

# Ongedechuul System of Conservation Areas Ecosystem-Based Management Plan 2011-2016

July 2011



## Ngardmau State, Republic of Palau

Prepared by the five-member Ngardmau Conservation Board with assistance from the Palau Conservation Society



Funding provided by the Micronesia Conservation Trust, UK Darwin Initiative through BirdLife International, the David and Lucile Packard Foundation and Ngardmau State Government.





# What this plan covers

Ongedechuul System of Conservation Areas  
An Ecosystem-based Management Plan  
2011 –2012



This plan was developed by the Ngardmau Conservation Board with assistance from Palau Conservation Society.

Quick Peek at the Plan





# Why manage these sites?

The Ongedechuul Conservation Area System consists of four areas linked ecologically: “Taki” Conservation Area, Ngercheluus Conservation Area, Ngermasech Conservation Area, and Ileyaklbeluu Conservation Area.

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Each area in the System is unique: The Taki Area includes Palau’s highest waterfall and its river, and is a popular tourist destination; as the highest point in Palau (713 feet), Ngerchelchuus is an important landmark in addition to being known habitat for a rare bird (White-breasted Woodswallow); Ngermasech is a spawning and aggregation site and nursery for marine species, and Ileyaklbeluu, a trochus sanctuary and manta ray cleaning station, is also a tourist site.

As a system, the four areas represent Ngardmau’s ecosystems and habitats. The system includes mangrove, coral reef, seagrass, a variety of forests, savannas, and the functionality of a watershed.

Ecologically, the System is home to endangered and endemic species. All of Palau’s applicable endemic birds and bats are found in abundance in these areas. Rare and endemic trees are also found in the area. Terrestrial areas are home to a rich variety of lizards, insects, and freshwater fish. Marine areas are home to species such as dugong, saltwater crocodile, sea turtles, mangrove crabs, trochus, and manta rays. The sites are connected: The Taki drains into marine areas that flow out through Ileyaklbeluu, and Ngerchelchuus forms part of the watershed draining into Ngermasech. Mobile species also move among sites.

As a system of ecologically connected areas, the System is resilient to environmental change. The System includes an upper watershed system, which is protected to maintain water availability even in times of drought. Intact forests in the Conservation Area serve as refuges during fires. Ngermasech is habitat for juvenile species, and mangroves are intact so as to provide shelter during storms. Protection of Ngermasech has led to a increase in fish and sea cucumbers, increasing resiliency for commercially-important species in times of stress. Protected areas tend to increase species outside of conservation areas as well.

The system’s eco services is vital to the livelihood of the people of Ngardmau culturally, spiritually, and economically.

Management of the site is necessary to reduce soil erosion and sediment build up, alleviate incompatible land development, stop poaching, preserve important habitat, and promote sustainable uses. Management is feasible due to access, leadership and strong community support.

Quick Peek at the Plan



# What we want:

## *Our vision*

"By 2031, effective management of the Ogedechuul System of Conservation Areas maintains the natural health and beauty of our environment, which promotes positive cultural practices and sustainable livelihoods that unite the people of Ngardmau to work together for the benefit of our children today, tomorrow, and the future generations".



## *Our goals*

1. By December 2015, the Ogedechuul System of Conservation Areas is effectively managed to achieve its purpose.
2. By 2021, the Ogedechuul System of Conservation Areas is sustainably financed into perpetuity.
3. By 2015, the Ogedechuul System of Conservation Areas helps to sustain positive cultural practices and is managed using best management practices and traditional conservation ways.

**Quick Peek at the Plan**



# Who is in charge?

## *Governor*

The Duties of the Governor as set forth in the Ngardmau Conservation Act of 2009 outline the following responsibilities:

- Implementation of the management plan
- Enforcement of regulations
- Administration of permits and licenses
- Collection and remittance to the state treasury all types of fees and proceeds from fines
- Produce a financial report of all conservation area revenues and expenditures to the
- state legislature and the conservation board

## *Ngardmau Conservation Board*

The Duties of the Board as set forth in the Ngardmau Conservation Act of 2009 outline the following responsibilities:

- Conservation planning
- Development of a management plan to include promulgation of regulations
- Review of the progress of implementation of the management plan
- Periodical reviews of the management plan and make changes as needed
- Development of an annual budget proposal

## *Coordinator*

**Role:** Coordinator and Implementer role: Ensure regulations are enforced and management actions occur on schedule. Work closely with leadership to coordinate management, review the Plan, and oversee all associated staff.

## *Conservation Officer*

**Role:** Enforcer and Implementer role: Monitor compliance with prohibited and allowable activities and enforce non-compliance, participate in monitoring, educational, restoration, and other field-based activities.

Quick Peek at the Plan



# What personnel are needed?

## Management Personnel

Under this Plan, three staff will be hired in Fiscal Year 2012:

- OSCA Conservation Coordinator
- Conservation Officers (2)
- Hiring for additional conservation officers is anticipated in between years 2 to 4.

This Plan also proposes to utilize the services of existing State personnel, including the:

- State Attorney
- State Administrative Staff
- State Maintenance Staff

Quick Peek at the Plan



# Zones:

This management plan includes the following zones:

## *Tourist Zone*

- Specific area to be decided after obtaining technical expertise. A tourist zone will include a trail that connects waterfalls, vista points, and cultural sites together. Tourists and limited tourism development will be allowed along the trail and at trailheads. All activities require a permit, permission, or fee.

## *No-take/Controlled Access Zone*

- All other areas in the OSCA are zoned as no-take areas with controlled access. All activities require a permit or permission.

## *Service Zones*

- Are areas that provide service access to essential services such as electrical power poles and communication towers.



# Quick Peek at the Plan

## Restrictions:

### **NOT ALLOWED AT ANY TIME IN ANY ZONE**

#### Marine conservation areas

- No removing sand or soil; dredging
- No harvesting of trochus in Ileyaklbeluu
- No chemicals, spills, or dumping
- No groundings of any vessels
- No aquaculture
- No entry without specific permission

#### Terrestrial conservation areas

- No alcohol or littering
- No burning or fires
- No new construction on Ngerchelchuus (no new towers)
- No fishing of eels
- No fishing or hunting of any native animals
- No entry without specific permission or fee
- No farming or agriculture

### **ALLOWED WITH PERMISSION, PERMIT, or FEE, dependent on zone**

#### Marine conservation areas

- Fishing in Ngermasech or Ileyakl Beluu, with permission from Governor and Traditional Chiefs for community purposes
- Entry for surveys, monitoring, and education
- Entry to Ileyakl Beluu for tourism (snorkeling)
- Once per quarter, collection of Ngduul by Ngardmau residents only, in Ngermasech.
- Sustainable cutting of individual mangrove trees with permission from Governor and Traditional Chiefs for community purposes

#### Terrestrial conservation areas

- Gathering of plants or cutting of trees, with permission from Governor and Traditional Chiefs for community purposes
- Cutting of trees, in tourist zone with permit; replanting required
- Planting of native plants
- Construction for ecotourism
- Removal of invasive species
- Entry to tourist zones
- Entry for surveys, monitoring, and education
- Commercial filming or photography

**Regulations and a permit system will be developed in the first year of the Plan.**





# What work needs to happen?

## Quick Peek at the Plan

Year 1	Years 2-3	Years 4-5
<ul style="list-style-type: none"> <li>-Adopt Management Plan</li> <li>-Access sustainable financing support from PAN</li> <li>-Hiring, and setup of regulations, fines, and fees necessary to authorize and regulate activities</li> <li>-Demarcate OSCA boundaries and mark</li> <li>-Establish outreach and education program</li> <li>-Establish enforcement system</li> <li>-Conduct baseline biophysical survey</li> <li>-Establish training program for staff</li> </ul>	<ul style="list-style-type: none"> <li>-School-based education</li> <li>-Ongoing adult outreach</li> <li>-Ongoing community-based activities</li> <li>-Ongoing surveillance and enforcement</li> <li>-Ongoing biophysical monitoring</li> <li>-Pave unsurfaced roads in OSCA</li> </ul>	<ul style="list-style-type: none"> <li>-Ongoing activities, surveillance and enforcement, and biophysical monitoring</li> <li>-Final review and analysis of Plan and monitoring data</li> <li>-Assess need for a separate office</li> </ul>



# Costs and funding

It will cost \$131,859.00 to implement all activities in the first year. The first year of the plan is a start-up year thus cost of starting up is expected to be high. The following four years the annual budget is expected to average between \$90,000 and \$100,000.

A sustainable financing plan calls for funding by the Palau PAN during the first year, with additional funding in following years. As activities are implemented, the Conservation Area will begin to generate its own revenues through ecotourism fees, fines associated with enforcement, and through grants or other fundraising efforts.

## Year 1 Budget (FY2012)

Budget Category:	Amount:	Total:
Personnel	\$ 43,000.00	\$ 43,000.00
Activities Cost Items:		
Major Equipment	15,000.00	15,000.00
Office Equipment	5,000.00	5,000.00
Conservation Equipment & Materials	6,000.00	6,000.00
- Equipment		
- Equipment Hire		
- Materials		
Fuel	8,000.00	8,000.00
Professional Services (contractual)	25,000.00	25,000.00
- Legal Assistance		
- Technical Assistance		
Publication	5,500.00	5,500.00
- Design & Print		
- Media		
- Signage Materials		
Office Supplies	2,000.00	2,000.00
Ngardmau Conservation Board Per Meeting (Ngardmau Conservation Act of 2009)	1,500.00	1,500.00
Occupancy (State Office Housing Share)	900.00	900.00
Food & Beverage	800.00	800.00
Total Cost	\$ 112,700.00	\$ 112,700.00
Indirect Cost (17%)		\$ 19,159.00
<b>TOTAL BUDGET (PAN FUND REQUEST)</b>		<b>\$ 131,859.00</b>

Quick Peek at the Plan

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# ENDORSEMENT

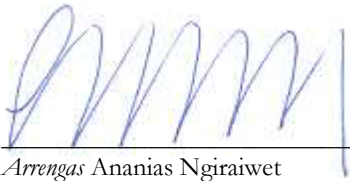
On this day, \_\_\_\_\_, at \_\_\_\_\_ in the Republic of Palau, we the Chiefs of Ngardmau, Governor, and Speaker of the Ngardmau State Legislature, endorse this Management Plan, and urge the people of Ngardmau to make every effort to ensure its effective implementation.



*Beouch Sakaziro Demk*



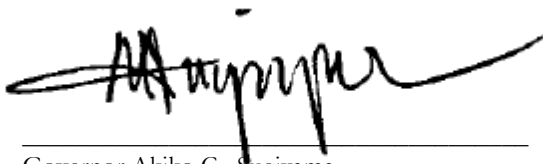
*Ngirkebai Aichi Kumangai*



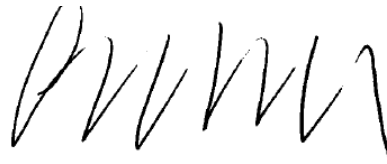
*Arrengas Ananias Ngiraiwet*



*Arbedul Ra Teblak Willard Kumangai*



Governor Akiko C. Sugiyama



Speaker Ananias Ngiraiwet

## ACKNOWLEDGEMENTS

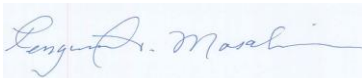
The Ngardmau Conservation Board wishes to recognize the vision and leadership of the people of Ngardmau, and celebrate their foresight and commitment to sustainable management of Ngardmau's valuable ecosystems for the benefit of present and future generations.

Traditionally the people of Ngardmau have supported the conservation and sustainable use of Ngardmau's natural resources through their traditional leaders. From the outset of the making of this Management Plan they have given their time and knowledge to ensure that informed management decisions are made. Their ongoing support is gratefully acknowledged.

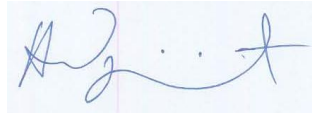
The adoption of this management plan is a significant milestone for eco-system based management at a local and national level only made possible by the contributions of a diverse range of individuals, partners, stakeholders and donors, including:

Palau Conservation Society  
Palau International Coral Reef Center  
The Nature Conservancy  
Palau Protected Areas Network  
Palau Automated Land and Resources Information System (PALARIS)  
Bureau of Lands and Survey  
Belau National Museum  
USDA Natural Resource Conservation Services  
Palau Environmental Quality Protection Board  
Division of Forestry  
Belau Watershed Alliance  
The David and Lucille Packard Foundation  
UK Darwin Initiative through Birdlife International  
Micronesia Conservation Trust  
Asap Bukurrou  
Ngardmau State Government

### Ngardmau Conservation Board:



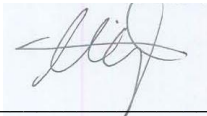
Chairman, *Ongelolem* Victor R. Masahiro



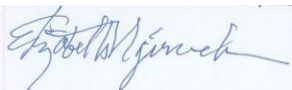
Vice Chairman, Alson Ngiraiwet



Tiare Turang Holm, Secretary



Bradley O. Kumangai, Member



Elizabeth J. Ngirmekur, Member

## I. Introduction

Through the Ngardmau Conservation Act of 2009 (NSPL 7-11), the Ngardmau Conservation Area System was reaffirmed. The System includes four discrete conservation areas commonly known as Ngermasech, Ngerchelchuus, Taki Waterfall, and Ileakelbeluu, which contain representation of all key ecosystem types in Palau (i.e. savannah, upland forest, mangrove, seagrass, and coral reefs). The conservation areas both on land and water is owned and managed by the people of Ngardmau ..

The system includes mangrove, coral reef, seagrass, a variety of forests, savannas, and the functionality of a watershed. The system is also home to endangered and endemic species. It offers educational opportunities highlighting ecological values and also holds significant historical and cultural values. Because there is a strong ecological connection between the conservation areas, the system is named the **Ongedechuul System of Conservation Areas** (Figure 1).

The four conservation areas with discrete boundaries are:

Name	General Characteristic	Area Size	Establishment (First; Last confirmed)
Ngerchelchuus Conservation Area (“Ngerchelchuus”)	Mountain (forest and savanna)	0.3km <sup>2</sup> or 50 acres	NPL 4-20 (1998); NSL 7-11 (2009)
Taki Waterfall Conservation Area (“Taki”)	Watershed, Waterfalls, Rivers, Tributaries	6.12km <sup>2</sup> or 1,512 acres	NPL 4-20 (1998); NSL 7-11 (2009)
Reef of Ileyakl Beluu Conservation Area (“Ileyakl Beluu”)	Trochus Sanctuary, reef	0.62km <sup>2</sup> or 110 acres	NSPL 5-28 (2005); NSL 7-11 (2009)
Ngermasech to Bkulachelid Conservation Area (“Ngermasech”)	Seagrass bed, mangrove, patch reef	3.3km <sup>2</sup> or 815 acres	NPL 4-20 (1998); NSL 7-11 (2009)

Because of the connectivity between the conservation areas this Management Plan takes an ecosystem-based management approach to manage the areas. It also focuses exclusively on management of the four conservation areas (rather than the entire state) for two reasons: 1) a desire to focus the management plan on discrete areas that could be realistically managed to ensure effective conservation of their resources, and 2) so as to meet the criteria of the national Protected Areas Network (PAN) to ensure effective and continuous management of the conservation area system into perpetuity. Ngardmau submitted its application to join the PAN on June 4, 2010. According to the PAN Regulations Section 5.7 (e) the OSCA became a member of the PAN in September 2010.

The Ongedechuul System of Conservation Areas Management Plan (OSCA-MP) is a five-year plan. It gives clear and strategic management guidance that is based upon the wishes of the people of Ngardmau. The Plan provides the most practical and cost-effective ecosystem-based management approach, including funding requirements necessary to ensure a healthy and productive conservation area system into the future. The Plan provides background information on the State of Ngardmau, the community and its people. It also provides a brief history of the areas, and describes the conservation area system, its ecological connectivity, and the State’s goals and strategic objectives for the conservation area system.

A management plan is mandated by NSPL 7-11 and shall be a legal document governing the protection and use of the Conservation Area System and its components. Implementation and enforcement of this management plan is set forth in Section 11 b) of the Ngardmau Conservation Act of 2009, which states: “*Any rules, regulation, or procedures included in the effective management plan shall have the full force and effect of law*”. The management plan would enter into force upon adoption by the legislature and governor, or after one year of the date of submission to the governor and legislature. If in one year of the date of submission to the Office of the Governor and the Legislature both branches fail to act, the Plan with all its contents enters into force. (This management plan is subject to periodical review by the Ngardmau Conservation Board. A review schedule is set by the Board.)



Figure 1. Ongedechuul System of Conservation Areas. Map provided through the Palau EBM project. This map shows the boundary of Ngardmau as described in the Ngardmau State Constitution.

Appendix 1 includes some non-binding recommendations for amendments to NSL 7-11 in order to clarify and streamline the Plan, and resolve conflicting measures. This Plan was drafted within the context of NSL 7-11 and the allowable activities under all previous legislation are included and allowed in this Plan.

## II. Management of the Ongedechuul System of Conservation Areas

### Rationale and Management

The management of the Ongedechuul System of Conservation Areas is guided by a broad vision and goals drafted by the Planning Team. The vision takes a long-term perspective (20 years) and the goals take a shorter-term perspective.

### Vision

“By 2031, effective management of the Ongedechuul System of Conservation Areas maintains the natural health and beauty of our environment, which promotes positive cultural practices and sustainable livelihoods that unite the people of Ngardmau to work together for the benefit of our children today, tomorrow, and the future generations”.

### A. Management Goals

Guided by their vision, the Board determined a set of shorter-term goals over the next ten years. The goals aspire to establish and maintain a healthy and productive conservation area system with continuous funding and support in place. The goals are intended to be consistent with state and national objectives, and to restore fragmented cultural practices and use of traditional conservation methods.

- 1) By December 2015, the Ongedechuul System of Conservation Areas is effectively managed to achieve its purpose.
- 2) By 2021, the Ongedechuul System of Conservation Areas is sustainably financed into perpetuity.
- 3) By 2015, the Ongedechuul System of Conservation Areas helps to sustain positive cultural practices and is managed using best management practices and traditional conservation ways.

*Goal 1* places emphasis on combating identified critical threats to the conservation areas, encouraging compatible development practices, and institutionalizing the management of OSCA. The objectives in the short- to medium-term respond specifically to minimizing sedimentation, eliminating illegal fishing, reducing impact from coral dredging, and discouraging incompatible development.

*Goal 2* seeks to secure effective and continuous management of Ngardmau’s natural resources into the future through stable financial means.

*Goal 3* serves to draw a parallel between the traditional practices of the people and their dependence on their natural resources. Ngardmau, through this goal, wishes to highlight this interaction and at the same time restore the traditional methods of managing their natural resources.

### B. Strategic Objectives.

**GOAL 1: By December 2015, the Ongedechuul System of Conservation Areas is effectively managed to achieve its purpose.**

- 1-1 By 2015, sediment along the coast at the village is reduced by 75% from the 2010 baseline, and turbidity has been reduced annually, and 100% of bare areas within the conservation areas have been or are being re-vegetated
- 1-2 Beginning in 2014 and from then on, there are no unpermitted burning and earthmoving activities.
- 1-3 By 2014, 95% of residents of Ngardmau state are aware of sedimentation and its causes and impacts, and at least 95% of the Ngardmau State community is aware and fully supportive of the OSCA and its boundaries, purpose, and rules.
- 1-4 By 2015, a buffer zone has been designed and implemented around Diongradid and its tributaries.
- 1-5 By 2012, the Taki trail has been improved to minimize sedimentation and there is controlled access and activities within the Conservation area.
- 1-6 By 2015, the road to Ngerchelchuu has been improved and stabilized to minimize stormwater runoff and erosion.
- 1-7 By 2015, there is no illegal fishing in Ngermasech and Ileakl Beluu.
- 1-8 By December 2011, buffer zones for Ngermasech and Ileakl Beluu have been established.
- 1-9 By 2015, Ngermasech and Ileakl Beluu are not negatively affected by dredging activities.



- 1-10 By 2015, all development in or near conservation areas are compatible with the objectives of OSCA.
- 1-11 By 2012, the OSCA Management Plan and associated regulations have been adopted by the Ngardmau State Government and endorsed by the Palau National Government as a member of the Palau Protected Areas Network.
- 1-12 By January 2012, OSCA has been institutionalized within the state government.
- 1-13 By January 2014, OSCA is clearly contributing to maintaining the subsistence and sustainable livelihoods of the people of Ngardmau.

**GOAL 2: By December 2015, the Ongedechuul System of Conservation Areas is sustainably financed into perpetuity.**

- 2-1 By September 2011, OSCA is a recognized member of the Palau Protected Areas Network.
- 2-2 By January 2012, OSCA is generating revenues (including entrance fees, penalties and grants) and is integrated into Ngardmau state annual budgeting.
- 2-3 By January 2012, there is an NGO component of OSCA that facilitates membership revenues and engagement as well as NGO-targeted grant-making.

**GOAL 3: By December 2015, the Ongedechuul System of Conservation Areas helps to sustain positive cultural practices and is managed using traditional conservation ways.**

- 3-1 By January 2012, enforcement of the OSCA is conducted jointly by the Ministry of Justice, Office of the Governor, and Traditional Leaders.
- 3-2 By 2015, citizens of Ngardmau continue to work together to monitor and manage the conservation areas.

### III Management Actions

#### A. 5-Year Management Activities (Overview)

##### Short Term (Year 1)

Activity begins in Year 1 and completes by end of Year 1; or recurrent.

- 1-1a Begin tree planting in bare areas caused by zip line development clearing.
- 1-1b General tree planting in all other identified bare areas.
- 1-1c Design educational message on sedimentation and its impact for billboard signage, and for regular print on fliers and posters for distribution.
- 1-1d Gather data from PICRC & EQPB necessary to develop a monitoring plan.
- 1-2a Board recommends state legislation on burning, open fires, and earthmoving activities.
- 1-3a Create Education and awareness campaign within Ngardmau targeting elementary school students; and a campaign targeting the general young adult and adult community.
- 1-3b Ask for assistance from partner agencies (PCS, NRCS) to develop awareness programs and materials.
- 1-3c Mark boundaries with buoys and signs.
- 1-4a State legislation drafted and legislature passes legislation prohibiting cutting within 150 feet of Diongradid.
- 1-4b Education of the community and general public of new law.
- 1-5a Monitor existing improvements to see if in compliance with existing laws and prepare reports for Governor.
- 1-5b Design and construct sign about hiking regulations.
- 1-5c Complete construction of boardwalk.
- 1-7a Develop and implement daily monitoring plan.
- 1-7b Conduct public awareness on illegal fishing in Ngermasech and Ileyakl Beluu.
- 1-7c Establish regular radio announcement on rules and regulations of Ngermasech and Ileyakl Beluu.
- 1-8a Board recommends legislation to create buffer zones for Ngermasech and Ileyakl Beluu.
- 1-8b Board seeks technical advice on size of buffer zone.
- 1-8c Conduct Ngduul survey in Ngermasech.

- 1-9a Forward results of socio economic survey to state leaders.
- 1-10a Incorporate OSCA Management Plan into larger state plans (Master Plan, Land-Use Plan) (ongoing).
- 1-11a Present management plan to Governor, legislature, and chiefs.
- 1-11b Legislature and executive branch adopt management plan.
- 1-12a Hire OSCA Coordinator and 2 conservation officers.
- 1-12b Purchase essential equipment.
- 2-1a Board lobbies MNRET for recognition of PAN status
- 2-2a Publicize entrance fee at Ileyakl Beluu.
- 2-2b Analyze current agreements with users on Ngerchelchuu and determine if fee schedule is appropriate (renegotiate as necessary).
- 2-2c OSCA Board develops some sort of MOU or agreement with NSPLA.
- 2-2d Include OSCA budget into state budget request.
- 2-2e Publicize existing penalties.
- 2-2f Develop regulations to address fees and fines.
- 2-2g Educate existing groups about goals and objectives of OSCA.
- 2-2h Develop and encourage participation and volunteer activities for OSCA.
- 3-1a Meet with all parties needed for law enforcement activities.
- 3-1b Memorandum Of Understanding between State and Ministry of Justice is developed and signed.
- 3-1c Implement MOU.

#### **Medium Term (Years 2-3)**

Activity begins in Year 2 and completes by end of Year 3; or recurrent.

- 1-2b After passage of prohibitions, monitor, observe, and enforce prohibitions.
- 1-6b Raise money to pave service access road on Ngerchelchuu.
- 1-6c Planning Commission undertakes study to determine options for fixing road.
- 1-9a Make quarterly decisions about opening Ngermasech for quarterly harvesting.
- 1-9b Monitor harvest and status of ngduul.
- 1-9c Develop public announcement system for ngduul harvest.
- 1-11a Monitor projects near conservation areas to ensure compliance with existing laws.
- 1-11b Develop stricter restrictions for development adjacent to conservation areas (e.g. native plants, replanting.)
- 1-13d OSCA personnel are adequately trained (all aspects).
- 2-2g NGO assisted grant applications submitted.
- 2-12h Market OSCA to national and international vendors.
- 3-1d Pass a *bul* to complement existing law.
- 3-2a State legislature designates OSCA day.
- 3-2b Hold OSCA day for people to visit sites.
- 3-2c Encourage community-based education and enforcement – e.g. people telling people not to fish in conservation areas.
- 3-2d Raise money / analyze reward system.
- 3-2e Institute yearly activities (picking up trash, planting trees, etc.)

#### **Long Term (Years 4-5)**

Activity begins in Year 4 and completes by end of Year 5; or recurrent.

- 1-13a Assess OSCA and need for separate office.

### **B. 5-Year Strategic Plan, 2011 – 2016**

Activities determined by the Ngardmau Planning Team were developed to meet each objective. The activities under each corresponding objective provide the core management directions of this Management Plan for the next five years. Additional

planning necessary for the future is also stated in this section. The 5-year Strategic Plan lays out activities per unique strategy, whereas the Overview table presented in the previous section outlined all activities by timeframe.

An associated Excel Spreadsheet accompanies this Management Plan and is meant to be used by implementers. On the spreadsheet, the Management Plan lists the lead person(s), the duration of the activity, priority level, success indicator, and how the activity is measured for progress. Timing and priority levels for each activity were based on priority level of the target and threat and an assessment of what could be realistically achieved within the assigned time frame.

The activities fall into one of five main categories of the strategic plan, in line with the PAN criteria: 1) *Administration and Regulatory Requirements*, 2) *Education and Awareness*, 3) *Monitoring and Evaluation*, 4) *Enforcement and Surveillance*, 5) *Maintenance and On-the Ground strategies*.

### Administrative and Regulatory Strategies

Administrative Strategies include those activities necessary to authorize and support management actions taken by the Ongedechuul System of Conservation Area staff, the Ngardmau Conservation Board, and Governor. Strategies include establishment of guidelines and regulatory requirements and adequate financing structures in place.

- Administration is the major focus of this Management Plan in the first year (Year 1). The first year is dedicated to ensuring that the Ngardmau Conservation Board and staff have the necessary regulatory support and are organized and enabled.
- The second and third years are dedicated to continuous improvement of the regulations and establishing a Non-Governmental Organization to assist with grant-writing and management support.
- The fourth and fifth years of the Plan focus on improving management, including efficiency and accountability, and further engaging the community in management activities.

<b>Administration and Regulatory Activities:</b>		
<i>Short-term Activities Year 1</i>	<i>Medium-term Activities Year 2 and 3</i>	<i>Long-term Activities Year 4 and 5</i>
<ol style="list-style-type: none"> <li>1. A Coordinator is hired by the Board and OSCA office is equipped by the Board and Coordinator.</li> <li>2. Coordinator and Ngardmau Conservation Board work with the Governor and State Attorney to draft regulations or legislation on:               <ol style="list-style-type: none"> <li>a) Prohibitions;</li> <li>b) Permitting Application, Process, and Issuance;</li> <li>c) Schedule of Fees and Charges;</li> <li>d) Penalties and Fines;</li> <li>e) Establishment of Buffer Zones (forested and marine) and other Restricted Zones and prohibitions on cutting.</li> <li>f) Burning, open fires, and earthmoving activities in or near the OSCA.</li> <li>g) Regulations for areas near OSCA (e.g. native plants, etc.)</li> </ol> </li> <li>3. The Governor and Board lobby MNRET for official recognition of PAN status.</li> <li>4. The Board and Governor analyze current agreements of uses in Ngerchelchuus.</li> </ol>	<ol style="list-style-type: none"> <li>1. Board oversees establishment of a Non-Government Organization.</li> <li>2. NGO and Board coordinate on grant applications.</li> <li>3. Board and Governor seek dialogue for cooperative enforcement from <i>Rubekul</i> Ngardmau and the Ministry of Justice.</li> <li>4. Board and Coordinator begin to develop marketing for OSCA tourism.</li> <li>5. Board and Governor assess options and begin to raise money for paving roads.</li> <li>6. Traditional chiefs pass <i>bul</i></li> <li>7. State legislature designates OSCA Day formally.</li> <li>8. Board submits yearly work plans and reports</li> </ol>	<ol style="list-style-type: none"> <li>1. Board and Coordinator assess and improve management (including evaluation and review).</li> <li>2. Board assesses need for OSCA Office.</li> <li>3. Coordinator develops new community engagement programs.</li> <li>4. Board undertakes review of Management Plan.</li> </ol>

<p>5. Board ensures that OSCA Management Plan is incorporated into land use and master plans (by partnering with NSPLA).</p> <p>6. Board lobbies Governor and legislature to adopt management plan and to include funding in budget requests, based on yearly reports and yearly work plans.</p> <p>7. Board oversees staffing and purchases.</p>		
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Additional planning needed:

- Yearly work plans (PAN)
- Individual capacity building plans for new staff

**Education, Awareness, and Outreach Strategies**

Education, awareness, and outreach strategies will raise awareness in general about the designation of the sites and its purpose, the critical threats, ecological properties, its allowable and non-allowable uses and activities, and including the overall goals of the conservation area system.

- In year one, community education on the effects from critical threats such as erosion and sediment are priorities. This includes education on burning on the savannahs and forests, and on dredging and earthmoving activities. The first year education also includes awareness on the boundaries of the conservation area system.
- In the second and third years, activities include a general program on the regulations, targeted for different community groups: school children, local adults, and visitors.
- In the fourth and fifth years, recurrent education activities will continue with continuous updating and improvement.

<b>Education, Awareness, and Outreach Activities:</b>		
<i>Short-term Activities Year 1</i>	<i>Medium-term Activities Year 2 and 3</i>	<i>Long-term Activities Year 4 and 5</i>
<p>1. Coordinator develops and distributes educational materials and designs and installs signs for erosion and sediment controls.</p> <p>2. Coordinator initiates education campaign on critical threats (including illegal fishing), rules and regulations, entrance fees, penalties.</p> <p>3. Coordinator works with partners on education programs.</p> <p>4. Coordinator educates public on new laws (e.g. buffer zones, etc.)</p> <p>5. Coordinator publicizes ndguul harvest when open.</p>	<p>1. Coordinator leads general community education on regulations and buffer zones.</p> <p>2. Coordinator leads targeted community education at local elementary school.</p> <p>3. Board assists with marketing of OSCA</p> <p>4. Board and Coordinator lead field trips to OSCA on OSCA Day.</p>	<p>1. Coordinator continues recurring general education activities on the conservation area.</p> <p>2. Board and Coordinator assess education programs and improve education, awareness, and outreach.</p>

**Research and Monitoring Strategies**

Research and monitoring strategies include efforts to monitor the effectiveness of the Plan in the long- and short-term and dedicated research towards filling gaps in understanding. Strategies include biophysical monitoring, socioeconomic monitoring, outcome monitoring, and targeted research. This Management Plan relies on technical partners for initial biophysical monitoring, but includes a strategy to build internal capacity to carry out all monitoring by Year 5.

- In Year 1, establishment of baseline conditions is a major focus of this Management Plan. This includes establishment of new monitoring systems, collection of existing data, and research into ndguul.
- The mid-term years include regular monitoring and discrete research projects that build understanding of the conservation area system.
- Comparing the effectiveness of this Management Plan against baseline conditions is a major focus of this Management Plan in the fifth year (Year 5). This includes follow-up monitoring and preparation of reports.

<b>Research and Monitoring Activities:</b>		
<i>Short-term Activities Year 1</i>	<i>Medium-term Activities Year 2 and 3</i>	<i>Long-term Activities Year 4 and 5</i>
1. Coordinator collects data and establishes baseline conditions from national monitoring of: <ol style="list-style-type: none"> <li>Mangroves (PICRC)</li> <li>Water (EQPB/PICRC)</li> <li>Birds (BNM)</li> <li>Forests (BNM/Forestry)</li> <li>Bare Areas (PALARIS)</li> </ol> 2. Coordinator establishes monitoring system, collects data, and establishes baseline conditions through regular state monitoring of: <ol style="list-style-type: none"> <li>Non-compliance or enforcement actions</li> <li>Fires</li> <li>Permits</li> <li>Visitors</li> <li>Littering / Visitor Impacts</li> <li>Income (fees, fines, all forms generated from, by, and/or for site)</li> <li>Trees planted or Invasive species removed</li> </ol> 3. Coordinator and Board develop quarterly and annual reporting system to track activities and outcomes against objectives.           4. Coordinator organizes an initial Ngduul survey and monitors harvest of ngduul when open.           5. Coordinator interprets and forwards existing socioeconomic data to leaders.	1. Conservation Officers and other interested community members learn monitoring methods and implement biological monitoring.           2. All partners continue biological monitoring           3. Board contracts a Climate Change Vulnerability Assessment and Action Plan.	1. After five years, Coordinator and technical partners repeat socioeconomic survey.           2. Coordinator works with technical partners to analyze biophysical data.

**Enforcement and Surveillance Strategies**

Enforcement and surveillance strategies include those efforts to monitor users of the conservation area system for compliance with laws and regulations, and to stop non-compliance through policing the areas and legal enforcement.

- Updating and establishment of an Enforcement System is a major focus of this Management Plan in the first year (year 1). The first year includes hiring and training of conservation officers and establishment of law enforcement monitoring system, general patrol and observation, daily tracking logs, and citation forms, and other law enforcement instruments.
- Implementation of the Enforcement System is a major focus of this Management Plan I the second year and subsequent years. These years include ongoing enforcement and surveillance.

<b>Enforcement and Surveillance Activities:</b>	
<i>Short-term Activities Year 1</i>	<i>Medium to Long-term Years 2 to 5</i>
1. Board ensures that Conservation Officers trained in methods of conservation, permit systems, existing national and state laws, and methods of enforcement.           2. Coordinator and Conservation Officers establish daily logs and citation system necessary to support enforcement.           3. Coordinator and Conservation Officers develop a daily	1. Conservation Officers are deputized to be able to apprehend violators, ask and inspect permits, and issue citations.           2. Conservation Officers carry out regular surveillance and enforcement, and reporting           3. Tour Guides and State personnel monitor permits and entry fees.

<p>surveillance and enforcement plan (including methods for reporting and enforcing non-compliance).</p> <p>3. Conservation Officers monitor conservation areas on a daily basis.</p> <p>5. Conservation Board and Coordinator establish necessary partnerships with the Bureau of Public Safety and the Division of Fish and Wildlife to ensure enforcement of all applicable laws.</p>	
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**Additional Planning necessary:**

- Daily surveillance and enforcement plan to include information on when and where surveillance will occur and methods for ensuring compliance with regulations.
- Short-term planning will occur by the Coordinator and Conservation Officers on daily efforts to report incidents and issue citations.

**Maintenance and On-the-Ground Strategies**

Maintenance and on-the-ground strategies include activities that require physical labor for the benefit restoring or maintaining ecosystem health. Strategies include clean-ups, removal of invasive/introduced plants, restoration of bare areas or replanting where necessary, developments of the trail the Tourist Zone and improvement of visitor facilities.

- The first and into the second year, includes completing restoration of the trail up to the waterfall, steps and rails, installing signage infrastructure, and marking boundaries and starting restoration activities in bare areas.
- The third to fifth years are dedicated to ongoing maintenance activities and possible new infrastructure installations if activities are expanded to accommodate new recreational or sporting activities, and ongoing restoration activities.

<b>Maintenance and On-the-Ground Activities:</b>	
<i>Short-term Activities Year 1</i>	<i>Medium to Long-term Years 2 to 5</i>
<ol style="list-style-type: none"> <li>1. Coordinator oversees completion of trail, steps, and rails on trail.</li> <li>2. Coordinator oversees replanting on cleared areas and tree planting on other bare areas.</li> <li>3. Coordinator oversees signage installations.</li> <li>4. Coordinator oversees demarcations of boundaries with signage and/or buoys.</li> <li>5. Board and Coordinator encourage community-based volunteer activities (e.g. cleanups, planting on OSCA day)</li> <li>6. Board makes quarterly decision about opening Ngduul harvest.</li> </ol>	<p>Additional planning necessary to:</p> <ul style="list-style-type: none"> <li>▪ Board considers long-term plan for Bauxite Bare Areas.</li> <li>▪ Board and Governor oversee paving or improvements to road and deploy regular maintenance.</li> <li>▪ Board ensures maintenance plan for waterfall infrastructure and visitor’s center maintains ecological integrity of site.</li> <li>▪ Coordinator ensures controls over invasive species and introduced plant species are followed.</li> <li>▪ Yearly activities continued (planting, cleanups)</li> </ul>

C. First Year Work Plan

A first year Work Plan is included in Section VI along with a detailed budget for each activity.

## IV Activity Restrictions and Permits

A. Zones

This Management Plan includes the following zones:

Taki Conservation Area (Figure 2)

1. Tourist Zone – this includes the existing trail to the waterfall, areas associated with existing tourism infrastructure, areas along old historic sites (such as the mining tracks), and an area along the Ngertebechel River up to the Japanese dam. Tourists are not allowed outside this zone. Boundaries of the zone are approximate and may change in subsequent versions of this Plan.

- No-take/Controlled Access Zone – All other areas of the Taki Conservation Area are restricted entry. They are no-take unless specific permission has been granted by Traditional Chiefs and the Governor for community purposes.

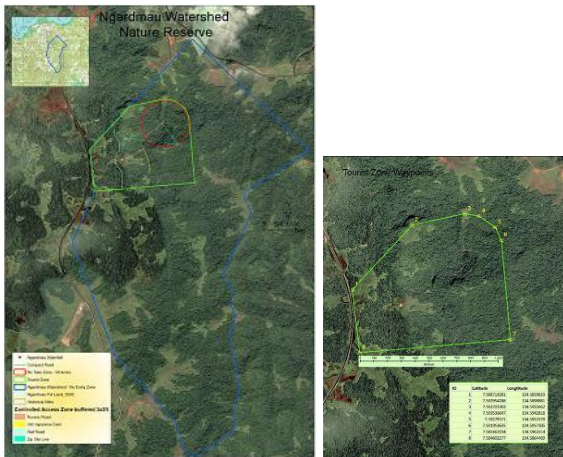


Figure 2. Taki Tourist Zone – in green. Boundaries are approximate and should be cross-referenced with historical sites map. All other area within the blue zone is No-Take/Controlled Access Zone.

#### Ngerchelchuus (Figure 3)

- Service Zone – this includes the access road and the existing towers and infrastructure at the very top of Ngerchelchuus, in the area that is already impacted by humans.
- No-take/Controlled Access Zone – All other areas of the Ngerchelchuus Conservation Area are restricted entry. They are no-take unless specific permission has been granted by Traditional Chiefs and the Governor for community purposes.



Figure 3. Ngerchelchuus Service Zone – in orange. Boundaries are approximate and are dictated by existing features (actual width of road). All other areas are a no-take/controlled access zone.

#### Ngermasech and Ileyakl Beluu

- No-take/Controlled Access Zone – All areas in the marine conservation areas are zoned for controlled access and are no-take, unless specific permission has been granted by the Governor and Chiefs. In the case of quarterly ngduul harvests, the Board must also declare the quarterly harvest open, and may limit the specific location where ngduul harvest may occur.

The Board may review these zones and introduce new or changed zones based on further analysis. The Board shall also review these zones and develop individual use zones (e.g. camping, hiking) if further analysis deems it appropriate. Any changes to zones shall be subject to the approval process dictated in NPL 7-11.

### **Rationale for these zones**

NPL 7-11 states that resources are to be protected and conserved to the extent necessary to ensure their productivity into the future, *and* of ensuring that benefits are gained from resources. These zones balance protection with areas of use. These zones are also in line with other legislation that allows for some harvesting with specific permission. In the terrestrial conservation areas, these zones limit impacts from humans to areas that are already impacted.

### **B. Restrictions, Prohibitions, and Allowable Activities**

Based on the zones described above, the following activities are restricted, prohibited, or allowed:

#### ***NOT ALLOWED AT ANY TIME IN ANY ZONE***

##### Marine conservation areas

1. No removing sand or soil; dredging
2. No harvesting of trochus in Ileyaklbeluu
3. No chemicals, spills, or dumping
4. No groundings of any vessels
5. No aquaculture
6. No entry without specific permission

##### Terrestrial conservation areas

1. No alcohol or littering
2. No burning or fires
3. No new construction on Ngerchelchuu (no new towers)
4. No fishing of eels
5. No fishing or hunting of any native animals
6. No entry without specific permission or fee
7. No farming or agriculture

#### ***ALLOWED WITH PERMISSION, PERMIT, or FEE, dependent on zone***

##### Marine conservation areas

1. Fishing in Ngermasech or Ileyakl Beluu, with permission from Governor and Traditional Chiefs for community purposes
2. Entry for surveys, monitoring, and education
3. Entry to Ileyakl Beluu for tourism (snorkeling)
4. Once per quarter, collection of Ngduul by Ngardmau residents only, in Ngermasech.
5. Sustainable cutting of individual mangrove trees with permission from Governor and Traditional Chiefs for community purposes

##### Terrestrial conservation areas

1. Gathering of plants or cutting of trees, with permission from Governor and Traditional Chiefs for community purposes
2. Cutting of trees, in tourist zone with permit; replanting required
3. Planting of native plants
4. Construction for ecotourism
5. Removal of invasive species
6. Entry to tourist zones
7. Entry for surveys, monitoring, and education
8. Commercial filming or photography

### **Restricted Activities requiring permit/permission**

The Ngardmau Conservation Act of 2009 calls for the creation of this management plan. Further, Section 8 b) 4 of the Act calls for the promulgation of regulations “applying to prohibited and restricted activities and uses, including fees and procedures for applications, review and issuance of permits”.

The following activities require permission from the Governor and Traditional Chiefs (per KN 6-10-05):

- Fishing in marine conservation areas
- Cutting of mangrove trees in Ngermasech
- Gathering of plants or cutting of trees in terrestrial conservation areas



The following activities require documented permission from the Governor (either in the form of a written letter, internal memo, or receipt of fee)

- Entry for surveys, monitoring, and education
- Entry for tourism (visits to Taki, visits to Ngerchelchuus, camping, snorkeling at Ileyakl Beluu)
- Planting of native plants
- Removal of invasive species
- Commercial filming or photography

The following activity requires permission from the Ngardmau Conservation Board and Governor (possibly to include a written letter of permission or internal memo):

- Quarterly harvesting of ngduul in Ngermasech

The following activities must follow established permitting systems, to be augmented to include approval from all parties (Governor, Public Lands Authority, Ngardmau Conservation Board, national entities such as EQPB):

- Cutting of trees in terrestrial conservation areas for tourism purposes
- Tourism development (including construction)

### **Development of permit, permission, and penalty/fine systems**

During the first year, permission shall be with a simple permission system (documentation) and/or existing mechanisms. If deemed necessary, during the first year, the Governor shall develop a permit and penalty system for violations to these restrictions and to refine permits. NPL 7-11 allows for fines up to \$500. Fines shall be assessed at any amount up to \$500 per day per violation.

Specific regulations to implement these fines and to ensure restoration of the site (in the case of damages) will be developed in year 1. The Board and Governor may also seek technical expertise to help with the development of permits, to include information on:

- Cost of permit/fee
- Timing/During of permit
- Number of people, days, and sites covered by permit
- Process of applying for permits
- Process for monitoring permits

## **V Parties Responsible for Implementing this Management Plan**

### **A. Management Authority**

The Ngardmau Conservation Act of 2009 establishes a five-member Ngardmau Conservation Board all of whom are appointed by the Governor and subjected to approval by the state legislature. The Board serves at the pleasure of the Governor. Board members serve for a period of three years. Management of the Ongedechuul System of Conservation Areas is divided between the conservation board and the Governor.

This Plan calls for members of the Board to be representatives of the following stakeholder groups (See Appendix 1 for legal recommendations to streamline this Plan with NPL 7-11):

1. Office of the Governor
2. State Legislature
3. Traditional Chiefs
4. Ngardmau State Public Lands Authority or Free Trade Zone
5. Community

The Duties of the Board as set forth in the Act outline the following responsibilities:

- Conservation planning
- Development of a management plan to include promulgation of regulations
- Review of the progress of implementation of the management plan
- Periodical reviews of the management plan and make changes as needed
- Development of an annual budget proposal

The Duties of the Governor as set forth in the Act outline the following responsibilities:

- Implementation of the management plan

- Enforcement of regulations
- Administration of permits and licenses
- Collection and remittance to the state treasury all types of fees and proceeds from fines
- Produce a financial report of all conservation area revenues and expenditures to the state legislature and the conservation board

**B. Management Personnel**

In addition to the Ngardmau Conservation Board and the Governor, this Plan proposes to hire staff dedicated to the management of the OSCA.

- 1 Coordinator to be hired by January 2012;
- 2 Conservation Officers to be hired over the course of year 1 of the Plan;
- 4 Conservation Officers to be hired over the course of year 2 to year 4 of the Plan;
- 1 Administrative Staff to be hired over the course of year 2 to year 3.

This Plan also proposes to utilize the services of existing State Personnel, including the

- 2 existing Conservation Officers
- State Administrative Staff
- State Maintenance Staff
- State Legal Advisor

This Plan also calls for the establishment of a non-governmental organization to assist with fundraising and implementation of the Plan. Appendix 3 outlines roles and responsibilities of stakeholders included in this Plan.

**C. Coordination and Partnerships**

A number of government, semi government, and non-government agencies make available to the State, technical support in planning, management, and monitoring and other related expertise to help manage the State’s conservation area, and are included in this Plan.

## VI Budget and Sustainable Financing Mechanism

### A. BUDGET DESCRIPTION AND BUDGET

1. Fixed Cost Items are items with a fixed amount set for entire budget period. In the case of the OSCA Management Plan Budget, Personnel are identified as a Fixed Cost Item.
2. Personnel include the salaries of the Conservation Coordinator and three Conservation Officers in Year 1. The Management Plan proposes hiring of additional conservation officers and a support staff in years 3 and 4. The Personnel budget item also takes into account fringe benefits that include social security, civil service pension, and medical savings. It also considers annual wages increments based on civil service pay step level.
3. Activities Cost Items are items determined by the type of resource needed to carry out the activity; and which the amount is driven by the extent of the activity to be carried out. In the OSCA Management Plan Budget there are ten types of cost items identified based on the type of resource needed for each activity.
4. Major Equipment includes assets such as automobiles and boats. The OSCA Management Plan regards Year 1 of the budget as the Start-Up year and proposes to allocate in the Year 1 Budget funds to acquire Major Equipments.
5. Office Equipment includes assets typical for office support such as computers, fax machines, printers, etc.
6. Conservation Equipment & Materials are those typical of setting up nature trails, demarcation, signs, and other permanent type of infrastructure within the conservation area system. Examples of equipments include manual and power tools; materials include plywood, lumber, nails, screws, etc.
7. Fuel includes gasoline, diesel, and oil. The OSCA Management Plan estimates an average consumption of 4 gallons per day for a 365 day work year.
8. Professional Services includes legal advice or assistance and technical assistance. The Ngardmau Act of 2009 calls for promulgation of regulations that will outline the prohibitions and restrictions of the conservation area system, permitting system, citation system, and a schedule for fees and fines. The development of the regulations will require significant use of legal and technical advice. Further, it is anticipated that so long as the conservation area system needs to be defended from violators in court, legal assistance will need to be retained to a certain extent.

Technical Assistance includes expertise from resource agencies to include scientific surveys, monitoring, management planning and annual work plans, program design, mentoring, and facilitation. It is envisaged that implementation of the Management Plan will continue to need assistance from support agencies and NGOs. The development of education and awareness programs, monitoring plans, enforcement and surveillance, and maintenance and on-the-ground activities will continue to rely on the experience of other organizations. Periodical reviews and performance or management audits, and reporting to satisfy donor agencies and PAN, is an area where capacity development will take a longer time for the conservation areas management personnel to acquire. Assistance will be most needed in this area.

9. Publication includes the design, print and distribution of educational messages, general public information announcements, law enforcement announcements, educational campaigns, and signs.
10. Office Supplies are typical office support resources such as papers, ink, binders, pins, etc.
11. Maintenance and Repair include costs for maintaining or repairing major equipments, conservation area infrastructure and improvements, office equipments, signs, and minor conservation equipments.
12. Replacement Parts and Fixtures include purchases of parts mechanized or motorized equipments, office equipments, minor conservation equipments; and fixtures for enforcement outpost.
13. Ngardman Conservation Board Meetings is the \$ 25.00 per meeting stipend allowed for in the Ngardmau Conservation Act of 2009.
14. Occupancy is housing share primarily for utilities and space at the Ngardmau State Office and Liaison Office in Koror.
15. Travel includes the cost of land or air transportation. This budget item is in anticipation of travelling to and from point of travel for the purpose of training, workshops, study exchange, and seminars for the conservation officers and conservation coordinator.
16. Capacity Building, Training includes registration fees, accommodations and lodging, or per diems for training, workshops, study exchange, and seminars for conservation officers and conservation coordinator.
17. Food & Beverage include snacks, lunches, and non-alcoholic beverage for meetings and field trips.
18. Indirect Costs includes some of the cost of the wages and salaries of other key employees of the State whose time is significantly needed in the implementation of the Management Plan. In this Management Plan, the Governor's time is integral in the implementation and enforcement of the Plan as set forth in the Ngardmau Conservation Act of 2009. The State's Treasury Department staff is also expected to provide support services such as administration of the PAN Grant or other grants received for OSCA Management, payroll, procurement and other related services. The States Public Works Department, the Ngardmau State Public Land Authority, and other departments may provide direct support to the development and management of the conservation area system.

Other indirect costs may include related building expenses, building depreciation, and equipment depreciation, and cleaning and maintenance.

**Five Year Budget Outlook**  
**FY2012 – FY2016**  
**Ongedechuul System of Conservation Area Management Plan - Ngardmau**

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Fixed Cost Items:					
Personnel	\$ 43,000.00	\$ 45,150.00	\$ 56,407.50	\$ 66,227.50	\$ 69,538.50
Activities Cost Items:					
Major Equipment	\$ 15,000.00	\$ -	\$ -	\$ -	\$ -
Office Equipment	\$ 5,000.00	\$ -	\$ -	\$ -	\$ -
Conservation Equipment & Materials	\$ 6,000.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00
- Equipment					
- Equipment Rental					
- Materials					
Fuel	\$ 8,000.00	\$ 8,000.00	\$ 8,000.00	\$ 8,500.00	\$ 8,500.00
Professional Services	\$ 25,000.00	\$ 20,000.00	\$ 18,000.00	\$ 18,000.00	\$ 20,000.00
- Legal Assistance					
- Technical Assistance					
Publication	\$ 5,500.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00
- Design & Print					
- Media					
Office Supplies	\$ 2,000.00	\$ 1,200.00	\$ 1,200.00	\$ 1,200.00	\$ 1,200.00
Maintenance & Repair		\$ 1,000.00	\$ 1,000.00	\$ 1,500.00	\$ 1,500.00
Replacement Parts & Fixtures		\$ 500.00	\$ 500.00	\$ 1,000.00	\$ 1,000.00
Ngardmau Conservation Board Per Meeting – NC Act 2009	\$ 1,500.00	\$ 1,500.00	\$ 1,500.00	\$ 1,500.00	\$ 1,500.00
Occupancy (State Housing Share)	\$ 900.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00
Travel		\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00
Capacity Building, Training		\$ 2,500.00	\$ 2,500.00	\$ 2,500.00	\$ 2,500.00
Food & Beverage	\$ 800.00	\$ 800.00	\$ 800.00	\$ 800.00	\$ 800.00
	\$ 112,700.00	\$ 90,650.00	\$ 99,907.50	\$ 111,227.50	\$ 116,538.50
Indirect Cost (17%)	\$ 19,159.00	\$ 15,410.50	\$ 16,984.00	\$ 18,908.50	\$ 19,811.50
<b>PAN FUND REQUEST TOTAL</b>	<b>\$ 131,859.00</b>	<b>\$ 106,060.50</b>	<b>\$ 116,891.50</b>	<b>\$ 130,136.00</b>	<b>\$ 136,350.00</b>

**Budget Summary - Year 1**  
**Ongedechuul System of Conservation Areas – Ngardmau**

<b>Budget Category:</b>	<b>Amount:</b>	<b>Total:</b>
<b>Personnel</b>	<b>\$ 43,000.00</b>	<b>\$ 43,000.00</b>
<b>Activities Cost Items:</b>		
<b>Major Equipment</b>	<b>15,000.00</b>	<b>15,000.00</b>
<b>Office Equipment</b>	<b>5,000.00</b>	<b>5,000.00</b>
<b>Conservation Equipment &amp; Materials</b>	<b>6,000.00</b>	<b>6,000.00</b>
- <b>Equipment</b>		
- <b>Equipment Hire</b>		
- <b>Materials</b>		
<b>Fuel</b>	<b>8,000.00</b>	<b>8,000.00</b>
<b>Professional Services (contractual)</b>	<b>25,000.00</b>	<b>25,000.00</b>
- <b>Legal Assistance</b>		
- <b>Technical Assistance</b>		
<b>Publication</b>	<b>5,500.00</b>	<b>5,500.00</b>
- <b>Design &amp; Print</b>		
- <b>Media</b>		
- <b>Signage Materials</b>		
<b>Office Supplies</b>	<b>2,000.00</b>	<b>2,000.00</b>
<b>Ngardmau Conservation Board Per Meeting</b>	<b>1,500.00</b>	<b>1,500.00</b>
<b>(Ngardmau Conservation Act of 2009)</b>		
<b>Occupancy (State Office Housing Share)</b>	<b>900.00</b>	<b>900.00</b>
<b>Food &amp; Beverage</b>	<b>800.00</b>	<b>800.00</b>
<b>Total Cost</b>	<b>\$ 112,700.00</b>	<b>\$ 112,700.00</b>
<b>Indirect Cost (17%)</b>		<b>\$ 19,159.00</b>
<b>TOTAL BUDGET</b>		<b>\$ 131,859.00</b>

**YEAR 1 ACTIVITIES AND COST**  
**Ongedechuul System of Conservation Areas – Ngardmau**

NO.	ACTIVITY	DURATION		RESOURCE	COST	TOTAL	SOURCE OF FUNDING		
		Begins	Ends	NEEDED	ITEM	COST (\$)	State	PAN Grant	Others
1-1a	Ensure areas cleared by zip line development is allowed to regrow.	Immediate	Recurring	Time, Fuel	Fuel	\$ 100.00		\$ 100.00	
1-1b	Plant trees in all other identified bare areas.	Immediate	MO12	Time, Fuel, Seeds	Fuel, Supplies	\$ 1,100.00		\$ 1,100.00	
1-1c	Develop Erosion, Run-Off, & Sediment education message and materials, and incorporate into overall Education Plan and Sign System.	Immediate	Recurring	Time, Materials, TA	Fuel, Materials, Prof. Svcs.	\$ 2,500.00		\$ 2,500.00	
1-1d	Obtain baseline data from PICRC & EQPB, and seek technical assistance to develop a Monitoring Plan.	MO1	MO3	Time, Fuel, TA	Fuel, Prof. Svcs.	\$ 1,200.00		\$ 1,200.00	
1-2a	The NCB recommends to the state legislature to pass a law that will address "burning" and earthmoving activities.	MO6	MO12	Time	NCB, F&B	\$ 100.00		\$ 100.00	
1-2b	Observe, monitor and enforce prohibitions and restrictions on burning and earthmoving	Immediate	Recurring	Time, Fuel	Fuel	\$ 1,000.00		\$ 1,000.00	
1-3a	Create and carry-out an Education and Awareness campaign to promote OSCA boundaries, purpose and rules.	MO6	MO12	Time, Fuel, Ed-Materials.	Fuel, Supplies	\$ 1,000.00		\$ 1,000.00	
1-3b	Request assistance from partner agencies (PCS/NRCS) to develop campaign education programs and materials.	MO3	MO5	Time, Fuel	Fuel, Materials, Prof. Svcs.	\$ 1,500.00		\$ 1,500.00	
1-3c	All boundary points of OSCA are adequately marked with buoys, markers, signs; and clearly visible by eye.	MO1	MO6	Time, Fuel, Con-Materials	Fuel, Materials	\$ 5,000.00		\$ 5,000.00	
1-4a	NCB draft a proposed bill to prohibit cutting trees within 150 feet from OSCA boundaries and lobby legislature to introduce and pass.	MO3	MO12	Time, TA, NCB	NCB, Prof. Svcs.	\$ 250.00		\$ 250.00	

NO.	ACTIVITY	DURATION		RESOURCE	COST	TOTAL	SOURCE OF FUNDING		
		Begins	Ends	NEEDED	ITEM	COST (\$)	State	PAN Grant	Others
1-4b	Develop and incorporate into general Education program a section on Buffer Zones, and importance and role of trees and vegetation in protecting sites.	MO6	MO12	Time, Supplies	Supplies	\$ 800.00		\$ 800.00	
1-4c	Incorporate enforcement of buffer zone regulations into wider Enforcement Program	MO1	Recurring	Time, Supplies	Supplies	\$ 100.00		\$ 100.00	
1-5a	Observe and monitor newly installed improvements at Taki for compliance and report to Governor.	MO1	Recurring	Time, Supplies	Supplies	\$ 100.00		\$ 100.00	
1-5b	Design and construct a sign that displays hiking rules.	MO1	MO6	Time, Supplies, Con-Materials	Supplies, Con-Materials	\$ 500.00		\$ 500.00	
1-5c	Complete construction of trail boardwalk. (100% complete)	MO1	MO12	Time, Con-Materials, Fuel, Equipment,	Materials, Fuel, Equipments, Rental	\$ 35,000.00		\$ -	\$ 29,000.00
1-5d	Place control measures on steep parts of trail.	MO1	MO6	Time, Fuel, Materials	Fuel, Materials	\$ 300.00		\$ 300.00	
1-6a	NCB and Governor initiate dialogue to find a way to surface unpaved access road in Ngerchelchuu.	MO1	MO3	Time, NCB	NCB	\$ 150.00		\$ 150.00	
1-6b	Commission a study to determine options for fixing the unpaved access road.	MO1	MO6	Time, NCB	NCB	\$ 100.00		\$ 100.00	
1-7a	Develop and implement a daily monitoring plan for Ngermasech and Ileaklbeluu; incorporate into wider Enforcement Program.	MO1	Recurring	Time, Fuel, Supplies	Fuel, Supplies	\$ 4,000.00		\$ 4,000.00	
1-7b	Create and conduct a public awareness scheme on illegal fishing to discourage poachers; publicize thru radio.	MO1	Recurring	Time, Fuel, Supplies	Fuel, Supplies	\$ 600.00		\$ 600.00	
1-8a	Request technical assistance from agencies to design adequate buffer zone for Ngermasech and Ileaklbeluu.	MO1	MO6	Time, Fuel, Supplies	Fuel, Supplies	\$ 300.00		\$ 300.00	
1-8b	Submit a request to the Governor and state legislature to enact a law designating	MO1	MO6	Time, Supplies	Supplies	\$ 100.00		\$ 100.00	

NO.	ACTIVITY	DURATION		RESOURCE	COST	TOTAL	SOURCE OF FUNDING		
		Begins	Ends	NEEDED	ITEM	COST (\$)	State	PAN Grant	Others
	buffer zones for the marine protected areas.								
1-8c	Ensure the public is deterred from entering designated buffer zones; incorporate into wider Enforcement Program.	MO1	Recurring	Time, Fuel, Supplies	Fuel, Supplies	\$ 500.00		\$ 500.00	
1-9a	Monitor dredging activities and enforce permit conditions	MO1	Recurring	Time, Fuel, Supplies	Fuel, Supplies	\$ 500.00		\$ 500.00	
1-9b	Submit results from the Socio Economic Survey to state leadership.	Immediate	MO1	Time		\$ 100.00		\$ 100.00	
1-9c	Submit to the State a request for a Feasibility study to be conducted on the Free Trade Zone Development.	MO6	MO12	Time	Supplies	\$ 100.00		\$ 100.00	
1-10a	Review and analyze monitoring results from Ngermasech and Ileaklbeluu on a quarterly basis and make a decision each time whether to open for quarterly harvesting.	MO6	Recurring	Time		\$ 100.00		\$ 100.00	
1-10b	Monitor status and harvesting of Ngduul.	MO1	Recurring	Time, Fuel, Supplies	Fuel, Supplies	\$ 300.00		\$ 300.00	
1-10c	Conduct Ngduul survey in Ngermasech.	MO1	MO3	Time, Fuel, Supplies	Fuel, Supplies	\$ 200.00		\$ 200.00	
1-11a	Monitor compliance of developments in progress in or nearby the conservation area system.	MO1	Recurring	Time, Fuel, Supplies	Fuel, Supplies	\$ 500.00		\$ 500.00	
1-11b	Incorporate regulation language to limit types of developments and landscaping designs in areas adjacent to OSCA.	MO1	MO6	Time, Supplies	Supplies	\$ 100.00		\$ 100.00	
1-11c	Request Governor and state legislature to establish buffer zones between OSCA sites and adjacent land areas allocated for development.	MO6	MO12	Time, Supplies	Supplies	\$ 100.00		\$ 100.00	
1-11d	Request Governor to initiate dialogue with NSPLA, and state legislature to incorporate OSCA Management Plan into state wide Masterplan.	MO6	MO12	Time, Supplies	Time, Supplies	\$ 100.00		\$ 100.00	



NO.	ACTIVITY	DURATION		RESOURCE	COST	TOTAL	SOURCE OF FUNDING		
		Begins	Ends	NEEDED	ITEM	COST (\$)	State	PAN Grant	Others
1-12a	Submit OSC Management Plan to Governor, State Legislature, and Traditional Chiefs.	MO1	MO6	Time, Supplies, Printing	Supplies, Publication	\$ 500.00		\$ 500.00	
1-12b	NCB and Governor seek legal assistance to develop OSCA Regulations, incorporate into OSCA-MP, and submit to Governor and Legislature for adoption.	MO1	MO6	Time, Supplies, TA	Supplies, Publication Prof. Svcs.	\$ 15,000.00		\$ 15,000.00	
1-13a	Seek and hire a Conservation Coordinator.	MO1	MO3	Time, Supplies,	Supplies, Publication	\$ 150.00		\$ 150.00	
1-13b	Ensure all start-up major and minor equipments for OSCA administration and management our sought.	MO1	MO6	Time, Supplies, Vehicle, Computers etc..	Supplies, Capital Assets, Office Equipment, Office	\$ 20,000.00		\$ 20,000.00	
1-13c	Seek training and skills enhancement course for the Coordinator, Conservation Officers, Ngardmau Conservation Board Members, and Governor.	MO6	Recurring	Time, Supplies, Workshops, Training	Supplies, Travel	\$ 5,500.00		\$ 5,500.00	
2-1a	OSCA Applicaton to PAN (Membership In-Effect as of 09/05/10, pursuant to PAN Regulations Section 5.7(e)).	COMPLETED				\$ -		\$ -	
2-2a	Establish and publicize Entrance Fee for Ileaklbeluu.	MO1	MO6	Time, Supplies, Media	Supplies, Publication	\$ 250.00		\$ 250.00	
2-2b	Request to review and analyze current users agreements in Ngerchelchuus and determine if fee schedule is appropriate - renegotiate if necessary.	MO3	MO6	Time, Supplies	Supplies, Professional Svcs.	\$ 1,500.00		\$ 1,500.00	
2-2c	The Ngardmau Conservation Board initiates dialogue with the Ngardmau State Public Land Authority to develop and Agreement on mutual goals that are in line with overall state goals of protecting its natural resources and land development.	MO6	MO12	Time, Supplies	NCB, Supplies	\$ 300.00		\$ 300.00	

NO.	ACTIVITY	DURATION		RESOURCE	COST	TOTAL	SOURCE OF FUNDING		
		Begins	Ends	NEEDED	ITEM	COST (\$)	State	PAN Grant	Others
2-2d	Develop a Fee Schedule for the various fees and incorporate into OSCA Regulations.	MO6	MO12	Time, Supplies, TA	Supplies, Professional Svcs.	\$ 1,000.00		\$ 1,000.00	
2-3a	Seek technical assistance to create an NGO and By Laws.	MO6	MO12	Time, Supplies, TA	Supplies, Professional Svcs.	\$ 1,250.00		\$ 1,250.00	
2-3b	Develop a Volunteer Program for OSCA and encourage community participation.	MO6	MO12	Time, Supplies	Supplies	\$ 100.00		\$ 100.00	
3-1a	Initiate and coordinate a meeting between NCB, Governor, Legislature, Chiefs, and the Ministry of Justice to address Joint Law Enforcement of the OSCA and reach an agreement through a Memorandum of Understanding.	MO6	MO12	Time, Supplies	Supplies, NCB, Prof. Svcs.	\$ 300.00		\$ 300.00	
3-1b	NCB and Governor meet with the Traditional Chiefs and request a for a bul to be passed for OSCA Sites.	MO6	MO12	Time, Supplies, Lunch	Supplies, F&B	\$ 150.00		\$ 150.00	
3-2a	Submit a request to the state legislature and Governor to declare an OSCA Day for people to visit the sites and hold other awareness activities.	MO8	MO12	Time, Supplies	Supplies	\$ 100.00		\$ 100.00	
3-2b	Develop community-based education and enforcement scheme (e.g. people telling other people not to fish in MPAs) and encourage through incentive system.	MO8	MO12	Time, Supplies	Supplies	\$ 100.00		\$ 100.00	
3-2c	Develop Annual Community Activities such as tree planting, trash collection, etc... and engage the community.	MO8	MO12	Time, Supplies	Supplies	\$ 100.00		\$ 100.00	
<b>TOTAL ACTIVITIES COST</b>						<b>\$ 104,700.00</b>		<b>\$ 69,700.00</b>	<b>\$ 29,000.00</b>

## **B. SUSTAINABLE FINANCING MECHANISM**

### **1. Protected Areas Network**

As a member of the national Protected Areas Network, the Ongedechuul System of Conservation Areas is among the beneficiaries of the Micronesia Challenge Endowment as well as the green fee pooled into the Protected Areas Network Fund. The Funds are accessible to PAN member conservation areas by applying for such funds. The PAN Fund is a national program created to ensure sustainable funding for conservation area protection and management.

### **2. User Fees, Access Fees, and Grants**

Objectives 2.14 and 2.15 of this Plan, seeks to garner fees from entry into the conservation area for allowable recreational activities, license or permit fees, and grants. For the reason that the OSCA has several ecotourism developments in it such as nature hikes, zip line, etc. The prospect of a viable eco tourism industry to sustainably finance the management of the conservation area is promising. In addition, included in the objectives is an effort to create a Nongovernmental Organization expected to be an effective conduit for NGO-targeted grant making.

## VIII Capacity Building Plan

One of the internal strengths in Ngardmau is that there is leadership supportive of conservation. Additionally, the state has long employed two marine Conservation Officers and has already undertaken conservation actions in several sites. These Conservation Officers have participated in numerous workshops and trainings, including some geared at improving enforcement skills. The state owns and operates a boat used for conservation activities and has a floating outpost stationed at Ngermasech to reduce poaching. Thus, the state has already begun implementing this Plan and has some of the necessary infrastructure in place.

However, to fully implement this Plan, the state needs to hire additional Conservation Officers and a Coordinator and to provide funds for supplies and activities. The employment of these additional staff is contingent on receipt of funds from the PAN or other sources. Once these funds are received, these positions can be filled. Ngardmau already has a number of people with experience in and knowledgeable about conservation. Thus the state already has the internal capacity to fill these positions.

The newly hired Coordinator will need to build capacity to better understand and fully implement the Plan. As a member of BWA, Ngardmau State has access to networking and partnerships. **The Coordinator should immediately begin attending BWA meetings and participating in activities conducted by BWA partners.**

As part of its management planning services, the **Palau Conservation Society offers mentoring services** and will mentor the Coordinator in the first year. PCS, the PAN office, and other technical partners are also developing a training program for Conservation Officers. One Conservation Officer from Ngardmau has already participated in a surveillance and enforcement training workshop, but **all remaining Conservation Officers should also participate when it is offered again. Conservation Officers should also continue to attend meetings of the Belau Locally Managed Areas Network (BLMA).** In the meantime, PCS and other technical partners will facilitate information-sharing and mentoring by agencies with experience in conservation enforcement (such as Palau Fish and Wildlife, Helen Reef, EQPB, and Koror State).

The development of a permit system will need access to technical information. **The Coordinator should also attend meetings of the Palau Conservation Consortium and the Belau Locally Managed Area Network (BLMA)** to identify and network with sources of technical expertise. Several technical partners have included capacity building in their strategies.

Additionally, this Plan includes a budget line for capacity building to enable training and/or trips as necessary.

## IX Process for reviewing plans

NSL 7-11 states that the Ngardmau Conservation Board shall meet at least three times per year to review the progress of the Governor in implementing the plan, make revisions as needed to the management plan, and develop recommendations to be submitted to the Governor regarding initiatives and activities needed to attain the management objectives. NSL 7-11 does not specifically dictate how changes to the management plan shall be adopted; however, it does dictate how the management plan shall be adopted. NSL 7-11 states that within 60 days of receiving the proposed management plan, the Governor and Legislature shall either adopt it by signature or send it back to the Board with their recommendations for revisions and re-submittal. The management plan shall become effective upon adoption by the Governor and the Legislature; or one (1) year after its submission to the Governor and the Legislature if no action is taken. The legislator who introduced NSL7-11 confirmed that the intent of the legislation was for this procedure to apply to changes to the management plan as well as to approval of the initial management plan (Kumangai, April 2011).

Thus, changes to the management plan shall follow these procedures:

1. On or before September 1 of every year, the Board shall submit proposed revisions to the management plan (if needed) to the Governor,

2. Within 60 days of receiving the proposed revisions, the Governor and Legislature shall either adopt the revisions or send it back to the Board,
3. Or, the proposed revisions shall become effective one year after their submission to the Governor and Legislature if no action is taken.

To assist the Board and Governor to meet their legal duties, the Coordinator shall be responsible for ensuring that biophysical and process-based monitoring occurs and that data is incorporated into annual reports. The Coordinator will draft annual reports detailing all activities, revenues generated from, and expenditures for the conservation area during the previous fiscal year. The Coordinator shall also develop an annual work plan and proposed budget for the upcoming fiscal year. The Coordinator shall forward these reports and work plans to the Governor, within 45 days before the end of the fiscal year, for review. Upon approval by the Governor, the Governor shall use these reports to fulfill the legal duties of the Governor, including:

1. On or before February 1<sup>st</sup> of each year, the Governor shall submit to the Legislature and Board a report detailing all revenues collected and expenditures made for the management of the conservation area during the previous fiscal year;
2. Within 30 days before the end of the fiscal year, the Governor shall prepare and submit a report to the Legislature detailing all activities, revenues generated from and expenditures for the conservation areas during the previous fiscal year; and
3. Within 30 days before the end of the fiscal year, the Governor shall submit a proposed budget to the Legislature for the management of the conservation areas for the upcoming fiscal year.
4. Although not mandated by law, the Governor shall also submit the activity report and proposed budget to the Board so that they may fulfill their legal duties.

The Coordinator shall also prepare two progress reports, which shall be submitted to the Governor, and upon approval, submitted to the Board. The Board shall use these reports during its meetings (to occur at least 3 times per year) to review the progress of implementing the plan, make revisions to the management plan, and develop recommendations regarding initiatives and activities needed to attain the management objectives.

At the five-year expiration of this Plan, the Board shall develop a new Management Plan and seek approval from the Governor and Legislature, per the procedures outlined in the first paragraph of this section and contained in NSL 7-11.

#### **Conflict resolution**

In the case of conflicts between any parties in this Plan, the Governor or Board shall first approach the Traditional Leaders for advice on conflict resolution. If necessary, any party may initiate facilitated meetings (with advice and facilitation provided by technical partners such as BWA, TNC, or PCS) to assist with conflict resolution.

#### **Legislative Conflicts**

There is legislative conflict between the Ngardmau Conservation Act of 2009 (NSL No. 7-11) and NSL No. 3-13. The Act NSL No. 3-13 was passed by the State in 1993 designating fifty acres of public land surrounding Taki Waterfall as state park. Prohibitions include a wide range of vegetation and tree clearing and destroying or altering all living and non-living thing in the area.

Notwithstanding the call for making of this Management Plan under NSL No. 7-11, the proposed Tourist Zone Area in the Taki Conservation Area is in conflict with NSL No. 3-13.

## **X Additional Information**

#### **Definition of Community**

For the purposes of this Management Plan, the definition of community includes all residents residing in Ngardmau, and those residents in Koror who maintain close ties to their families and land in Ngardmau. When this Plan refers to community activities, it assumes that activities will target or include residents in Ngardmau and citizens of the State living elsewhere in Palau or outside of Palau. Similarly, this Plan assumes that community activities will also have the support of the Governor, Traditional Leaders, and State Legislature.

As part of development of this Management Plan, the Conservation Board considered the impacts of various stakeholders on targets and on the success of this Plan. Zones, prohibitions, objectives, and activities were developed with these stakeholder groups in mind. Appendix 2 includes a list of relevant stakeholder groups and the general approach towards including the needs and perspectives of those groups in this Plan.

### **PAN Membership**

The Ongedechuul System of Conservation Areas was nominated to the Palau PAN because each site is unique and valuable to the state and nation, and because they are linked ecologically. The Taki Conservation Area includes Palau's highest water and contains a fully functioning watershed with healthy forest and wildlife. Ngerchelchuu is Palau's highest point and is home to a persistent population of the rare White-breasted Woodswallow. Ngermasech contains a large block of functioning mangrove and is a spawning and aggregation site for fish and other marine species. Illeyaklbeluu is a trochus sanctuary and is habitat for manta rays, which are important to Palau's tourism industry. Together the sites form a representative system of habitats on Babeldaob, which includes forest, savannas, mangrove, coral reef, and seagrass. Many endangered and endemic species reside in the sites. The areas are important economically, both for generating income and for subsistence. Sites in the System are also important culturally and historically.

### **The Network and Climate Change**

As a linked network of connected sites, the System is resilient to some threats associated with climate change. Multiple terrestrial and marine conservation areas offer multiple refuges and diverse habitats to species. The Taki protects a large portion of the watershed draining into the Diong Era Did River, which is the water source for Ngardmau State. Multiple rivers drain into the water source and are protected. Protection of multiple sources provides a buffer to human-induced stresses and gives the community of Ngardmau some resilience to climate change induced droughts. Multiple watersheds drain into Ngermasech, so no single activity on land can negatively impact the entire mangrove site. Ngermasech's mangroves and marine habitats are intact and have high populations of such species as sea cucumbers, serving as a natural refuge. Although Ngermasech has high exposure to sea level rise, there is no development behind the site, so the mangrove may migrate upwards when sea level rises. Land behind this mangrove is steep and difficult to access. Fires remain a threat, but increased management will reduce the likelihood of this threat.

### **Site Connectivity**

The four conservation areas are linked physically and ecologically to each other. The Taki Conservation Area drains onto the west side of Babeldaob, and is hydrologically connected to Illeyaklbeluu. Portions of the Ngerchelchuu Conservation Area drain directly into Ngermasech. Birds have been observed flying between Ngerchelchuu and the Taki Conservation Area.

In addition, the southeastern corner of the Taki Conservation Area abuts the Olsolkesol Waterfall and Ngerbekuu Nature Reserve in Ngilwal, which is already a PAN site. Presumably animals and plant seeds move between the two areas. The Taki Conservation Area protects a portion of the Middle Ridge Important Bird Area and the Ngerchelchuu Conservation Area protects a portion of the Western Ridge Important Bird Area.

### **IUCN Categories**

Allowable and prohibited activities within the Ongedechuul System of Conservation Areas vary with site. Thus the four discrete conservation areas fall under different IUCN Protected Area Categories.

Illeyaklbeluu: **1a: *Strict Nature Reserve***: protected area managed mainly for science. The Area is a representative reef ecosystem that is available primarily for scientific research and/or environmental monitoring.

“Taki”: **CATEGORY III *Natural Monument***: protected area managed mainly for conservation of specific natural features. The Area contains Palau's highest waterfall and as such is of outstanding or unique value because of its inherent rarity, aesthetic qualities, and cultural significance..

Ngermasech: **CATEGORY VI *Managed Resource Protected Area***: protected area managed mainly for the sustainable use of natural ecosystems. The Area contains predominantly unmodified mangrove and seagrass, is managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.

Ngerchelchuus: **CATEGORY III** *Natural Monument*: protected area managed mainly for conservation of specific natural features. The Area contains Palau's highest point and as such is of outstanding or unique value because of its inherent rarity, aesthetic qualities, and cultural significance.

## XI Background Information

### Description of the Planning Process

A Management Plan is mandated by NSL 7-11. Several activities were completed as part of the development of this Plan.

In October 2009, natural resource agencies and the Ngardmau community participated in a three-day Conservation Action Planning (CAP) workshop. The workshop was led by The Nature Conservancy Micronesia Program and assisted by the Palau Conservation Society, Bureau of Agriculture, Babeldaob Watershed Alliance, and Belau National Museum. Forty-five (45) residents from Ngardmau participated in the CAP, including the Governor, Traditional Chiefs, Speaker and other members of the Legislature, NSPLA Chairperson and members, representatives from traditional men's and women's groups and other community-based organizations, state staff, and other interested community members.

During the CAP, the community developed a state vision calling for a healthy community, a healthy environment, and healthy ecosystems, through active leadership and community involvement. The community identified eight priority conservation targets: savannas, wetlands, forest, cultural sites, rivers and streams, mangroves, coral reef, and seagrass. The community developed two objectives: 1) Increase fish abundance by 20% by 2015 and 2) Reduce sedimentation by 25% from current levels by 2013. Although the CAP document refers to the state as a whole, the document formed the basis for much of this Management Plan. Significant effort was put into developing objectives and actions that would meet the wider state objectives of increasing fish and reducing sedimentation.

In January 2010 the Governor of Ngardmau appointed five members to the Ngardmau Conservation Board, who were approved by the Legislature per NSL 7-11. The Conservation Board began working with the Palau Conservation Society in February 2010 to draft this Management Plan. Between February 2010 and April 2011, the Conservation Board and PCS derived content for this Plan through:

- 16 planning meetings
- 2 Familiarization Tours
- 4 terrestrial field days (examining sedimentation and forests)
- 2 field visits to determine zoning boundaries
- 1 socioeconomic survey (95 out of 166 adults were surveyed (2005 census), representing 57% of adults and 100% of heads of households (both in Ngardmau in Koror)). Survey followed SemPacifika methods, interviewers were trained in SemPacifika methods, and Micronesia Challenge indicators were built into questionnaire.
- 2 community meetings
- 4 leadership meetings
- An ongoing literature review
- Meetings and discussions with technical partners

The Conservation Board generated all content representing the desires of Ngardmau, including the vision, goals, objectives, targets, priority threats, prohibited and allowable actions, zones, and many actions. The Palau Conservation Society formatted this content from the Board and then added additional information and background information. All content was approved by the Ngardmau Conservation Board in May 2011, after which it was sent to the Governor and Legislature for final approval. Several meetings were held with the Governor, Legislature, and community to derive content and seek approval.

#### *Members of the Ngardmau Conservation Board*

- *Ongelolem* Victor Renguul Masahiro\*, Chair
- Alson Ngiraiwet
- Bradley Kumangai
- Elizabeth Ngirmekur
- Tiare Holm

*Facilitation (PCS):* Asap Bukurrou, Anuradha Gupta, Joyce Beouch



*Writing and compilation (PCS):* Lolita Gibbons-Decherong, Anuradha Gupta

\* Renguul Masahiro is also a PCS employee, but acted in this capacity as a Ngardmau traditional leader

### **Conservation Targets**

Conservation targets include those species or features in the conservation areas that the Ngardmau community wanted to conserve. All targets from the CAP document were relevant to the OSCA, and were adopted as targets of this Management Plan.

1. Savanna system (including plants and animals)
2. Wetlands (taro patches, riparian marshes)
3. Forest system (upland, riverine, lowland, and swamp forests, birds, bats)
4. Cultural and Historical sites (Ngerchelchuus, stone features, World War II relics)
5. Rivers and streams (water, river ecosystem, waterfalls)
6. Mangrove system (forest, mud clam, mangrove crab, fish)
7. Coral reef system (fish, lobster, trochus, corals, giant clams)
8. Seagrass system (fish, sea cucumber, sea urchin, seagrass bed, dugong)

### **Threats to Targets**

In this Management Plan, threats include both those immediate “target-based threats” that directly threaten the survival, health, or functionality of the conservation targets, and those “process-based threats or weaknesses” that would undermine the ability to implement effective management. Actions in the Management Plan seek to reduce the impacts of both target-based and process-based threats.

### **Target-based Threats**

All target-based threats from the CAP document were included as threats in this Management Plan. These and additional threats were prioritized based on the primary objectives of the management plan (e.g. reducing sedimentation and increasing fish) and based on a general understanding of the processes within the conservation areas in the OSCA. Prioritization was by consensus.

#### *Priority Threats*

<u>Rank</u>	<u>Threat</u>
1	Sediment/Erosion
2	Burning/Fire
3	Dredging/Port Development
4	Overharvesting (Overfishing, Illegal fishing, Overhunting, Illegal hunting)
5	Development near Conservation Areas
6	Climate Change
7	Pollution

**Sedimentation/Erosion** – Sedimentation was ranked as a HIGH threat in the CAP document. This threat was highly ranked because it impacts all conservation areas (sedimentation smothers marine systems and hinders growth in marine waters, and erosion strips terrestrial areas of essential soil nutrients) and because the effects of sedimentation are difficult to reverse.

**Burning/Fire** – Fire was ranked as a LOW threat in the CAP document, but a priority threat in this Management Plan. This is because Ngerchelchuus in particular has been burned and the vegetation and soils there are now sensitive to repeated burns (e.g. there is little protective cover). There is also evidence of burning along the edges of the Taki Conservation Area. Burning was ranked as a High threat because its impacts are high in scope (affecting multiple targets by removing vegetation and enabling sedimentation) and because burned areas are hard to control and slow to revegetate.

**Dredging/Port Development** – Dredging and Port Development were not included as threats in the CAP document. However, they were included as a threat in this Management Plan because dredging for a proposed National Port in Ngardmau could result in the removal or degradation of the patch reef at Ileyaklbeluu. This would be completely irreversible.

**Overharvesting** – Overharvesting was ranked as a HIGH threat and Hunting was listed as a LOW threat in the CAP document. In this Management Plan, overharvesting refers largely to overfishing and illegal fishing in both marine areas, but the threat of overhunting and illegal hunting of birds and bats is present in the Taki Conservation Area.

**Development near Conservation Areas** – Road construction was ranked as a MEDIUM threat and Urban Development was ranked as a LOW threat in the CAP document. Development was seen as a priority threat to Ngerchelchuus, where nearby lands have been leased for residential development. The proximity of developed structures introduces the possibility of pollution, clearing, invasive species (e.g. from ornamentals) and burning that may accidentally stray into the Conservation Area. This same impacts could occur in the Taki Conservation Area if development occurs on the border of the Area.

**Climate Change** – Climate Change was ranked as a HIGH threat in the CAP document. In this Management Plan, Climate Change was also prioritized because of possible increases in rainfall intensity that could cause increased sedimentation, and because sea level rise could disturb the ecosystems in the marine conservation areas.

**Pollution** – Pollution (other than sedimentation) was not included as a threat in the CAP document. Pollution was prioritized as a threat in this Management Plan because of the possibility that development could introduce chemicals and oils to marine and terrestrial conservation areas.

*All target-based threats and Overall Threat Rank (from the CAP document)*

<u>Threat</u>	<u>Overall Threat Rank</u>
Sedimentation	High
Climate Change	High
Overharvesting	High
Road construction	Medium
Invasive animals	Medium
Dam	Medium
Invasive plants	Medium
Lack of traditional restoration practices	Medium
Fire	Low
Hunting	Low
Mining	Low
Urban development	Low
Anchor damage	Low
Commercial and public use	Low
Farming	Low
Wood harvesting	Low

### **Process-based threats**

Process-based threats and weaknesses were identified at a Community Meeting whereby the community brainstormed using the Strengths-Weaknesses-Opportunities-Threats (SWOT) model. Process-based threats include both internal weaknesses and external threats or risks, all of which may hinder the effective management and conservation of targets.

#### *Internal weaknesses*

- No Conservation Officers at Taki or Ngerchelchuus
- Not enough Conservation Officers
- No buffer zone for MPAs
- Not enough public awareness of regulations
- No management plan (yet!)
- Continued poaching (by community members and outsiders)
- No review of Conservation Areas
- Not enough fuel to monitor and enforce
- Still need infrastructure (buoys, etc.)

#### *External Risks and Threats*

- Poachers

- No control over tourism markets
- Increased tourism traffic (especially at Taki)
- National Port development
- Funding may become unavailable
- Climate Change
- Boat traffic
- Traffic from outsiders going to and using Ngerchelchuus
- Littering
- All threats mentioned in CAP chart

### **Opportunities and strengths that make management viable**

Although there are a number of target-based and process-based threats, there are also a number of internal strengths and external opportunities that make management viable. This Management Plan capitalizes on many of these.

#### *Internal Strengths*

- OSCA already generating revenues
- Two marine conservation officers already employed and working
- Four people employed at Taki
- Existing equipment (e.g. Boat)
- Existing laws (e.g. Regulations)
- Beautiful sites
- Highest mountain and tallest waterfall in Palau
- Strategic location of Ngerchelchuus (political and economic)
- Existing infrastructure (e.g. access roads)
- All ecosystem types are represented in OSCA
- Supportive leadership

#### *External Opportunities*

- PAN membership
- Grant support
- Enhanced tourism for Ngardmau
- Training opportunities
- Job opportunities
- NRCS sedimentation control project (ongoing)
- Partnerships with technical agencies (PCS, PICRC, etc.)
- Increased revenues
- National government support (political, technical, and financial)
- Economic opportunities (e.g. Makit)
- Increased marketing potential for Ngardmau

### **History of the Ongedchuul System of Conservation Area**

Prior to the Act of 2009, the conservation sites were independently managed without one cohesive management approach. Of the four conservation sites, Ngermasech is given the most scientific data collection as much of the monitoring focused on the area. Historically Ngermasech is a traditional fishing ground known as aggregation site for highly valued food fish. Prior to its closure, fishing and gleaning in Ngermasech was common with locals.

In 2008 Ngardmau became the fifth State in Babeldaob to join the Belau Watershed Alliance. The Alliance is a coalition of States with a mission that aspires “*to protect, conserve and restore the water resources of Belau through collaborative outreach, education, networking, science, information sharing and technical assistance by and for the communities of the island*”. Currently, nine of the ten states located in Babeldaob are members of the Alliance.

Since its membership in the Alliance, the State’s effort has progressed to gain several important milestones.

- In October 2009 Ngardmau completed a Conservation Action Planning workshop facilitated for the community by The Nature Conservancy.
- In December 2009, The Ngardmau Conservation Act of 2009 expanded the boundaries of the protected watershed area.
- In September 2010, the Ngardmau Conservation Area System (Ongedechuul System of Conservation Area) became a member of the national Protected Areas Network.
- In 2009, Ngardmau is awarded \$3,000 from the German LifeWeb Grant through PICRC for development of nursery for re-vegetation project and water flow restoration of stream feeding into taro patch.

Other significant conservation efforts taken include:

- In 2009, Ngardmau and forestry partners received funds to build a suspension bridge across the river on the trail to the Taki Waterfall Conservation Site.
- Following passage of the Ngardmau Conservation Act of 2009, Ngardmau and Palau Conservation Society began working together to develop a management plan for the Ngardmau System of Conservation Areas.
- In May of 2010, Ngardmau launched a renovation of the Floating Outpost needed to monitor and enforce the Ngermasech Marine and Mangrove Conservation Area.
- In May of 2010, Ngardmau and Palau Conservation Society received a grant from Seacology to fund the start of a boardwalk along the trail near the river.

### **Surrounding Area Characteristics, Conservation Context**

The Republic of Palau comprises a curved archipelago of approximately 350 islands lying between 4 and 8 degrees North latitude and between 131 and 135 degrees East longitude, at the western edge of the Caroline Islands, in a cultural region known as Micronesia.

The high island of Babeldaob covers 334 square kilometers (82,000) acres, accounting for over 80% of Palau's landmass. Ngardmau State is located in the northwestern corner of Babeldaob on the west coast. The Ngardmau Constitution specifies that its boundaries follow the boundaries presented in Figure 1, out to 12 miles past the edge of the coast.<sup>1</sup> Ngardmau has three villages: Ngetbong, Ngerutoi, and Urdmau. In 2005, the population of Ngardmau was 166 people in 47 households.

Ngardmau is settled on the Northeast corner of Babeldaob and consists of a total area of 12.4 square miles or (32.2 square kilometers) representing 8.9% of the total Babeldaob land mass. Of the 12.4 square miles, 11.1 square miles are land, while 1.3 square miles are in mangrove area. The State of Ngaremlengui lies to the South, the States of Ngaraard and Ngiwal lie to the East of Ngardmau (Palau Planning Office, Existing Conditions Ngardmau Municipality, P. 7).

Ngardmau is generally defined by its gradient landscape reaching its highest points with Mount Ngerchelchuus (elevation 786 feet) and Mount Ngeskiu (elevation 682 feet). The hill crest runs along the border with Ngaremlengui. The entire area of this section of the boundary between Ngardmau and Ngaremlengui is above 500 feet. Mount Ngerikul, between Ngaraard and Ngardmau reaches a height of 523 feet. A number of other prominent peaks along the ridges run between river systems where elevations exceed 400 feet in the lower river areas and 600 feet in the upper reaches. Ngardmau is also characterized by the watersheds of its main rivers: The Ilol, Ngerchetang, and Ngertebechel along South and East. The East branch of Ngertebechel extends into Ngaraard along the Eastern boundary, and the Kaud River forms a boundary between Ngaremlengui at the Southwestern edge of Ngardmau.

Another noticeable feature of Ngardmau are the land terraces created by strip mining for bauxite in the late 1930's to early 1940's by the Japanese. The high presence of bauxite also translates to minimal vegetation on the savannahs.

### **Description of Ngardmau's Conservation Areas (including Location and Ownership)**

As a system (Figure 4), the four areas represent Ngardmau's ecosystems and habitats. The system includes mangrove, coral reef, seagrass, a variety of forests, savannahs, and the functionality of a watershed.

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<sup>1</sup> The Ngardmau State constitution specifies the boundaries shown in Figure 1. However, the document that the Palau National Government follows is the 1971 Trust Territory Charter. The 1971 Charter shows a different border from that in the Ngardmau Constitution. Maps provided by the Palau Automated Land and Resource Information System (PALARIS; under the Ministry of Public Infrastructures, Industries, and Commerce) must, by law, use the boundaries in the 1971 Charter. This management plan, however, as a document created by Ngardmau residents for Ngardmau residents, follows the Ngardmau Constitution.

Ecologically, the System is home to endangered and endemic species. All of Palau's applicable endemic birds and bats are found in abundance in these areas. Rare and endemic trees are also found in the area. Terrestrial areas are home to a rich variety of lizards, insects, and freshwater fish. Marine areas are home to species such as dugong, saltwater crocodile, sea turtles, mangrove crabs, trochus, and manta rays. The sites are also physically connected: The Taki drains into marine areas that flow out through Ileaklbeluu and Ngerchelchus forms part of the watershed draining into Ngermasech. Mobile species move among sites.

As a system of ecologically connected areas, the System is resilient to environmental change. The System includes an upper watershed system, which is protected to maintain water availability even in times of drought. Intact forests in the Conservation Area serve as refuges during fires. Ngermasech is habitat for juvenile species, and mangroves are intact so as to provide shelter during storms. Protection of Ngermasech has led to increase in fish and sea cucumbers, increasing resiliency for commercially-important species in times of stress. Protected areas tend to increase species outside of conservation areas, as well as promote positive health and productivity of habitat in surrounding areas.



Figure 4. Ongedechuul Conservation Area System. State boundaries on this map are as permitted by PALARIS and are not the boundaries recognized by the Ngardmau constitution.

#### *Ngermasech to Bkulachelid*

The Ngermasech to Bkulachelid Conservation Area (Center, 7°35'06" N, 134°31'56"E) consists of mangrove, seagrass, and patch reefs from the Ngardmau/Ngaremlengui State border at the Ngermasech Taoch (mangrove channel) running north to the prominent Bkulachelid point. The Ngermasech Conservation Area is approximately 2.93 square kilometers in size. The edge of the mangrove form the eastern border and the edge of the fringing reef forms much of the western border.

This conservation area commonly referred to as “Ngermasech” is a marine protected area. Ngermasech was first designated as a marine protected area in 1998, when actual managed area covered approximately 2.5 square kilometers of shallow seagrass beds, blue holes, and mangroves. Ngermasech is a nursery for highly valuable food fish and a habitat for protected and threatened species such as the dugong, juvenile humphead wrasse, and the bumphead parrotfish. It is also a habitat for invertebrates, such as sea cucumbers, also under considerable threat. Ngermasech was later expanded

to Bkulachelid, while the recent Ngardmau Conservation Act of 2009 included the Ngermasech Channel. The approximate size of the managed area has expanded to 3.5 square kilometers.

Management of Ngermasech include ongoing monitoring by Palau International Coral Reef Research Center (PICRC) (Figure 5), the Locally Managed Marine Area Network (LMMA), and other State Partners. The management also includes enforcement of restrictions on Ngermasech. As such, a floating outpost was erected in 2005 to establish a landing for conservation enforcement officers to provide a watch over the area and to discourage poachers from entering into the conservation area. The outpost was renovated in 2010 for improved enforcement. The 2010 Socioeconomic study of Ngardmau found that 80% of residents believed the Outpost stopped poaching.

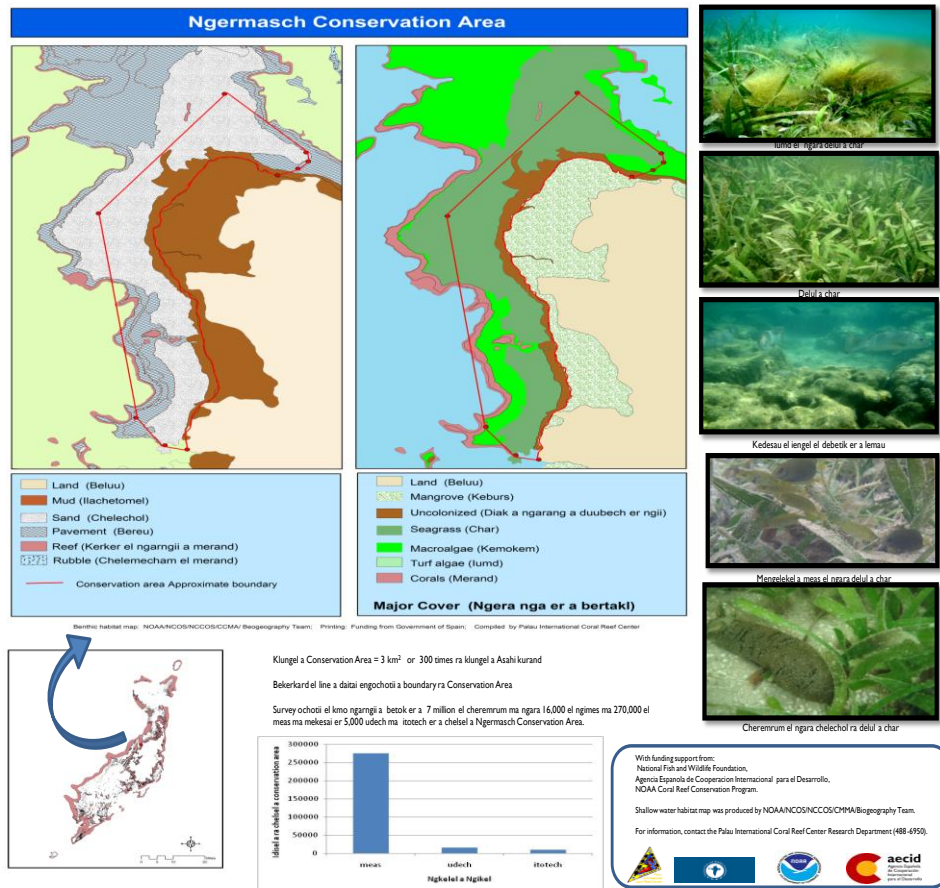


Figure 5. Results from monitoring conducted by partners.

### Reef of Ileyaklbeluu

The Reef of Ileyakl Beluu Conservation Area (Center, 7° 38'55"N, 134° 32'46"E) is a small patch reef on the outer reef slightly northwest of the Ngardmau dock. The area is approximately 0.63 square kilometers of reef. The edge of the reef where it drops off forms the border. The Conservation Area is adjacent to two channels, one of which includes the well-known dive site "Devilfish City," which Manta Rays frequent. Diving boats often use buoys marking the boundary of Ileyakl Beluu as their mooring points.

This Management Plan calls for a Permit system to be established to control dive boats and plans for a survey to establish a baseline of Trochus. Partners such as PICRC have established monitoring plots here (Figure 6).

## Ileyakl Beluu MPA Surveys



Figure 6. Monitoring stations inside and outside Ileyakl Beluu. Monitoring conducted by PICRC.

### *Ngerchelchuus*

The Ngerchelchuus Conservation Area (Center, 7°33'48"N, 134°34'19"E) is a terrestrial conservation area in the southern part of the state, and includes Palau's highest point (230 meters; 754 feet; PALARIS 2011). The area is approximately 0.2 square kilometers. Its boundary is an exact circle encompassing 50 acres around the USGS fixed marker indicating Palau's highest point (a circle with radius of 253.7 meters or 832 feet).

Mount Ngerchelchuus is one of several natural national landmark situated in Ngardmau's conservation area system. Ngerchelchuus is home to the rare White-breasted Woodswallow (Pratt and Etpison (2008) call the bird the endemic Palau Woodswallow, and if endemic, would be Palau's rarest endemic bird). An unpaved access road to the center has severely eroding gullies and extensive burned areas on its flanks are also eroding.

### *Taki*

The Taki Waterfall Conservation Area (Center, 7°35'05"N, 134°35'40"E) is a terrestrial conservation area encompassing much of the eastern part of the state. The area comprises 6.12 square kilometers. The border is determined by the upper ridge of the watershed draining into the point just after where the Diong Era Did and Ngertebechel Rivers join (just after the Medalaiechad Waterfall) and by the Ngardmau/Ngaraard State border in the northeast corner. The site includes Palau's tallest waterfall (approximately 20 meters; 65 feet; TNC, 2011) and its watershed.

The Taki Waterfall, like Mount Ngerchelchuus, is also a treasured natural national landmark for Palau situated within Ngardmau's system of conservation areas. The Taki is the highest waterfall in Palau. The Taki offers a potentially great opportunity of income sources for Ngardmau, many of which are capitalized on in this Plan. In recent years, Ngardmau, with assistance from technical agencies, has improved access to the falls in order to attract visitors and reduce their impacts. A number of basic minor infrastructure have been installed to try to minimize footprint impact along the access trail to the falls. However, to adequately improve the site to prevent runoffs from bare soil, and other human impact, the Management Plan puts forward measures and activities that will minimize the impact of this important conservation site.

Together adding to 9.97 square kilometers, the four conservation areas comprising the Ongedechuul System of Conservation Areas cover over 20% of Ngardmau's land area. The four conservation areas are located exclusively on state-owned or claimed land.

## Current Resource and/or Land Uses and Land Cover

### *Ngermasech and Ileyakl Beluu*

Although the legislation establishing the Ngermasech Conservation Area allows for sustainable harvest with the permission of traditional leaders, there is little to no allowed harvesting. There is poaching of fish and marine invertebrates. There are no structures or development inside the Conservation Area. A line of buoys (connected by a line of rope) marks the edge of the Conservation Area and a Floating Surveillance Outpost is situated just outside the northwestern border. Similarly, although allowed with the permission of traditional leaders, there is little allowed harvesting in the Ileyakl Beluu Conservation Area. There are individual buoys roughly marking the corners of the Ileyakl Beluu.

Several small watersheds, both in Ngardmau and Ngaremlengui, drain into Ngermasech and/or the Ngermasech Taoch. Sedimentation has been observed coming into Ngermasech from the Ngermasech Taoch, in part caused by wild pigs or by transient hunter's camps along the river (in both Ngardmau and Ngaremlengui; 2005). There is currently no development in the watersheds draining into Ngermasech, although in the past there were traditional villages. There is a large bare area draining into the middle portion of Ngermasech (Figure 7). There are also large savannas, some of which appear to have sparse vegetation, and thus risk of fire and resulting erosion is present. There are no roads accessing these watersheds, but there are hunter's trails. Access to the Ngermasech and Ileyakl Beluu Conservation Areas is exclusively by boat.

Simulations of a hydrological model by the Palau International Coral Reef Center (2011) indicate that although Ileyakl Beluu is nearly 5 kilometers from the mouth of the Diong Era Did River, it could still feel the effects of sedimentation. A plume of sediment (such as that created after heavy rains) would take about three days to reach Ileyakl Beluu. There is sediment monitoring at Ileyakl Beluu. Prevailing currents move in a northwest direction from the mouth of Diong Era Did, thus the majority of Ngermasech does not receive sediment from Diong Era Did. However, the northern portion of Ngermasech (at the Bkulachelid point) could receive water carrying sediment after a storm.

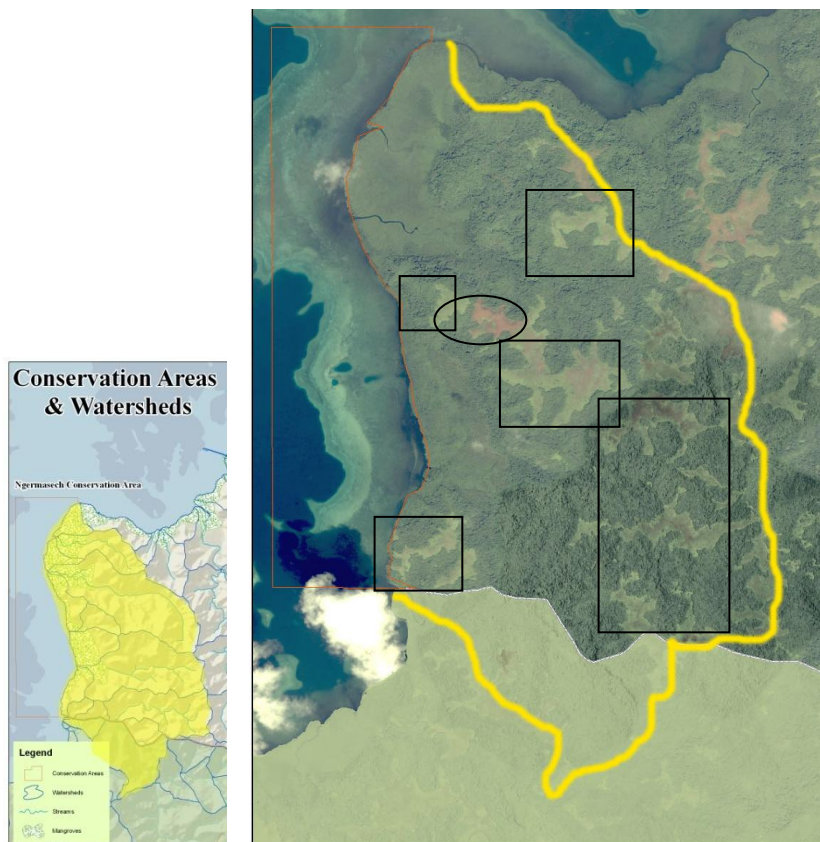




Figure 7. There are numerous savannas (squares, not all are mapped) and bare areas (oval, not all are mapped) in the watersheds draining into Ngermasech (map from 2006). Yellow line indicates boundary of watersheds that drain into Ngermasech. From satellite photos and field visits, it appears that dark savannas have sparse vegetation, possibly due to previous fires. Maps modified from PALARIS maps.

#### *Taki Waterfall Conservation Area*

There are tourist structures inside the Conservation Area, including a two unused huts, trail (with steps, benches, and ropes), tents, benches, summer houses, monorail, and zipline with towers. At the entrance to the Conservation Area (on the ridge forming the eastern boundary of the Conservation Area) there are several summer houses, a graded and graveled parking area, trash bins, and a flush toilet system with septic tank. There is clearing of forest and vegetation around these tourist structures. There are also historical ruins of a dam and rails from a mining operation inside the Conservation Area. The state water source is nearly two kilometers downriver from the Conservation Area.

Many thousand tourists (nearing 1000 per month) visit the Taki Waterfall every year, with as many as 100 tourists visiting per day. Most tourists come as part of tour groups and follow a guide from the entrance to the waterfall. There are occasional paying tourists and local visitors who do not have guides, although this practice is discouraged.

There are several small bare areas in the Conservation Area (Figure 8). Additionally, soil is exposed and eroding on the trail to the Taki. There are also numerous savannas, some of which appear to be sparse in vegetation. Several savannas on the high ridges appear to have been burned in 2010. Several of the savannas are in the upper parts of the conservation area are on high slopes (30 to 75%) and are situated close to roads and thus pose a fire risk. A small part of the eastern part of the conservation area includes the remains of a former bauxite mine (terraces without vegetation), mined during the Japanese era. Most of the lower slope areas and bottom lands are covered with forest.

There are hunter's trails throughout the Conservation Area, some of which appear to be in current use (2010).

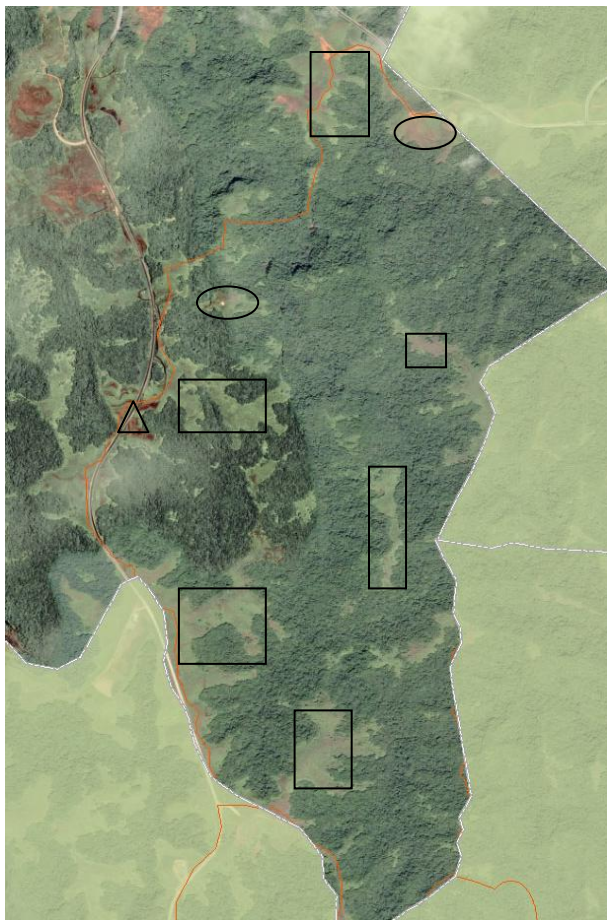


Figure 8. There are numerous savannas (squares, not all are mapped) and bare areas (oval, not all are mapped) in the Taki Waterfall Conservation Area (map from 2006). The triangle indicates a portion of a former bauxite mine terrace. From satellite photos and field visits, it appears that dark savannas have sparse vegetation, possibly due to previous fires. Maps modified from PALARIS maps.

*Ngerchelchuus*

There is a dirt road, with many steep and eroding portions, leading to in Ngerchelchuus (Figure 9). The road makes it approach from the east and connects to the Compact Road. The top of Ngerchelchuus has four towers (with cement structures and foundations) belonging to the Palau National Communications Corporation and local radio stations. Vehicles drive in the Conservation Area in order to reach and service these towers. There are the remains of a summer house and a large amount of trash on the top of Ngerchelchuus (2010). The site is known as a gathering point for young people. Parts of the top of Ngerchelchuus are bare and some parts are covered with grass. The flanks of Ngerchelchuus (within the Conservation Area) are covered with savanna and forest. Savanna on the northwest corner of the conservation area was burned in 2009 and 2010.

There are a few currently used hunter’s trails that begin in the Ngerchelchuus Conservation Area and continue beyond its borders (2010).

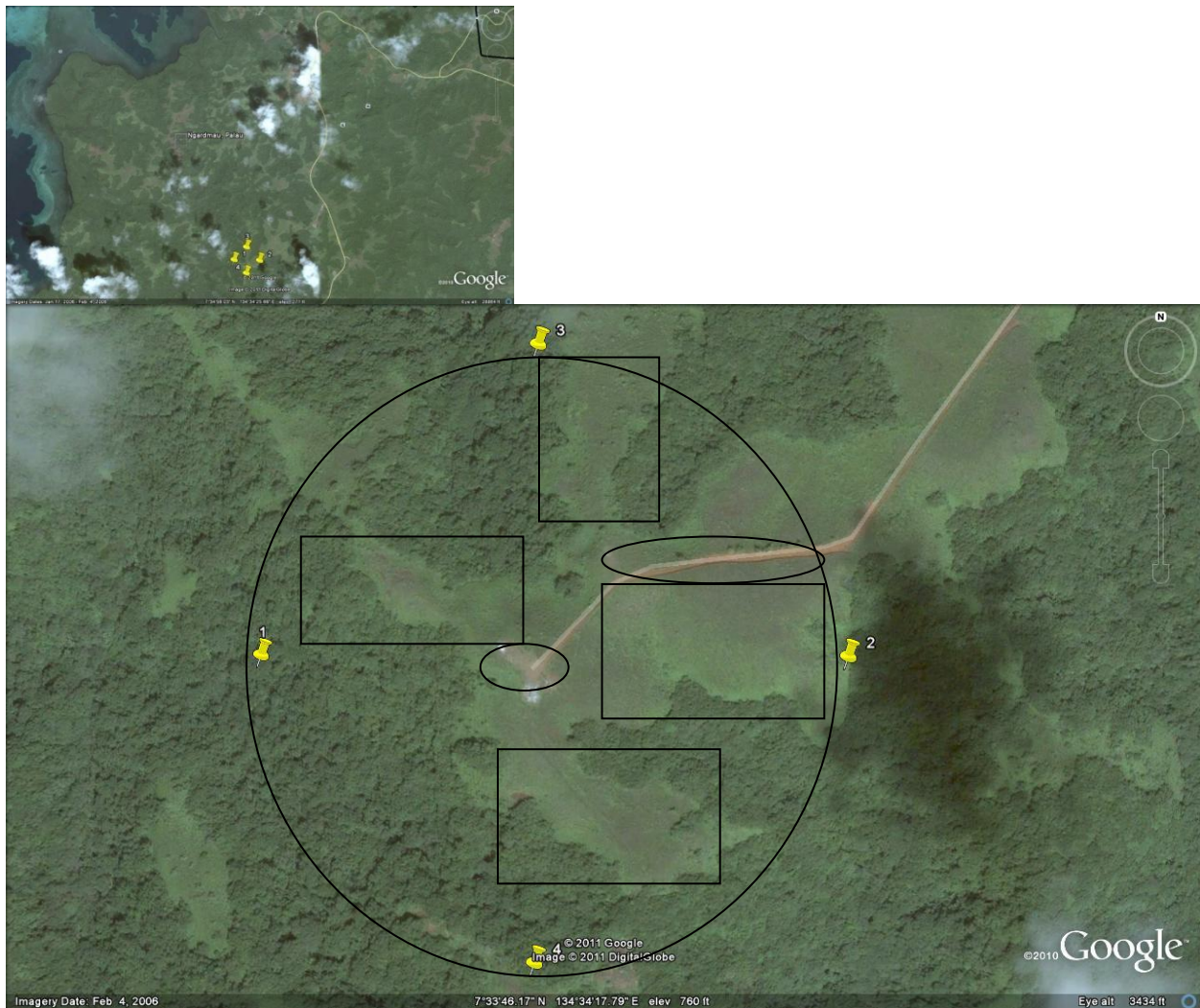


Figure 9. There are numerous savannas (squares, not all are mapped) and bare areas (oval, not all are mapped) in the Ngerchelchuus Conservation Area (map from 2006). Savannas in the northeast corner (north of the road) were burned in 2010. Maps modified from GoogleEarth map.

### Socioeconomic, Cultural, and Historical Information

The Ongedechuul System of Conservation Areas is important to Ngardmau residents for cultural and socioeconomic reasons.

The Taki Conservation Area is also important economically to Ngardmau. It employs four employees (2010) and receives thousands of visitors per year. Paying \$5 per head, income generation is estimated at between \$50,000 and \$80,000 per year. This income is returned to the State budget and used for management and other state costs. It offers recreational opportunities from visitation and hiking and from new tourist facilities such as a monorail and zipline. Ngerchelchuus is also important economically, as the states generates small revenues from use agreements with owners of towers. Ngardmau's two marine areas employ 2 marine conservation officers. According to a Socioeconomic survey conducted in Ngardmau as part of preparation of this Management Plan (2010), 75% of Ngardmau residents believe that the Ngermasech Conservation Area has led to an increase in Ngardmau's fish resources. More than 65% of Ngardmau residents fished for subsistence or commercially. Ileyakl Beluu has a permit system in place for divers wishing to visit Devilfish City, although there are only a few permits purchased every year.

The Taki Conservation Area includes a number of culturally important and sacred sites associated with Palauan legends. The traditional name of the waterfall and its pools (Medalaeichad) or "eyes of the gods" indicates its special significance. Ngerchelchuus has special significance as the highest point in the land and thus is sacred to some Ngardmau residents. There is cultural significance to the mangroves in Ngermasech, as it is taboo to cut trees in Ngermasech and transport them elsewhere.

There are a number of historical sites in the Taki Waterfall Conservation Area that have been catalogued and recorded by the Bureau of Arts and Culture (Figure 10), including a dam, rails, locomotive and mining carts, and other mining paraphernalia establishing during the Japanese period (1918-1945). There are some World War II remains in the northern portion of the Taki Conservation Area.

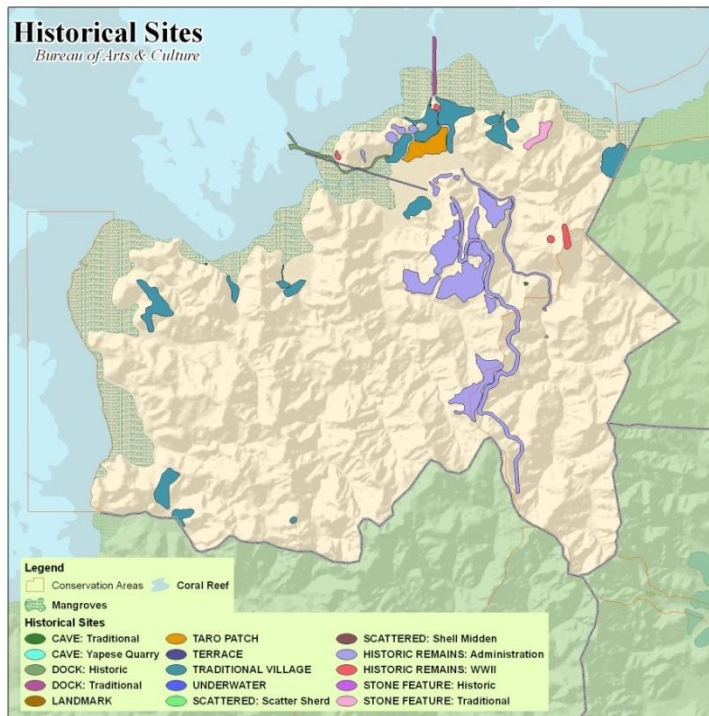


Figure 10. Cultural and historical sites.

### Biological and Ecological Information

For a group of Pacific Islands, Palau has remarkably biodiverse terrestrial environments. This is because of Palau's proximity to Southeast Asia and the age of the land, geologically the oldest in the Micronesian group.

### *Climate*

Palau has a wet tropical climate, with little seasonal variation in temperature. The mean daily temperature throughout the year averages about 80° F (27°C) with a daily range of about 10° F (7° C). Rainfall averages about 144 inches (370 cm) per year (US Army, 1956).

### *Geology and Soil*

Babeldaob is a high island that originated in an underwater volcanic eruption. It was uplifted from the sea due to movement of the continental plates and is still gradually moving upwards. Babeldaob is underlain by basalt rock.

There are a number of soils in the OSCA. In the Taki Waterfall Conservation Area (Figure 11), soils on forested lands are dominated by 602, 603, and 604 series (Aimeliik Silt Loam, 12-30%, 30-50%, and 50-75% slopes, respectively). These are deep and well-drained soils. If vegetation is removed, runoff is medium and the hazard of water erosion is moderate. Areas under forest are more fertile than areas under savanna. Upland forested areas are also found on some patches of 614 (Babelthuap-Ngardmau Udorthents Undifferentiated Group, 12-30% slope; well-drained, low hazard of water erosion, low fertility) and 620 (Ngardmau-Babelthuap-Typic Udorthents Undifferentiated Group 50-75% slope; well-drained, highly erodible with rapid runoff when vegetation is removed, low fertility). Lowland forested areas are found on 630 (Ngersuul Silt Loam 0-4% slopes) and 636 (Palau Silty Clay Loam 6-12% slopes; well-drained). Bare areas are on soil series 614 and 653 (Typic Udorthents complex, mined, 0-75% slopes; high erodability, extremely low fertility). Savannas have a range of soils, including 612, 613, 614, 620, and 621, with variable erosion hazards and permeability.

During a 2010 field visit with the USDA NRCS as part of preparing this plan, bare areas along the trail to the waterfall were identified as being depleted of organic matter, having excessive runoff, flooding, or ponding, and inadequate outlets for runoff. Fire in savanna areas and compaction on the trail were noted as possible reasons for ponding and loss of organic matter. Soil on the streambed and suspended sediment in the stream adjacent to the trail was observed. Possible erosion caused by wild pig activity in the forest was also noted.



Figure 11. Soils in the Taki Watershed Conservation Area. Boundaries are approximate. Map modified from 2011 USDA NRCS Soil survey.

Soils in the Ngerchelchhus Conservation Area (Figure 12) are 614, 620, and 621 (variable erodability) on savannas and bare areas and soils under forested areas are 602, 604, 633, and 639 (moderate to high erodability).

During a 2010 field visit with the USDA NRCS as part of preparing this plan, bare areas along the road and at the top of Ngerchelchuus were identified as having sheet and gully erosion, organic matter depletion, and excessive runoff, flooding, or ponding. Recent fire was identified as a possible reason for these conditions.

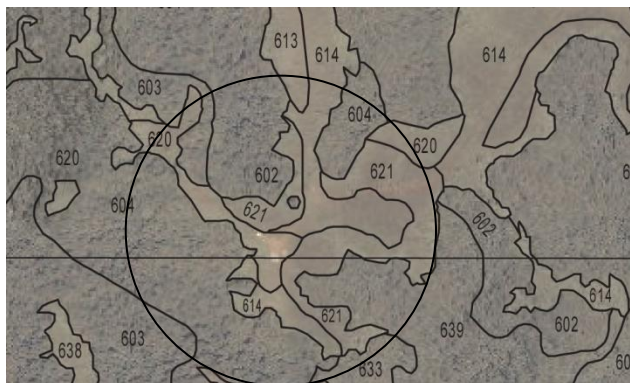


Figure 12. Soils on Ngerchelchuus. Map modified from 2011 USDA NRCS Soil Survey.

Soils under mangroves at Ngermasech are 617 (Ilachetomel-Naniak complex, 0 -1% slopes).

#### *Water Resources*

The Taki Waterfall Conservation Area is in an area of relatively high rainfall (145-153 inches of rain fall per year; USDA NRCS 2011). The average discharge in the Diong Era Did River was 34.1 cubic feet per second (Palau Planning Office, 1977) with seasonal variation corresponding to rainfall. Water is supplied to the most of the state from a diversion on the Diongradid River. This water is stored in tanks and supplies Ngetbong and outlying areas (MWM, 2003).

Suspended sediment flux in the Diong Era Did River was estimated at 32.2 g/s (1014 tons/year) (Golbuu et al 2010). Suspended solid concentration (a measure of turbidity) at the mouth of the Diong Era Did River averaged 9 mg/l but peaked at 636 mg/l during rain events. According to Golbuu et al (2010), during their study period the sedimentation rate and water turbidity exceeded levels considered harmful to corals.

In 2007 Ngardmau State joined the Belau Watershed Alliance (BWA; formerly the Babeldaob Watershed Alliance). The BWA Mission is to protect, restore, and conserve water resources in Palau.

#### *Vegetation*

Upland forests in Palau are considered the most species-diverse in Micronesia (Stemmermann, 1981) and have the highest rate of endemism (Costion and Kitalong 2006). Forests on ridges have a higher species diversity with *Parinari corymbosa* often dominant, whereas forests on slopes and in valleys are less diverse and dominant with *Campnosperma brevipedunculata* and *Pinanga insignis*. Costion and Kitalong (2006) divides upland forest into four categories: Upland, Lowland, Riparian, and Basaltic outcrop forests. All are found in the Ongedecheul System of Conservation Areas, as is Swamp forest (Figure 13). Palau has approximately 200-250 endemic species of plants, of which approximately 40% are endemic to Babeldaob (Costion and Kitalong 2006).

Kitalong and Holm (2004) surveyed plants north of the Taki Waterfall Conservation Area and found approximately 11 to 15 endemic plant species (highest numbers encountered elsewhere were 25 endemic species). Costion (2008) found a freshwater marsh in the eastern portion of the Taki Conservation Area. Costion and Kitalong (2006) found that forest on Ngerchelchuus had the only record on Babeldaob of the endemic tree *Badusa palauensis*, a tree common in the Rock Islands.

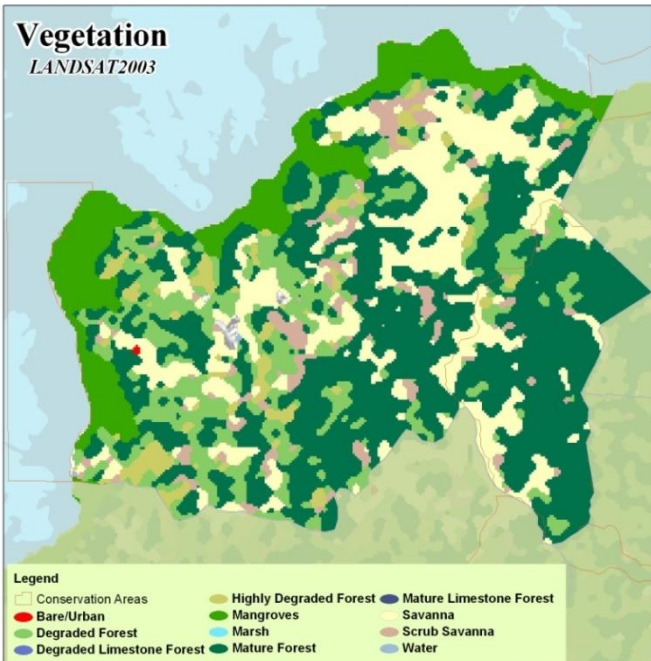


Figure 13. Vegetation in Ngardmau. Note that Ngerchelchuus is not visible on this map. Vegetation on the southern flank of Ngerchelchuus is similar to that on the northern flank (savanna, degraded forest, and mature forest).

Kitalong (2002) surveyed savannas and forest outside of the conservation areas, approximately 1.5 km away from the eastern boundary of Ngerchelchuus and 300 m away from the western boundary of the Taki Waterfall Conservation Areas. It is likely that vegetation inside the conservation areas is similar. Savannas were described as “classic,” dominated by the fern, *Gleichenia linearis* var. *ferruginea* (itouch), the lily, *Dianella carolinensis* (kobesos), the small bush, *Morinda pedunculata* (kesengelgel), white grass, *Eriachne palleescens* (oes kadran), grass, *Ischaemum polystachyum* var. *cbordatum* (kelelakameng), and the *Pandanus tectorius* (ongor) tree. This savanna was described as “relatively homogeneous.” Forest was a mixture of primary and secondary forest. Primary forests included the endemic *Pinanga insignis* (chebouch), the endemic *Pandanus aimiriikensis* (chertochet), the endemic *Garcinia matudai* (tilol), the endemic *Marantbes corymbosa* (bkau), *Rhus taitensis* (eues), *Pouteria obovata* (chelangel), *Campnosperma brevipetiolata* (kelelacharm), *Cerebera manghas* (chemeridech), and *Fagraea ksud* (ksid). Secondary forest included some faster growing plants than those in primary forest, including “bedel” or *Macaranga carolinensis*. The invasive indigenous vine, *Merremia peltata* (kebeas) was not found at the survey site.

Zig-zag surveys inside the Taki Waterfall Conservation Area (in an area of primary forest) conducted in partnership with the USDA NRCS in 2010 as part of development of this Management Plan found six large tree species: *Marantbes corymbosa* (bkau), *Semecarpus venenosus* (tonget), *Pouteria obovata* (chelangel), *Pinanga insignis* (chebouch), *Astonidium palaense* (mesekui), and *Campnosperma brevipetiolata* (kelelacharm). All 20 stations along the zig-zag transect were described as being in “good” condition (e.g. healthy forest). Similar surveys were conducted outside the conservation area in a site with Tree measurements were also made. A site inside the Taki Waterfall Conservation Area with primary forest was compared to a site outside the conservation area with secondary forest. 11 species of tree were surveyed. The estimated number of trees per acre inside the conservation area was 468.3 trees, much higher than the estimated number per acre outside the conservation area, which was only 194 trees. An estimate of wood was also made; inside the conservation area the estimate was 4126 board-feet (1650 marketable) of wood per acre and outside the estimate was 3736 board-feet (1494 marketable) of wood per acre.

The invasive non-native *Albezia* trees is present in large numbers in Ngaremlengui, and thus it is possible that *Albezia* trees are present in the Taki Waterfall Conservation Area, particularly in the southern portion.

Ngermasech has extensive seagrass beds and healthy mangrove.

#### Mammals

Palau has two native mammals, both bats. The Palau Fruit Bat (*Pteropus pelewensis*; Olik) is endemic to Palau. Polynesian Sheath-Tailed Bats (*Emballonura semicaudata*; Chesisualik) reside in caves. Fruit bats have not been surveyed in the

conservation areas, but survey locations in 1991 and 2005 observed bats that may have originated from or been traveling to conservation areas. In 2005, 38 Fruit Bats were observed originating from areas close to Ngermasech. 37 Fruit Bats were seen flying from the Taki Waterfall Conservation Area, and 53 Fruit Bats were seen flying near Ngerchelchuu. Two (2) Sheath-Tailed Bats were observed near Ngerchelchuu in 2005.

One dugong was observed near the Ngermasech Conservation Area during surveys conducted by PCS in 2000.

Feral pigs are known to occur in the Taki Waterfall Conservation Area and below Ngerchelchuu.

*Birds*

162 species of birds have been reported from Palau (Olsen, 2010). 51 species nest and live in Palau all year round and as many as 12 are endemic (Pratt and Etpison, 2008). There are more bird species in Palau than in the Micronesian islands to the east, due to the relative proximity of land masses and the diversity of geology and habitats in Palau (Engbring 1988; Holm et al 2008).

Five of Palau’s resident birds are listed as threatened or endangered by the International Union for the Conservation of Nature (IUCN). The Micronesian Megapode (bekai) is Endangered (EN), and the Palau Grove Dove (omekrengukl), Giant White-eye (charmbedel), Micronesian Imperial Pigeon (belochel), and Nicobar Pigeon (laib) are listed as Near-Threatened (NT).

Ngerchelchuu is well-known as being one of the few spots in Palau where the rare White-breasted Woodswallow is found consistently. The endangered Micronesian Megapode has also been confirmed in the Taki Waterfall Conservation Area.

Table 1 lists birds that were counted in Ngardmau in 2005. In 1991 and 2005, two survey transects followed the old road, parts of which are now inside the Taki Waterfall Conservation Area. However, birds were surveyed both inside and outside the conservation area. Birds per station were calculated for these two transects and for Babeldaob as a whole. Populations of most birds in Ngardmau were comparable to populations in the rest of Babeldaob. Of key species, there were fewer Micronesian Pigeons and Fruit Doves and more Nicobar Pigeons and White-breasted Woodswallows per station in Ngardmau than in Babeldaob.

**Table 1. Estimate of key bird species abundance in and near the Taki Waterfall Conservation Area versus Babeldaob as a whole, based on 2005 survey**

English Name	Palauan Name	2005 Birds-Per-Station (38 stations in Ngardmau)	
		Ngardmau (transects near Taki) (from PCS data)	Babeldaob (VanderWerf, 2007; over 300 stations)
<b>Endangered</b>			
Micronesian Pigeon	Belochel	0.42	<b>1.44</b>
Nicobar Pigeon	Laib	<b>0.24</b>	0.02
<b>Endemic</b>			
Palau Fruit Dove	Biib	3.97	<b>8.19</b>
Cicadabird	Kiuidukall	<b>0.39</b>	0.25
Caroline Islands White Eye	Chesisebarsech	0.11	<b>0.41</b>
Dusky White Eye	Chetitalial	2.63	<b>4.17</b>
Morningbird	Tutau	<b>1.03</b>	0.81
Palau Fantail	Melimdelebbeb, Chesisirech	<b>0.32</b>	0.20
Palau Flycatcher	Charmelachull	0.61	<b>0.77</b>
Palau Bush-Warbler	Wuul	<b>1.87</b>	1.52
Palau Swiftlet	Chesisekiaid	<b>1.68</b>	0.86
Rusty-capped Kingfisher (Micronesian Kingfisher)	Cherosech, Ongelimadech	<b>0.16</b>	0.15

English Name	Palauan Name	2005 Birds-Per-Station (38 stations in Ngardmau)	
		Ngardmau (transects near Taki) (from PCS data)	Babeldaob (VanderWerf, 2007; over 300 stations)
<b>Regionally-Restricted</b>			
Micronesian Honeyeater	Chesisebangiau	0.61	<b>0.70</b>
Micronesian Starling	Kiuid	1.95	<b>2.72</b>
<b>Native</b>			
Banded Rail	Terrid	<b>0.05</b>	0.02
Collared Kingfisher	Tengadidik	0.18	<b>0.35</b>
Junglefowl	Malkureomel	0.63	<b>0.80</b>
White-breasted Woodswallow	Mengeliuliu	<b>0.08</b>	0.003

#### *Amphibians and Reptiles*

Various species of snakes and lizards must occur in the conservation areas, but no comprehensive surveys of these animals have been undertaken. The snakes that have been recorded elsewhere in Babeldaob include the *nguis* (Palau tree snake, *Dendrelaphis lineolatus*), *bersoech* (Pacific Island boa) and the Brahminy blind snake (*typhlops braminus*) (ITPI 1977). Skink species that also occur include the *chemaidechedui* (emerald or green skink, *Lamprolepis smaragdina*) and the endemic pandanus skink (*Aulacoplax leptosoma*) which can be found in the crowns of pandanus trees (ITPI 1977). Kitalong (2002) noted that the introduced toad (*Bufo marinus*) was not present in the area she surveyed (near the conservation areas).

A hawksbill sea turtle was observed in Ngermasech Conservation Area during surveys conducted by PCS in 2000.

#### *Freshwater fish*

No comprehensive surveys of freshwater fish have been conducted in the conservation areas. Studies on freshwater habitats elsewhere in Babeldaob have shown that at least 40 species of fish need freshwater to survive (Bright 1979), and there are at least two endemic freshwater fish species (Gobies, *sicyopus sp.* and *Redigobius horiae*) (Bright and June 1981). The largest fish in Palauan freshwater is the *kitel* (freshwater eel, *Anguilla marmorata*), of which the largest recorded specimen measured 3.7 feet (1.2 meters) (Bright and June 1981). The eel is known to occur in the Conservation Area and there has been some poaching of the eel from the Area.

#### *Marine Fish*

PCS conducted surveys in Ngermasech Conservation Area in 2000. A variety of reef fish were observed at two blue holes. In the blue holes, the majority of economically valuable fish recorded were in juvenile or sub-adult phases of development. These included siganids, lutjanids, lethrins, labrids, (including Napoleon Wrasse), and scarids (including Humphead Parrotfish). The only fish in high abundance was the lined rabbitfish (kelsebuul, *Signus lineatus*). At the drop off on the edge of Ngermasech, 19 species of fish were recorded. Some species were present as juveniles and some as adults. Keremlal, reall, and kelsebuul were present in high abundance.

Manta Rays are known to frequent the Devilfish City dive spot near Ileyakl Beluu.

#### *Freshwater Invertebrates*

Little information is available on the terrestrial and aquatic invertebrates (such as snails, worms, shrimp and clams). Bright (1979) gives a list of insects, water mites, crustaceans and mollusks found in areas in Palau and mentions that there are at least 18 species of shrimp and crab in Palauan freshwater habitats, including some endemic species.

#### *Marine Invertebrates*

PCS conducted surveys of Ngermasech in 2000. The sea cucumber (cherumrum) was extremely abundant, with as many as 49 per square meter in some areas and an average of 33 per square meter. Sizes ranged from 1.5 to 4.0 inches with an average size of 2.6 inches. Only two (2) ngims (*Stichopus variegates*) were found during the surveys. Additional sea cucumber species were present, but not recorded. Giant clams and rock-boring clams were observed in Ngermasech in 2000. One crown-of-thorns starfish was also observed. Coral species included *Porites cylindrical*, *Porites lobata*, *Montipora sp.*, *Fungia sp.*, *Diploastrea heliopora*, and other encrusting, foliose, massive, and submassive species. Mangrove crabs and ngduul (mud clams) are present in Ngermasech, although there is no data to confirm numbers. During the 2010



socioeconomic survey, 62% of Ngardmau residents said they thought Ngermasech should be open for harvesting of ngduul. Ileyakl Beluu is home to trochus and corals.

## **Conclusion**

The Ongedechuul System of Conservation Areas is a special place. Community-based management of its lands and species will ensure that its natural resources are available for perpetuity. This Plan lays out, in detail, the activities that will be needed over the next five years to ensure that Ngardmau's natural and cultural heritage are protected.

## Appendix 1. Policy and Legal Recommendations (non-binding)

The following changes to NPL 7-11 will streamline the legislation:

- Amend Section 7a) to include the recommended composition of the Board (from 5 stakeholder groups)
- Delete Section 8b4, as developing regulations requires legal expertise beyond the scope of this management plan
- Amend Section 11 to say “proposed management plan or changes to management plan”
- Amend Section 14 to clarify that penalties are \$500 per violation per day
- Amend Line 11 to include NSL No. 3-13

Additional policy recommendations:

1. In order to properly foster growth of the eco-tourism industry within the conservation area system, it is recommended that:

- A group of volunteer individuals from the local community form a voluntary tourism board whose role is to advise the Conservation Board and the Governor of new ideas, lessons-learned, developing needs and responses to matters arising relating to the visitor’s industry in the State. In particular those matters where conservation goals and tourism goals are in conflict.
- Management identifies “Low Impact Development” zones, and assigns “Allowable Uses” for the purpose of eco-tourism developments in Ngerchelchuus and Taki Waterfall, and incorporate the zones into OSCA Regulations.
- Management identifies and designates areas in the conservation area system as “Recreational” zones to be able to accommodate new “Allowable Activities”. For example, Rock Climbing, Nature Hikes, Bird Watching, Kayaking, and Hand-Gliding, etc... Incorporate the zones and its “Allowable Activities” into the OSCA Regulations.

2. To help reduce erosion from land and sediment build up in the marine conservation areas and Ngardmau Bay in general from agricultural activities, it is recommended that:

- The Ngardmau Conservation Board proposes to the State to identify and designate “Agriculture Reserve” zones confined to alluvial soils and assign “Commercial” and “Non-Commercial” agricultural uses within the zones, and for the State to incorporate into the Land Use Plan;
- The Ngardmau Conservation Board and Governor seeks technical assistance from the Division of Forestry and US Natural Resource Conservation Services to develop **Best Practices in Farming for Ngardmau** and propose for State to incorporate into Land Use Plan.

3. To help reduce erosion from land and sediment build up in the marine conservation areas and Ngardmau Bay in general from unpaved roads, it is recommended that:

- Management with leadership from the Governor and Legislature consider an annual **Conservation Easement Charge** for those service access roads in the conservation area system. The Conservation Easement Charge is to help defray the cost for the State to surface the unpaved roads and provide regular improvement and maintenance on the roads. The charge is attached to the individual leaseholders or companies whose properties are being serviced by the access road. The Conservation Easement Charge is incorporated into the OSCA Regulations.

4. In order to try to balance sustainable economic development within a highly vulnerable natural area complex, every development allowed into the conservation area must be willing to except a premium to be in such an area. It is recommended that:

- Management with leadership from the Governor and Legislature consider an annual **Conservation Premium Charge** to leaseholders of both commercial and private developments situated within the conservation area system. The Conservation Premium Charge on an annual basis is allocated to storm water management, and erosion and sediment controls. The Conservation Premium Charge is incorporated into the OSCA Regulations.

5. In order to obtain a long term plan for the Bauxite Bare Areas given its unfertile soil condition, it is recommended that:

- The management and the State leadership hold a meeting exercise to determine the best land-use option for the areas. For example, the areas could be used to compensate the scarcity of developable land through “Low-Impact” subdivision developments that will seal the soil from run-offs.

## Appendix 2. Stakeholder Analysis

PCS identified stakeholder groups from general experience (e.g. Governor's Office) and from an analysis of respondents to the 2010 socioeconomic survey (based on sources of income and areas of concern). PCS then created this table based on activities in the Management Plan to determine if concerns or activities of stakeholder groups had been addressed in this Plan.

Stakeholder Group	General Approach and notes
State Government – Governor and Legislature	<ul style="list-style-type: none"> <li>• Governor is implementer, other state leaders must approve Management Plan, budgets, and changes to management plan</li> <li>• Plan includes targeted meetings and information sharing between Board, State Government, and Public Lands Authority</li> <li>• Income generation or sustainable use opportunities in all conservation areas</li> </ul>
State Government – Enforcement	<ul style="list-style-type: none"> <li>• Conservation Officers included in Plan, with more clearly delineated duties</li> <li>• Capacity building plan for Conservation Officers included</li> </ul>
Farmers (30% of residents have some income from farming)	<ul style="list-style-type: none"> <li>• Farming is prohibited; increased regulations and enforcement to ensure no encroachment</li> <li>• Other areas in state have no restrictions on farming</li> </ul>
Fishermen/women (75% of residents fish)	<ul style="list-style-type: none"> <li>• Fishing still allowed with permission of traditional leaders</li> <li>• Increased regulations and enforcement to ensure no poaching</li> <li>• No gear restrictions when permission is given (except those regulated by national law)</li> </ul>
Marine gleaners (70% of residents glean)	<ul style="list-style-type: none"> <li>• Quarterly openings for ngduul harvest in Ngermasech</li> </ul>
Makit women (6% of residents sell to tourism market)	<ul style="list-style-type: none"> <li>• Allowable activities encourage sustainable ecotourism and expansion of income from tourism</li> </ul>
Community – Villages	<ul style="list-style-type: none"> <li>• Community outreach</li> <li>• Economic and subsistence use opportunities in all conservation areas</li> <li>• More focus on enforcement than on education (based on survey results showing that 60-90% of residents were aware of marine conservation areas and their restrictions, over 90% support marine conservation areas, 94% support no entry rules for Ngermasech and Ileyakl Beluu, 97% believe Conservation Officers should have access to training and tools, 88% said there was not enough enforcement at marine conservation areas.</li> </ul>
Hunters	<ul style="list-style-type: none"> <li>• Increased education and outreach</li> <li>• Expanded surveillance and enforcement of terrestrial areas</li> <li>• Economic opportunities through tourism and job opportunities through increased numbers of Conservation Officers</li> </ul>
Tourists / Tour companies	<ul style="list-style-type: none"> <li>• Sustainable ecotourism allowed in two sites</li> <li>• Advertising and increased information about the site</li> </ul>
Students	<ul style="list-style-type: none"> <li>• Development of school-based programs</li> <li>• Educational activities allowed in all zones (with permit/permission, if necessary)</li> </ul>
Other States / Residents from outside Ngardmau	<ul style="list-style-type: none"> <li>• Public education to include signs, use of multiple media to access a broader audience</li> <li>• Increased surveillance and enforcement to reduce poaching</li> </ul>
Landowners	<ul style="list-style-type: none"> <li>• Development of clear regulations to control activities on leases adjacent to conservation areas</li> </ul>

### Appendix 3: Roles and day-to-day responsibilities of authorities and personnel

<p><b>Traditional Leaders</b></p> <p><b>Role:</b> Supervisory and Advisory role: Oversight of activities in the Reserve to ensure cultural appropriateness; conflict resolution if necessary</p> <p><b>Responsibilities</b></p> <ul style="list-style-type: none"> <li>• Give permission for restricted activities</li> <li>• Assist with conflict resolution</li> </ul>
<p><b>State Government Leadership</b></p> <p><b>Governor</b></p> <p><b>Role:</b> Implementer role: Governor has ultimate responsibility for implementation, including oversight of implementation and financial management of funds</p> <p><b>Responsibilities</b></p> <ul style="list-style-type: none"> <li>• Establish Board</li> <li>• Introduce and or/initiate legislation, regulations, and resolutions, if necessary</li> <li>• Authorize expenditures</li> <li>• Collect, maintain, and manage funds</li> <li>• Implement activities</li> <li>• Enforce laws, rules, and regulations</li> <li>• Approve annual reports, annual work plans, and changes to the Management Plan</li> <li>• Participate in community outreach and relevant meetings</li> </ul>
<p><b>Legislature</b></p> <p><b>Role:</b> Implementer and Supporter role: Provide enabling legal environment to implement Plan</p> <p><b>Responsibilities</b></p> <ul style="list-style-type: none"> <li>• Approve members of the Board</li> <li>• Pass/Adopt legislation, resolutions, and/or regulations</li> <li>• Participate in community outreach and relevant meetings</li> </ul>
<p><b>Ngardmau State Public Lands Authority</b></p> <p><b>Role:</b> Advisory and Supporter role: Maintain consistency between public lands and Management Plan</p> <p><b>Responsibilities</b></p> <ul style="list-style-type: none"> <li>• Participate in joint meetings about System</li> <li>• Ensure leases are in compliance with Plan</li> </ul>
<p><b>State Government Staff</b></p> <p><b>State Attorney</b></p> <p><b>Role:</b> Implementer and Supporter role: Ensure consistency with laws and oversee development of regulations, legislation, and permits</p> <p><b>Responsibilities:</b></p> <ul style="list-style-type: none"> <li>• Assist with legislation and regulations</li> <li>• Draft and/or review regulations on fines, development, and ecotourism</li> <li>• Draft and/or review permit system and liability forms</li> <li>• Assist with establishment of NGO/IGO</li> </ul>
<p><b>State Administrative Personnel</b></p> <p><b>Role:</b> Supporter role: Manage funds and maintain accurate records of all expenditures</p> <p><b>Responsibilities:</b></p> <ul style="list-style-type: none"> <li>• Maintain financial compliance with Plan</li> <li>• Issue purchase orders, checks, and other financial documents</li> <li>• Track spending and maintain all financial files</li> <li>• Assist with preparation of yearly financial reports, annual work plans, and annual budget requests</li> <li>• Assist with outreach and education (e.g. logistics)</li> </ul>

<p><b>State Maintenance Personnel</b>  <b>Role:</b> Implementer role: Assist with field-based activities  <b>Responsibilities:</b></p> <ul style="list-style-type: none"> <li>• Assist with Education (e.g. distribution, installations, labor)</li> <li>• Complete and maintain trail(s) and other construction</li> <li>• Participate in cleanups and field trips</li> <li>• Maintain and service trash bins in conservation areas</li> </ul>
<p><b>Network Leadership</b></p>
<p><b>Board of Directors</b>  <b>Role:</b> Supervisory and Implementer role: Oversight for implementation of the Plan, planning  <b>Responsibilities</b></p> <ul style="list-style-type: none"> <li>• Review and recommend actions</li> <li>• Revise plan</li> </ul>
<p><b>Network Staff</b></p>
<p><b>Coordinator</b>  <b>Role:</b> Coordinator and Implementer role: Ensure regulations are enforced and management actions occur on schedule. Work closely with leadership to coordinate management, review the Plan, and oversee all associated staff.  <b>Responsibilities</b></p> <ul style="list-style-type: none"> <li>• Coordinate and implement activities</li> <li>• Follow up with leadership on administrative actions, including development of permit system</li> <li>• Coordinate development of educational materials and programs</li> <li>• Supervise and coordinate printing and distribution of educational materials, signs, etc.</li> <li>• Coordinate and participate in community meetings, cleanups, restorations, etc.</li> <li>• Draft additional necessary plans and forward to Board for review</li> <li>• Jointly develop daily surveillance plans</li> <li>• Hear daily reports from Conservation Officers on enforcement issues</li> <li>• Supervise and coordinate monitoring activities and baseline studies</li> <li>• Collect and analyze monitoring data and suggest changes to Management Plan as necessary</li> <li>• Develop annual work plans and budgets</li> <li>• Initiate expenditure requests based on activities</li> </ul>
<p><b>Conservation Officer</b>  <b>Role:</b> Enforcer and Implementer role: Monitor compliance with prohibited and allowable activities and enforce non-compliance, participate in monitoring, educational, restoration, and other field-based activities.  <b>Responsibilities</b></p> <ul style="list-style-type: none"> <li>• Participate in daily enforcement and compliance monitoring, check permits</li> <li>• Follow legal procedures for reporting and stopping prohibited activities (according to daily surveillance and enforcement plan)</li> <li>• File incident reports and keep daily logs</li> <li>• Participate in research and scientific monitoring</li> <li>• Participate in daily visitor tours and briefings on allowable activities (including large groups, school groups)</li> <li>• Ensure visitor safety</li> <li>• Participate in training opportunities</li> <li>• Assist with field-based activities (cleanups, placement of signs, restorations, invasive species removal, etc.)</li> </ul>
<p><b>Community</b></p>
<p><b>Ngardmau Community</b>  <b>Role:</b> Supporter and Implementer role: Comply with the Plan and participate in kinrohoshi</p> <ul style="list-style-type: none"> <li>• Refrain from prohibited activities</li> <li>• Participate in community outreach</li> <li>• Participate in field-based activities (cleanups, restoration)</li> <li>• Capitalize on tourism opportunities</li> </ul>

**Nongovernmental Organization/Intergovernmental Organization**

**Role:** Financial support and Implementer role

**Responsibilities:**

- Assist with fundraising
- Assist with implementation, based on funds raised

**Technical organizations**

**Role:** Mentor

**Responsibilities:**

- Assist with capacity building
- Assist with monitoring

#### Appendix 4a. Evaluation Criteria

Objective/Action	Any milestones?	Indicator of success/Indicator of action	How measured
<b>By December 2015, the Ongedechuul System of Conservation Areas (OSCA) is effectively managed to achieve its purpose.</b>		OSCA health parameters good; community parameters good	Socioeconomic survey, marine surveys, terrestrial surveys, tallies, observation
By 2015, sediment along the coast at the village is reduced by 75% from the 2010 baseline, and turbidity has been reduced annually, and 100% of bare areas within the conservation areas have been or are being re-vegetated.B14	Baseline established in Year 1, plus decrease in Year 1; revegetation near dam by Year 2	Sediment reduced by 75%; Turbidity in river and ocean decreasing annually, 100% of bare areas revegetated or being planted	Biophysical survey, PICRC surveys, EQPB surveys, observation
Starting in 2014 and from then on, there are no unpermitted burning and earthmoving activities.	Legislation in place by Year 1	No unpermitted burns or earthmoving activities	Observation, EQPB fines, state fines, no enforcement actions (but same effort)
By 2014, 95% of residents of Ngardmau state are aware of sedimentation and its causes and impacts, and at least 95% of the Ngardmau State community is aware and fully supportive of the OSCA and its boundaries, purpose, and rules.	Information prepared by Year 2	95% of residents aware of sediment and its causes	Socioeconomic survey
By 2015, a buffer zone has been designed and implemented around Diong era Did and its tributaries	Legislation by Year 1; Re-vegetation near dam by Year 2	Buffer zone of trees/vegetation along rivers, legislation, Number of trees being replanted	Observation, maps, copies of legislation
By 2012, the Taki trail has been improved to minimize sedimentation and there is controlled access and activities within the Conservation Area.	Baseline established by Year 1	Taki trail improved, access controlled, Number of tourists straying out of zone at zero	Biophysical survey, photographs, observation, reports
By 2015, the road to Ngerchelchuus has been improved and stabilized to minimize stormwater runoff and erosion	Establish sediment control on runoff areas by Year 2 (e.g. lemongrass, etc.)	Number of improvement measures on road	Photographs, reports
By 2015, there is no illegal fishing in Ngermasech and Ileyakl el Beluu.	More buoys at Ileyaklbeluu by Year 3; Buoys changed to cones by Year 3 at both sites	No reports of illegal fishing, no survey respondents say yes to illegal fishing, fish populations increase or stay same, number enforcement actions decrease	CO Reports, Socioeconomic survey

By December 2011, buffer zones for Ngarmasech and Illeakelbeluu has been established	Buffer Zone legislation drafted by Year 1	Buffer zone legislation passed, buoys in place	Copy of legislation
By January 2014, OSCA is clearly contributing to maintaining the subsistence and sustainable livelihoods of the people of Ngardmau State.	Women sustainably harvesting from Ngermasech		
By 2015, Ngarmasech and Illeakelbeluu are not negatively affected by dredging activities.	Baseline established in Year	Surveys indicate no negative effects of dredging, no coral dredge drifting in	Biophysical surveys, socioeconomic surveys
By 2015, all development in or near conservation areas are compatible with the objectives of OSCA.	Bungalows are built in an environmentally friendly way - no non-native species, etc.	Development follows conditions on permits to minimize sediment and/or maximize vegetation, NCB does not contest any permit?	Reports, EQPB permits
By January 2012, the OSCA management plan and associated regulations have been adopted by Ngardmau State Government and endorsed by the Palau National Government as a member of the Palau Protected Areas Network.		Legislation passed, OSCA management plan accepted by Nat. Gov., number of leaders with buy-in	Copy of signed legislation, letter from Minister, budget from national government
By January 2016, OSCA has been institutionalized within the state government	At least two personnel hired by Year 2	Personnel hired, plan implemented, NCB institutionalized?	State organizational chart and budget
<b>By December 2015, the Ongedechuul System of Conservation Areas (OSCA) is sustainably financed into perpetuity.</b>		Financing enough to cover costs and from a secure source	Counts, tallies, survey
By September 2011, OSCA is a member of the Palau Protected Areas Network.		PAN Member	Letter from Minister
By January 2012, OSCA is generating revenues (including entrance fees, penalties and grants) and is integrated into Ngardmau state annual budgeting.		Income generated, included in annual budget, number of permits, number of fines, etc.	Receipts, state financial reports, copy of state budget request
By January 2013, there is an NGO component of OSCA that facilitates membership revenues and engagement as well as NGO-targeted grant-making.		NGO established	NGO Charter
<b>By December 2015, the Ongedechuul System of Conservation Areas (OSCA) helps to sustain positive cultural practices and is managed using traditional conservation ways.</b>		Number of stakeholders involved?	



By January 2013, enforcement of the OSCA is conducted jointly by the Ministry the Justice, Office of the Governor, and Traditional Leaders.		Traditional leaders aware of OSCA and its regulations. Traditional leaders impose fines or punishments as stated in law. Fish & Wildlife issues arrests or citations in OSCA (if necessary). State Conservation Officers deputized.	Observation
By 2015 citizens of Ngardmau continue to work together to monitor and manage the conservation areas.		OSCA day event occurring with community participation; number of stakeholders involved	Tally at events

#### Appendix 4b. Monitoring Plan

*Items in italics are agreed upon indicators from Micronesia Challenge or National Monitoring programs*

Indicator	Lead Party	Methodology	Frequency
<i>Number of leaders participating in or supporting Plan</i>	<i>Coordinator</i>	<i>Tally of stakeholders participating in events</i>	<i>Monthly</i>
Number of enforcement actions with successful fines	Coordinator/State Administrative Staff	Count of daily logs and records	Monthly
Number of fires	Coordinator / Conservation Officers	Visual tally	Monthly
Number of permits	Coordinator / State administrative staff	Count of records	Monthly
Water quality- turbidity	EQPB/PICRC	WiSci	Annual, plus at least once per year after an extreme rain event
Water flow - cubic ft/sec	EQPB/PICRC	WiSci	Annual, plus at least once per year after an extreme rain event
Number of areas with exposed soil	PALARIS/Coordinat or	Visual census from field visits and digital maps	Annual

Indicator	Lead Party	Methodology	Frequency
Extent and square area of forest	PALARIS/Coordinator	Digital map estimated with input from visual census	Annual
Amount of trash collected from conservation areas, number of areas where trash is collected	Conservation Officers	Count of bags collected	Annual
<i>Percent buy-in/ support for OSCA</i>	<i>Year 1 - PICRC; Year 5 - Coordinator</i>	<i>Socioeconomic survey</i>	<i>Year 5</i>
<i>Number of stakeholder groups participating</i>	<i>Coordinator</i>	<i>Tally of stakeholders participating in events</i>	<i>Monthly</i>
Number of community members participating	Year 1 - PICRC; Year 5 - Coordinator	Socioeconomic survey	Year 5
Percent stakeholders responding yes to questions about hunting	Year 1 - PICRC; Year 5 - Coordinator	Socioeconomic survey	Year 5
Number of enforcement actions against poachers	Coordinator/Conservation Officers	Count of daily logs	Monthly
Area affected by invasive species	Coordinator	Visual census from field visits	
<i>Population of birds</i>	<i>BNM</i>	<i>National Bird Monitoring method</i>	<i>Monthly</i>
<i>Population of fruit bats</i>	<i>BNM/PICRC</i>	<i>National Bird Monitoring method</i>	<i>Annual</i>
<i>Native bird diversity maintained</i>	<i>BNM</i>	<i>National Bird Monitoring Method</i>	<i>Monthly</i>
Number of mangrove trees	PICRC	PICRC Method	Annual
Population of mangrove crabs and clams	PICRC	PICRC Method	Annual
<i>Coral and fish diversity and populations</i>	<i>PICRC</i>	<i>PICRC Method</i>	<i>Annual</i>
Tree diversity	Forestry	Plot method	Year 5
Presence/absence of seedlings	Forestry	Plot method	Year 5
Percent buy-in/support for regulations	Year 1 - PICRC; Year 5 - Coordinator	Socioeconomic survey	Year 5
Number of visitors	Coordinator/Tour guides	Basic count of visitors	Monthly
Amount of income generated from site	State administrative personnel	Tally of income	Monthly
NGO Charter signed	Coordinator	Copy of charter	Year 5