

Jaluit Atoll

Background Report

Environmental Resource Management Plan

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EXECUTIVE SUMMARY & RECOMMENDATIONS

The environmental resources of Jaluit Atoll (marine and terrestrial) require management.

GOALS

The goals of the Jaluit Atoll Environmental Resource Management Plan (ERMP) are to provide all stakeholders with a framework to guide environmental resource management initiatives that will assist the community to maintain healthy marine and terrestrial environments for current and future generations. The options set forth in the ERMP are specifically designed to promote and empower all communities to actively participate in the protection of the atoll's valuable resources, while allowing for sustainable use.

TARGET AUDIENCE

The target audience for this report is the people of Jaluit Atoll and the Government of the Republic of the Marshall Islands (RMI). This includes Conservation Area Coordinating Committee members (the CACC), the Conservation Area Support Officer (the CASO), Jaluit Atoll Local Government (the JALG) council members, traditional landowners (Iroij and Alabs), all other members of the Jaluit Atoll community, and the RMI Environmental Protection Agency (EPA) who are supporting management activities at Jaluit.

Every attempt has been made to ensure that this report is clearly and concisely written. Layman's terms have been used where possible to simplify difficult issues to provide a resource for use by all and hopefully assist community members to better understand the complex issues facing their environment and its management.

CONSULTATION PROCESS

The ERMP has been developed through an extensive dialogue of formal and informal meetings and workshops held on Majuro and Jaluit Atolls. Traditional leaders, landowners, JALG and CACC members, elected national government representatives, staff from several government agencies and the Jaluit Atoll community at large, attended these meetings. All documents and publications pertaining to the atoll's resources and their uses, industries and developments were consulted.

The priority recommendations listed below are the result of this stakeholder consultation. They highlight activities and concerns that need direct and immediate action.

Recommendations:

- » *Formal and informal community meetings and stakeholder discussions should be an ongoing activity undertaken by the CASO. These activities should be undertaken regularly and over the long-term.*
- » *Feedback should be used to update the ERMP..*

TRADITIONAL MANAGEMENT APPROACH AND ZONATION

All Jaluit Atoll's stakeholders share the same goal - to conserve and properly manage the atoll's marine and terrestrial resources. It is clear that the community of Jaluit Atoll hopes to achieve this goal by utilising traditional management practices, specifically the system of taboo areas called 'Mo'.

Mo function as marine and terrestrial restricted Zones’. They are traditionally declared, managed and enforced by the traditional chief (Iroi) and landowners of each community.

This system, therefore, forms the basis of the proposed management framework.

The traditional Mo system by itself, however, is insufficient to handle the growing pressures on the natural resources. Specific modern resource management practices have been incorporated into the ERMP to supplement the traditional system.

Consequently, the resulting ERMP merges traditional and modern resource management practices and concepts. Mo’s are proposed as one zone within the three-tiered zonation system that forms the basis for the ERMP. The other zones are called General Use areas and Sanctuaries. Each zone has specific restrictions on activities.

There are additional Atoll-Wide Bans that encompass all zones.

Fifteen Mo’s, and 14 Sanctuaries were identified and agreed upon by relevant community leaders and members.

Detailed maps defining these zones (including Global Information System (GIS) data points) have been produced (refer Section 8.2). Mo and Sanctuary locations will need to be visibly marked (e.g. mooring buoys) to assure easy and immediate identification of the zones by all atoll users.

<p>General Use Zone</p> <ul style="list-style-type: none"> • All areas outside Mo’s. • Allows Subsistence, Off-island Demand, Special Occasion, Ecotourism and Commercial activities. • Atoll-Wide Ban restrictions apply.
<p>Mo Zone</p> <ul style="list-style-type: none"> • Community determined areas. • Allows Subsistence, Special Occasion and Ecotourism activities. • Total ban on all Off -Island Demand and Commercial activities. • Atoll-Wide Bans restrictions apply.
<p>Sanctuary Zone</p> <ul style="list-style-type: none"> • Biologically important area located within Mo’s. • Strictly No Take Zones. • No activities allowed (except ecotourism if permission is granted by community). • Atoll-Wide Ban restrictions apply.

Recommendations:

» *The Zone boundaries should be 1) clearly defined, marked and agreed to by each community, 2) incorporated into local council ordinances, and 3) passed into atoll legislation.*

ATOLL-WIDE BANS

Through consultation with stakeholders, 14 Atoll-Wide Bans are recommended. These are to prevent further over-exploitation of specific resources, particularly those that have been targeted by commercial activities in the past. Atoll-Wide Bans are valid in all zones.

Recommendations:

» *All Atoll-Wide Bans should be put into local council ordinances and passed into atoll legislation as soon as possible.*

PUBLIC AWARENESS

The success of the ERMP relies heavily on continued acceptance and support from all sectors of the Jaluit Atoll community. This will be best achieved through a strong public awareness program coordinated by the CACC and CASO.

Recommendations:

- » *An intensive atoll wide public awareness and education program must be ongoing under the coordination of the Conservation Area Support Officer (CASO) and the Conservation Area Coordinating Committee (CACC). All sectors of the community (even those living off-island) need to be targeted. The program needs to include awareness on the following issues:*
 - *Importance of the Atoll’s natural resources to community well-being,*
 - *Rationale and details of the zones and their restrictions,*
 - *Rationale and details of Atoll-Wide Bans,*
 - *Enforcement methods & the role of the communities, and*
 - *How the ERMP will directly affect the communities.*

ENFORCEMENT

Enforcement of the ERMP is critical to its long-term success. Once the zones, bans and other recommendations presented in the ERMP are put into ordinance, the JALG will be able to support and assist the communities in patrolling their areas.

Enforcement of the ERMP has been designed to include the communities.

Recommendations:

- » *Rangers need training in the details of the ERMP and enforcement skills.*
- » *Rangers need to liaise closely with the community at all times.*

IMPACTS

Communities identified extractive resource activities and shore-based impacts as the two biggest threats to the atoll’s environment. Extractive activities include all resource harvesting, (e.g. for subsistence, to meet off-island demand, for special occasion and for commercial benefits). Shore-based impacts include land clearing, coral/sand dredging, solid waste and sewage disposal.

Several methods to reduce impacts are presented. These include:

- Best Environmental Practices (BEP’s) to limit impacts from tourism.
- A Waste Management Plan to limit impacts from solid waste and sewage disposal.
- Environmental Impact Assessments (EIA) and Management Plans for all development projects to limit the impacts of development & construction.
- On-going Marine Monitoring Programs to provide information (based on scientific data) to identify actions that may need to be taken to protect natural resources.

Recommendations:

- » ***BEP's for Tourism Operations** should be developed with and approved by communities and put into ordinances. They need to be well advertised to tourists and tourism operations.*
- » ***A Waste Management Assessment** should be conducted, and a plan developed and implemented. The plan must address community concerns about increasing pollution by poor solid waste and sewage disposal.*
- » ***The recommended Marine Monitoring Program** should be implemented. The Fish Base data collection and analysis programs, and the atoll-wide marine resource assessments, should be priority activities. Capacity building and training must be an important component.*
- » ***Environmental Impact Assessments and Management Plans** focussing on best environmental practices should be developed and implemented for all future development activities.*
- » ***Prohibition of all new commercial marine-harvesting activities** should be put into ordinance until sufficient biological information has been collected to develop correct Management Plans for specific resources. This would be reviewed as resource numbers increase.*

ECOTOURISM

All stakeholders raised ecotourism as one of the key potential economic growth industry for the atoll. It is an attractive alternative income-generating activity that can bring financial gain without depleting resources. A series of Best Environmental Practices (BEP's) has been developed. These BEP's should be put into local council ordinances **before** the tourism industry develops further.

Recommendations:

- » ***Ecotourism Best Environmental Practises (BEP's) and Best Community Practices (BCP's)** should be put into local ordinances, and enforced. They need to be well advertised to communities, tourists and ecotourism operators. They should be reviewed regularly to make sure they address changing community concerns and needs.*
- » ***User Fees** should be negotiated between the CACC and each community. A system of fee collection and distribution needs to be decided.*
- » ***An Ecotourism Community Training Program** should be undertaken to develop a plan for the development of a sustainable scuba diving industry that does not impact on the environment or culture.*

DEVELOPMENT

With increased development on outer atolls in the RMI, care must be taken to ensure that development occurs in an environmentally compatible manner. EIA and subsequent Management Plans, with Risk Management systems and Best Environmental Practices, should be implemented for all future development activities.

Recommendations:

- » *Environment Impact Assessments should be a mandatory requirement for all future development activities within Jaluit Atoll.*
- » *Adherence to Best Environmental Practises should be a mandatory requirement of all development programs.*

ACKNOWLEDGEMENTS

The consultants wish to express their gratitude and appreciation to all individuals and organizations that contributed in all stages of the development of the Jaluit Atoll Environmental Resource Management Plan .

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The success of the consultants' site visit on Jaluit Atoll depended greatly on the assistance of Mr. Albon Ishoda (EPA), Mr. Miram Ankeid (CASO), Mr. Maity Bungitak (assistant to the CASO) and Mr. Aldon Jacklick (councilman and traditional leader).

The support of the national government Ministers Mr. Tadashi Lometo, Mr Alvin Jacklick and Mr Rien Morris with their highly regarded advice is greatly acknowledged. Department Directors, Mr. Danny Wase (MIMRA) and Mr. Mark Steges (MIVA) were also very helpful and encouraging, whilst Mr. Augustine Nakamura (Jaluit Atoll City Manager) provided valuable advice and guidance on traditional matters.

Many thanks are given to Ms. Mary Power, Coastal Management Adviser and Ms. Elizabeth Patterson Coastal Management Support Officer, South Pacific Regional Environment Programme (SPREP) and to the International Coral Reef Action Network (ICRAN), which provided the funds to support this work. The Jaluit Atoll Conservation Area is funded through SPREP and the UN Environment Program (UNEP) by the UN Foundation.

Special thanks are extended to the Jaluit Atoll Local Government council members, traditional leaders and all community members who actively participated in the consultation meetings and discussions that provided information essential to the development of this plan. Without the assistance and advice from such a wide group of individuals within the community the ERMP could not have been developed.

Kommol Tata (Thankyou).

ABBREVIATIONS

BCP	Best Community Practices
BEP	Environmental Best Practices
BSAP	Biodiversity Strategy and Action Plan
CACC	Jaluit Atoll Conservation Area Coordinating Committee
CASO	Conservation Area Supporting Officer
CMI	College of the Marshall Islands
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ERMP	Environmental Resource Management Plan
GIS	Global Information System
HPO	Historic Preservation Office
ICRAN	International Coral Reef Action Network
IUCN	The World Conservation Union
JACA	Jaluit Atoll Conservation Area
JADA	Jaluit Atoll Development Association
JALG	Jaluit Atoll Local Government
JAMCA	Jaluit Atoll Marine Conservation Area
MIMRA	Marshall Islands Marine Resource Authority
MIVA	Marshall Islands Visitors Authority
MOU	Memorandum of Understanding
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-Government Organisation
RMI	Republic of the Marshall Islands
SPBCP	South Pacific Biodiversity Conservation Program
SPREP	South Pacific Regional Environment Programme
UNEP	United Nation Environment Program

FOREWORD

We, the Jaluit Atoll community, our traditional leaders and elected representatives, are concerned over increasing trends of resource depletion within our atoll. We want to develop a plan that will protect our environment while allowing sustainable use of our atoll's natural resources.

We have already begun this process by establishing the Jaluit Atoll Conservation Area (JACA) in 1999. This was done through the combined efforts of the Jaluit Atoll Development Association (JADA), the Conservation Area Coordinating Committee (CACC), the Jaluit Atoll Local Government (JALG), the traditional leaders, the communities and the RMI Environment Protection Authority (RMIEPA) and the Conservation Area Support Officer (CASO).

Becoming a Conservation Area means that the local communities, the Jaluit Atoll Local Government (JALG), the RMI national government and we the community have committed ourselves to conserving and sustainably managing our local environment.

To guide us in the management of the Conservation Area we have, with the help of many people developed this Management Plan. This plan demonstrates our commitment to manage our precious resources and heritage for our community and our children.

Iroj Anjua Loeak

Iroj Imata Kabua

Hon. Alvin Jacklick, Minister of Health

Hon. Rien Morris, Minister of Internal Affairs

Hon. Antari Jason, Mayor, Jaluit Atoll

1 THE VISION

*“We, the people of Jaluit Atoll,
will strive to conserve and sustainably manage the biodiversity of the
atoll for the subsistence and the social-economic needs of the
present and future generations”*



2 INTRODUCTION

2.1 Background to the Management Plan

The Jaluit Atoll community, their elected representatives and traditional leaders, expressed concern over increasing trends of resource depletion within the atoll. They wish to be leaders in their region and develop a process that will protect their environment while allowing sustainable use of the atoll's natural resources. A formal request was made to the South Pacific Regional Environmental Programme (SPREP) in the late 1990's for assistance in achieving this goal.

As a result, with funding and technical support from SPREP under the GEF-UNDP South Pacific Biodiversity Conservation Programme (SPBCP), the Jaluit Atoll Conservation Area (JACA) was declared in 1999. The Conservation Area includes the entire atoll. It was developed by the combined efforts of the Jaluit Atoll Development Association (JADA), the Conservation Area Coordinating Committee (CACCC), the Jaluit Atoll Local Government (JALG), the communities, the traditional leaders and the RMI Environment Protection Authority (EPA). Support from the SPBCP ended in December 2000.

The South Pacific Regional Environment Programme (SPREP) continues to support the management of the JACA, through the International Coral Reef Action Network (ICRAN) Pacific Action Phase. The development of the Jaluit Atoll Environmental Resource Management Plan (ERMP) is part of this support.

ICRAN is funded by the United Nation Foundation through the UN Environment Program (UNEP). It is dedicated to curtailing and reversing degradation of coral reefs worldwide. The focus of this program is to establish a global network of 'demonstration sites' of integrated coastal and marine protected areas that use good management practices and involve local communities. Jaluit Atoll is one of the Pacific 'demonstration' sites. The RMI Environmental Protection Agency (EPA) has the overall responsibility for the Conservation Area. Day-to-day management decisions are made jointly with the Conservation Area Coordinating Committee (CACCC), which is composed of traditional landowners, community members, and EPA representatives. The Conservation Area Supporting Officer (CASO) is responsible for carrying out day-to-day activities within the Conservation Area, such as public awareness and community liaison, enforcement and resource monitoring.

Becoming a Conservation Area meant that the RMI national government, the Jaluit Atoll Local Government (JALG) and local communities committed themselves to conserving their local environments through the implementation of a multi-level program including resource management strategies and alternative income generating programs (e.g. ecotourism). Six strategy goals were developed for implementing the Conservation Area Program.

Strategy Goals:

1. A sustainable Marine Resource Management Plan.
2. A sustainable Terrestrial Resource Management Plan.
3. Community-based management structures.
4. Alternative income generating activities (e.g. ecotourism, handicraft).
5. Public awareness, training and education programs.
6. Capacity building to enable communities to effectively manage the Conservation Area.

This report and the Management Plan developed from this scoping process, provides the essential information and direction to empower the communities to sustainably manage their environment and resources within the atoll.

Furthermore, the ERMP strategies and goals reinforce and support RMI's Biodiversity Strategy and Action Plan (BSAP) for the conservation of the nation's biodiversity and sustainable use (Tibon & Mohamed, 1999).

The four strategies and tasks of the RMI BSAP that are directly relevant to the management and utilization of Jaluit Atolls natural resources are:

Strategies of the RMI's Biodiversity Strategy and Action Plan (Tibon & Mohamed, 1999).

1. Conservation of biodiversity and biological resources.

- Activate traditional "Mo" conservation sites.
- Imposition of fines and penalties on those who destroy resources.

2. Protection of the marine environment.

- Training and capacity building towards conserving our resources.
- Sustainable fishing practices.

3. Traditional culture and practices.

- Apply traditional skills and knowledge.
- Institute learning of the culture through the traditional way of passing knowledge from elders to the young, through schools, community meetings and workshops.

4. People and Biodiversity.

- Self-reliance through traditional values and cultures.
- Population awareness.
- Working cooperatively and justly with one another.
- Clean up the environment.

2.2 Stakeholders

The development and long term implementation of the ERMP requires active involvement from all sectors of Jaluit Atoll.

Key stakeholders include, but are not limited to:

- **Local Communities** - residents and landowners who live on the atoll and are an integral part of both the problems and solutions of environmental resource management.
- **Local Government (Council)** - elected members of government that represent the people. This group is required to take a lead role in establishing atoll ordinances, enforcing protocols and increasing public awareness.
- **National Government** - government officials and agencies that provide advice to atolls. Many national government agencies need to be actively involved in the ERMP by providing advice and expertise on a wide range of legislative and environmental resource management issues. Leading roles will need to be taken by the EPA, MIMRA and MIVA.

- **Local, National & International Non-Government Organisations (NGO's)** - organisations that provide advice and assistance to all stakeholders. They promote best practice resource management concepts and implementation techniques at the community level.
- **Private Sector** - privately owned and operated companies, such as tourist operations and commercial fishing companies. They need to help communities by incorporating sustainable management practices and BEP's into their business plans. Lead roles will have to be taken by the tourism and marine fisheries industry sectors.

2.3 Previous Studies

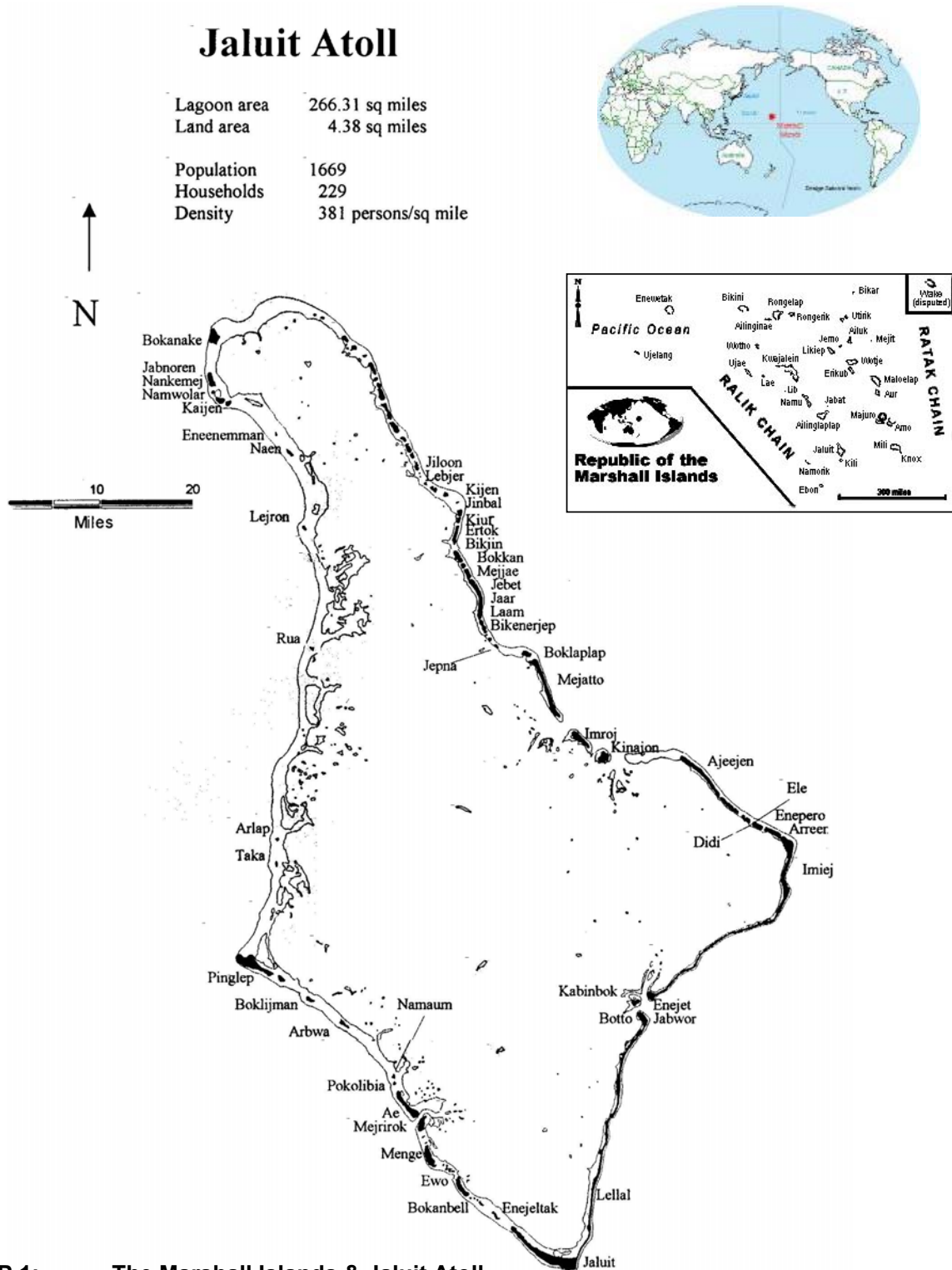
There are several comprehensive reports written about Jaluit Atoll. Combined, they form the foundation on which the present Jaluit Atoll Conservation Area project is based.

All reports were closely consulted during the development of the ERMP. Updated information was gathered during community and government consultations.

Previous studies include:

- **SPREP (2001) *Feasibility Assessment & Support for Community Ecotourism Development*** prepared by Robin Aiello. This report reviews the potential for ecotourism on Jaluit Atoll, and develops a recommended guesthouse accommodation project with several guided tour options.
- **SPREP (2000) *Marine Resource Survey of Jaluit Atoll, RMI for Marine Management & Conservation Area Project***, prepared by Stephen Lindsay. This report is a detailed survey of the status of marine resources within Jaluit Atoll, and recommends a marine monitoring program to collect data to help develop appropriate Management Plans for resource use.
- **Jaluit Atoll Development Association (2000) *Jaluit Atoll Conservation Area Business Plan***.
- **SPREP (1999) *Project Preparatory Document, Jaluit Atoll Conservation Area Project RMI***, This report outlines the rationale behind selecting Jaluit Atoll as a Conservation Area.
- **Thomas, Emily (1998) *Community-based Tourism Development for Jaluit Atoll***, University of Oregon, Micronesia and South Pacific Program. This document reports on the completion of three activities recommended in a previous report Miller (1997): 1) beach clean-up activity, 2) a tour guide training session for men & women, and 3) suggested text for a Jaluit Atoll Guidebook.
- **Miller (1997) *A Community-based Tourism Plan for Jaluit Atoll***, University of Oregon Micronesia and South Pacific Program. This report reviews natural, cultural & historical resources, infrastructure, and the level of community support on Jaluit Atoll. It lays out the suggested framework for community-based tourism development in Jaluit.
- **Deunert, B. et al (1996) *Anthropological Survey of Jaluit Atoll: terrestrial and underwater reconnaissance surveys and oral history recording***, Republic of Marshall Islands Historical Preservation Office. This report documents significant historical features and relics, both on land and underwater. They are documented, mapped and analysed for universal significance.

3 THE JALUIT ATOLL CONSERVATION AREA



MAP 1: The Marshall Islands & Jaluit Atoll
 (Note: the Conservation Area covers the entire atoll)

3.1 Geography

Jaluit Atoll is the southern district centre of the Marshall Islands, located at 6°00' north latitude and 169° 34' east longitude (Map 1). It is located approximately 210 kilometres (130 miles) south east of Majuro, the capital of the Republic of the Marshall Islands.



A ring of shallow coral reefs and islands surround the outer perimeter of the lagoon. Jaluit Atoll is a large coral atoll, covering 690 square kilometres (266 square miles) and includes a land area comprising of 91 islets covering an area of 7 square kilometres (4.38 square miles).

Jaluit Atoll was the capital of the Marshall Islands during the German (1878-1914) and Japanese (1914-1943) administrations. It also played a significant role during both WWI and WWII.

The entire atoll was designated a Conservation Area in 1999 as part of the South Pacific Biodiversity Conservation Program (SPBCP) which was managed through the South Pacific Regional Environmental Programme (SPREP).

3.2 Demographics

Predominate demographic trends for the RMI include rapid population growth and unplanned urbanization. These trends are especially prevalent in the urban centres, and have direct impacts on the biodiversity and environmental integrity of the nation (SPREP, 1993).

Within the outer atolls, an increasing percentage of the population is children. In some cases, over 50% of the communities are primary school children. This trend is due mainly to the steady migration of young adults from the outer atolls to the larger centres of Majuro and Ebeye, and to other locations throughout the world (mainly the USA) for education and employment.



The current population, at any one time on Jaluit Atoll is approximately 1000 individuals.

3.3 Ecosystems & Resources

Jaluit Atoll is large atoll with a wide range of relatively pristine and healthy ecosystems.

The diverse marine and terrestrial habitats, including reefs, sandflats, lagoons, seagrass beds, deep water, mangroves and sand cays, support a wide range of organisms that are presently maintaining relatively healthy, reproducing populations. The atoll was designated a Conservation Area as part of an effort to develop a program for the atoll that would safeguard the marine and terrestrial ecosystems.

MARINE RESOURCES

The marine resources of Jaluit Atoll have been reported to be generally in good condition (SPREP, 2000). Ocean-side reefs and atoll passes are pristine, with high percentage coral cover and biodiversity. Fishery resources, apart from commercially targeted invertebrate species (e.g. sea cucumbers [beche-de-mer], trochus, giant clams, black pearl oyster shell and mangrove crabs), are healthy and support the island's subsistence life style. The high marine biodiversity within Jaluit Atoll is thought to make a significant contribution to marine life on reefs, not only within the Jaluit Atoll system, but also throughout the southern atolls of the Marshall Islands.

However, populations of some specifically targeted animals have been and are still being over-exploited, due to commercial and off-island demand pressures. These resources, particularly giant clams, sea cucumbers (bech-de-mer), pearl oysters and trochus, are in great danger of becoming locally extinct. Unfortunately, the majority of the commercial resource collection activities have been carried out without using sustainable resource harvesting practices. Over-exploitation of resource stocks has occurred. Urgent management options need to be initiated to prevent further decline of these stocks (SPREP, 2000).

In addition, the recent development and opening of the Jaluit Atoll Commercial Wholesale Fish Base has commercialised atoll fishing. Wide ranges of inshore and pelagic food fish species are sold for off-island consumption in Majuro and Ebeye. Accurate assessment of the status of these resources and the pressures on them is needed to allow the correct management of these resources and prevent over-fishing and the collapse of the atoll's food fish resources.

TERRESTRIAL RESOURCES

Due to the limited land area of Jaluit Atoll, terrestrial species diversity is naturally limited. Despite heavy pressures dating back to the German and Japanese administrations, the islands terrestrial habitats remain in relatively good condition.

Some of the terrestrial resources, however, have been severely impacted. Mangrove crabs and coconut crab populations have already been over-harvested and anecdotal information indicates that mangrove crabs may be locally extinct.

Land clearing for the extension and up grading of the road between Jabwor and Jaluit Jaluit has caused localised physical removal of all vegetation and associated wildlife. Sand dredging associated with this development has also degraded these shallow areas and greatly increased sedimentation load in the nearby marine environment.

Other resources, including mangrove swamps, turtle nesting beaches and seabird roosting islands remain in relatively stable conditions, although some 'one-off' impacts have been recorded.

Maintaining healthy populations of terrestrial organisms and habitats are essential to the overall environmental health and long term sustainability of the atoll and to the livelihoods of the population. In addition, these resources are important to future promotion and success of the local ecotourism industry.



3.4 Traditional Resource Ownership & Management

RESOURCE OWNERSHIP

Traditionally, Iroij own all land and water resources within a community's jurisdiction. By birthright, Iroij have absolute power – including all resource use, preservation and management.

Landownership in Jaluit Atoll is different from that of other Marshallese atolls. On most atolls ownership extends over the land and coastal areas, not deep water and submerged reefs. On Jaluit Atoll, however, ownership includes land, coastal, deep water and submerged reefs. In the past, Jaluit Atoll communities battled one another for ownership of these reefs within the lagoon. These rights are maintained to this day with some communities owning reefs on the opposite side of the atoll from where the community actually resides.

This jurisdiction issue is an extremely important consideration when determining the most appropriate resource management system for the atoll. Landownership has been carefully incorporated in the ERMP.

This traditional system, however, has weakened with time. More and more of the resource management responsibility, especially with regards to marine resources, have fallen under the responsibilities of the Local Government Council.

RESOURCE MANAGEMENT

Unfortunately, this change of responsibility has led to a slow decline in traditional awareness of resource values. This, in turn, has resulted in a decline in sustainable management practices. Lack of adequate enforcement has resulted in overexploitation of resources, mostly for Off-Island Demand.

Traditional resource management is based on a system whereby the Iroij would 'set aside' one or more parcels of land and/or reef as 'Mo' (taboo areas). The Iroij would declare what animals are protected, and for how long. Some communities have only one Mo, while others have several.

Usually the removal of any animal or plants within the Mo was forbidden. Special permission was needed from the Iroij to enter the area to collect anything. Some Mo were seasonal while others were more or less permanent. In effect, Mo function as 'restricted' zones. Resource harvesting was limited to special traditional occasions (e.g. wedding or funeral feasts).

Enforcement remained the responsibility of the communities themselves.

3.5 Government & Traditional Society

NATIONAL GOVERNMENT

The Government of the Republic of the Marshall Islands (RMI) is a democracy, consisting of a 33 member parliament (Nitijela) which represents the 24 inhabited atolls and islands of the nation. The President, who is elected by parliament members, is head of the government. The President appoints to Cabinet posts from the members of the parliament.

In addition to the western style Democratic government, the traditional Marshallese governing system is also strong and deeply respected. The traditional system is a hierarchical system with paramount chiefs (or Iroij) playing important roles in politics. A council of 12 Iroij act as an

advisory group to the parliament, especially on matters that affect customary law, traditional practice and land tenure (Marshall Island Government, 2000).

LOCAL GOVERNMENT

Each of the inhabited islands has a Local Government that consists of a Mayor and a Council that holds jurisdiction over their own atoll including the land, lagoons and all waters up to 5 nautical miles offshore from their reefs. Each Local Government is based on the national government legislative system, however they have the power to introduce laws and regulations pertinent to their atoll's affairs (Marshall Island Government, 2000). Therefore, local councils have jurisdiction over the majority of coastal and marine management issues (SPREP, 1999).

TRADITIONAL SYSTEM

Each inhabited island has a traditional hierarchical system centering around the traditional chief, (Iroj). Each Iroj selects one or more "Alap" who manage the lands. Dir- jerbai are the people who work and live on the land (Marshall Island Government, 2000).

Although the Iroj may not hold absolute power as they once did, they are still highly respected by communities and play a vital role in the atoll's politics. All major decisions regarding the communities are taken to the Iroj for their approval (Marshall Island Government, 2000).

3.6 Economics

SUBSISTENCE

The majority of the population of Jaluit Atoll relies on subsistence activities to support their basic needs. The main subsistence activities are fishing and collecting of marine organisms and the production of certain food crops.

The main source of income for the communities is from limited Local Government employment, copra production and funds provided by relatives working in the urban centres of Majuro and Ebeye, or overseas.

COMMERCIAL HARVESTING

Additional cash incomes have been traditionally generated from commercial harvesting of marine resources, primarily sea cucumbers, trochus and pearl shells. The recent opening of the government owned Jaluit Atoll Fish Base provides periodic cash income to fishermen.

ECOTOURISM

An emerging economic activity within Jaluit Atoll Conservation Area is ecotourism. Although economic benefits of ecotourism might take a few years to be realised, there is potential for a successful industry. If developed well, the income derived from ecotourism could benefit the local communities, and provide a source of income that does not require exploitation of the natural environment and resources.

The Ecotourism Feasibility Assessment Report (SPREP 2001), developed for the JACA (SPBCP), identified several areas of high ecotourism value.

Various Ecotourism projects and activities were recommended in the report. Several of these recommendations have been implemented, including:

- Five traditional-style ecotourist guesthouses have been built on the northern end of Jaluit Atoll. They were opened to the public in mid-2002, and have already had several guests. A series of associated guided tours were also developed, but have not been used.

- Mangrove forest pathways have been built by local community members and the CASO through the Jaluit Jaluit mangrove forest.

Increased visitation is expected. The RMI Department of Works is currently extending and widening the Jaluit airstrip in anticipation of greater development and larger planes landing in Jaluit Atoll. In 2002 Air Marshall Islands changed their flight schedule to link Jaluit and Kwajelein Atolls. This has the potential to bring tourists from the military base. The flights have been scheduled to encourage people to spend a long weekend on Jaluit Atoll.

Jaluit Atoll has wildlife, historical and cultural values, that could support a strong ecotourism industry. The growth of ecotourism, however, relies heavily on the ability of the local community members actually being able to provide the products that they are advertising. In order to do this, there needs to be better communication between communities, traditional leaders, the CASO, government agencies and private businesses in Jaluit and Majuro.

The designation of the Jaluit Atoll Conservation Area and the development of this Management Plan are both positive steps towards attracting ecotourism to Jaluit. Eco-tourists are attracted to places that have an obvious dedication to protecting their environment (SPREP, 2001).

HANDICRAFT

Handicraft production and sales is being considered as a potential income generating activity. Initial steps were taken in 2001, including the formation of a CACC sub-Committee on handicrafts. This committee made some progress with refurbishing the airport terminal building into a handicraft store. However, complications arose, and there is at present, no commercial handicraft business on the atoll.

SCUBA DIVING

There is no permanent dive operation on Jaluit Atoll. Awareness of Jaluit Atoll as a diving destination, however it is increasing. In 2002 several groups of international divers came to Jaluit Atoll on pre-arranged tours organised by dive operations in Majuro.

The potential for a strong reef and wreck scuba diving industry in Jaluit is high. The reefs have all the elements necessary for a successful industry – clear water, healthy reefs, diverse animal life, WWII wrecks and sheltered locations.

DEVELOPMENT

New developments in Jaluit Atoll include the expansion of the airstrip and the paving of the road from Jabwor to Jaluit Jaluit. Further developments are planned for the near future.

It is important to consider the possible effects of development on the new ecotourism industry in Jaluit. The community of Jaluit Atoll is dedicated to managing their environment (and developing a strong ecotourism industry on the atoll), therefore minimising impacts of all development activities needs to be considered during the planning and construction phases of those developments.

Best Environmental Practices (BEP) and Environmental Impact Assessments (EIA) should be followed during all phases of construction. This should be put into ordinance so that it can be better enforced.

4 IMPACTS & THREATS

4.1 General Impacts/Threats

Extractive resource harvesting and shore-based impacts were identified in all community discussions as being the two biggest threats to the atoll's environment.

Each impact affects resource stocks differently, therefore all proposed management recommendations have been designed to address impacts independently.

EXTRACTIVE IMPACTS

- **Subsistence** - daily activities undertaken in the pursuit of providing food, shelter and livelihoods for family and community.
- **Meeting Off-Island Demand** - extraction of large quantities of resources to be sent off-island to meet family and social obligations. The quantities of resources taken exceed subsistence requirements. Money is usually not exchanged, so it is not officially a commercial activity.
- **Special Occasion** –extraction of large amounts resources for the purpose of a feast or other special community event within Jaluit Atoll (e.g. funerals and weddings).
- **Commercial** –extraction of resources for sale and commercial profit, usually for off-island markets.

SHORE-BASED IMPACTS

Shore-based impacts in Jaluit Atoll are limited, especially when compared to the nations centres of Majuro and Ebeye. However, increased development and urbanisation in the atoll centres of Jabwor and to a lesser degree Jaluit Jaluit, have resulted in increased impacts.

Several shore-based impacts were identified during community consultation and site inspection:

- **Land Clearing** – clears vegetation and increases erosion and sedimentation.
- **Shoreline and Coral Dredging** – destroys coastal habitats, increases erosion and sedimentation, and is unattractive.
- **Solid Waste Pollution** – ruins the scenic values, and leads to water and soil contamination.
- **Sewage Pollution** - leads to water and soil contamination. It can also result in increased algal growth in nearby lagoon waters, which causes coral reef death.



DEVELOPMENT

Recent preparation for a paved road between Jabwor and Jaluit Jaluit has increased clearing of the coastal vegetation along both sides of the road. This has led to increased sedimentation discharges into the lagoon. Multiple dredging sites along the road have created significant local impacts on the lagoon coastline.

Furthermore, community concerns were expressed throughout the atoll for the urgent need of an atoll-wide waste management program to help control the growing solid waste problems related to increased development.

4.2 Extractive Impacts

Extractive activities target a wide variety of marine resources. Each resource stock is affected differently, therefore all proposed management recommendations have been designed to address impacts independently.

GIANT CLAMS

Four species of giant clam are present in Jaluit Atoll: *T. gigas*, *T. maxima*, *T. squamosa* and *Hippopus hippopus* (SPREP, 2000). Populations of each species within the atoll differ (SPREP, 2000).

Subsistence Value – VERY HIGH

Giant clams are an important subsistence food. They are consumed by a majority of households.

Economic Value – LOW

The economic value of giant clams to the community is currently low. The majority of giant clams are harvested for subsistence or off-island demand. Giant clams could be a commercial value as a sale food item in Majuro and Ebeye. They are also economically valuable in the international aquarium trade. At present, neither of these commercial activities occurs in Jaluit.

Giant clams, especially in large numbers, are attractions for eco-diving operations. Good stock populations of all species of giant clams are good for ecotourism.

Threats - EXTREME

Current harvesting levels of all species of giant clams (especially *T. maxima*) within Jaluit Atoll are a high. Harvesting of giant clams for off-island demand has greatly increased over the past two years, with all communities acknowledging increase resource extraction.

- » Harvesting pressures on *Tridacne gigas* have been so severe that it is reportedly extinct.
- » *Tridacna maxima* have the largest and healthiest stock populations, although numbers are rapidly decreasing.
- » Population numbers of *T. squamosa* and *H. hippopus* are extremely low from over-harvesting.

Recent over-exploitation of *T. maxima* for Off-Island Demand has been recorded. All communities agreed that extractive controls and public awareness programs needed to be implemented immediately.

BLACKLIP PEARL OYSTERS

The tropical blacklip pearl oyster *Pinctada margaritifera* is the only commercially valuable species of tropical pearl oyster in Jaluit Atoll. The artificial culture of this species has been developed in other Pacific nations that have produced gem quality back pearls. This industry is in its infancy within the Marshall Islands.

Wild stocks of blacklip pearl oysters were heavily harvested from Jaluit Atoll in the early to mid 1990's and in mid 2002. They were collected from the lagoon, stored at a holding farm within the atoll and transported to other atolls in the RMI for commercial farming. In 1999

wild oyster spat were collected on artificial substrates in attempts to start an industry in Jaluit. Poor survival rates prompted the discontinuation of this program (SPREP 2000).

Subsistence Value – LOW

Pearl oyster are seldom collected and used as a food source by the communities.

Economic Value – POTENTIALLY HIGH

The cultivation of pearl oysters within Jaluit Atoll for the purpose to culturing black pearls has a high economic potential for the community.

Tours of pearl farms can also generate income through entrance fees and pearl sales.

Threats - EXTREME

The harvesting and removal of these animals from Jaluit has resulted in a large decrease in their stock populations. Continued exploitation of this resource will result in further stock depletions which may lead to local extinction of this species. Sustainable resource management protocols need to be implemented immediately.

REEF FISH

Reef fish are the most widely utilised and valuable marine resource within Jaluit Atoll. They are harvested for subsistence, off-island demand, special occasions and commercial activities. A wide range of species are targeted.

Commercial fishing within the atoll centres around the Jaluit Atoll Fish Base, which buys fish from local fishermen at wholesale prices. All purchased fish are exported off-island to support market demands from the urban centres of Majuro and Ebeye.

Commercial fishermen from outside Jaluit Atoll have been reported to fish large quantities of fish, especially grouper (Epinephelinae), from fish spawning aggregation sites within the atoll. This unsustainable fishing practice can quickly deplete local fish stocks and mitigation measures must be introduced to prevent further exploitation.

To date, live fish and aquarium fish collecting has not been reported from Jaluit Atoll. These commercial activities pose potentially serious threats to the lagoon fish stock populations of Jaluit Atoll if introduced. Without good fisheries management policies in place, these activities can result in detrimental results to the fish population, and directly impact on the potential ecotourism industry on the atoll.

Subsistence Value – VERY HIGH

Reef fish provide a stable protein source for the atoll residents. It is one of the most important food sources. A wide range of species are harvested and consumed.

Economic Value – VERY HIGH

Fish have been used as commodity within the atoll for generations. They are used mainly as trade items for essential items. Recently, the commercial collection and sale of reef and pelagic fish has provided an economic opportunity for the people of the atoll.

Diverse and large populations of reef fish are attractions for ecotourism, especially scuba diving. Good populations of all species, especially large brightly coloured species (e.g. Humphead wrasse or Napoleon wrasse [*Cheilinus undulates*], parrotfish [*Scarus sp.*]), are important resources for ecotourism.

Threats – VERY HIGH

The introduction of the commercial fish base within the atoll could lead to resource over-harvesting. Management Plans and monitoring programs need to be developed to assure sustainable management of these resources.

Destructive fishing techniques, although not common within the Jaluit Atoll, are potentially serious threats. The use of chlorine (household bleach) for stunning marine animals (e.g. octopus, fish) and the use of small sized gill nets have been reported. Non-sustainable fishing practices such as these should be banned.

SHARKS

Sharks are regarded throughout the world as major attractions for ecotourism (e.g. scuba diving and snorkelling)

Research studies from around the world document that sharks are worth far more as tourist attractions than as shark meat. One shark, which might sell for less than \$10 in the shark fisheries market, can, in the long run, be worth thousands of dollars if left alive for tourists to see.

Jaluit Atoll has a healthy population of reef sharks, which could become an attraction for ecotourism and scuba divers.

Subsistence Value – VERY LOW

Sharks are not a regularly caught for food.

Economic Value – NONE

There is no reported commercial trade in sharks or their by products (e.g. fin) within the atoll. Sharks are powerful tourism attractions, particularly within the scuba diving industry. A study of the value of sharks within the Maldives showed that a single shark was worth 100 times more left alive in the ocean as a tourism attraction than dead for its fins and meat.

Threats – POTENTIALLY HIGH

The Shark Fishery industry in the Marshall Islands is rapidly expanding with the development of a shark fin processing plant in Majuro. Although no shark fishery is presently operating in Jaluit Atoll, the potential for the expansion of this industry into the atoll is high. Appropriate management regulations should be introduced to manage this resource.

SEA CUCUMBERS

Jaluit Atoll has a high diversity of sea cucumbers. Commercially valuable species (bech-de-mer) have been heavily harvested and populations within the lagoon are low (SPREP, 2000). Commercial operations have recently ended in Jaluit atoll due to depleted numbers. Commercial harvesting is no longer profitable in Jaluit atoll.

Subsistence Value – VERY LOW

Sea cucumbers have a low subsistence value to the communities.

Economic Value – VERY LOW

Over-exploitation of the commercially valuable species of sea cucumbers (bech-de-mer) has resulted in a dramatic reduction in stock populations, preventing further commercial harvesting. If commercially important species populations are allowed to recover to pre-harvesting densities, they could become an economic consideration again. However, it must be stressed that natural populations will take a long time to recover to pre-harvesting levels.

A temporary ban (3 – 5 years) on commercial harvesting of sea cucumbers should be implemented immediately. Furthermore, a Management Plan to develop sustainable sea cucumber fisheries in the future must be implemented.

Threats - HIGH

Sea cucumbers play a vital role in breaking down organic material in the sediments of reefs, which assist in the prevention of anoxic conditions. A reduction in sea cucumbers can result in poor reef health. The collection and sale of commercially valuable sea cucumbers (bech-de-mer) is currently occurring within the RMI. The possibility of further collection from Jaluit is a real threat to the remaining stock populations. A temporary ban on commercial sea cucumber activities should be implemented immediately. Recommendations made in the Marine Resource Survey (SPREP, 2000) should be implemented and enforced.

TROCHUS

The top shell, or trochus, (*Trochus niloticus*) is a marine snail that was introduced to the reefs on Jaluit Atoll in 1939 to establish a breeding population for commercial harvesting. They are commercially valuable for their mother of pearl shell, which is made into buttons and other ornamental objects.

Trochus have been heavily harvested for the past 5 years. As a result, populations are very low (SPREP, 2000). Commercial harvesting finished in 2000, as a result of recommendations made during the Marine Resource Survey of the atoll (SPREP, 2000). This survey documented extremely low numbers of trochus left on the reefs as a result of over-exploitation. Trochus collecting was no longer profitable, so commercial harvesting stopped.

Subsistence Value – LOW

When trochus numbers were high, they were a regular food for communities. However, once commercial harvesting reduced numbers, the reliance on this animal for subsistence food has been greatly reduced.

Economic Value – VERY LOW

Due to the over-exploitation of this commercially valuable species, there is no present economic value from this resource. Once populations are allowed to recover to pre-harvesting densities economic opportunities may return. However, it must be stressed that natural populations will take a long time to recovery to pre-harvesting levels. A Management Plan should be formalised to develop a future sustainable fishery.

Threats - HIGH

Although trochus is an introduced species, and its over-exploitation may not negatively impact the reef, it is still a resource under threat. Further collection of trochus at this stage could cause an irreversible decline in population numbers. An atoll-wide ban on trochus should be imposed for a number of years (3-5 years) to let the stock population numbers recover. A well-managed trochus fishery can produce long-term sustainable incomes for the communities of this atoll.

MANGROVE (MUD) CRABS

The occurrence of mangrove crab (*Scylla serrata*) in the mangrove forests of Jaluit Atoll is unique and rare. Although mangrove crabs are reportedly still found in the mangrove forests of Jaluit Jaluit, neither consultant has seen any evidence that populations still exist. Anecdotal information indicates that these populations may be locally extinct.

Subsistence Value – VERY LOW

Crabs were a popular food for communities.

Economic Value – NONE

At present low population levels there is no economic value.

Threats - HIGH

All mangrove swamps in Jaluit Atoll rely on tidal flushing to keep mangroves healthy. Similarly, tidal water exchange is essential to the life history of the mangrove crab. Protecting natural water movement in the Jaluit Atoll mangrove forests is essential to maintain mangrove crab populations and forest biodiversity.

Anecdotal information from community representatives suggests that the continued collection of crabs for food in the past, coupled with the alterations of water exchange patterns within mangrove forests, has led to the depletion, and possible local extinction, of mangrove crabs.

COCONUT CRABS

Coconut crabs (*Birgus latro*) are found in Jaluit Atoll. Anecdotal information indicates that these crabs occur on most of the islands within the lagoon. However, sizes and abundances are decreasing, especially on inhabited islands (Lindsay pers. observations, 2000).

Subsistence Value - LOW

Coconut crabs are a delicacy. They are usually harvested and consumed for special events both on and off island and are not utilised as a common day-to-day food item.

Economic Value – VERY LOW

It was reported that there is no commercial trade in coconut crabs within the atoll.

Threats - HIGH

Coconut crabs are susceptible to over-harvesting due to their long life cycle and slow maturity. They are also easily caught. Coconut crab populations throughout RMI and the Pacific are heavily exploited and suffering severe declines. The populations of this animal on Jaluit Atoll are in great danger.

SEABIRDS

There are several islands in Jaluit Atoll called “Bird Islands”. Several seabirds, including frigates, noddy terns, white-tailed tropicbirds, crested terns, brown boobies and white terns roost and nest on these islands. Nesting occurs in low vegetation and on the sand – this makes the eggs highly vulnerable to exposure and human impacts.

These specific “Bird Islands” are all within traditional Mo banned/taboo areas of Pingelap and Jitoken.

Subsistence Value - LOW

Seabirds provide a limited source of food for the communities.

Economic Value – VERY LOW

There is no commercial trade in seabirds. Ecotourists are often avid birdwatchers. In fact, bird observation is one of the largest subsections within ecotourism. The sheer beauty of these ‘Bird Islands’ would be a very large attraction for ecotourism.

Threats - MODERATE

Hunting seabirds for subsistence food occurs within the atoll. Mass shootings of seabirds on the “Bird Islands”, which are traditional Mo areas, have been reported. Anecdotal information suggests that seabird populations were once much larger in the atoll, but have decreased. Some of this reduction can be contributed to hunting, and some to reduction of nesting habitats.

The collection of seabird eggs for commercial sale in Jabwor was report to have occurred on several occasions over the past several years. Since the bird populations on these islands are quite small, over-collecting of eggs on a regular basis could easily trigger severe decline in the bird population atoll-wide.

TURTLES

Two turtle species, the Green turtle (*Chelonia mydas*) and the Hawksbill turtle (*Eretmochelys imbricata*), have been reported from the lagoon and ocean reefs of Jaluit Atoll (SPREP, 2000). There is at least one island within Jaluit Atoll that has been reported as a turtle-nesting site. The consultants explored several beaches, but found no evidence of nesting. Anecdotal information suggests that the numbers of nesting turtles have declined significantly over the past few decades.

Subsistence Value - MODERATE

Turtles are hunted for food, although the level of harvesting is unknown.

Economic Value – VERY LOW

There is no reported commercial trade in turtle meat or shell in the atoll. Turtles are important ecotourism attractions, for both divers and snorkellers. Turtle nesting sites are a very popular, although seasonal, attraction.

Threats - MODERATE

Turtles and turtle eggs are hunted and collected food. There is no available information on the level of harvesting.

MANGROVES

Jaluit Atoll has nine mangrove forests. They are found on Jaluit Jaluit, Majrirok, Boknake, Imroj, Kinejon, Mejato, Pingelap, Ae and Taruk islands. They vary in size, diversity of flora and fauna, water exchange and usage. The largest mangrove forest is located on Jaluit Jaluit. Unfortunately, the construction of a road in the late 1960's blocked two of the major water-exchange channels that allowed lagoonal water into the forest. The closure of these channels has had a dramatic negative effect on the biodiversity of marine organisms within the forest. Nevertheless, the forest remains healthy and has been identified as a prime ecotourism area for conducting guided tours.

Subsistence Value – MODERATE

Mangroves provide the only real source of wood for the atoll. Mangroves are used to construct traditional homes.

Economic Value – NONE

There is no commercial trade in mangrove wood, although it is used by the local communities for construction and subsistent purposes.

Mangrove areas are a popular ecotourist attraction. The outstanding mangrove area in Jaluit Jaluit has an extremely high ecotourism value, and will play an important role with the development of ecotourism in Jaluit Atoll.

Threats - HIGH

All mangrove swamps in Jaluit Atoll rely on tidal flushing to keep the mangroves healthy. Water exchange flushes out the ecosystem – taking away harmful products and bringing in needed nutrients and animals. Several animal species found in mangrove ecosystems rely on this tidal flushing to complete their reproductive lifecycles.

Demand for mangrove wood for building houses is high. Recent construction of pathways through the mangrove in Jaluit Jaluit for ecotourist tours (by the CASO and the local community) has created an unforeseen problem. The pathways, by increasing accessibility, have resulted in increased ‘poaching’ of mangrove trees. Consequently, there are large newly cleared areas next to the pathways.

Continued blockage and alteration to water exchange pathways into all mangrove forests within the atoll will degrade these forest and have a negative impact on the health of all organisms, resulting in a loss of biodiversity and a potential loss to the eco-tourism market.

Table 1: Summary of Resource Specific Threats.

Resource	Fishing Demand	Present Population Status	Existing & Potential Threats	Current Threat Level
Giant Clams	Subsistence Off-Island Demand Special Occasion	Depleted	<ul style="list-style-type: none"> ▪ Over-harvesting 	Extreme
Reef Fish	Subsistence Off-Island Demand Special Occasion Commercial	Reported reduction in quantities & sizes caught	<ul style="list-style-type: none"> ▪ Overfishing 	Moderate/high
			<ul style="list-style-type: none"> ▪ Fishing at aggregation sites 	High
			<ul style="list-style-type: none"> ▪ Chlorine fishing 	Low
			<ul style="list-style-type: none"> ▪ Live fish collecting 	None
Sharks	None	Stable	<ul style="list-style-type: none"> ▪ Over-harvesting 	None
			<ul style="list-style-type: none"> ▪ Aquarium collecting 	None
Pearl Shell	Commercial	Depleted	<ul style="list-style-type: none"> ▪ Over-harvesting 	High
Sea Cucumber	Commercial	Commercial species depleted	<ul style="list-style-type: none"> ▪ Over-harvesting 	Extreme
Trochus	Subsistence Commercial	Depleted	<ul style="list-style-type: none"> ▪ Over-harvesting 	Extreme
Mangrove Crabs	Subsistence	Depleted	<ul style="list-style-type: none"> ▪ Over-harvesting 	Extreme
			<ul style="list-style-type: none"> ▪ Habitat destruction 	Moderate
Coconut Crabs	Subsistence	Unknown	<ul style="list-style-type: none"> ▪ Over harvesting 	Unknown
Birds	Subsistence	Stable Nesting populations restricted to only a few small islands	<ul style="list-style-type: none"> ▪ Shooting of adults 	Moderate
			<ul style="list-style-type: none"> ▪ Collecting eggs from nests 	Moderate
Turtles	Subsistence	Reports of reductions in the numbers seen and caught	<ul style="list-style-type: none"> ▪ Killing of adults 	Low/Moderate
			<ul style="list-style-type: none"> ▪ Collecting of eggs from nests 	Low/Moderate
Mangroves	Subsistence	Stable – recent clearing has occurred in areas made more accessible by as construction of paths for ecotourism	<ul style="list-style-type: none"> ▪ Tree clearing 	Moderate
			<ul style="list-style-type: none"> ▪ Land filling in mangrove areas 	Low
			<ul style="list-style-type: none"> ▪ Habitat destruction through tidal flush restriction 	Moderate

5 DEVELOPMENT OF THE PLAN

5.1 The Decision-Making Process

Success of the Jaluit Atoll Environmental Resource Management Plan will rely heavily on several factors, including:

- government support (both local & national),
- community ownership and support,
- CACC ownership and support,

PLEASE REFER

*Appendix 1:
 Meetings & Attendees.*

During the development of the plan all efforts were taken to ensure widespread consultation involving relevant government and community representatives to make sure that all concerns and issues were addressed, and ensure there was widespread ownership of the proposed management initiatives that would form the basis of the plan.

The proposed management arrangements have been thoroughly discussed, accepted by the parties listed below and developed into a Management Plan titled, Jaluit Atoll Environmental Resource Management Plan. The Plan can be found in Appendix 10.

GOVERNMENT CONSULTATION

Meetings were held with national government representatives including:

- Mr Tadashi Lometo
*Acting President of RMI
 Minister in Assistance to the President
 Minister for Environmental Protection Authority*
- Mr Alvin Jacklick
*Minister of Health RMI National Government
 Senator for Jaluit Atoll*
- Mr Rien Morris
*Minister of Public Works RMI National Government
 Senator for Jaluit Atoll*
- Mr Augustine B. Nakamura
City Manager, Jaluit Atoll & Iroij
- Mr Danny Wase
Director, Marshall Islands Marine Resource Authority (MIMRA)
- Mr. Mark Steges
*General Manager, Marshall Islands Visitor
 Authority*

Government Consultation	
Issues raised	Level of Acceptance
<ul style="list-style-type: none"> ▪ Role of government agencies in the Plan. ▪ Depletion of marine resource stocks. ▪ Balance between commercial activities and resource depletion. 	<ul style="list-style-type: none"> ▪ Very High. ▪ All aspects of the Plan were regarded as necessary, and essential to the ongoing development of Jaluit Atoll. ▪ All attendees of the meetings gave formal support of the concepts of the Plan.

COMMUNITY CONSULTATIONS

Seven community meetings were undertaken on Jaluit and representatives from all Jaluit Atoll communities were engaged in the process:

- **On-site Community Meetings** - on-site meeting were held with the Imroj, Mejrironk, Ajeejon, Narmej, Jabnodren, Jabwor and Imiej communities.

Community Consultation	
Issues raised	Level of Acceptance
<ul style="list-style-type: none"> ▪ Recent depletion of resource stocks. ▪ Poor enforcement of traditional Mo system. ▪ Concern with commercial harvesting. ▪ Lack of general knowledge of reef biology and life histories. ▪ Lack of legislative support ▪ The need for ordinances to support and 'back-up' traditional law. 	<ul style="list-style-type: none"> ▪ Very high. ▪ All communities supported the proposed Plan, and the implementation of stricter control over resources. ▪ All attendees of the meetings gave formal support of the concepts of the Plan.

- **General Community Meetings** - one meeting was held in Jabwor with many of the landowners who were unable to make the on-site meetings.
- **CACC Meeting** - two meetings of the CACC in Jabwor to present and discuss options for the Management Plan.
- **Executive Meeting** – one meeting was held in Majuro to present results of community consultation on Jaluit. All concepts of the Management Plan were presented.

5.2 Merging Traditional & Modern Management

The Iroj, the communities and the elected government officials all wanted the Plan to focus on re-establishment of the traditional Mo management system. They considered that incorporating a traditional system would make public awareness, implementation and enforcement easier, and lead to a higher chance of success for the overall Management Plan.

All involved considered that the Jaluit Atoll Local Government Council will need to take a much more active role in supporting the traditional ownership rights by developing appropriate ordinances, actively assisting in enforcement and promoting the laws through public awareness.

The proposed basis for the Environmental Resource Management Plan for JACA presented in this report revolves around the traditional Mo areas.

PLEASE REFER
 Section 7.2: Zones
 for a detailed
 explanation of zones.

However, modern scientific-based management concepts have been introduced to provide management protocols to deal with modern resource pressures (e.g. commercial fishing & off-island demand harvesting).

THE RESULTING MANAGEMENT PLAN

The resulting proposed structure for the Management Plan is a three-tiered system.

General Use Area	<ul style="list-style-type: none"> • All areas outside Mo's. • Allows Subsistence, Off-island Demand, Special Occasion, Ecotourism and Commercial activities. • Atoll-wide Ban restrictions apply.
Mo	<ul style="list-style-type: none"> • Community determined areas. • Allows Subsistence, Special Occasion and Ecotourism activities. • Total ban on all Off -Island Demand and Commercial activities. • Atoll -wide Bans restrictions apply.
Sanctuary	<ul style="list-style-type: none"> • Biologically important areas located within Mo's. • Strictly No Take Zones. • No activities allowed (except ecotourism if permission is granted by community). • Atoll-wide Ban restrictions apply.

5.3 Expected Success & Benefits

The goals of the Jaluit Atoll Environmental Resource Management Plan are addressed by the introduction of a three-tiered zonation system developed especially for Jaluit Atoll. Each zone has specific restrictions on human activities.

The most protected zone, the “no take” Sanctuary, prohibits all human activities. Sanctuaries are cost effective and provide a holistic approach to the conservation of ecosystems. A series of Sanctuaries throughout the atoll that covers a representative set of ecosystems and associated habitats provides the best option for the conservation and preservation of all organisms. The Jaluit Atoll communities can expect to experience several benefits from the implementation and continued use of the suggested Sanctuaries. Table 2 summarise these potential benefits.

In time, an evaluation of the success and benefit of the Management Plan for Jaluit Atoll should be undertaken. Factors to be evaluated include, but are not limited to:

- increases in the quality and quantity of resources,
- increases in community awareness, perception and conservation efforts,
- level of implementation of recommendations provided in the Management Plan (e.g. mooring buoys, awareness and education programs),
- degree of compliance with the ERMP and associated ordinances,
- degree of community empowerment to take on the responsibility to manage their own resources.

Table 2: Potential Benefits of Marine Sanctuaries
 (modified from Ward et. al., 2001).

Fishing Mortality	short term benefit
<ul style="list-style-type: none"> ▪ Eliminate mortality to targeted species. ▪ Eliminate by-catch mortality and incidental mortality caused by fishing gear/practices. ▪ Eliminate indirect mortality caused by the damage/destruction of habitats caused by fishing gear/practise. 	
Population Structure	short to medium term benefit
<ul style="list-style-type: none"> ▪ Restore/maintain natural size/age structure in reserve populations. ▪ Increase mean size/age of individuals of the previously targeted species. 	
Reproduction	short to medium term benefit
<ul style="list-style-type: none"> ▪ Increase the potential and actual reproductive output. ▪ Protect portion of the stocks spawning biomass. ▪ Enhance settlement/recruitment. 	
Spillover (outside of Sanctuary)	medium term benefit
<ul style="list-style-type: none"> ▪ Result in atoll-wide increase in emigration of juvenile and adult marine animals from the sanctuary areas. ▪ Increase abundance of larger fish near reserves. ▪ Increase catches of larger, more valuable individuals near reserves. 	
Larval Export	medium term benefit
<ul style="list-style-type: none"> ▪ Result in net export of eggs and /or larvae to non-Sanctuary areas. ▪ Enhanced recruitment to fisheries outside reserve. 	
Habitat Quality	medium to long term benefit
<ul style="list-style-type: none"> ▪ Protect and allows recovery of natural habitat. ▪ Increases biodiversity. ▪ Reestablishment of natural community composition, trophic structure, food webs, species and ecosystem processes. ▪ Improves amenities and resources for non-fisheries sectors of society. ▪ Protect against loss of targeted species and effects of fishing on community structure. 	
Population size	medium to long-term benefit
<ul style="list-style-type: none"> ▪ Increase abundance, density and/or biomass of previously exploited species. ▪ Increase abundance and/or density of spawning individuals or spawning biomass of previously targeted species. 	
Fisheries	medium to long term benefit
<ul style="list-style-type: none"> ▪ Increased catches, fisheries yield, profits. ▪ Decreased variability in catches, fisheries yield and profits. ▪ Maintain biodiversity of fishing opportunities. ▪ Sustain fisheries for vulnerable species. ▪ Increase likelihood that existing fishing effort levels are sustainable. ▪ Increase long-term stability in fisheries. 	

6 GOALS

6.1 Goals

The five management goals developed for the Jaluit Atoll Environmental Resource Management Plan (ERMP) contribute to the conservation and preservation of the atoll by providing a framework for achieving sustainable resource management of human activities. The goals address the major management issues and form the basis for the structure of the ERMP.

Management Goals of the Management Plan

- 1. Conservation:**
 - Protect, conserve and, where possible, restore the natural biodiversity and cultural values of the atoll.
- 2. Community involvement and support;**
 - Develop community awareness, understanding and appreciation of the biological and physical diversity of the atoll, and promote community involvement in, and support for, its protection, conservation, and restoration.
 - To incorporate traditional and modern resource management practices to form a comprehensive and integrated community-based resource Management Plan.
- 3. Commercial and other uses:**
 - Manage commercial and other uses in an ecologically sustainable way.
- 4. Ecotourism:**
 - Facilitate nature-based ecotourism in a manner that is compatible with the other goals.
- 5. Research and Monitoring:**
 - To better understand the potential and real impacts resulting from resource use.
 - Implement a data collection and analysis program that provides for a much greater understanding of the impacts of use and management activities within the atoll.

7 MANAGEMENT STRATEGIES

7.1 Rationale and Approach

The Jaluit Atoll Environmental Resource Management Plan has combined traditional management methods with modern scientific techniques that have been proven to be effective in management of marine and terrestrial ecosystems and species in other parts of the world.

During the consultation phase of this project the communities clearly expressed their desire to re-establish their traditional management system of Mo.

Using the traditional system of Mo's has several benefits:

1. Mo's are already clearly defined by each community.
2. Community members will be more likely to follow the actions in the Management Plan if it has basis in traditional systems.
3. Mo have been declared by traditional leaders for many of the same reasons that the Management Plan is being developed – to limit extractive pressures on the marine resources. Therefore, they have been placed over areas of the atoll that have unique and important resources.
4. They act as important buffer zones reducing resource exploitation in areas adjacent to Sanctuaries (no take zones).

WHAT ARE MO?

- *Traditional taboo areas where fishing & collecting is banned*
- *Declared by the community Iroij*
- *Can be seasonal or permanent*
- *Includes land, water & reef*
- *Not necessarily adjacent to where the community lives*

The introduction of the modern scientific based marine and terrestrial management methods of Sanctuaries and Atoll-Wide Bans is a necessary addition to the traditional Mo system to address the increasing pressure of off island demand and commercial exploitation of resources. Sanctuaries ('No-Take zones) are designated over areas with healthy resource populations (recommendations from SPREP, 2000), which, if left undisturbed, will help maintain healthy stock populations throughout the atoll.

7.2 Resource Threat Management

Before deciding on the exact management regime to be implemented in Jaluit Atoll, the communities identified which resources were most at risk. They also suggested specific management strategies. Table 3 below lists the proposed methods for management. These were incorporated into the JAPOM.

Table 3: Summary of Proposed Management Strategies for Specific Resources.

Resource	Proposed Management Strategies
Giant Clams	<ul style="list-style-type: none"> ▪ ‘No Take’ Sanctuaries ▪ Atoll-wide Ban on ‘Commercial’ collecting ▪ Restriction on ‘Off-Island Demand’ collecting
Reef Fish	<ul style="list-style-type: none"> ▪ ‘No Take’ Sanctuaries ▪ Ban on commercial fishing in Mo areas Monitoring of fish from Fish Base activities
	‘No Take’ Sanctuaries
	Increase public awareness of law (this is already an RMI-wide illegal activity)
Sharks	Atoll-wide ban
Pearl Shell	Atoll-wide ban on off-island export of live shell
Sea Cucumbers	Atoll-wide ban
Trochus	Atoll-wide ban
Mangrove Crabs	Atoll-wide ban
Coconut Crabs	‘No Take’ Sanctuaries
Birds	Atoll-wide ban
	Atoll-wide ban

7.3 Zones

Communities, traditional landowners, and elected officials unanimously agreed that the re-establishment of the traditional Mo system of marine and land management is required to ensure correct management of the atoll’s resources. Furthermore, communities requested that the JALG take a more active role in supporting traditional ownership rights and take on the responsibility of developing ordinances that support management issues. The JALG, conversely, needs assistance from the community to enforce the laws.

Three zones were decided upon:

GENERAL USE ZONE

General Use areas are marked in white on the Zoning Maps (refer Section 8).

- Includes all areas outside the designated Mo and Sanctuary areas, both inside the lagoon, on land, and up to 200 meters (600 feet) outside the atoll.
- Allows all extractive activities within this zone, including Subsistence, Off-island Demand, Special Occasion and Commercial activities.

- All Atoll-wide Bans are applicable to this zone.
- General Use areas cover approximately 60% of the atoll

TRADITIONAL MO

Mo’s are marked in green on the Zoning Maps (refer Section 8).

- Includes traditional community-owned areas that have already been designated for Subsistence Use only by resource owners.
- Prohibits all Off-Island Demand, Special Occasion and Commercial resource harvesting. Eco-tourism activities (e.g. diving and snorkelling) are allowed only if specified management

DEFINITIONS – TYPES OF RESOURCE EXPLOITATION

Subsistence – for immediate consumption by people in the communities.

Off-Island Demand – collecting of resources to be shipped off Jaluit for family & friends.

Special Occasion – collecting unusually large amounts for big events (e.g. funerals, weddings).

Commercial – collection of resources for resale to the general public or larger companies.

regulations are met, and necessary permissions are granted.

- There are fifteen (15) Mo, owned by nine (9) communities.
- They cover approximately 30% of the lagoon.

The overwhelming view of traditional leaders and communities throughout the atoll is that the community members are no longer following the restrictions of the traditional Mo. ‘Poaching’ is common, and the traditional enforcement system which prevents individuals from entering Mo areas and taking the resources is ineffectual. Therefore, the community leaders decided that the Mo need to be backed up by legislation by including the Mo and Sanctuary areas into Local Government ordinances. (see Table 11: Proposed Ordinances).

NO-TAKE SANCTUARY

***Sanctuaries
are marked in red
on the Zoning Maps
(refer Section 8).***

- Includes specially designated areas located within Mo’s where ***ALL*** resource extraction activities are banned.
 - These zones will function as marine and terrestrial “no take reserves”, allowing natural biological process to exist without human interference.
 - There are fourteen (14) No-Take Sanctuaries.
- They cover approximately 10% of the Atoll.

The establishment of a series of Sanctuaries that covers all ecosystems and habitats provides the best option for the conservation and preservation of resources. Mo’s serve as “buffer zones” around these Sanctuaries by having only limited harvesting. Specific ecotourism activities (e.g. diving and snorkelling) can be undertaken with community consent and supervision.

Sanctuaries were selected using the following criteria:

1. *Ecological significance* (e.g. species and habitat diversity, status of resource population stocks,) as described in the Jaluit Atoll Resource Assessment Report (SPREP, 2000).
2. *Cultural importance to the local community.*
3. *Need for immediate conservation.*

Sanctuaries cover important areas such as fish spawning aggregation sites, reefs with high giant clam populations and areas of good current flow for larvae exchange.

Table 4: Summary of Zones & Activities

GENERAL USE	
<i>WHAT IS ALLOWED</i>	<i>WHAT IS NOT ALLOWED</i>
<ul style="list-style-type: none"> ✓ Subsistence. ✓ Special Occasion. ✓ Commercial harvesting. ✓ Sending off island harvesting. ✓ Ecotourism—only with prior agreement from the communities 	<ul style="list-style-type: none"> ⊗ All Atoll-wide Banned Activities.
MO	
<i>WHAT IS ALLOWED</i>	<i>WHAT IS NOT ALLOWED</i>
<ul style="list-style-type: none"> ✓ Subsistence harvesting –but only if people are associated with that particular Mo. ✓ Special Occasion harvesting– but only if people are associated with that particular Mo. ✓ Ecotourism Activities (diving & snorkelling) – but only with prior agreement from the communities. 	<ul style="list-style-type: none"> ⊗ Commercial harvesting. ⊗ Resources for sending off island. ⊗ All Atoll-wide Banned Activities.
SANCTUARY	
<i>WHAT IS ALLOWED</i>	<i>WHAT IS NOT ALLOWED</i>
<ul style="list-style-type: none"> ✓ Ecotourism Activities (diving & snorkelling) – but only with prior agreement from the community. 	<ul style="list-style-type: none"> ⊗ Subsistence harvesting. ⊗ Special Occasion harvesting. ⊗ Commercial harvesting. ⊗ Sending off island harvesting. ⊗ All Atoll-wide Banned Activities.

Table 5: Details of Activities in each Zone

ACTIVITIES	GENERAL USE	MO	SANCTUARIES
Subsistence resource harvesting	Yes	Yes	No
Special Occasion resource harvesting	Yes	Yes	No
Off-Island Demand resource harvesting	Yes	No	No
Commercial resource harvesting	Yes	No	No
Ecotourism diving & snorkelling	Yes	Yes	Yes
Spearfishing**	Yes	Yes only for subsistence	No
Shell collecting*	No	No	No
Relic collecting*	No	No	No
Sea Cucumber collecting*	No	No	No
Shark Fishing*	No	No	No
Turtle hunting*	No	No	No
Seabird hunting*	No	No	No
Black Pearl collecting*	No	No	No

* - This activity is an Atoll-wide banned (prohibited) activity

** - Spearfishing cannot be conducted at night with underwater torches

7.4 Atoll-Wide Bans

Several Atoll-Wide Bans (Table 6) are required to prevent over-harvesting and resource depletion. Most of these bans are placed upon commercial resources that have been harvested to dangerously low numbers. These bans will allow current populations to mature, reproduce and repopulate the reefs of the atoll. In time, this should allow future commercial fishing.

All Atoll-wide Bans listed in Table 6 received strong support from traditional leaders, the JALG council, community members and government agencies and elected officials.

Table 6: Atoll-Wide Bans.

Banned Activity	Rationale
⊗ Giant Clam harvesting - commercial & off-island demand.	All species of giant clams are currently heavily harvested. Large quantity fishing must be banned to prevent depletion and allow natural recovery.
⊗ Trochus harvesting.	Trochus are currently heavily exploited. Large quantity harvesting must be banned to prevent total depletion and allow natural recovery of stocks.
⊗ Sea Cucumber harvesting.	Commercial species of sea cucumbers are heavily exploited. Large quantity fishing must be banned to prevent total depletion and allow natural stock recovery.
⊗ Black Pearl Oyster harvesting.	Pearl oysters are currently heavily exploited. Large quantity collecting must be banned to prevent total depletion and allow natural recovery.
⊗ Shark fishing.	Sharks are a major ecotourism attraction providing potential income to all communities. Over exploitation has occurred elsewhere in the RMI.
⊗ Turtle and egg harvesting.	Turtles are a major ecotourism attraction, and can easily be hunted to local extinction.
⊗ Seabird and egg harvesting.	Seabirds are a major ecotourism attraction, and can easily be hunted to local extinction.
⊗ Destructive fishing techniques (chlorine, cyanide, dynamite).	Destructive fishing is illegal in the RMI. It should be specifically banned in Jaluit Atoll.
⊗ Unsustainable fishing practices (small size gill nets)	Unsustainable fish practises that can lead to overfishing.
⊗ Spearfishing on SCUBA.	Spearfishing on SCUBA is an unsustainable fishing practice and can lead to overfishing.
⊗ Commercial Spearfishing at night with underwater flashlights.	Spearfishing with lights is an unsustainable fishing practice that can lead to overfishing.
⊗ Shell & Relic Collecting.	Shell and relic collecting removes historic relics from the atoll. All collecting should be banned.
⊗ Live Fish Trade.	Live fish collecting usually targets fish that are also major ecotourism attractions.
⊗ Live rock & coral collecting.	Removal of live rock and coral damages large sections of the reef.
⊗ Dredging or mining.	Digging causes severe damage to all marine environments, and increases sedimentation.
⊗ Aquarium Fish collecting.	Aquarium fish collecting targets fish that are also ecotourism attractions.

7.5 Best Practices (Environmental & Cultural) for Tourists

POTENTIAL ENVIRONMENTAL IMPACTS

Tourism can result in significant local impacts if clear behavioural limits are not established. The Ecotourism Feasibility Study (SPREP 2001) details potential impacts from tourism.

Scuba diver damage is widely recognised throughout the world. Research studies clearly demonstrate that poorly managed diving and snorkelling can lead to high levels of impacts.

REMEMBER
**PRESERVATION IS
 CHEAPER THAN
 RESTORATION**

Potential environmental impacts include standing on and breaking marine life (e.g. corals), collecting marine life (e.g. live and dead shells, coral), collecting historical relics, trampling vegetation and littering.

Most of these environmental impacts can be prevented by making sure there are Best Environmental Practices (BEP's) set-up and enforced throughout the atoll.

BEST ENVIRONMENTAL PRACTICES (BEP'S)

Best Environmental Practices are rules that all tourists and divers MUST follow.

They are used throughout the world as an environmental management tool. If properly advertised and enforced, they can effectively reduce tourist and diver impact. Tourists and divers throughout the world are becoming increasingly familiar with BEP's, and willing to adhere to them. Detailed BEP's are presented in the Ecotourism Feasibility Study (SPREP 2001).

PLEASE REFER
*Appendix 4: Reef
 Protection Poster.*

Every diver and visiting tourist should be given a copy of the atoll-specific BEP's. Boat drivers and dive guides must regulate them. It is recommended that the BEP's be made into an Ordinance.

The following BEP's were recommended by community members during community consultation.

Table 7: Best Environmental Practices for Tourists and Scuba Divers.

Marine Life (for example: corals, clams, fish, sea cucumbers, snails).	
× No touching, or moving animals.	× No feeding animals.
× No collecting or taking animals out of the water.	× No fishing.
× No hassling, chasing, or poking animals.	× No spearfishing.
Littering.	
× No littering.	
× Do not throw away cigarette butts.	
Historic Relics (for example: glassbottles, parts of ships or airplanes, bones).	
× No touching or moving – leave them where they are.	
× No collecting or removing from water.	
× No breaking or smashing.	
Dive Site Moorings.	
× No anchoring on the reef - dive boats must drift or use dive site moorings.	

POTENTIAL COMMUNITY & CULTURAL IMPACTS

In addition to the need to take care of the marine environment, there is a need to take care of the local community and the culture. Several issues and concerns about tourists on Jaluit Atoll were raised during consultation with the communities.

These concerns include:

- Inappropriate dress (e.g. shorts, bikinis and mini-skirts),
- Inappropriate behaviour (e.g. loud voices),
- Trespassing into private or taboo areas,
- Little fore-warning about groups arriving in Jaluit,
- Failure of divers to get permission from communities and the JALG,
- Little financial gain by local communities or business, and
- Collecting of historic relics (glass bottles) and shells.

Most of these impacts can be minimised by giving all ecotourists good pre-arrival information that clearly states appropriate social behaviour while visiting Jaluit Atoll.

In addition, there should be a good set of Best Cultural Practices (BCP's) set-up and enforced throughout the atoll.

BEST CULTURAL PRACTICES (BCP's)

Like BEP's, BCP's can be used to change visitor behaviour and make them better aware of how they should act in the communities. These rules need to be clearly advertised to all tourists.

Table 8: Best Cultural Practices for Tourists.

Community Permission.
× Community permission must be granted before diving at any site.
× Divers must be aware of what zone they are in – Mo, Sanctuary or General Use.
Visiting a Community.
× Respect all community members - say hello, smile and talk with them.
× Wear long shorts and a shirt – do not wear bikinis and short-shorts.
× Do not wander off uninvited.
User Fees.
× User fees must be paid for every scuba dive.
× User fees must be paid for every guided land-based tour.
Guides.
× A local guide must accompany all dive boats and land tours.
× Respect the decision of the guide.
× Follow all rules.

ENFORCEMENT OF BEP'S AND BCP'S

BEP's and BCP's are only effective if 1) tourists are well informed about what they should and should not do, and 2) they are enforced.

There are several enforcement options:

1. **The Honour System** - tourists are informed of the BEP's and BCP's, and are expected to follow them. This is called 'self-regulation'.
2. **Mo Ranger Enforcement (for Divers)** - Mo Ranger(s) conduct on-the-spot inspections of diver groups while they are diving. Breaches are penalised.
3. **Community Guides (for Divers)** – a designated community representative is required to be on the dive boat at all times, ensuring compliance with the rules. This person could be any one of a series of people (e.g. a Mo Ranger, a policeman, a CACC member, the CASO), but has to be someone who is very knowledgeable about the boundaries of the MO and Sanctuary zones, and the rules governing them.

7.6 User Fees

Throughout the world, paying a small fee to the appropriate landowner of the land, reef or wreck is becoming a widely accepted practice.

In Rabaul, PNG, divers are asked to pay a few dollar fee for every scuba dive that they conduct off the landowners land.

The concept behind User Fees is that the fees are to be used by the community to help fund the preservation and conservation of the dive sites. Ecotourists and divers do not mind paying a small fee if they know that it goes back into taking care of the environment.

REMEMBER

User Fees should be reasonable – only a couple of dollars per dive.

If the fees are too high, divers may stop coming to the atoll.

FEE STRUCTURE OPTIONS

There are several different potential types of User Fees that could be implemented. Community members raised the following three options during consultation.

1. **Per Dive Fee** – divers pay a User Fee for every dive that they make. That fee would then get paid directly to the landowner who owns that reef/wreck. This type of User Fee is used in Papua New Guinea.
2. **A One-off Atoll User Fee** – each diver pays a higher one-off User Fee as they come to the atoll that covers their entire visit to Jaluit Atoll. It is then the responsibility of the fee collector to distribute the monies to the appropriate landowners. This type of User Fee is used in Saba, Bonaire, PNG and Indonesia.
3. **A One-Year Diver Permit User Fee** – each diver pays a one-off fee for a diving permit that is valid for 1 year. This is used quite successfully in other parts of the Pacific, such as Palau.

COLLECTING THE FEE

Since most divers do not carry cash on them while diving, these fees are usually collected by one person in charge of collecting fees, at the end of the dive trip. The monies are then distributed to the appropriate landowners. This requires that the dive boat knows which community they are diving.

It was agreed that the CASO would be the most appropriate person to collect the fees.

7.7 Dive Site Mooring System

It is well documented that anchoring is one of the most destructive impacts on the reef. Anchors break large patches of coral and can damage underwater wrecks.

As the diving industry grows in Jaluit, more and more visits will be made to the best dive sites, in areas of high coral cover, diverse fish life, and underwater wrecks. It is important that indiscriminate anchoring is banned in these areas.

Moorings are the most appropriate alternative to anchoring.

Moorings should be placed in locations that are recognised as the best dive sites. It will be necessary to consult with the Majuro dive operations who use Jaluit to help determine which sites are preferred and most used. Moorings should follow the recommendation made in Section 8.3 of this report.

MOORING BUOYS

Make sure that dive mooring buoys are not the same colour as those used to mark boundaries of Mo and Sanctuaries.

See Section 8.3: Marking Boundaries

7.8 Biological Monitoring

THE ROLE OF BIOLOGICAL MONITORING

Biological Monitoring provides ongoing data on the health and status of resource stocks. This data is essential for re-assessing and reviewing management issues with regards to specific animals and resources. This information is essential to provide the community with regular status reports of the marine environment and highlight management actions that may need to be taken to ensure sustainable management of these resources.

In 1999 the Jaluit Atoll Resource Assessment Study (SPREP 2000) was undertaken. From this study, a detailed marine monitoring program was recommended.

RECOMMENDED MARINE MONITORING PROGRAM

The proposed Monitoring Program below has been taken directly from the marine resource assessment study undertaken in 1999 (SPREP, 2000). Additional activities are also suggested (e.g. monitoring of fish caught for the Fish Base Project).

The marine assessment study (SPREP 2000) gives detailed information on all techniques required to undertake the marine monitoring program. These have not been replicated here. Please refer to the Marine Assessment Study for details.

THE FIVE ELEMENTS OF THE BIOLOGICAL MONITORING PROGRAM

There are five main elements to the Biological Monitoring Program.

They are listed below in order of greatest priority

Element 1. Atoll Wide Marine Assessment

An atoll-wide rapid assessment should be undertaken annually to provide a general assessment of the health of all marine habitats and stock populations of selected indicator species within the atoll. This will duplicate the original marine assessment undertaken in 1999 and all techniques and organisms targeted are described in detail in that report. Capacity building, training and community awareness programs on all aspects of this program should be included in these activities.

In addition, all future assessments should include representative samples of Sanctuary, Mo and General Use areas. These data then need to be analysed to provide information on the success of the Management Plan. This information is extremely important to provide direct scientific evidence that the management tools implemented are conserving and protecting marine species

and habitats. Permanent monitoring sites should also be established in each of the three types of management zones to provide long-term repeatable data sets.

It is expected that the marine sanctuaries will provide a habitat that is free from human interference, thus allowing the natural processes of reproduction and recruitment to occur resulting in stock population increases of previously targeted species. These marine sanctuaries are an essential component to the management of the marine resources of Jaluit atoll and must be maintained and monitored.

Several specific giant clam-monitoring sites were established during the initial marine assessment (SPREP, 2000). These sites should be reused and incorporated into this annual monitoring program.

Element 2. Monitoring Effects of Atoll Wide Bans

The Atoll-wide Bans on selected species must be reviewed through data assessment to determine if and when stock populations have recovered enough to allow subsistence and/or commercial activities to recommence.

Element 3. Monitoring Fish Catches for Fish Base

A Memorandum of Understanding (MOU) has been signed between the national government line agencies of Marshall Islands Marine Resource Authority (MIMRA) (responsible for operating the Fish Base) and the EPA to jointly monitor and manage fish resources on behalf of the Jaluit Atoll community.

All commercial fishing activities associated with the Fish Base must be monitored. It is essential that standard length/weight frequency data of all caught fish is collected on a regular basis. To minimise the risk of fish stock depletion, this monitoring program must be initiated as soon as possible.

Currently, MIMRA staff at the Fish Base are recording limited fish catch data. It is essential that a more comprehensive system of data collection be developed and implemented to allow the correct management of individual fish species stock populations.

A new Fish Catch Monitoring Data Recording Sheet is provided in Appendix 8. It is strongly urged that this new Data Sheet replaces the sheet currently in use.

A technical training course is required for the CASO and Fish Base staff on standard fisheries data collection techniques (specifically designed to gather length and weight frequency data, species identification, fisheries biology), and data storage and analysis (refer below). The fisherman's catch data sheet should be further developed to incorporate scientific and local fish names. Training is required for the fisherman on its use and the long term benefit to their commercial operations and to the environment. The catch data sheet should be mandatory for all fishermen.

It is also recommended that the CASO include the collection of all data from the Fish Base as part of his daily work activities.

Element 4. Monitoring Spawning Aggregation Sites

It is recommended that there be an investigation into the exact reef locations and timing of spawning aggregations for Epinephelinae fish populations within the atoll.

Anecdotal information gained from the marine assessment report (SPREP, 2000) and information gleaned during the community discussions for the development of the Management Plan have provided valuable information on the locations of fish spawning aggregation sites.

These sites have been incorporated into the sanctuary areas recommended in this report. However, verification of these and other sites within the lagoon is required to allow the successful management of these important resources to be achieved.

Element 5. Evaluating Specific Species

A resource evaluation should be undertaken to determine the existence, locations, and abundance and population size of mangrove crab, coconut crab and turtle populations within the atoll.

MARINE MONITORING TRAINING NEEDS

There is an urgent need to run an extensive training program on resource management and monitoring protocols. This training program must include data collection techniques for both terrestrial and marine environments, data recording and analysis. This is especially important for the data collection program for the Fish Base.

Unfortunately, due to a recent change in CASO, the new CASO has no environmental monitoring training. The varied responsibility of the CASO position and the time required to implement and manage the suggested monitoring program may in fact impede the successful implementation of the suggested marine monitoring program (SPREP, 2000). It is recommended that the Conservation Project seek the participation of a local science graduate (and perhaps an overseas volunteer in the first instant) to assist in all aspects of the program. Consultation with the College of Marshall Islands (CMI) indicated that they would be willing to become involved in this aspect of the program.

In the short term many aspects associated with the marine monitoring program may require external technical support. In time, through training and capacity building these responsibilities will rest with the program officers, especially CASO and local residents.

7.9 Waste Management

The Community repeatedly identified the need throughout the atoll for information that will enable the communities and the local government council to mitigate the current pollution problems that are degrading the environment. The two major concerns are solid wastes from household garbage and to a lesser degree sewage. Community awareness and understanding of potential hazards and pollution resulting from these problems is poor and a major public community awareness program must be undertaken to provide both information and a mechanism for the correct disposal of all wastes.

SOLID WASTE

Currently, household domestic garbage (paper, plastics, steel, batteries) is dumped directly into family or community owned landfill pits that serve in general to reclaim land. The larger garbage pits are open and are normally located on the lagoon side of the atoll. During the consultants visit a considerable amount of garbage was noticed within the lagoon and along beaches. From visual inspections of the larger garbage pits, garbage enters the lagoon in periods of high tidal flushing and during periods of strong winds. The waste then gets distributed around the atoll. Most of this garbage is plastic. In addition, garbage is also dumped directly into the lagoon. Steel and other large items of garbage were found within the lagoon during the Marine Resource Assessment (SPREP, 2000).

SEWAGE TREATMENT

There is no treatment plant for sewage on the atoll. The majority of households located within the main communities use septic systems that discharge into underground reservoirs or directly

into the sea. The direct use of beaches as a toilet is a common practice. The threat of surface and ground water contamination is therefore high. Anecdotal information indicates that high water tables have prevented the effective use of septic systems in some locations within the atoll.

HAZARDOUS WASTE

Hazardous and oily wastes make up a very small portion of waste generated by the atoll however the community and council as an environmental health issue acknowledged these items. Waste oil from the power stations generators, personal generators, outboard engines and car engines make up the majority of these wastes. The power company currently stores all waste oil from the generators in 55-gallon steel drums and periodically ships them to Majuro. A percentage of waste oil in Majuro is recycled and used to fuel the power company's generators. The fate of used oil from these other sources within Jaluit Atoll is unknown, however anecdotal information indicates it is dumped directly onto the ground.

Jaluit atoll has neither equipment nor a contingency plan to deal with pollution emergencies such as oil spills.

ORGANIC WASTE

The majority of garbage of organic origin is recycled within the atoll and used primarily as garden fertilizer or food for domesticated animals (pigs).

AIR & NOISE POLLUTION

Currently air and noise pollutions concerns are minimal.

THE NEED FOR A WASTE MANAGEMENT PLAN

The current levels of pollution from solid and liquid waste in Jaluit Atoll are increasing particularly in the larger communities of Jabwor and Jaluit Jaluit and it is clear that the generation of wastes will increase both in quantity and type in the future. The effect of pollution on the terrestrial, marine and freshwater environments is a major concern of the communities and therefore there is urgent need for an atoll wide program that can provide information to allow the correct management of human generated wastes that will prevent or minimize environmental degradation and pollution.

It was the unanimous recommendation of the community and government that an atoll-wide Waste Management Plan is urgently required.

8 PROPOSED ZONES & BOUNDARIES – THE DETAILS

8.1 Zone Names & Locations

The communities identified fifteen (15) individual designated Mo areas, which include fourteen (14) designated Sanctuaries. Some communities own more than one Mo and Sanctuary.

All Mo and sanctuary boundaries have been identified by the use of latitudinal and longitudinal coordinates obtained from the use of a hand held Global Positioning System (GPS). Details are presented in Table 9 below.

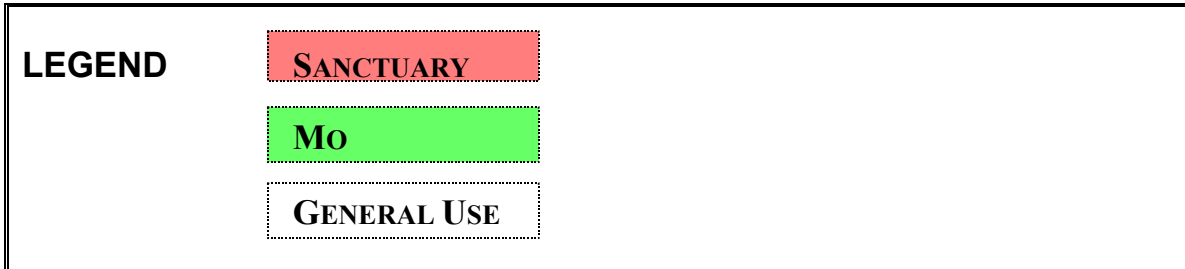
Table 9: Latitude and longitude coordinates for Mo and Sanctuaries.

Please refer to Maps 2 – 10.

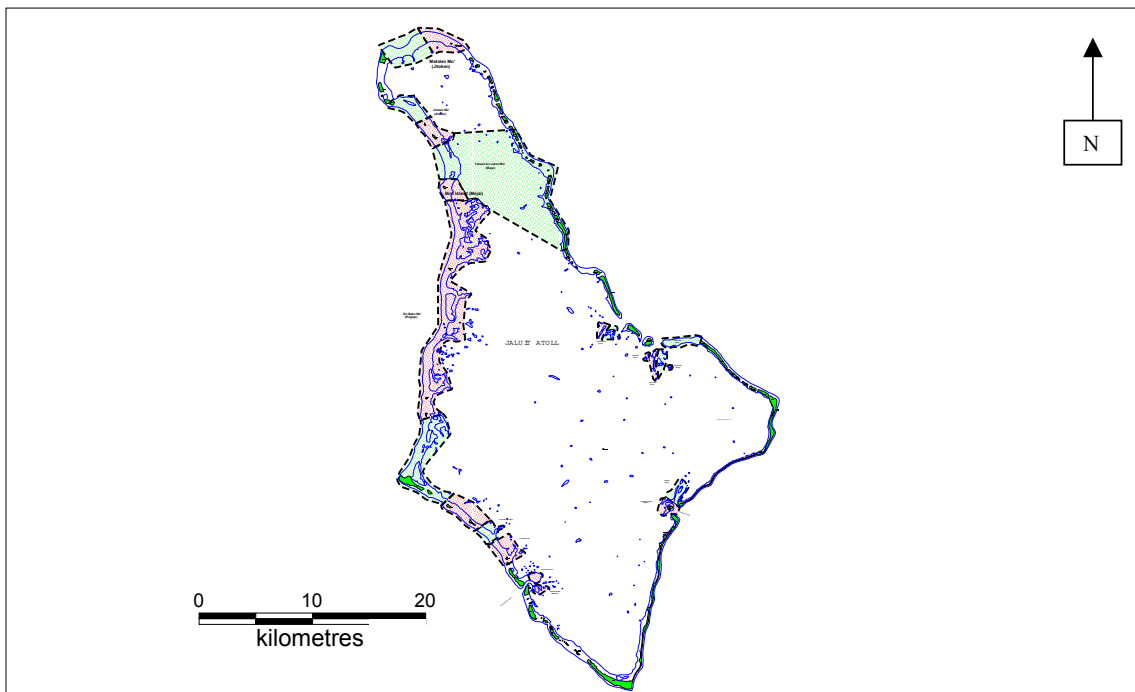
Community	Mo	Latitude, Longitude	Sanctuary	Latitude, Longitude
Jitoken	Matolen Mo	A. 169.41061, 6.29472 B. 169.42334, 6.27706 C. 169.44134, 6.30843 D. 169.45447, 6.28714 E. 169.47815, 6.29835 F. 169.48253, 6.29214 G. 169.47304, 6.28892	Matolen Sanctuary	C. 169.44134, 6.30843 D. 169.45447, 6.28714 E. 169.47815, 6.29835 F. 169.48253, 6.29214 G. 169.47304, 6.28892
	Likin Woden Mo	A. 169.41766, 6.24531 B. 169.42764, 6.25519 C. 169.43921, 6.25469 D. 169.45172, 6.23843 E. 169.43985, 6.23230 F. 169.45310, 6.21289 G. 169.47077, 6.22493	Likin Woden Sanctuary	D. 169.45172, 6.23843 E. 169.43985, 6.23230 F. 169.45310, 6.21289 G. 169.47077, 6.22493
Mejae	Takaen an Lāben Mo	A. 169.45310, 6.21289 B. 169.47077, 6.22493 C. 169.51972, 6.22783 D. 169.55332, 6.19804 E. 169.54682, 6.17217 F. 169.56172, 6.14852 G. 169.56114, 6.13345 H. 169.55645, 6.13165 I. 169.45887, 6.18836 J. 169.47254, 6.18862 K. 169.48160, 6.17274 L. 169.46323, 6.17135	Bird Island Sanctuary	I. 169.45887, 6.18836 J. 169.47254, 6.18862 K. 169.48160, 6.17274 L. 169.46323, 6.17135
Pinglep	Dri Bako Mo	A. 169.46323, 6.17135 B. 169.4883, 6.1732 C. 169.4618, 6.0029 D. 169.4433, 5.9979 E. 169.4252, 5.9492 F. 169.4598, 5.9296 G. 169.4703, 5.9399 H. 169.48673, 5.90941 I. 169.49967, 5.91815	Dri Bako Sanctuary	A. 169.46323, 6.17135 B. 169.4883, 6.1732 C. 169.4618, 6.0029 D. 169.4433, 5.9979
			Pinglep Island Sanctuary	F. 169.4598, 5.9296 G. 169.4703, 5.9399 H. 169.48673, 5.90941 I. 169.49967, 5.91815
	Lorā Mo	H. 169.48673, 5.90941 I. 169.49967, 5.91815 J. 169.49642, 5.89873 K. 169.50521, 5.90477	No designated Sanctuary	

Ae	Lorā Mo	<i>Entire Mo is a designated Sanctuary</i>	Lorā Sanctuary	A. 169.49763, 5.89808 B. 169.51032, 5.88142 C. 169.52750, 5.89180 D. 169.51437, 5.90773
	Enindo Mo	<i>Entire Mo is a designated Sanctuary</i>	Enindo Sanctuary	A. 169.5298, 5.8760 B. 169.5382, 5.8768 C. 169.5415, 5.8740 D. 169.5384, 5.8690 E. 169.5310, 5.8700
Mejrrok	Wodenlap Mo	<i>Entire Mo is a designated Sanctuary</i>	Wodenlap Sanctuary	A. 169.53441, 5.88661 B. 169.53681, 5.8671 C. 169.54494, 5.8651 D. 169.54662, 5.8643 E. 169.53876, 5.8590 F. 169.53505, 5.8597 G. 169.53270, 5.8617
Enejat	Bar Mo	A. 169.63916, 5.93648 B. 169.65887, 5.95732 C. 169.67258, 5.94508 D. 169.65056, 5.92807	<i>No designated Sanctuary</i>	
Jabwor	Karajraj Kan Mo	<i>Entire Mo is a designated Sanctuary</i>	Karajraj Kan Sanctuary	A. 169.63257, 5.92566 B. 169.63511, 5.93516 C. 169.63931, 5.93609 D. 169.65032, 5.92800 E. 169.64832, 5.92269 F. 169.63661, 5.92144
Imiej	Reijok Mo	A. 169.66804, 6.0361 B. 169.66567, 6.0561 C. 169.63660, 6.0564 D. 169.63617, 6.0621	<i>No designated Sanctuary</i>	
Imroj	No No Mo	A. 169.63752, 6.05371 B. 169.64027, 6.04983 C. 169.64032, 6.04596 D. 169.63762, 6.03753 E. 169.63252, 6.02885 F. 169.62935, 6.02978 G. 169.62566, 6.04415 H. 169.62551, 6.04782 I. 169.63164, 6.05376	No No Sanctuary	F. 169.62935, 6.02978 G. 169.62566, 6.04415 H. 169.62551, 6.04782 I. 169.63164, 6.05376 J. 169.63122, 6.04100 K. 169.63299, 6.03464
	Jea Ko Mo	<i>Entire Mo is a designated Sanctuary</i>	Jea Ko Sanctuary	A. 169.64019, 6.04058 B. 169.64500, 6.04081 C. 169.64374, 6.03721 D. 169.64041, 6.03774
	Kiliek Mo	<i>Entire Mo is a designated Sanctuary</i>	Kiliek Sanctuary	A. 169.62143, 6.04481 B. 169.62322, 6.05055 C. 169.62551, 6.04782 D. 169.62566, 6.04415 E. 169.62575, 6.04423
	Lokuben Mo	A. 169.59498, 6.07280 B. 169.60007, 6.07191 C. 169.60280, 6.06188 D. 169.58823, 6.06110 E. 169.58426, 6.06202 F. 169.58475, 6.07295 G. 169.58561, 6.07516 H. 169.58798, 6.07541		Lokuben Sanctuary

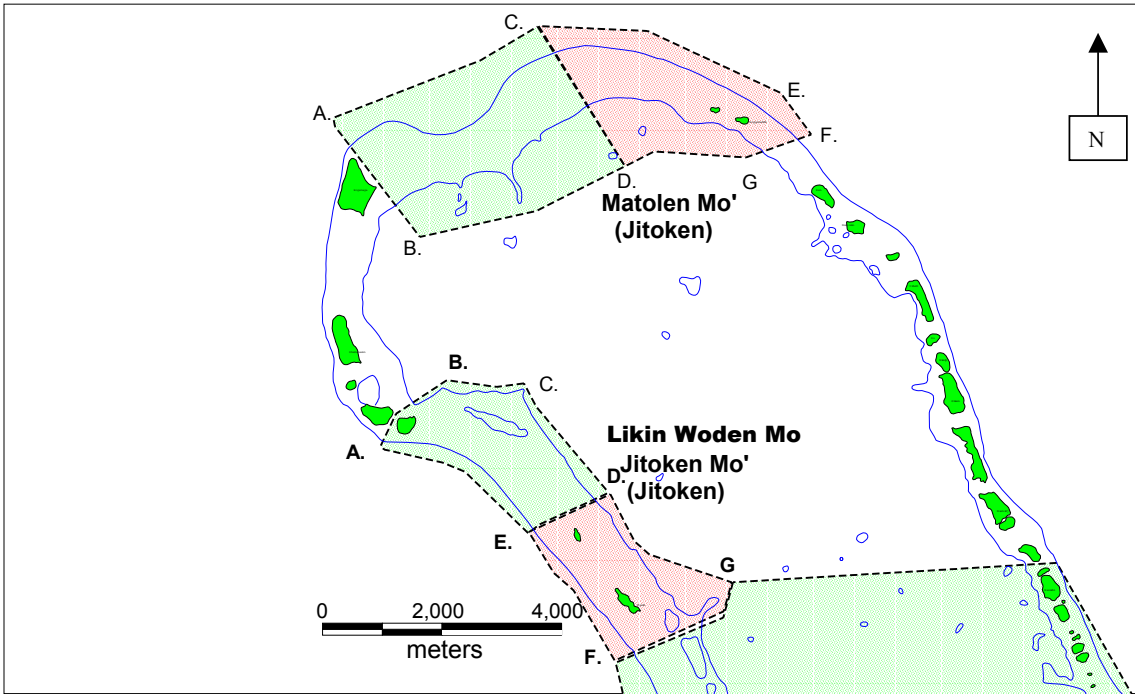
8.2 Maps



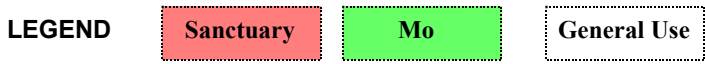
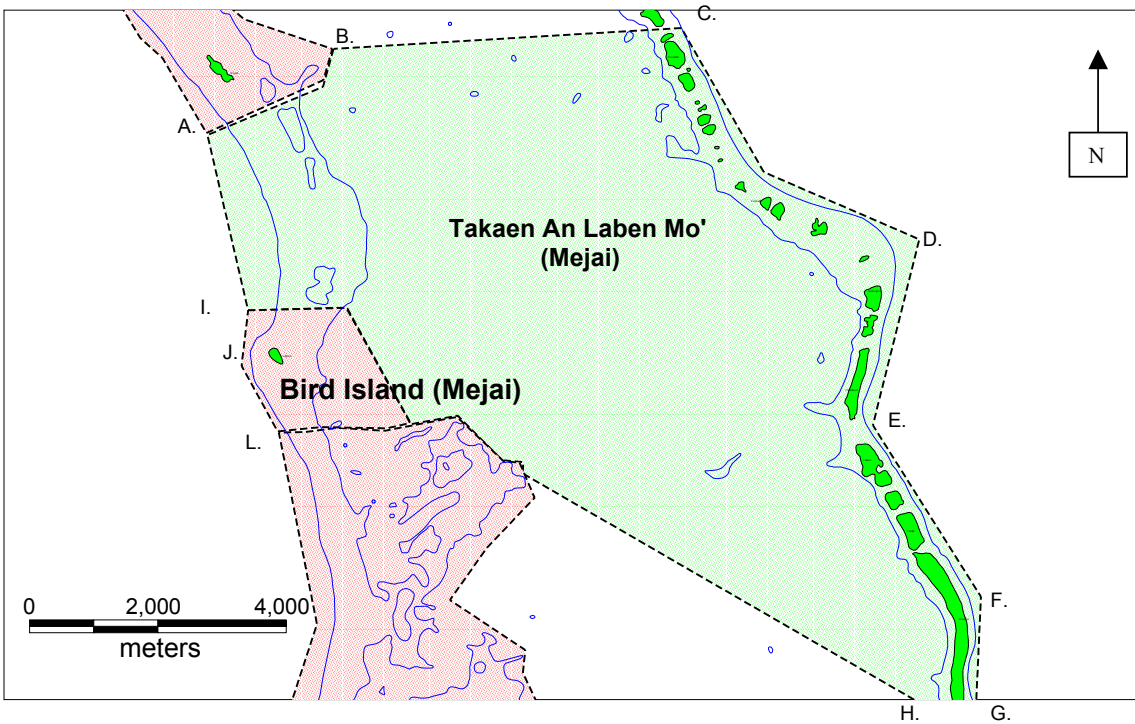
Map-2. Jaluit Atoll
Traditional Mo and Sanctuaries.



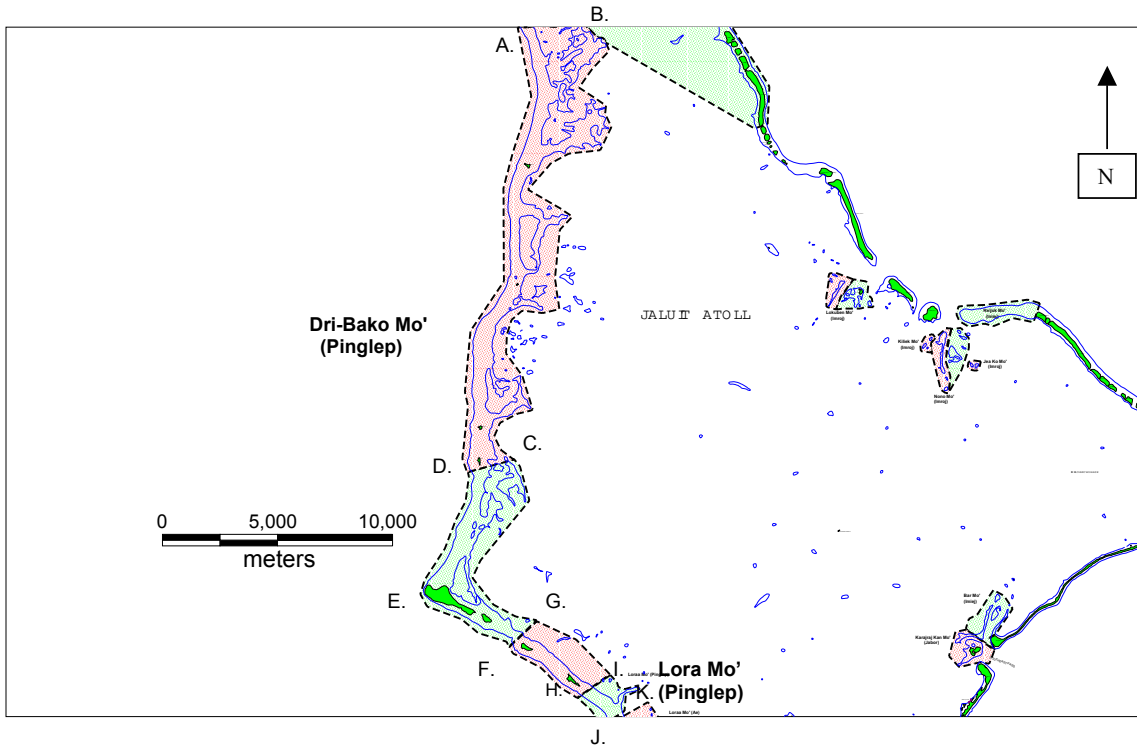
Map 3. Jitoken Community, Jaluit Atoll
Traditional Mo and Sanctuaries.



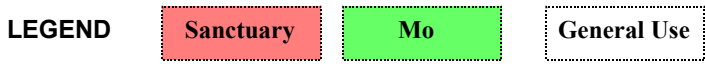
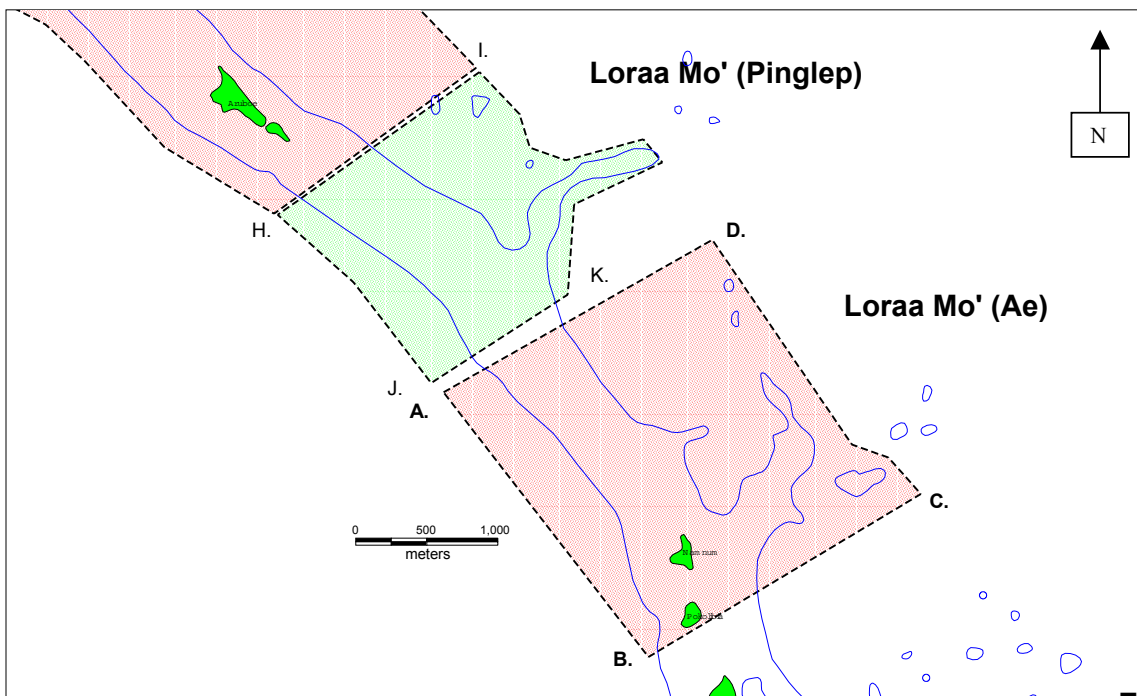
Map-4. Mejai Community, Jaluit Atoll
Traditional Mo and Sanctuaries.



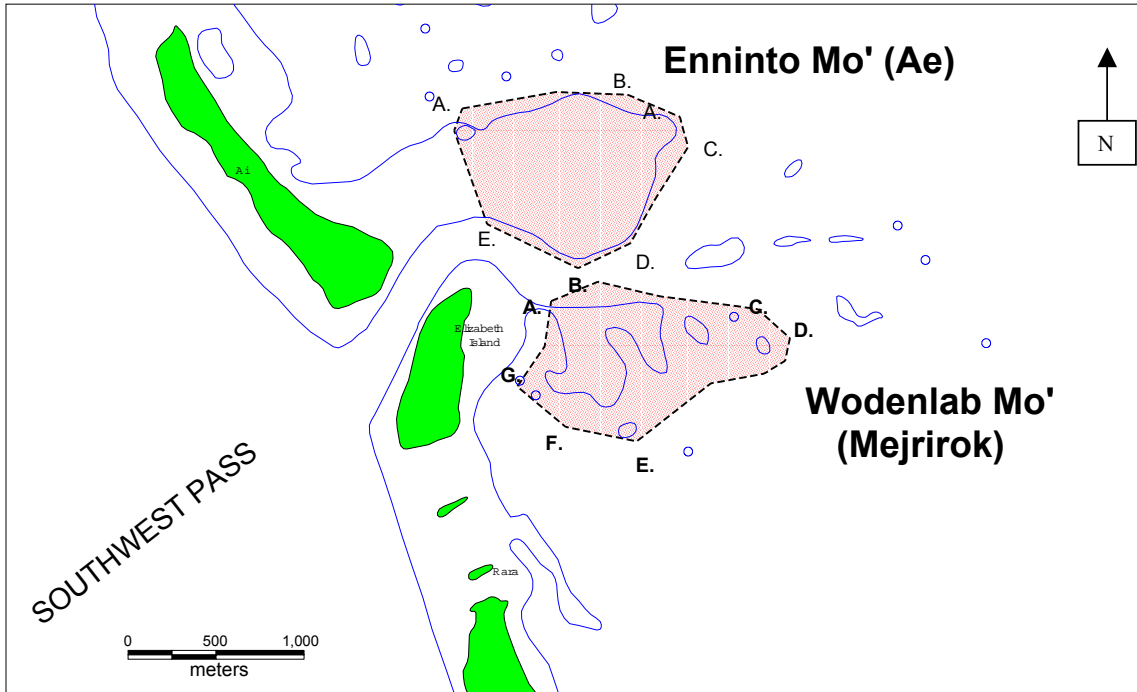
Map-5. Pinglep Community, Jaluit Atoll.
Traditional Mo and Sanctuaries.



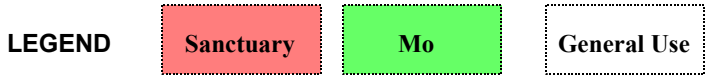
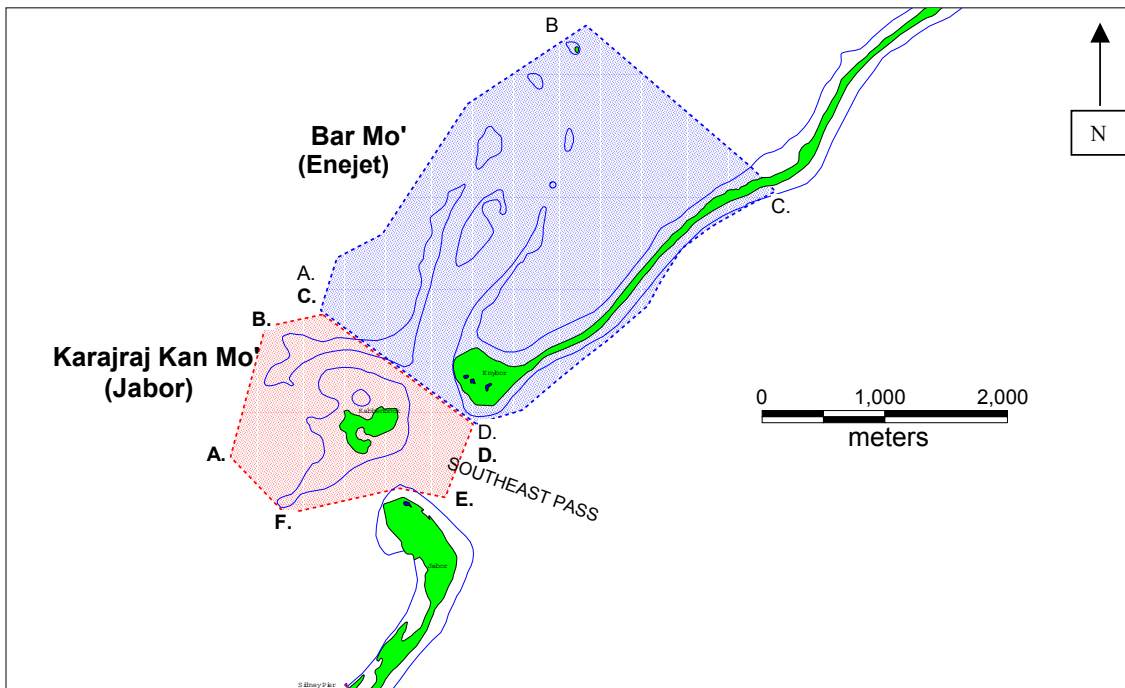
Map 6. Pinglep and the Ae Communities, Jaluit Atoll
Traditional Mo and Sanctuaries.



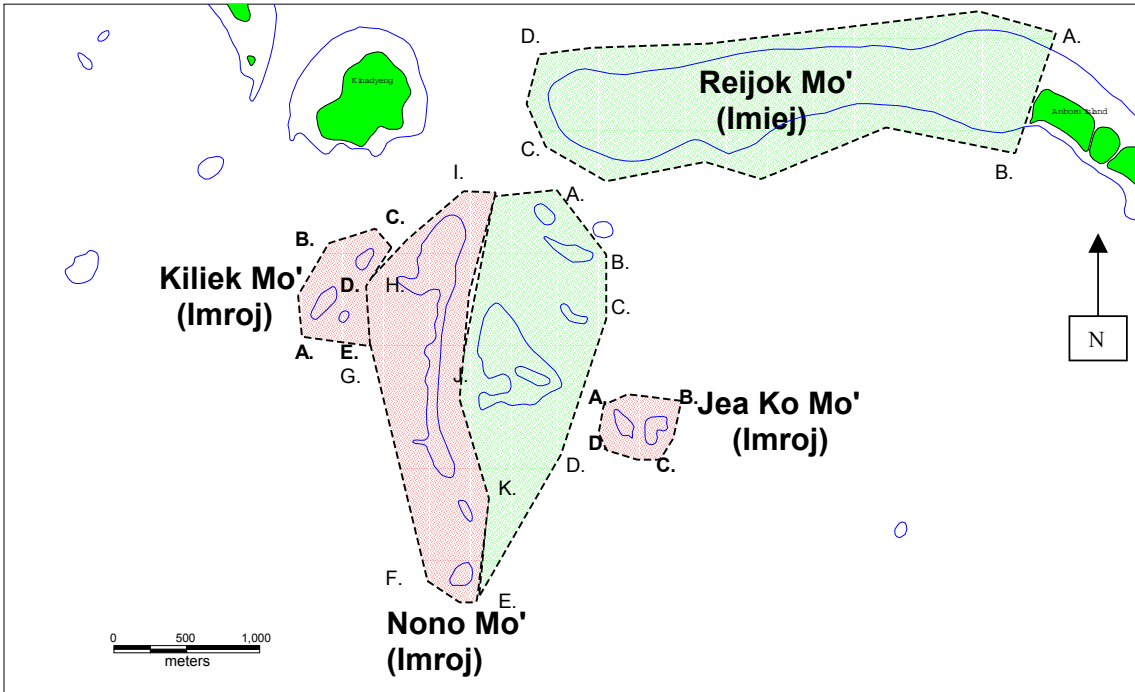
**Map 7. Ae and Mejrirok Communities, Jaluit Atoll.
 Sanctuaries.**



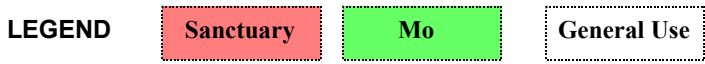
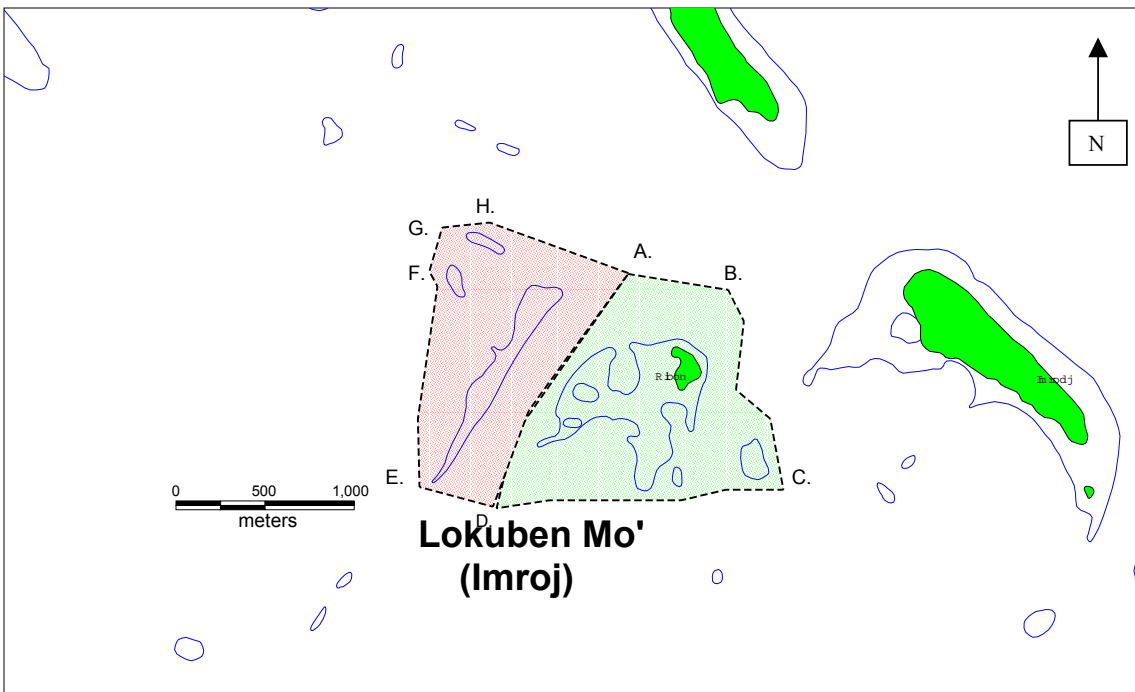
**Map-8. Jabor and Imiej Communities, Jaluit Atoll
 Traditional Mo and Sanctuary** (Note: Bar Mo area should be coded Green, not Blue)



Map-9. Imiej and Imroj Communities, Jaluit Atoll.
Traditional Mo and Sanctuaries.



Map-10. Imroj Community, Jaluit Atoll.
Traditional Mo and Sanctuary.



8.3 Marking Mo & Sanctuary Boundaries

All Mo and Sanctuary boundaries need to be marked for easy recognition. Latitude and longitude coordinates presented in Table 9 should be used.

The clear marking of these management zones will allow simple visibly identification of areas and prevent confusion among all residents of the atoll.

All boundary demarcations should be standard through out the atoll, clearly visible and colour coordinated for ease of recognition to clearly define the particular zone.

Therefore:

- All land-based markings should use landmarks (eg tree) or a length of PVC pipe embedded in the ground.
- All marine markings should use fixed buoys.

All marine-marking and mooring sites should be secured to the reef. For all shallow water mooring locations all buoys should be attached to the reef using a stainless steel rod and loop attached directly to a large coral head and secured. A smaller submersed float should be attached to the mooring line below the surface at all sites to assist in keeping the mooring rope off the reef and act as a safety line if the main float is lost (e.g. storm conditions). All moorings located in deep water should be attached to a concrete block, of a size no less than half a meter square (1.5 feet square) with a steel rod and loop embedded in the concrete and attached at the surface as mentioned above.

Demarcation of Mo and Sanctuary zones will require at a minimum 4 floats located on each corner boundary of the each zone. Additional floats/markers may be required in cases when the zones are large. Each marking location must be visible from the other.

THE BUOYS SHOULD BE COLOUR CODED FOR EASY RECOGNITION:

Orange Buoy	to mark the corners of each Mo.
Red Buoy	to mark the corners of each Sanctuary.
White Buoy	to mark dive site moorings.

9 IMPLEMENTATION - REGULATIONS & ENFORCEMENT

9.1 Elements for Success

The long term success of the Management Plan is dependent on all individuals in all communities understanding, accepting and fully participating in both the implementation and enforcement of the plan. Furthermore, support and encouragement from national government line agencies is also required.

The successful implementation of the Management Plan is achievable, however the following issues will need to be actively addressed:

Jaluit Atoll is a very large atoll and communities are spread out throughout the atoll.

- There is limited communication between communities.
- The Jaluit Atoll Local Government meets irregularly.
- Many of the Iroi and citizens of the atoll live off-island.

Some implementation recommendations are discussed below.

9.2 Public Awareness

One of the most important implementation tools is public awareness. When communities have ownership of a program, and fully understand the day-to-day benefits of such a plan, they will take a more active role in its implementation. It is essential, therefore, that a huge effort is put into public awareness so that all community members fully understand the ERMP. Support from the whole community, and self-regulation, is the key in determining the long-term success of the Plan.

All levels of the community need to be involved in the public awareness program. This may include church groups, women's groups, youth groups, sport groups, primary schools, high schools, local government, local communities and communities from other atolls.

Since people learn differently, a range of methods should be used to “get the message across”. These could include meetings, media releases, newspaper articles, radio broadcasts, playacting, school classroom activities and posters.

It is important that the proper topics are covered during public awareness. Not only should people be informed about what they can and cannot do under the new Plan, but also why the new Plan was developed – what are the benefits and how will they tell it's working.

It is recommended that an international volunteer be considered to be included in this program. The volunteer should have a background in tropical marine science and possess the needed water and community development skills. The volunteer should work along side the CASO officer to assist in all functions of this position, especially in the development and maintenance of the marine monitoring and management program. In addition, the volunteer and the CASO officer should provide community marine awareness programs and undertake specific lectures with the students of the Jaluit High school including field trips.

Important Topics

Community members need to understand:

- *How the Plan will help them,*
- *Why these restrictions have been placed,*
- *Where the Mo and Sanctuaries are located,*
- *What activities are allowed, and what are banned,*
- *Who must follow the Plan,*
- *Who will enforce the Plan,*
- *What are the penalties for a breach of the Plan.*

9.3 Traditional Leadership

Jaluit Atoll is still a very traditional place, where the traditional systems and their representative maintain their authority and influence. It is essential that the traditional leaders endorse this plan and use their authority to build community support.

9.4 Regulations

EXISTING LEGAL REGULATIONS

In addition to the new restrictions set out by the Management Plan, it is important to increase awareness and compliance with existing legislation.

Table 10 lists the existing relevant RMI national government Acts and environmental legislation that regulate marine resource exploitation and management (adopted from SPREP, 1999). The importance of these regulations and their direct relevance to the Management Plan for Jaluit Atoll needs to be clearly explained to all communities and individuals within the atoll. This task should be included in the public awareness campaign and be a major role of the CASO position.

Table 10: RMI Environmental Legislation (adopted from SPREP, 1999).

Endangered Species Act 1975.	Regulates all endangered species within the archipelago.
Marine Zones (Declaration) Act 1984.	Defines the internal waters, archipelagic waters, the territorial sea, the exclusive economic zone and the contiguous waters.
Public Lands and Resources Act 1986.	Defines all marine areas below the ordinary high water mark as government-owned.
Marshall Islands Marine Resource Authority Act 1988.	Sets out the powers and responsibility of the Marshall Islands Marine Resource Authority (MIMRA).
Marshall Islands Marine Resource Authority (Amendment Act) 1989.	Prohibits the use of drift nets.
Marine Resources Act 1987.	Regulates fishing and protects endangered species in the Marshall Islands.
Marine Resources (Trochus) Act 1983.	Regulates the harvesting of trochus.
National Environmental protection Act 1984.	Provides for the establishment of a National Environment Protection Authority.
Coast Conservation Act 1988.	Makes provision for coastal zone survey and the development of a coastal zone Management Plan by the Director of EPA.
Marine Mammals Protection Act, 1990.	Regulates mammal protection within the archipelago.
Marshall Islands Marine Resource Act, 1997.	Defines the nations marine legislation.

NEW PROPOSED ORDINANCES

To add strength to the declaration of Mo, Sanctuaries and Atoll-Wide Bans, the local government and community members decided that aspects of the Plan need to be endorsed and supported by local council ordinances. As ordinances, there will be stronger penalties for breaches.

They also decided that the Jaluit Atoll Local Government council should develop and implement a law that specifically defines the Jaluit Atoll Conservation Area and the Management Plan. The list of ordinances suggested in Table 11 should be included under this specific law.

These ordinances are designed to strengthen the power the ERMP, and allow enforcement officials to impose punishment to anyone who is in breach of the Plan.

Table 11: Proposed Ordinances to support the Environmental Management Plan.

Ordinance.
Designate the Jaluit Atoll Management Plan as legislation.
Designate the boundaries of all Mo and Sanctuaries within the atoll utilising the latitudinal and longitudinal coordinates in Table 9.
Designate all Sanctuaries as “no-take zones” (refer Section 7.2).
Designate all Mo’s as ‘subsistence-only zones’ and clearly define the activities that are allowed, and those that are banned (refer Section 7.2).
Designate all Atoll-wide Bans (refer Section 7.3).
Ban all coral, shell and relic collecting by tourists (refer Section 7.4).
Make the payment of User Fees mandatory for all tourist activities (refer Section 7.5).
Make it mandatory for all tourists to follow all Best Environmental Practices and Best Community Practices (refer Section 7.4).
Designate the need for a local guide to be present on all tourist boat or land tours.
All future development on Jaluit Atoll be undertaken using Best Environmental Practices & Minimal Impact Practices.
Dive operation boats will not anchor on the reef – but either drift or use a Dive Mooring.

9.5 Enforcement

Achieving total compliance of the Plan is a difficult and challenging job. Successful enforcement will require a strong joint effort between the Local Government, traditional landowners and leaders, and all community members

ISSUES

There are several issues that must be taken into account when considering enforcement.

- **The atoll is very large** (refer Section 3.1) –it can take several hours to get from one end to the other, and in bad weather it can be impossible.
- **There are complicated landownership issues** - the complex landownership issues make it difficult to limit community activities on/in their own land. Support from the Iroij of each community is essential.

FACTORS FOR SUCCESSFUL ENFORCEMENT

- **Public Awareness** - Enforcement, without public awareness, cannot ensure the success of the Plan. One of the most vital components of enforcement is public awareness. The Mo Rangers must also participate in educating the communities in not only the laws (what they can and cannot do) but also WHY they should follow the rules.
- **Community Participation** – including the community in various aspects of enforcement will also help promote the success of the Management Plan. Getting people to want to ‘do-the-right-thing’ is important.
- **Community Support** – without community support the ERMP will most likely fail.
- **Manpower** – in order to effectively patrol all Mo’s and Sanctuaries, it is important to make sure that there is enough manpower. Without adequate patrolling, enforcement will be ineffective.
- **Reliable Enforcement** – Mo Rangers must be dedicated to enforcing the Mo and Sanctuary restrictions, without exception for family or friends. Enforcement has to be universal and unbiased.
- **Strong Support** – The JALG, MIMRA, EPA, CACC and CASO must all be dedicated to supporting the ERMP and the Rangers.
- **Legislative Backup** – local ordinances are extremely important to ‘give strength’ to the Mo and Sanctuary restrictions. Ordinance violations must be fairly punishable to all offenders as a deterrent for future activities.

9.6 Management Plan Enforcement Options

Without a strong enforcement program, the success of the Management Plan will be limited. There have been many cases in the world where poor and inappropriate enforcement programs have failed to prevent poaching and environmental destruction even though a good Management Plan was in place. Two enforcement Program options were identified during community consultations. The two options are outlined below.

OPTION 1 – COMMUNITY MO RANGERS

This option is based on the cooperation between the communities, MIMRA (and the Fish Base), the JALG, the EPA, CACC and CASO.

▪ Patrol Boats

Each of the nine communities that have Mo's, also has one of the MIMRA fishing boats, and a designated driver. These vessels are used for commercial fishing operations approximately every two weeks, for a few days, when the Fish Base is operational. The rest of the time, the vessels are available for community use.

These boats could be the Mo Patrol Boats during their 'down-time' when they are not fishing for the Fish Base.

▪ Community Mo Rangers

The drivers of these fishing boats would become the Mo Rangers. They would be responsible for patrolling and enforcing their own community's Mo(s). This will ensure that the rangers would have a good knowledge of the boundaries and zones, and by being part of that community, will have strong community support.

▪ Coordinator and Coordinating Committee

The coordination of this option would be jointly the responsibility of the CASO officer, the MIMRA Fish Base Manager under the direction and support of the CACC.

▪ Expenses

By sharing MIMRA boats, some of the costs are also shared. However, who pays expenses such as salaries and petrol costs would have to be negotiated. Most of it would have to be externally funded.

▪ Concerns

Due to the usage of the boats during the time the Fish Base is purchasing fish the communities would not have any boats available for surveillance during this period of time – when enforcement is probably most needed.

OPTION 2 – GOVERNMENT MO RANGER

This option suggests an enforcement system that is isolated from the community – it is a stand-alone program run by the government. Government Rangers would be recruited to the job, and may not be directly associated with the communities.

▪ Patrol Boats

In this option, one or more patrol boats would have to be bought specifically for the enforcement program.

▪ Government Mo Rangers

A Mo Ranger would have to be selected to act as full-time ranger. This person would then have to be trained in enforcement practices and Mo and Sanctuary boundary recognition.

▪ Coordinator and Coordinating Committee

The role of coordinator would remain with the CASO, who already has the role of overall Conservation Area coordinator. The CACC would have overall coordinating responsibility

▪ **Expenses**

All set-up and operational expenses would need to be funded externally.

▪ **Concerns**

The ranger may not be respected in communities to which he is not traditionally from and removes the responsibility of the enforcement away from the community and traditional resource owners.

Table 12: Summary of pros & cons of Enforcement Options 1 & 2.

	PROS	CONS
OPTION 1 Community Mo Rangers	<ul style="list-style-type: none"> ▪ Cost effective - uses existing infrastructure (fishing vessels). ▪ Is a community-based initiatives – directly involves community in protecting their own resources. ▪ Provides for several Rangers on patrol at once to help patrol the entire atoll. 	<ul style="list-style-type: none"> ▪ Requires training of all Mo Rangers in enforcement duties. ▪ Needs good coordination by the CASO, CACC, MIMRA & JALG. ▪ Boats are not available during fish base operations.
OPTION 2 Government Mo Ranger	<ul style="list-style-type: none"> ▪ Lower training costs for ranger(s) and equipment. ▪ Less demanding coordination of ranger(s). 	<ul style="list-style-type: none"> ▪ High set-up costs for infrastructure (boats, office). ▪ Introduces a non-community member to enforce laws on community – may limit community support. ▪ Fewer rangers will cover less area.

It is recommended that the most appropriate enforcement option is Option 1.

10 OTHER ASSOCIATED PLANS

10.1 Dive Industry Management Plan

With the potential growth of the dive industry in Jaluit Atoll, it would be useful to have a Dive Industry Development Plan that guides training and infrastructure needs as well as divers behaviour.

Elements that should be include in such a Plan:

- Dive site inventory,
- Dive site ownership issues,
- Environmental Impact Assessment,
- Training needs analysis,
- Capacity building of local staff, especially in the area of Dive Master and Instructors,
- Growth potential analysis,
- Stakeholder inventory,
- Public awareness issues with communities and dive operators,
- Vessel mooring system,
- Risk assessment,
- Emergency evacuation plan, and
- Marketing strategy.

10.2 Waste Management Plan

A detailed Waste Management Plan is lacking for Jaluit Atoll. With increased development and visitation to the atoll, it is essential that this plan is developed and implemented as soon as possible.

Waste management issues on Jaluit Atoll are discussed in Section 7.8 – Waste Management.

11 SUMMARY OF RECOMMENDED MANAGEMENT STRATEGIES

11.1 Summary Table

The recommended management strategies listed below form the basis of the Management Plan found in Appendix 10.

LEGISLATION.	Section 9.4
< The Management Plan will be formally accepted and put into legislation.	
< Local Ordinances will put the zones into law.	
ZONES.	Section 7.2
< The atoll is divided into 3 zones that allow for different levels of resource protection.	
< In order from least protected to most protected they are:	
▪ General Use – allows all activities including commercial fishing.	
▪ Mo – allows subsistence and special occasion collecting for the local community that owns the Mo, but no commercial or off-island harvesting.	
▪ Sanctuaries –no-take zones within the Mo where there is no collecting or fishing allowed. Only ecotourism activities can take place , provided the community gives permission.	
< All zones will be declared under a local Ordinance.	
ATOLL WIDE BANS.	Section 7.3
< Collecting of some resources will be completely banned.	
BIOLOGICAL MONITORING.	Section 7.7
< Resource stocks will be monitored on a regular basis.	
< Fish processed through the Fish Base will be monitored.	
ECOTOURISM & DIVING.	Section 7.4
< Community permission must be granted to any ecotourism activity.	
< A User Fee will be paid to landowners.	
< Best Environmental Practices must be followed by all ecotourists and divers.	
< Best Community Practices must be followed by all ecotourists and divers.	
< Dive boats will use moorings – they will not anchor on the reef. Mooring buoys must be used.	
ENFORCEMENT.	Section 9.5
< Mo Rangers will patrol the zones, enforcing the rules and applying the penalties.	
MANAGEMENT.	Section 9.6
< The RMI EPA will have overall management responsibility.	
< Day-to-Day management will be carried out by the CACC and CASO.	

12 IMPLEMENTATION SCHEDULE

The proposed Implementation Schedule is a guideline only. If, during implementation, completion dates are delayed, the timetable will be adjusted as required.

A COORDINATED EFFORT

Successful implementation requires a coordinated effort between all stakeholders, including:

- Traditional leaders and landowners.
- All sectors of the communities.
- The Jaluit Atoll Local Government council.
- The CACC.
- The CASO.
- Government agencies – including EPA, MIMRA, MIVA, HPO.

QUALITY CONTROL

Every step of the implementation must be carefully monitored to assure that it has been completed as required. Implementation without quality control can lead to the failure of the Management Plan.

Table 13: Implementation Issues, Actions & Timing.

ISSUE	ACTION	STEPS	TIIMING	RESPONSIBLE GROUPS
Level of Use	Atoll-Wide Bans put in place on certain activities	Local government to put the atoll wide banned activities into local ordinances and pass into legislation.	June 2003	Local government CACC
	Designate Mo and Sanctuary management zones	Zone boundaries, once agreed on by each community, to be clearly defined and incorporated into local council ordinances, and passed into atoll legislation	June 2003	Local government CACC
		Each Mo and Sanctuary clearly marked on land and water to allow easy identification.	September 2003	CACC
	On-going Marine Monitoring Program to be established	Funds to be secured for professional technical assistance.	December 2003	RMI EPA
		International volunteer to work with CACC and CASO to start biological monitoring program.	September 2003	CACC RMI EPA
		All new commercial marine-harvesting activities prohibited until enough information has been collected to develop correct Management Plans for specific resources. This would be reviewed regularly.	June 2003	CACC Local Government National Government
Impact of Shore Based Activities	Best Environmental Practices (BEP's) and Best Community Practices (BCP's) for development and tourism activities adopted	BEP's and BCP's developed and put into local ordinances.	June 2004	RMI EPA CACC Local Council
		Need to be well advertised (communities, tourists and ecotourism operators) and reviewed regularly	June 2004	RMI EPA CACC Local Council
		Any BEP's and BCP's with User Fees system need to be negotiated between the CACC and each community	June 2004	Jaluit Atoll Community CACC

ISSUE	ACTION	STEPS	TIIMING	RESPONSIBLE GROUPS
	Waste Management Plan developed with help from government	A Waste Management Assessment for the atoll should be completed for the development of a Waste Management Plan.	December 2004 Implemented June 2005	RMI EPA CACC Jaluit Community
		A Waste Management Plan to be created. The plan must address pollution by solid waste and sewage disposal		
	Environmental Impact Studies and Management Plans for developments on Jaluit Atoll be requested of government	CACC to be informed by the government of any new developments that are occurring on Jaluit Atoll that may affect the atoll's resources.	Ongoing	National Government CACC
		Environment Impact Assessments mandatory for all future development activities within Jaluit Atoll	Ongoing	National Government
Involvement of the Community	Community Updated on Progress of Plan	Formal and informal community meetings and stakeholder discussions about plan and other resource management issues.	Ongoing (possibly every 6 months)	CASO
		CASO to keep community informed about the progress of implementation of the plan.	Every 6 months	CASO
		Feedback from community discussion and meetings will be used to help update this Plan. Review and update of Plan to be coordinated by CACC in 2005.	Dec 2005	CACC Jaluit Community RMI EPA

ISSUE	ACTION	STEPS	TIIMING	RESPONSIBLE GROUPS
	Atoll Wide Awareness and Education Program , developed and implemented CASO	CASO to develop an Awareness Raising Program. The program should include: <ul style="list-style-type: none"> • Importance of the Atoll’s natural resources to community well-being • Reason for different actions • Explanation of how it will all work • Role of the community in the Plan 	Developed by June 2003 Begin implementation September 2003 On-going	CASO International Volunteer if recruited
	Community Ranger Program for Coordination of Regulation of action and activities in Plan	Mo Community Rangers need to be trained in details of the zones, atoll bans and other enforcement skills.	Look for volunteer by March 2003 Volunteer start September 2003	RMI EPA CASO CACC

Table 14. Summary of Timeframe.

June 2003	September 2003	December 2003	June 2004	September 2004	December 2004	June 2005	September 2005	December 2005
Ordinance for Atoll-Wide bans Ordinance for Zoning system Mark Zones Ordinance to stop new commercial activities.	Research international volunteers to help implement plan:	Enforcement Ordinances Mo Rangers trained Find Funds for monitoring	Develop Awareness Program Develop BEP, BCP	Implement Awareness Program Negotiate User Pay system	Develop Waste Assessment and Program	Implement Waste Program	Commence Review of Plan	Finish Review of Plan
<p>Ongoing Activities Meetings with community to update on progress of plan and other Atoll resource management issues Information updates to community (maybe newsletter) on progress of Plan Government to inform CACC on any development on Jaluit Atoll</p>								

13 REFERENCES

Marshall Island Government, 2000. *The Marshall Islands – Living Atolls Amidst the Living Sea*. The National Biodiversity Report of the Republic of the Marshall Islands. RMI Government Publication. 345pp. ISBN: 982-9045-02-1.

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Ward, T. S., Heinemann, D. and Evans, N. 2001. *The role of marine reserves as fisheries management tools: a review of concepts, evidence and international experience*. Bureau of Rural Science, Canberra, Australia. 192pp.

14. APPENDICES

- Appendix 1: List of Meetings and Attendees**
- Appendix 2: Best Environmental Practices**
- Appendix 3: Best Cultural Practices**
- Appendix 4: Reef Protection Poster**
- Appendix 5: Fish Spawning Aggregation Poster**
- Appendix 6: Giant Clam Awareness Information**
- Appendix 7: List of Recommendations from the Marine Resource Survey of Jaluit Atoll (SPREP 2000)**
- Appendix 8: Fish Catch Monitoring Data Recording Sheet**
- Appendix 9: Garbage Awareness Posters**
- Appendix 10: Jaluit Atoll Environmental Resource Management Plan**

APPENDIX 1 - LIST OF MEETINGS AND ATTENDEES

DATE	ATTENDEES	POSITION
30 July 2002	Mr. Albon Ishoda	Project Officers, RMI EPA
	Ms. Deborah Barker	Project Officers, RMI EPA
	Mr. Danny Wase	Director MIMRA
	Mr. Robert Smith	SPOAC
31 July 2002	Mr Alvin Jacklick	Minister of Health & Senator, Jaluit Atoll
	Mr Rien Morris	Minister of Public Works & Senator, Jaluit
	Mr Augustine B. Nakamura	City Manager & Iroj, Jaluit Atoll
	Mr Julian Alik	Acting General Manager, RMIEPA
5 August 2002	Mr. Albon Tshoda	Environmental Officer, RMIEPA
	Mr. Miran Ankeid	Jaluit Atoll CASO
	Mr. Holden Milne	National Police
	Mr. Abner Shem	Council man
	Mr. Thurston Mejjena	Jaluit Atoll Fish Base Manager, MIMRA & Representative, Jaluit Jaluit
	Mr. Alden Jacklick	Councilman & Alab, Imej
	Mr. Lujennet Hemos	Fisherman & boat driver, Jaluit Jaluit
	Mr. Lakijin Kijenmei	Alab, Jabor
10 August 2002	Mr. Banep Bikajle	Councilman
	Mr. Albon Tshoda	Environmental Officer, RMIEPA
	Mr. Miram Ankeid	Jaluit Atoll CASO
	Mr. Hitto Nathan	Jabor Teacher
	Mr. Henery Amon	Jaluit
	Mr. Menbet Jinna	Jabor Plant Operator
	Mr. Bien Jabue	Jabor Cook
	Mrs. Hertina Hertin	Council Women & Business Operator
	Miss Neitom Lani	Jabor AMI Agent
	Mr. Enji Robert	Jabor Cook
	Mr. Bones Bramid	MEC Carpenter
	Mr. P C Tatios	Public Interest
	Mr. Jokan Alex	Jaluit Jaluit
12 August 2002	Mrs Dolores Jacklick	Council woman & Alap
	Mr. Alden Jacklick	Councilman & Alab Imroj
	Mr. Rien Morris	Minister of Public Works & Senator, Jaluit
	Mr. Augustine B. Nakamura	City Manager & Iroj, Jaluit Atoll
	Mr. John Bungitak	Director, EPA
	Miss Deborah Baker	Project Officer, EPA
	Mr. Abtolom Heneus	College of the Marshall Islands
	Mr. Misao Kabot	Councilman
	Mr. Joe Heneus	Community Member
	Mr. Abner Shem	Councilman
	Mr. Emla Abnei	Alab
	Mr. Diem Robert	Executive Member Jaluit Council
	Mrs Mani Wonne	Council woman
	Mr. Antari Jason	Major
Mr. Joneu Takia	Messenger	
Mrs Heney Morris	Council Woman	

APPENDIX 2 - BEST ENVIRONMENTAL PRACTICES

BEST ENVIRONMENTAL PRACTICES (BEP'S)

Marine Life: (for example: corals, clams, fish, sea cucumbers, snails)

- No touching, or moving - leave them where they are.
- No collecting or taking out of the water.
- No hassling, chasing, or poking.
- No feeding animals.
- No fishing.
- No spearfishing.

Historic Relics: (for example: glass bottles, parts of ships or airplanes, bones)

- No touching or moving – leave them where they are.
- No collecting or removing from water.
- No breaking or smashing.

Dive Site Moorings:

- No anchoring allowed.
 - Dive boats must drift or use established moorings.
-

APPENDIX 3 – BEST COMMUNITY PRACTICES

BEST COMMUNITY PRACTICES

Community Permission:

- Community permission must be granted before diving at any site.
- Divers must be aware of the zonation of that area – Mo, Sanctuary or General Use.

Visiting a Community:

- Respect all community members - say hello, smile and talk with them.
- Wear long shorts and a shirt – do not wear bikinis and short-shorts.
- Do not wander off uninvited.

User Fees:

- User fees must be paid for every dive conducted.
- User fees must be paid for every guided tour on land.

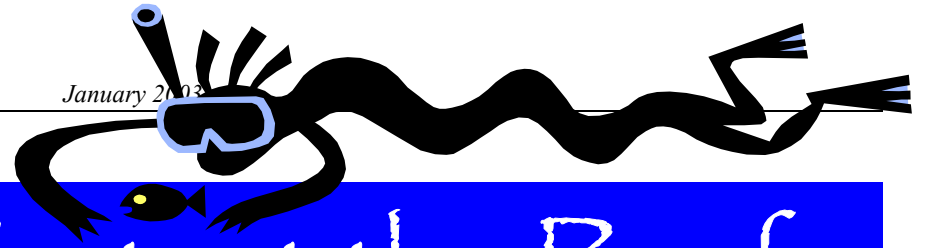
Guides:

- A local guide must accompany all dive boats and land tours.
 - Respect the decision of the guide.
 - Follow all rules.
-

APPENDIX 4 - REEF PROTECTION POSTER

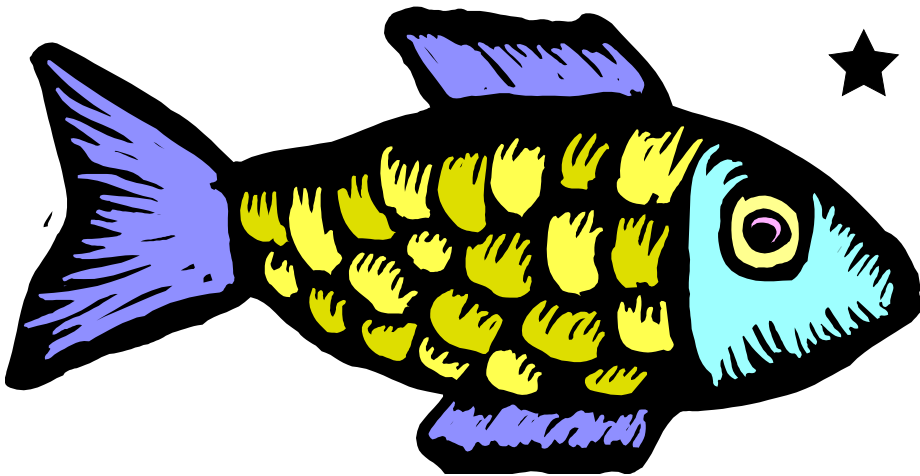
The following poster can be:

- Modified to address the key issues on your island.
- Copied as many times as you like.
- Used during Public Awareness activities.
- Included in tourist information packages.



Please Help Us Protect the Reef

We hope that you enjoy your visit to the Jaluit Atoll Conservation Area.



DO NOT STAND UP ON THE REEF -
all those things that look like rocks are living corals.



DO NOT LITTER -
did you know that cigarette butts are toxic? They kill fish.



DO NOT FEED BIRDS OR FISH -
these animals cannot digest human food.

APPENDIX 5 - FISH SPAWNING AGGREGATION POSTER

The following poster can be:

- Modified to address the key issues on your island.
- Copied as many times as you like.
- Used during Public Awareness activities.
- Included in tourist information packages.

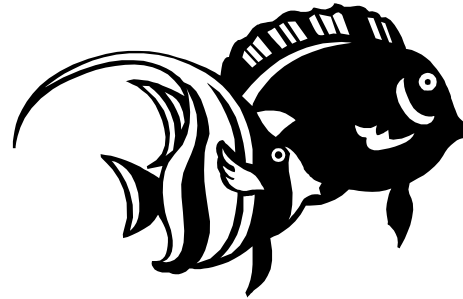
Fish Spawning Aggregation Sites

Fish Aggregations Sites are extremely important and need to be protected!
Protected Fish Aggregation sites will lead to higher number of fish in Jaluit Atoll.

Do You Know....

1. ...What Fish Spawning Aggregations Sites are?

- Aggregation sites are the places where fish come together at a certain time of the year for mating.
- When they mate fish either lay their eggs, or release them into the water where they float in the currents.
- Most of these areas are well known by local fishermen.
- These areas need protecting.



2. ...Why they are important?

- Spawning Aggregation sites are very important because these are where the fish get together to mate and release eggs.
- These eggs will turn into baby fish.
- These baby fish will grow up and stay in the atoll to increase fish populations.
- Fish is one of the main sources of food for communities.

3. ...Why we should protect them?

- We need to protect aggregation sites because when fish get together to mate, they are easily disturbed and caught.
- This means that if they are disturbed while spawning (by fishing, netting, loud noises, etc.) they might go away or leave forever to find another site where they will not be disturbed.

4. ...How we plan to protect them?

- Aggregation Sites will be protected under the new Jaluit Atoll Environmental Resource Plan of Management (JAPOM).
- They will be inside Sanctuary zones.
- All activities such as collecting, fishing, netting, or spearfishing are banned inside Sanctuary zones.

5. ...How the community will benefit from protecting these sites?

- If Spawning Aggregation Sites are protected, the fish can mate without any stresses.
- This will lead to more baby fish that will grow up and re-populate Jaluit Atoll.
- This means that the communities of Jaluit Atoll will have plenty of fish to eat.

APPENDIX 6 – CLAM AWARENESS INFORMATION

Giant Clam Species	Natural Habitat
<i>Tridacna gigas</i>	Generally found on sand and among corals on shallow reefs inside the lagoon, but may be found at depths of 60 feet (20m); may be exposed during low tide. Largest clam, can reach a length of over 5 feet (1.5 m). Adult is not attached.
<i>T. squamosa</i>	Occurs on outer edges of reefs both within and outside the lagoon at about 12 – 60 feet (4-20 m) and appears to favour oceanic clear water environments. Adult attached by a weak byssus to living coral or coral rubble on reefs usually dominated by <i>Acropora</i> . Can reach a length of 2 feet (60cm).
<i>T. maxima</i>	Occurs on reefs both within and outside the lagoon at about 3-30 feet (1-10 m). Adult attached by a strong byssus to living coral or coral rubble on reefs usually dominated by hard coral species. Can occur in large numbers on coral heads and very abundant. Embedded in coral or firmly attached to coral heads with a maximum length of less than 1 foot (40 cm).
<i>Hippopus hippopus</i>	Found on sandy areas in coral reefs at depths up to 20 feet (7 m) and on seagrass beds adjoining reefs. Adult not attached and can grow to approximately 2 feet (50 cm). Normally found in low numbers distributed on sandy reef flats, can be exposed.

APPENDIX 7 - LIST OF RECOMMENDATIONS FROM THE MARINE RESOURCE SURVEY (SPREP 2000)

The marine resources of Jaluit Atoll require management.

Without an adaptive useable management plan, stock populations of marine organisms will be exploited.

- < The priority activity that must be undertaken is the collection of basic life history data on these organisms. These data (biological and morphological) must be collected on a monthly basis over an annual period for each organism as outlined in the report. The biological information obtained on each individual species is imperative to the development of a suitable marine management plan. This data must include; date of sample, location of sample, sex and maturity of animal, body length (fork length, carapace length), total weight, reproductive condition, and gonad index.
- < In addition, marine resource stock surveys (as undertaken in this evaluation) should be repeated, at least on an annual basis, to provide information on the population structure and abundance of marine organisms within the lagoon over time.
- < Data collection should be undertaken at intervals of 3 months on the four existing giant clam monitoring transect sites. Additional transects sites, including coral monitoring sites must be developed in the suggested marine reserve areas once the reserves have been developed.
- < The four marine reserves recommended should have boundaries identified and passed into legislation as swiftly as possible and all marine life found in these reserves should be preserved and protected.
- < The suggested community based fisheries questionnaire should be carried out to assess the patterns of exploitation of fisheries resources, the main methods of fishing and the commonest species caught.
- < These activities should form part of the CASO officers work plan. The CASO officer should provide marine education and awareness training programs for the community on all aspects of coral reef management and conduct regular community based meetings to discuss the management program with the community.
- < A marine evaluation is required to determine the spawning aggregation sites of the dominant Epinephelinae fish species. The timing of this program will be determined from the CASO monthly examination of fish gonads.
- < A resource evaluation is required to determine the existence, abundance, location and population size of mangrove crab and coconut crab populations within the atoll. This evaluation should also provide information to assist in the development of a management plan for each species.
- < Immediate conservation measures should be implemented to prevent further exploitation of trochus and commercial sea cucumber stocks. A total ban on all commercial harvesting

of trochus should be considered. Regulations should be introduced to decrease the fishing pressure on the existing stocks of commercial valuable sea cucumbers.

- < All new commercial marine harvesting activities should be prohibited until such time that sufficient biological information has been collected to develop correct management protocols.
- < The artificial culture of pearl oysters for the pearling industry should be considered.
- < Several publications should be purchased and subscribed to for the project.
 - The Jaluit atoll Conservation programme should be registered to receive all SPREP publications, newsletters (e.g. CALL) and bulletins. In addition, the programme should be registered with the Pacific Communities (SPC) publications list and news letters, in particular the trochus, bech-de-mer, giant clam traditional fishing and pearl oyster bulletins. Several books are suggested to be used as references, these are:
 - Colin, P. I. and Arneson, C. (1995). *Tropical Pacific Invertebrates: A field guide to the marine invertebrates occurring on tropical pacific coral reefs, sea grass beds and mangroves*. The coral reef research foundation publication. 296pp.
 - English, S., Wilkinson, C. & Baker, V., (Ed). 1997. *Survey manual for Tropical Marine Resources*, 2nd Edition. Australian Institute of Marine Science publication. 390pp.
 - Myers, R. F. *Micronesian Reef fishers: A practical guide to the identification of the coral reef fishers of the tropical central and western pacific*, second edition. Coral Graphics publication. 298pp.

APPENDIX 8 - FISH CATCH MONITORING DATA RECORDING SHEET

For use by MIMRA and EPA staff at the Jaluit Atoll Fish Base.

Please replace existing Data Sheet with this new version

JACA Fisherman's Catch Report Jaluit Atoll Conservation Project

1. Type of Fishing boat <i>Etan/Kain Wa Rot</i>	
2. Date of Fishing <i>Ran in Eonod</i>	
3. Location/s of Fishing: <i>Jikein Eonod:</i>	A/ B/ C/
4. Names of Fisherman:	
5. Weather <i>Mejatoto</i>	

Fish Name Local / scientific	Total Fish Weight	Total Fish Length (Nose to caudal fork)

APPENDIX 9 - GARBAGE AWARENESS POSTER

The following poster can be:

- Modified to address the key waste issues on your island.
- Copied as many times as you like.
- Used during Public Awareness activities.
- Included in tourist information packages.



WHAT A WASTE

Help keep our island beautiful!!!

1. Grab a bag
2. Walk the beaches & trails
3. Collect litter.
4. Record what you collect.

You'll be amazed at what you collect!!!

TRASH	NUMBER OF PIECES	TOTAL	%
Aluminum Can			
Cigarette Butts			
Cotton Rags			
Fishing Line			
Glass Bottle			
Milk Carton			
Orange Peel			
Painted Wood			
Paper			
Plastic Bag			
Plastic Bottle			
Plastic 6 Pack Rings			
Rope			
Flip Flops			
Styrofoam Cup			
Tin Can			
Other			



How Long Does It Take to Rot Away?

TRASH	APPROXIMATE TIME TO ROT
Aluminum Can	200-500 years
Apple Core	2 months
Cigarette Butts	40 years
Cotton Rags	1-5 months
Dead Animal	Less than 1 year
Diapers (biodegradable)	200 years
Fishing Line	600 years
Glass Bottle	1 million years
Milk Carton	5 years
Orange Peel	6 months
Painted Wood	13 years
Paper	1-5 months
Paper Towel	2 – 4 weeks
Parking Ticket	2-4 weeks
Plastic Bag	10 – 50 years
Plastic Bottle	50 - 80 years
Plastic 6 Pack Rings	500 years
Plywood	1-3 years
Rope	3 - 24 months
Sand Shoes	75 years
Styrofoam Cup	500 years
Tin Can	50 - 100 years
Woollen Sock	1 year

APPENDIX **10** - **J**ALUIT **A**TOLL **E**NVIRONMENTAL **R**ESOURCE **M**ANAGEMENT **P**LAN

The Jaluit Atoll Environmental Resource Management Plan is a synthesis of the final management decisions by the Jaluit Atoll community.

It is reproduced in its entirety, except for the Maps. Maps of Zones from Appendix 2 of the Management Plan have been removed. Please refer to Maps 2 – 8 in Section 8.2 of the above Background Report.

Jaluit Atoll Environmental Resource Management Plan

January 2003



Prepared for:

Environmental Protection Agency, Republic of the Marshall Islands

Funded by:

The South Pacific Regional Environmental Programme

Prepared by:

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1 FOREWORD

We, the Jaluit Atoll community, our traditional leaders and elected representatives, are concerned over increasing trends of resource depletion within our atoll. We want to develop a plan that will protect our environment while allowing sustainable use of our atoll's natural resources.

We have already begun this process by establishing the Jaluit Atoll Conservation Area (JACA) in 1999. This was done through the combined efforts of the Jaluit Atoll Development Association (JADA), the Conservation Area Coordinating Committee (CACC), the Jaluit Atoll Local Government (JALG), the traditional leaders, the communities and the RMI Environment Protection Authority (RMIEPA) and the Conservation Area Support Officer (CASO).

Becoming a Conservation Area means that the local communities, the Jaluit Atoll Local Government (JALG), the RMI national government and we the community have committed ourselves to conserving and sustainably managing our local environment.

To guide us in the management of the Conservation Area we have, with the help of many people developed this Management Plan. This plan demonstrates our commitment to manage our precious resources and heritage for our community and our children.

Iroij Anjua Loeak

Iroij Imata Kabua

Hon. Alvin Jacklick, Minister of Health

Hon. Rien Morris, Minister of Internal Affairs

Hon. Antari Jason, Mayor, Jaluit Atoll

2 ACKNOWLEDGEMENTS

Many people have contributed to this Plan including, the staff of the Republic of Marshall Islands Environmental Protection Authority (RMIEPA), especially Mr. John Bungitak, Mr. Julian Alik, Mr. Albon Ishoda and Ms. Deborah Parker. On Jaluit Atoll, Mr. Albon Ishoda (RMIEPA), Mr. Miram Ankeid (CASO), Mr. Maity Bungitak (assistant to the CASO) and Mr. Aldon Jacklick (councilman and traditional leader). The national government Ministers Mr. Tadashi Lomoto, Mr Alvin Jacklick and Mr Rien Morris and Department Directors, Mr. Danny Wase (MIMRA) and Mr. Mark Steges (MIVA) and Mr. Augustine Nakamura (Jaluit Atoll City Manager).

The background research and consultation for development of this Management Plan is documented in the report “*Jaluit Atoll Conservation Area Environmental Resource Management Plan – Background Report* prepared by Steve Lindsay, Director of Micronesian Aquaculture & Marine Consultancy Services and Robin Aiello, Marine Biologist & Ecotourism Consultant.

The South Pacific Regional Environment Programme (SPREP) supports the management of the JACA, through the International Coral Reef Action Network (ICRAN) Pacific Action Phase funded by UNF-UNEP. SPREP support is coordinated by Mary Power, Coastal Management Adviser and Elizabeth Patterson, Project Support Officer, Coastal Management.

ICRAN is funded by the United Nation Foundation through the UN Environment Program (UNEP). It is dedicated to halting degradation of coral reefs worldwide with a focus on establishing a global network of ‘Demonstration Sites’ of Marine Protected Areas that use good management practices and involve local communities. Jaluit Atoll is one of the Pacific ‘Demonstration’ sites and the development of the Jaluit Atoll Resource Plan of Management is part of this support.

3 INTRODUCTION

We, the Jaluit Atoll community, our traditional leaders and elected representatives, are concerned over increasing trends of resource depletion within our atoll. We want to develop a plan that will protect our environment while allowing sustainable use of our atoll's natural resources.

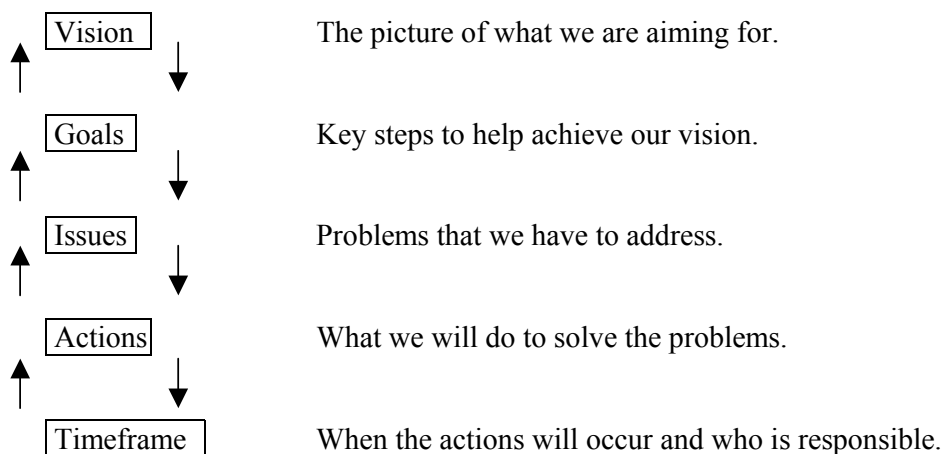
We began this process in 1999 by establishing the Jaluit Atoll Conservation Area (JACA). The strategy goals for the Conservation Area are:

Strategy Goals:

1. A sustainable Marine Resource Management Plan,
2. A sustainable Terrestrial Resource Management Plan,
3. Community-based management structures,
4. Alternative income generating activities (e.g. ecotourism, handicraft),
5. Public awareness, training and education programs, and
6. Capacity building to enable communities to effectively manage the Conservation Area.

This Management Plan aims to meet goals 1 and 2 of the Strategy Goals, while also being a step in the right direction to help achieve goals 3,4,5 & 6.

This Plan describes:

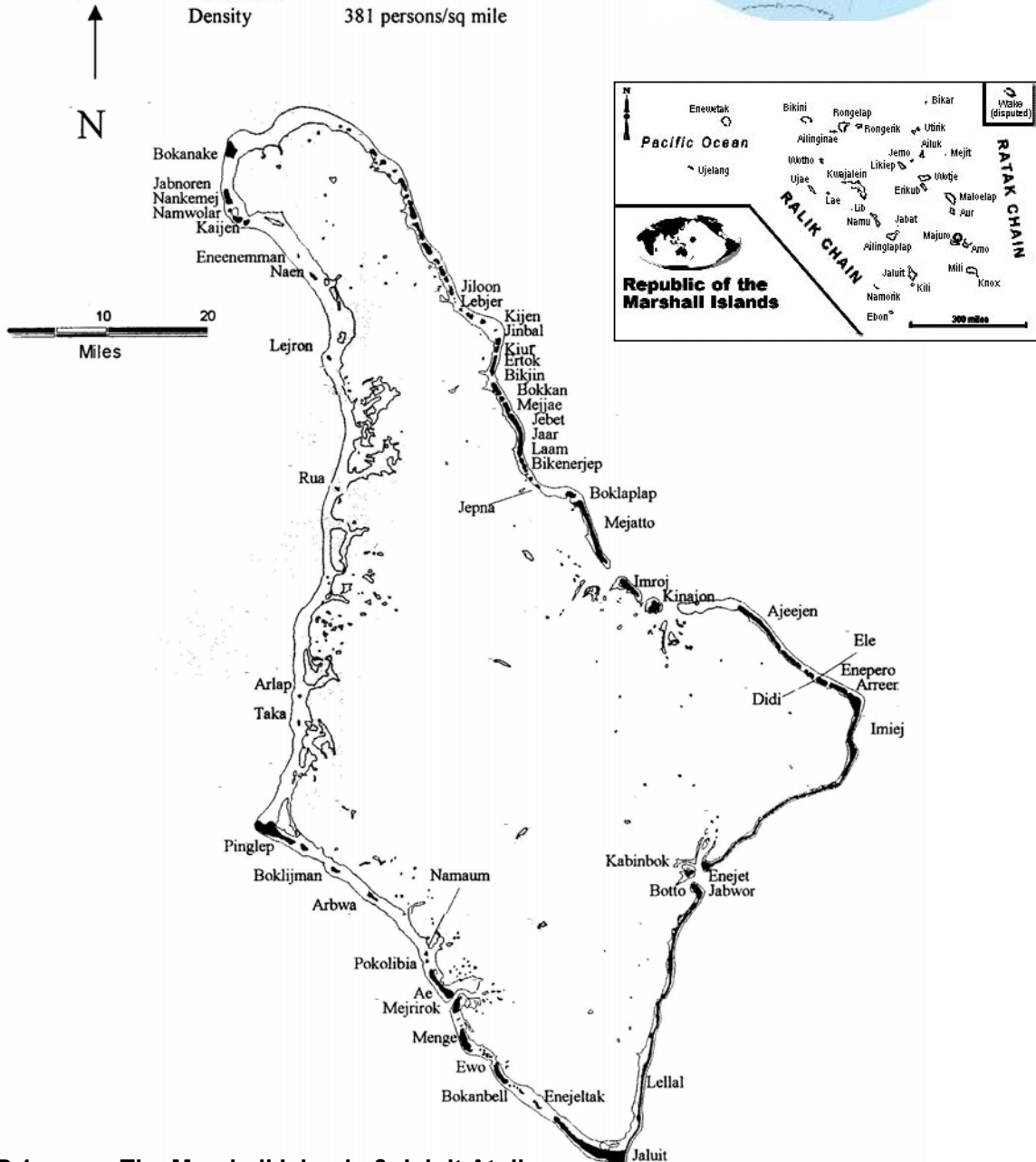


The community in consultation with the government has developed this Plan. It has full acceptance and support from the community and the government (both local & national), and will be implemented by the CACC and CASO.

THE JALUIT ATOLL CONSERVATION AREA

Jaluit Atoll

Lagoon area	266.31 sq miles
Land area	4.38 sq miles
Population	1669
Households	229
Density	381 persons/sq mile



MAP 1: The Marshall Islands & Jaluit Atoll
 (Note: the Conservation Area covers the entire atoll)

4 THE VISION

*“We the people of Jaluit Atoll
will strive to conserve and sustainably manage the biodiversity of the
atoll for the subsistence and the social-economic needs of the
present and future generations”*



5 THE GOALS

Put simply, we wish to manage our resources, so that, we have enough food to eat, live in a beautiful place, can practice our culture, and have the opportunity to generate income from our resources. We want our children, and our children's children to also be able to enjoy these benefits.

To achieve our vision we have identified five key management goals that will help to us address the major issues facing Jaluit Atoll.

Management Goals

1. Conservation

- To conserve and where possible restore the biodiversity of our atoll's resources.
- To manage the use of the atolls resources to cater for our needs on a sustainable basis.

2. Community Involvement and Support

- To have all users of the atoll (the community and people off-island) understand the reason and need for active management of the atolls resources.
- To have all users of the atoll actively involved in the management of the atolls resources.

3. Commercial Use

- To make sure that all commercial operators that fish in the atoll do not harvest more than is sustainable.
- To support initiatives that use ecological sustainable practices.
- To explore alternative sources of income for our community.

4. Ecotourism

- To Support nature-based ecotourism in a manner that is compatible with the other goals.

5. Information

- To obtain information about our natural resources to help us manage them sustainably.
- To monitor the use and condition of our resources over time.

6 THE ISSUES

Currently, there are three major issues that we need to address to achieve our goals and vision:

1. **The level of marine and terrestrial resources that are harvested** on the atoll (being used for subsistence living, to send off island, for special occasions and for commercial use).
2. **The impact of shore based activities** on the atoll's marine environment, such as **mangrove** clearing, coral/sand dredging, solid waste disposal and sewage dumping.
3. **The level of environmental awareness** and the importance of looking after our **natural** resources, and to have the need for **ownership and involvement** of all of us in the implementation of the plan and ongoing management activities.

Level of Resource Use

Currently all residence of Jaluit Atoll use the natural resources to meet their daily subsistence needs. In addition, resources are harvested to meet on and off island social and family commitments.

Commercial harvesting of resources provides an economic opportunity for the residence of the atoll. However, all commercial activities in the past have resulted in over harvesting of the target animals (e.g. trochus, sea cucumbers) causing drastic stock population declines.

With all these demands there is a risk that the natural resources may run out and some species could be lost forever. If this occurs it could leave us, the communities of Jaluit with a limited supply of food and reduced opportunities to make money.

Impact of Shore Based Activities

Several shore-based activities that impact on the Atoll's environment were identified during community consultations. Although these activities are limited, especially when compared to Majuro and Ebeye, the recent increase in urbanisation at the atoll centres, Jabwor and to a lesser degree Jaluit Jaluit, have still resulted in some negative impacts.

Examples of Shore-Based Impacts

- **Land Clearing** - clears vegetation and increases erosion and sediments being discharged into the lagoon.
- **Shoreline and Coral Dredging** - destroys coastal habitats, is unattractive, increases and causes erosion and sediment being discharged into the lagoon.
- **Solid Waste Pollution** – is unattractive and leads to water and soil contamination.
- **Sewage Pollution** - leads to water and soil contamination and can also result in increased algal growth in nearby lagoons that can cause coral reef death.

A recent example of a shore-based impact is preparations for a paved road between Jabwor and Jaluit Jaluit. This development activity caused an increased in the clearing of the coastal

vegetation along the road, which led to sediment entering the lagoon. Multiple dredging sites were also used and impacted on the coastal processes and the lagoon's coastline.

Solid waste on the Atoll is also a problem. As there is only a limited amount of land space, strategies need to be put in place to cope with the increase in solid waste, which is getting worse with increased development.

Level Of Environmental Awareness

Traditionally, *Iroij* own all land and water resources within a community's jurisdiction. By birthright, *Iroij* have absolute power, including all resource use, preservation and management.

As part of this, traditionally some areas were set aside as 'No-Take' zones (Mo's), where the removal of any plants or animals was forbidden.

This system however, has weakened with time and more and more of the resource management responsibility, especially with marine resources, now falls under the responsibility of the Local Government Council.

Unfortunately, this change has led to a slow decline in traditional awareness of resource values and has resulted in the over harvesting of resources and a decline in sustainable management practices.

An understanding of why the atoll's resources are important and how the community can help to look after them is a key factor in achieving sustainable resource management.

7 THE ACTIONS

To address these issues and help us achieve our goals and vision we have decided on the following actions:

LEVEL OF RESOURCE USE

1. We will designate Mo, Sanctuary and other special management zones
2. We will put in place bans on certain activities that apply to the entire Atoll (Atoll-Wide Bans).
3. We will establish a Marine Monitoring Program to provide information that will help us manage our marine resources.

IMPACT OF SHORE BASED ACTIVITIES

4. We will adopt and ask others to adopt *Best Environmental Practices (BEP's)* to limit impacts from development and tourism activities.
5. We will seek assistance to develop a *Waste Management Plan* to limit impacts from solid waste and sewage disposal.
6. We will ask the government to make sure *that Environmental Impact Studies and Management Plans* are requested for all development projects on Jaluit Atoll.

INVOLVEMENT AND OWNERSHIP OF COMMUNITY

7. The CACC and CASO will keep us, the community informed of implementation of the plan and other relevant matters.
8. The CACC and CASO will coordinate an intensive on-going atoll wide public resource use awareness and education program.
9. The CACC and CASO will assist with the regulation of the actions and activities in the Management Plan.

8 IN DETAIL

LEVEL OF RESOURCE USE - Zones

Action 1. We will designate Mo, Sanctuary and Other Special Management Zones, and mark them so they can be easily identified.

We on Jaluit Atoll wish to conserve and properly manage our atoll's marine and terrestrial resources. We hope to achieve this by using traditional management practices, specifically the system of taboo areas called 'Mo' combined with new management practices and other management "zones".

THE ZONES

We have decided on a management system with three different zones. **Mo, No-Take Sanctuary, and General Use.** Each zone will have specific restrictions on what activities can be done in that area.

Mo's

Mo - traditional community-owned areas that have been designated for **Subsistence Use** by resource owners. Collection of resources for commercial use or for special occasions is not allowed. Activities such as diving and snorkelling are allowed when particular rules are met, and permission is given.



- There are fifteen (15) Mo, owned by nine (9) communities.
- They cover approximately 30% of the Atoll.

Mo Zones are shown in green on the Zoning Maps.

(Appendix 2)

No-Take Sanctuaries

These are areas where there can be no removal of the resources. These "no take zones" allow natural processes to happen without impact.

We have selected Sanctuary zones using the following three criteria:

1. *Ecological significance* (e.g. species and habitat diversity, spawning areas).
2. *Cultural importance* to the local community.
3. *Need for immediate conservation.*



- There are fourteen (14) No-Take Sanctuaries.
- They cover approximately 10% of the Atoll.

Sanctuary Zones are shown in red on the Zoning Maps.

(Appendix 2)

General Use Zone

This zone includes all areas outside the Mo and Sanctuary areas, both inside the lagoon, on land, and up to 200 meters (600 feet) offshore outside the atoll.

All activities (except Atoll-Wide Banned activities) are allowed within this zone.



- It covers approximately 60% of the Atoll.

**General Use
 Zones are shown
 in white on the
 Zoning Maps.**

(Appendix 2)

Table 1. Summary of Zones & Activities

MO	
<p><i>WHAT IS ALLOWED</i></p> <ul style="list-style-type: none"> ✓ Subsistence harvesting –but only if people are associated with that particular Mo. ✓ Special Occasion harvesting– but only if people are associated with that particular Mo. ✓ Ecotourism Activities (diving & snorkelling) – but only with prior agreement from the communities. 	<p><i>WHAT IS NOT ALLOWED</i></p> <ul style="list-style-type: none"> ⊗ Commercial harvesting. ⊗ Resources for sending off island. ⊗ All Atoll-wide Banned Activities.
SANCTUARY	
<p><i>WHAT IS ALLOWED</i></p> <ul style="list-style-type: none"> ✓ Ecotourism Activities (diving & snorkelling) – but only with prior agreement from the community. 	<p><i>WHAT IS NOT ALLOWED</i></p> <ul style="list-style-type: none"> ⊗ Subsistence harvesting. ⊗ Special Occasion harvesting. ⊗ Commercial harvesting. ⊗ Sending off island harvesting. ⊗ All Atoll-wide Banned Activities.
GENERAL USE	
<p><i>WHAT IS ALLOWED</i></p> <ul style="list-style-type: none"> ✓ Subsistence. ✓ Special Occasion. ✓ Commercial harvesting. ✓ Send off island harvesting. ✓ Ecotourism–only with prior agreement from the communities 	<p><i>WHAT IS NOT ALLOWED</i></p> <ul style="list-style-type: none"> ⊗ All Atoll-wide Banned Activities.

Table 2: Details of Activities in each Zone

ACTIVITIES	GENERAL USE	MO	SANCTUARIES
Subsistence resource harvesting	Yes	Yes	No
Special Occasion resource harvesting	Yes	Yes	No
Off-Island Demand resource harvesting	Yes	No	No
Commercial resource harvesting	Yes	No	No
Ecotourism diving & snorkelling	Yes	Yes	Yes
Spearfishing**	Yes	Yes only for subsistence	No
Shell collecting*	No	No	No
Relic collecting*	No	No	No
Sea Cucumber collecting*	No	No	No
Shark Fishing*	No	No	No
Turtle hunting*	No	No	No
Seabird hunting*	No	No	No
Black Pearl collecting*	No	No	No

* - This activity is an Atoll-wide banned (prohibited) activity

** - Spearfishing cannot be conducted at night with underwater torches

MARKING THE ZONES

All Mo and Sanctuary boundaries need to be marked for easy recognition. The marker, such as a mooring buoy, should be standard for the atoll, clearly visible and colour coordinated to show what zone they define. Latitude and longitude coordinates and further details for marking procedures can be found in Appendix 1.

Suggested Colour Coded Buoys (Floats):

Green Buoy	Mark the corners of each Mo.
Red Buoy	Mark the corners of each Sanctuary.
White Buoy	Mark dive site moorings (see Background Report).

Steps for Action 1:

*The Zone Boundaries once generally agreed by each community will be clearly defined and incorporated into local council ordinances, and passed into atoll legislation by June 2003. Details of zone boundaries are in **Appendix 1**.*

*Each Mo and Sanctuary will be clearly marked on land and water to allow easy identification by September 2003. Details of mooring buoy system found in **Background Report**.*

LEVEL OF RESOURCE USE – Atoll-Wide Bans

Action 2 We will place Atoll-Wide Bans on certain Activities

We have decided that Atoll Wide bans on certain activities are required to protect some species. These bans will allow current populations to mature, reproduce and repopulate the reefs of the atoll. In time, this should allow the species to repopulate and all activities be allowed again.

Table 3: Atoll Wide Banned Activities.

Banned Activity	Reason
⊗ Clam harvesting - commercial & sending off-island.	All species of clams are over-harvested.
⊗ Trochus harvesting.	Trochus have been over-harvested.
⊗ Sea Cucumber harvesting.	Commercial species of sea cucumbers have been over-harvested.
⊗ Black Pearl Oyster harvesting.	Pearl oysters are currently over-harvested.
⊗ Shark fishing.	Sharks are a major component of the reef and are ecotourism attractions providing potential income to all communities.
⊗ Turtle and egg harvesting.	Turtles are a major ecotourism attraction, and can easily be hunted to local extinction.
⊗ Seabird and egg harvesting.	Seabirds are a major ecotourism attraction, and can easily be hunted to local extinction.
⊗ Destructive fishing techniques (chlorine, cyanide, dynamite).	Destructive fishing is illegal in the RMI. It should be specifically banned in Jaluit Atoll.
⊗ Spearfishing on SCUBA.	Spearfishing on SCUBA is an unsustainable fishing practice and can lead to overfishing.
⊗ Commercial Spearfishing at night with underwater flashlights.	Spearfishing with lights is an unsustainable fishing practice that can lead to overfishing.
⊗ Unsustainable Fishing Practices (e.g. small size gill nets).	These are unsustainable fishing practices that can lead to over fishing.
⊗ Relic Collecting.	Relic collecting takes them away from the atoll.
⊗ Live Fish Trade.	Live fish collecting usually targets fish that are an important food subsistence food source and are also major ecotourism attractions.
⊗ Live rock & coral collecting.	Removal of live rock and coral damages large sections of the reef.
⊗ Dredging or mining.	Digging causes damage to marine environments, and increases sedimentation.
⊗ Aquarium Fish collecting.	Aquarium fish collecting targets fish that are also ecotourism attractions.

Steps for Action 2:

We will ask the local government to put the atoll wide banned activities into local ordinances and pass into legislation by June 2003.

LEVEL OF RESOURCE USE – Marine Monitoring Program

Action 3. We will establish an on-going Marine Monitoring Program to provide information that will help us manage our natural resources.

Resource monitoring gives us information on the health and extent of resources in our atoll. This helps us to manage our resources sustainably and allows us to review and change our management strategies when needed.

A Marine Resources Base-line Survey was done in 1999 (SPREP 2000). The survey contained information on numbers of target species. This will form the basis of our monitoring program. To collect information required to help us manage our resources we will need to have a monitoring program that will run for many years.

There will be 6 parts to the monitoring program.

Part 1. Atoll Wide Marine Assessment

Atoll-wide rapid assessment of the state of marine resources will be undertaken every year to provide a general assessment of the health of all marine habitats and resources within the atoll. This will require the assistance of EPA and MIMRA.

Part 2. Monitoring Effects of Atoll Wide Bans

Atoll-wide bans on particular species will be reviewed using the information from the atoll wide assessment. This will help us to work out if the species are in decline or they have recovered enough to allow subsistence and/or commercial activities to occur again.

Part 3. Monitoring Fish Catches for the Fish Base Project

Monitoring of the commercial activities associated with Fish Base will be undertaken continuously. It is essential that standard length/weight frequency data of all caught fish is collected on a regular basis.

Part 4. Monitoring Spawning Aggregation Sites

There needs to be investigations into reef location and timing of fish **spawning aggregations** within the atoll (within the next 2 years).

Part 5. Evaluating Specific Species Status

A resource assessment will be undertaken to work out the, locations, and abundance and population size of mangrove crab, coconut crab and turtle populations within the atoll.

Part 6. Training at local and government levels

We will have **training programs** on resource management and marine monitoring issues for people that have a direct involvement in the management of the atoll resources eg: CASO, volunteers and government officers.

Steps for Action 3:

The Marine Monitoring Program will be initiated in 2000, based on the 1999 Marine Resource Survey. The Fish Base data collection and analysis program, and the atoll-wide marine resource assessments, will be priority actions. Capacity building and training will be an important component.

We will explore *the possibility of having an international volunteer* work with CACC and the CASO officer to start the monitoring program

All new commercial marine-harvesting activities will be prohibited until enough information has been collected to develop management plans for specific resources. This will be put into ordinance and reviewed as resource conditions improve.

IMPACT OF SHORE BASED ACTIVITIES – Best Practices

Action 4. We will adopt and ask others to adopt Best Environmental Practices (BEP's) and Best Cultural Practices to limit impacts from development and tourism activities.

BEST ENVIRONMENTAL PRACTICES (BEP'S)

Best Environmental Practices are rules people follow to help reduce the impact of activities on the environment. They are used throughout the world as a management tool.

BEP's can be developed for tourist activities or for any development activities on the atoll. It is best to develop BEP's before the impacts of the activities starts to degrade the resources.

Below are examples of 'Best Environmental Practices' for Tourists.

Table 4. Example of Best Environmental Practices for Tourists

Marine Life (for example: corals, clams, fish, sea cucumbers, snails)	
× No touching, or moving animals.	× No feeding animals.
× No collecting or taking animals out of the water.	× No fishing.
× No hassling, chasing, or poking animals.	× No spearfishing.
Littering	
× No littering	
× Do not throw away cigarette butts.	
Historic Relics (for example: glass bottles, parts of ships or airplanes, bones)	
× No touching or moving – leave them where they are.	
× No collecting or removing from water.	
× No breaking or smashing.	
Dive Site Moorings	
× No anchoring on the reef - dive boats must drift or use dive site moorings.	

BEST CULTURAL PRACTICES

Best Practises can also be used to help reduce negative cultural impacts. Several issues and concerns about tourists visiting Jaluit Atoll were raised during our consultations meetings. These concerns included:

- Inappropriate dress (e.g. shorts, bikinis and mini-skirts),
- Inappropriate behaviour (e.g. loud voices),
- Trespassing into private or taboo areas,
- Little fore-warning about groups arriving in Jaluit,

- Failure of divers to get permission from communities and the JALG,
- Little financial gain by local communities or business, and
- Collecting of historic relics (glass bottles) and shells.

Below are examples of Best Practise Guidelines for dealing with cultural impacts.

Table 5: Best Cultural Practices for Tourists.

Community Permission

- × Community permission must be granted before diving at any site.
- × Divers must be aware of what zone they are in – Mo, Sanctuary or General Use.

Visiting a Community

- × Respect all community members - say hello, smile and talk with them.
- × Wear long shorts and a shirt – do not wear bikinis and short-shorts.
- × Do not wander off uninvited.

Guides

- × A local guide must accompany all dive boats and land tours.
- × Respect the decision of the guide.
- × Follow all rules.

Best Environmental and Cultural Practices can also be built into specific plans, such as a Dive Industry Plan. With the potential growth of the dive industry in Jaluit Atoll, a Dive Industry Development Plan would be useful to guide diver's behaviour (environmentally and culturally) as well as addressing the industry's training and capacity building needs. See Appendix 3 for more details.

Steps for Action 4:

We will adopt *Ecotourism Best Environmental Practises (BEP's) and Best Community Practices (BCP's)* and put these into local ordinances as appropriate. They will be well advertised (communities, tourists and ecotourism operators) and reviewed regularly to make sure they address changing community concerns and needs.

BEP's and BCP's may include a User Fees system that will be negotiated between the CACC and each community.

IMPACT OF SHORE BASED ACTIVITIES – Waste Management

Action 5. We will seek assistance to develop a Waste Management Plan to limit impacts from solid waste and sewage disposal.

Two major concerns for us on Jaluit Atoll are solid wastes from household garbage and sewage disposal. Currently the levels of pollution and waste on our Atoll are increasing, particularly in the larger communities of Jabwor and Jaluit Jaluit. It is clear that this will continue to be a problem and will get worse in the future.

TYPES OF WASTE

There are several types of waste found on our atoll. All types of waste need to be managed so that we do not harm the fragile environment of our atoll.

Common Types of Waste

Household Waste

Currently, household garbage (paper, plastics, steel, batteries) is dumped directly into family or community owned landfill pits. The larger garbage pits are open and are commonly located on the lagoon side of the atoll. During periods of high tides and strong winds lots of rubbish from these sites gets pushed into the lagoon. This can cause contamination of the ocean waters.

Sewage

Most houses use septic systems that link to underground reservoirs or go directly into the sea. This way of sewage disposal can cause contamination of surface and/or ground water.

Oily Waste

Oily waste is a small part of all the overall waste on the atoll. It includes waste oil from the power stations generators, personal generators, outboard engines and car engines. Currently the power company stores all the waste oil from the generators in 55-gallon steel drums and ships them to Majuro. Leakage into the ground can cause contamination of soil and ground water.

Organic Waste

Most organic waste on the atoll is recycled and used as garden fertilizer or food for domesticated animals (pigs).

WASTE MANAGEMENT PLAN

As a community we don't have a strong awareness of the dangers and problems from these wastes on us or on our environment. We would like to get assistance from the government to develop an **Atoll Wide Waste Management Plan**. This Waste Plan should include information on the dangers of waste and the correct ways of disposal.

Steps for Action 5:

*We will seek assistance to undertake a **Waste Management Assessment** and to develop a **Waste Management Plan** that will address community concerns about increasing pollution by poor solid waste and sewage disposal. We will try to have the Plan developed by December 2004, and start implementation by June 2005.*

IMPACT OF SHORE BASED ACTIVITIES – Environmental Impacts

Action 6. We will ask the government to make sure that Environmental Impact Studies and Management Plans are required for development projects.

Major developments and construction activities can have an impact on our atoll's resources and environment. New developments and construction activities need plans that clearly state what actions will be taken during construction to minimise any negative impacts on our environment.

We recognise that it is not the community's role to regulate building and development works, therefore we ask the government to take care in making sure that all new development proposals for Jaluit Atoll have the correct and required environmental assessments.

Steps for Action 6:

The CACC will ask the government to notify them of any new developments that are occurring on Jaluit Atoll that may affect the atoll's resources.

The government (EPA) will require an Environmental Impact Assessment and Environmental Management Plan for future development activities within Jaluit Atoll.

INVOLVEMENT AND OWNERSHIP OF COMMUNITY – Sharing Information

Action 7. The CASO and CACC will keep the Community informed of the implementation of the plan

This Plan has been developed through a series of formal and informal meetings and workshops held on Majuro and Jaluit Atoll. People involved in these meetings and workshops included, traditional leaders, landowners, local government and Conservation Area Coordinating Committee (CACC) members, elected national government representatives, staff from several government agencies and people from Jaluit Atoll community.

Part of the success of this plan will be the continued support and interest from our communities. It is important that there is on going open communication between the CACC and the community, particularly in regards to reporting on the progress of the implementation of the plan.

Steps for Action 7:

The CASO and CACC will organise Formal and informal community meetings and stakeholder discussions to talk about plan and other atoll resources management issues. This will occur on a regular basis with a formal meeting at least every 3 to 4 months.

The CASO will keep the communities informed of the progress of the plan.

Feedback will be used to update this Plan. This Plan will be reviewed and updated by the CACC in 2005.

INVOLVEMENT AND OWNERSHIP OF COMMUNITY – Public Awareness Programs

Action 8. The CACC and CASO will coordinate an intensive on-going atoll wide public awareness and education program.

The success of any Management Plan relies heavily on the support and acceptance of the community. To help gain support and acceptance for this Plan the CACC and CASO will run a strong public awareness program.

These programs will cover information on:

- What the Plan is for,
- Who the Plan affects,
- What the Actions are,
for example:

Where the Mo and Sanctuaries are located.

What activities are allowed, and what are banned.

What are the penalties for a breach of the Plan?

- Who is responsible for carrying out the Plan, and
- How the actions are implemented.

The CASO will target all groups including, church groups, women's groups, youth groups, sport groups, primary schools, high schools, local government, our community and communities from other atolls.

We will seek the assistance of an international volunteer with awareness raising and education type skills to work with the CASO to develop and conduct the public awareness program.

Steps for Action 8:

The RMI government will investigate getting an international volunteer to work with CASO to develop and conduct Awareness Raising Program. Investigations for a volunteer should start by September 2003.

The CASO and CACC will develop an Awareness Raising Program by June 2003. This will be an on-going program.

INVOLVEMENT AND OWNERSHIP OF PLAN BY THE COMMUNITY – Enforcement of the Plan

Action 9. CACC and CASO will coordinate the enforcement of the actions and activities in the Management Plan in conjunction with the local and National Government

Enforcement of the rules in this Plan, especially the ones relating to the zones and atoll wide bans, will be important to the success of the Plan. Key issues that will help us to achieve successful enforcement include, public awareness, community support, reliable enforcement, manpower and strong government and agency support.

To strengthen the Plan we have also decided that the Jaluit Atoll Local Government Council should make a law (local ordinance) relating to the Conservation Area and the Plan (example Ordinances can be found in Appendix 4).

There are a few options for the enforcement of the regulations on the Atoll, including government rangers to be recruited and enforce the regulations, or to train local community members as community rangers (further details about the pros and cons of each option can be found in the Background Report).

As each community has access to a fishing boat from the Fish Base project, we have decided that the best enforcement option is for our own community members (particularly boat divers) to be trained as community rangers and help enforce the regulations in their area.

This will be done with the assistance of the local and national governments and in cooperation with MIMRA (and the Fish Base), the JALG, the RMIEPA, CACC and CASO

Below are some details and issues involved in setting up this enforcement system.

Enforcement Details & Issues

Community Mo Rangers

The drivers of these fishing boats would become the Mo Rangers. They would be responsible for patrolling and enforcing their own community's Mo (s).

Coordinator and Coordinating Committee

The coordination of this option would be jointly the responsibility of the CASO officer and the MIMRA Fish Base Manager under the direction and support of the CACC.

Expenses

By sharing MIMRA boats, some of the costs are also shared. However, who pays expenses such as salaries and petrol costs would have to be negotiated. Most of it would have to be externally funded.

Concerns

Due to the usage of the boats during the time the Fish Base is purchasing fish the communities would not have any boats available for surveillance during this period of time.

Steps for Action 9:

The Community Ranger Program will be established by ordinances and implemented by December 2003 (example of ordinances in Appendix 4).

Rangers will be trained in details of the zones, atoll bans and other enforcement skills. This will start by December 2003 and will be ongoing.

9. TIME FRAME AND RESPONSIBILITIES

ISSUE	NUMBER	ACTION	STEPS	TIIMING	RESPONSIBLE GROUPS
Level of Use	1	Designate Mo, Sanctuary and other special management zones.	The Zone Boundaries once generally agreed by each community clearly defined and incorporated into local council ordinances, and passed into atoll legislation.	June 2003	Local government CACC
			Each Mo and Sanctuary clearly marked on land and water to allow easy identification.	September 2003	CACC
	2	Atoll Wide Bans put in place on certain activities.	Local government to put the atoll wide banned activities into local ordinances and pass into legislation.	June 2003	Local government CACC
	3	On-going Marine Monitoring Program to be established.	Funds need to be secured for professional technical assistance.	December 2003	RMI EPA
			International volunteer work with CACC and CASO officer to start the monitoring program.	September 2003	CACC RMI EPA
			All new commercial marine-harvesting activities prohibited and made into ordinance until enough information has been collected to develop correct management plans for specific resources. This would be reviewed as resource numbers increase.	June 2003	CACC Local Government National Government

ISSUE	NUMBER	ACTION	STEPS	TIIMING	RESPONSIBLE GROUPS
Impact of Shore Based Activities	4	<i>Best Environmental Practices (BEP's)</i> for development and tourism activities, adopted.	Ecotourism Best Environmental Practices (BEP's) and Best Community Practices (BCP's) developed and put into local ordinances. Need to be well advertised (communities, tourists and ecotourism operators) and reviewed regularly.	June 2004	RMI EPA CACC Local Council
			Any BEP's and BCP's with User Fees system need to be negotiated between the CACC and each community.	September 2004	Jaluit Atoll Community CACC
	5	Waste Management Plan developed with help from government.	Initial waste assessment completed by December 2004. Information to be used to develop a Waste Management Plan. The plan must address pollution by solid waste and sewage disposal.	Implemented June 2005	RMI EPA CACC Jaluit Community
	6	<i>Environmental Impact Studies and Management Plans</i> for developments on Jaluit Atoll be requested of government.	CACC to be informed by the government of any new developments that are occurring on Jaluit Atoll that may affect the atoll's resources.	Ongoing	National Government CACC
			Environment Impact Assessments mandatory for all future development activities within Jaluit Atoll.	Ongoing	National Government
Involvement of the Community	7	Community Updated on Progress of Plan.	Formal and informal community meetings and stakeholder discussions about plan and other resource management issues.	Ongoing (possibly every 6 months)	CASO
			CASO to keep community informed about the progress of implementation of the plan.	Every 6 months	CASO
			Feedback from community discussion and meetings will used to help update this Plan. Review and update of Plan to be coordinated by CACC in 2005.	Dec 2005	CACC Jaluit Community RMI EPA

ISSUE	NUMBER	ACTION	STEPS	TIMING	RESPONSIBLE GROUPS
	8	Atoll Wide Awareness and Education Program developed and implemented by CASO.	CASO to develop an Awareness Raising Program. The program should include: <ul style="list-style-type: none"> ▪ Importance of the Atoll's natural resources to community well-being. ▪ Reason for different actions. ▪ Explanation of how it will all work. ▪ Role of the community in the Plan. 	Developed by June 2003 Begin implementation September 2003 On-going	CASO International Volunteer if recruited
			RMI government investigate getting an international volunteer to work with CASO to develop and conduct Awareness Raising Program. Investigations for a volunteer should start by March 2003 to have volunteer in place by Sept 2003.	September 2003	RMI EPA CASO CACC
	9	Community Ranger Program for Coordination of Regulation of action and activities in Plan.	Mo Community Rangers need to be trained in details of the zones, atoll bans and other enforcement skills.	December 2003.	CACC RMI EPA Jaluit Community

SUMMARY OF TIME FRAME

June 2003	September 2003	December 2003	June 2004	September 2004	December 2004	June 2005	September 2005	December 2005
Ordinance for Atoll Wide bans. Ordinance for zoning system. Mark Zones. Ordinance to stop any new commercial activities.	Secure international volunteer to help implement plan.	Enforcement. Ordinances. Mo Rangers trained. Find Funds for monitoring.	Develop Awareness Program. Develop BEP, BCP.	Implement Awareness Program. Negotiate User Pay system.	Complete Waste Assessment (information to be used to develop Waste Plan).	Develop Waste Program and Implement Waste Program.	Commence Review of Plan.	Finish Review of Plan
<p>Ongoing Activities Meeting with community to update on progress of plan and other Atoll resource management issues. Information updates to community (maybe newsletter) on progress of Plan. Government to inform CACC or any development on Jaluit Atoll.</p>								

9 APPENDICES

APPENDIX 1.

Marking Mo & Sanctuary Boundaries

MARKING THE ZONES

Suggested Procedure for marking management zones.

- **On land** - Use landmarks (e.g. tree) or a length of PVC pipe embedded in the ground.
- **In the water** - Markings should be fixed buoys or mooring sites secured to the reef.
- **Shallow water mooring locations:** All buoys (floats) should be attached to the reef using a stainless steel rod and loop attached directly to a large coral head and secured. A smaller submersed float should be attached below the surface on all sites to assist in keeping the mooring rope off the reef and act as a safety line if the main float is lost (e.g. storm conditions).
- **Deep water moorings locations:** All buoys (floats) should be attached to a concrete block, of a size no less than half a meter square (1.5 feet square) with a steel rod and loop embedded in the concrete and attached to the surface as mentioned above.
- **A minimum of 4 buoys (floats) must be used to mark each Mo and Sanctuary zone** These should be located on each boundary of the zone. Additional floats/markers may be required in cases when the zones are large. Each marking location must be visible from each other.
- **Colour coded buoys (floats):** Buoys should be coloured coded so that the zone can be easily recognised. The following colours are suggested so that they match the zone colours on the maps.

SUGGESTED BUOY COLOURS:

Green Buoy	Mark the corners of each Mo.
Red Buoy	Mark the corners of each Sanctuary.
White Buoy	Mark dive site moorings (see Background Report).

- **Reuse old buoys (floats):** It is recommended that buoys (floats) that have washed up onto the islands of the atoll be used for these purposes.

ZONE BOUNDARIES

All Mo and Sanctuary boundaries have been identified by the use of latitudinal and longitudinal coordinates obtained from the use of a hand held Global Positioning System (GPS). Details are presented in below.

Latitude and longitude coordinates for Mo's and Sanctuaries.
Please refer to Maps 1 – 9 in Appendix 2.

Community	Mo	Latitude, Longitude	Sanctuary	Latitude, Longitude
Jitoken	Matolen Mo	A. 169.41061, 6.29472 B. 169.42334, 6.27706 C. 169.44134, 6.30843 D. 169.45447, 6.28714 E. 169.47815, 6.29835 F. 169.48253, 6.29214 G. 169.47304, 6.28892	Matolen Sanctuary	C. 169.44134, 6.30843 D. 169.45447, 6.28714 E. 169.47815, 6.29835 F. 169.48253, 6.29214 G. 169.47304, 6.28892
	Likin Woden Mo	A. 169.41766, 6.24531 B. 169.42764, 6.25519 C. 169.43921, 6.25469 D. 169.45172, 6.23843 E. 169.43985, 6.23230 F. 169.45310, 6.21289 G. 169.47077, 6.22493	Likin Woden Sanctuary	D. 169.45172, 6.23843 E. 169.43985, 6.23230 F. 169.45310, 6.21289 G. 169.47077, 6.22493
Mejae	Takaen an Lāben Mo	A. 169.45310, 6.21289 B. 169.47077, 6.22493 C. 169.51972, 6.22783 D. 169.55332, 6.19804 E. 169.54682, 6.17217 F. 169.56172, 6.14852 G. 169.56114, 6.13345 H. 169.55645, 6.13165 I. 169.45887, 6.18836 J. 169.47254, 6.18862 K. 169.48160, 6.17274 L. 169.46323, 6.17135	Bird Island Sanctuary	I. 169.45887, 6.18836 J. 169.47254, 6.18862 K. 169.48160, 6.17274 L. 169.46323, 6.17135
Pinglep	Dri Bako Mo	A. 169.46323, 6.17135 B. 169.4883, 6.1732 C. 169.4618, 6.0029 D. 169.4433, 5.9979 E. 169.4252, 5.9492 F. 169.4598, 5.9296 G. 169.4703, 5.9399 H. 169.48673, 5.90941 I. 169.49967, 5.91815	Dri Bako Sanctuary	A. 169.46323, 6.17135 B. 169.4883, 6.1732 C. 169.4618, 6.0029 D. 169.4433, 5.9979
			Pinglep Island Sanctuary	F. 169.4598, 5.9296 G. 169.4703, 5.9399 H. 169.48673, 5.90941 I. 169.49967, 5.91815
	Lorā Mo	H. 169.48673, 5.90941 I. 169.49967, 5.91815 J. 169.49642, 5.89873 K. 169.50521, 5.90477	No designated Sanctuary	
Ae	Lorā Mo	<i>Entire Mo is a designated Sanctuary</i>	Lorā Sanctuary	A. 169.49763, 5.89808 B. 169.51032, 5.88142 C. 169.52750, 5.89180 D. 169.51437, 5.90773
	Enindo Mo	<i>Entire Mo is a designated Sanctuary</i>	Enindo Sanctuary	A. 169.5298, 5.8760 B. 169.5382, 5.8768 C. 169.5415, 5.8740 D. 169.5384, 5.8690 E. 169.5310, 5.8700

Community	Mo	Latitude, Longitude	Sanctuary	Latitude, Longitude
Mejrirok	Wodenlap Mo	<i>Entire Mo is a designated Sanctuary</i>	Wodenlap Sanctuary	A. 169.53441, 5.88661 B. 169.53681, 5.8671 C. 169.54494, 5.8651 D. 169.54662, 5.8643 E. 169.53876, 5.8590 F. 169.53505, 5.8597 G. 169.53270, 5.8617
Enejat	Bar Mo	A. 169.63916, 5.93648 B. 169.65887, 5.95732 C. 169.67258, 5.94508 D. 169.65056, 5.92807	<i>No designated Sanctuary</i>	
Jabwor	Karajraj Kan Mo	<i>Entire Mo is a designated Sanctuary</i>	Karajraj Kan Sanctuary	A. 169.63257, 5.92566 B. 169.63511, 5.93516 C. 169.63931, 5.93609 D. 169.65032, 5.92800 E. 169.64832, 5.92269 F. 169.63661, 5.92144
Imiej	Reijok Mo	A. 169.66804, 6.0361 B. 169.66567, 6.0561 C. 169.63660, 6.0564 D. 169.63617, 6.0621	<i>No designated Sanctuary</i>	
Imroj	No No Mo	A. 169.63752, 6.05371 B. 169.64027, 6.04983 C. 169.64032, 6.04596 D. 169.63762, 6.03753 E. 169.63252, 6.02885 F. 169.62935, 6.02978 G. 169.62566, 6.04415 H. 169.62551, 6.04782 I. 169.63164, 6.05376	No No Sanctuary	F. 169.62935, 6.02978 G. 169.62566, 6.04415 H. 169.62551, 6.04782 I. 169.63164, 6.05376 J. 169.63122, 6.04100 K. 169.63299, 6.03464
	Jea Ko Mo	<i>Entire Mo is a designated Sanctuary</i>	Jea Ko Sanctuary	A. 169.64019, 6.04058 B. 169.64500, 6.04081 C. 169.64374, 6.03721 D. 169.64041, 6.03774
	Kiliek Mo	<i>Entire Mo is a designated Sanctuary</i>	Kiliek Sanctuary	A. 169.62143, 6.04481 B. 169.62322, 6.05055 C. 169.62551, 6.04782 D. 169.62566, 6.04415 E. 169.62575, 6.04423
	Lokuben Mo	A. 169.59498, 6.07280 B. 169.60007, 6.07191 C. 169.60280, 6.06188 D. 169.58823, 6.06110 E. 169.58426, 6.06202 F. 169.58475, 6.07295 G. 169.58561, 6.07516 H. 169.58798, 6.07541	Lokuben Sanctuary	A. 169.59498, 6.07280 D. 169.58823, 6.06110 E. 169.58426, 6.06202 F. 169.58475, 6.07295 G. 169.58561, 6.07516 H. 169.58798, 6.07541

APPENDIX 2.

Maps of Zones

Maps of Zones have been removed from this section.

Please refer to Maps 2 – 8 in Section 8.2 of the above Background Report.

APPENDIX 3.

Outline for the Development of a Dive Industry Plan

Scuba diver damage is widely recognised throughout the world. Research studies clearly demonstrate that poorly managed diving and snorkelling can lead to high levels of impacts. Potential environmental impacts include standing on and breaking marine life (e.g. corals), collecting marine life (e.g. live and dead shells, coral), collecting historical relics, trampling vegetation, and littering.

With the potential growth of the dive industry in Jaluit Atoll, it would be useful to have a Dive Industry Development Plan that guides training and infrastructure needs as well as divers behaviour.

A Dive Plan should include the following elements

- Dive site inventory.
- Dive site ownership issues.
- Environmental Impact Assessment.
- Training needs analysis.
- Capacity building of local staff, especially in the area of Dive Master and Instructors.
- Growth potential analysis.
- Stakeholder inventory.
- Public awareness issues with communities and dive operators.
- Vessel mooring system.
- Risk assessment.
- Emergency evacuation plan.
- Marketing strategy.

APPENDIX 4.

Enforcement Information

Suggested Draft Ordinances:

Ordinance
Designate the Jaluit Atoll Plan of Management as legislation.
Designate the boundaries of all Mo and Sanctuaries within the atoll utilising the latitudinal and longitudinal coordinates.
Designate all Sanctuaries within the atoll as “no-take zones”.
Designate all Mo’s within the atoll as ‘subsistence-only zones’ and clearly define the activities that are allowed, and those that are banned.
Designate all Atoll-wide Bans.
Ban all coral, shell and relic collecting (e.g. tourists).
Make the payment of User Fees mandatory for all tourist activities.
Make it mandatory for all tourists to follow all Best Environmental Practices and Best Community Practices as stated in the Guidelines for Divers.
Designate the need for a local guide to be present on all tourist boat or land tours.
All future development on Jaluit Atoll be undertaken using Best Environmental Practices & Minimal Impact Practices.
Dive operation boats will not anchor on the reef – but either drift or use a Dive Mooring.