

of the resources), wildlife and the governance of the Bank. The project included activities for habitat restoration and threat reduction (eg. overfishing, destructive fishing practices and destruction of nesting grounds for wildlife such as seabirds and turtles); establishment of Jamaica's first offshore marine protected area, capacity-building of government agencies and the fishing community and developing and implementing a system of collaborative enforcement, and scientific (physical and ecological) and community-based monitoring. The project took place over the course of 1.5 years/18 months.

1.1. Context for Conservation Measures Framework

"In order to achieve our goals, the conservation community must be able to determine the extent to which our actions are working – and we must be able to diagnose why some actions succeed while some do not" (Open Standards For the Practice of Conservation, 2007). This Conservation Measures Framework is an output of the above-stated CLME project. It is a tool aimed at guiding methods for site-based conservation and measuring progress towards achieving conservation goals. It gives a comprehensive description of the rationale behind the conservation activities undertaken in the Pedro Bank Management Programme, status of targets, and procedures for monitoring targets and evaluating success.

For the 18 months of the CLME Project, TNC and partners have expended considerable time and resources on the Pedro Bank Management Programme. The Framework is critical as it allows us to show the impact that the CLME project has had, the role that each partner has played in the CLME project and will play in the future, and the continuity of conservation efforts beyond the life of the CLME project. Importantly, it indicates how targets will be monitored, objectives met, and success measured in a deliberate and quantifiable way going forward. It was developed using:

- Concepts from the Conservation Measures Partnership (CMP) – Open Standards for the Practice of Conservation.
- Findings and strategies from the Management Plan for the Pedro Cays and Surrounding Water developed by Susuan Otuokon in 2012 for TNC and Pedro Bank stakeholders.
- Findings and strategies from the Seabird Conservation and Monitoring Plan for the Pedro Cays developed by Ann Sutton in 2012.

Both Plans were quite instrumental as they incorporated strategies, actions and recommendations put forward by resources users, enforcement and management personnel, educators, experts and TNC, co-managers of the Pedro Bank Management Programme, during consultations that have taken place over a number of years.

1.2. Project Outcomes/Success Factors established by UNEP and TNC

Project Outcomes/Success Factors were established by UNEP and TNC as follows:

1: Integrated ecosystem-based management needs assessed and management frameworks strengthened.

Outcome 1 will be achieved by successfully completing the following actions:

- 1.1. *Continue implementation of 'early actions' of the Pedro Cays Biodiversity and Conservation Management and Zoning Plan and complete a first draft.*
- 1.2. *Establish, equip and staff the Pedro Bank Field and Research Station*
- 1.3. *Conduct Atlantic and Gulf Rapid Reef Assessment (AGRRA) survey to update the 2005 AGRRA to inform and adapt the Pedro Cays Management Plan.*
- 1.4. *Establish a Pedro Cays Fish Sanctuary (including no-take areas and a wildlife reserve).*

1.5 *Using an Ecosystem-Based Management approach, continue and expand management and monitoring activities and begin habitat restoration.*

2: Existing regulations analysed, with new regulations in place and collaborative enforcement mechanisms identified.

Outcome 2 will be achieved by successfully completing the following actions:

2.1 *Inform and support Government of Jamaica (GoJ) efforts to pass new National Fisheries Bill and Policy*

2.2 *Train and develop an effective management and enforcement presence on the Pedro Cays comprised of government, NGO and community representatives.*

2.3 *Continue efforts to assist the Pedro Cays fishing community to organize themselves, and assist them to seek to revise governance arrangements on the Bank and Cays that they would recommend to the GOJ for better, more sustainable management of the Bank's resources. (This would facilitate community-based work & collaborative enforcement & compliance targeting previously engaged fishers).*

3: Public awareness, education, and outreach focused on regulations and enforcement enhanced.

Outcome 3 will be achieved by successfully completing the following actions:

3.1 *Develop public awareness and outreach materials and activities (brochures, training materials, newsletters, Internet materials, etc.) to promote education and awareness and develop conservation leaders among the fishing community.*

4: Best practices transferred between partners with lessons learnt disseminated locally, nationally, and regionally.

Outcome 4 will be achieved by successfully completing the following actions:

4.1 *Share best practices and lessons learnt from activities with the wider national and regional community through the use and dissemination of print and video materials, workshops and web-based methods among others.*

5: Adaptive management improved through the introduction of best management practices.

Outcome 5 will be achieved by successfully completing the following actions:

5.1 *Develop a conservation measures framework and Monitoring and Evaluation Plan to provide inputs to a robust adaptive management regime based on TNC's and the Conservation Measures Partnership (CMP) methodologies. The CMP is a partnership of conservation organizations (including TNC) that seek better ways to design, manage, and measure the impacts of their conservation actions. For more information, see: <http://www.conservationmeasures.org/>.*

2. Summary of The Nature Conservancy's work prior to the CLME Project

The Pedro Bank Management Programme is aimed at establishing a framework and foundation for effective natural resource management and conservation of the Pedro Bank, Jamaica's major fishing grounds and an area of significant marine biodiversity. It is being implemented by The Nature Conservancy in Jamaica (TNC) in partnership with the Fisheries Division (FD), the Jamaica Defence Force (JDF) Coast Guard Service, the University of the West Indies (UWI), the National Planning and Environmental Agency (NEPA) and the Pedro Cays fishing community.

The Programme's goal is to protect and restore Pedro Bank's natural resources and wildlife, while providing a viable livelihood to the Pedro Bank fishing community and building the institutional capacity and financial mechanisms needed to ensure long-term protection.

The Pedro Bank is one of the biggest offshore banks in the Caribbean Basin and is an important historical, commercial, and biological area, both regionally and nationally. The Bank is Jamaica's most important fishing ground; both for artisanal and commercial purposes, supplying over 95% of country's conch exports and the majority of its domestic fish products, an estimated annual value of US\$24 million. The Pedro Bank also harbours some of Jamaica's better-preserved coral reefs (estimated over 90% of Jamaica's reefs are in danger). It is an important area of marine biodiversity due mainly to its relative isolation – Pedro Cays are regionally important seabird and sea turtle nesting habitat. In 2004 it was declared a National Underwater Monument by the Jamaica National Heritage Trust (JNHT).

2.1. Major Issues on the Bank

- Heavy population density, substandard living and sanitary conditions
- Fishers not organized and have limited skills
- Little fisheries management & enforcement & heavy fishing pressure and unsustainable fishing practices and methods
- Limited & erratic natural resource monitoring
- No formal biodiversity protection (reefs, seabirds, turtles) & increasing & compounding threats
- Weak policy and legislation to support sustainable management & conservation
- External/new pressures
- Illegal foreign fishing (Honduras, Dominican Republic)
- Oil exploration and potential future extraction

2.2. Major accomplishments prior to CLME Project:

- a. Targeted baseline field research conducted (2005-2007) to evaluate and document ecological and human conditions on the Pedro Cays and surrounding coral reefs and provide recommendations.
- b. Development of public awareness and outreach materials.
- c. Capacity-building with partners such as the Fisheries Division, Coast Guard and fishing community.
- d. Marine Protected Areas work that included strong recommendations of areas on the Bank that should be protected.
- e. Fundraising (2005 – 2008).

2.3. Next steps/activities identified prior to the CLME Project:

- a. Build capacity, alliances and public awareness on-site and nationally for effective implementation of marine conservation strategies.
- b. Research and test concrete strategies to reduce fishing pressure through promotion of more sustainable fishing practices and alternative livelihood initiatives.
- c. Implement preliminary monitoring and restoration activities as part of greater Management Plan activities on Pedro Bank.

- d. Continue work to address short-term and long-term management and living conditions on Pedro Cays.
- e. Establish marine protected areas.

2.4.Targets identified and their status prior to the CLME Project

Conservation Targets or Biodiversity Targets are specific species, ecological systems/habitats, or ecological processes that are chosen to (i) Represent and encompass the overall biodiversity of a site, (ii) Represent and encompass different levels of biological and spatial organization within a site or (iii) Protect important species which are globally/locally imperilled or endemic. They are the basis for setting goals, carrying out conservation actions and measuring conservation effectiveness.

The targets below were selected based on the results of assessments completed in 2005 and stakeholder consultations that followed in 2006. They were reevaluated in 2011/2012 consultations associated with the Management Plan for the Pedro Cays and surrounding water where they were divided into primary and secondary targets – mainly due to ease of monitoring effectively and dependence on the target by the Pedro Cays community. The targets are of economic, cultural and/or ecological significance. Primary targets are in bold print.

- **Coral reefs**
- **Ecologically important reef species**
- Marine mammals
- **Nesting seabirds**
- **Offshore cays**
- **Seagrass beds**
- **Seaturtles**
- Sharks

Table 1 below summarizes the status of these targets at the time.

Table 1: Status of Conservation Targets in 2005.

Target	Status in 2004/2005	Main threat/s	Threat rating
Coral Reefs	Higher relief than other Caribbean countries. Cover (16%) lower than Caribbean average (20%) but higher than that on coast of Jamaica. Recruitment lower than Caribbean average. Sizes larger than Caribbean averages. Very little disease. Macroalgal cover (except around cays) lower than Caribbean average.	Macroalgal growth in spp. around cays because of high nutrient levels and overfishing. Storm events. Disease and climate change other main threats (incidence of disease low at the time).	High (mainly due to climate change that was relatively unknown at the time and overfishing)
Ecologically important reef spp.	Highest biomass of herbivorous fish in Region. Density of Seabass and Snapper lower than the Caribbean average. Seabass and Snapper make up 1% each of the total fish population surveyed. Conch well managed commercially but there are issues with local and foreign poaching. Same with lobster.	Overfishing and use of unsustainable practices.	Medium/High
Marine Mammals	Not surveyed	Unknown	Not Specified
Nesting Seabirds	Masked Boobies used as indicator. Numbers declining on Middle Cay. Incidence of nesting failure high on Middle Cay. Population stable on South West Cay. Numbers of other nesting birds seem to be declining.	Predation by cats. Loss of habitat to solid waste and human development. Human physical disturbance. Interference by domestic fowl. For other seabird	High

		spp. decline may be due to regular fluctuation in nesting cycles and poor food quality and abundance as a result of overfishing.	
Offshore Cays	More vegetation present (26 spp total) than in the 1950's (9 spp). Annual patten of movement of sand around the cays noted.	Sea level rise as a result of climate change. Introduced species.	Medium
Seagrass Beds	Scattered over the Bank in patches. <i>Thalassia</i> and <i>Syringodium</i> the main types.	Algal overgrowth as a result of nutrients from cays and removal of herbivorous fish.	Low
Sea turtles	There have not been any sustained systematic surveys of turtles on the cays. Hawsbill and Green seaturtles are the most common types seen on and around the cays.	Poaching of adults and eggs. Strandings in pond of South West Cay. Limited nesting sites on Middle Cay.	Very High
Sharks	Not surveyed	Capture for fins and other body parts.	Medium

#Threats # / =>Targets=>	Coral reefs	Ecologically imp...	Marine mammals	Nesting seabirds	Offshore cays	Seagrass beds	Sea turtles	Sharks	Summary Threat Rating
Illegal and/or unsustainable fishing practices	High	High	Not Specified			Low	Medium	Medium	High
Climate Change	High	Not Specified		High	Low	Not Specified	High		High
Habitat degradation/destruction	Low			High	High	Not Specified	Very High		High
Invasive/introduced species (marine and terrestrial)	Not Specified	Medium		High			High		High
Inappropriate boating activity	Low					Low			Low
Species Disturbance			Not Specified	Low			High		Medium
Shark finning/fishing and bycatch								Medium	Low
Summary Target Ratings:	High	Medium	Not Specified	High	Medium	Low	Very High	Medium	Overall Project Rating High

Image 1 of table showing conservation targets, their threats and the levels of threats as at 2005.

Threats were ranked based on a combination of their scope, severity and irreversibility defined below.

Scope - Most commonly defined spatially as the proportion of the target that can reasonably be expected to be affected by the threat within ten years given the continuation of current circumstances and trends. For ecosystems and ecological communities, measured as the proportion of the target's occurrence. For species, measured as the proportion of the target's population.

- **Very High:** The threat is likely to be pervasive in its scope, affecting the target across all or most (71-100%) of its occurrence/population.
- **High:** The threat is likely to be widespread in its scope, affecting the target across much (31-70%) of its occurrence/population.
- **Medium:** The threat is likely to be restricted in its scope, affecting the target across some (11-30%) of its occurrence/population.
- **Low:** The threat is likely to be very narrow in its scope, affecting the target across a small proportion (1-10%) of its occurrence/population.

Severity - Within the scope, the level of damage to the target from the threat that can reasonably be expected given the continuation of current circumstances and trends. For ecosystems and ecological communities, typically measured as the degree of destruction or degradation of the target within the scope. For species, usually measured as the degree of reduction of the target population within the scope.

- **Very High:** Within the scope, the threat is likely to destroy or eliminate the target, or reduce its population by 71-100% within ten years or three generations.
- **High:** Within the scope, the threat is likely to seriously degrade/reduce the target or reduce its population by 31-70% within ten years or three generations.
- **Medium:** Within the scope, the threat is likely to moderately degrade/reduce the target or reduce its population by 11-30% within ten years or three generations.
- **Low:** Within the scope, the threat is likely to only slightly degrade/reduce the target or reduce its population by 1-10% within ten years or three generations.

Irreversibility (Permanence) - The degree to which the effects of a threat can be reversed and the target affected by the threat restored.

- **Very High:** The effects of the threat cannot be reversed and it is very unlikely the target can be restored, and/or it would take more than 100 years to achieve this (e.g., wetlands converted to a shopping center).
- **High:** The effects of the threat can technically be reversed and the target restored, but it is not practically affordable and/or it would take 21-100 years to achieve this (e.g., wetland converted to agriculture).
- **Medium:** The effects of the threat can be reversed and the target restored with a reasonable commitment of resources and/or within 6-20 years (e.g., ditching and draining of wetland).
- **Low:** The effects of the threat are easily reversible and the target can be easily restored at a relatively low cost and/or within 0-5 years (e.g., off-road vehicles trespassing in wetland).

3. Accomplishments of the CLME Project and how they tie in with wider/overarching Project objectives/components

The CLME Project met most of its objectives and laid the foundation for work to be done by the Government of Jamaica, TNC and other Pedro Bank stakeholders well into the future. Based on expected outcomes established prior to project implementation, the Logical Framework below (a tool used in the design, monitoring and evaluation of projects, including conservation projects) was drafted to track the progress of the project. The final two columns have been added to indicate how each activity was completed and when. See **Table 2: Accomplishments of the CLME Project**.

1. Project Outcome = Expected Accomplishment or PoW Output	Indicators ²	Means of Verification	Status details	Timeline
<i>Expected Accomplishments under Outcome 1 (Integrated ecosystem-based management needs assessed and management frameworks strengthened)</i>				
1.1. Continue implementation of 'early actions' (necessary activities for Phase 1 of Plan) of the Pedro Cays Biodiversity and Conservation Management and Zoning Plan and complete a first draft	Pedro Cays Biodiversity and Conservation Management and Zoning Plan (MP) developed and implementation thereof initiated leading to improved management and protection of resources and habitat	<ul style="list-style-type: none"> • Miradi conservation planning software file (used to inform MP) Stakeholder meeting records. • Pedro Cays Biodiversity and Conservation Management and Zoning Plan (MP) • GIS mapping and database for Pedro Cays and Bank • Zoning maps • Meeting notes for consultations held on the draft MP 	<ul style="list-style-type: none"> • Pedro Cays Biodiversity and Conservation Management and Zoning Plan (MP) completed. <ul style="list-style-type: none"> - Project data entered into Miradi prior to start of project and included into the management plan. - GIS mapping and creation of database not done, however, benthic habitat classification completed. - Consultations with community members and stakeholders in preparation of MP held and meeting notes taken. 	<ul style="list-style-type: none"> • Management Plan completed in April 2012
1.2. Establish, equip and staff the Pedro Bank Field and Research Station	<ul style="list-style-type: none"> • Enforcement, management and monitoring efforts improved due to project staff presence and increased communication and collaboration with JDF Coast Guard, Marine Police and fishing community. • Field & Research Station used as a research base and resource centre by project staff, research institutions, fishing community, JDF Coast Guard and others to advance management and conservation efforts. 	<ul style="list-style-type: none"> • Staff hired and located at Field Station • Frequent visitation to and use of Field Station by researchers, TNC and GoJ staff (as documented in log/visitors book) • Monitoring logs/datasheets 	<ul style="list-style-type: none"> • Staff hired and patrols started. • Field Station used for conch survey, Management Plan Consultations, cleanup activities, buoy deployment, seabird workshops etc. • Monitoring plan or sheets were not created during the project. 	<ul style="list-style-type: none"> • Staff hired in June 2012 • Wardens hired in October 2012 • Field Station used throughout period of project.
1.3. Conduct Atlantic and Gulf Rapid Reef Assessment (AGRRA) survey to update the 2005 AGRRA to inform	A second AGRRA survey is conducted to determine the status and condition of Pedro Cay coral reefs and fish populations to inform and guide management and monitoring activities and	<ul style="list-style-type: none"> • AGRRA survey and data • AGRRA report and incorporation of AGRRA recommendations into the management and monitoring activities. 	<ul style="list-style-type: none"> • AGRRA survey done by Living Oceans Foundation with participation from UWI, TNC, Fisheries Division, NEPA, Vet Services. • Field report completed 	<ul style="list-style-type: none"> • AGRRA survey done in March 2012 • Field Report completed in May 2012 • Benthic classification report of areas around

1. Project Outcome = Expected Accomplishment or PoW Output	Indicators ²	Means of Verification	Status details	Timeline
and adapt the Pedro Cays Management Plan.	strategies and to be used as a comparison with the 2005 AGRRRA results.		<ul style="list-style-type: none"> • Full report that has analysis of data is being done by the Living Oceans Foundation and is not yet complete. • Recommendations from Field Report incorporated into MP • Benthic data collected around the cays using side scan sonar technology. Analysis also done and report submitted to TNC. 	cays done in June 2012.
1.4. Establish a Pedro Cays Fish Sanctuary (including no-take areas)	Operation of the first ever MPA on Pedro Bank has the support of Pedro fishing community, is adequately staffed and funded and is being effectively managed to promote and increase resource protection.	<ul style="list-style-type: none"> • (Data) reports on management and monitoring – of species, habitat quality, habitat restoration activities • Compliance reports noting breaches and compliance • “Gazette” announcing the establishment of fish sanctuary 	<ul style="list-style-type: none"> • South West Cay Special Fisheries Conservation Area (sanctuary) declared under the Fishing industry Act. • Conservation Officer hired to manage wardens. • Wardens hired for patrolling of the sanctuary and infractions (with details) being recorded. 	<ul style="list-style-type: none"> • Sanctuary declared on May 17, 2012. • Conservation Officer hired to manage wardens on June 1, 2012. • Wardens hired in October 2012.
1.5. Using an Ecosystem-Based Management approach, continue and expand management and monitoring activities and begin habitat restoration	Management, monitoring and restoration activities are being conducted towards the improvement of breeding success of seabirds and turtles, augmentation of fish stocks and identification of areas of resilience for climate change adaptation efforts	(Data) reports on management and monitoring – of species, habitat quality, # of plants planted as part of habitat restoration activities	<ul style="list-style-type: none"> • Monitoring of marine species has not begun due to delays in hiring staff and the subsequent limited time to get staff hired, patrols started and buoys deployed. • Some data on seabirds was collected during the June and October 2012 seabird workshops. Monitoring was also done for the preparation of the Seabird Conservation and Monitoring Plan. Reports and Plan available. • Cat eradication, rat baiting and cleanup of solid waste all completed as part of habitat restoration activities. Incinerators handed out to community members and JDF Coast Guard as part of activity. Improvement of nesting success of masked boobies on Middle Cay noted. 	<ul style="list-style-type: none"> • Cleanup of solid waste on Middle Cay completed in September 2012. • Seabird Conservation and Monitoring Plan completed in October 2012.
Expected Accomplishments under Outcome 2 (Existing regulations analyzed, with new regulations in place and collaborative enforcement mechanisms identified)				
2.1. Inform and support Government of Jamaica (GoJ) with efforts to	TNC’s technical input and review of the new National Fisheries Bill and Policy assists in the re-	TNC participation in GoJ review and consultation meetings	<ul style="list-style-type: none"> • TNC finally received correspondence from the GoJ through its Fisheries Division in 	<ul style="list-style-type: none"> • Letter requesting TNCs support

1. Project Outcome = Expected Accomplishment or PoW Output	Indicators ²	Means of Verification	Status details	Timeline
pass new National Fisheries Bill and Policy	submission of the documents to the relevant authorities		September 2012 requesting its technical assistance in getting regulations to support the new National Fisheries Bill and Policy drafted. We have since drafted a contract to hire legal personnel that will provide this support to the Fisheries Division. The drafting and accepting of the regulations was not completed before the end of the CLME project.	received from the Government of Jamaica in October 2012. <ul style="list-style-type: none"> Contract to hire legal support completed by TNC in December 2012.
2.2. Train and develop an effective management and enforcement presence on the Pedro Cays comprised of government, NGO and community representatives	2-4 trained enforcement staff regularly present on Pedro Cays, carrying out enforcement, education and communication duties	<ul style="list-style-type: none"> Records of infractions Community meeting records Training reports documenting training workshop /apprenticeship 	<ul style="list-style-type: none"> TNCs Conservation Coordinator attended: <ul style="list-style-type: none"> MPA management workshop in Belize coordinated by CAMPAM Network. Seabird workshop in San Salvador, Bahamas WildAid MPA Enforcement workshop in San Francisco (also attended by Conservation Officer) Fish Sanctuary Workshop held for members of Pedro Cays, Treasure Beach and Galleon Beach communities. Patrols now in effect and data being collected on infractions committed. Seabird Training workshops held for TNC, NEPA, UWI and regional conservationists and birders. Reports on all activities submitted to UNEP and available. 	<ul style="list-style-type: none"> MPA management workshop attended in September 2011 Fish Sanctuary workshop coordinated and executed by TNC in February 2012 Seabird workshops coordinated and hosted on the Pedro Bank in June and October 2012.
2.3. Continue efforts to assist the Pedro Cays fishing community to organize themselves, and assist them to seek to revise governance	Progress made in assisting the Pedro Cays fishing community to organize themselves and mobilise in order to lobby the GoJ to improve management and governance arrangements on the Cays and Bank..	<ul style="list-style-type: none"> # of fisher meetings held # of fishers attending meetings # of visits to/exchanges with existing friendly societies or associations on the South 	<ul style="list-style-type: none"> Not accomplished. This aspect of the project was to be completed by the Education and Outreach contractor. Due to non-performance, this contract was terminated. Production of community educational material was taken on by TNC as priority over the community organization meetings as it was felt that to 	

1. Project Outcome = Expected Accomplishment or PoW Output	Indicators ²	Means of Verification	Status details	Timeline
arrangements on the Bank and Cays for better, more sustainable management of the Bank's resources.		Coast • Reports of relevant fishers meetings	accomplish true organization, far more time was required.	
<i>Expected Accomplishments under Outcome 3 (Public awareness, education, and outreach focused on regulations and enforcement enhanced)</i>				
3.1. Develop public awareness and outreach materials and activities (newsletters, Internet materials, etc.) to promote education and awareness and develop conservation leaders among the fishing community	Materials developed serve to further create awareness and sensitise key stakeholders to the value and benefit of effective conservation management and protection, including MPAs	<ul style="list-style-type: none"> • Record of community meetings. • Print materials for education and awareness • Film (already developed pre-CLME project) Massa God Fish Can Done is shared widely to increase education and awareness • Training reports 	<ul style="list-style-type: none"> • Outreach materials were created <ul style="list-style-type: none"> - Outreach material included posters, training videos and signage for the sanctuary. 	<ul style="list-style-type: none"> • Outreach material completed in November 2012
<ul style="list-style-type: none"> • <i>Expected Accomplishments under Outcome 4 (Best practices transferred with lessons learnt disseminated)</i> 				
4.1 Share best practices and lessons learnt from activities with the wider national and regional community through the use and dissemination of print and video materials, and web-based methods among others	Exchange/transfer of knowledge between the sites serve to create more robust, innovative and effective strategies for governance and management	<ul style="list-style-type: none"> • Interactive web-pages (CLME and Pedro Project websites) • Media and outreach reports • Print materials for education and awareness • Film/video materials for education and awareness • Training and technical reports 	<ul style="list-style-type: none"> • Print materials created but yet to be distributed. • Video material created and shared with partners including FD, NEPA, Jamaica Fish Sanctuaries Network, Fisheries Advisory Board, CAMPAM Network etc. • Training workshops done to share knowledge and techniques/practices and reports created. • Meetings attended with government partners to try to find a solution to solid and human waste, and fisheries management issues that face the Pedro Bank. 	<ul style="list-style-type: none"> • Print and video materials completed in November 2012. • Trainings done in February, June and October 2012
<i>Expected Accomplishments under Outcome 5 (Adaptive management improved through the introduction of best management practices)</i>				

1. Project Outcome = Expected Accomplishment or PoW Output	Indicators ²	Means of Verification	Status details	Timeline
5.1 Develop a conservation measures framework and Monitoring and Evaluation Plan to provide inputs to a robust adaptive management regime based on TNC's and the Conservation Measures Partnership (CMP) methodologies.	A conservation measures framework has been developed to assess and inform conservation and management progress/success in order to better diagnose (potential) problems and maximize the effectiveness and efficiency of the work for greatest conservation gain.	<ul style="list-style-type: none"> • Conservation measures report • List of measures (indicators) of success 	<ul style="list-style-type: none"> • Framework completed 	<ul style="list-style-type: none"> • December 2012
2. Project Outputs:	Indicators	Means of Verification		
1. Support and improve the governance of Jamaica's reef fisheries and marine biodiversity management through piloting community-derived governance recommendations, investment in resource monitoring and management, establishment of marine protected areas, and building enforcement and surveillance capacity necessary to abate threats to fisheries and biodiversity.	<ul style="list-style-type: none"> • Development of Pedro Cays Biodiversity and Conservation Management Plan • Stakeholder Participation • Operational and Active Field Station • Collection of biological survey data 	<ul style="list-style-type: none"> • Creation of the Report • Stakeholder meeting records • Staff presence • Raw and analysed data available • Reports to Government of Jamaica 	<ul style="list-style-type: none"> • Management Plan created with input from community members and stakeholders. Meeting records taken. • Field Station operational and has hosted many groups for many activities including conch survey, consultations, buoy deployment, cleanup activities, cat eradications, workshops etc. • Biological survey data collected through LOF Expedition and seabird surveys 	<ul style="list-style-type: none"> • Management Plan created in April 2012 • Field Station operational since March 2010 • LOF Expedition in March 2012 and seabird surveys in 2011/2012.
2. Promote behavioural changes and attitudes towards resource-extraction and conservation through education and	Public awareness and outreach materials and activities developed	Outreach materials developed and activities conducted	<ul style="list-style-type: none"> • Public awareness and outreach materials produced. • Activities being developed. This has not been completed within the lifespan of the project due to the lateness in producing 	<ul style="list-style-type: none"> • Education and outreach materials produced November 2012.

1. Project Outcome = Expected Accomplishment or PoW Output	Indicators ²	Means of Verification	Status details	Timeline
sensitization, as a means to begin reducing fishing pressure and the rate of extraction on the Pedro Bank.			educational materials. This was late because of the termination of the education and outreach contract.	
3. Share lessons learnt and facilitate the transfer of best practices for application and adaptation to sites in-country and throughout the region facing similar challenges.	<ul style="list-style-type: none"> • Materials documenting project outcomes created • Presentation of project outcomes at regional and international workshops • Development of Monitoring and Evaluation Plan for Pedro Bank 	Monitoring reports and presentations	<ul style="list-style-type: none"> • Reports and Conservation Measures Framework completed. • Sharing of lessons learned and project activities done through preparation of management plan and consultations; workshops on Pedro Cays and in Treasure Beach; workshops/conferences attended in Belize and Colombia. • Monitoring Plan delayed; however, aspects have been completed in the Management Plan and the Seabird Conservation and Monitoring Plan. 	<ul style="list-style-type: none"> • CMF completed in December 2012 • MP completed in April 2012, Seabird Plan completed in October 2012, Workshops on Pedro in June and Oct. 2012, Belize workshop in September 2011, CLME Conference in San Andres (Colombia) in April 2012.
3. Project Milestones⁴:				
M1 Pedro Cays Biodiversity and Conservation Management and Zoning Plan developed			Completed	April 2012
M2 Pedro Bank Field and Research Station fully equipped and staffed			Completed	March 2010 & June 2012
M3 Pedro Cays Fish Sanctuary established			Completed	May 2012 with buoys deployed in October 2012

3.1. Present Status Summary – since 2005 assessments

Activities since 2005 have not focused on all targets due to resource constraints. During the period of the CLME Project, an Atlantic and Gulf Rapid Reef Assessment (AGRRA) Survey with focus on coral reefs and reef fish was completed. Seabird surveys were also conducted with particular focus on Masked Boobies and their habitat.

For the AGRRA survey the research team assessed the coral reef community structure at 20 sites across the Bank. At each site at least one 10 m X 1 m photo transect was taken. A subset of reef fish (approx. 70 species) were quantified (abundance and biomass) within 187 belt transects (each 30 m X 2 m). Additional roving surveys were undertaken to characterize reef fish diversity using REEF methodology. The size and condition of approximately 3000 corals were assessed within 74 belt transects (each 10 m X 1 m). Benthic assessments using a point count method were conducted on 158 transects (each 10 m in length; 100 points). Motile invertebrates (lobster, conch, crabs, sea cucumbers and sea urchins) were assessed in each location within circular plots (each 314 m² area). The team completed 252 dives and a total bottom time of 202 hours.

Seabird surveys were conducted in October 2011, February 2012, June 2012 and October 2012. Data was gathered on all species present as well as their habitats, however, the masked booby was selected as a target/indicator species and as such more data was gathered on this species. During each survey, full census counts were made, nests were flagged and all masked boobies, including adults and chicks, were banded. This allowed the determination of nest cycle and nesting success. In June and October 2012, tracking devices were placed on masked boobies to help determine their feeding range.

Table 3: Present status summary for project targets

Target	Status in 2004/2005	Status in 2012
Coral Reefs	Higher relief than other Caribbean countries. Cover (16%) lower than Caribbean average (20%) but higher than that on coast of Jamaica. Recruitment lower than Caribbean average. Sizes larger than Caribbean averages. Very little disease. Macroalgal cover (except around cays) lower than Caribbean average. Status: Good	Reefs in good condition with few diseases and moderate to low macroalgal cover. Disease included isolated cases of white plague, yellow band and dark spot. On most reefs there were little signs of recent mortality. <i>Montastrea</i> spp. abundant on forereefs. <i>Acropora</i> spp. abundant in patches. Analysis of data collected during AGRRA survey yet to be completed.
Ecologically important reef spp.	Highest biomass of herbivorous fish in Caribbean Region. Density of Seabass and Snapper lower than the Caribbean average. Seabass and Snapper make up 1% each of the total fish population surveyed. Conch well managed commercially but there are issues with local and foreign poaching. Same with lobster. Status: Fair	Moderate diversity of fish with most being small (less than 20 cm length). Parrotfish in juvenile or initial phases, very few princess and queen parrotfish, terminal phase fish smaller than those in other countries in Caribbean, snappers and groupers rare or absent. Very few spiny lobsters seen.
Marine Mammals	Not surveyed	Not surveyed
Nesting Seabirds	Masked Boobies used as indicator. Numbers declining on Middle Cay (approx 150 pairs – Sutton, Progress Report 2012). Incidence of nesting failure high on Middle Cay. Population stable on South West Cay. Numbers of other nesting birds seem to be declining. Status: Poor	Nesting success of masked boobies on Middle Cay increased significantly after cat eradication exercises in November 2011, February 2012 and finally July 2012. Population number still low (approx.. 77 pairs in Feb 2012 – Sutton, Progress Report, 2012). Status: Poor

Offshore Cays	More vegetation present (26 spp total) than in the 1950's (9 spp). Annual pattern of movement of sand around the cays noted. Status: Fair	Only slight changes in vegetation since 2005 with pumpkin being seen in greater abundance. Rodents do not seem to be a significant threat on SW Cay although the presence of mice was confirmed by sight and not by baiting. Status: Fair
Seagrass Beds	Scattered over the Bank in patches. <i>Thalassia</i> and <i>Syringodium</i> the main types. Status: Not stated	Not surveyed
Sea turtles	There have not been any sustained systematic surveys of turtles on the cays. Hawksbill and Green seaturtles are the most common types seen on and around the cays. Occasional strandings seen in pond of SW Cay. Status: Not stated	Occasional strandings still observed. Wardens of sanctuary rescued a female Hawksbill from the pond on SW Cay in November 2012.
Sharks	Not surveyed	Reef and nurse sharks seen on almost all 2012 AGRRA dives. Nurse sharks particularly abundant in comparison to other areas in the Caribbean (A. Bruckner, personal communication, 2012).

Analysis of marine data collected in the 2012 AGRRA survey has not yet been completed by the Living Oceans Foundation. As such we have not been able to provide the status of the marine targets in 2012. However, we will discuss the changes found in terrestrial targets and attempt to make a comparison between the statuses of marine targets in 2005 and 2012 based on observations made.

Status ratings of targets in 2005 were determined based on a number of Key Ecological Attributes (KEAs). Those that were surveyed and a status determined have been detailed below:

- Coral Reefs – KEAs included population structure and recruitment, presence/abundance of key functional guilds (piscivorous fish, herbivores), fish diversity, coral diversity, primary productivity (macroalgal cover), water quality and water temperature (indicated by % bleached cover in addition to temperature readings).
- Ecologically important reef species – KEAs included population size and dynamics, presence/abundance of keystone species (parrotfish), species composition/dominance, population structure and recruitment, presence/abundance of key functional guilds
- Nesting Seabirds – KEAs included population size and dynamics, population structure and recruitment, abundance of food resources, depredation and parasitism, community architecture and species diversity.
- Offshore Cays – KEAs included size/extent of characteristic communities/ecosystems, species composition/dominance (plants), species diversity, landscape pattern, soil/sediment stability and movement.

Corals reefs in 2012 appeared to be in relatively good condition when compared to 2005. The main difference with the 2012 survey, which also covers our next target (Ecologically important reef species), was the significant decline in the size and density of herbivorous and piscivorous/predatory fish. This raises concerns for the disruption of the coral reefs as a system that could have grave consequences if

not addressed. Though the coral themselves remain in good condition, if the structure of the system is affected through, for example, the removal of herbivorous fish that remove macroalgae that are damaging to the reef, in the long run the coral that appears healthy could suffer significantly. The main reason for the declines is heavy fishing pressure and unsustainable fishing practices. The contributing factors to this include poverty, limited knowledge and awareness, limited enforcement and outdated legislation to support effective management.

The Nesting Seabirds and Offshore Cays targets are also linked in that anything that affects the ability of the offshore cay to act as a habitat, is also likely to affect nesting seabirds, and seaturtles for that matter. The major threat to these targets has been the human community that significantly impacts the terrestrial habitat through improper human and solid waste disposal, unmanaged erection of structures, introduction of alien invasives and physical disturbance. The viability of the offshore cay as a habitat can be evident when looking at nesting seabirds on the inhabited cays versus the uninhabited cay. North East Cay is inhabited by humans and has not had nesting seabirds use it since before 2005. The only seabird species that nests on Middle Cay, also inhabited by humans, is the Masked Booby and its population declined from 150 pairs in 2005 to 77 pairs in 2012. South West Cay is not inhabited by humans and population numbers for seabirds that live there year round (Masked Boobies, Brown Boobies and Frigate Birds), have fluctuated. The 2012 Masked Booby count was approximately 90 nesting pairs, this on a cay that was not used historically by this species. The March 2012 Brown Booby count was approximately 125 nesting pairs, similar to the 128 pairs during counted in March 2009 and an increase over the 119 *individuals* counted, albeit in a different time of year in 2005. This cay is also used annually by other nesting seabird species that amount in the thousands during peak nesting season.

The above findings suggest that the status of the targets have not improved and that activities that target them at a site level but also at a governance/management level are needed. Such findings form the basis of our future actions.

4. Adaptive Management – Obstacles Encountered and actions taken

This section focuses on challenges that were faced during the implementation of the project and describes what was done in order to overcome these challenges. It provides context for the following section (Monitoring and Evaluation Framework) in that it expresses realities, learned from these experiences, which have been considered when planning:

- conservation activities with and without stakeholder participation
- how to monitor in the field, staff members, impact on community and partners
- how to evaluate success
- how to report and to whom
- the regularity of all of the above

4.1. Overall late start to Project

The CLME Project was originally designed to be implemented over a three year period. For a number of reasons, the project started late giving TNC less time (one and a half years or 18 months) to complete project objectives and activities.

4.2. Late declaration of the South West Cay Special Fisheries Conservation Area (SW Cay SFCA)

The major setback experienced in the project was a significant delay in the declaration of the SW Cay SFCA. The request for declaration and approval of same came as far back as December 2009. The reasons for the late declaration by the Government of Jamaica through its Fisheries Division of the Ministry of Agriculture and Fisheries are as follows:

- Late ground truthing of the site to determine exactly the boundaries of the sanctuary should be.
- The GOJ decision to delay declaration until legislation was in place to declare all fish sanctuaries islandwide as SFCAs.
- The GOJ decision to delay declaration until a new group of SFCA's could be declared all at once.

The declaration of the SFCA was expected in late 2011 but came in May 2012. This resulted in delays in the hiring and training of staff and community fisheries contractors, hiring of contractor to create and administer/deliver conservation awareness material to members of the Pedro Cays Community, creation and deployment of demarcation buoys and starting patrols of the SW Cay SFCA. Further, as of December 31, 2012 TNC had not been provided with a final Memorandum of Agreement (MOA) between TNC and the Ministry of Agriculture and Fisheries (MoAF) that would govern the co-management arrangement of the SFCA. This signed document would formally represent TNC's co-management of the SW Cay SFCA and the partnership between TNC and the MoAF.

Actions taken

- TNC tried a number of interventions to encourage the government to declare the SFCA on the Pedro Bank. These included numerous calls and letters to the Jamaica Fisheries Division, direct communication about the matter with different government ministers, and a request to UNEP to intervene at a governmental level.
- TNC went to great lengths to facilitate the declaration by coordinating fisher consultations, ensuring that the community members were made aware of all the details of the SFCA including shape, size, location, do's and don'ts'. TNC was also present at the ground truthing of the SFCA (an exercise which identified the best location for the boundaries of the SFCA) providing knowledge gleaned since working on the Cays in 2005 and rallying community members to participate in the process.
- While waiting for the declaration, TNC made the decision, albeit delayed, to start the hiring process for staff that would be based on the cays and work with TNC, the Pedro Cays community members and project partners. The result of this was that staff was in place and ready to start activities as soon as the declaration came for the SFCA. The delay however, resulted in less-than-planned expenditure due to a shorter period of hire.

- Throughout the CLME Project, TNC made required changes to the MOA document that would govern the arrangement between TNC and the MoAF for the management of the SFCA. TNC returned the documents to the Fisheries Division encouraging their final approval and signing by the Minister of Agriculture and Fisheries. This had not happened up to December 31, 2012.

4.3. Social Issues

For decades the Pedro Cays community has operated from the Pedro Cays without a proper solid waste or sanitation system in place. There has been very little control over who goes out to the Cays and what they take with them. This has resulted in the unmanaged erection of structures for housing and businesses, improper disposal of solid and human waste, and introduction of alien invasive species on the cays, all of which threaten the wildlife that depend on the cays – Middle and North East Cay in particular. A recently completed study of the breeding success of Masked Boobies on Middle Cay conducted by University of the West Indies' Master of Philosophy student Peter Ainsworth pointed to predation by cats on booby chicks as one of the reasons for limited breeding success of the seabird. Such threats have long undermined conservation efforts on the cays and the decision was taken to reduce the impacts of some of these threats under the habitat restoration component of the CLME Project.

Actions Taken

Using recommendations from Ainsworth, Otuokon and Sutton, the following actions were taken:

- Removal of all cats on the cays to increase breeding success of Masked Boobies and the survival of migratory birds that use the cays.
- Coordination and execution of a massive solid waste cleanup of Middle Cay and rat baiting exercises.
- Encourage government to remove solid waste, regulate who is allowed access to the cays and what is taken there and implement solid and human waste systems for the benefit of the community and the resources.

4.4. Failed Education and Outreach Contract

The Education and Outreach Contractor was hired in July 2012 to create and administer conservation awareness material to the members of the Pedro Cays Community. The material could also be used by members of the Jamaica Fish Sanctuaries Network, stakeholders of the fishing industry including the Fisheries Division and fishing communities islandwide. The Contractor was to also work with Community Fisheries Contractors (wardens), training them to be better able to conduct monitoring activities and creating special monitoring form to facilitate this. Finally, the Contractor was to hold meetings with the Pedro Cays community showing the benefits of them organizing a formal entity to represent them.

Unfortunately, three months into the contract, activities that should have been conducted and material that should have been created had not been completed. TNC made the decision in September 2012 to sever ties with the Contractor and create the educational material with the help of a graphic artist.

Distribution and administering of the material with its messages would have to come at a later date. This meant not being able to do significant community outreach activities as planned under the lifespan of the project.

Actions taken

- Throughout the short contract period, TNC did its best to stay in close contact with the contractor. Missed deadlines, deliverables and activities were recorded and raised with the Contractor. After attempts to communicate with the contractor failed and three months had elapsed without TNC seeing meaningful progress, the option to terminate this contract was taken. The result of the failed contract was a significant delay in the production of educational material, added workload on project personnel in a short period to create material, material not being distributed and material being explained/imparted during the period of the Project.
- A graphic artist was hired to create the educational material internally using the said graphic artist for the artwork and TNC personnel, with support from partners, to provide the content for the material.
- Given the focus on cleanup activities, coordination of our Regional Seabird Workshop, deployment of demarcation buoys for the SFCA and limited staff because of the termination of this contract, only one meeting was conducted with the Pedro Cays Community that focused on the benefits of community creating a recognized body that could represent them at meetings and events that take place back on “mainland”.

4.5. Late start to enforcement activities

Enforcement activities started late in the project as a result of the SFCA not being declared and there not being an official area to protect.

Actions taken

- Knowing that the declaration was imminent, TNC took the opportunity to train members of the community that expressed interest in becoming wardens, conduct interviews with these persons in order to select the best persons to hire, hold more meetings with the Pedro Cays Community informing/reminding them of the declaration and look into the method that would be used to deploy buoys for the demarcation of the SFCA.
- After the declaration of the SFCA and prior to the installation of demarcation buoys, patrols were conducted using a “soft enforcement” approach. That is, persons found fishing within the SFCA were warned to conduct fishing activities a distance of 2 km or greater from South West Cay (in all directions). Names, dates, boat registration numbers and details of activities were always recorded.
- TNC purchased an engine for the JDF Coast Guard to facilitate them patrolling the SFCA with the Marine Police. This would augment patrols coordinated by TNC using Pedro Cays community members.

4.6. TNC not facilitated in supporting Government to pass new Fisheries Bill and supporting regulations

For a number of years fisheries enforcement in Jamaica has been ineffective because of outdated legislation among other problems. A New Fisheries Bill and supporting regulations that would provide the legislative support to improve fisheries enforcement considerably, has been in the making for approximately 15 years. It is against this backdrop and the fact that the Fisheries Division does not have its own lawyer but has to rely on very busy lawyers from the Ministry of Agriculture and Fisheries to do such tasks, that TNC offered to provide support towards drafting these documents under the CLME Project. TNC's plan was to hire a lawyer approved by the necessary authorities that would be assigned to the Fisheries Division to assist in the drafting of the legal documents. TNC's Standard Operating Procedures (SOPs) dictate that such interventions involving legislation require a formal request from government in order for TNC to proceed. Despite many requests to the Fisheries Division for such a letter, TNC did not receive this letter until the last quarter of 2012, not enough time to contract a lawyer and more significantly complete the drafting of the documents before the December 31, 2012 end of the CLME Project.

Actions Taken

- TNC informed the Minister of Agriculture and Fisheries of its offer and sought his intervention in expediting the process. This did not work.
- TNC sought the intervention of UNEP hoping that a request from an international partner would influence action. UNEP tried. This did not seem to speed up the process.

5. Monitoring and Evaluation Framework

The activities of this project are the start of medium to longer term activities that are needed for effective conservation of resources on the Pedro Bank. The Management Plan outlines the Programmes and Goals of our conservation efforts as:

1. **Conservation Programme:** To restore and maintain healthy conservation targets (coral reefs, seagrass beds, ecologically important species, seabirds, sea turtles and Cay ecosystems).
2. **Sustainable Fisheries Management Programme:** To optimise the sustainability of fisheries resources through sustainable fisheries methods and management programmes.
3. **Socio-economic Sustainability Programme:** To improve the sustainability of the living and socio-economic conditions for all persons on the Cays.
4. **Governance and Management Programme:** To provide adequate, appropriate and sustainable governance and management systems to support the realisation of the other goals.

This section uses the Management Plan goals and related objectives to guide the monitoring and evaluation framework below. Activities are aimed at achieving improved biodiversity health and effective natural resource management and conservation. The budget below estimates the minimal costs of these activities and the framework that follows outlines the different parameters that will be used to monitor the success of activities, how this monitoring will take place and the frequency of monitoring.

5.1. Budget

Activity	Details	Who involved	Total \$
Marine monitoring	One week activity involving team of 8 that includes 2 chefs and 6 data collectors. Hidden costs include salaries and transport to the cays via the Coast Guard. Twice per year.	TNC, UWI, NEPA, FD	
	Chefs - \$70,000 for two chefs each week		140,000
	Food – \$60,000 for food and beverage per week for 8 persons		140,000
	Rental of tanks - \$500 per tank per day, 12 tanks per day for 6 days.		72,000
	Boatman - \$15000 per day, 8 days needed (includes on and offloading)		240,000
	Gas – 50 gallons for the week		120,000
Wildlife Monitoring	These are activities that could easily be carried out by staff on the ground for little additional costs outside salaries. For peak turtle nesting, monitoring could be made into an activity involving other partners – one one-week activity outside of regular checks. Equipment to be provided by TNC or partners.	TNC, NEPA, UWI	
	Food - \$50,000 for food and beverage per week for 6 persons		50,000
Data collection from enforcement personnel	Will be done in salaried time.	TNC	
Monitoring of human conditions	Will be done in salaried time.	TNC	
Monitoring Attitudes and Behavioural change	Collection of data from log books will be done on salaried time. The Knowledge, Attitudes, Practice (KAP) survey will be done by hiring an external contractor. Costs are as follows:	TNC	1,500,000

5.2. The Proposed Framework

Table 4a: Monitoring and evaluation of Pedro Cays conservation targets

Goal	Areas of Measurement	Related Objectives as in Management Plan	Target	Indicators
Restore and maintain Healthy Conservation Targets	Marine life	Increase in the number of predatory fish e.g. snapper and grouper/seabass	Commercial fish	Biomass of select areas in and around sanctuary (eg. Snapper & grouper/seabass)
		Protect and increase fish populations by protection of nursery and other critical habitats	Ecologically important fish	Biomass of select areas in and around sanctuary (eg. parrot and surgeon)
		Maintain or increase existing live coral cover.	Coral reef	Health (Algae, disease, parasites/predators)
	Wildlife	Increase the survival and reproductive success of seabirds and seaturtles on the Pedro Bank.	Masked Booby	Population number on Middle and South West Cay Nesting Success on Middle and South West Cay
			Seaturtles	Number of Hawksbills nesting on Middle and South West Cay during peak nesting season, Aug – Sept.
	Habitat Quality	Reduce the amount of solid waste on the cays by at least 50%. Prepare a plan for a system of sustainable short term accommodations	Nesting habitat for masked boobies on Middle Cay	Availability of appropriate habitat for seabirds
			Nesting habitat for seaturtles on Middle Cay	Use of Middle Cay by nesting turtles
Optimise the sustainability of fisheries resources through sustainable fisheries methods and management programmes. Provide adequate, appropriate and sustainable governance and management systems to support the realisation of other goals.	Fisheries & Wildlife Management	See a 50% decrease in illegal and unsustainable fishing practices	Pedro fishers	Fishing Pressure Incidence of unsustainable fishing practices
		Prepare a plan for a system of sustainable short term accommodations.	Masked Boobies	Nesting success of Masked Booby on Middle Cay
		Reduce the amount of solid waste on the cays by at least 50%.	Seaturtles	Incidence of turtle nesting on Middle Cay
	Governance & Management	Establish an effective, collaborative management mechanism for the Pedro Cays. Provide adequate and trained personnel and other resources to support effective conservation and management Limit and control access to the Pedro Bank fisheries resource Provide policy and legislative support necessary for effective management	Enforcement & Management personnel for the Pedro Bank	Passing of new Fisheries Bill and supporting regulations
				Number of government led patrols per year
				Number of NGO led patrols per year
				Number of prosecutions per year
	Human Conditions	Improve sustainability of the living and socioeconomic conditions for all persons on the cays. Reduce public health risks for people on the cays. Reduce number of cay permits issued to less than 350 within 5 years	Sanitary conveniences	Management of solid waste Proper disposal of human waste
			Human carrying capacity	Carrying capacity enforced on cays and for fishery
	Attitudes and behavioural change	Formation and maintenance of fisher organizations on the cays within 5 years	Pedro Cays Community members	Participation in conservation activities
		See a 50% decrease in illegal and unsustainable fishing practices		Adherence to Fisheries Regulations (# of prosecutions per year)
		See a 50% decrease in illegal and unsustainable fishing practices	Enforcement personnel (FD, CG, MP)	Number of government led patrols and prosecutions per year

Table 4b: Monitoring and evaluation of Pedro Cays conservation targets Continued

Target	Indicators	Baselines	Method of Monitoring	Frequency of monitoring	Lead Entity & Person/s	Reporting & sharing of info
Goal – Restore and maintain Healthy Conservation Targets						
AREA OF MEASUREMENT – MARINE LIFE						
Commercial fish	Biomass of select areas in and around sanctuary (eg. seabass and snapper). Complete list of species considered commercially important in “Pedro Bank Coral Reefs, Status of coral reefs and reef fishes 2005, Report for The Nature Conservancy”.	Avg. 509g/100 m ² (Kramer, 2006)	Catch monitoring using Community-based Live Fish Monitoring Method (used by sanctuary network)	Every 6 months	TNC	NEPA, UWI, JFSN, TNC, FAB, JET, Sanctuary Subcte., Marine and MPA Networks eg. CAMPAM, funders
Ecologically important fish	Biomass of select areas in and around sanctuary (eg. parrot and surgeon).	Avg. 5095g/100 m ² (Kramer, 2006)	Catch monitoring using Community-based Live Fish Monitoring Method (used by sanctuary network)	Every 6 months	TNC	NEPA, UWI, JFSN, TNC, FAB, JET, Sanctuary Subcte., Marine and MPA Networks eg. CAMPAM, funders
Coral reefs	Health (Algae, disease, parasites/predators)		Undecided – perhaps Reef Check	Every 6 months	TNC	NEPA, UWI, JFSN, TNC, FAB, JET, Sanctuary Subcte., Marine and MPA Networks eg. CAMPAM, funders
AREA OF MEASUREMENT – WILDLIFE						
Masked Booby	Population number on Middle and South West Cay	117 breeding pairs (Hay, 2006)	Census	Every 6 months	TNC & NEPA	TNC, NEPA, UWI, JFSN, SWBG, JET, funders
	Nesting success on Middle and South West Cay	37.2% & 100% respectively (Ainsworth, 2011)	Census on eggs surviving to chicks (use 10 nests and monitor every 3 days).	Quarterly & to include Oct.	TNC & NEPA	TNC, NEPA, UWI, JFSN, SWBG, JET, funders
Seaturtles	Number of Hawksbills nesting on Middle and South West Cay during peak nesting season, Aug – Sept.	0/wk & 16/wk respectively (Hay 2006)	Census during peak nesting season (Aug – Sept.) to involve partners and community. 2x1week activities for season – every night	Once a year	TNC & NEPA	TNC, NEPA, UWI, JET, JFSN, funders
HABITAT QUALITY						
Nesting habitat for masked boobies on Middle Cay	Availability of appropriate habitat for seabirds	30% of Middle Cay available	Visual documentation and actual measurement of area on the Cay occupied by Masked Boobies (aerial photos, maps, sketches, etc). Take photos, create maps.	Once a year	TNC, NEPA	TNC, NEPA, UWI, JFSN, JET, SWBG, funders
Nesting habitat for seaturtles on Middle Cay	Use of Middle Cay by nesting turtles	Zero in 2005 (Hay, 2006)	Census during peak nesting season (Aug – Sept.) to involve partners and community.	Once a year	NEPA, FD	TNC, NEPA, UWI, JET, JFSN, funders

			2x1week activities for season – every night			
Goals – Optimise the sustainability of fisheries resources through sustainable fisheries methods and management programmes/ Provide adequate, appropriate and sustainable governance and management systems to support the realisation of other goals.						
AREA OF MEASUREMENT – FISHERIES & WILDLIFE						
Pedro fishers	Fishing Pressure	Over 600 licences issued in 2011	Check with Fisheries Division to see number of persons licenced and match it with numbers of persons on cays.	Once a year	FD	NEPA, UWI, JFSN, TNC, FAB, JET, Sanctuary Subcte., Marine and MPA Networks eg. CAMPAM, funders
	Number of documented Incidences of unsustainable fishing practices (night spearfishing, berried lobster) Reports of and charges for breaking fisheries regulations (night spearfishing, catching undersized conch and lobster, berried lobster, catching or holding lobster and conch during closed season, fishing in the SFCA)	Unmonitored and unmanaged on Pedro Cays up to Jan 2013.	Surveys with community members & checking of Marine Police’s Pedro Cays logbook for infractions	Quarterly	FD, MP, TNC	NEPA, UWI, JFSN, TNC, FAB, JET, Sanctuary Subcte., Marine and MPA Networks eg. CAMPAM, funders
Masked Boobies	Nesting success of Masked Booby on Middle Cay	37.2% (Ainsworth, 2011)	Census on eggs surviving to chicks (use 10 nests and monitor every 3 days).	Quarterly & to include Oct.	TNC & NEPA	TNC, NEPA, UWI, JFSN, JET, SWBG, funders
Seaturtles	Incidence of turtle nesting on Middle Cay	Zero in 2005 (Hay, 2006)	Census during peak nesting season (Aug – Sept.) to involve partners and community. 2x1week activities for season – every night	Once a year	NEPA, FD	TNC, NEPA, UWI, JET, JFSN, funders
AREA OF MEASUREMENT – GOVERNANCE & MANAGEMENT						
Enforcement & Management personnel for the Pedro Bank	Passing of new Fisheries Bill and supporting regulations	New Bill yet to be passed as at Jan 2013	Monitor progress as it relates to passing new regulations.	Bimonthly	FD, TNC	
	Number of government led patrols of sanctuary per year	Zero as at Jan. 2013	Log sheets filled out by officers	Monthly	CG, MP	MP, CG, JFSN, TNC, FAB, JET, Sanctuary Subcte., Marine and MPA Networks eg. CAMPAM, funders
	Number of NGO led patrols of sanctuary per year	>150 in first 4 months of operation (2012)	Log sheets filled out by wardens	Monthly	TNC	NEPA, UWI, JFSN, TNC, FAB, JET, Sanctuary Subcte., Marine and MPA Networks eg. CAMPAM, funders
	Number of fisheries related prosecutions per year originating from the Pedro Cays	Zero in 2005	Search records of cases taken to courts.	Every 6 months	FD, MP	CG, MP, FD, TNC, JET, FAB,
	Carrying capacity enforced on cays and for fishery	CC not enforced as at Jan 2013. Over 600 licences issued by FD in 2005.	Enquiries into number of licences issued and raids carried out to remove unauthorized persons.	Quarterly	FD, MP, CG, TNC	TNC, NEPA, JFSN, FAB, KSAC, MOH, JET, VSD, NSWMA, funders

AREA OF MEASUREMENT – HUMAN CONDITIONS						
Sanitary conveniences	Management of solid waste	Burying and burning by ct. up to Jan 2013.	Checks into functionality of any systems put in place.	Quarterly	FD	TNC, JET, KSAC, NSWMA, MOH, VSD
	Proper disposal of human waste (only human waste that is managed as at Jan 2013 is by CG and users of Field Station).	Beach used by community.	Checks into functionality, maintenance and use of any conveniences installed.	Quarterly	FD	TNC, JET, KSAC, NSWMA, MOH, VSD
Human Carrying Capacity	Carrying capacity enforced on cays and for fishery	CC not enforced as at Jan. 2013. Over 600 licences issued by FD in 2005.	Enquiries into number of licences issued and raids carried out to remove unauthorized persons.	Quarterly	FD, MP	TNC, JET, KSAC, NSWMA, MOH, VSD
AREA OF MEASUREMENT – ATTITUDES AND BEHAVIOURAL CHANGE						
Pedro Cays Community Members	Participation in conservation activities	Over 20 in sanctuary buoy installation in 2012	Check TNC records into new community members participating in conservation activities	Quarterly	TNC	TNC, FD, MPA Networks eg. CAMPAM, funders
			KAP survey	Every 6 months	TNC	TNC, FD, MPA Networks eg. CAMPAM, funders
	Adherence to Fisheries Regulations by Pedro Cays community members (# of prosecutions per year)	Zero in 2005	Search records of cases taken to courts.	Every 6 months	FD, MP	CG, MP, FD, TNC, JET, FAB,
			KAP survey	Every 6 months	TNC	CG, MP, FD, TNC, JET, FAB,
Enforcement Personnel (FD, CG, MP)	Number of government led patrols and prosecutions per year	Zero as at Jan 2013	Log sheets filled out by officers	Monthly	CG, MP	MP, CG, JFSN, TNC, FAB, JET, Sanctuary Subcte., Marine and MPA Networks eg. CAMPAM, funders
			KAP survey	Every 6 months	TNC	MP, CG, JFSN, TNC, FAB, JET, Sanctuary Subcte., Marine and MPA Networks eg. CAMPAM, funders

5.3. Assumptions made and anticipated obstacles/risks

With all such plans there are assumptions made and anticipated obstacles/risks to the success of the project and the execution of the Monitoring and Evaluation Framework. These have been briefly explained below.

Availability of funding – Funding is needed from government partners and TNC in order to implement this framework. From the government’s perspective, funds have been identified from the Fisheries Management and Development Fund (FMDF) for use by the Fisheries Division (the lead government agency responsible for the Pedro Bank) for various activities. As of January 2013 discussions were being held to determine the amount of funds that would be made available for the Pedro Bank and over what period. Stakeholders were also discussing the issues that would be tackled on site and in what timeframe. Government partners such as the Coast Guard and Marine Police that have long had budget and personnel allocated to activities on the Pedro Bank, will not need to make too many adjustments to their budgets or personnel requirements but rather their operating procedures as it relates to enforcement. Other government partners such as NEPA are required to provide mainly staff time. The assumption is that the significant funding required by the FMDF will be provided for at least another 5 years. The risk is that the funds will not be provided or that they will be provided but used without the necessary longterm systems being in place (restrictions to the persons using the cays and what they bring to the cays) to ensure that the investment is not wasted.

TNC’s activities, like other NGOs, will be determined by funds that it can raise. Its activities will be tremendously restricted if it cannot raise funds for all work on site.

Budget – The budget assumes that there is a source of funds. It treats activities separately. Not all activities will be done independently of others meaning that when activities are coupled, certain expenses such as food, travel and fuel will be reduced. The budget does not take salaries into account.

Availability of personnel – The main concern is with two main project partners, TNC and the Fisheries Division. TNC is yet to raise funds for personnel and activities on site for a sustained period of time. The Fisheries Division has been the lead government partner but has never had officers stationed on site on a permanent or semi-permanent basis. The framework assumes that personnel will be available from TNC, Fisheries Division and other partners. The risk is that lack of funding and/or commitment will not facilitate this.

Change in work ethic of enforcement personnel – The Fisheries Division, JDF Coast Guard and the JCF Marine Police Division are the main government entities that have been and will be responsible for marine enforcement on the Pedro Bank. Up to January 2013, very little marine conservation enforcement had been done on the Pedro Bank even though the Coast Guard and Marine Police are stationed there. Support is needed on site from personnel deployed by the Fisheries Division in order to facilitate this. The assumption is that the Fisheries Division will deploy personnel and that the Coast Guard and Marine Police will take an active role in marine conservation enforcement out on the Pedro Bank. The risk is that efforts will not be sustained.

Carrying Capacity implemented – The 2005 assessments coordinated by TNC and the resulting reports pointed to the need for a carrying capacity for the human population on the Pedro Cays to be implemented and enforced. Up to January 2013 this was not done. In order for there to be sustainable management of natural resources and solid and human waste systems, this must be established and enforced. This was admitted by the Honourable Minister of Agriculture and Fisheries, Mr. Roger Clarke, in his September 2012 visit to Middle Cay, Pedro Bank. The framework assumes that this will be done. If it is not then the risk is that natural resources will continue to be overexploited and encroached upon and money will be put into sanitary conveniences that will fail eventually as a result of overuse.

Solid waste and sanitation conveniences provided – These have been needed on the Pedro Cays for decades. It was stated in September 2012 by the Honourable Minister of Agriculture and Fisheries, Mr. Roger Clarke that funds will be made available from the FMDF to address solid waste and sanitation issues on the Pedro Cays though neither the timeframe nor the amount were stated. The assumption is that these conveniences will be provided for a specific number of persons and that the conveniences will be used, managed and maintained for the longterm. The risk is that the conveniences will not be provided or that they will be provided with no longterm steps as to the proper managing of the investment/s and restricting access to the cays or items taken there resulting in failure.

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