Commonwealth of the Northern Mariana Islands
Division of Environmental Quality
Office of the Governor

Laolao Bay Conservation Action Plan

February 2009

Note: This plan was compiled by Kathleen Herrmann and Meghan Gombos. Much of the information contained in this plan was taken directly from existing CNMI Government planning documents obtained from DEQ, CRM, and DFW.

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Table of Contents

Executive Summary 4
Introduction 5
(a) CAP Planning Process 6
Site Description 7
(a) Location and Governance 7
(b) Biophysical Setting: 12
(c) Benthic Habitat: 13
(d) Socioeconomic and Cultural Setting: 14
(e) Conservation Status: 16
(f) Viability of Conservation Targets: 18
Management Approach 20
VISION: 20
MISSION STATEMENT: 20
(a) CAP Process & Recommendations: 20
(b) SWOT Analysis: 21
(c) Local Capacity Assessment 22
(d) Objectives and Strategies: 24
(d) Implementation: 25
(e) Monitoring Effectiveness: 25
References 27
Commonwealth of the Northern Mariana Islands Three-Year Coral Reef Protection Local Action Strategy, DFW, DLNR, DEQ, CRM, September 9, 2003 27
Appendix One: Annual Work Plan 28
Appendix Two: CAP Workshop Participants 29
Appendix Three: December 2008 CAP Workshop Summary 30

Tables

Table 1: OSDS Program Inspection Status 15
Table 2: Overall Viability Summary 18
Table 3: Summary and Rank of Threats across Targets 19
Table 4: Local Capacity Assessment 23
Table 5: Laolao Bay CAP Objectives and Strategic Actions 24

Figures

Figure 1: Watersheds of Saipan (CNMI) 7
Figure 2: Marine Protected Areas of Saipan (CNMI) 11
Figure 3: Annual and seasonal differences in benthic cover at two reef flat sites on Saipan: (top) Laolao #1 and (bottom) Laolao #2. Source: CNMI MMT 14

Executive Summary

Introduction

This plan is a joint cooperative effort between the three resource management agencies with both federal and local mandates to manage resources in Laolao Bay including; Division of Environmental Quality (DEQ), Coastal Resources Management Office (CRM), and Division of Fish and Wildlife (DFW). It is our belief and the outcome of recent National Oceanic and Atmospheric Administration (NOAA) evaluation reports that a cooperative, site-based planning effort will provide a new focus on resource management to an area jointly agreed by these three agencies to be of critical importance (Coral Reef Conservation Program 2002-2006 External Panel Review Final Report November 30, 2007).

The people of the Commonwealth of the Northern Mariana Islands (CNMI) value coral reefs and are dedicated to their sustained use and conservation. Coral reefs are important to the CNMI, because they provide traditional and subsistence uses; production of commercial food products; recreational opportunities for a healthy tourist economy; physical protection of the coastal zone from storms; diversity, rarity, and uniqueness of life forms; and educational and research uses. Coral reefs are also an important part of our cultural heritage. (2005 CRI Grant)

Increased population and development over the past two decades in the CNMI has exacerbated the threats to our coral reef ecosystems and reduced health of coral reef and coral-reef associated habitats has been documented (Houk 2000). These effects are most noticeable on the island of Saipan where approximately 90% of CNMI's population resides (Stewart 1997). From a long-term perspective, the decline in coral-reef coverage and marine health threatens the CNMI's cultural heritage, traditional ways of life and physical protection from storms. However, this decline also immediately impacts CNMI's tourism and fisheries industries and thus its economy. The CNMI government places coral reef ecosystem conservation and management as a priority concern. (2005 CRI Grant)

In 2002 the U.S. Coral Reef Task Force adopted the "Puerto Rico Resolution" which called for the development of three-year Local Action Strategies (LAS) by each of the seven member U.S. states, territories and commonwealths. These LAS are three-year locally-driven roadmaps for collaborative and cooperative action among federal, state, territory and non-governmental partners which identify and implement priority actions needed to reduce key threats to valuable coral reef resources (LAS Webpage). As such, the CNMI chose one Local Action Strategy (LAS) site on Saipan. This site is the Laolao Bay Watershed, established by the community and CNMI resource agencies as a priority location for restoration and protection of both marine and terrestrial resources. Laolao Bay Watershed was also listed as a Category 1 watershed in the 1998 Unified Watershed Assessment; however the full assessment was not completed.

A first "round" of LAS was carried out and a variety of activities were implemented in Laolao Bay to abate the threats of the site. However, after three years it was recognized that further strategic planning and actions needed to occur to effectively improve the health of the site's resources. To do this, a multi-agency group was assembled to undergo a strategic planning process that would result in a new LAS for Laolao Bay. This year long process is described below.

(a) CAP Planning Process

Beginning in November 2007, the Nature Conservancy (TNC) - Micronesia Program began a new round of Conservation Action Planning (CAP) in the region. The CAP Adaptive Management Cycle is an iterative process which helps conservation projects develop and implement strategies, and then evaluate and learn from their experiences. The general steps of the process are to 1) define the project team and scope, 2) identify the conservation targets and assess their viability, 3) identify and assess the critical threats, 4) conduct a situation analysis, 5) develop conservation strategies, 6) establish measures, 7) implement the strategies and measures, and 8) analyze, reflect and learn from the results. The use of adaptive management means that the planning is never fully completed, but is continually refined, improved, and adapted over time.

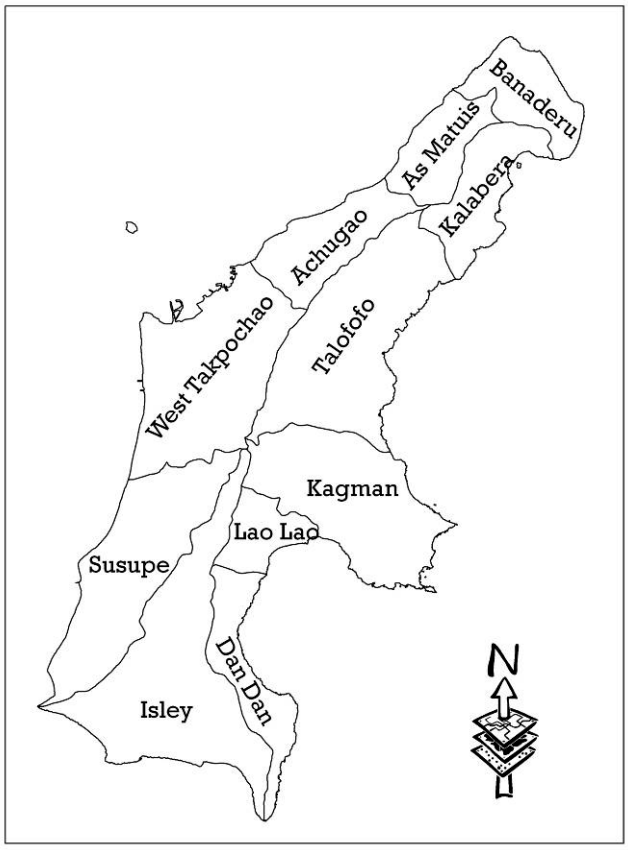
Participating islands include CNMI, Chuuk, Guam, and the Marshall Islands. These CAP teams were assembled in each island to include government, NGOs, and community members. A series of workshops were aimed at using the CAP tool to undergo a comprehensive and strategic process for site-specific threat identification and action planning. These workshops are also using the Pacific Islands Marine Protected Area (PIMPAC) management planning guidebook and drawing from Locally Managed Marine Area (LMMA) network methods for engaging communities in the planning process to ensure a key outcome of the process will be the development of management plans for the CAP sites. The entire process comprised of a three-part workshop series. A first workshop was held on CNMI to review the tool and develop initial parts of management plans. The second workshop brought together all CAP teams to share their initial plans at a regional Micronesia Workshop in Chuuk to obtain feedback from each other and resource experts. The final workshop was held to finalize the CAP outputs and to develop this management plan. Future work will include a re-evaluation and refinement of the products to better reflect our growing knowledge and experience. (CAP document)

Site Description

(a) Location and Governance

The 466-mile long Mariana Island archipelago includes 14 islands within the U.S. Commonwealth of the Northern Mariana Islands located in the Western Pacific. The Mariana Islands are the closest Pacific island chain to Japan, approximately 1,500 miles from Tokyo or slightly less than 3½ hours by air. Saipan, Tinian, and Rota are the three developed islands of the CNMI with 90% of the population based on Saipan (CNMI Statistical, 2002; 2005 CRI Grant). All watersheds in the islands are considered coastal watersheds. Under CNMI law, the Coastal Resource Management office (CRM) has regulatory jurisdiction over all lands of the Commonwealth. Laolao Bay is located on the south eastern side of the island of Saipan. Three watersheds have direct influence on the waters of Laolao Bay; Laolao, Dan Dan, and Kagman. Laolao watershed is 926 acres, Kagman watershed is 3,666 acres, and Dan Dan watershed is 1,517 acres. These three watersheds cover a total of 6,109 acres (Source: DEQ GIS Specialist & USGS Shed GIS layer).

Figure 1: Watersheds of Saipan (CNMI)



Three agencies partner to manage these lands including, the Division of Environmental Quality (DEQ), the CRM, and the Division of Fish and Wildlife (DFW), within the Department of Lands and Natural Resources (DLNR-DFW). The DEQ was created through Public Law 3-23 to protect the right of each person to a clean and healthful environment. The Commonwealth Environmental Protection Act defines the purpose and jurisdiction and authorization to issue regulations and implement programs to protect the air, land, and water of the Commonwealth. CRM was established on 11 February 1983 with the implementation of Public Law 3-47 within the Office of the Governor. The CRM program was established in order to promote the conservation and wise development of coastal resources. The DFW was created in 1981 by Public Law 2-51 which was later revised by Public Law 10-57. The DFW is housed with DLNR and its purpose is to conserve fish, game, and wildlife and to protect endangered and threatened species. Through research, monitoring, regulation, enforcement, planning, and management, DFW seeks to ensure long-term survival and sustainability of CNMI's resources.

Land ownership in the CNMI is regulated differently than in the mainland USA, with restrictions to favor the indigenous population. In order to own land, individuals must prove a certain degree of indigenous blood. 55-year leases are available to other corporations or individuals. All lands in the CNMI fall into one of three categories: private lands, public lands, and government acquired lands. Private lands are all lands that are alienable by the titleholder. Public lands are those that were transferred into the public domain upon the creation of the Commonwealth. Public lands are freely alienable by the Commonwealth and managed by the Marianas Public Lands Authority (MPLA). Government acquired lands are those lands purchased by the government for public purposes, the use of which is controlled by deed restriction. MPLA is charged with managing public land for the benefit of the indigenous population. MPLA is in the process of drafting a comprehensive plan for its lands, but its mandate is directed towards economic development and homesteading. Except in cases where public lands are ecologically necessary to completely protect conservation corridors, public land is not being considered for this program. Additionally, within the boundaries of this site also exists a marine sanctuary.

Forbidden Island Sanctuary Excerpt (whole section FROM MPA SUMMARY REPORT)

The Forbidden Island Sanctuary is a 0.979 mi^2 protected area which consists of 0.967 mi^2 of marine habitat and a small, 0.012 mi^2 (3 hectare) island. The sanctuary benefits from this small adjacent terrestrial conservation area that was established through separate processes. The National Classification is a No-Take, Natural Heritage MPA.

The sanctuary was legally established on April 20, 2001 through CNMI Public Law 12-46. Public Law 12-46 protects waters from the low tide line to 1000 feet seaward. Public Law 12-12 gives exclusive management authority of marine conservation areas to DFW. Public Law 12-46 reiterates this authority and places management and monitoring responsibilities under DFW. However, Public Law 12-46 also clearly states that DFW shall work with Public Lands, CRM, and the Marianas Visitors Authority to collaborate on management activities. Under Public Law 12-46, DFW has the authority to charge a “nominal entry fee for the purposes of maintenance of these sanctuaries and for enforcement, research and improvement of these sanctuaries" (Public Law 12-46 §4).

The legislative purpose of the sanctuaries is the conservation of wildlife and marine life, and they were designated to serve as "natural laboratories for continued propagation of wildlife and marine species, which gradually and naturally can re-populate depopulated areas of [the] lagoon and island" (Public Law 12-46 §1). The enabling legislation prohibits the "destruction, harassment and/or removal of plants, wildlife including birds, turtles, fish and marine species of any kind, fishing in any form, operation of jet skis, walking on exposed sections of the reef, harvesting or removal of fish, shellfish or marine life in any form" within the confines of the sanctuaries (Public Law 12-46 §5). A fine of $500 and/or a prison sentence of not more than one year shall be imposed on any individual who engages in any of the prohibited activities within the sanctuaries.

Forbidden Island Management Activities

On May 15, 2007 a management plan was finalized for Kagman/Forbidden Island by DFW's Natural Resource Planning Section. DFW's Marine Sanctuaries Program regularly carries out monitoring activities in the Bird Island and Forbidden Island Marine Sanctuaries. The MSP does fish counts, counts invertebrates of commercial interest, maintains a fish species checklist, and conducts a basic benthic habitat characterization (coral, sand, rubble, etc.) at each of its monitoring sites within the sanctuaries. Biological and reef flat monitoring are also conducted by the interagency Marine Monitoring Team (MMT) at three monitoring sites within the sanctuaries (Bird Island, Forbidden Island, and Tank Beach). DEQ samples water at three sites (Bird Island, Forbidden Island, and Tank Beach) on an eight-week rotational basis. Enforcement activities fall under the jurisdiction of the head of the Enforcement Section. The sanctuaries are patrolled periodically by DFW conservation officers, primarily via land patrol. The sanctuaries' location on the east side of Saipan means that boat patrols are often difficult, though not impossible. Much of the Bird Island and Forbidden Island Sanctuaries is visible from a variety of vantage points on land, although these vantage points are not always easily accessible. Nighttime patrolling of these sanctuaries is logistically challenging.

Laolao Bay Sea Cucumber Sanctuary Excerpt (whole section FROM MPA SUMMARY REPORT)

The sanctuaries provide protections for either the topshell *Techtus (Techtus) niloticus* (known locally as "trochus") or sea cucumbers (including families *holothuridae, synaptidae,* and *stichopodidae*). The Bird Island Sea Cucumber Sanctuary and Tank Beach Trochus Sanctuary are overlapped entirely by no-take MPAs (Bird Island Sanctuary and the Forbidden Island Sanctuary). The Laolao Bay and Bird Island Sea Cucumber Sanctuaries include 0.759 mi^2 and 0.309 mi2 marine of marine habitat, respectively. The Bird Island Sea Cucumber Sanctuary also includes a small terrestrial habitat so its total area is 0.314 mi^2. The 0.429 mi^2 Lighthouse Reef and 0.066 mi^2 Tank Beach Trochus Sanctuaries include only marine habitat. The National Classification is Uniform Multiple-Use, Sustainable Production MPA.

The Laolao Bay Sea Cucumber Sanctuary and Bird Island Sea Cucumber Sanctuary were established by the DFW Non-Commercial Fishing and Hunting Regulations, Part 5, §60.2 on August 18, 2000. The sanctuaries encompass the waters from the mean high tide line to the 40-foot depth contour. DFW is the responsible agency, with the authority to promulgate and enforce fish and wildlife regulations as allowed under Public Law 2-51. The Lighthouse Reef Trochus Sanctuary and Tank Beach Trochus Sanctuary were established by the DFW Non-

Commercial Fishing and Hunting Regulations, Part 5, §50.2 in 1981. The Lighthouse Reef Trochus Sanctuary extends from the inshore edge of the reef to the 40-foot depth contour. The Tank Beach Trochus Sanctuary extends from the mean high tide line to the 40-foot depth contour. DFW is the responsible agency, with the authority to promulgate and enforce fish and wildlife regulations as allowed under Public Law 2-51.

Collection of sea cucumber and trochus is currently prohibited by law due to a sea cucumber moratorium, and the lack of an open harvest season for trochus. However, the reserves were established in anticipation of possible open seasons in the future.

Sea Cucumber Sanctuaries:

In 1995, a fishery for sea cucumbers was started on the island of Rota that targeted *Actinopyga mauritiana,* with incidental captures of the black teatfish, *Holothuria whitmaei*. In 1996, after depleting much of the resource on Rota, the fishery moved to Saipan (Trianni 2002c). As a condition on the original fishing permits, harvesting was not allowed in Laolao Bay or around Bird Island. At that time, these sites were not yet formally established as MPAs. After the fishery was closed in 1997 due to declining catch, DFW conducted a post-harvest study on Saipan and found that 80-100 percent of the population had been harvested there (Trianni 2002a). DFW also conducted a pre-harvest study on Tinian because the fishery had expressed intentions to move to that island next. The results of these studies demonstrated a near total depletion of sea cucumber at the harvested islands. In response, a CNMI-wide moratorium on the harvest of sea cucumber (and seaweed and sea grass) was put into effect with the passing of Public Law 11-63 on February 18, 1999. The moratorium is effective for a period of at least ten years and is set to expire in early 2009. The goals of the sea cucumber sanctuaries are to minimize the impacts of the (currently inactive) sea cucumber fishery, and to ensure a sustainable harvest of sea cucumber if and when the fishery is reopened. These goals are not explicitly stated in the regulations that created the reserves.

Trochus Sanctuaries:

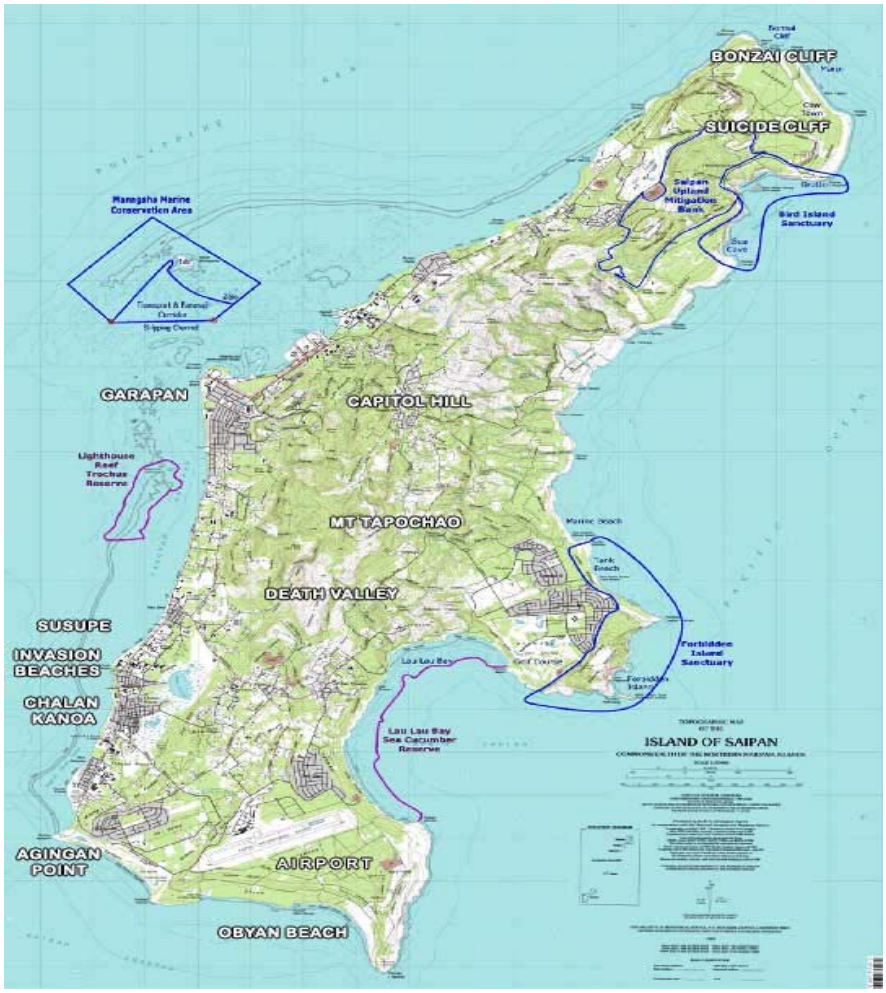
The topshell "trochus",*Tectus (Tectus) niloticus* (synonymous with *Trochus niloticus*), was introduced to the Mariana Islands in March 1938, when 2,974 individuals were planted in Saipan. According to historical records, peak harvest was in 1956. From 1947-1976, trochus harvest was restricted to a 14-day period between May and July. From 1976 to 1981, harvest was unrestricted. In 1981, Public Law 2-51 established DFW, and the first set of DFW regulations was adopted. The regulations included the two trochus sanctuaries, making them the first formally established MPAs in the CNMI. The DFW regulations also imposed size restrictions and a CNMI-wide moratorium on the harvest of *Trochus niloticus*, and gave the DLNR secretary the authority to declare open seasons at any time after consultation with the director of DFW. Since 1981, an open season has been declared only once, in 1996, for a period of three months (Trianni 2002b). The declaration of an open season does not affect the restrictions on harvest in the trochus sanctuaries. The goals of the trochus sanctuaries are to "ensure continuous high levels of productivity of trochus" (DFW Non-Commercial Fishing and Hunting Regulations, Part 5, §60.2). It is prohibited to take trochus from the trochus sanctuaries at any time, even during open seasons.

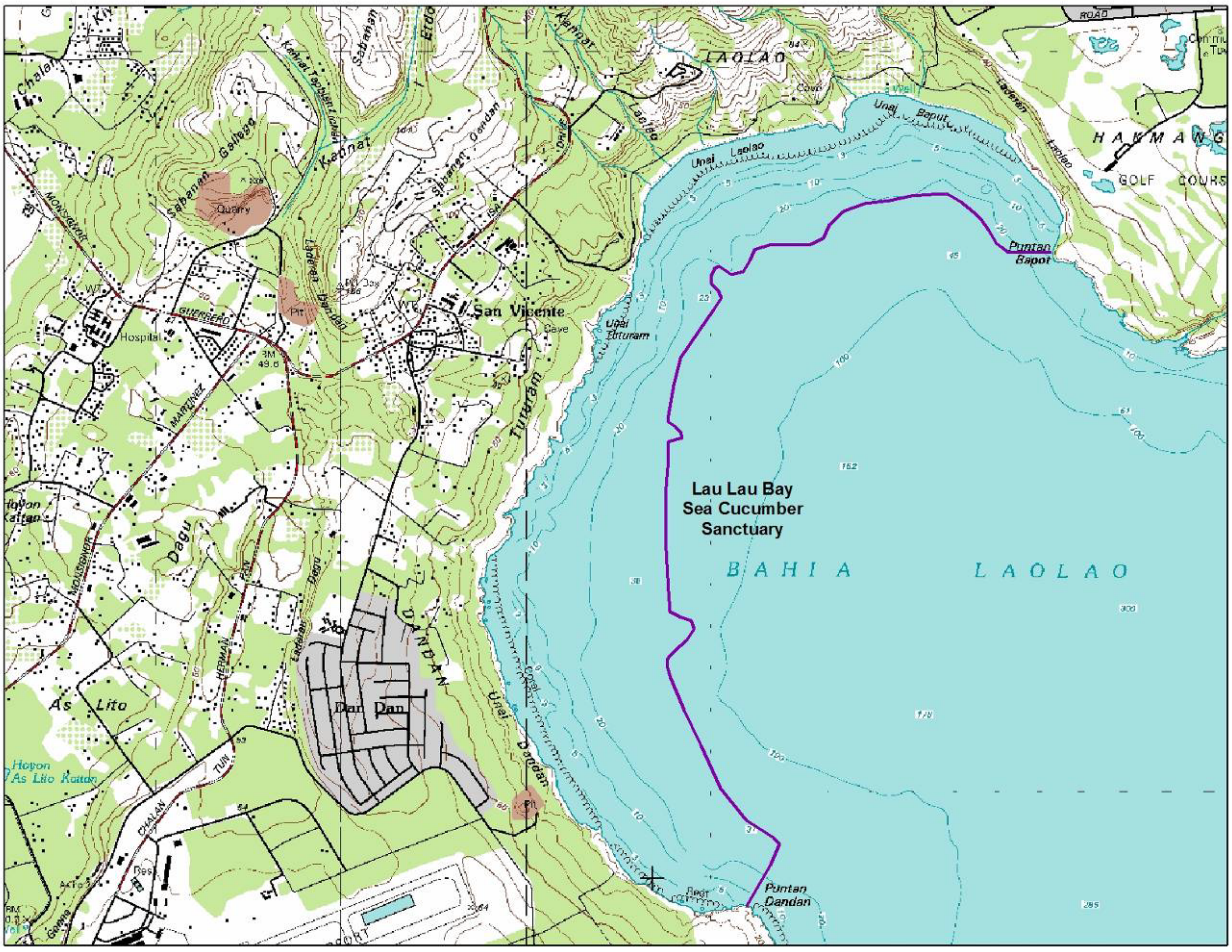
Laolao Bay Sea Cucumber Sanctuary Management Activities:

There are little to no management activities related to the sea cucumber or trochus sanctuaries, except for the continued enforcement of the CNMI-wide prohibition on the harvest of these resources. The interagency MMT conducts biological monitoring, water quality monitoring, and reef flat monitoring (including counts of macroinvertebrates) at two monitoring sites within the Laolao Bay Sea Cucumber Sanctuary. The MMT also regularly surveys two sites at Bird Island and Tank Beach (for more details, see the "Research and Monitoring" section for Bird Island Sanctuary and Forbidden Island Sanctuary). The CRM/DEQ Lagoon Monitoring Project also collects benthic habitat data at the Lighthouse Reef Trochus Sanctuary.

Enforcement activities fall under the jurisdiction of the head of the Enforcement Section. Because there is a moratorium on the harvest of trochus and sea cucumber, the sanctuaries do not have any additional level of protection over other CNMI waters. Therefore, the sanctuaries are not specifically patrolled. Conservation officers have periodically cited individuals for illegal collection of trochus.

Figure 2: Marine Protected Areas of Saipan (CNMI)





(b) Biophysical Setting:

Saipan is the largest of the Northern Mariana Island; about 12.5 miles long, 5.5 miles wide at the widest point and has a total land area of 46.5 square miles. The island consists of a volcanic core enveloped by younger limestone formations. Saipan is a modern island with the amenities of a tropical resort area. Saipan has 14 miles of beach, with the majority along the western coastal plains that are protected by a fringing and barrier reef system. The areas along the western side of the island are the most populated and developed. The coral reefs along these areas are more affected by increased human presence (e.g., beach pollution from storm-water drainage) (2005 CRI grant).

The geology of the three most Southern and populated Mariana Islands suggest that they were once submerged below sea-level, allowing a layer of coral reef to form over the volcanic rock. This resultant limestone rock is extremely porous in nature and groundwater discharges unknown amounts of pollution that can enter the basal aquifer, and marine system. Lack of knowledge about groundwater flow and water quality is a major impediment to improving conditions for many of CNMI nearshore marine systems (LAS).

Two distinct climatic seasons occur on the CNMI and Guam: wet and dry (Duenas & Associates, 1996). The months of July through November are considered to be the wet season

and the months of January through May are considered to be the dry season (Carruth, 2003). December and June are considered to be the transitional months. On Saipan, 67% (about 53 inches) of the rain falls during the wet season, and 21% (about 17 inches) of the rain falls during the dry season. The transitional months receive the remaining 12% (about 10 inches) of the annual rainfall. The following table shows the annual precipitation values based on location for Saipan (CNMI). (Stormwater Management Plan-Volume 1)

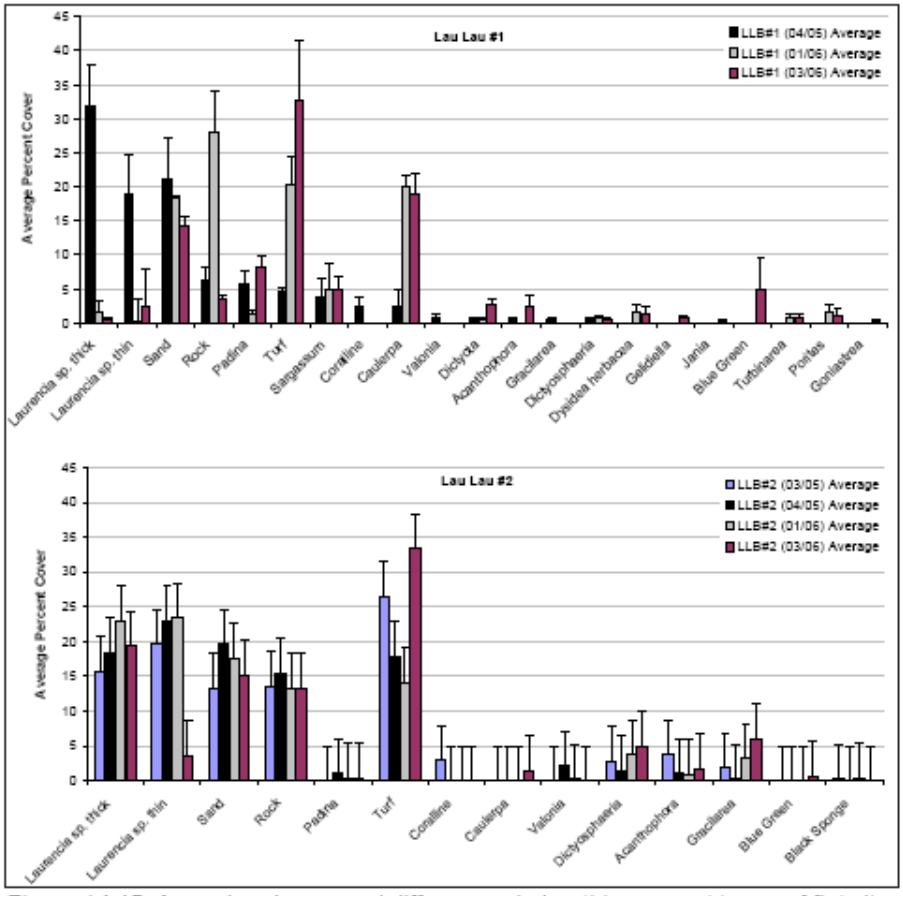
Table X Average Annual Rainfall by Location for CNMI

Location	**Average Annual Rainfall (inches)**
Saipan (CNMI)	
Capitol Hill	95
Marpi	85
Mt. Tagpochau	85
Saipan Int'l Airport	75
Susupe	75
Tinian (CNMI)	80
Rota (CNMI)	80

(c) Benthic Habitat:

Expanding on the existing MMT efforts, monitoring on the reef flats on Saipan, Tinian and Rota has recently begun. While most sites have only been visited a single time at present, two sites at Laolao Bay have been surveyed four times over two years (Figure 3). These surveys demonstrate a greater variability on reef flats than in fore reef environments, and indicate that the persistence of specific macroalgae may result from watershed-based pollution. Further information on local monitoring efforts is available online (http://www.cnmicor-alreef.net/monitoring.htm; SOR report including graphs below).

Figure 3: Annual and seasonal differences in benthic cover at two reef flat sites on Saipan: (top) Laolao #1 and (bottom) Laolao #2.



Source: CNMI MMT

(d) Socioeconomic and Cultural Setting:

Laolao Bay contains steep upland areas already experiencing severe erosion problems, and drains into a large coral reef. The Bay has one of the most popular dive sites on island, with considerable year-round traffic from local residents and tourists with dive operators. There are a number of undeveloped private lots located near the shore, and the roadway that services them and the dive site is frequently in poor repair. The roadway is held by both public and private landowners. Heavy rainfall associated with typhoons causes rutting in the roadway and erosion of the upland soil. DEQ and CRM are currently working with other agencies in this region to reduce non-point source pollution, but the presence of private land is a complicating factor. Acquisition of some of that land would assure that the area does not undergo further development, which would exacerbate the problem (2006 CRI Grant).

The watersheds that drain to Laolao Bay contain the villages of Kagman, DanDan, and a small community within Laolao. Many of the homes in these villages are not connected to a public sewer system and use onsite sewage disposal systems. Many of these homes were built on homestead properties provided to native islanders by the CNMI government. Currently,

DEQ is conducting an inspection of all the Onsite Sewage Disposal Systems in Laolao Bay. Laolao Bay watershed investigations are complete and Kagman watershed investigations are underway.

Table 1: OSDS Program Inspection Status

	Laolao Bay Watershed	**Kagman Watershed**
Total lots inspected	136	229
In-Violation (Waste Water Regs)	13	45
	All violations now in compliance	*43 – Violations in Compliance* *2 - Pending*
Out-House	2	2
Deny Entry	1	1

Source: DEQ NPS Program 2008

Culturally, Laolao Bay has a rich and diverse history. Archeological investigations have uncovered both WWII artifacts and ancient artifacts dating from 1600 to 1420 BC. Laolao Bay is now believed to be "the first human colonization in Remote Oceania" (Carson, Mike T. 2008)

A variety of socioeconomic surveys have been conducted on the island of Saipan. Those with a specific focus on Laolao Bay are limited, however, in 2005 a "Know Your Watershed" survey was carried out for the purpose of gathering a baseline assessment of socio-economic information on local residents of Laolao Bay watershed. The purpose of the survey was to better understand the knowledge, attitude and perceptions of local residents to help further develop the design of future outreach campaigns. Ninety-two households were surveyed in Laolao Bay. Of that, 66% of respondents were willing to participate in future surveys or to be contacted by the government. While this survey was useful, it did not contain all the information needed to determine the current trends and future management needs of local resources. Information is needed on site access, number and type of resource users, tenure and trends among local communities and their dependence on managed areas.

The Global Socioeconomic Monitoring Initiative for Coastal Management (SocMon) is aimed at helping coastal managers better understand and incorporate the socioeconomic context into coastal management programs. The SocMon initiative has several components that are being implemented at a global and regional level to support these efforts. These components include: publication of region-specific guidelines, training in SocMon methods, technical assistance and funding to carry out socioeconomic assessments, and regional partnerships through site networks.

SEM – Pasifika (Soc-Mon Pacific) was developed to compliment the Global Coral Reef Monitoring Network (GCRMN) Socioeconomic Manual for Coral Reef Management by providing more standardized guidelines on how to conduct socioeconomic monitoring specific to each region. A DEQ employee was trained in the SEM-Pasifika methods in the Republic of the Marshall Islands and will be conducting a socioeconomic survey to fill in missing information needed for Laolao Bay.

The SEM-Pasifika process resulted in determining the main stakeholder groups in Laolao which include fisherman, recreational users, divers, and landowners/homeowners. These stakeholder groups were initially engaged during the first CAP workshop, however the turnout

to the workshop was very low. Initial work to engage stakeholders in the future planning process is critical as the implementation of the management plan moves forward and additional island locations are considered.

A Rare Pride Campaign is also being conducted in CNMI. Working together with Rare, an international conservation organization, our Pride in the Environment Campaign will focus on the CNMI's coral reefs. Through more than 15 years of working in grassroots conservation education, Rare has developed an inviting social marketing program for raising community awareness: The Pride campaign. Proven successful in more than 30 countries, Pride campaigns build momentum for conservation by inspiring enthusiasm and commitment within individuals and local communities living in the earth's most ecologically valuable regions such as the CNMI (www.rareconservation.org). Right now, there are similar campaigns going on in the Marshall Islands, Kosrae (FSM), Palau and Guam. The development of this campaign included obtaining information on attitudes and perceptions of coral reefs using a statistically significant island wide socioeconomic survey. (Saipan Tribune, March 20, 2008)

Development of this social marketing plan will be augmented by an upcoming training provided by Conservation International (CI). The Targeting Behavior course provides hands-on training in the design of conservation education and social marketing strategies targeting behavior change. Participants will learn principles of designing behavior change programs and gain skills in utilizing participatory assessment tools. During the practicum component of the course, instructors will lead trainees in conducting an assessment of a local site where one or more partners/staff are planning to work on conservation outreach and education to address a behavior change challenge. During this formative research process instructors will demonstrate the use of participatory stakeholder workshop tools to analyze problems, define behavior change objectives, identify alternatives and prioritize target groups. Trainees will then help design and apply a knowledge, attitude and skills survey to two priority target groups. After analyzing survey results, participants will work with instructors to select activities and tools to include in a final strategy. CI will ensure that the outcomes of the Laolao Bay CAP are interwoven into the CI training to provide a starting point for the workshop.

(e) Conservation Status:

A wide variety of activities take place in Laolao Bay. These include residential living; agricultural use including growing crops, cattle grazing and burning to clear land; commercial areas; institutional uses such as schools, churches, and a juvenile prison; and recreational uses including fishing, hunting, diving, hiking, running, and beach picnics. In addition, certain activities are regulated or prohibited in terrestrial and marine protected areas. Sometimes these human activities have a negative effect on the surrounding environment and are a source of land-based pollution or problems like overfishing.

Land-based sources of pollution are having a significant negative impact on coral reef health and coral cover throughout the populated islands of the CNMI. These sources of pollution are one of CNMI’s greatest threats to its reefs in the southern islands. The CNMI’s natural resource agencies have several plans and programs in place to address and monitor the inputs and effects of current and potential sources of land-based sources of pollution on the marine environment. However, the problem is large and complicated. CNMI would like to develop and grow in a competitive economic environment, yet the resource base is finite and

already heavily impacted by human activities. Addressing land-based sources of pollution involves all sectors of the government, private and public sectors (2004 CRI Grant). The LAS stakeholder meetings and workshop emphasized the need to address land based sources of pollution (LBS).

Decreased water quality threatens coral reefs and other marine systems that rely on good water quality to thrive. These marine communities are negatively altered in response to nutrient loads, sediment loads, temperature, turbidity, and other water quality parameters. Both point and non-point source pollution are responsible for lowering the quality of the CNMI's surface and near-shore coastal waters. Sewage out-falls, sewer collection overflows, sedimentation from unpaved roads and development, urban runoff, reverse osmosis discharges, and nutrients from landscaping, golf courses, and agriculture are some of the most significant stressors on CNMI's surface and marine water quality (LAS). At the present time, the waters surrounding Laolao Bay are listed in the CNMI 303(d) list as impaired for EPA aquatic life use designation. This impairment classification was a result of high bacteria and nutrient levels detected in the DEQ water quality monitoring, as well as large abundances of turf and macroalgae in comparison to corals and coralline algae found in CNMI reef monitoring program (CNMI DEQ 305(b) Report, 2004).

In the CNMI, the main sources of nonpoint source pollution are urban runoff, land clearing, animal and human waste disposal, and agricultural practices. Sediments, nutrients, and toxic chemicals are the three greatest threats to clean nearshore waters and healthy coral reef ecosystems. The resource management agencies in the CNMI have built up their efforts to prevent, control and reduce the amount of nonpoint source pollution entering the ground and surface waters; however, more steps still need to be taken.

Heavy precipitation events are common in the CNMI during the annual rainy season. High velocity stormwater draining through the watersheds erodes soil, picks up pollutants, and is inevitably drawn towards the coastal waters. Runoff water carries a soup of pollutants both naturally occurring and man-made. At the Laolao Watershed, brown runoff water is frequently observed flowing into the bay during storm events. According to the USDA Survey (Young, 1989), many of the soils in the Laolao Watershed are classified as highly erodible, "badland" soils. In its NPS study, DEQ identified two critical sources of sedimentation at Laolao: 1) the existing secondary road; and 2) exposed, eroding land within the watershed.

More recently, a land clearing of approximately one acre was identified as another critical source of sedimentation in the Laolao Watershed. This area was cleared in 1991 under an Earthmoving and Erosion Control permit, for the purposes of constructing an access road. The earthmoving activities violated the conditions of the permit because no erosion control measures were installed. During subsequent storm events, significant amounts of sediment were discharged from the cleared lot into Laolao Bay. In cooperation with the DEQ Notice of Violation, the landowner prepared an erosion control and site drainage plan and commenced to implement the plan. However, not all aspects of the plan were followed during the implementation phase and some erosion control techniques prescribed were ineffective. The lot continues to be a significant source of sedimentation into Laolao Bay.

In 1998, the DEQ Non Point Source Pollution Program along with the CNMI Watershed Group, consisting of CRM, DEQ, DFW, Natural Resource Conservation Service (NRCS), Northern Marianas College-Cooperative Research, Extension and Education Services (NMC-CREES),

Saipan and Northern Islands Soil and Watershed Conservation District (S&NISWCD) and other agencies, decided to collaborate in the effort to control NPS pollution in the Laolao Bay Watershed area, beginning with a revegetation project in the badlands area. As a result of the revegetation project, the CNMI MMT was formed to assess the impacts of sediment to marine organisms and the effectiveness of management measures.

(f) Viability of Conservation Targets:

Through the CAP process, the target natural resources were identified and included 1) coral, 2) macroinvertebrates, 3) fish, 4) turtles, and 5) vegetation. The TNC Program Miradi defines targets as "a limited suite of species, communities, and ecological systems that are chosen to represent and encompass the full array of biodiversity found in a project area. They are the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness. In theory - and hopefully in practice - conservation of the focal targets will ensure the conservation of all native biodiversity within functional landscapes".

The viability of each of these target natural resources were rated by the multidisciplinary CAP planning team. Coral, Macroinvertebrates, Fish, and Vegetation were rated as "Fair" and Turtles were rated as "Poor". The following definitions were used to make determinations of the rating.

- Very Good – The factor is functioning at an ecologically desirable status, and requires little human intervention.
- Good – The factor is functioning within its range of acceptable variation; it may require some human intervention.
- Fair – The factor lies outside of its range of acceptable variation & requires human intervention. If unchecked, the target will be vulnerable to serious degradation.
- Poor – Allowing the factor to remain in this condition for an extended period will make restoration or preventing extirpation practically impossible.

Table 2: Overall Viability Summary

Conservation Targets		Condition		Size		Viability Rank
		Grade	Weight	Grade	Weight	
1	Coral	Fair	1	-	1	**Fair**
2	Macroinvertebrates	Fair	1	-	1	**Fair**
3	Fish	Fair	1	Fair	1	**Fair**
4	Turtles	Poor	1	Fair	1	**Fair**
5	Vegetation	Fair	1	Fair	1	**Fair**
Project Biodiversity Health Rank						**Fair**

Thirteen specific threats to Laolao Bay and its adjacent watersheds have been identified in the CAP process and each of these threats ranked for each target. The following table shows how each threat is ranked according to its affect on specific natural resource targets.

Table 3: Summary and Rank of Threats across Targets

Threats Across Targets		Coral	Macroinvertebrates	Fish	Turtles	Vegetation	Overall Threat Rank
Project-specific threats		1	2	3	4	5	
1	Runoff	High	Medium	Low	Low	-	Medium
2	Large scale disturbance	High	Medium	Low	-	-	Medium
3	Lack of herbivory	High	-	Low	-	-	Medium
4	Fire	-	-	-	-	High	Medium
5	Invasive species	-	-	-	-	High	Medium
6	Poaching (Lack of Enforcement)	-	Medium	Low	Medium	-	Medium
7	Beach Activities	-	-	-	Medium	Low	Low
8	Overharvesting	-	Low	Medium	-	-	Low
9	Development	-	-	-	-	Medium	Low
10	Anthropogenic Light Sources	-	-	-	Low	-	Low
11	Lack of baseline data	-	-	-	Low	-	Low
12	Loss of Foraging Habitat	-	-	-	Low	-	Low
13	Habitat Loss	-	-	-	-	-	-
Threat Status for Targets and Project		High	Medium	Low	Medium	High	Medium

Management Approach

VISION:

Laolao is world renowned as a beautiful tropical destination where natural, cultural and historical resources, knowledge and values are abundant for all to enjoy above and below the waves of Saipan.

MISSION STATEMENT:

In appreciation of the cultural, historical, and environmental significance and educational, economic, and social values that benefit all stakeholders—indigenous people, residents, tourists, traditional fishermen, dive operators and divers—we pledge to protect, preserve, restore, and manage Laolao Bay through stakeholder-driven sustainable resource management practices.

(a) CAP Process & Recommendations:

On December 10, 2008, representatives from various resource agencies and organizations came together to complete the CAP process for Laolao Bay using updated software called *Miradi* (www.miradi.org) and to use it to develop a management plan for the site. These agencies included: DEQ, CRM, DFW, and the Mariana Islands Nature Alliance (MINA). This effort was coordinated by the CNMI Coral Reef Initiative and facilitated by TNC – Micronesia Program, and the US National Oceanic and Atmospheric Administration NOAA. This group discussed and came to consensus around several major topics that were aimed at moving the group and plans forward, and made the following recommendations.

- The CAP should be part of an over-arching CNMI Local Action Strategy. Any further LASs (CAP or other) should be site specific, ridge to reef, ecosystem-based, coordinate agency efforts, and undergo a comprehensive management planning process such as the CAP.
- CNMI should aim to implement four CAPs: one on Tinian, one on Rota, and two on Saipan (Laolao and one other). Other CAPs should begin development after the Laolao CAP begins implementation and it is shown that there is enough capacity, and funding to continue new sites.
- The Laolao CAP Team should meeting at least annually to review CAP progress, prioritize projects for CRI grant funds and develop an annual workplan. This group will provide these annual workplan recommendations to the policy committee for adoption.
- 70 – 80% of coral reef management grant funds should be used to support implementation of the CAP annual workplan. 20 – 30% should be left for coral coordination staff/ travel/ and other priority projects.
- Future CAP/LAS processes should include community/stakeholder group input from the beginning of the process.

(b) SWOT Analysis:

A Strength, Weaknesses, Opportunities and Threats Analysis was conducted at the December 2008 CAP Workshop to supplement the existing planning, and specifically to support finalizing the management objectives for the site. The following bullet list provides a summary of this SWOT analysis and outlines both internal and external threats and opportunities.

Internal Strengths

- Lots of information & data
- Lots of technical capacity
- Popular tourism/dive site/ people care about
- Existing legal status (Sea Cucumber Sanctuary & Forbidden Island)
- Exsiting LAS/ revegetation efforts
- Support from directors
- Team has shared vision

Internal Weakness

- Capacity- lack of personnel to implement, enforce, funding
- No designated leadership (at all levels)
    - Hard to get agreement
- Loose "community" diverse interests
- Divers are large stakeholder group of non-natives
- Multiple large scale threats (reforestation user conflicts, road improvement)
- Not enough education & outreach, different levels of awareness
- No opportunities for community volunteers
- Need better "branding"
- Most of land private
- Confusion on how to incorporate CAP into existing work

External Threats

- Military Buildup
- Property Rights/Easement Issues
- Off-island Ownership
- "Monument"/MPA-resistance spillover to land conservation
- Federalization- Feds viewed as enemy
- Easy for poachers/night fishing
- Priority to Pave road (misallocation) - CIP
- General lack of stakeholder involvement

External Opportunities

- Local Stakeholders
- User Fees (Diving, Picnic, Park)
- Medicinal Group

- Compensation for Military Buildup
- MVA Tourism Increased Potential
- Decrease in resource user population
- Federal Funding Opportunities- DOT, Homeland Security
- DPW
- FEMA emergency relief money
- DPS (enforcement)
- Triathlon Association
- Kagman Community Association
- Marianas Dive, NMDOA
- University of Guam Marine Lab
- Sea Grant
- New NOAA Coral Program Priorities
- NMC Natural Resource Management (NRM) Program- Students
- NRCS-EQUIP/WHIP
- USFS through local forestry agencies

(c) Local Capacity Assessment

An analysis of the local capacity of agency staff was conducted at the December 2008 CAP workshop and facilitated by TNC. The following definitions and tables describe the results of this analysis. The overall project resource rank was determined as "medium". The following list defines the components that comprise this resource rank:

- **Staff Leadership** Definition: The presence of a talented staff member with lead responsibility for conserving the area. If multiple staff leaders are involved, they must also have a shared vision of success and successful collaboration mechanisms in place.
- **Multidisciplinary Team** Definition: Project receives support from an experienced, multidisciplinary team to develop and implement key strategies - located on site, within the lead institution(s) or provided by partner organizations.
- **Institutional Leadership** Definition: A private conservation organization (NGO), government agency, other private sector institution or some combination of institutions is providing leadership for developing and implementing conservation strategies at the project area. If multiple institutions are involved they must have a shared vision of success and successful collaboration mechanisms in place.
- **Funding** Definition: Existence of sufficient operational funding to support the staff and operating costs, as well as program funding to implement and sustain key strategies. Funding may come from both private and public sectors and be available through a variety of mechanisms and sources, such as appropriation of public funds, contributions by donors, endowment and other sources.
- **Social/Legal Framework for Conservation** Definition: Existence of an appropriate framework of protection tools and policy instruments that can be deployed to secure enduring conservation results at the project area. The potential legal protection tools include many types of ownerships and forms, such as parks, privately owned conservation areas, community reserves, conservation easements or public

designations. The potential policy instruments also include many types, such as development ordinances, legal permits, seasonal restrictions or no-take fisheries zones. This factor seeks to assess whether the potential legal framework for conservation at the project area exists, not whether it has been fully deployed or fulfilled.

- **Community and Constituency Support** Definition: The project team effectively engages and gains the support of key constituencies, including those in the local community.

Table 4: Local Capacity Assessment

Categories & Measures	Score	Definition
People		
Staff Leadership	Medium	• A staff leader has no more than one of the three elements of focused staff responsibility (responsibility, experience, time). If multiple staff leaders are involved, they have conflicting visions of success and no collaboration mechanisms.
Multidisciplinary Team	High	• The project receives support from a project team – but regular assistance is not available in a few important programmatic areas needed for successful strategy implementation.
People Average	Medium	
Internal Resources		
Institutional Leadership	High	• Institutional leadership is being provided but assignment of responsibility or adequate capacity is not at a sufficient level. If multiple institutions are involved, there may be some difficulties in collaboration.
Funding	Medium	• Funding has been secured or pledged for core operations for at least one year and some planning underway to develop diversified sources of long-term support for operations and conservation strategies.
Internal Resources Average	Medium	
External Resources		
Social/Legal Framework for Conservation	Medium	• Some elements of a legal framework exist, but two or more key protection tools or policy instruments need to be authorized or substantially amended.
Community and Constituency Support	Medium	• The project team and their program have mixed support in the community and there is some significant community opposition to strategy implementation
External Resources Average	Medium	
Overall Project Resource Rank	**Medium**	

(d) Objectives and Strategies:

Table 5: Laolao Bay CAP Objectives and Strategic Actions

Objective	**Statistically significant positive trends in the abundance of carnivorous fish, surgeon fish and adult parrot fish by FY2015 compared to baseline.**
Strategic action	Contract party to develop, create and install 4 Educational and Outreach signs.
Strategic action	Hire a new Creel data collection employees and a new vehicle
Strategic action	Hire one full time or up to three part time community conservation coordinators
Strategic action	Work with community to form a Volunteer Tasi-watch Team (Steve talk with Marianne)
Strategic action	Maintain or improve current fisheries regulation
Strategic action	Hire a charismatic community leader to work with local fisherman to create a locally managed marine area (LMMA)
Strategic action	Perform additional in water fisheries surveys in Laolao Bay
Objective	**By the end of FY2015 water turbidity is reduced below 1997 ambient levels by 10%, and by 50% by the end of FY2018, at both Laolao water quality sample sites.**
Strategic action	Barricade vehicular traffic access to beaches
Strategic action	Revegetate badlands using student and community volunteers
Strategic action	Implement Road Improvement Plan
Strategic action	Promote the use of Crimestoppers to increase compliance with laws and regulations
Strategic action	Install and check answering machines daily at DFW, DEQ, and CRM.
Objective	**By the end of 2009, Develop a Social Marketing Campaign to Address Priority Threats in Laolao**
Strategic action	Invite key stakeholders to Conservation International March Workshop
Strategic action	Designate campaign coordinator
Objective	**Statistically significant positive trends in the abundance of sea urchins and sea cucumbers by FY2015.**
Strategic action	Continue the sea cucumber moratorium beyond 2010.
Strategic action	Contract party to develop, create and install 4 Educational and Outreach signs
Strategic action	Hire a new Creel data collection employees and a new vehicle
Strategic action	Hire one full time or up to three part time community conservation coordinators
Strategic action	Work with community to form a Volunteer Tasi-watch Team (Steve talk with Marianne)
Strategic action	Maintain or improve current fisheries regulation
Strategic action	Hire a charismatic community leader to work with local fisherman to create a locally managed marine area (LMMA)
Strategic action	Perform additional in water fisheries surveys in Laolao Bay
Objective	**Statistically significant positive trends in the abundance of the coral density per unit area and mean colony size by FY2015.**
Strategic action	Implement road improvement plan
Strategic action	Reduce the number of failing septic systems
Strategic action	Maintain and improve fisheries regulations
Strategic action	Provide non-destructive diver access from shore to both reef cuts.
Strategic action	Provide parking areas for Laolao Bay Beach by end of FY2015
Strategic action	Revegetate badlands using student and community volunteers

Objective	**Eliminate all unsustainable beach activities by 2011. (Steve needs to check notes with turtle group)(Define unsustainable and beach)**
Strategic action	Promote Crimestoppers to increase compliance with laws and regulations
Strategic action	Implement road improvement plan
Strategic action	Barricade vehicular traffic access to beaches
Strategic action	Provide parking areas for Laolao Bay Beach by end of FY2015
Strategic action	Revegetate badlands using student and community volunteers
Strategic action	Hire one full time or up to three part time community conservation coordinators
Strategic action	Work with NGOs to form a Volunteer Tasi-watch Team (Steve talk with Marianne)
Objective	**Under normal weather conditions the acreage burned by fires in the Laolao Bay Watershed has been reduced by 50% by the end of FY2010.**
Strategic action	Hire one full time or up to three part time community conservation coordinators
Strategic action	Work with community to form a Volunteer Tasi-watch Team (Steve talk with Marianne)
Strategic action	Promote Crimestoppers to increase compliance with laws and regulations
Strategic action	Revegetate badlands using student and community volunteers
Objective	**Using the NRCS Planting Plan, at least 4 canopy species are established in the Laolao Bay Revegetation Site by the demonstration of a 50% total survival rate (24 acres) by the end of FY2009.**
Strategic action	Promote Crimestoppers to increase compliance with laws and regulations
Strategic action	Revegetate badlands using student and community volunteers
Objective (new)	**Initial increase in federal prosecutions of turtle poachers followed by decrease in prosecutions by 2012.**
Strategic action	Work with NOAA fisheries enforcement to increase Guam staff to visit/support Saipan
Strategic action	Secure buy-in from local natural resource agency directors
Strategic action	Work with Department of Justice to provide training for local enforcement officers
Strategic action	Obtain information from US Attorney's office on procedural strategy to deal with poaching violators

(d) Implementation:

An annual workplan will be developed each year to prioritize the projects to be implemented from the plan for that year as well as to guide the grant funding process. The first annual workplan was developed in December 2008 and is included in Appendix One. A significant portion of the CRI09 grant will be used to fund this plan. Additional funding for CAP projects may become available through the United States Economic Stimulus Package. The workplan lists the lead responsible agency for each task.

(e) Monitoring Effectiveness:

Environmental change in the marine environment at Laolao Bay is monitored as a part of CNMI's long-term monitoring program and has been surveyed consistently at two fore-reef

sites since 2000. Two reef flat sites are also currently part of the program and at least two additional fore reef and on additional reef flat site will be added to support CAP activities. Details of benthic, invertebrate and fish survey methods are detailed in Starmer and Houk, 2008.

Information on changes will be reported out annually before the annual work-plan is developed to ensure that needed changes to the plan are incorporated.

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CNMI DEQ 305(b) Report, 2004

CNMI CRI Grants 2004, 2005, 2006, 2007, 2008

Commonwealth of the Northern Mariana Islands Three-Year Coral Reef Protection Local Action Strategy, DFW, DLNR, DEQ, CRM, September 9, 2003

CNMI & Guam Stormwater Management Plan-Volume 1 Final, Horsley Witten Group Inc., October 2006

Coral Reef Conservation Program 2002-2006 External Panel Review Final Report, November 30, 2007

Forbidden Island Sanctuary: CNMI Public Law 12-46

Kagman/Forbidden Island Management Plan, 2007 DFW's Natural Resource Planning Section

Laolao Bay Sea Cucumber Sanctuary: CNMI Public Law 11-63.

Saipan Tribune, March 20, 2008

The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2008, Chapter 2: Commonwealth of the Northern Mariana Islands Coral Reef MPA Summary
Greg Moretti, CNMI Division of Fish and Wildlife Contributors: Fran Castro, Michael Trianni, Dr. Peter Houk, and John Starmer

Starmer, J.A. and Houk, P. 2008. Marine and Water Quality Monitoring Plan for the Commonwealth of the Northern Mariana Islands. DEQ and CRM, CNMI. 38 pp.

Unified Watershed Assessment, DEQ and Interagency Watershed Working Group, 1998

Webpages:

- **CRM**
- **DEQ**
- **DFW**
- **NOAA LAS**
- **TNC**
- **Rare Pride**

Appendix One: Annual Work Plan

OBJECTIVES	ACTIVITIES	Objective Supported	Responsible Agency
Objective One: Statistically significant positive trends in the abundance of carnivorous fish, surgeon fish and adult parrot fish by FY2015 compared to baseline.	Activity 1: Contract party to develop, create and install 4 Educational and Outreach signs	1,4	DEQ
Objective Two: By the end of FY2015 water turbidity is reduced below 1997 ambient levels by 10% and by 50% by the end of FY2018, at both Laolao water quality sample sites.	Activity 2: Hire one full time or up to three part time community conservation coordinators	1,4,6,7	DEQ
Objective Three: By the end of 2009, Develop a Social Marketing Campaign to Address Priority Threats in Laolao	Activity 3: Work with community to form a Volunteer Tasi-watch Team	1,4,6,7	CRM/DEQ/ DFW
Objective Four: Statistically significant positive trends in the abundance of sea urchins and sea cucumbers by FY2015.	Activity 4: Maintain and improve fisheries regulations	1,4.5	DFW
Objective Five: Statistically significant positive trends in the abundance of the coral density per unit area and mean colony size by FY2015.	Activity 5: Revegetate badlands using student and community volunteers	2,5,6,7,8	CRM/DEQ
Objective Six: Eliminate all unsustainable beach activities by 2011. (Steve to check turtle group)(Define unsustainable beach)	Activity 6: Promote Crimestoppers to increase compliance with laws and regulations	2,5,7,8	CRM
Objective Seven: Under normal weather conditions the acreage burned by fires in the Laolao Bay Watershed has been reduced by 50% by the end of FY2010.	Activity 7: Install and check answering machines daily at DFW, DEQ, and CRM.	2	CRM/DEQ/ DFW
Objective Eight: Using the NRCS Planting Plan, at least 4 canopy species are established in the Laolao Bay Revegetation Site by the demonstration of a 50% total survival rate (24 acres) by the end of FY2009.	Activity 8: Invite key stakeholders to Conservation International March Workshop	3	DEQ
Objective Nine: Initial increase in federal prosecutions of turtle poachers followed by decrease in prosecutions by 2012.	Activity 9: Designate campaign coordinator for Social Marketing Campaign	3	DEQ
	Activity 10: Continue the sea cucumber moratorium beyond 2010.	4	DFW
	Activity 12: Work with NOAA fisheries enforcement to increase Guam staff to visit/support Saipan	9	DFW
	Activity 13: Secure buy-in from local natural resource agency directors	9	CRM/DEQ/ DFW
	Activity 14: Work with Department of Justice to provide training for local enforcement officers	9	DFW
	Activity 15: Obtain information from US Attorney's office on procedural strategy to deal with poaching violators	9	DFW

Appendix Two: CAP Workshop Participants

CAP Workshop:	January 2008, CNMI	
Participants:	We had a core group of 10 participants everyday (from DEQ, CRM, DFW, NOAA, and MINA). In addition we had intermittent participation from USDA – NRCS, Historic Preservation, the Zoning Office, Public Lands, and a local dive operator.	
CAP Group Workshop:	Spring 2008, Chuuk, FSM	
Participants:	Kathy Yuknavage	
	Angelo Villagomez	
	Steve McKagan	
Final CAP Workshop:	December 10-11, 2008	
Participants:	Trina Leberer	TNC
	Umiich Sengebau	TNC
	Meghan Gombos	NOAA
	Fran Castro	DEQ
	Kathleen Herrmann	DEQ/NOAA
	Reina Camacho	DEQ
	Peter Houk	DEQ
	Brooke Nevitt	CRM
	John Starmer	CRM
	Steve McKagan	DFW
	Laura Williams	DFW
	Nate Hawley	DFW
	Angelo Villagomez	MINA/Beautify CNMI
	Kathy Yuknavage	MINA/Papago Citizen

Appendix Three: December 2008 CAP Workshop Summary

- CAP Purpose: The group agreed that the purpose for carrying out the Conservation Action Planning (CAP) process was mainly to:
  1) Better understand the priority threats to Laolao Bay,
  2) Continue the work that has been done there and ensure it gets completed, and
  3) Coordinate agency efforts to most effectively share resources and improve management including indicators of performance.

- CAP/ LAS process: The group agreed that CNMI should continue to have an over arching LAS that includes specific threats such as Land Based Sources of Pollution, Impacts from Fishing, Outreach and Education, etc. However, the implementation of the LAS should be through an ecosystem based approach using a comprehensive planning process such as CAP. The group also recognized that existing agency mandates and efforts could not be redirected. However, they felt that the CAP, through the CNMI LAS process, provides the opportunity to comprehensively address threats in one location through partnerships and combined support from all agencies. This would require buy-in from agency directors to focus staff time for site planning and implementation where appropriate.

- CAP Implementation Responsibility: The next topic of discussion was who was responsible for developing and implementing the CAP. The group felt that they were the right technical group to both provide input and support implementation of the CAP. The group also felt there was a need to have a specific person hired to drive coordination and implementation of the CAP. To ensure implementation, it was noted that there needs to be a combination of bottom up and top down efforts. From the bottom up, the group felt it was important to carry out stakeholder outreach activities to help gain support for and participation in management activities. However, the group recognized there was a need to have buy-in from appropriate agency chiefs to ensure the CAP was prioritized in both funding and staffing support. Finally, it was mentioned that federal policy would also influence the ability for staff and funding to support implementation of the CAP/LAS.

- Coral Management Grant Funding: The group discussed the percent of coral management funds that should be used to implement CAP projects. Currently approximately 40% of the coral grant funds are used to implement LAS projects. Although there was some variance in the actual percentages, the group agreed that substantially more of the NOAA coral funding (70-80%) should go towards implementation of CAP /LAS projects.

- Decision Making: The group discussed the process for decision making around the grant and CAP/LAS priority setting process. The group felt that the present participants represented the correct agencies to be involved in development of the CAP/LAS and to make recommendations on prioritizing projects for funding the CAP. However, the group also recognized that this CAP/LAS process was insufficient in getting community/stakeholder input. This includes relevant working groups such as the watershed working group and DPW.

- Future LAS/CAP Development: The group discussed how to move forward with further LAS revisions/development and further CAP sites. The group agreed that further CAP/LAS sites should be developed and include sites on both Rota and Tinian. However, the group felt it was important to first implement the Laolao CAP and ensure that there is enough capacity, funding, and stakeholder involvement.

Laolao Bay Conservation Action Plan 2012 Addendum and Workplan

2012 CAP Process & Implementation

On February 28th, 2012, a working group met at the Pacific Islands Club on Saipan for a day-long workshop to review the Laolao Bay Conservation Action Plan created in 2009 and create a work plan for the 2012-2013 calendar years. Members of participating agencies for the original CAP as well as several new stakeholders were invited (see appendix for list of attendees). The objectives for the workshop were to update what projects and strategic actions had been accomplished, update monitoring outcomes, and establish new objectives and strategic actions for the 2012 and 2013 fiscal years. Deliverables were to include this addendum to the 2009 CAP which includes revised threat rankings, conceptual diagrams and results chains generated in Miradi and a list of 2012-2013 Objectives and Strategic actions.

Participants in the workshop agreed that regular evaluation and monitoring is necessary to continue to have management success in the Laolao Bay watershed. It was therefore decided that a review would be conducted every two years to evaluate the CAP (the next review is scheduled for early 2014) and that a meeting would occur annually to update the status of projects within the two-year workplan. The next workplan update meeting should occur in early 2013.

Objective, Strategic Action and Target Updates

Projects Complete/In Progress

ARRA Engineering, Road Development and Outreach

A $2.6 million grant was awarded through the American Recovery and Reinvestment Act to reduce erosion and sediment transfer from the Dandan/San Vicente side of Laolao Bay Drive through road and drainage improvements. The project is nearly complete at the writing of this addendum. The upper reach of the road (0.4 miles) was paved and storm water runoff controls were installed, redirecting these waters into a large sediment chamber at the bottom of the road. The remainder of the Laulau Bay Drive gravel road and the road leading to the dive site from the village of Kagman (Gap Gap Road) has been re-graded to improve drainage and decrease erosion. Workshops were held in 2010 and 2011 to discuss maintenance and construction of unpaved roads. These workshops were attended by government agency engineers and commercial contractors as well as the Public Works Department (responsible for government road maintenance) in an effort to improve regular maintenance to Laolao Bay drive and other unpaved roads on the island. Additionally, an engineering design plan was created for the eventual paving and re-alignment of Gapgap Road, the suspected main driver of sedimentation near the Laolao dive site. Construction costs for this road are estimated to be around $900,000 and the new road would be rerouted to more naturally follow the contour of the land and decrease erosion.

Stream crossings along the unpaved portion of the road will also be hardened in 2012 at six locations to prevent chronic erosion. There are three additional stream crossings that are not on public easements and will therefore not be improved since property lease holders do not want permanent structures at those locations.

There has been significant progress revegetating the upper badland areas in the watershed that had been cleared and damaged by fires over the last several decades. The project has planted 1600 seedlings of 12 native or naturalized species over a 14 acre area. A 67% survival rate has been observed over the first year of maintenance and evaluation. Sword grass (*Miscanthus sp.*) has been cut back around seedlings and will continue to die off as the planted species develop closed canopies. The planting is now complete and monitoring is ongoing.

An outreach section in the ARRA grant has provided for the posting of signs at beach areas regarding turtles and littering, and the project has created revegetation brochures for school programs. Additionally, volunteers assisted with planting activities as another form of outreach with the goal of raising awareness about the restoration project and the threat sedimentation presents to the resources of Laolao Bay.

Biological Monitoring

Biological monitoring has been ongoing in Laolao, with new studies funded by the ARRA grant. Research methods have been designed to allow for comparisons to the last comprehensive study of the Bay completed in 1992. A technical report comparing 2010 research to the 1992 baselines can be found in the appendix. Replication of this study is planned for 2017 to evaluate the effectiveness of management initiatives and changes in benthic vertebrate and invertebrate populations. The Marine Monitoring Team (DEQ and CRM) also has two long-term study locations at the site with data from the last 10 years. Monthly reef flat water quality surveys have been done using a YSI probe to monitor nutrients including nitrates, nitrites and phosphorous. Salinity tows have also been completed in an effort to identify possible sources of freshwater intrusion into the Bay. Turbidity measurements at ten stream crossing locations are being conducted during rain events to measure the effects of the revegetation project and other construction projects in the area. An Integrated Coral Observing Network (ICON) station located at Laolao is collecting real-time oceanographic and weather data both at depth and at the surface including air temperature, wind speed and gusts, wind direction, barometric pressure, precipitation, light (above and below water), sea temperature, salinity and state of tide. More information about this NOAA-funded initiative can be found at www.coral.noaa.gov/global-monitoring.html.

In addition to marine monitoring in Laolao Bay, DFW conducts fish population monitoring around the Forbidden Island marine protected area (MPA) and has expanded weekly fisherman counts to Laolao Bay. DFW is also monitoring the beaches and considers the area to be active for sea turtle nesting.

As part of a master's thesis project through the University of Guam Marine Lab, a CRM employee, Dave Benavente, is conducting surveys with fishermen and measuring catches (including about 3000 fish

measured from talaya and 2000 from night and day spear-fishing). This may assist in the assessment of fish populations in Laolao and estimating take from the area.

Outreach/Access Improvements

A socioeconomic study of Laolao users was completed in 2008 as part of a SEM-Pasifika project to understand more about threats to the area and solutions from the users' perspective. This data was used to develop a Laolao Bay anti-littering social marketing campaign designed and led by Seaweb. The campaign kicked off in March 2012.

The CRMO completed the construction of a permeably paved parking lot near the mid-point picnicking beach. Work to install vegetated blinds to block light from affecting nesting sea turtles and further revegetate the area is still in progress. The parking lot was constructed near an existing barbeque pit and in a cleared area where parking was occurring. The project goal was to improve public access and limit points where vehicles access the beach. MINA has recently built a traditional-style hut near the CRM parking lot to serve as a base for the Tasi-Watch program that will serve as an outreach and community enforcement group to raise awareness on threats to the area and reduce incidences of unsustainable beach activities (i.e. driving on the beach, fires on the sand, walking on coral, etc).

Objectives from the 2009 Plan

The following objectives were written for the 2009 CAP and have been evaluated based on their status of completion in 2012.

Objective	Status	Notes
Reduce the acreage burned by fires in the Laolao Bay watershed by 50% under normal weather conditions by the end of FY2010	Completed	No wildfires have been reported since 2008
Establish at least four canopy species in the Laolao Bay Revegetation Site (by demonstration of a 50% total survival rate over 24 acres) by the end of FY2009	Completed	Final phase of revegetation was completed in 2011 and plants are showing 67% survival
Develop a social marketing campaign to address priority threats in Laolao (by the end of 2009)	In progress	The anti-littering campaign managed by Seaweb was launched in March 2012 and is scheduled to run through 2013
By FY2015, achieve statistically significant positive trends compared to baseline in: • the abundance of carnivorous fish, surgeon fish and adult parrotfish • the abundance of sea urchins and sea cucumbers • coral density per unit area and mean coral colony size	In progress	Reduction in sedimentation and illegal beach/fishing activities may lead toward completion by the target date. Monitoring is taking place so information can be evaluated in 2015
Reduce water turbidity below 1997 ambient levels at both Laolao water quality monitoring sites by 10% by the end of FY2015 and by 50% by the end of FY2018	In progress	Reduction in sedimentation should lead toward completion by the target date. Monitoring is taking place so information can be evaluated in 2015
Eliminate all unsustainable beach activities by 2011	Not obtained	“Unsustainable” and “beach activities” were not defined previously. Many illegal and unsustainable activities still take place
Increase the number of federal prosecutions of turtle poachers annually in order to achieve a decrease in turtle poaching by 2012	In progress	Five individuals were locally prosecuted in 2010 and 2011; one case is currently being locally prosecuted. Federal prosecution numbers could not be obtained

Strategic Actions from the 2009 Plan

Strategic actions were determined during the 2009 CAP workshop to establish how objectives would be attained and threats would be abated. The 2012 statuses of these actions are below.

Strategic Action	Status
Monitoring	
• Perform addition in-water fisheries surveys in Laolao Bay	In progress
• Hire a new Creel data collection employee	Not started
Education and Outreach	
• Install educational signs	Completed
• Form a volunteer Tasi-watch team	In progress
• Revegetate badlands using student and community volunteers	Completed
• Develop a social marketing campaign	In progress
• Hire community conservation coordinators	Not started
Revegetation	
• Revegetate badlands using student and community volunteers	Completed
Road improvement	
• Implement road improvement plan	In progress
Parking areas	
• Barricade vehicular traffic access to the beaches	In progress
• Provide parking areas for Laolao Bay Beach	In progress
Sewer system engineering	
• Reduce number of failing septic systems	Not started
New legislation and regulations	
• Continue the sea cucumber moratorium beyond 2010	Completed
• Maintain or improve fisheries regulations	Not started
• Hire a charismatic leader to work with fishermen to create a Locally Managed Marine Area	Not started
Effective enforcement	
• Form a volunteer Tasi-watch Team	In progress
• Hire a charismatic leader to work with fishermen to create a Locally Managed Marine Area	Not started
• Promote the use of Crimestoppers to report illegal activities (install and check answering machines at DFW, DEQ, CRM)	Not started
• Increase NOAA fisheries enforcement support from Guam	Not started
• Increase enforcement capacity of local natural resource agencies	In progress
• Partner with Department of Justice and US Attorney's office to provide training for enforcement and prosecution	In progress
Change hunting strategies	Not started
Improve dive access	
• Provide non-destructive diver access from shore to both reef cuts	In progress

Target Status and KEA Updates

Several new targets were brainstormed and suggested to be added to the list but were ultimately decided against. Biodiversity was suggested to become its own target or to be better nested into each target as a Key Ecological Attribute (KEA). It was not accepted as a new target because there were several barriers for coming up with KEAs/indicators and it could be better addressed within individual targets. Divers and other users (generally, the people who visit Laolao Bay) and historical sites were discussed as targets but were discarded because they would better contribute to a social/cultural resource management plan than to a natural resource plan. Algae and water quality were also mentioned as possible targets but were included in the new "Benthic Habitat" target instead of being listed on their own. Finally, birds and soil were suggested but were judged not to be at risk enough to be included separately as targets. Both are covered to some degree within the vegetation target and do not need to be evaluated independently at this time, however it is worthwhile to continue to discuss them at later CAP reviews.

Key Ecological Attributes were checked with experts who have been collecting data on each of the targets. In some cases, the KEAs and indicators developed for the 2009 CAP were no longer being measured or were not considered to be adequate measurements of target health. In these cases, some KEAs were discontinued and other new ones were introduced. In cases where data was available and indicators were still relevant, the status of each indicator was calculated using current data measurements. Current targets with KEAs, indicators and statuses are shown below. Whether or not they will be used in future years is indicated.

TARGET	*Key Ecological Attribute*	*Indicator*	*Status*	*Use in 2012*
Benthic Habitat	Population structure and recruitment	Diversity per unit area	FAIR	Continued
		Size class distribution	FAIR	Continued
	Successional dynamics	Rate of recovery	FAIR	Continued
		Benthic substrate	---	NEW
	Water quality	Turbidity	---	NEW
Macro-invertebrates	Abundance of food resources	Density of edible shells	FAIR	Continued
	Trophic structure	Density of grazing urchins	POOR	Continued
		Density of sea cucumbers	FAIR	Continued
Fish	Population size and dynamics	Abundance/biomass of Acanthuridae	FAIR	Continued
		Abundance/biomass of carnivorous fish	FAIR	Continued
		Abundance/biomass of Scaridae	---	NEW
	Presence of key communities	Relative contributions of Acanthuridae, Scaridae and carnivorous fish to total abundance/biomass	---	NEW
	Population structure and recruitment	Scaridae T/I	FAIR	Discontinued
Turtles	Population size and dynamics	Number of turtles observed from cliff line surveys	POOR	Discontinued
		Number or turtle in-water captures	---	NEW
	Population structure and recruitment	Number of successful turtles nests	FAIR	Continued
		% possible nesting habitat available for nesting	---	NEW
Vegetation	Size/extent of characteristic communities	% Cover of diverse plants	GOOD	Continued
		% Badland succession to native forest	---	NEW
	Physical appearance	% survival of planted seedlings	GOOD	Continued
		Amount of bare ground revegetated	---	NEW

Revised Threat Rankings

Participants in the workshop re-evaluated the threats to the focal conservation targets that were brainstormed for the 2009 CAP and had the chance to eliminate threats, add new ones, and re-rank threats that were still relevant to each target. Threats were ranked based on their scope, severity and irreversibility on scales of low, medium, high or very high for each. The Miradi program then consolidated these rankings into a single summary ranking for each threat-target combination. These rankings are listed below:

THREATS/TARGETS	*Vegetation*	*Benthic Habitat*	*Macro-invertebrates*	*Fish*	*Turtles*	*SUMMARY*
Algal growth		High				MEDIUM
Diver damage		Med				LOW
Large scale disturbance		High	High	High		HIGH
Runoff/sedimentation		Med	Low	Med	Low	MEDIUM
Habitat loss					Med	LOW
Poaching			Med	Low	High	MEDIUM
Overharvesting			Med	Med		MEDIUM
Beach activities	Low				Low	LOW
Trash	Low				Low	LOW
Land clearing/development	Med					LOW
Wildfires	Med					LOW
Invasive species	Med					LOW
SUMMARY TARGET RATINGS	MEDIUM	HIGH	MEDIUM	MEDIUM	MEDIUM	HIGH

2014 CAP Review recommendations

Several points were brought up during the 2012 CAP review that were tabled to be discussed at future meetings. First, many social targets were identified in Laolao Bay that were recommended to be added to the model. These targets (such as divers, fisherman or historical sites) were ultimately left out of this addendum because they seemed better suited to a social action plan than to a natural resource conservation plan. We recommend that a social diagram be made to compliment this Conservation Action Plan to make sure that social targets and considerations in long-term planning.

Soil and birds were two targets that were not considered to be necessary to add as focal conservation targets at this point in time, but it is recommended that they be re-evaluated at each CAP review and be included at any time if they are considered to be separate enough from the other targets and sufficiently important and threatened to warrant being added to the model. Similarly, the threats of habitat loss (in terms of forests/vegetation/birds) and overharvesting of Tangantangan (for charcoal) were not considered to be issues at this point in time but should be re-evaluated frequently to make sure that they are discussed and addressed before they have devastating effects on the focal conservation targets of Laolao Bay.

The strategy of encouraging landowner conservation practices was heavily discussed at this year's meeting as well, but was ultimately left out of the 2012-2013 workplan because the two main federal programs that would have contributed to this strategy – the Coastal and Estuarine Land Conservation Program (CELCP) and the Wildlife Habitat Incentive Program (WHIP, coordinated through the USDA-NRCS program) – have been defunded. In order to promote landowner stewardship practices, conservation easements and preservation, these programs should be revisited in future years as possible strategies that can contribute to the Laolao Bay CAP.

2012-2013 Workplan: Objectives and Strategies

Enforcement

Objectives

- Achieve thirty violations phoned in to DFW/DEQ/CRM/Fire enforcement per year in 2012 and 2013
- Increase Tasi-Watch ranger capacity by 50% by the end of 2014 compared to start-up program numbers

Strategic Actions

- Contact Department of Justice (federal) about providing training sessions to law enforcement and Tasi-Watch personnel
- Assist (Tasi-Watch personnel) with record-keeping to track data on reports/calls, citations/violations, prosecutions and fines paid
- Strengthen Tasi-Watch program
    - DEQ provide training to Tasi-Watch rangers explaining the projects going on in Laolao
    - DEQ/CRM/DFW enforcement officers assist with ranger trainings

Education/Outreach

Objectives

- DEQ/CRM Education and Outreach Coordinators will provide coral reef-focused educational presentations to all 4th grade classrooms throughout the CNMI each year from 2013-2015.
- The DEQ Education and Outreach Coordinator will organize an Environmental Expo in April each year from 2013-2015 for 1,500 students from 4th and 5th grade classes from public and private schools to learn from participating private and government agencies working to improve, protect, and conserve Saipan's natural resources.
- Tasi-Watch volunteers will conduct outreach to Laolao Bay users for 4 hours each day on all weekend days and holidays from June 2012 through 2015.

Strategic Actions

- Continue working with Seaweb on anti-littering campaign, consider expanding it to include trash burning
- Re-emphasize “Walk It, Don’t Drive It” campaign as part of CRMO’s “Love Our Beaches” campaign to educate against beach driving in Laolao
- Continue planning the Annual Environmental Expo during April each year.
- Fill education and outreach-based positions at DEQ and CRM and have these personnel work collaboratively with one another and other Laolao Bay stakeholders.

Engineering

Objectives

- See a 10% reduction in turbidity at two water quality monitoring sites by 2015; 50% by 2018

Strategic Actions

- Find funding for Gapgap Road improvements
- Begin realignment and stormwater control construction on Gapgap
- Improve dive site parking lot with permeable pavers and re-vegetation
- Improve dive site access with signs/markers on beach/reef
- Harden six stream crossings to prevent chronic erosion on Laulau Bay Drive
- Secure permissions to finish improvements on remaining 3 stream crossings
- Clean Laulau Bay Drive sediment traps from improved road twice a month
- Determine plan for barriers to vehicle access to beaches in high traffic areas
- Consult with sea turtle program to coordinate activities during the nesting season to minimize risks to turtles

Vegetation Protection

Objectives

- Continue recent record of “no fires” through 2014
- Maintain >50% survival of plants in revegetation sites

Strategic Actions

- Weed/fertilize upland revegetation sites twice a year for the next two years until the plants grow above the level of the grass
- Partner with NRCS to create an invasive plant monitoring plan for upland and lowland areas (by 2014)
- Partner with NRCS to create a revegetation plan for beach and road edges
- Plant native vegetation on beach and road edges

Monitoring and Assessment

Objectives

- Survey two existing and one new marine monitoring program site in Laolao Bay biannually

Strategic Actions

- Continue marine monitoring program benthic habitat, invertebrate and fish surveys, and water quality monitoring
- Create and implement a surface water quality assurance monitoring plan for Laolao Bay's watersheds
- Evaluate marine monitoring data in the 4-year CNMI State of the Reefs report (to be completed in 2013/14)
- Expand long-term marine monitoring program to include third Laolao site at Tuturam Beach drainage (downstream of 2011 ARRA road improvement)

FIGURES

Figure 1: 2012 Laolao Bay Conceptual Model

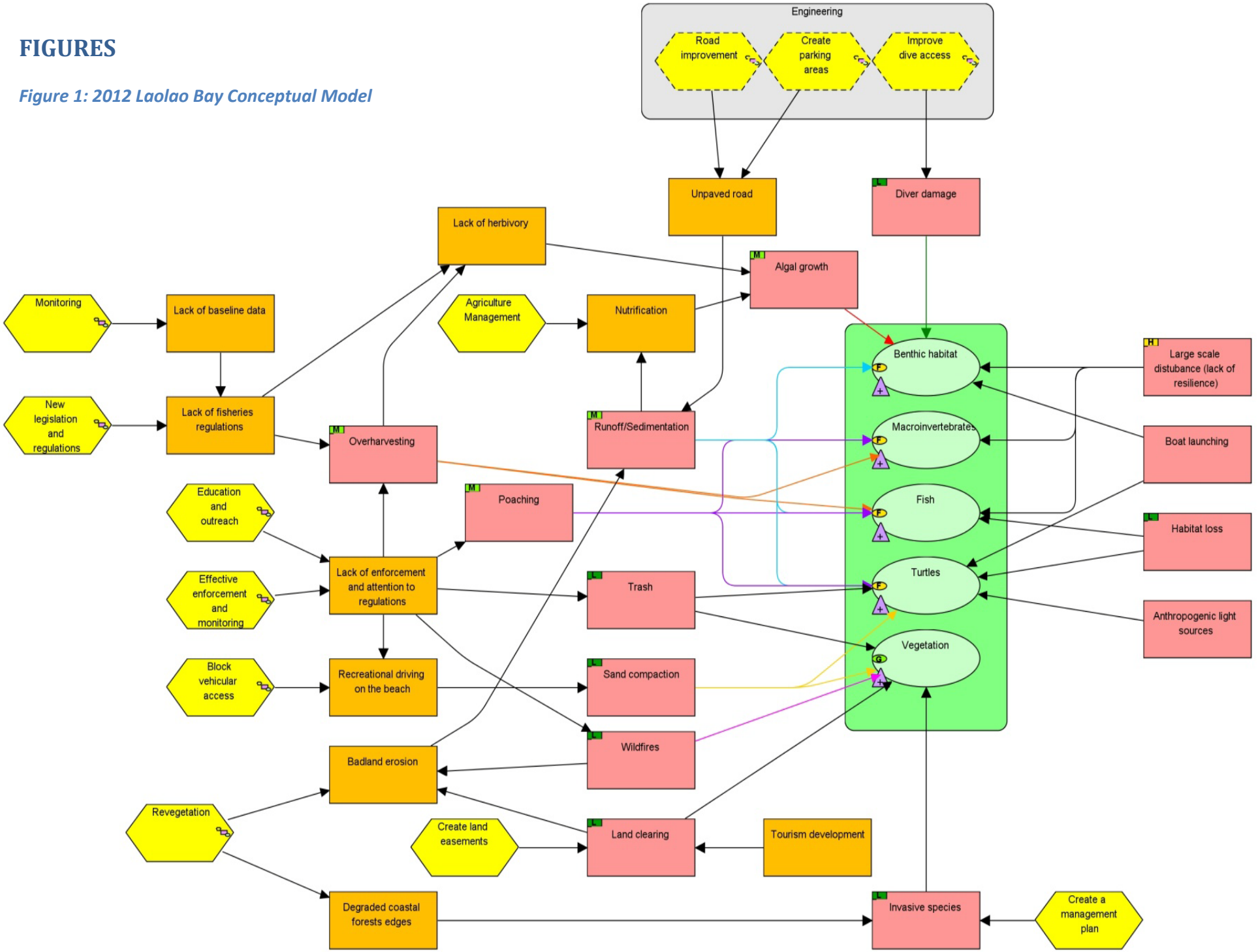
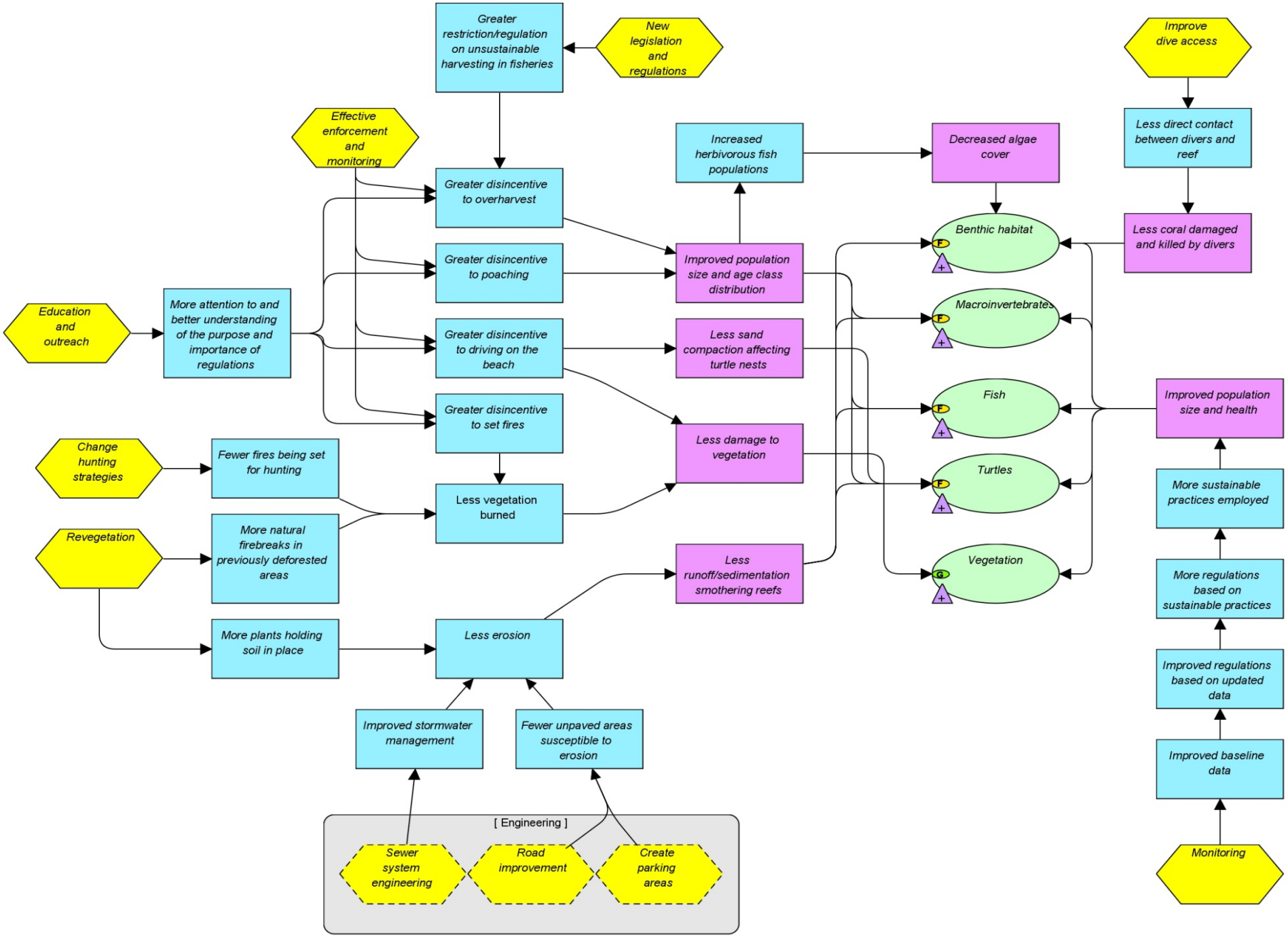


Figure 2: 2012 Laolao Bay Results Chains



Appendices

Appendix 1: CAP Review Attendees (for February 28, 2012 meeting):

DEQ: Fran Castro, Kaity Mattos, Jose Quan, Jihan Buniag, Steven Johnson, Ryan Okano, Tim Lang

CRM: Rachel Zuercher, Dave Benavente, Rebecca Skeele

DFW: Jeremy Plauss-Johnson, Mike Tenorio, Joe Ruak

NOAA: Steve McKagan

NRCS: Jay Doronila

MINA: Sam Sablan, Frank Villagomez, Shirlynn Perez

PMRI: Greg Moretti

DPL: Pat Rasa, Mel Igitol

Marianas Variety: Tammy Doty

Appendix 2: Link to Technical Report comparing 1992 and 2010 Laolao Bay Marine Monitoring Data

http://www.pacmares.com/Publications_files/Houk_et_al_2011_Laolao.pdf