

**Kerradel Conservation Network  
Management Plan  
2011-2016  
*April 5, 2011 Draft***



**Ngaraard State, Republic of Palau**

Prepared by the 7-member volunteer Kerradel Planning Team  
with assistance from the Palau Conservation Society



Funding provided by the UK Darwin Initiative through BirdLife International, The Nature Conservancy, The David & Lucile Packard Foundation through the Ecosystem-Based Management (EBM) Project, and Palau's Sustainable Land Management (SLM) Project through the Office of PALARIS.

## **Forward**

In our ongoing efforts to preserve, protect, and maintain our State's resources, it is the intent of the people and community of Ngaraard State to move forward in forging and adopting a management plan for our designated conservation areas.

This plan has been developed with the purpose of ensuring community support, participation, and involvement in the protection of our existing resources to ensure that we will be able to enjoy such resources for ourselves and for generations to come.

As we have been proactive in the development of State legislation to protect our resources, we are prepared to move forward in adopting a management plan that will put into effect our community's desire for comprehensive and practical actions that would enable the State to attain its goals and visions for achieving a balanced approach to managing our inherited resources.

It is with great pride that we have developed this management plan that will be utilized to ensure the continuity of our resources for years to come.

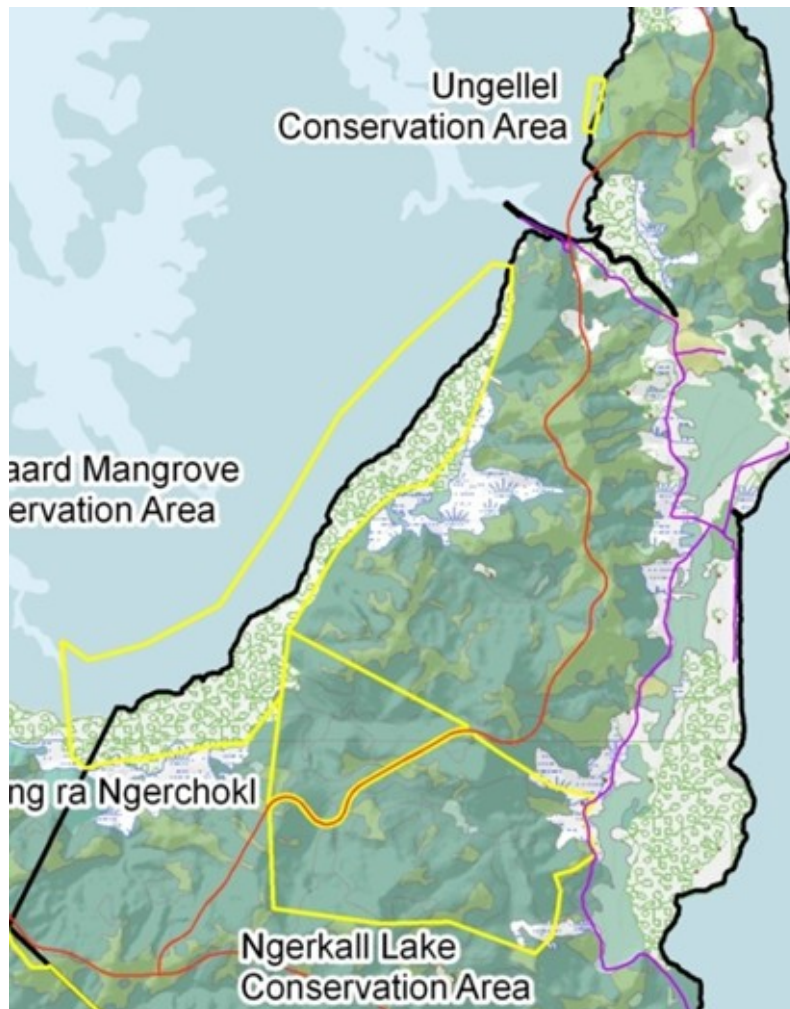
A handwritten signature in black ink, appearing to read 'L. Ulechong', written over a horizontal line.

Governor Laurentino Ulechong

# What this plan covers

## Kerradel Conservation Network

1. West Coast Mangrove Conservation Area
2. Ungellel Conservation Area
3. Ngerkall Lake and Metmellasech Watershed Conservation Area
4. Diong Era Ngerchokl Conservation Area



Quick Peek at the Plan

# Why manage these sites?

The Ngerkall lake and Metmellasech River Conservation Area serves as the water source for villages in the central and southern part of the state. The forest is healthy and has healthy populations of birds and plants. Between 1991 and 2005, Belochel increased in this site, but decreased in the rest of Palau. The site contains the unique Ngerkall Lake. The lake is habitat for endangered crocodile. However, soils in the area are prone to erosion and the site could be easily negatively impacted.

The Diong Era Ngerchokl Conservation Area includes the Ngerchokl cultural site, which is registered on the Palau National Register. The site is a target for ecotourism, but could be easily impacted by overuse. The site has a significantly large and unique swamp with endemic trees and has healthy bird populations.

The West Coast Mangrove Conservation Area is open for subsistence fishing, and thus serves as a source of food. In addition, the mangroves are adjacent to seagrasses and reef holes that are known to still harbor fish that are important economically. The Ungellel Conservation Area is a near pristine mangrove. Both could be impacted by overharvesting and illegal harvesting.

Quick Peek at the Plan

# What we want:

## *Our 20-year Vision:*

- We can still enjoy our marine and terrestrial resources
- Sustainable harvesting
- Income generation through ecofriendly tourism

## *Our 10-year Objectives:*

### **Land in the Kerradel Conservation Network is in good shape**

- Conservation Area boundary expanded to include full watersheds
- Restrictions on any areas that drain into Conservation Areas
- No fires
- No littering
- No earthmoving, farming, or impacts from areas outside of CA
- Bethania farm relocated
- Water bodies clean, erosion stopped, and bare areas restored

### **Laws, regulations, and plans are in place, implemented, and enforced**

- Regulations created and enforced by Conservation Officers
- Rulebreakers reduced by at least 50%
- Funding from multiple sources
- NGO/IGO created to help fundraise

### **People are aware and supportive of the Network**

- Information is available and used by leaders and the community
- At least 50% of the community supports the conservation areas

### **Natural resources (species) are healthy and can be sustainably used**

- Invasive species identified and controlled
- Permits in place for harvesting of mangrove trees, crabs, and clams
- Sustainable harvesting in the West Coast Mangrove Conservation Area
- Decline in illegal hunting of birds and illegal harvesting of plants
- Climate Change better understood and addressed by development of a Vulnerability Assessment and Action Plan

### **Ecotourism**

- Ngerchokl open for business, with guided tours
- 2 trails or tours built or established
- Medical plants incorporated into tours
- Camping (with fees)

Quick Peek at the Plan

# Who is in charge?

## Management Authority

This Management Plan proposes the creation of a Kerradel Conservation Network Board of Directors (the Board) that has the responsibility for implementing this Plan. The Board shall report to the Governor. The Governor shall appoint members to the Board, subject to approval from the State Legislature.

## Composition of the Board

- The Board shall have at least seven (7) volunteer members.
- Two *ex-officio* members are recommended to be from technical partners.
- The term shall be 2-4 years, with individual's terms overlapping each other.

## Duties of the Board

- *Self-organization* – The Board shall select a Chair and establish rules of procedures. The Board shall supervise its own attendance and take measures to ensure that meetings are held as often as necessary and well attended. The Board shall draft its own bylaws.
- *Hiring of staff* – The Board shall hire its own staff. Staff shall be state employees.
- *Supervision of staff* – The Board shall oversee its own staff.
- *Issuance of permits and permission* – The Board shall approve all requests for permits and permission for restricted activities.
- *Request expenditures* – The Board shall request expenditures of PAN funds and other funds in the separate Kerradel Conservation Network fund.
- *Fundraise* – The Board shall assist with fundraising, including from private donors, grants, and government sources.
- *Annual Reports and Work Planning* – The Board shall request annual reports, work plans, and budgets from the Coordinator, review annual reports, work plans and budgets, and submit reports to the Governor.
- *Yearly Management Plan Review* – The Board shall review yearly reports and write addendums to Management Plan as needed, and submit changes to the Governor.
- *5-year Management Plan Review* – The Board shall initiate a comprehensive review and planning effort at the five-year mark, and submit new plan to the Governor.

## Duties of the Governor

- *Establishment of the Board* – The Governor shall appoint members to the Board and shall call the first meeting of the Board.
- *Establishment of separate fund* – The Governor shall establish a subaccount for PAN funds and other funds that are directed solely to the Kerradel Conservation Network.
- *Approve and issue expenditures* – The Governor shall issue checks based on Board expenditure requests.
- *Track expenditures* – The Governor shall track expenditures and provide financial reports.
- *Budget requests* – The Governor shall include the yearly budget request for the Kerradel Conservation Network in his yearly request to the National Government.
- *Annual Reports and Work Planning* – The Governor shall approve annual reports, work plans and budgets as provided by the Board.
- *Yearly Management Plan Review* – The Governor shall approve yearly reports and addendums to Management Plan as provided by the Board.
- *5-year Management Plan Review* – The Governor shall review and approve new Management Plans as provided by the Board.

# What personnel are needed?

## Management Structure and Personnel

In addition to the Board and Governor, this Plan proposes to hire:

- Ngaraard Conservation Coordinator
- Conservation Officers (2 in 2011)
- Tour Guides (Number assessed and hired in Years 3 or later)
- JOCV or Peace Corps Volunteers to assist the Coordinator (Years 1-5)

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

- State Attorney
- State Administrative Staff
- State Maintenance Staff

Quick Peek at the Plan

# Zones:

## **No-impact Zones (*no entry, no take*)**

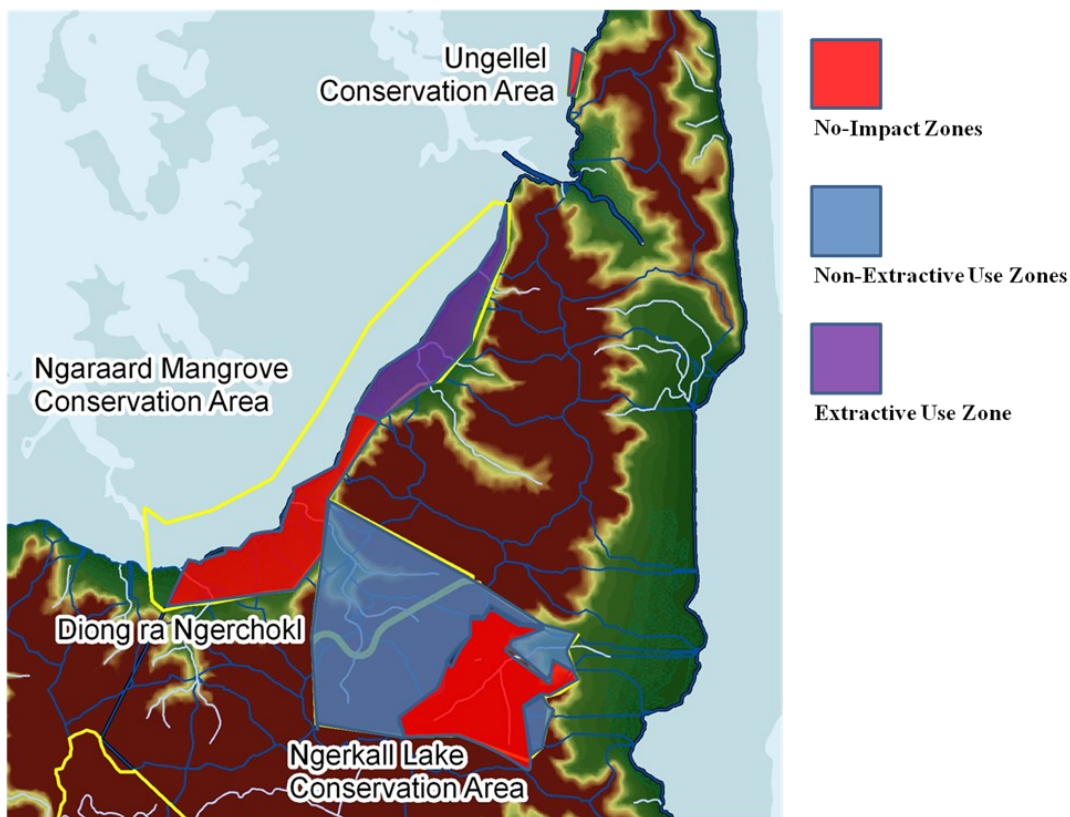
- Ungellel Mangrove Conservation Area
- Southern Portion of the West Coast Mangrove Conservation Area
- Watershed draining into Ngerkall Pond and Metmellasech dam

## **Extractive Use Zone (*sustainable harvesting allowed*)**

- Northern Portion of the West Coast Mangrove Conservation Area

## **Non-Extractive Use Zones (*education and ecotourism allowed*)**

- Diong Era Ngerchokl Conservation Area
- Remaining areas in Metmellasech Conservation Area not zoned as No-Impact Zones



Quick Peek at the Plan



# Restrictions:

## **ALWAYS PROHIBITED** (*Never allowed in any site*):

- 4-wheel driving, entry of vehicles in areas not associated with dam
- Alcohol (consumption and possession)
- Aquaculture
- Commercial tree cutting
- Excavating, earthmoving, or digging
- Leasing for agriculture or non-ecotour related development
- Littering / Dumping of trash
- Netfishing
- Personal pumping of freshwater
- Possession of airguns, chainsaws, or gillnets
- Residence on a permanent or long-term basis
- Smoking
- Spilling and/or dumping of pollutants
- Taking or harassing of Crocodiles and their eggs and nests

## **YOU MIGHT BE ALLOWED TO**, *depending on the Zone, and possibly with a permit*

- Camping (including fires, possession of fires, etc.) (*parts of Diong Era Ngerchokl and Metmellasech*)
- Commercial photography
- Ecotourism – development (*parts of Diong Era Ngerchokl and Metmellasech*)
- Ecotourism – visitation (*parts of Diong Era Ngerchokl and Metmellasech*)
- Educational activities
- Hunting of invasive animal species
- Planting of native species
- Removal of invasive plants
- Research
- Sustainable harvest of crabs, clams, and trees / Taking or removal of plants or animals (*north part of West Coast Mangrove*)

**A permit system will be developed in the first year**

Quick Peek at the Plan

# What work needs to happen?

## Quick Peek at the Plan

### **Administrative and Legal/Authoritative Strategies**

- *Administration is the major focus of this Management Plan in the first year (Year 1).* The first year will see that the Board is set up and organized.
- The second and third years are dedicated to developing more detailed regulations and permits if necessary, and to establishing a nongovernmental/intergovernmental organization (NGO/IGO) to assist with fundraising.
- The fourth and fifth years are dedicated to any administrative issues that are still outstanding, and to implementing the plan with appropriate oversight and accountability.

### **Education, Outreach, and Tourism Strategies**

- The first year includes introductory meetings and community meetings.
- *Education and Outreach activities are a major focus of this Management Plan in the second year (Year 2).* The mid-term years are for school and community programs.
- The fourth and fifth years include ongoing education and advertizing.

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

- The first year includes some community-based cleanups and simple activities such as placement of trash bins.
- *Maintenance activities are a major focus of this Management Plan in the third year (Year 3).* The mid-term years are dedicated to restoring ecosystems and finishing ecotour facilities at Diong Era Ngerchokl.
- The fourth and fifth years are for ongoing maintenance.

### **Enforcement and Surveillance Strategies**

- *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 monitoring systems, daily tracking logs, and development of paraphernalia to support enforcement (e.g. citation booklets).
- *Implementation of the Enforcement System is a major focus of this Management Plan in the second year and all following years (Year 2 and subsequent years).* These years include ongoing enforcement and surveillance.

### **Research and Monitoring Strategies**

- *Establishment of baseline conditions is a major focus of this Management Plan in the first year (Year 1).* This includes collection of existing data and implementation of a socioeconomic survey.
- The mid-term years include regular monitoring and discrete research projects that build understanding of the Conservation Areas.
- *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.

# First year costs:

Activity	Category	Year 1 Cost (US\$)
Hire a coordinator and Conservation Officers	Advertising	300
	<b>TOTAL ADVERTISING</b>	<b>300</b>
Annual work plans and management plan review, annual reports	Consultant - Technical assistance	1000
Socioeconomic survey, monitoring	Consultant - Technical assistance	1000
Capacity building for staff	Consultant - Technical assistance	2000
Daily logs and tracking system (fines, citations)	Consultant - Technical assistance	1000
Permit system and zones for camping and allowable fires in campsites developed, Permit system for harvesting	Consultant - Technical assistance	2000
Communications plan	Consultant - Technical assistance	1000
	<b>TOTAL CONSULTING</b>	<b>7000</b>
Non-profit intergovernment organization (IGO) registration fee	Fee	500
	<b>TOTAL FEES</b>	<b>500</b>
Meetings with partners in Koror	Gasoline	600
Meetings with partners/stakeholders, field trips and tours	Gasoline	5000
Conservation Officers monitor sites and enforce laws and regulations	Gasoline	5000
	<b>TOTAL GASOLINE</b>	<b>10600</b>
Community meetings, signing ceremony, meetings with leaders, meetings with partners, NSPLA joint meetings, consultations about farm, etc.	Meetings/Food	2500
	<b>TOTAL MEETINGS/FOOD</b>	<b>2500</b>
Trash bins, trash cleanup, monitoring supplies, stream cleanup, trail maintenance	Supplies	2800
	<b>TOTAL SUPPLIES</b>	<b>2800</b>
Tours for the community, Enforcement, meetings, etc.	Vehicle	13000
	<b>TOTAL VEHICLE</b>	<b>13000</b>
Personnel	Coordinator	18000
Personnel	Conservation Officer 1	9000
Personnel	Conservation Officer 2	9000
Personnel	State Attorney	5000
Personnel	JOCV/Peace Corps	2400
	<b>TOTAL PERSONNEL</b>	<b>43400</b>
Administration and Office Supplies (17%)	Administration	13700
	<b>TOTAL ADMINISTRATION</b>	<b>13700</b>
<b>TOTAL</b>	<b>TOTAL FIRST YEAR COST</b>	<b>US\$94,800</b>

Quick Peek at the Plan

## Introduction

Ngaraard has five conservation areas with discrete boundaries and a managed coastal area (beach and nearshore waters). In addition, all marine waters under Ngaraard State jurisdiction were placed under the control of the Governor (NSPL No. 3-4) as a marine life conservation area.

The five conservation areas with discrete boundaries are:

- West Coast Mangrove Conservation Area (also called Ngaraard State Conservation Area Set Aside in NSPL 4-4; and Ngaraard Mangrove Conservation Area on maps from PALARIS), NSPL 4-4, June 1994<sup>1</sup>
- Ungellel Conservation Area, NSPL 7-13, July 2007
- Ngerkall Lake and Metmellasech Watershed Conservation Area, NSPL 7-25, December 2008
- Diong Era Ngerchokl Conservation Area, NSPL 7-25, December 2008
- Ongiil Conservation Area, December 2010

A number of traditional and/or legislative restrictions apply to the managed coastal area, which includes the beach and nearshore waters on the East Coast of Ngaraard, including restrictions on driving, use of jet skis, and fishing methods (e.g. NSPL 7-20, 2008, restricting set netting).

The Ngaraard State Conservation Act of 2008, NSPL 7-25, specifically mandated the creation of a management plan detailing and enumerating the types of activities permissible within Ngaraard's Conservation areas.

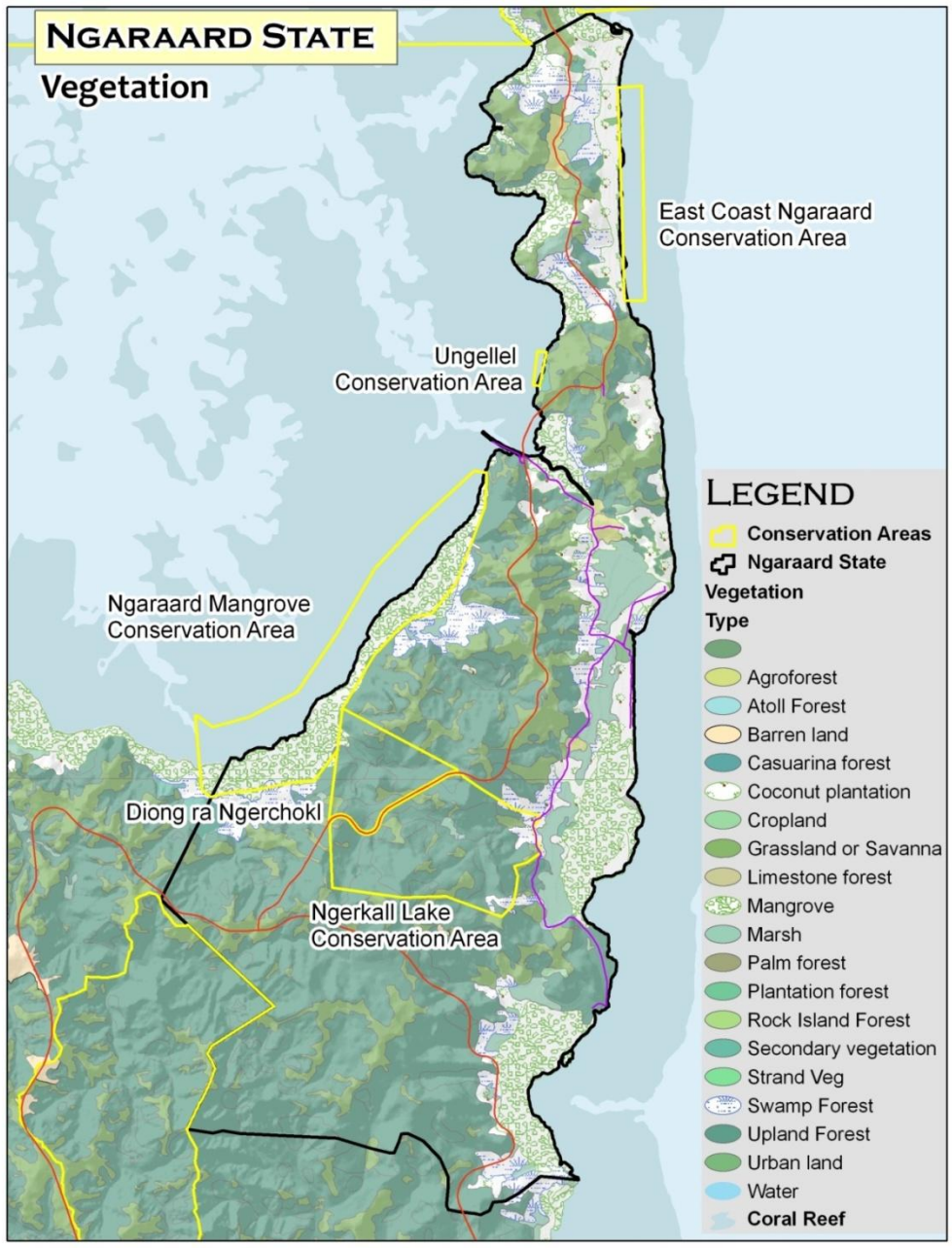
**This management plan covers the four conservation areas with discrete boundaries that were established by law by June 2010, when the planning process began.** Because these conservation areas are linked ecologically and socioeconomically, they are termed the Kerradel Conservation Network. This Management Plan focuses on conservation areas with discrete boundaries to ensure consistency with requirements in the Palau Protected Areas Network (PAN), which includes a criterion requiring clear boundaries without disputes.

### **Kerradel Conservation Network (Figure 1)**

- 1. *West Coast Mangrove Conservation Area***
- 2. *Ungellel Conservation Area***
- 3. *Metmellasech Conservation Area***
- 4. *Diong Era Ngerchokl Conservation Area***

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<sup>1</sup> Maps of this conservation area as provided by the Palau Automated Land and Resource Information System (PALARIS) show the boundary extending into the nearby reef and seagrass bed. However, NSPL 4-4 specifically mentions "the wetlands area being the entire Mangrove Area." There is no mention of the adjacent marine waters. There is also no delineation on the topographic map that is attached to NSPL 4-4. Therefore this Management Plan treated the Mangrove Conservation Area as having boundaries that included only the mangroves themselves. This varies from the maps provided by PALARIS.



**Figure 1.** Kerradel Conservation Network within Ngaraard State. The Network includes the West Coast Mangrove Conservation Area (on this map labeled as Ngaraard Mangrove Conservation Area), Ungellel Conservation Area, Diong Era Ngerchokl Conservation Area, and Ngerkall Lake and Metmellasech Watershed Conservation Area. The East Coast Conservation Area was not included in this Plan, as explained in the text. (Map provided by PALARIS).  
 \* In this Management Plan, the boundary of the West Coast Mangrove Conservation Area is treated as the exact boundary of the mangroves, and does not include the adjacent waters. See Footnote 1. The map provided by PALARIS treats extra area as being part of the Conservation Area, which this Management Plan does not. PALARIS has the only maps of Conservation Areas currently publicly available.

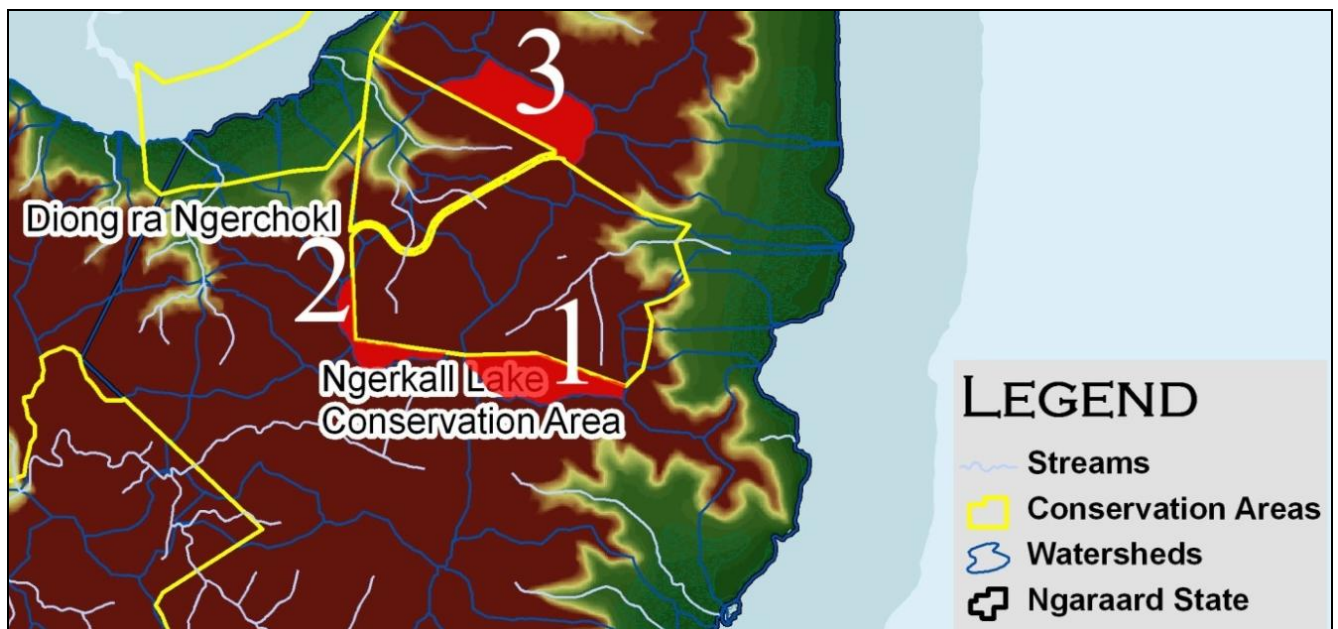
This Management Plan describes the protection and use of the Kerradel Conservation Network. It gives a background to the Network and its natural and cultural resources. It outlines the main threats to the quality and integrity of the Network and details the actions and prohibitions necessary to mitigate these threats.

The completion of this Management Plan in April 2011 also coincided with the submission of Ngaraard’s application to join the Palau Protected Area Network (PAN). The PAN application sought to establish the four conservation areas in the Kerradel Conservation Network as a PAN site.

#### **Legislative conflicts, if any**

There is a legislative conflict between this Plan and the existing conservation area legislation. NSPL 7-25 excludes from protection 10-meter zones (“exclusion zone”) adjacent to the Compact Road along the entire length of the Diong Era Ngerchokl and Metmellasech Conservation Areas and along the old road from Ngkekklau to Ulimang along the eastern border of part of the Metmellasech Conservation Area. These exclusion zones drain into the conservation areas and are on high-slope areas. Sediment and pollution may enter the conservation areas from these exclusion zones. **This Plan recommends strict guidelines for any land use in these exclusion zones (See Appendix 6).**

There is a conflict between the boundaries of the terrestrial conservation areas and the spirit of the legislation that established them. NSPL 7-25 lists the boundaries as “established and identified to protect the Ngaraard State watersheds.” However, the boundaries were established by drawing straight lines between coordinates. This means that portions of the watersheds draining into Ngerkall Lake, Metmellasech dam, and Ngerchokl Stream are not protected as part of the conservation areas (Figure 2). Thus, **this Plan recommends protection for the entire watershed (See Appendix 6).**



**Figure 2.** Watershed boundaries and Conservation Area boundaries. **Area 1** drains into the Ngerkall Lake and Metmellasech Dam, and is not included in the Conservation Area. **Areas 2 and 3** drain into Ngerchokl Stream and are not included in the Conservation Area. (Modifications made to map provided by PALARIS).

This Plan was drafted within the context of the existing legislation, and the allowable activities in the legislation are included in this Plan. This Management Plan relies on the authority of NSPL 7-25 Section 5a, which states “Unless

authorized under this act” and Section 6, which dictates that a Management Plan will detail and enumerate the types of activities permissible within the Conservation Areas, pursuant to Section 5.

## **Management of the Kerradel Conservation Network**

### **Part A. Rationale and desires behind management**

The management of the Kerradel Conservation Network 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 (10 years).

#### **20-year Vision**

By 2031, the people of Ngaraard State will continue to enjoy their marine and terrestrial resources in the Conservation Areas, through sustainable harvesting practices and income generated from their natural, historical, and cultural resources based on a sustainable, eco-friendly tourism industry.

#### **10-year Management Goals**

- 1) By 2021, the laws, regulations, and plans that govern the Kerradel Conservation Network are effectively implemented and enforced.
- 2) By 2021, Ngaraard’s Conservation Areas and their lands will be maintained for citizens and visitors to enjoy by emphasizing their economic and social value to the community.
- 3) By 2021, education and awareness programs promoting the value of conservation areas to the people of Ngaraard are developed and implemented.
- 4) By 2021, Ngaraard’s natural resources and species are healthy and abundant and are able to provide for the subsistence use of her citizens
- 5) By 2021, the development of eco-friendly programs for Ngaraard’s Conservation Areas benefits the people of Ngaraard State and enhances Palau’s tourism industry.

These goals and their relevant objectives implement many of the short-term (1-5 years) goals and recommendations from the Ngaraard Master Plan. In particular, Goals 1 to 4 here address many of the recommendations in the Master Plan Section 4.5 (Environmental and Cultural Resource Management), including 1) public and visitor education, 2) management actions to preserve water quality in the Metmellasech, and 3) development of a nature trail system. In addition, Goal 5 of this Management Plan, and its related objectives, address several recommendations of the Master Plan’s Eco-Tourism recommendations, including establishment of a local body tasked with developing and implementing user fees. Full implementation of this Management Plan will achieve many of the goals in the Master Plan.

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

### **Management Authority**

This Management Plan proposes the creation of a Kerradel Conservation Network Board of Directors (the Board) that has the responsibility for implementing this Plan. The Board shall report to the Governor.

The Governor shall appoint members to the Board, subject to approval from the State Legislature.

#### **Composition of the Board**

- The Board shall have at least seven (7) volunteer<sup>2</sup> members.

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<sup>2</sup> The Board is established initially as a volunteer Board. However, subsequent reviews of this plan should assess whether payment for Board members is feasible and/or necessary.

- Two *ex-officio* members are recommended to be from technical partners.
- The term shall be 2-4 years, with individual's terms overlapping each other.

#### Duties of the Board

- *Self-organization* – The Board shall select a Chair and establish rules of procedures. The Board shall supervise its own attendance and take measures to ensure that meetings are held as often as necessary and well attended. The Board shall draft its own bylaws.
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#### Management Structure and Personnel

In addition to the Board and Governor, this Plan proposes to hire:

1. Ngaraard Conservation Coordinator
2. Conservation Officers (2 in 2011)
3. Tour Guides (Number assessed and hired in Years 3 or later)
4. JOCV or Peace Corps Volunteers to assist the Coordinator (Years 1-5)

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

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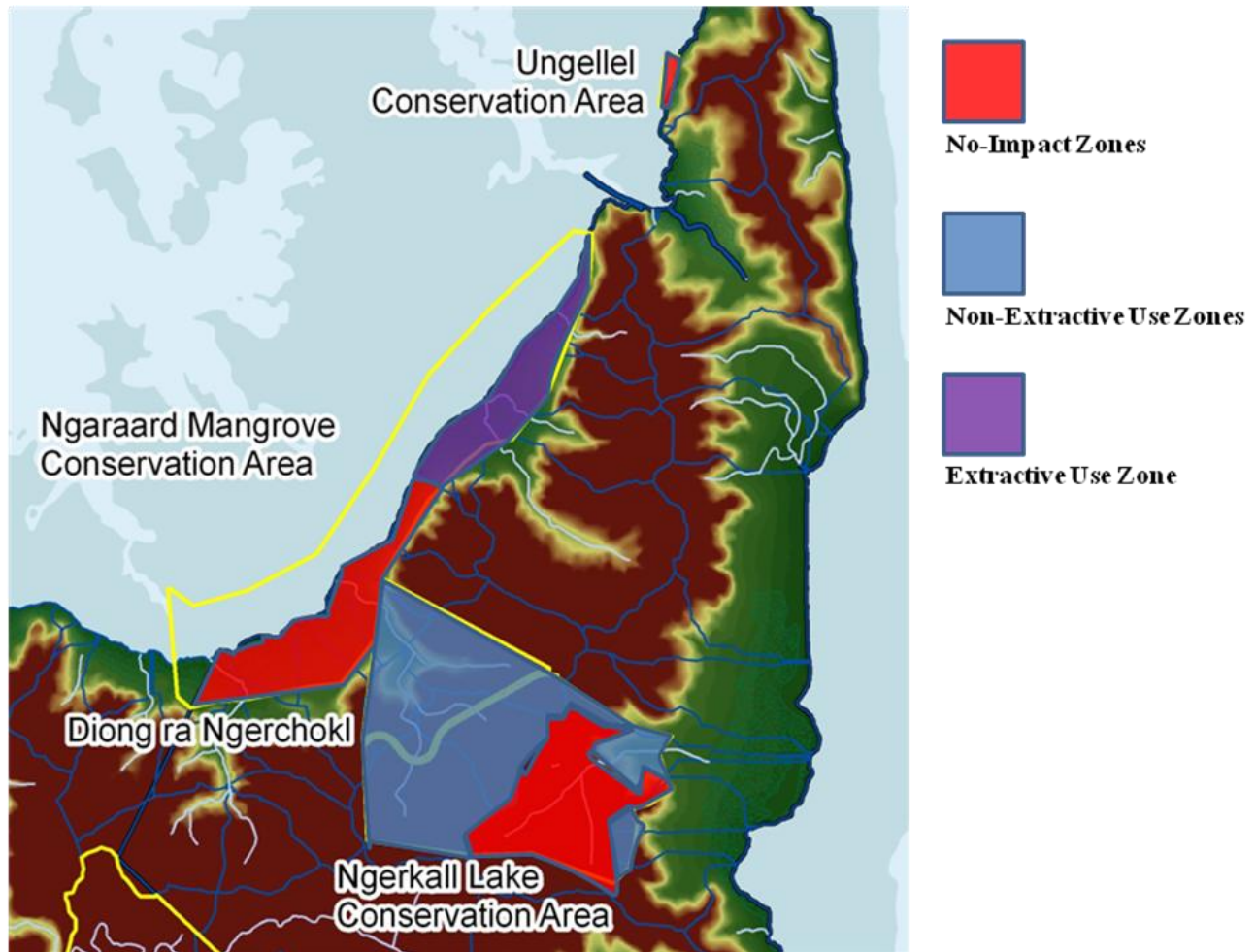
Appendix 2 lists roles and responsibilities of all authorities and personnel involved in this Management Plan.

### **Activity Restrictions and Permits**

#### **Zones**

This management plan includes the following zones (Figure 5):

1. No-impact Zones
    - a. Ungellel Mangrove Conservation Area
    - b. Southern Portion of the West Coast Mangrove Conservation Area
    - c. Watershed draining into Ngerkall Pond and Metmellasech dam
  2. Extractive Use Zone
    - a. Northern Portion of the West Coast Mangrove Conservation Area
  3. Non-Extractive Use Zones
    - a. Diong Era Ngerchokl Conservation Area
    - b. Remaining areas in Metmellasech Conservation Area not zoned as No-Impact Zones
- If changes to the zones are necessary, the Board shall make recommendations for changes to the Governor and Legislature (See Appendix 6).



**Figure 5.** Zones in the Network. Boundaries of zones are approximate.

#### **Rationale for these zones**

- The legislation establishing the Ungellel Mangrove Conservation Area establishes the area as a no-entry zone. Additionally, because the site is in view of the Ngaraard State Office and other public areas, it is feasible to maintain the area as a No-impact Zone.
- The legislation establishing the West Coast Mangrove Conservation Area specifically allowed sustainable use in the conservation area. However, the Planning Team determined that it would be prudent to set aside some portion of this mangrove area as no-entry and no-take to minimize human impacts and offer refugia to animals and plants. The Planning Team sought technical advice from individuals with expertise in mangroves (S. Victor, P. Colin, and A. Kitalong). S. Victor (TNC, 2010) suggested that a closed zone extend roughly from the center of the area all the way to the Ngardmau border. His rationale was that this area of mangrove was adjacent to reef with reef holes and areas of deep water. Reef fish were likely to use these deep areas and thus also likely to use the adjacent mangrove. The border of this zone was placed at the Taoch, because it can be distinguished by users. The remaining mangrove not zoned as No-impact was zoned for extractive use in accordance with the law.
- Water bodies were selected as Number 1 Priority targets. The Planning Team decided to minimize impacts to water bodies by restricting all actions in the watershed draining into them.
- The legislation establishing the Diong Era Ngerchokl and Metmellasech Conservation Areas stated its purpose as the “continued sustainable use and enjoyment” of the area but also prohibited removal of

vegetation (with the exception of invasive species). Therefore the Planning Team created a Non-Extractive Use Zone for all areas not zoned as No-Impact.

**Additional Planning necessary: Additional Zoning**

1. Within two years of implementation of this Management Plan, the Board will recommend specific zones for camping and/or campgrounds within the Non-Extractive Use Zone. The Board may seek technical expertise within the two year period to help guide its decision.
2. Within two years of implementation of this Management Plan, the Board shall analyze the Extractive Use Zone and determine if any changes are necessary. The Board may seek technical expertise within the two year period to help guide its decision.

## Prohibited, Restricted, and Allowable Activities

Tables 2 and 3 list prohibited, restricted, and allowable activities in all zones. Appendix 3 repeats this information, but lists information by zone.

*Table 2. Restrictions by Activity - Terrestrial Conservation Areas*

Activity	No-Impact Zone	Non-Extractive Use Zone	
	Watershed draining into Ngerkall Pond and Metmellasech Dam	Diong Era Ngerchokl Conservation Area	Remaining portions of Metmellasech Conservation Area not zoned as No-Impact Zones
4-wheel driving, entry of vehicles in areas not associated with dam	Prohibited	Prohibited	Prohibited
Alcohol (consumption and possession)	Prohibited	Prohibited	Prohibited
Camping (including fires, possession of fires, etc.)	Prohibited	Allowable with permit/permission	Allowable with permit/permission
Commercial photography	Allowable with permit/permission	Allowable with permit/permission	Allowable with permit/permission
Cutting trees	Prohibited	Prohibited	Prohibited
Ecotourism – development	Prohibited	Allowable with permit/permission	Allowable with permit/permission
Ecotourism – visitation	Allowable with permit/permission	Allowable with permit/permission	Allowable with permit/permission
Educational activities	Allowable with permit/permission	Allowable - No permit/permission necessary	Allowable - No permit/permission necessary
Enforcement	Allowable - No permit/permission necessary	Allowable - No permit/permission necessary	Allowable - No permit/permission necessary
Excavating, earthmoving, or digging	Prohibited	Prohibited	Prohibited
Hunting of invasive animal species	Allowable with permit/permission	Allowable with permit/permission	Allowable with permit/permission
Hunting of native animal species	Prohibited	Prohibited	Prohibited
Leasing for agriculture or non-ecotour related development	Prohibited	Prohibited	Prohibited
Littering / Dumping of trash	Prohibited	Prohibited	Prohibited
Maintenance of dam, including possession of associated vehicles	N/A	N/A	Allowable - No permit/permission necessary
Personal pumping of freshwater	Prohibited	Prohibited	Prohibited
Planting of native species	Allowable with permit/permission	Allowable with permit/permission	Allowable with permit/permission
Possession of airguns and/or chainsaws	Prohibited	Prohibited	Prohibited

Regular Monitoring	Allowable - No permit/permission necessary	Allowable - No permit/permission necessary	Allowable - No permit/permission necessary
Removal of invasive plants	Allowable with permit/permission	Allowable with permit/permission	Allowable with permit/permission
Research	Allowable with permit/permission	Allowable with permit/permission	Allowable with permit/permission
Residence on a permanent or long-term basis	Prohibited	Prohibited	Prohibited
Smoking	Prohibited	Prohibited	Prohibited
Spilling and/or dumping of pollutants	Prohibited	Prohibited	Prohibited

Table 3. Restrictions by Activity – Marine/Mangrove Conservation Areas

Activity	No-Impact Zone		Extractive Use Zone
	Ungellel Mangrove Conservation Area	Southern Portion of West Coast Mangrove Conservation Area	Northern Portion of West Coast Mangrove Conservation Area
Aquaculture	Prohibited	Prohibited	Prohibited
Commercial photography	Allowable with permit/permission	Allowable with permit/permission	Allowable with permit/permission
Commercial tree cutting	Prohibited	Prohibited	Prohibited
Educational activities	Allowable with permit/permission	Allowable with permit/permission	Allowable - No permit/permission necessary
Enforcement	Allowable - No permit/permission necessary	Allowable - No permit/permission necessary	Allowable - No permit/permission necessary
Netfishing	Prohibited	Prohibited	Prohibited
Planting of native species	Allowable with permit/permission	Allowable with permit/permission	Allowable - No permit/permission necessary
Possession of chainsaws	Prohibited	Prohibited	Prohibited
Possession of gillnets	Prohibited	Prohibited	Prohibited
Regular Monitoring	Allowable - No permit/permission necessary	Allowable - No permit/permission necessary	Allowable - No permit/permission necessary
Research	Allowable with permit/permission	Allowable with permit/permission	Allowable with permit/permission
Spilling/dumping of pollutants and trash	Prohibited	Prohibited	Prohibited
Sustainable harvest of crabs, clams, and trees / Taking or removal of plants or animals	Prohibited	Prohibited	Allowable with permit/permission
Taking or harassing of Crocodiles and their eggs and nests	Prohibited	Prohibited	Prohibited

#### Restricted Activities Requiring Permit/Permission

The following activities may require a permit or permission, depending on zone:

- Camping (including fires, possession of fires, etc.)

- Commercial photography
- Ecotourism – development
- Ecotourism – visitation
- Educational activities
- Hunting of invasive animal species
- Planting of native species
- Removal of invasive plants
- Research
- Sustainable harvest of crabs and trees / Taking or removal of plants or animals

**Additional Planning necessary: Developing a Permit/Permission System**

During the first year of implementation, the Board will implement a simple permission system for restricted activities requiring permit/permission. Permission shall be documented on paper (either with letters or internal memos) and have at least one signature from a Board Member.

During the first year the Board shall seek technical expertise for developing a permit system. In particular, the Board shall seek technical expertise regarding the following points:

- Cost of permit
- Timing/Duration of permit
- Number of people covered by permit
- Number of days covered by permit
- Species for harvest allowed by permit
- Number/Amount of harvest/taking allowed by permit
- Method(s) of harvest/taking allowed by permit
- Process for applying for and issuing permits
- Process for monitoring and assessing fees/fines for permits

**Management Objectives**

The Planning Team analyzed each target-based and process-based threat to hypothesize underlying causes of those threats. This was done during a two-meeting brainstorming effort. Then, the Planning Team identified possible solutions to each threat or underlying cause. This table is included in Appendix 4 as the Threat-Cause-Solution table.

The Planning Team then drafted objectives for each goal, cross-referencing against the Threat-Cause-Solution Table and the Vision. Objectives were first written to directly counter threats. Then the Planning Team assessed its Goals and Vision and wrote additional objectives that were not specifically related to threats, but which would help achieve the Vision. Thus objectives in this Plan address both threats to biodiversity and sustainable development issues.

**Goal 1. By 2021, the laws, regulations, and plans that govern Ngaraard Conservation Areas are effectively implemented and enforced**

- Objective 1-1. By January 2012, the Board has identified grant sources and technical assistance by coordinating with other agencies.
- Objective 1-2. By June 2012, regulations that effectively manage impacts of activities in conservation areas and areas bordering the conservation area and address outside non-compliance are developed and enforced

- Objective 1-3. By June 2012, a non-profit intergovernment organization has been established and is able to fundraise
- Objective 1-4. By December 2016, there will be at least one grant secured to establish Ngerchokl as an eco-tourist site to generate income for the state.
- Objective 1-5. By December 2015, non-compliance offenders will be reduced by 50%.

**Goal 2. By 2021, Ngaraard’s Conservation Areas and their lands will be maintained for citizens and visitors to enjoy by emphasizing its economic and social value to the community**

- Objective 1-1. By December 2013, there are no fires in the Conservation Areas.
- Objective 1-2. By December 2016, littering in all conservation areas and roads leading to those areas will be reduced by 95%.
- Objective 1-3. By December 2016, there is no earthmoving or farming in the exclusion zone adjacent to the Conservation Area (10 m zone adjacent to roads)
- Objective 1-4. By December 2016, the Bethania Farm has been relocated outside the Conservation Area.
- Objective 1-5. By December 2016, water bodies have been restored and erosion mitigated.

**Goal 3. Education and awareness programs promoting the value of conservation areas to the people of Ngaraard are developed**

- Objective 3-1. By December 2012, an awareness packet will be available for leaders, community, and visitors.
- Objective 3-2. By December 2016, 50% of community survey respondents support the conservation areas.

**Goal 4. Ngaraard’s natural resources and species are healthy and abundant and are able to provide for the subsistence use of her citizens**

- Objective 4-1. By December 2012, the types and locations of invasive species will be identified.
- Objective 4-2. By December 2012, a permitting system will be established and implemented for harvest of mangrove trees, crabs, and clams
- Objective 4-3. By December 2015, a Vulnerability Assessment and Action Plan for the Conservation Area is developed.
- Objective 4-4. By December 2016, community survey results show a 50% decline in illegal hunting and bird surveys show increasing or constant populations of birds
- Objective 4-5. By December 2016, reports and survey results show a 50% decline in illegal harvesting from the Conservation Area.
- Objective 4-6. By December 2016, invasive species will have been reduced by 90%

**Goal 5. The development of eco-friendly programs for Ngaraard’s Conservation Areas benefits the people of Ngaraard State and enhances Palau’s tourism industry**

- Objective 5-1. By March 2012, the established nature trail at Ngerchokl will be made available for guided tours.
- Objective 5-2. By December 2016, 2 trails or tours have been established for guided tours.
- Objective 5-3. By December 2016, areas for camping and hiking have been identified and promoted and are generating income.
- Objective 5-4. By December 2016, medicinal and endemic plants have been identified and incorporated into tours.

**Five-Year Strategic Plan, 2011-2016**

Activities were drafted to meet each objective. For each activity, the Planning Team listed the lead person and other people/groups who would be involved, the schedule, priority level (high/medium/low), milestones for long-term actions, and costs. Timing and priority levels for each activity were based on the priority level of the target and threat and an assessment of what could realistically be achieved in a certain timeframe.

### **Administrative and Legal /Authoritative Strategies**

Administrative Strategies include those activities necessary to authorize and establish the Kerradel Conservation Network and its Board. Strategies include enabling the Kerradel Conservation Network through adequate financing and legal structures.

- **Administration is the major focus of this Management Plan in the first year (Year 1).** The first year is dedicated to ensuring that the Board and staff are enabled and organized.
- The second and third years are dedicated to developing more detailed regulations and permits if necessary, and to establishing a nongovernmental/intergovernmental organization (NGO/IGO) to assist with fundraising.
- The fourth and fifth years are dedicated to fixing any administrative issues that are still outstanding, and to implementing the plan with appropriate oversight and accountability.

#### *Short-term Activities (1 Year)*

1. Governor establishes Board of Directors
2. Board hires personnel (Coordinator and Conservation Officers) and applies for JOCV or Peace Corps Volunteers
3. Coordinator, Board, and State Attorney develop permit systems
4. Traditional leaders declare a *bul* to support Management Plan
5. State Attorney drafts regulations:
  - a. Fines and consequences for non-compliance
  - b. Development in, near, or draining into Conservation Area
  - c. Ecotourism, including fees, permits, and liability waivers
6. Board explores options for NGO/IGO
7. Coordinator works with PALARIS to update digital maps to include true boundaries of conservation areas and zones.

#### *Medium-term Activities (2-3 Years)*

1. Board and other stakeholders establish NGO/IGO
2. NGO/IGO initiates fundraising activities

#### *Long-term Activities (4-5 Years)*

1. Board ensures funds are spent according to plans

#### Additional Planning needed:

- Yearly work plans
- Individual capacity building and professional development plans for new staff (particularly Coordinator, Conservation Officers, and State Finance Personnel reporting to the PAN). These plans will be developed as needed, when personnel are hired.

See Appendix 6 for additional recommendations on changes to existing laws.

### **Education, Outreach, and Tourism Strategies**

Education, outreach, and tourism strategies will raise awareness about the site or its ecological properties. Strategies include developing a school-based educational program, holding regular community-based educational events, advertising sites to tourists and visitors, and *in situ* education.

- The first year includes introductory meetings and community meetings.



- **Education and Outreach activities are a major focus of this Management Plan in the second year (Year 2).** The mid-term years are dedicated to local school and community programs.
- The fourth and fifth years include ongoing education and advertizing.

*Short-term Activities (1 Year)*

1. Board adopts Communications Plan
2. Board and Personnel conduct introductory community visits
3. Board initiates yearly community field trips
4. Board and NSPLA initiate yearly meetings
5. Coordinator holds introductory meetings with technical partners
6. Board and Coordinator initiate meetings and planning to relocate Bethania Farm

*Medium-term Activities (2-3 Years)*

1. Coordinator develops and implements education and awareness program on all topics, to include
  - a. Signs
  - b. School programs (in-school visits and field trips)
  - c. Community meetings
  - d. Development of materials for radio and television
  - e. Development and distribution of written materials
  - f. Websites
  - g. Targeted meetings
2. Board conducts yearly community field trips
3. Coordinator, Conservation Officers, and technical partners demarcate boundary
4. Conservation Officers / State maintenance personnel place signs at entrance to Diong Era Ngerchokl
5. Board and Coordinator hire and train tour guides for Diong Era Ngerchokl
6. Board develops long-term plan for multiple visitors (e.g. parking, accommodations, advertising)
7. Board establishes relationship with PVA and other tourism-related groups

*Long-term Activities (4-5 Years)*

1. Board conducts yearly community field trips
2. Conservation Officers / State maintenance personnel place signs inside Diong Era Ngerchokl (to identify sites, vegetation, etc.)
3. Board and Coordinator market Diong Era Ngerchokl to national and international audiences
4. Coordinator and Technical partners establish a kayak tour in the West Coast Mangrove Conservation Area

Additional Planning necessary:

- Communications Plan. This will include key messages and frequency and location of educational activities. This will be developed in the first year. The Coordinator will also undertake short-term planning as components of the educational plan are developed (e.g. number of classrooms visited, etc.).
- Long-term Plan for Multiple Visitors, to determine the number of tourists and visitors, other target audiences, and facilities desired.

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

Maintenance and on-the-ground strategies include activities that require physical labor for the benefit of establishing trails or restoring/maintain ecosystem health. Strategies include cleanups, removal of invasive/introduced plants, restoration of bare areas or replanting where necessary, development of the trail at Diong Era Ngerchokl, and construction of visitor facilities.

- The first year includes some community-based cleanups and simple activities such as placement of trash bins.
- ***Maintenance activities are a major focus of this Management Plan in the third year (Year 3).*** The mid-term years are dedicated to restoring ecosystems and finishing the trail at Diong Era Ngerchokl.
- The fourth and fifth years are dedicated to ongoing maintenance activities and completing other facilities at Diong Era Ngerchokl.

*Short-term Activities (1 Year)*

1. Community conducts annual volunteer trash cleanup (kinrohoshi)
2. Conservation Officers place trash bins along road
3. Community conducts annual volunteer cleanup (kinrohoshi) of Diong Era Ngerchokl Stream
4. Board initiates program to replace introduced ornamental plants at entrance to Diong Era Ngerchokl with native plants

*Medium-term Activities (2-3 Years)*

1. Community and Conservation Officers initiate restoration of bare areas (through planting, land cover, or diversions)
5. Community conducts annual volunteer cleanup of Ngerchokl and annual volunteer trash cleanup (kinrohoshi)
2. Coordinator drafts invasive species control or eradication plan
3. Technical partners provide training on invasive species control
4. Community and Conservation Officers remove invasive species from Conservation Areas at least once per year
5. Board and Coordinator work with community to replace ornamental plants at entrance to with native plants
6. State Maintenance personnel and Conservation Officers complete trail to Diong Era Ngerchokl, including expansion to waterfall
7. Community and Conservation Officers clean taoch in Extractive Use Zone of West Coast Mangrove Conservation Area

*Long-term Activities (4-5 Years)*

1. Community and Conservation Officers restore bare areas
2. Community conducts annual volunteer cleanup of Ngerchokl
3. Community conducts annual volunteer trash cleanup (kinrohoshi)
4. Community and Conservation Officers remove invasive species from Conservation Areas at least once per year
5. Tour Guides lead tours at Diong Era Ngerchokl
6. State maintenance personnel and Conservation Officers construct or place facilities placed near Diong Era Ngerchokl (e.g. toilets, summer house, picnic tables, benches)
7. Coordinator and Conservation Officers explore options for pig hunting (including tourism-based)

Additional Planning necessary:

- Invasive species control plan
- Short-term planning will be conducted by the Board and Coordinator to ensure that maintenance and on-the-ground activities such as cleanups and restoration are effective and efficient. This will occur throughout the year.

## **Enforcement and Surveillance Strategies**

Enforcement and surveillance strategies include those efforts to monitor users of the Conservation Areas for compliance with laws and regulations, and to stop non-compliance through policing of the areas and actual enforcement.

- ***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 monitoring systems, daily tracking logs, and development of paraphernalia to support enforcement (e.g. citation booklets).
- ***Implementation of the Enforcement System is a major focus of this Management Plan in the second year and all following years (Year 2 and subsequent years).*** These years include ongoing enforcement and surveillance.

### *Short-term Activities (1 Year)*

1. 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 development citation system/paperwork system necessary to support enforcement
3. Conservation Officers monitor conservation areas on a daily basis
4. Coordinator and Conservation Officers develop a daily surveillance and enforcement plan (including methods for reporting and enforcing non-compliance)
5. Board and Coordinator establish necessary partnerships (e.g. with National Police or National Fish & Wildlife) to ensure enforcement of all applicable laws.

### *Medium-term to Long-term Activities (2-5 Years)*

1. Conservation Officers enforce laws (to include apprehending perpetrators, checking permits, etc.)
2. Conservation Officers receive adequate training to be deputized.
3. Tour Guides and State personnel monitor permits and fees of visitors

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 to ensure that training, development of citations and paperwork, and other enforcement activities occur effectively and efficiently.

## **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.

- ***Establishment of baseline conditions is a major focus of this Management Plan in the first year (Year 1).*** This includes collection of existing data and implementation of a socioeconomic survey.
- The mid-term years include regular monitoring and discrete research projects that build understanding of the Conservation Areas.
- ***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.

#### Short-term Activities (1 Year)

1. Coordinator and Technical partners develop and implement socioeconomic survey to establish baseline conditions
2. Coordinator collects data and establishes baseline conditions from national monitoring of
  - a. Mangroves (PICRC)
  - b. Water (EQPB/PICRC)
  - c. Birds (BNM)
  - d. Forests (BNM/Forestry)
  - e. Bare areas (PALARIS)
3. Coordinator establishes monitoring system, collects data, and establishes baseline conditions through regular state monitoring of
  - a. Non-compliance or enforcement actions
  - b. Fires
  - c. Permits
  - d. Visitors
  - e. Trash/Visitor impacts
  - f. Income (fees, fines, all forms) generated from, by, and/or for site
  - g. Invasive species removed (area treated, number of animals removed during cleanups)
4. Coordinator and Board develop quarterly and annual reporting system to track activities and outcomes against objectives.
5. Coordinator works with technical partners and Governor/NSPLA to identify locations for relocating Bethania Farm

#### Medium-term Activities (2-3 Years)

1. Conservation Officers and other interested community members learn monitoring methods and implement biological monitoring
2. All partners continue biological monitoring
3. Coordinator and Board write quarterly and annual reports and distribute to all stakeholders.
4. Coordinator works with partners to conduct surveys to
  - a. Identify sources of sediment into water bodies
  - b. Identify types and locations of invasive species
  - c. Identify types and locations of medicinal plants
  - d. Catalog legends, stories, and cultural sites in Diong Era Ngerchokl
5. Board requests Bureau of Arts and Culture to catalog all unregistered sites
6. Coordinator conducts research for and develops training guide for Tour Guides on Ngerchokl
7. Boards contracts a Climate Change Vulnerability Assessment and Action Plan

#### Long-term Activities (4-5 Years)

8. At five years, Coordinator and technical partners repeat socioeconomic survey
9. Coordinator works with technical partners to analyze biophysical data
10. Coordinator and Board write quarterly and annual reports and distribute to all stakeholders.
11. Board commissions study to determine if second trail on land is viable
12. Board includes Climate Change Vulnerability Assessment and Action Plan in Management Plan review

#### Additional Planning necessary:

Climate Change Vulnerability Assessment and Action Plan in Management Plan

Appendix 5 includes more detail on the monitoring plan, including indicators of long- and short-term conservation success. Appendix 5a is the Evaluation Plan, noting indicators and milestones. Appendix 5b is the Monitoring Plan, for collecting indicator data.

## First Year Work Plan

Goal / Objective / Activity	General Strategy	Lead person	Who else involved	Q 1	Q 2	Q 3	Q 4	Priority	Milestones (if any)	Indicator(s) of success	YEAR 1 Cost (description)	YEAR 1 Cost (\$ estimate) (non-personnel)
<b>Goal 1. The laws, regulations, and plans that govern Ngarard Conservation Areas are effectively implemented and enforced</b>												
Governor establishes Board of Directors	Administrative	Governor		x				High		Board established - minutes/ bylaws/ resolutions		
Hire / identify a coordinator and Conservation Officers	Administrative	Board Chairperson		x				High	Job description advertised during Q1	Coordinator hired / Contract signed	Advertising	600
Reporting system established to track outcomes and activities against objectives	Administrative	Coordinator	Board	x				High		Data collected according to Monitoring and Evaluation Plan	Personnel	
Bul declared	Administrative	Traditional leaders			x	x	x	Low		Bul established	Meetings	100
Discrepancies between boundaries and maps resolved	Administrative	Coordinator	PALARIS		x	x	x	Low		Digital maps updated	Gasoline	100
Annual work plans developed and reviewed	Administrative	Coordinator	Consultant	x			x	High			Consultant - Technical assistance	1000
Capacity building for staff	Administrative	Board		x	x	x	x	Medium		Staff participate in training programs	Consultant - Technical assistance	2000
By January 2012, the Board has identified grant sources and technical assistance by coordinating with other agencies.								High		List of grant sources		
Identify and have meetings with partner agencies, groups, and technical assistance	Administrative	Coordinator	Chair of Board	x				High	Emails or minutes showing work	Google group started	Meetings	200
Hold introductory meetings with partners/stakeholders	Education	Coordinator	Chair of Board	x				High	Meetings with PCS, TNC, PICRC, Forestry, EQPB, BMR, OERC, MCT	Minutes / status reports to Board	Gasoline	3600
By June 2012, regulations that effectively manage impacts of activities in conservation areas and areas bordering the conservation area and address outside non-compliance are developed and enforced									Draft regulations developed	Regulations passed; less or no reports of non-compliance		

Goal / Objective / Activity	General Strategy	Lead person	Who else involved	Q 1	Q 2	Q 3	Q 4	Priority	Milestones (if any)	Indicator(s) of success	YEAR 1 Cost (description)	YEAR 1 Cost (\$ estimate) (non-personnel)
Regulations drafted on fines, fees, ecotourism, and development	Administrative	State attorney	Coordinator	x	x	x	x	High		Draft regulations in place	Personnel	0
By June 2012, a non-profit intergovernment organization has been established and is able to fundraise										IGO Charter passed		
Coordinator and Board explores options to establish a non-profit intergovernment organization (IGO) that can fundraise through such things as bi-weekly allotments.	Administrative	Coordinator	Board	x	x	x	x	High		Draft articles of incorporation and bylaws	Fee	500
By December 2015, non-compliance offenders will be reduced by 50%.										Number of reports reduced by 50% from baseline / survey		
Daily logs and tracking system (fines, citations) established	Enforcement	Coordinator	Conservation Officers / Technical advice		x	x	x	High	Baseline collected for Year 1; / Socioeconomic survey	Data reports / data	Technical assistance	1000
Daily surveillance plans developed	Enforcement	Conservation Officers	Coordinator		x	x	x	Medium		Plans available	Personnel	0
Conservation Officers monitor sites and enforce laws and regulations	Enforcement	Conservation Officers	Coordinator		x			High			Gasoline	3600
Partnerships established with Fish & Wildlife, etc.	Enforcement	Coordinator	Board			x		High		Discussions with partners	Meetings	100
<b>Goal 2. Ngaraard's Conservation Areas and their lands will be maintained for citizens and visitors to enjoy by emphasizing its economic and social value to the community</b>												
By December 2013, there are no fires in the Conservation Areas.										No fires (track Conservation Officers logs), PALARIS does yearly analysis of burned areas (against baseline), #fines declined		
Permit system and zones for camping and allowable fires in campsites developed	Administrative	Coordinator	Board				x	Low	Fee schedule established	Permit system incorporated into fliers	Technical assistance	1000
By December 2016, littering in all conservation areas and roads leading to those areas will be reduced by 95%.										Bags of trash / pounds of trash / number of cleanups necessary reduced. Socioeconomic survey		
Annual trash cleanup	Maintenance	Coordinator	Conservation Officers				x	Low	1 clean up per year	People participating	Refreshments / gas / gloves / trash bags	500

Goal / Objective / Activity	General Strategy	Lead person	Who else involved	Q 1	Q 2	Q 3	Q 4	Priority	Milestones (if any)	Indicator(s) of success	YEAR 1 Cost (description)	YEAR 1 Cost (\$ estimate) (non-personnel)
Trash bins along road (and make sure state picks up)	Maintenance	Coordinator	Conservation Officers			x		Low	1 can Ngerchokl - donated by Shell?	Trash can installed	Cost of trash can / paint / secure / rebar	500
Traditional leaders announce a bul for no littering in these areas	Enforcement	Coordinator	Board Chair				x	Low		Bul established	Community meeting	100
By December 2016, there is no earthmoving or farming in the exclusion zone adjacent to the Conservation Area (10 m zone adjacent to roads)									Legislation passed	No earthmoving / farming in area / Visual census		
NSPLA and Board hold joint meetings	Education	Coordinator	Governor / Board Chair	x				Medium	Meetings twice a year / Dialogue started immediately	Meetings are happening / minutes	Food	300
By December 2016, the Bethania Farm has been relocated outside the Conservation Area.									Letter of approval / letter of acceptance by Bethania	No farm inside / Visual census		
Meetings and Consultations to move farm	Education	Coordinator	Governor / Board Chair / Board of NPLA	x	x	x	x	High		Meeting minutes	Food / fuel	1200
Identify alternate locations for farm	Research	Coordinator	NPLA / Governor	x	x	x	x	High		Approval letter / map of alternate locations	Field work	1000
By December 2016, water bodies have been restored and erosion mitigated.									Kinrohoshi along the way; Mid-term sediment measures	Ngerchokl - removing vegetation; Metmellasch - sediment measures - natural state; bare areas covered		
Kinrohoshi - Annual volunteer cleanup of Diong Era Ngerchokl	Maintenance	Coordinator	Community		x			Medium	One clean up per year	Cleanups happen - kinrohoshi	Refreshments / gas / gloves / trash bags	500
<b>Goal 3. Education and awareness programs promoting the value of conservation areas to the people of Ngaraard are developed</b>												
By December 2012, an awareness packet will be available for leaders, community, and visitors.										Awareness packet produced, disseminated, materials circulated		
Communications plan drafted	Education	Coordinator	Consultant			x	x	High	Draft communications plan	Communications plan agreed	Contract	1000
By December 2016, 50% of community survey respondents support the conservation areas.									Socioeconomic survey - baseline	At least 50% of survey respondents support		

Goal / Objective / Activity	General Strategy	Lead person	Who else involved	Q 1	Q 2	Q 3	Q 4	Priority	Milestones (if any)	Indicator(s) of success	YEAR 1 Cost (description)	YEAR 1 Cost (\$ estimate) (non-personnel)
Tours for the community	Education	Coordinator	Governor / Conservation Officer			x	x	Medium		10 tours / targeted each county at least twice / sign up sheets	Transportation / Fuel / Vehicle	15000
Community meetings by county twice a year by the Board and Coordinator	Education	Coordinator	Board	x	x	x	x	High		Meetings and minutes	Food / Fuel	1200
<b>Goal 4. Ngaraard's natural resources and species are healthy and abundant and are able to provide for the subsistence use of her citizens</b>												
By December 2012, a permitting system will be established and implemented for harvest of mangrove trees and crabs										Permitting system in place, permits tracked and community knows and supports to permit system; mangrove trees and crabs maintained or increased		
Permit system for harvesting established	Administrative	Coordinator	State Attorney		x	x	x	High		Regulations passed; less or no reports of non-compliance	Technical assistance	1000
By December 2016, community survey results show a 50% decline in illegal hunting and bird surveys show increasing or constant populations of birds									Baseline collected for Year 1; / Socioeconomic survey	50% decline in hunting from socioeconomic survey; 50% decline in enforcement actions; increase or constant bird populations		
Establish fees and fines and regulations for non-compliance	Administrative	State attorney	Coordinator	x	x	x	x	High	Fines established	Regulations with fines and fees passed	Personnel	0
By December 2016, reports and survey results show a 50% decline in illegal harvesting from the Conservation Area.									Baseline collected for Year 1; / Socioeconomic survey	50% decrease in harvesting from socioeconomic survey, 50% decline in enforcement action		
Develop and implement socioeconomic survey and establish baseline conditions	Research	Coordinator	PICRC / Coordinator		x			High	Survey questions drafted	Surveys conducted, data entered, and reports	Partner costs	0
By 2016, invasive species will have been reduced by 90%									Baseline included in report	90% less area affected by invasive species		
Program to replace plants started (targeted education to community members who plant ornamentals)	Maintenance	Coordinator				x	x	High	Evidence of communications	Number of meetings, number of people interacted with	Meetings and food	200
Coordinate with NISC	Education	Coordinator	NISC			x	x	Medium	Initial communication	Number of NISC meetings attended, Number of activities with NISC participation	Gasoline	100



Goal / Objective / Activity	General Strategy	Lead person	Who else involved	Q 1	Q 2	Q 3	Q 4	Priority	Milestones (if any)	Indicator(s) of success	YEAR 1 Cost (description)	YEAR 1 Cost (\$ estimate) (non-personnel)
<b>Goal 5. The development of eco-friendly programs for Ngaraard's Conservation Areas benefits the people of Ngaraard State and enhances Palau's tourism industry</b>												
By March 2012, the established nature trail at Ngerchokl will be made available for guided tours.									Tour guides hired and training identified	Trail is completed, tour guides trained, tourists come to site		
Ongoing trail maintenance and expansion	Maintenance	State maintenance personnel	Conservation Officers				x	Low		Trail maintained and clean	Tools	300

**Total Non-Personnel Budget**

**37000**

## Budget

<b>Activity</b>	<b>Category</b>	<b>Cost (US\$)</b>
<i>Hire a coordinator and Conservation Officers</i>	Advertising	300
	<b>TOTAL ADVERTISING</b>	<b>300</b>
<i>Annual work plans and management plan review, annual reports</i>	Consultant - Technical assistance	1000
<i>Socioeconomic survey, monitoring</i>	Consultant - Technical assistance	1000
<i>Capacity building for staff</i>	Consultant - Technical assistance	2000
<i>Daily logs and tracking system (fines, citations)</i>	Consultant - Technical assistance	1000
<i>Permit system and zones for camping and allowable fires in campsites developed, Permit system for harvesting</i>	Consultant - Technical assistance	2000
<i>Communications plan</i>	Consultant - Technical assistance	1000
	<b>TOTAL CONSULTING</b>	<b>8000</b>
<i>Non-profit intergovernment organization (IGO) registration fee</i>	Fee	500
	<b>TOTAL FEES</b>	<b>500</b>
<i>Meetings with partners in Koror</i>	Gasoline	600
<i>Meetings with partners/stakeholders, field trips and tours</i>	Gasoline	5000
<i>Conservation Officers monitor sites and enforce laws and regulations</i>	Gasoline	5000
	<b>TOTAL GASOLINE</b>	<b>10600</b>
<i>Community meetings, signing ceremony, meetings with leaders, meetings with partners, NSPLA joint meetings, consultations about farm, etc.</i>	Meetings/Food	2500
	<b>TOTAL MEETINGS/FOOD</b>	<b>2500</b>
<i>Trash bins, trash cleanup, monitoring supplies, stream cleanup, trail maintenance</i>	Supplies	2800
	<b>TOTAL SUPPLIES</b>	<b>2800</b>
<i>Tours for the community, Enforcement, meetings, etc.</i>	Vehicle	13000
	<b>TOTAL VEHICLE</b>	<b>13000</b>
<i>Personnel</i>	Coordinator	18000
<i>Personnel</i>	Conservation Officer 1	9000
<i>Personnel</i>	Conservation Officer 2	9000
<i>Personnel</i>	State Attorney	5000
<i>Personnel</i>	JOCV/Peace Corps	2400
	<b>TOTAL PERSONNEL</b>	<b>43400</b>
<i>Administration and Office Supplies (17%)</i>	Administration	13700
	<b>TOTAL ADMINISTRATION</b>	<b>13700</b>
<b>TOTAL</b>	<b>TOTAL FIRST YEAR COST</b>	<b>US\$94,800</b>

## Capacity Building Plan

One of the internal strengths in Ngaraard is that there is currently high leadership support and involvement in conservation. Thus the state is currently able to begin implementation of this Plan, by establishing a Board.

Currently, the state lacks the funding to support a Coordinator and Conservation Officers. Thus, their employment is contingent on receipt of funds from the PAN or other sources. Once these funds are received, these positions can be filled. Another internal strength in Ngaraard is that there are already a number of people knowledgeable about conservation. Thus the state should have the internal capacity to fill these positions.

A newly hired Coordinator will need to build some capacity to understand and implement the Plan. As a member of BWA, Ngaraard State has access to networking and partnerships. **The Coordinator should immediately begin attending BWA meetings and shadowing BWA partners.**

As part of its facilitation 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. **Conservation Officers should also 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.

### Process for reviewing plans

The Coordinator shall be responsible for ensuring that biophysical and process-based monitoring occurs and that data is incorporated into annual reports. Based on yearly data, the Coordinator will draft annual work plans and forward these to the Board for review. If the annual work plans require changes to the Management Plan, the Coordinator shall develop a report detailing the changes and the rationale for the changes and forward this to the Board.

Once the Board has agreed to the yearly work plans and/or changes to the Management Plan, the changes will be forwarded to the Governor for review. Once the Governor has approved the changes to the Management Plan, it shall be forwarded to the Legislature for their action.

At the five-year expiration of this Plan, the Board shall develop a new Management Plan and seek approval from the Governor and Legislature.

### Conflict resolution

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

## **Additional Information**

### **Definition of Community**

For the purposes of this Management Plan, the definition of community includes all residents residing in Ngaraard's five villages, and those residents in Koror who maintain close ties to their families and land in Ngaraard. When this Plan refers to community activities, it assumes that activities will target all five villages, or that representatives of all five villages will be included in activities. 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 Planning Team 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 1 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 Kerradel Conservation Network was nominated to the Palau PAN for a number of reasons. Each conservation area in the Network includes an assemblage of native and endemic species, most of which are in a healthy state. In particular, between 1991 and 2005 the population of many of Palau's birds declined. However, in Ngaraard many of those same birds increased in population, indicating that the Ngaraard Conservation Network is a healthy refuge for these species. The Conservation Area System has some of Palau's most unique ecosystems, including one of Palau's only two freshwater lakes. Unlike Lake Ngardok, which is fed and drained by streams (Bright, 1979), Ngerkall lake is naturally dystrophic (acidic due to decomposition of organic matter *in situ*) and thus is unique in Palau. Research continues to show that mangroves are particularly important to marine and terrestrial environments in Palau (e.g. Victor, 2010). In 2011, the Kerradel Conservation Network had the largest block of protected mangrove in the country. The Kerradel Conservation Network also has important cultural sites. Conservation areas have strong community and leadership support, and threats are relatively few and most can be managed or mitigated.

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

The Kerradel Conservation Network has relatively few threats (compared to other conservation areas in Palau), and thus secondary pressures that exacerbate the impacts of climate change are few and the sites have low vulnerability. For the Metmellasech Conservation Area, there are only a few areas of savanna and bare areas and the soils are well-drained, thus the threats of sedimentation during extreme rainfall are minimal. Additionally, the fact that the state has natural water storage capacity in Ngerkall Lake gives Ngaraard some natural resilience to drought. The water intake for the Metmellasech dam is above the elevation that will be affected by a 3 to 4 meter rise in sea level. The ecotourism potential of Diong Era Ngerchokl and other tourist sites also increases the adaptive capacity of the Ngaraard community by introducing a diversity of income-generating possibilities. Although the two mangrove conservation areas have high exposure to sea level rise, there is no development behind the sites, so they may migrate upwards when sea level rises. Land behind these mangroves is difficult to access or partially protected.

### **Site Connectivity**

The four conservation areas are linked physically and ecologically. The Compact Road guides the boundaries of the Diong Era Ngerchokl and Metmellasech Conservation Areas. Although the Road generally followed the middle ridge in Ngaraard, there are a few areas where it bisects watersheds. Several portions of the Metmellasech Conservation Area drain into Ngerchokl Stream. The Diong Era Ngerchokl Conservation Area abuts the West Coast Mangrove Conservation Area, and Ngerchokl Stream drains directly into those mangroves. The two mangrove conservation areas, both on Ngaraard's west coast, also presumably are influenced by the currents that move along the west coast. Birds and crocodiles presumably use multiple conservation areas.

## **IUCN Categories**

Allowable and prohibited activities within the Kerradel Conservation Network vary with site. Thus the four discrete conservation areas fall under different IUCN Protected Area Categories.

West Coast Mangrove Conservation Area: **CATEGORY VI *Managed Resource Protected Area***: protected area managed mainly for the sustainable use of natural ecosystems. The area contains an unmodified natural mangrove system. Subsistence and sustainable harvesting are allowed, but will be managed to ensure long-term protection and maintenance of biological diversity.

Ungellel Conservation Area: **CATEGORY Ia: *Strict Nature Reserve***: protected area managed mainly for science. The Ungellel Conservation Area is a representative mangrove ecosystem with little to no current or potential human impact. It is strictly managed and only open to environmental monitoring.

Ngerkall Lake and Metmellasech Watershed Conservation Area: **CATEGORY VI *Managed Resource Protected Area***: protected area managed mainly for the sustainable use of natural ecosystems. The Area contains predominantly unmodified natural forest and wetland systems. The site is managed to ensure long term protection and maintenance of biological diversity, while allowing sustainable use of its water resources and vistas.

Diong Era Ngerchokl Conservation Area: **CATEGORY III *Natural Monument***: protected area managed mainly for conservation of specific natural or natural/cultural features. The Area contains the natural site (“footprints” in the stone) associated with the Ngerchokl legend. It is outstanding and unique because of its rarity and cultural significance.

## **Background Information**

### **Description of the Planning Process**

A Management Plan is mandated by NSPL 7-25. This Plan utilized many existing documents, and several activities were completed as part of the development of this Plan.

Ngaraard has a Master Plan (1999) that addressed a variety of issues in the state, including resource management and environmental protection. The purpose of the Master Plan was “to lay a foundation for guiding future growth in a sustainable manner that will increase the number and range of economic and employment opportunities for residents and improve their overall quality of life, while protecting the integrity of the natural environment.” In the Master Plan, the Metmellasech Watershed and the West Coast Mangrove Conservation Areas were zoned as District 1: Environmental Conservation. Passive recreation, research, and non-commercial subsistence uses are preferred uses for District 1. The Master Plan zoned much of the state, including parts of the Metmellasech and Diong Era Ngerchokl Conservation Areas, as District 2: Open Space/Recreation. Passive or active recreation, eco-tourism, and limited agriculture are preferred uses. This Management Plan is in line with the Master Plan. The vision, goals, and objectives listed in this Management Plan are consistent with the purpose or districts in the Master Plan.

In June 2010, natural resource agencies and the Ngaraard community participated in a three-night Conservation Action Planning (CAP) workshop. The workshop was led by The Nature Conservancy Micronesia Program and assisted by the Palau International Coral Reef Center, USDA Natural Resource Conservation Service, Babeldaob Watershed Alliance, Palau Conservation Society, and Sustainable Land Development/PALARIS. Sixty-one (61) residents from Ngaraard participated in the CAP, including the Governor, Traditional Chiefs, Speaker and other members of the Legislature, National Congress Delegate, representatives from traditional men’s and women’s groups and other community-based organizations, and other interested community members.

During the CAP, the community developed a state vision that called for sustainable development and wise use of resources through collaborative efforts, while maintaining a healthy ecosystem. The community identified eight

priority conservation targets: forests, water sources, wetlands, mangroves, seagrass beds, coral reefs, food fish, and historical and cultural sites. The community also developed a number of objectives and actions targeted at increasing fishing viability, decreasing erosion, and maintaining waterways.

In June 2010 the Governor of Ngaraard established the Kerradel Planning Team, with seven members. Members were selected to represent Ngaraard's five villages and the Governor's Office, Traditional Leaders, and State Legislature. The Planning Team began working with the Palau Conservation Society in July 2010 to draft this Management Plan. Through weekly meetings, three field visits, and discussions with community members in Ngaraard, the Kerradel Planning Team identified the content for this Plan. The Palau Conservation Society then put content from the Planning Team together with other existing information to draft the final Plan. The Kerradel Planning Team approved the final draft of the Management Plan in April 2011, after which it was sent to the Governor and Legislature for approval.

*Members of the Kerradel Planning Team*

- Ruth S. Wong, Chair
- TJ Remengesau, Vice Chair
- Hermana Idip, Secretary
- Carol O. Emaurois
- Ereong Ngirailemesang
- Semdiu Decherong
- Surech Hideyos

*Facilitator and PCS representative: Anuradha Gupta*

This Plan is in line with the CAP document produced by the wider community. All of the targets from the CAP document are in this Plan. Where relevant, objectives from the CAP were included in this Plan. This Management Plan focuses exclusively on management of the four conservation areas, and not on broader ecosystems or processes in the State. Thus, this Plan does not include every objective contained in the CAP document (e.g. the CAP document developed three fisheries-related objectives; however, these objectives were not relevant to Ngaraard's mangrove and terrestrial conservation areas). This decision was made 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) to meet the requirements of the PAN, which is a network of conservation areas with discrete boundaries.

**Conservation Targets**

Conservation targets include those species or features in the conservation areas that the Ngaraard community and Kerradel Planning Team wanted to conserve. Targets were identified through a brainstorming event and by consulting available documents such as the CAP document. Targets from the CAP document are included in this Management Plan if they are located in the Kerradel Conservation Network.

Targets were prioritized based on consensus by the Planning Team. Priority Targets are listed below.

*Priority Targets*

<u>Priority</u>	<u>Target</u>
1	Water bodies
1	Ngerchokl (natural/cultural site)
2	Marine fish
2	Mangrove
3	Forest

**Targets Ranked #1 in importance** – Two targets were selected by the Planning Team as top priority targets. These included Water bodies (because of the importance of natural water bodies to drinking water, downstream taro patches, and nearshore marine environments) and the natural/cultural site of Ngerchokl (which was prioritized based on its potential to generate income as a tourist site, and thus provide for further management of all sites).

**Targets Ranked #2 in Importance** – Two related targets were selected by the Planning Team as second priority targets, marine fish and mangroves. Fish were prioritized because of their importance as food (both for livelihoods and cultural practices). Mangroves were prioritized because of their role in providing nursery, breeding ground, habitat, and other services to marine fish. Mangroves were also prioritized because of their importance as a source of food (e.g. clams and crabs) and building materials (trees).

**Targets Ranked #3 in Importance** – Forest (to include plants, animals, and ecosystem services) was selected as a priority target by the Planning Team based on its importance to water regulation, ecotourism, and habitat for native species.<sup>3</sup>

### **All Targets**

*Water bodies/sources, with particular emphasis on:*

- Ngerkall Lake
- Metmellasch Stream
- Ngerchokl Stream

*Mangroves, with particular emphasis on:*

- Chemang (Mangrove crabs)
- Meas
- Rull
- Ngduul (Mangrove clams)
- Trees
- Fruit Bats

*Cultural Sites, particularly*

- Ngerchokl stream and stone features (“Fountain of Youth”)

*Marine Fish, with particular emphasis on:*

- Meas
- Rull

*Forest, with particular emphasis on:*

- Trees
- Birds, particularly Belochel and Biib
- Fruit Bats
- Medicinal plants

### **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

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<sup>3</sup> Ngaraard’s East Coast Beach was initially included as a priority target in the Management Plan. However after analyzing existing legislation, PCS advised the Planning Team to focus on the four conservation areas with discrete boundaries. Although a number of regulations and restrictions apply to the East Coast Beach, there is no legislation designating a specific area as a Conservation Area. Thus beaches were not considered further in the Management Plan.

would undermine the ability to implement effective management. Target-based threats were identified first through a brainstorming event and by consulting available documents such as the CAP document. Process-based threats and weaknesses were identified through a brainstorming event that utilized 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.

All threats (target-based and process-based) were considered for prioritization, either because of direct impacts on conservation targets or because of indirect impacts that could hinder management. Threats were prioritized based on simple voting whereby Planning Team members selected their top five threats. Those threats with a higher priority level were selected by more Planning Team members. The Planning Team was advised to consider the *scope* of the threat (how widespread the threat is in terms of number of targets or population of targets affected), *severity* of the threat (how much damage it could cause to the survival, health, or functionality of targets), and *irreversibility* of the threat (how easily/realistically the negative effects of the threat could be stopped or reversed).

*Priority Threats*

<u>Rank</u>	<u>Threat</u>
1	Development (in, at edges of, or draining into Conservation Areas)
1	Invasive species
2	Deforestation
3	Climate Change
3	Illegal hunting (terrestrial conservation areas and marine zones)
3	Negative impacts from tourists
3	Trash
3	Internal Leadership Conflict
4	Fire
4	Difficulty in enforcing all four sites and all necessary regulations
4	Possibility of inadequate funds

**Threats Ranked #1 in Importance** –Top priority threats included invasive species (marine and terrestrial, plant and animal), and development. Invasive species were selected as a priority threat because of their potential to have high scope (every site), severity (impact all targets), and irreversibility (difficult to control and remove). Development in, at the edges of, or draining into the Conservation Areas was selected as another top priority threat because of its potential impacts on water quality and the integrity and value of Ngerchokl as a tourist site, both of which were top priority targets.

**Threats Ranked #2 in Importance** – Deforestation (through development and logging), was selected as a second priority threat. Deforestation was prioritized because of the importance of trees and forest to minimizing sedimentation and regulating water quality, and because of the importance of forest as habitat for both marine and terrestrial species. Deforestation was ranked highly because of high scope (applicable to all conservation areas), relatively high severity (applicable to priority targets), and relatively high irreversibility (difficulty and long time period to replant).

**Threats Ranked #3 in Importance** – Five threats were seen as equally important.

- a) Climate Change was prioritized because it is nearly irreversible and could impact all sites and targets,
- b) Illegal hunting was prioritized because it is potentially severe and irreversible if populations are reduced to unsustainable levels,
- c) Negative impacts from tourists (including trash, taking of plants, vandalism, sedimentation from trails, habitat degradation, and disturbance) were prioritized because of their possibility to degrade the Ngerchokl target.



- d) Trash (from tourists and from users of the Compact Road and other boundary roads) was prioritized because of its scope (potentially along the entire length of the road and at tourist sites, but potentially impacting all targets).
- e) Leadership conflict (among and within elected and traditional leaders, at all levels) was prioritized because disagreement over management could hinder activities in all sites (high scope).

**Threats Ranked #4 in Importance** – Four threats were seen as equally important.

- a) Fire was prioritized because it creates a source of sediment into water bodies and degrades habitats, and because the impacts of fire are nearly irreversible,
- b) The likelihood that it will be difficult to enforce all sites and all regulations was prioritized as a threat/risk, because it impacts all sites and targets, and because inadequate enforcement could lead to potentially severe effects.
- c) The possibility of receiving inadequate funds was prioritized as a threat because of the widespread impacts that inadequate funding could have on all sites and all targets.

### **All target-based threats**

*Cross-cutting threats, affecting all targets*

- Invasive species
- Climate change
- Deforestation
- Illegal hunting or illegal harvesting (where/when applicable)
- Overhunting or overharvesting (where/when applicable)

*Threats specific to terrestrial conservation areas (including forests and water bodies)*

- Fire
- Sedimentation
- Negative Impacts from Tourists
- Development (in, at edges of, or draining into Conservation Areas)
- Streams filling in
- Trash

*Threats specific to mangrove conservation areas*

- Boating
- Dredging
- Filling

### **All process-based threats**

*Internal weaknesses*

- Inadequate information about the conservation areas (e.g. little data about fish, status of reefs, etc.)
- Drivers of overfishing, including
  - Commercialization (overfishing for purposes of income)
  - Increased access because of the Compact Road
  - Increasing pressure on non-traditional fish (e.g. due to declining sardines)
- Inadequate state or local funding to support all necessary activities, including inadequate staff
- Difficulty to enforcing all four sites and all necessary regulations, because of large size and difficult access of conservation areas
- Internal leadership conflict
- Local community members who are unable or unwilling to control negative impacts on targets, because of
  - Inadequate awareness about natural resources and the rationale for conservation and enforcement
  - Inadequate will to enforce rules

- Fear of or difficulty confronting others (e.g. such as non-Ngaraard community members negatively impacting resources)
- Inadequate laws, rules, or regulations
- Inadequate understanding about existing laws
- Inadequate skill in communicating conservation rules, rationale, etc. to both internal and external audiences

#### *External Risks and Threats*

- Possibility of inadequate funds (e.g. from PAN)
- Possibility that development opportunities will offer greater financial benefits than conservation, creating a loss of conservation vision
- Possibility of increased competition with other states for tourist and conservation dollars
- Non-compliance from people who are not part of the Ngaraard community
- Bleaching
- Sea level rise

#### **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*

- Ngaraard's 5 High Chiefs are members of the State Legislature (can create unity and share information).
- Some areas are already under traditional *bul*.
- Most of Ngaraard is not highly developed, so resources are still viable.
- Difficult terrain means some areas will be difficult to access (which may reduce non-compliance).
- State has diverse and beautiful habitats and healthy populations of animals.
- Negative impacts are visible and the community has noticed/cares about many of them.
- Ngaraard State has a history of broad conservation.
- The community is supportive of conservation.
- Many people from Ngaraard are currently in conservation or are already knowledgeable about conservation.
- Many groups in Ngaraard are knowledgeable about sustainable harvest and sustainable use of resources, through traditional use.
- Existing beach resorts are already bringing in an ecotour audience.

#### *External Opportunities*

- PAN and Grant funds currently available.
- Technical assistance is available from on- and off-island partners.
- Development planned for the East Coast beaches can be a source of funding, tourists, and can showcase sustainable development that respects the environment.

#### **Location and Ownership**

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. Ngaraard State is located on the northern end of Babeldaob and includes both west and east coasts. Ngaraard State covers approximately 32 square kilometers (MWM Ngaraard, 2003). Ngaraard has five discrete villages: Ngkeklau, Ulimang, Chelab, Ngebuked, and Chol. In 2005, the population of Ngaraard was 581 people in 120 households.

The West Coast Mangrove Conservation Area (Center, 7°37'23" N, 134°36'59"E) is located on the West Coast of Ngaraard State, and consists of the entire mangrove area from the Ngaraard/Ngardmau State border running northeast following the coastline to Bkul Ngelu in Urung. The West Coast Mangrove Conservation Area is approximately 2.88 square kilometers in size. Other than the Compact Road, there is little to no development in the watersheds draining into the West Coast Mangrove Conservation Area. Several of the watersheds draining into this conservation area are protected as part of the Diong Era Ngerchokl Conservation Area.

The Ungellel Conservation Area (Center, 7° 38'59"N, 134° 38'02"E) was established as mitigation for construction of the Urung-Orredakl Road. The Conservation Area consists of a mangrove just north of the causeway in Ngaraard, west of the land area of Ungelel and Northwest of the adjacent roadway. The area comprises 0.03 square kilometers of mangrove. There is no development in the watershed draining into the Ungellel Conservation Area.

The Diong Era Ngerchokl Conservation Area (Center, 7°36'16"N, 134°37'22"E) is a terrestrial conservation area in the southwest part of the state. The conservation area includes the Ngerchokl stream and the watershed surrounding it on the west side of the Compact Road. A 10 meter zone adjacent to the Compact Road is excluded from the Conservation Area. The area comprises 0.91 square kilometers. There is some tourism development (including a trail, clearing, and planting with ornamental plants) in the Conservation Area in the vicinity of the Diong Era Ngerchokl cultural site. The specific boundaries of the Conservation Area (bearings) are listed in NSPL 7-25. At its northwest corner, the Diong Era Ngerchokl Conservation Area abuts the West Coast Mangrove Conservation Area.

The Ngerkall Lake and Metmellasech Watershed Conservation Area (Center, 7°36'44"N, 134°37'00"E) is a terrestrial conservation area in the southeast part of the state. The conservation area includes the Ngerkall Lake, Palau's second largest body of standing freshwater, the Metmellasech River, and the watershed surrounding them on the east side of the Compact Road. The eastern boundary is formed by the road from Ngkekklau to Ulimang. 10 meter zones adjacent to the Compact Road and the Ngkekklau-Ulimang Road are excluded from the Conservation Area. The area comprises 2.23 square kilometers. There is a farm inside the conservation area. The Metmellasech serves as a water source for villages in Ngaraard State, thus the dam and associated support structures (e.g. access road) are also located in the conservation area.

Together adding to 6.05 square kilometers, the four conservation areas comprising the Kerradel Conservation Network cover 19% of Ngaraard's land area. The four conservation areas are located exclusively on state-owned land.

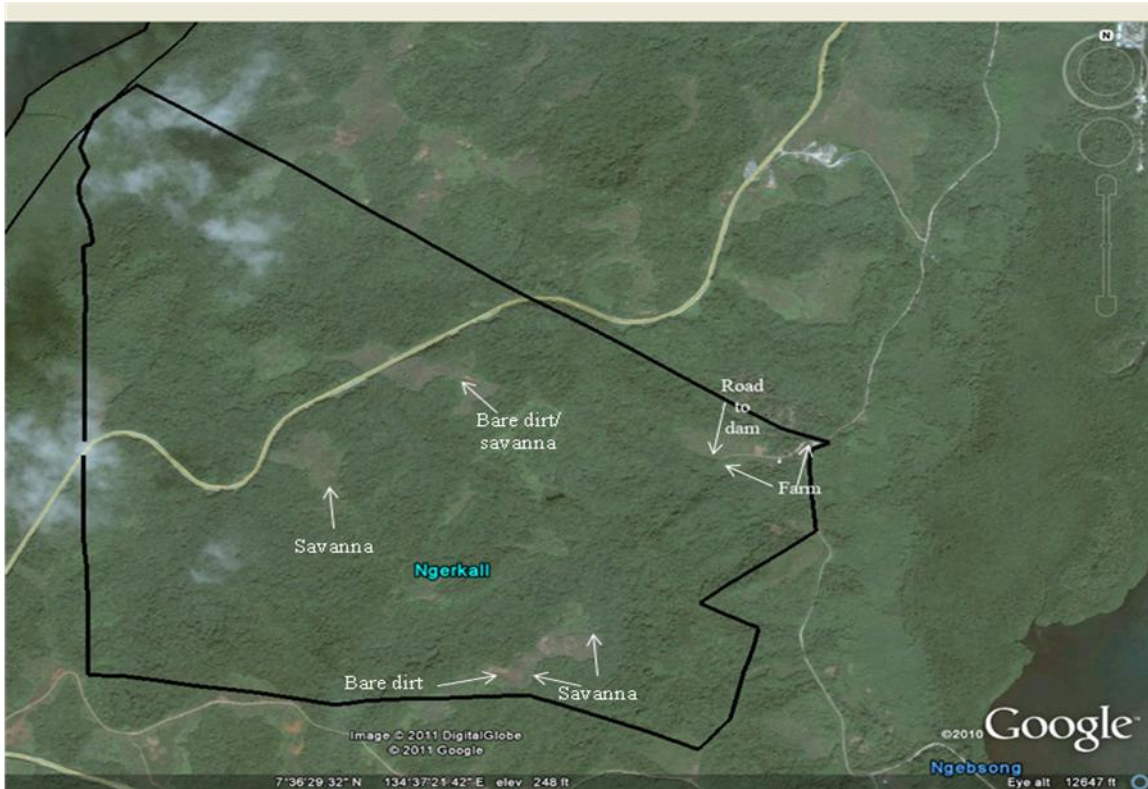
### **Current Land Uses and Land Cover**

The West Coast Mangrove Conservation Area is currently harvested for trees, bats, clams, and crabs, but at a low pressure, according to informal interviews with community members in Ngaraard. There is no documented use of the Ungellel Conservation Area.

In the Diong Era Ngerchokl Conservation Area, there is a trail leading to the forest to the cultural site on the Ngerchokl Stream. At the stream, a patch of forest approximately 200 x 100 m has been cleared of most understory. At the entrance to the trail, a patch of approximately 100 x 100 m has been cleared and planted with ornamental plants. There is a sign at the entrance explaining the site in Palauan.

In the Metmellasech Conservation Area there is a farm for Bethania High School. The farm is located below the intake for the Metmellasech dam but is inside the Conservation Area. The Metmellasech dam is also inside the Conservation Area (with cement and piping structures). There is a dirt road from the Ngkekklau-Ulimang Road into the farm and to the dam. There is a farm house inside the Conservation Area (Figure 3). **The action plan includes actions to move the farm out of the Conservation Area.**

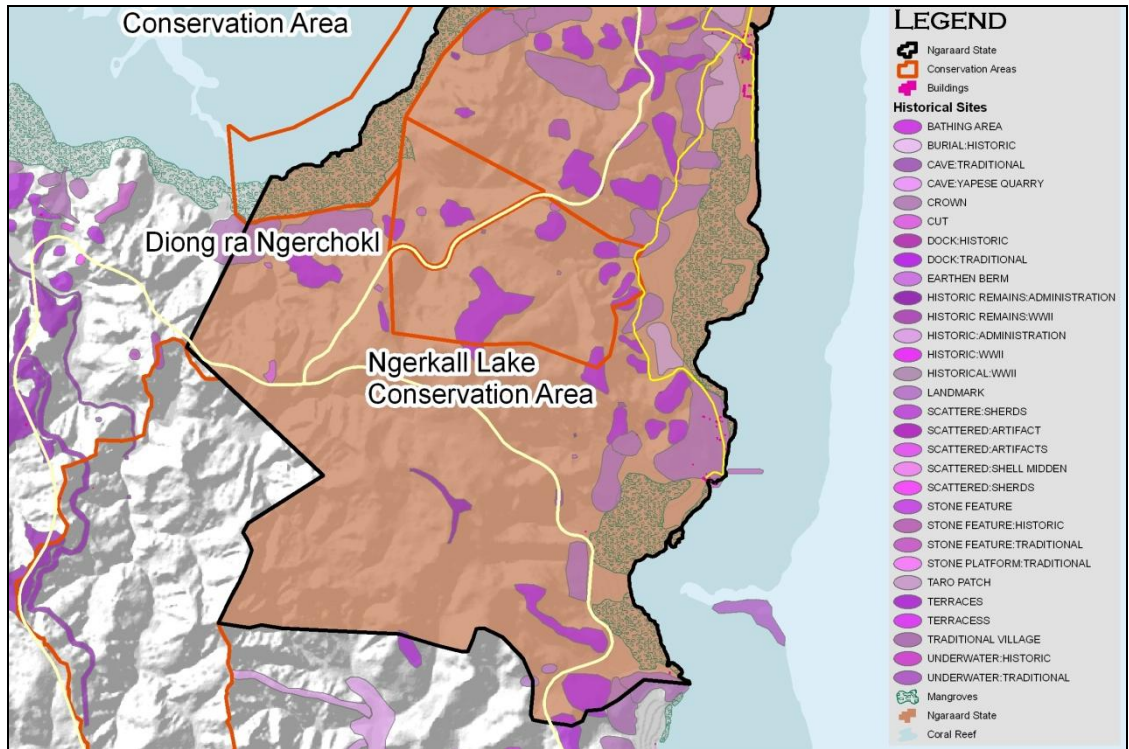
There are a number of small savannas in the terrestrial conservation areas. In July 2010, two bare areas with exposed dirt were observed in the conservation area (Figure 3). The old road from Ngiwal to Ngardmau does not touch the conservation areas, but would if the conservation area boundary were expanded to include the entire watershed draining into Metmellasech and Diong Era Ngerchokl. Portions of this road are steep and have exposed dirt. The rest of the terrestrial conservation areas are covered with forest (presumably mostly secondary forest).



**Figure 3.** Terrestrial conservation areas (approximate boundaries) showing the location of the farm, road, savannas, and bare areas.

### **Socioeconomic, Cultural, and Historical Information**

The Kerradel Conservation Network is important to Ngaraard residents for cultural and socioeconomic reasons. There are a number of cultural and historical sites that have been catalogued and recorded by the Bureau of Arts and Culture (Figure 4).



**Figure 4.** Cultural and historical sites in the Network (there are no cultural sites recorded in the mangrove conservation areas).

The Metmellasech River serves as the water source for villages in the central and southern part of the state, through provision of surface water. The dam and water system include three storage tanks with a total of 110,000 gallon storage capacity. The water system includes an 8-inch pipe system (with some sections at 6 or 4 inches), a booster pumps, and a chlorinator (Master Plan, 2001). In 2001 the system was able to serve all households in the southern part of the state. There is a farm located in the Metmellasech Conservation Area, below the dam intake.

The name of Metmellasech has cultural significance, and there are stories about the site providing water for carving. The area also serves as a living laboratory, showing casing the water source and the connections between the River and the downstream taro patches.

The Diong Era Ngerchokl Conservation Area includes the Ngerchokl historical site, which is registered on the Palau National Register. The site is the home of the “Fountain of Youth” and the legend of a grandmother and her granddaughter. The site has already seen some development as a tourist site, and there is a trail, ornamental plants, and a sign explaining some of the historical features. In addition downstream from the historical site is a small cascading waterfall that could serve as a recreational area. According to the Resource Management and Development Suitability Study (MWM, 2003), “the proximity of excellently preserved traditional villages, stone features, and terrace complexes, together with beautiful beaches, makes Ngeraard a prime candidate for the decentralization of tourism away from Koror and the Rock Islands. Ngeraard is a prime candidate to serve as a major tourism focus on the north of Babeldaob, and it enables access to the the natural and cultural resources in the adjacent states of Ngarchelong, Ngiwal, and Ngardmau” (4.4-6). The Diong Era Ngerchokl Conservation Area is centrally located and one of the state’s strongest sites.

The West Coast Mangrove Conservation Area is open for subsistence fishing, and thus serves as a source of food. In addition, the mangroves are adjacent to seagrasses and reef holes that are known to still harbor fish that are

important economically. The mangroves presumably serve as a nursery and shelter for many of these fish species. According to informal surveys of community members, mangrove trees and clams are still plentiful enough to be harvested with little effort from the Conservation Area, although in general they felt that harvesting pressure in the Area was low.

### **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.

The most common soils in the Kerradel Conservation Network are upland soils, which are made from highly weathered volcanic material. They are very easily eroded and when washed into the water, remain suspended, making the water cloudy. Thin organic soils in the 401 to 403 series (Aimeliik-Palau complex; 6 to 75% slopes) cover the forested areas of Ngerkall and Metmellasech Conservation Areas (USDA SCS, 1991). These soils are very deep and well drained, but when vegetation is removed in higher slope areas runoff is very rapid and hazard of water erosion is very high. Bare areas can be revegetated to reduce erosion. Areas under forest are more fertile than those under savanna. The soils are moderately suited to subsistence agricultural forest crop production. On higher slopes the soil is poorly suited for homesite development. Any development requires structures to divert runoff. Soils around Ngerkall Lake and other wetland areas are in the 414 to 417 series (Ngardok silt loam; 6 to 75% slopes). Permeability is moderately rapid. Soil have low soil strength. The mangrove areas have Ilachetomel peat (Series 409, 0 to 1 slopes).

#### *Water Resources*

Ngerkall Lake is the second-largest lake in Palau, with a surface area of around 0.35 hectares, a maximum depth of 2 meters, and a volume of about 300,000-400,000 gallons. There is no stream input into this pond (Bright, 1979). The lake is surrounded by a 5-10 meter wide layer of *Haranguana malayana* marsh reed. Bright (1979) wrote that the waters of Ngerkall are dystrophic (acidic due to high content of organic matter) and are naturally low in productivity. Although the water column has little life, the littoral zone supports a healthy fauna of animals.

A dam on the Metmellasech River, with three water tanks, holds a total of 110,000 gallons of storage.

Water quality in marine waters just west of the Ulimang dock in Ngaraard (southwest of the Ungel Conservation Area and northwest of the tip of the West Coast Mangrove Conservation Area) rated as Class AA or A in water quality (safe for fishing, swimming, bathing, and general use) after dredging in the 1990s.

In 2010 Ngaraard 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 brewvipetiolata* and *Pinanga insignis*. Costion and Kitalong (2006) divides upland forest into four categories: Upland, Lowland, Riparian, and Basaltic outcrop forests. Upland, lowland, and riparian forests are found in the Kerradel Conservation Network. Palau has approximately 200-250 endemic species of plants, of which approximately 40% are endemic to Babeldaob (Costion and Kitalong 2006).

During a rapid survey of the reefs fringing the West Coast Mangrove Conservation Area in 2005, PCS found patches of apparently healthy seagrass adjacent to the mangroves.

The terrestrial conservation areas in Ngaraard include a range of vegetation types, including upland tropical rainforest, lowland rainforest, grassland, marsh, and swamp forest (Cole et al 1987; Donnegan et al 2003).

Costion and Kitalong (2006) found that the moist understory of forest in the vicinity of Ngerkall Pond in the Metmellasech Conservation Area contained an unusually high diversity of terrestrial orchids. Costion (2008) recommended protection of this part of Babeldaob due to the presence of both native and endemic plants. Kitalong and Holm (2004) estimated that forest in the region included 6-10 endemic plant species (of 25 recorded).

The Diong Era Ngerchokl Conservation Area includes a “significantly large” *Horsfieldia* swamp to the west of Ngerchokl (Costion and Kitalong, 2006). They wrote that the swamp was “very large, pristine, and primary forest. It is a *Horsfieldia irya* (amklaal) dominant swamp with scattered *Calophyllum pelwense*, both of which are endemic. Swamp forests are one of the more rare forest types in Palau.” Although Palau does not have a threatened species list, Kitalong and Holm (2004) recommended that *Horsfieldia irya* be considered as a threatened native species.

Kitalong (1990) surveyed mangroves between the West Mangrove and Ungellel Conservation Areas. She found that these were healthy with *Sonneratia alba*, *Rhizophora mucronata*, and *Bruguiera gymnorhiza*. Metz (2000) recommended that the West Coast Mangrove be included in the Diongradid Mangrove Reserve (as a National Reserve), and noted that these mangroves were vital to Palau’s west, northwest aquatic habitat and water quality. He noted that these mangroves were an “outstanding” example of Palau’s fringe mangrove type. Metz (2000) also noted that Northern Peninsula mangroves (including the location with the Ungellel Conservation Area) were among least disturbed in country. In 2011 the Palau International Coral Reef Center (PICRC) will begin monitoring the West Coast Mangrove Conservation Area.

#### *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*; Chesisialik) reside in caves. Bats have not been formally surveyed in the Kerradel Conservation Network, although Fruit Bats are known to occur in all areas.

#### *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 (omekrekugl), Giant White-eye (charmbedel), Micronesian Imperial Pigeon (belochel), and Nicobar Pigeon (laib) are listed as Near-Threatened (NT).

Table 1 lists birds that were counted in the conservation areas in 1991 and 2005. In 1991 and 2005, a survey transect crossed the Metmellasech, so bird numbers include areas both inside and outside the conservation area. In 2005, an

additional transect originating at the Ngerchokl spring surveyed the conservation area. All of the expected endemic birds are present in the conservation areas, as are several of the endangered birds. Those that were not surveyed are also known to be present, including Micronesian Megapodes and Palau Owls.

Although several species of birds declined in Palau between 1991 and 2005, many of these same species increased in Ngaraard. Of special note is the Micronesian Pigeon. In the rest of Palau, the Pigeon declined between 40 and 50%. In Ngaraard, the number of Pigeons increased. Although the sample size is small, it appears that Ngaraard's forests are supporting these threatened species.

Table 1. Birds in the Kerradel Conservation Network

		Number of Birds Counted			Difference between 1991 and 2005	Palau-wide status (VanderWerf, 2007)	
		West Side	East Side				
English Name	Palauan Name	2005	1991	2005	<i>Ngaraard (East Side only)</i>	<i>Palau-wide (VanderWerf, 2007)</i>	
<b>Endangered</b>							
Micronesian Pigeon (also regionally-restricted)	Belochel	30	8	16	More	Fewer	Common
Nicobar Pigeon	Laib	2			Not enough information	More	Rare
Giant White-eye (also endemic)	Charnebedel	*	*	*		Fewer	Common in the Rock Islands and Peleliu
Palau Ground Dove (also endemic)	Omekrengukl	N/C	N/C	N/C		Not enough information	Rare
Micronesian Megapode (also regionally-restricted)	Bekai	N/C	N/C	N/C		Fewer	Rare
<b>Endemic</b>							
Palau Fruit Dove	Biib	64	62	76	More	Fewer	Very common
Cicadabird	Kiuidukall	0	4	5	No change	Fewer	Rare
Dusky White Eye	Chetitalial	35	88	38	Fewer	Fewer	Very common
Morningbird	Tutau	2	8	5	Fewer	Fewer	Common
Palau Fantail	Melimdelebtob, Chesisirech	3	5	10	More	No change	Very common
Palau Flycatcher	Charmelachull	14	8	19	More	No change	Very common
Palau Bush-Warbler	Wuul	42	19	42	More	No change	Very common
Palau Swiftlet	Chesisekiaid	6	33	0	Fewer	No change	Common
Rusty-capped Kingfisher (Micronesian Kingfisher)	Cherosech, Ongelimadech	1	3	2	No change	No change	Rare
Palau Owl	Chesuch	N/C	N/C	N/C			Common
<b>Restricted to Micronesia Region</b>							
Micronesian Honeyeater	Chesisebangiau	9	13	7	Fewer	More	Very common
Caroline Islands White Eye	Chesisebarsech	5	8	3	Fewer	Fewer	Common
Micronesian Starling	Kiuid	27	43	40	No change	Fewer	Very common
<b>Other Native</b>							
Banded Rail	Terriid		1	2	No change	More	Very common
Brown Noddy	Mechadelbedaoch		8	4	Fewer	Fewer	Common
Black Noddy	Bedaoch		2	0	Fewer	Fewer	Common
Collared Kingfisher	Tengadidik		11	3	Fewer	No change	Very common
Junglefowl	Malkureomel	8	24	7	Fewer	Fewer	Very common



Slatey-legged Crake	Ulerratel		0	1	No change	Fewer	Rare
White tern	Sechosech	2	35	8	Fewer	Fewer	Common
Yellow Bittern		2					Rare
<b>Introduced</b>							
Chestnut Mannekin	Kanaria	4	7				Common
<b>Migrant</b>							
Grey-streaked flycatcher		1					Very rare

N/C - Not counted. Bird surveys in 1991 and 2005 did not target elusive ground birds or night birds

\* Prior to 2008, this bird had only been observed in the Rock Islands and Peleliu (Olsen 2009)

### *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*) (TTPI 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 (TTPI 1977).

Frogs occur around Ngerkall lake, but they have not been studied. The Palauan endemic frog *dechedch* (*Platymantis pelewensis*) lives in the conservation area, as it is very common throughout Palau (TTPI 1977).

The marsh and Ngerkall Lake in the Metmellasech Conservation Area provide habitat for the endangered *ius* (saltwater crocodile, *Crocodylus porosus*) (Bright, 1979). Crocodile numbers in the whole of Palau are estimated to be fewer than 150 animals. Crocodiles have also been observed from the mangrove conservation areas in Ngaraard. The introduced toad (*Bufo marinus*) was also observed at the lake (Bright, 1979).

### *Freshwater fish*

No comprehensive surveys of freshwater fish have been conducted in the conservation areas. Bright (1979) collected *Misgurnus anguillicaudatus* from Ngerkall lake. 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 *kitlel* (freshwater eel, *Anguilla marmorata*), of which the largest recorded specimen measured 3.7 feet (1.2 meters) (Bright and June 1981).

### *Marine Fish*

Marine fish were surveyed in the reefs adjacent to the West Coast Mangrove Conservation Area in 2005 (PCS, 2005). Several food fish, including chum, tiau, ngraoch, juvenile kemedukl, kelsebuul, juvenile meskuuk, other parrotfish, and many other species of small reef fish.

This target includes all the fish species that are caught for subsistence and for commercial purpose. Most notable of these species are the parrotfishes, surgeonfishes, rabbitfishes, groupers, mullets, wrasses, and the snappers.

### *Freshwater Invertebrates*

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

### *Marine Invertebrates*

According to informal interviews of community members, mangrove crabs (chemang) and mangrove clams (ngduul) are still present in the West Coast Mangrove Conservation Area. All people informally interviewed thought that harvesting pressure for these species was low and that there were enough individuals to allow some harvest.

### **Conclusion**

The Kerradel Conservation Network 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 Ngaraard's natural and cultural heritage are protected.

## Appendix 1. Stakeholder Analysis

During development of this Plan, the Planning Team identified a number of stakeholder groups who would have some influence over the success of this Plan. This table discusses the general approach for addressing stakeholder perspectives and influences.

Stakeholder Group	General Approach and notes
State Government – Governor and Legislature	<ul style="list-style-type: none"> <li>• Governor and State legislature are included as active participants</li> <li>• Plan includes targeted meetings and information sharing between Coordinator, Board, and State Government</li> </ul>
State Government – Enforcement	<ul style="list-style-type: none"> <li>• Conservation Officers included in Plan, with clearly delineated duties</li> <li>• Capacity building plan for Conservation Officers included</li> </ul>
Farmers	<ul style="list-style-type: none"> <li>• Plan to move Bethania Farm is scheduled for long-term, and actions include participatory planning for the move</li> </ul>
Fishermen/ crab gatherers / gleaners / Makit women	<ul style="list-style-type: none"> <li>• Establishment of the Extractive Use Zone</li> <li>• General Education on purpose of No Impact Zone</li> <li>• Establishment of tourist areas to expand customer base</li> </ul>
Community – Villages	<ul style="list-style-type: none"> <li>• Community outreach in each village</li> <li>• Economic and subsistence use opportunities in various zones</li> </ul>
Hunters	<ul style="list-style-type: none"> <li>• Establishment of Extractive Use Zone</li> <li>• General Education on purpose of No Impact Zone</li> <li>• Expanded surveillance and enforcement</li> <li>• Economic opportunities through tourism</li> </ul>
Tourists / Tour companies / PVA	<ul style="list-style-type: none"> <li>• Development of Tourist Sites</li> <li>• Advertising and increased information about the site</li> <li>• Development of clear permit and fee system</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 Ngaraard	<ul style="list-style-type: none"> <li>• Public education to include signs, use of multiple media to access a broader audience</li> </ul>
Landowners	<ul style="list-style-type: none"> <li>• <i>(Not applicable as Network is on public land)</i></li> </ul>
Developers / Contractors	<ul style="list-style-type: none"> <li>• Ecotourism allowed in several zones</li> <li>• Development of clear regulations and permit system</li> <li>• Targeted outreach</li> </ul>
Marine Law	<ul style="list-style-type: none"> <li>• Management Plan distributed widely</li> <li>• PAN Membership establishes formal authorities and partnerships</li> </ul>

**Appendix 2: Roles and day-to-day responsibilities of authorities and personnel**

<p><b>Traditional Leaders</b></p> <p><i>Role:</i> Supervisory and Advisory role: Oversight of activities in the Reserve to ensure cultural appropriateness; conflict resolution if necessary</p> <p><i>Responsibilities</i></p> <ul style="list-style-type: none"> <li>• Advising the Legislature</li> <li>• Declare <i>bul</i> as necessary</li> </ul>
<p><b>State Government Leadership</b></p> <p><b>Governor</b></p> <p><i>Role:</i> Implementer role: Governor has ultimate responsibility for implementation, including oversight of implementation and financial management of funds</p> <p><i>Responsibilities</i></p> <ul style="list-style-type: none"> <li>• Establish Board</li> <li>• Name representatives to the Board</li> <li>• Meet with Board on a regular basis</li> <li>• Introduce and or/initiate legislation, regulations, and resolutions, if necessary</li> <li>• Authorize expenditures</li> <li>• Maintain and manage funds</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><i>Role:</i> Implementer and Supporter role: Provide enabling legal environment to implement Plan</p> <p><i>Responsibilities</i></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>Ngaraard State Public Lands Authority</b></p> <p><i>Role:</i> Advisory and Supporter role: Maintain consistency between public lands and Management Plan</p> <p><i>Responsibilities</i></p> <ul style="list-style-type: none"> <li>• Participate in joint meetings about Network</li> <li>• Ensure leases are in compliance with Plan</li> <li>• Assist with relocation of Bethania Farm</li> </ul>
<p><b>State Government Staff</b></p> <p><b>State Attorney</b></p> <p><i>Role:</i> Implementer and Supporter role: Ensure consistency with laws and oversee development of regulations, legislation, and permits</p> <p><i>Responsibilities:</i></p> <ul style="list-style-type: none"> <li>• Assist with legislation and regulations for “Exclusion Zone”</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 (two signatures for approval)</li> <li>• Issue purchase orders, checks, and other financial documents</li> <li>• Track spending and maintain all financial files</li> <li>• Report regularly to Governor and Board</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></p> <p><b>Role:</b> Implementer role: Assist with field-based activities</p> <p><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)</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></p> <p><b>Role:</b> Supervisory and Implementer role: Joint oversight for implementation of the Plan, direct implementation of leadership activities, and financial management</p> <p><b>Responsibilities</b></p> <ul style="list-style-type: none"> <li>• Self-organize</li> <li>• Hire Network staff and jointly supervise Network, Maintenance, and Administrative staff</li> <li>• Identify training opportunities for staff</li> <li>• Jointly issue permits/permission</li> <li>• Jointly authorize expenditures</li> <li>• Track funds</li> <li>• Initiate, issue, and approve annual reports, annual work plans, and changes to the Management Plan</li> <li>• Initiate and approve additional zones and other necessary plans (Communications Plan, etc.)</li> <li>• Participate in community outreach and relevant meetings</li> <li>• Assist with fundraising, including establishment of NGO/IGO</li> <li>• Develop or strengthen partnerships and relationships with other agencies</li> <li>• Assist with marketing of the site</li> </ul>
<p><b>Network Staff</b></p>
<p><b>Coordinator</b></p> <p><b>Role:</b> Coordinator and Implementer role: Ensure regulations are enforced and management actions occur on schedule. Work closely with Board to coordinate management, review the Plan, and oversee all associated staff.</p> <p><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>

**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.

**Responsibilities**

- Participate in daily enforcement and compliance monitoring, check permits
- Follow legal procedures for reporting and stopping prohibited activities (according to daily surveillance and enforcement plan)
- File incident reports and keep daily logs
- Participate in research and scientific monitoring
- Participate in daily visitor tours and briefings on allowable activities (including large groups, school groups)
- Ensure visitor safety
- Participate in training opportunities
- Assist with field-based activities (cleanups, placement of signs, restorations, invasive species removal, etc.)

**Community****Ngaraard Community**

**Role:** Supporter and Implementer role: Comply with the Plan and participate in kinrohoshi

- Refrain from prohibited activities
- Participate in community outreach
- Participate in field-based activities (cleanups, restoration)
- Capitalize on tourism opportunities

**Nongovernmental Organization/Intergovernmental Organization**

**Role:** Financial support and Implementer role

**Responsibilities:**

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

### **Appendix 3. Restrictions by Zone - Terrestrial Zones**

***PROHIBITED in all zones*** (Applicable to all parts of the Diong Era Ngerchokl and Metmellasech Conservation Areas)

- Littering / Dumping of trash
- Hunting of native animal species
- Smoking
- Excavating, earthmoving, or digging
- Possession of airguns and/or chainsaws
- 4-wheel driving, entry of vehicles in areas not associated with dam
- Spilling and/or dumping of pollutants
- Personal pumping of freshwater
- Residence on a permanent or long-term basis
- Cutting trees
- Leasing for agriculture or non-ecotour related development
- Alcohol (consumption and possession)\* \* subject to review when campgrounds open

***PROHIBITED in No-Impact Zone*** (Applicable to watersheds draining into Metmellasech Water Dam and Ngerkall Pond)

- Camping (including fires, possession of lighters, etc.)
- Eco-tourism development

***ALLOWABLE WITH PERMIT/PERMISSION in No-Impact Zone*** (Applicable to watersheds draining into Metmellasech Water Dam and Ngerkall Pond)

- Educational activities
- Commercial photography
- Hunting of invasive animal species
- Planting of native species
- Research
- Maintenance of dam, including possession of associated vehicles
- Ecotourism – visitation
- Removal of invasive plants

***ALLOWABLE WITH PERMIT/PERMISSION in Non-Extractive Use Zone*** (Applicable to Diong Era Ngerchokl and remaining parts of Metmellasech Conservation Area)

- Commercial photography
- Hunting of invasive animal species
- Camping (including fires, possession of fires, etc.)
- Planting of native species
- Research
- Ecotourism – development
- Ecotourism – visitation
- Removal of invasive plants

***ALLOWABLE – NO PERMIT/PERMISSION NECESSARY in No-Impact Zone*** (Applicable to watersheds draining into Metmellasech Water Dam and Ngerkall Pond)

- Enforcement

- Regular Monitoring (as established under this plan)

***ALLOWABLE – NO PERMIT/PERMISSION NECESSARY in Non-Extractive Use Zone*** (Applicable to Diong Era Ngerchokl and remaining parts of Metmellasech Conservation Area)

- Enforcement
- Regular Monitoring
- Educational Activities
- Maintenance of dam, including possession of associated vehicles

*Restrictions by Zone – Marine/Mangrove Zones*

***PROHIBITED in all zones*** (Applicable to all parts of the Ungellel and West Coast Mangrove Conservation Areas)

- Commercial tree cutting
- Aquaculture
- Possession of chainsaws
- Taking or harassing of Crocodiles and their eggs and nests
- Netfishing
- Possession of gillnets
- Spilling/dumping of pollutants and trash

***PROHIBITED in No-Impact Zone*** (Applicable to Ungellel Conservation Area and Southern Portion of the West Coast Mangrove Conservation Area)

- Entry without permit
- Taking, harvesting, or removal of plants or animals

***ALLOWABLE WITH PERMIT/PERMISSION in No-Impact Zone*** (Applicable to Ungellel Conservation Area and Southern Portion of the West Coast Mangrove Conservation Area)

- Educational activities
- Commercial photography
- Research

***ALLOWABLE WITH PERMIT/PERMISSION in Extractive Use Zone*** (Applicable to Diong Era Ngerchokl and remaining parts of Metmellasech Conservation Area)

- Commercial photography
- Research
- Sustainable harvest of crabs, clams, and trees

***ALLOWABLE – NO PERMIT/PERMISSION NECESSARY in No-Impact Zone*** (Applicable to Ungellel Conservation Area and Southern Portion of the West Coast Mangrove Conservation Area)

- Enforcement
- Regular monitoring (as established under this Plan)

***ALLOWABLE – NO PERMIT/PERMISSION NECESSARY in Extractive Use Zone*** (Applicable to Northern portion of West Coast Mangrove Conservation Area)

- Enforcement
- Regular Monitoring (as established under this Plan)
- Educational Activities
- Planting of native species



**Appendix 4. Threat-Cause-Solution Table**

This table was developed during the brainstorming phase of management planning. Not all solutions were endorsed or included in the Final Plan. This table is included to indicate the rationale for many of the objectives and actions, and to assist with future planning.

Threat	Cause of Threat	Solutions
Deforestation	<ul style="list-style-type: none"> <li>• Development               <ul style="list-style-type: none"> <li>○ Lease next to road</li> <li>○ Clearing</li> <li>○ Beautification                   <ul style="list-style-type: none"> <li>▪ No Plan for beautification</li> <li>▪ No beautification committee</li> <li>▪ No consulting the state</li> <li>▪ No management plan in place</li> <li>▪ Governor thinks good</li> <li>▪ Person clearing doesn't know impacts</li> </ul> </li> </ul> </li> <li>• Compact Road – Access               <ul style="list-style-type: none"> <li>○ New subdivisions</li> <li>○ Farms</li> <li>○ Misunderstanding about CA</li> </ul> </li> <li>• Buffer zone along road – leases in CA?</li> <li>• Farm – allowed to start again               <ul style="list-style-type: none"> <li>○ Communication across all parties not occurring</li> <li>○ Don't understand farm impacts on CA</li> </ul> </li> <li>• Leases all one size (2000 sq meters)(farm only)</li> <li>• Fire               <ul style="list-style-type: none"> <li>○ Careless – Ignorance</li> <li>○ Not monitored</li> <li>○ Fun – Ignorance</li> <li>○ Get rid of tree/shrub                   <ul style="list-style-type: none"> <li>▪ Think helping</li> <li>▪ Don't know process</li> </ul> </li> </ul> </li> <li>• People harvesting               <ul style="list-style-type: none"> <li>○ No permits</li> <li>○ Not enough awareness</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Signs/ entrance and exit of CA</li> <li>• Strategic fencing</li> <li>• Create beautification committee/State committee</li> <li>• Establish some sort of system for permits</li> <li>• Permits for harvesting trees</li> <li>• Conservation plan part of development process</li> <li>• Awareness</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Checklist</li> <li>• Have management plan</li> <li>• PLA on the same page – check with conservation committee</li> <li>• Trade leases</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Awareness</li> <li>• Relocate farm</li> <li>• Increase buffer zone</li> <li>• Limit activities in leases</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Establish permits</li> <li>• Establish fines</li> <li>• Awareness of conservation boundary, management policies, system/science</li> </ul>
Sedimentation – (as result of deforestation for development)	<ul style="list-style-type: none"> <li>• Deforestation (see above)</li> <li>• Clearing for:               <ul style="list-style-type: none"> <li>○ Farms</li> <li>○ Houses</li> <li>○ Cleaning</li> <li>○ Access</li> </ul> </li> <li>• Fire</li> </ul>	<ul style="list-style-type: none"> <li>• Requirements/retaining wall</li> <li>• Contour farming</li> <li>• Promoting best farming practices/Education about farming</li> <li>• Permit/fines for clearing farms</li> <li>• Guidelines on how to build houses</li> <li>• Set requirements for permits at state level</li> <li>• Checklist and monitoring</li> </ul>
Fire	<ul style="list-style-type: none"> <li>• Careless – ignorance</li> <li>• Not monitored</li> <li>• Get rid of shrubs/pests/trees</li> </ul>	<ul style="list-style-type: none"> <li>• Permit</li> <li>• Awareness</li> </ul>

<p>Hunting (terrestrial - birds &amp; bats)</p>	<ul style="list-style-type: none"> <li>• Economy (source of income) <ul style="list-style-type: none"> <li>○ Food for themselves</li> <li>○ No jobs</li> </ul> </li> <li>• Hobby</li> <li>• Demand</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness</li> <li>• Aviaries (aquaculture for birds)</li> <li>• Push for legal hunting with permits and licensing for airguns</li> <li>• Research</li> <li>• Provide options for other income sources</li> <li>• Pay someone to monitor</li> <li>• Pay people to lead tours instead</li> <li>• Enforcement <ul style="list-style-type: none"> <li>○ Permanent positions with badge, uniform, authority</li> <li>○ Training</li> </ul> </li> </ul>
<p>Debris &amp; Trash</p>	<ul style="list-style-type: none"> <li>• Fishing fleets</li> <li>• Local littering</li> <li>• No trash bins along road</li> </ul>	<ul style="list-style-type: none"> <li>• Cleanups</li> <li>• Trash bins</li> <li>• State collection</li> <li>• Policy about plastic containers</li> </ul>
<p>Invasive species</p>	<ul style="list-style-type: none"> <li>• Sources exist</li> <li>• Access to site</li> <li>• Planting <ul style="list-style-type: none"> <li>○ Wanting something rare and different</li> <li>○ Hiding</li> <li>○ Can get in (quarantine lax, penalties low)</li> </ul> </li> <li>• Hard to kill/control</li> <li>• Brought in for aquaculture (tilapia)</li> <li>• Pigs <ul style="list-style-type: none"> <li>○ No pens for pigs</li> <li>○ Have access through road</li> <li>○ Multiplying through trash/gardens</li> <li>○ No hunting with rifles</li> </ul> </li> <li>• No time (community)</li> </ul>	<ul style="list-style-type: none"> <li>• Identify sources and species</li> <li>• Annual cleanup</li> <li>• Coordinate with other agencies</li> <li>• Awareness</li> <li>• Regulations</li> <li>• Personnel check – training (aquaculture)</li> <li>• Conservation Officers <ul style="list-style-type: none"> <li>○ Deputized</li> <li>○ Trained</li> <li>○ Authorized to hunt pigs</li> </ul> </li> <li>• Financial incentives to hunt pigs</li> <li>• Offer incentives or pay community</li> </ul>
<p>Impact from tourist/visitors</p>	<ul style="list-style-type: none"> <li>• Waste/Trash <ul style="list-style-type: none"> <li>○ No bins</li> <li>○ Not used to trash cans</li> <li>○ Don't care</li> <li>○ Expect others to clean</li> </ul> </li> <li>• Too many tourists <ul style="list-style-type: none"> <li>○ Type of tourist</li> <li>○ Inexpensive</li> <li>○ No guide, or local guide who doesn't know rules</li> <li>○ Access</li> </ul> </li> <li>• Wandering off trail, creating new trails</li> <li>• Destroying things</li> <li>• Taking plants, things from site, shells, mud from swamp</li> <li>• Trampling reef/walk on reef</li> <li>• Disturbing natural sites/systems</li> <li>• Suntan lotion</li> </ul>	<ul style="list-style-type: none"> <li>• Trash bins</li> <li>• Awareness</li> <li>• Limits on what to bring in</li> <li>• Fee structure</li> <li>• Zoning/activities</li> <li>• Guides/Conservation officers</li> <li>• Monitoring</li> <li>• Limits on size of groups</li> <li>• No taking/prohibitions</li> <li>• Signs, identification</li> <li>• Hold tour company responsible</li> <li>• Ban use of suntan lotion/establish guidelines</li> </ul>
<p>Ngerchokl (shallower)</p>	<ul style="list-style-type: none"> <li>• Sedimentation from road</li> <li>• Invasive species</li> <li>• Falling leaves – no clearing</li> </ul>	<ul style="list-style-type: none"> <li>• Community cleanups (4 x year)</li> <li>• Targeted invasive cleanups</li> </ul>

Climate Change	<ul style="list-style-type: none"> <li>• Sea level rise</li> <li>• Bleaching corals</li> <li>• Higher sea temperature</li> <li>• Contaminating water source</li> </ul>	<ul style="list-style-type: none"> <li>• Identify resiliency areas</li> <li>• Moving inland</li> <li>• Buffer zones</li> <li>• Protect spawning areas</li> <li>• Plant corals</li> <li>• Prohibit fishing of certain resilient fish species</li> </ul>
Dredging	<ul style="list-style-type: none"> <li>• Offsite impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Dredging applications must be seen by committee</li> <li>• Regulations</li> </ul>
Filling	<ul style="list-style-type: none"> <li>• For dams</li> <li>• For buildings</li> <li>• Lease property next to mangrove</li> <li>• Trash dump</li> </ul>	<ul style="list-style-type: none"> <li>• Prohibit</li> <li>• Monitored</li> <li>• Replace leases</li> <li>• New leases in line with CA</li> <li>• Regulations on property</li> </ul>
Development	<ul style="list-style-type: none"> <li>• Need housing space</li> <li>• Access to land &amp; power lines</li> <li>• Proximity to other business</li> <li>• State needs income(e.g. golf course, tourist trails, tourist center)</li> <li>• Access to water</li> </ul>	<ul style="list-style-type: none"> <li>• Limits to where</li> <li>• Regulations on how to build &amp; access</li> <li>• Proper planning - where to place</li> <li>• Restrictions</li> <li>• Guidelines</li> <li>• Checkpoints/Checklists</li> <li>• Seek alternate water sources</li> </ul>
No Money/PAN		<ul style="list-style-type: none"> <li>• Fees to cover costs</li> <li>• Kinrohoshi (community service) /incentives</li> <li>• Build ownership</li> <li>• Chiefs involved</li> <li>• Grants (Management authority set up to increase eligibility)</li> </ul>
Not Stopping outsiders (outside non-compliance)		<ul style="list-style-type: none"> <li>• Chiefs have authority</li> <li>• Build mutual understanding</li> </ul>
Not enough Staff		<ul style="list-style-type: none"> <li>• Ban uses that require more staff</li> <li>• Rotations</li> </ul>
Leadership Conflicts		<ul style="list-style-type: none"> <li>• Involve all parties</li> <li>• Keep leadership and money separate</li> <li>• Pass management plan by law</li> <li>• Different agencies to get approval for activities</li> </ul>
Difficult to Enforce		<ul style="list-style-type: none"> <li>• Conservation Officers</li> <li>• Plan A</li> <li>• Plan B simple</li> </ul>
Lose Sight of Conservation	<ul style="list-style-type: none"> <li>• Plan shelved/not used</li> </ul>	<ul style="list-style-type: none"> <li>• Constant awareness</li> <li>• Some kind of council to enforce</li> <li>• Community involvement</li> <li>• Benefits for community</li> </ul>
Not Telling Others Serious about		<ul style="list-style-type: none"> <li>• Practice what we preach and highlight actions</li> <li>• Be serious about fees and fines</li> </ul>

Conservation		<ul style="list-style-type: none"> <li>• Have a structure for fees and fines – system/range – cutbacks on fines have a process</li> <li>• Outreach</li> </ul>
Lack of information	<ul style="list-style-type: none"> <li>• Assume everyone knows</li> <li>• Information not disseminated</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous outreach &amp; communicate what's new to community</li> <li>• Information dissemination in Palauan</li> <li>• Community meetings w/ entertainment</li> <li>• TV and radio shows</li> <li>• Decentralized information (offices, stores, church, bai, online)</li> </ul>
Taking sand	<ul style="list-style-type: none"> <li>• For construction of house – road <ul style="list-style-type: none"> <li>○ Free</li> <li>○ Accessible</li> <li>○ No one stopping them</li> <li>○ People don't know the law</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 5 Conservation Officers</li> <li>• Awareness</li> <li>• Signs</li> <li>• People monitoring</li> <li>• Fines</li> </ul>
Retaining walls	<ul style="list-style-type: none"> <li>• Beautify</li> <li>• Expand property</li> <li>• Disregard law – careless/ignorance</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring</li> <li>• Awareness</li> <li>• Enforce laws (fines)</li> <li>• Return to normal</li> <li>• Rules prohibiting</li> <li>• Building codes</li> <li>• Setbacks</li> <li>• NPLA bring codes and standards up to modern standards</li> </ul>
Jetties	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Permitting processs (state level)</li> </ul>
Cars	<ul style="list-style-type: none"> <li>• Car racing</li> <li>• Ignorance about law</li> <li>• Easy access</li> <li>• Crushing crabs</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness (external and internal)</li> <li>• Fines from Rubak</li> <li>• Communicate well with Chiefs</li> <li>• Public embarrassment</li> <li>• Impose rules for re-registering vehicle</li> <li>• Confiscate vehicle</li> <li>• Develop rules and policies</li> <li>• System of reporting</li> <li>• Crab-cross signs</li> </ul>

## Appendix 5a. Evaluation Criteria

Objective	Milestone	Milestone Year	Indicator of Success
<b>Goal 1. The laws, regulations, and plans that govern Ngaraard Conservation Areas are effectively implemented and enforced</b>			1) Multiple Leaders have supported plan. 2) Number of successful enforcement actions.
By January 2012, the Board has identified grant sources and technical assistance by coordinating with other agencies.			List of grant sources and technical partners and their roles developed and used by Coordinator.
By June 2012, regulations that effectively manage impacts of activities in conservation areas and areas bordering the conservation area and address outside non-compliance are developed and enforced	Draft regulations developed	Year 1	1) Regulations passed. 2) Fewer or no reports of non-compliance.
By June 2012, a non-profit intergovernmental organization has been established and is able to fundraise			NGO/IGO Charter passed and authorized by national government
By December 2016, there will be at least one grant secured to establish Ngerchokl as an eco-tourist site to generate income for the state.	Grant application developed and disseminated.	Year 3	At least one grant secured
By December 2015, non-compliance offenders will be reduced by 50%.	Permit system developed	Year 1	Number of reports of non-compliance reduced by 50% from baseline
<b>Goal 2. Ngaraard's Conservation Areas and their lands will be maintained for citizens and visitors to enjoy by emphasizing its economic and social value to the community</b>			1) Water quality is at acceptable levels, with no declines. 2) Water flow remains correlated to rainfall (no unexpected anthropogenic declines). 3) Number of areas with exposed soil decreases or near zero. 4) Extent and square area of forest remains at baseline levels or increases.
By December 2013, there are no fires in the Conservation Areas.	Education program established	Year 2	No fires or number of fires declines
By December 2016, littering in all conservation areas and roads leading to those areas will be reduced by 95%.	Education program established	Year 2	Trash reduced
By December 2016, there is no earthmoving or farming in the exclusion zone adjacent to the Conservation Area (10 m zone adjacent to roads)	Legislation passed	Year 1	No earthmoving or farming in exclusion zone
By December 2016, the Bethania Farm has been relocated outside the Conservation Area.	Letter of approval / letter of acceptance by Bethania	Year 2	No farm inside the conservation area

By December 2016, water bodies have been restored and erosion mitigated.	At least one site restored	Year 3	1) Vegetation removed from Ngerchokl and bare areas covered at Metmellasech. 2) Water quality measures show acceptable levels.
<b>Goal 3. Education and awareness programs promoting the value of conservation areas to the people of Ngaraard are developed</b>			1) Increasing buy-in and support among stakeholders between 2011 and 2016, with at least 50% supporting. 2) Increasing levels of stakeholders participating in activities.
By December 2012, an awareness packet will be available for leaders, community, and visitors.			Awareness packet produced, disseminated and materials circulated. 2) Increasing levels of stakeholders participating in activities.
By December 2016, 50% of community survey respondents support the conservation areas.	Baseline collected	Year 1	At least 50% of survey respondents support sites.
<b>Goal 4. Ngaraard's natural resources and species are healthy and abundant and are able to provide for the subsistence use of her citizens</b>			1) Decrease in hunting. 2) Decrease in area affected by invasive species. 3) Populations of birds, mangrove trees, crabs, clams, and bats steady or increasing. 4) Native bird diversity maintained. 5) Forest indicators healthy. 6) Community supports permit system. 7) Decrease in enforcement actions.
By December 2012, the types and locations of invasive species will be identified.			Report shows the types and locations of invasive species developed and disseminated.
By December 2012, a permitting system will be established and implemented for harvest of mangrove trees and crabs	Permit system developed	Year 1	1) Permitting system in place, permits tracked and community knows and supports to permit system. 2) Mangrove trees, crabs, clams, and bats maintained or increased in population.
By 2015, a Vulnerability Assessment and Action Plan for the Conservation Area is developed.	Draft plan ready	Year 3	Plan developed and disseminated.
By December 2016, community survey results show a 50% decline in illegal hunting and bird surveys show increasing or constant populations of birds	Baseline collected	Year 1	1) Community members indicate at least a 50% decline in hunting. 2) 50% decline in enforcement actions. 3) Increase or constant bird populations.
By December 2016, reports and survey results show a 50% decline in illegal harvesting from the Conservation Area.	Baseline collected	Year 1	1) 50% decrease in harvesting from socioeconomic survey. 2) 50% decline in enforcement actions. 3) Forest indicators healthy (seedlings, diversity)
By 2016, invasive species will have been reduced by 90%			90% less area affected by invasive species.
<b>Goal 5. The development of eco-friendly programs for Ngaraard's Conservation Areas benefits the people of Ngaraard State and enhances Palau's tourism industry</b>			1) Number of visitors increases. 2) Amount of income increases.

By March 2012, the established nature trail at Ngerchokl will be made available for guided tours.			1) Trail is completed. 2) Tour guides trained. 3) Tourists increase yearly.
By December 2016, 2 trails or tours have been established for guided tours.	Map or plan for second trail developed	Year 3	2 trails or tours completed.
By December 2016, medicinal and endemic plants have been identified and incorporated into tours.	Plan for handling multiple visitors drafted.	Year 3	1) Signs about medicinal plants placed on trees. 2) Tours include information on medicinal plants. 3) Advertising materials include information.
By December 2016, areas for camping and hiking have been identified and promoted and are generating income.	Zone for camping established	Year 2	1) Areas identified. 2) Income generated from hiking and camping.

### Appendix 5b. Monitoring Plan

Target	Indicator	Lead Party	Methodology	Frequency
<b>Goal 1. The laws, regulations, and plans that govern Ngaraard Conservation Areas are effectively implemented and enforced</b>				
All targets	Number of leaders participating or supporting Plan	Coordinator	Tally of stakeholders participating in events	Monthly
All targets	Number of enforcement actions with successful fines	Coordinator/State Administrative Staff	Count of daily logs and records	Monthly
All targets	Number of fires	Coordinator / Conservation Officers	Visual tally	Monthly
All targets	Number of permits	Coordinator / State administrative staff	Count of records	Monthly
<b>Goal 2. Ngaraard's Conservation Areas and their lands will be maintained for citizens and visitors to enjoy by emphasizing its economic and social value to the community</b>				
Water bodies	Water quality- turbidity	EQPB/PICRC	WiSci	Annual, plus at least once per year after an extreme rain event
Water bodies	Water flow - cubic ft/sec	EQPB/PICRC	WiSci	Annual, plus at least once per year after an extreme rain event
Water bodies	Number of area with exposed soil	PALARIS/Coordinator	Visual census from field visits and digital maps	Annual

Target	Indicator	Lead Party	Methodology	Frequency
Forest	Extent and square area of forest	PALARIS/Coordinator or	Digital map estimated with input from visual census	Annual
All targets	Amount of trash collected from conservation areas	Conservation Officers	Count of bags collected	Annual
<b>Goal 3. Education and awareness programs promoting the value of conservation areas to the people of Ngaraard are developed</b>				
All targets	Percent buy-in/support for Network	Year 1 - PICRC; Year 5 - Coordinator	Socioeconomic survey	Year 1 and Year 5
All targets	Number of stakeholder groups participating	Coordinator	Tally of stakeholders participating in events	Monthly
All targets	Number of community members participating	Year 1 - PICRC; Year 5 - Coordinator	Socioeconomic survey	Year 1 and Year 5
<b>Goal 4. Ngaraard's natural resources and species are healthy and abundant and are able to provide for the subsistence use of her citizens</b>				
All species targets	Percent stakeholders responding yes to questions about hunting	Year 1 - PICRC; Year 5 - Coordinator	Socioeconomic survey	Year 1 and Year 5
All species targets	Number of enforcement actions against hunters	Coordinator/Conservation Officers	Count of daily logs	Monthly
Forest	Area affected by invasive species	Coordinator	Visual census from field visits	
Birds	Population of birds	BNM	National Bird Monitoring method	Monthly
Mangrove	Number of mangrove trees	PICRC	PICRC Method	Annual
Mangrove crabs and clams	Population of mangrove crabs and clams	PICRC	PICRC Method	Annual
Fruit Bats	Population of fruit bats	BNM/PICRC	National Bird Monitoring method	Annual
Birds, Forest	Native bird diversity maintained	BNM	National Bird Monitoring Method	Monthly
Trees, Forest	Tree diversity	Forestry	Plot method	Year 1 and Year 5
Forest	Presence/absence of seedlings	Forestry	Plot method	Year 1 and Year 5
All targets	Percent buy-in/support for regulations	Year 1 - PICRC; Year 5 - Coordinator	Socioeconomic survey	Year 1 and Year 5
<b>Goal 5. The development of eco-friendly programs for Ngaraard's Conservation Areas benefits the people of Ngaraard State and enhances Palau's tourism industry</b>				
Ngerchokl (natural/cultural site)	Number of visitors	Coordinator/Tour guides	Basic count of visitors	Monthly
Ngerchokl (natural/cultural site)	Amount of income generated from site	State administrative personnel	Tally of income	Monthly



## **Appendix 6. Legislative Recommendations (Non-binding)**

1. Pass a resolution to approve the Management Plan
2. Amend NSPL 7-25 to provide stricter regulations of the 10 m “Exclusion Zones” surrounding the Conservation Areas
3. Amend NSPF 7-25 to expand the Diong Era Ngerchokl and Metmellasech Conservation Areas to include the entire watersheds draining into them
4. In the second and third years, pass resolutions and/or regulations to adopt regulations, permits, etc. as they are developed
5. When new information so recommends it, pass legislation or resolutions to amend zones and restrictions in the Management Plan