



AMERICAN SAMOA CORAL REEF MARINE PROTECTED AREA STRATEGY

January 2006



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January 2006

Acknowledgements

Reviewers of previous drafts:

Ray Tulafono, Alofa Tuaumu, Doug Fenner, Karl Brookins, Lelei Peau, Gene Brighthouse, Nancy Dashbach, Peter Craig, Christopher Hawkins, Gerry Davis, Meghan Gombos, Fatima Sauafea, Virginia Farmer, Leslie Whaylen, Selaina Vaitautolu, Ryan Binns, Marlowe Sabater, Josh Seaman, Sirpa Oram, Rod Salm, Alan White, David Fluharty, Jim Maragos, Athline Clark, John Parks, Bill Milhouser, Allison Green, Alan Everson, Eric Co, Eric Mielbrecht, Eric Trembl, Matthew Parry, and Emily Lundblad.

Other contributors:

Selaina Vaitautolu (Samoan translation and facilitation), Deborah Vaoali'i (Samoan translation and facilitation), Marlowe Sabater (formatting), Fatima Sauafea (coordination assistance), Darren Okimoto, Edna Buchan, Francesca Riolo (GIS support), Karl Brookins (extensive input on final draft), Office of Samoan Affairs, DMWR (office space, administrative support and supervisor for MPA Coordinator).

Funding:

Funding for MPA Coordinator position was provided by the U.S. Coral Reef Initiative.

Cover photo credits:

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Executive Summary

Coral reefs are an important natural resource in American Samoa providing protection, food, and other benefits. American Samoa's reefs have suffered numerous natural and anthropogenic destructive impacts including crown-of-thorns starfish infestations, coral bleaching events, cyclones, sedimentation and pollution. Marine Protected Areas (MPAs) are one form of management that can be used to address some of these threats to the reefs. Studies have shown that well-designed no-take reserves are particularly effective in maintaining biodiversity, productivity and ecological integrity of coral reefs (NOAA, 2002). MPAs also protect trophic systems and ecosystem resilience.

On August 2, 2000 then-Governor Tauese Sunia requested a plan be developed for coral reef protection to reach the goal of protecting twenty percent (20%) of Territorial coral reefs as "no-take" MPA's (Sunia, 2000). To ensure effective management, the American Samoa Government has acknowledged the need for a Coral Reef MPA Strategy that can guide the creation of new no-take MPAs. The American Samoa Coral Reef MPA Strategy covers the coral reef ecosystems in American Samoa, which are understood to include coral, seagrass, macroalgae, coralline algae, turf algae, emergent vegetation and mangroves.

The Department of Marine and Wildlife Resources (DMWR) has the power and duty to manage, protect, preserve and perpetuate the marine and wildlife resources in the Territory (ASC, 2005a). Consequently, DMWR is the primary agency responsible for making regulations on take of marine resources and for no-take MPA management and enforcement. The vision of the American Samoa Coral Reef MPA Strategy is to create MPAs in order to safeguard and sustain the value of coral reefs in American Samoa. The goal of the American Samoa Coral Reef MPA Strategy is to create MPAs that a) Enhance the fa'asamoa way of life by improving the territorial coral reefs for Samoan society; b) Protect 20% of the Territory's coral reef associated ecosystems from human manipulation or harvest (e.g. 'no-take' areas); and; c) Increase the resilience of territorial coral reef ecosystems to natural and other stress.

The American Samoa Coral Reef MPA Strategy describes guiding principles for selecting areas to become no-take MPAs. The two primary concepts to consider during site selection are diversity and reproductive potential. Other things to consider such as social, economic, enforcement, pragmatic, and regional criteria, MPA size and period of closure are also listed. The process to follow during a no-take MPA site selection is detailed. Management plans are required for each no-take MPA designated in American Samoa. The necessary elements of an acceptable management plan are described along with a checklist.

Education is an essential part and identified need of the American Samoa Coral Reef MPA Strategy (Oram, 2005). The DMWR plans to spend hundreds-of-thousands of dollars on MPAs including funds for education messages. Therefore, DMWR is the obvious body to approve all no-take MPA messages. Other government bodies, organizations and individuals can support territorial no-take MPA education efforts through supporting DMWR. DMWR has an arrangement to hire new staff responsible for producing education materials. In the initial years, the content of the education materials that are produced will be general in nature. DMWR's MPA Program will also hold three public meetings per year on the islands of Tutuila, Ofu-Olosega and Ta'u to discuss MPA issues. Targeted education materials will be developed for specific audiences or areas as needed.

Building the capacity of DMWR to implement an MPA Program is a top priority including funding, training and education supplies. A critical aspect in being able to build this capacity is the buy-in from the Director of DMWR, and the identification of a secure funding source: Federal Aid for Sportfish Restoration. Building DMWR's MPA Program capacity involves hiring an MPA Coordinator and assistants, purchasing equipment and supplies. The MPA Program intends to build technical skills of the staff as needed when funds are available. Educators working for American Samoa Community College, local schools, non-government organizations (NGOs), and American Samoa Government (ASG), can all potentially learn and teach about MPAs. In order to do this, these educators need primarily training and education supplies. Federal partners may also assist in MPA capacity building.

Preface

The American Samoa Coral Reef Marine Protected Area Strategy was generated through cooperation from the American Samoa Coral Reef Advisory Group (CRAG). CRAG is a collaboration of five different agencies in the Territory, all of which have some link to the coral reef environment: The Department of Marine and Wildlife Resources (DMWR); the Department of Commerce (DOC); American Samoa Environmental Protection Agency (ASEPA); the American Samoa Community College (ASCC); and the National Park of American Samoa (CRAG, 2005).

In 1999 CRAG organized a workshop to create a five-year plan for coral reef management in American Samoa. During that workshop CRAG identified the need for an MPA network. CRAG was identified as the lead on this issue; however the MPA network was unfunded at that point (Craig et al., 1999).

In 2000, the U.S. Coral Reef Task Force (USCRTF) adopted the Coral Reef National Action Plan that set the goal of establishing 20% of all U.S. coral reefs in no-take MPAs (USCRTF, 2000). Following the recommendation by the USCRTF, former Governor Tauese Sunia requested a plan be developed for coral reef protection to reach the goal of protecting twenty percent (20%) of Territorial coral reefs as “no-take” MPA’s (Sunia, 2000). Former Governor Sunia directed the Coral Reef Advisory Group to develop the plan.

In 2002 a CRAG-sponsored MPA workshop was held with an objective to produce an integrated plan for identification of potential marine areas that would become part of the Territory’s network of MPAs. The workshop proceedings focused primarily on expanding the existing community-based MPA program through DMWR, which relies on the volunteer participation of villages.

In 2003 CRAG identified the need for an MPA Coordinator to finalize and implement the MPA Plan and to work closely with other local, regional and federal partners in assuring that current and future MPA efforts in American Samoa are coordinated and utilize best management practices. CRAG requested funding for an MPA Coordinator from the U.S. CRI in their FY2004 and FY 2005 CRI grants. Recruiting began at the end of 2003 and the MPA Coordinator arrived on island in January 2004. The MPA Coordinator, with assistance from the MPA working group, revised the workshop proceedings from the 2002 MPA Workshop. Several drafts of the American Samoa Coral Reef MPA Strategy were presented and reviewed. This American Samoa Coral Reef MPA Strategy will be used as a guide by the Territory to implement the no-take MPA Program to address the 20% goal from former Governor Sunia.

Introduction

American Samoa is a group of seven islands located 14° S 170° W in the South Pacific Ocean. The inhabited islands of American Samoa are Tutuila, Aunu'u, Ofu, Olosega, Ta'u, and Swains. The uninhabited areas are Rose Atoll, as well as offshore banks: Taema, Nafanua, East, and South banks. American Samoa's total coral reef area has been reported in different ways by various authors. The disparity is based on the water depth measured, whether offshore banks were included, and the base maps that were used. The official Territorial coral reef area number needs to be declared by DMWR.

Importance of American Samoa's reefs:

"Coral reefs are an important natural resource in American Samoa. Not only are they important habitats for fishes, but for traditional and recreational activities as well" (Saucerman, 1995). Coral reefs provide protection, food, other resources, medicines, security, and social, cultural, economic and aesthetic benefits, plus others. A recent economic valuation study conducted by Jacobs Inc. indicated that the current total coral reef annual value (US\$/year at 2004 market prices) in American Samoa is \$10,057,000. The total current product added value of the direct coral reef subsistence fishery in American Samoa is estimated to be around US\$ 544,000/year (Jacobs, et al. 2004).

Threats to American Samoa's reefs:

American Samoa's reefs have suffered numerous destructive impacts. "Natural events include a crown-of-thorns starfish infestation in 1978, hurricanes in 1987, 1990, and 1991, which reduced much of the coral to rubble, and a massive coral bleaching event in 1994, presumably due to high sea temperatures. Live coral cover has dropped from 60% in 1979 (Wass 1980 in Saucerman, 1995) to 3-13% in 1993" (Maragos et al. 1994 in Saucerman, 1995) and rebuilding (Whaylen, et al., 2005 and Sabater, pers. comm., 2005).

The reef ecosystem has also been impacted as a result of the significant human population growth that has occurred over the last two decades. American Samoa has a population of 64,000 people and a high population growth rate of 2% per year (American Samoa Statistical Yearbook, 2001). "Rapid development and the accompanying environmental degradation have affected the South of Tutuila Island in many ways: roads encroach on shoreline, new construction, siltation problems, an increase in the amount of waste that the canneries discharge into inner Pago Pago Harbor until the mid-90's" (Coutures, 2003). And more, fish caught in the inner Pago Pago Harbor are seriously contaminated with lead, other heavy metals and other contaminants. The fish in the inner Pago Pago Harbor are not safe to eat, and the sale of these fish is prohibited (ASEPA, 1991)

"Added to this are continuing land-based human-induced impacts such as eutrophication and sedimentation which inhibit recovery of the coral reef ecosystem." (Saucerman, 1995). Eutrophication and sedimentation are likely responsible for the destruction of many coral reefs in Pago Pago Harbor (Banner, et al., 1970, Caperon, et al. 1971, Smith, et al. 1973 in Dahl, et al., 1977). Sedimentation is significant because "...elevated levels of suspended sediment (and nutrients) represent perhaps the greatest single threat to nearshore reef that has been documented to date..." (Hubbard, D.K. 1997).

ASEPA regularly highlights the chronic negative environmental impacts occurring in the waters of American Samoa through weekly Beach Advisory notifications in the Samoa News newspaper. Advisories are issued when E. coli bacteria (an indicator of contamination by human and/or animal

wastes) concentrations exceed levels determined safe for human exposure (ASEPA, 2005). Coral reef organisms are susceptible to diseases caused by pathogens and parasites as well as to those conditions caused or aggravated by exposures to anthropogenic pollutants and habitat degradation (Peters, 1997).

Why MPAs?:

Marine Protected Areas (MPAs) are one form of management that can be used to address some of these threats to the reefs. MPAs are areas designated for special protection to enhance the management of marine resources. No-take reserves, also called no-take areas, ecological reserves, harvest refugia, and fully -protected MPAs, are one type of marine protected area where all extractive uses are prohibited. Many studies have shown that no-take reserves are particularly effective in maintaining biodiversity, productivity and ecological integrity of coral reefs (NOAA, 2002). The use of marine reserves in the management of fisheries in general, and fisheries on coral reefs in particular, has been advocated as a cost-effective strategy to sustain fish stocks (e.g., Alcala, 1988, Davis, 1989, Alcala et al., 1990, Bohnsack 1990, 1993, Polacheck 1990, Roberts, et al., 1991, Carr, et al., 1993, DeMartini 1993, Dugan, et al., 1993, Polunin, et al., 1993, Rowley 1994, Man, et al. 1995 in Russ, et al., 1996).

MPAs are valuable for managing biodiversity, trophic structure and function and ecosystem resilience. (Bellwood, et al., 2004; Hughes, et al., 2003; Sobel, et al., (eds), 2004; Lubchenco, et al., 2003 in Hughes et al., 2005). MPAs can also protect ecosystem services provided by natural communities, including "...goods (e.g. seafood and shells...), life support processes (e.g. carbon sequestration, nutrient recycling), quality of life (beauty, enjoyment of natural seascapes), and potential future uses (drug discovery, genetic diversity) (Daily, et al., 2000 in Committee on the Evaluation, Design, and Monitoring of Marine Reserves and Protected Areas in the United States, et al., 2001). Additionally, MPAs can support the maintenance of marine ecosystems and the services they provide, including water purification; protection of coastal areas from storm damage bioremediation of chemical and oil spills; reduction of atmospheric carbon dioxide through biological carbon sequestration; and nutrient cycling.

MPAs are likely to ensure the conservation of diverse species assemblages and maintain genetic diversity by preserving representative ecosystems (Committee on the Evaluation, Design, and Monitoring of Marine Reserves and Protected Areas in the United States, et al., 2001). Opportunities for the public to learn about the diversity of marine life and how human activities both on land and in the sea affect the health of the marine environments are also afforded by MPAs.

On August 2, 2002 then-Governor Tauese Sunia requested a plan be developed for coral reef protection to reach the goal of protecting twenty percent (20%) of Territorial coral reefs as "no-take" MPA's (Sunia, 2000). To ensure effective management, the American Samoa Government has acknowledged the need for a Coral Reef MPA Strategy that can guide the creation of new no-take MPAs.

Chapter 1 Vision, Goal, and Legal Framework

1.1 Vision:

To create Marine Protected Areas in order to safeguard and sustain the coral reef resources in American Samoa.

1.2 Goal:

To create MPAs that:

- a) Enhance the fa'asamoa way of life by improving the territorial coral reefs for Samoan society;
- b) Protect 20% of the Territory's coral reef associated ecosystems from human manipulation or harvest (e.g. 'no-take' areas); and;
- c) Increase the resilience of territorial coral reef ecosystems to natural and other stress.

To evaluate the 20% part of the goal, DMWR will need to declare the official Territorial total coral reef area for American Samoa.

1.3 Legal Framework:

On August 2, 2002 then-Governor Tauese Sunia requested a plan be developed for coral reef protection to reach the goal of protecting twenty percent (20%) of Territorial coral reefs as "no-take" MPA's (Sunia, 2000). The American Samoa Coral Reef MPA Strategy covers the coral reef ecosystems in American Samoa, which are understood to include coral, seagrass, macroalgae, coralline algae, turf algae, emergent vegetation and mangroves. The Territory has some knowledge of the benthic habitats in the 0-30m depth range (NCCOS, 2005). The legal framework section will clarify that DMWR is the primary agency responsible for no-take MPAs, and will also describe the secondary agencies associated with no-take MPAs, namely American Samoa Coastal Management Program (ASCMP) and American Samoa Environmental Protection Agency (ASEPA). DMWR's MPA Program plans are also briefly discussed.

1.3.1 DMWR Responsibility:

The Department of Marine and Wildlife Resources has the power and duty to manage, protect, preserve and perpetuate the marine and wildlife resources in the Territory (ASC, 2005a). Consequently, DMWR is the primary agency responsible for making regulations on take of marine resources and for no-take MPA management and enforcement. All other agencies are secondary with respect to harvest, therefore also with no-take MPAs, for example ASCMP and ASEPA.

1.3.2 Other Agencies Associated with No-take MPAs:

ASCMP and ASEPA, while secondary agencies when it comes to no-take MPA management, have authority to manage threats that may inhibit coral reef ecosystem resilience to natural and other stress. ASCMP's general purpose is to provide effective resource management by protecting, maintaining,

restoring, and enhancing the resources of the coastal zone. Coastal zone management may be accomplished through protection of unique areas and resources, including wetlands, mangrove swamps, aquifer recharge areas, critical habitat areas, streams, coral reefs, watersheds, near shore waters, and designated or potential historic, cultural or archaeological sites, from destructive or inappropriate development (ASC, 2005b).

The ASEPA was established in 1987 (Executive Order 16-1987, issued on October 23, 1987) under the authority and responsibility of the Environmental Quality Commission to carry out the consolidated environmental program established by Executive Order 12-1985 issued on June 14, 1985. The program encompasses water pollution control, safe drinking water, solid and hazardous waste, air pollution control, pesticides use and certification, and environmental awareness and education.

Federal agencies whose actions affect U.S. coral reef ecosystems, shall work in consultation with affected local government agencies (Executive Order 13089).

1.3.3 DMWR's MPA Program Approach

As the principal agency in charge of no-take MPAs, DMWR created a 1-year MPA work plan and received funding from Federal Aid for Sportfish Restoration (Brookins, et al., 2005b). Over the next five years (2007-2011), the DMWR MPA Program intends to build technical skills of the staff to design socioeconomic and governance studies of MPAs, conduct interviews, analyze data, write reports and make management decisions based on these data. Capacity to conduct regular effectiveness evaluations of MPAs will be developed through this program. Trainings are planned depending on skills of available personnel at hiring: MPAs; fisheries management; fisheries regulations; leadership and values formation; group facilitation; conflict resolution; database management; SCUBA; statistics and data analysis; socio-economic, and governance monitoring, and MPA effectiveness evaluation. Cross-site learning exchanges with MPA managers and staff from regional partners are intended. These regional partners include Samoa's Ministry of Natural Resources and Environment and Samoa Fisheries that coordinate several MPA programs in that country, as well as the Samoa-based Secretariat of the Pacific Regional Environment Program that provides regional assistance to environmental governance programs. Additional partners may also include the Fiji, Palau and Cook Island Governments, the Secretariat of the Pacific Community, the Locally Managed Marine Area Network, and Pacific Island Marine Protected Area Community. Annual public meetings will be held throughout the duration of the DMWR MPA Program in the islands of Tutuila, Ofu & Olosega, and Ta'u. Two permanent no-take MPAs with a site-level management plan are proposed to be established by September 2010 (Brookins, et al., 2005a).

Chapter 2 Guidelines for selecting no-take MPAs

The following section describes guidelines for selecting areas to become no-take MPAs. The two primary concepts to consider are diversity and reproductive potential. Other things to consider such as social, economic, enforcement, pragmatic, and regional criteria, MPA size and period of closure are also listed.

2.1 Diversity:

Biologic diversity (including taxonomic and lifestage), genetic diversity and ecologic diversity are important factors to be considered during MPA site selection. To support ecological diversity in site selection, the MPA manager should include many species. By choosing many sites and habitats, the MPA manager will incorporate geographic diversity. Spatial diversity is built-in by selecting - multiple locations; many exposures, and many depths. Examples include:

- Sites that include a diversity of habitats (e.g., spawning grounds, nurseries, coral, coralline algae, emergent vegetation, macroalgae, turf, seabed, seagrasses, coastal and riparian areas, unclassified habitats, turtle nesting beaches and mangroves);
- Sites that contain vulnerable life history stages (e.g., larval stages, spawning, large terminal phases of fish, etc.);
- Sites that provide ecological diversity (habitat or species diversity);
- Sites that provide interaction diversity (species A that eats species B, and species A that eats species C; coral A that lives shallow and coral A that lives deep);
- Multiple redundancy when possible - Protect multiple samples of the full range of reef areas representing the likely complement of biodiversity to spread among them the risk of any one being lost.
- Sites that incorporate geographic diversity of reef zones including shoreline/intertidal, reef flat, reef crest, forereef, bank/shelf, bank/shelf escarpment.
- Sites that take account of physical diversity of geomorphological structure types, including: coral reef and hard bottom; aggregate reef; spur and groove; patch reef (individual or aggregated); scattered coral/rock in unconsolidated sediment; rock/boulder; pavement with sand channels; reef rubble; and unconsolidated sediment.

2.2 Reproductive Potential:

Fecundity, larval survival, recruitment, asexual capabilities, partnering, parental care, density and spacing are important forms of reproductive potential that should be considered during MPA site selection, examples include:

- Sites that are known to contain both male and female of a species.
- Sites that include high enough density and proper spacing so that sedentary broadcast spawner gametes can fertilize successfully.
- Sites that have sediment-free hard strata for attachment of fragments and recruits.

2.3 Other Things to Consider:

2.3.1 Social Criteria:

- The sites should be culturally and socially acceptable. This should be documented with public hearings and meetings.
- Document that all citizens continue to have locations to fish for coral reef species after the MPA is established.
- Define degree to which MPA would affect activities of residents.
- Get approval from the village council and Mayors

2.3.2 Economic Criteria:

- Include sites that:
 - Promote long-term sustainable economic benefits

2.3.3 Enforcement Criteria:

- Reserve borders be easily defined and monitored (e.g., straight lines running north-south or east-west) obvious navigational reference points, where possible, use landmarks.
- Ensure that sites are observable and accessible to enforcement.
- One larger MPA is easier to enforce than multiple smaller MPAs with many borders, or one view shed is easier to enforce than many.

2.3.4 Pragmatic criteria:

- Integrate the management of these marine reserves with coastal land use and watershed management.

2.3.5 MPA Size:

- Designate the largest no-take area as possible that is still acceptable to stakeholders. Small is OK if that is all that is possible.
- Larger areas are the best union of incorporating diversity and enforcement criteria provided the area includes a diversity of habitat.

2.3.6 MPA Period of Closure:

MPA closure should be permanent, unless:

- Management plans specify that the MPA can be changed based on overriding societal need declared by governor or legislature;
- Evaluation demonstrates they are ineffective; or
- A better location is found and approved to fulfill management goals.

2.3.7 Species Managed:

- All species managed, with provisions to remove or “take” ecologically detrimental species such as introductions and predators (crown of thorn starfish) need to be specified.

2.4 No-take MPA Site Selection Process:

The process that will be followed during a no-take MPA site selection is detailed in Figure 1.

No-take MPA Site Selection Process

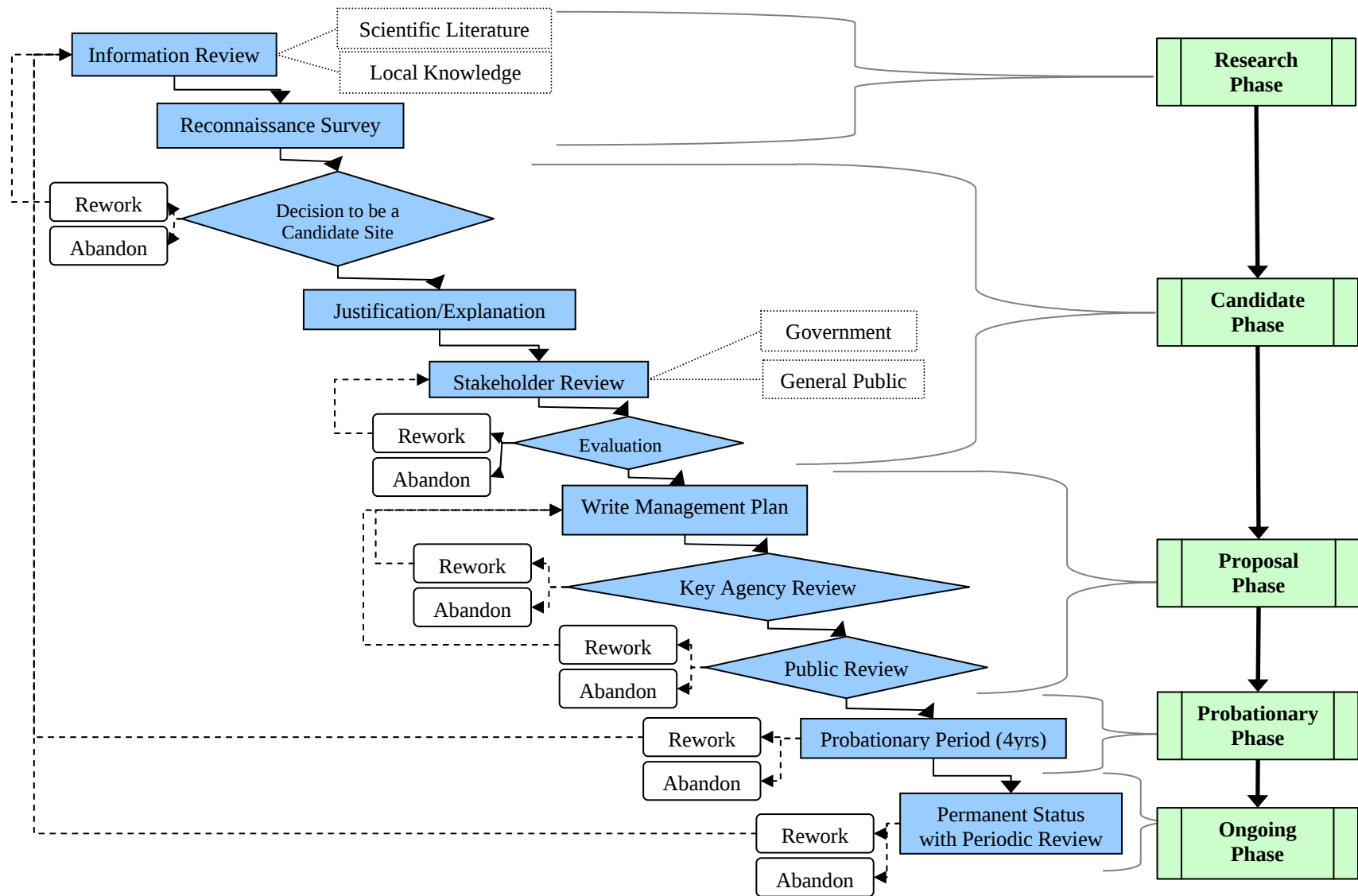


Figure 1: No-take MPA Site Selection Process

Chapter 3 Management Plan Requirements

Management plans are required for each no-take MPA designated in American Samoa. The necessary elements of an acceptable management plan are described in this chapter. The following management plan checklist (Figure 2) can be photocopied and used as a guide when writing a management plan.

A green rectangular box containing a white rectangular area with the title "Management Plan Checklist" and a list of 17 items, each preceded by a checkbox. The items are: Availability, Jurisdictional Authority, Buy-in Document, Stakeholder Contribution, MPA Purpose, MPA Boundaries and Rules, Clear and Measurable Objectives, Management Activities, Proposed Timeline, Sustainable Financing, Outreach, Enforcement, Monitoring (with sub-items Biophysical and Socio-economic), and Effectiveness Evaluation.

Management Plan Checklist

- ☐ Availability
- ☐ Jurisdictional Authority
- ☐ Buy-in Document
- ☐ Stakeholder Contribution
- ☐ MPA Purpose
- ☐ MPA Boundaries and Rules
- ☐ Clear and Measurable Objectives
- ☐ Management Activities
- ☐ Proposed Timeline
- ☐ Sustainable Financing
- ☐ Outreach
- ☐ Enforcement
- ☐ Monitoring
 - ☐ Biophysical
 - ☐ Socio-economic
- ☐ Effectiveness Evaluation

Figure 2: Management Plan Checklist

3.1 Availability:

For American Samoa, acceptable management plans include both English and Samoan translations (Revised Constitution of American Samoa, 2005). In order to ensure accessibility of management plans, it is essential that copies be made available to interested parties through mechanisms like government offices, libraries, news media and the internet.

3.2 Jurisdictional authority:

An obligation of the management plan is to list the jurisdictional authority under which the MPA is designated, as well as provide supporting references and documents. References should be comprehensive and follow a standard format. Supporting documents could include memorandums of understanding, and letters of support from partnering individuals and agencies.

3.3 Buy-in Document:

If an agency or individual (other than DMWR) proposes to create a no-take MPA in American Samoa, the agency or individual must receive approval from the Director of DMWR based on American Samoa laws (section 1.3). A buy-in document might be a memorandum of understanding signed by the Director of DMWR and the Director of the agency proposing the no-take MPA, or an approval letter signed by the Director of DMWR. The buy-in document is a mandatory component to the management plan. Final DMWR approval of a no-take MPA will be based on a management plan and other things described in the American Samoa Coral Reef MPA Strategy.

3.4 Stakeholder contribution:

Typically stakeholders are involved throughout formation and continued operation of an MPA. The methodology for seeking stakeholder participation is a crucial component to the management plan. Stakeholders include: (a) resource managers from governmental agencies with jurisdiction or expertise relevant to coral reef resources and habitats; (b) commercial and recreational users, including Regional Fishery Management Councils; (c) non-governmental organizations; and (d) coral reef scientists and other subject matter experts (NOAA, 2002).

In American Samoa, traditional land owners claim ownership over the coral reef areas adjacent to their family land. Family chiefs, called *matai*'s, are entrusted with the management of any claims made on these lands and any subsequent building or land use changes that may transpire (Tulafono, pers. comm., 2005). Matai's need to be involved with any and all planning that will affect their coral reef area. Permission must be gained from these landowners before MPA management can commence.

Local stakeholders are the ones that are likely to be most affected by management decisions (e.g. fishermen who are prohibited fishing in an area). Therefore, it is understood that if stakeholders are part of a process, they are educated about why it is a good management method, and take ownership over the decisions that are made; it will improve compliance of these management decisions. If a 'no-take' area is designated without stakeholder involvement, then stakeholders may be largely unaware of the site, its regulations and purpose and may continue to violate the regulations. Thus, requiring enormous enforcement capacity that American Samoa Government (ASG) does not have, and it will likely be tens of years before ASG does have a large enforcement capacity.

"A combination of participatory mechanisms has been shown to generate the highest level of participation" (Beierle, et al., 2002; Brody, et al., 2003; Cocklin, et al., 1998 in Kessler, 2004). Mechanisms to facilitate stakeholder participation include public hearings, workshops, committees, websites, focus groups, charettes, surveys, presentations to community groups, newsletters, brochures, videos, newspaper inserts, and public service announcements (Brody, et al., 2003 in Kessler, 2004) and other participatory techniques. Public meetings and participation need to be convenient to key stakeholders (both in location and time), all of who have jobs, family, and other social responsibilities. For example, meetings can be held within local villages during evenings and on weekends to accommodate people who have full-time jobs and individuals that stay within the village.

3.5 MPA Purpose:

A clearly stated purpose of the MPA, and how the MPA meets the goals of the American Samoa Coral Reef MPA Strategy, are essential components to a well-developed management plan. The purpose of the management plan may include an explanation of the conservation benefit that is expected to be gained with management. The description of how the MPA meets the goals of the American Samoa Coral Reef MPA Strategy should be linked to, and support by the monitoring planned for the site.

3.6 MPA Boundaries, Rules and Map:

Clearly defined boundaries, rules and a map indicating boundaries are expected features of a management plan. Ordinarily, the boundaries are determined with the community, and recorded using GPS. If adjacent to land, the landward side of the MPA should be marked by a natural feature or with a cement fixture. The seaward boundaries need to be clearly marked.

3.7 Clear and Measurable Objectives:

Completing a management plan includes developing objectives for MPA management. “Objectives are specific statements detailing the desired accomplishments or outcomes of a project” (Margoluis, et al., 1998). In the manual, *Measures of Success: Designing Managing, and Monitoring Conservation and Development Projects*, Margoluis, et al., (1998) suggest that a good objective meets the following criteria:

- Impact Oriented. Represents desired changes in critical threat factors that affect the project goal.
- Measurable. Definable in relation to some standard scale (numbers, percentages, fractions, or all/nothing states). These would be used as performance measures during evaluation.
- Time Limited. Achievable within a specific period of time.
- Specific. Clearly defined so that all people involved in the project have the same understanding of what the terms in the objective mean.
- Practical. Achievable and appropriate within the context of the project site.

3.8 Management Activities:

Constructing a comprehensive management plan also includes designing management activities for the MPA. “Activities are specific actions or tasks undertaken by project staff designed to reach each of the project’s objectives. A good activity meets the following criteria (Margoluis, et al., 1998):

- Linked. Directly related to achieving a specific objective.
- Focused. Outlines specific tasks that need to be carried out.
- Feasible. Accomplishable in light of the project’s resources and constraints.
- Appropriate. Acceptable to and fitting within site-specific cultural, social, and biological norms”

The management activities may be internal or external to the MPA, examples of activities internal to the MPA include: a) Deploy marker buoys and signage along defined borders; b) Remove marine debris (old nets, bottles, etc.) within the borders; c) Map significant features of MPA. The activities

external to the MPA may consist of: a) Meeting with landowners to discuss erosion control; b) Offering assistance with waste management; c) Scheduling stream clean-ups.

3.9 Proposed Timeline:

A timeline (also known as a Gantt chart) is a bar graph that lists the major activities and tasks involved in the project. It also shows how long the various activities are supposed to last and the relationship between different activities (Margoluis, et al., 1998). A Gantt chart can graphically illustrate what tasks the project needs to accomplish at any one point in time and what the limiting steps are that may prevent the project from moving forward. This chart can be depicted in monthly, quarterly, or annual format. Typically, management plan timelines span from the project's commencement to the first evaluation cycle, describe when activities are proposed to occur, and end with the approval of the next timeline. Ideally, the person responsible for conducting the activity, and the expected product should also be detailed. The timeline may be redundant with other sections of the management plan. Despite this expected overlap, the timeline helps to illustrate all the activities and their relationships with one another in one location.

3.10 Sustainable Financing:

The management plan includes details about the financing the MPA receives and information about how the MPA will continue to seek and receive funds for management operations. The agency managing the MPA is responsible for seeking funding to create and maintain the MPA. In addition to federal grants, other financing efforts, such as user fees, should be explored. Individuals managing the MPA are also responsible for hiring and training necessary staff. The management plan ought to detail how many staff members are necessary and the associated costs. If volunteers are utilized, the management plan should explain how the volunteers will be recruited, organized, coordinated and utilized. The sustainable financing section will detail what funds are required for outreach and education, enforcement, monitoring activities and other activities.

3.11 Outreach:

Details of planned outreach measures by the agency implementing the MPA are a significant component to the management plan. Outreach activities will identify target audiences, which may include: Governor, Fono members, pulenu'u, church groups, youth groups, managers, educators, fishermen, schools, students, women's groups, general public, ASG, landowners, commercial and subsistence fishers, government agencies and recreational users. The outreach topics may include: management planning, facilitation; conflict resolution; grant writing; leadership and values formation, evaluation, community empowerment, fisheries ecology and management; biological monitoring; socio-economic monitoring; marine resource conditions; threats and management efforts; no-take areas, coral reef resilience; environmental stewardship. The plan should identify the products that will be produced from the outreach efforts, which may include: PowerPoint slides, MPA awareness booklets, newspaper ads, radio ads, tv ads, posters, brochures, signboards, road shows, songs, skits, etc.

3.12 Enforcement:

Mechanisms that are being used to gain compliance of the MPA and to enforce rules and regulations of the MPA are essential to incorporate in the management plan. Mechanisms might

consist of: clearly written regulations and rules in Samoan and English; a discussion about signs used to explain MPA rules; who to call (and contact information) to report a violation, opportunities for stakeholders to learn about MPA rules and regulations; and the location of boundary markers. Other instruments to take into account are:

- A clear conflict-resolution adjudication process;
- Adequate penalties for rule violations;
- A clear process for arrests, citations, fines and confiscation of gear and boats;
- A clear process for bringing violators to court; and
- A clear process that can be followed to resolve any lack of accountability in any of the steps that contribute to adequate enforcement.

The enforcement section is to be written with the MPA manager and the enforcement divisions that have jurisdiction over the MPA. The enforcement division or their supervising authority must sign-off on all rules and regulations, a copy of which is to be included in the plan. Stakeholders should be involved in the conceptualization of the enforcement mechanisms. The enforcement system needs to be tailored to existing structures (coast guard, maritime police, DMWR enforcement division, and village police). Giving small incentives to support voluntary enforcement may work in some areas where volunteers are really concerned about the reefs.

The enforcement section of the management plan should detail what enforcement staff is needed, plus the training and resources essential to carry out their work. Staff may require training on fisheries regulations; patrolling; enforcement techniques; apprehension of violators; maintenance of buoys; MPA boundaries and regulations; environmental laws; user-fees; refresher courses; and other opportunities to update skills. Ideally, the management plan will include an explanation of how to coordinate enforcement with other management components.

3.13 Monitoring:

A monitoring section in the management plan will detail the methodology that will be followed to collect regular data on the MPA. The monitoring should include fixed sites, regular surveys, biophysical parameters and socio-economic parameters. The results from these studies should be checked against one another for the same indicators to assess perceptions and misconceptions. The monitoring program ought to be specifically targeted toward measuring whether the MPAs are successful in achieving their goals (or not). The results of monitoring should be relayed to managers and communities in a timely manner. Disaster response monitoring for things like coral bleaching events, oil spills and cyclones should be included in the monitoring section.

3.13.1 Biophysical monitoring parameters:

Biological parameters that might be studied include: coral diversity, coral size, coral frequency, mean diameter, population size distribution, percent coral cover, coral rugosity, bottom rugosity, coral reef resilience principles including coral community composition, acclimatization, localized cooling, flushing, shading, recruitment, herbivory, bioeroders, corallivores, bleaching, predation and disease; and percent algal cover. Fish species abundance, fish length, size/age distribution, and biomass of selected fish species; creel census, macro-invertebrate species abundance (giant clams, lobsters, crown of thorns starfish) may also be studied. Water quality parameters could be measured, including temperature, salinity, dissolved oxygen, pH and turbidity. Weather parameters such as air temperature, sun/cloud cover and wind might also be measured.

3.13.2 Socio-economic monitoring parameters:

Socio-economic parameters may be monitored for the MPA, these include: local marine resource use patterns; local values and benefits of marine resources; level of understanding of human impacts on resources; perceptions of seafood availability; perceptions of local resource harvest; perceptions of non-market, non-use values; material style of life; quality of human health; household income distribution by source; household occupational structure; community infrastructure and business; number and nature of markets; stakeholder knowledge of natural history; distribution of formal knowledge to community; percentage of stakeholder group in leadership positions; changes in condition of ancestral and historical sites/features/monuments. Anthropogenic parameters such as debris and damage; and visitation, could also be measured.

3.14 Effectiveness Evaluation:

Evaluating the effectiveness of the MPA is a vital element to the MPA management plan. “Evaluation consists of reviewing the results of actions taken and assessing whether these actions are producing the desired outcomes” (Pomeroy, et al., 2004). The *How is your MPA doing? Guidebook* includes the following evaluation steps: 1) select indicators, 2) plan the evaluation, 3) conduct the evaluation, 4) communicate results and adapt management (See Figure 3 for more details) (Pomeroy, et al., 2004). The *How is your MPA doing? Guidebook* offers managers and other conservation practitioners a process and methods to evaluate the effectiveness of MPAs for the purposes of adaptive management. “Adaptive management is a cyclical process of systematically testing assumptions, generating learning by evaluating the results of such testing, and further revising and improving management practices. The result of adaptive management in a protected area context is improved effectiveness and increased progress towards the achievement of goals and objectives” (Pomeroy, et al., 2004).

The monitoring and evaluation of the MPA are directly linked and should be planned together. In addition to the biological and socio-economic parameters that may be measured with the monitoring program, the effectiveness evaluation might include governance parameters. The MPA Program managers are responsible for leading regular effectiveness evaluations. MPA staff members and community members ought to be involved with this process. The results of these evaluations are relayed to managers and communities in a timely manner and are used to adjust management plans.

The effectiveness evaluation section of the management plan includes a quantitative evaluation of performance measures to determine if the MPA is meeting the management objectives, and a qualitative evaluation in relation to overall American Samoa Coral Reef MPA Strategy goals.

Evaluation Steps

1) Select indicators:

- 1.1) Identify MPA goals and objectives;
- 1.2) Choose the relevant 'indicators' that match the MPA goals and objectives;
- 1.3) Review and prioritize the indicators identified; and
- 1.4) Identify how the selected indicators relate to one another.

2) Plan the evaluation:

- 2.1) Assess resource needs for measuring indicators (*develop a plan to secure necessary resources, implement the plan, and secure the resources needed*);
- 2.2) Determine the audience(s) who will receive the evaluation results;
- 2.3) Identify who should participate in the evaluation;
- 2.4) Develop a timeline and a work plan for evaluation.

3) Conduct the evaluation:

- 3.1) Implement the evaluation work plan;
- 3.2) Collect data;
- 3.3) Manage data;
- 3.4) Analyze collected data (*determine if data are reliable and determine sources of error (e.g., human or sample) and adjust evaluation plan – go back to step 3.1 if data are found to have errors*);
- 3.5) Encourage peer review and independent validation of results.

4) Communicate results and adapt management:

- 4.1) Share results with target audiences;
- 4.2) Use results to adapt management strategies (*are all goals and objectives achieved fully? – if no, review and adjust MPA management practices. If yes, maintain MPA management performance*);
- 4.3) Iterate process (*start back at beginning with step 1.1*).

Figure 3: Evaluation Steps (from Pomeroy, et al., 2004)

Chapter 4 Outreach Education

Education is a vital component to implementing a no-take MPA Program in American Samoa. Understanding of no-take MPA benefits and issues is limited in American Samoan natural resource stakeholders. A great deal of education is needed if the people are to properly understand the MPA Program (Oram, 2005). Presenting unambiguous and uniform messages is vital to forward progress in creating no-take MPAs. The following section discusses the need for DMWR approval of no-take MPA educational messages, communication approaches, and DMWR's education plan.

4.1 DMWR approval of no-take MPA educational messages

The DMWR plans to spend hundreds-of-thousands of dollars on MPAs including funds for education messages as a primary tool in the creation of MPAs. The territorial agency authorized to implement no-take MPAs is DMWR. Therefore, DMWR is the obvious body to approve all no-take

MPA education and messages, to act otherwise would be counterproductive, contrary to established jurisdictions, and a waste of government funds. For example, if any governmental entity (i.e. ASCMP or ASEPA) would like to create education messages about no-take MPAs, they would work with DMWR's MPA Program for approval of their educational message. For non-government organizations or individuals who would like to create education messages about no-take MPAs, DMWR is the territorial agency to contact for message coordination. Other government bodies, organizations and individuals can support territorial no-take MPA education efforts through supporting DMWR requests and decisions.

4.2 Communication Approaches

Education is an essential part and identified need of the American Samoa Coral Reef MPA Strategy (Oram, 2005). DMWR's MPA Program will be utilizing two basic approaches to communicate about MPAs and the MPA Program, as described below.

The first communication approach that DMWR will use is marine environmental education and program support. Marine environmental education and program support communication is a process through which knowledge is imparted to communities to increase their awareness, understanding, and appreciation of the marine environment and its importance. Marine environmental education and program support communication has several functions in management including: reducing social conflicts and resource impacts; gaining support for management programs; and increasing knowledge of local resource users. Materials commonly produced to enhance awareness include posters, short publications, newsletters, comic books, leaflets, radio and television plugs, info-commercials, and radio dramas (Department of Environment and Natural Resources, et al., 2001).

The second communication approach that DMWR will use is social and community mobilization. The social and community mobilization approach focuses on collective action and uses public participation processes and techniques to bring about consensus and to inform and educate the public about the marine environment and MPAs. Common participatory tools include workshops, public meetings, study tours, advocacy campaigns, committees, community patrols, citizen watchdog groups, school programs, and special projects involving the community or various sectors of society (Department of Environment and Natural Resources, et al., 2001).

4.3 DMWR's Education Plan

DMWR has an arrangement to hire new staff responsible for producing education materials (Brookins, 2005b). In the initial years, the content of the education materials that are produced will be general in nature, and will be aired throughout the subsequent years as appropriate. For the marine environmental education and program support communication approach DMWR will produce education materials in Samoan and English, including:

- Posters
- TV ads
- Radio ads
- Newspaper ads

Using the social and community mobilization communication approach, DMWR's MPA Program will hold three public meetings per year on the islands of Tutuila, Ofu-Olosega and Ta'u to discuss MPA issues. In the third year, targeted education materials will be developed for specific audiences or areas based on the results of the reconnaissance survey, whether decisions to create a candidate site are made, and the outcome of public meetings (see Figure 4).

Target audiences of these education and communication approaches include the fishermen, resource users, educators, students, church groups, youth groups, managers, women's groups, and social groups, Governor, Fono members, pulenu'u, both men and women. The expected output of the DMWR's MPA Program education efforts is that the public of American Samoa will be educated about MPAs. Managers and public will engage in regular dialogue regarding MPA planning, development, management and evaluation. Additionally, the public will provide feedback to managers about acceptable locations for no-take MPAs.

Education Timetable for DMWR's MPA Program

Year 1	Year 2	Year 3	Year 4	Year 5
Produce General MPA Materials				
		Airing General MPA Materials		
		Produce Targeted MPA Materials		
			Airing Targeted MPA Materials	
General Meetings				
		Targeted Meetings		

Figure 4: Education Timetable

Chapter 5 Capacity Building

5.1 DMWR Fisheries and Wildlife Divisions

Building the capacity of DMWR to implement an MPA Program is a top priority. A critical aspect in being able to build this capacity is the buy-in from the Director of DMWR, and the identification of a secure funding source; Federal Aid for Sportfish Restoration. Building DMWR's MPA Program capacity involves hiring an MPA Coordinator and two assistants, purchasing necessary equipment (vehicle) and supplies (computers, etc.). The Department intends to build technical skills of the staff to design socioeconomic and governance studies of MPAs, conduct interviews, analyze data, write reports and recommend management decisions based on these data. Capacity to conduct regular effectiveness evaluations of MPAs will be developed through this program. Building the capacity of local staff will increase retention of skills and information in DMWR.

DMWR's MPA Program staff is to participate in trainings, one or more of the following, depending on skills of personnel at hiring: MPAs; fisheries management; fisheries regulations;

leadership and values formation; group facilitation; conflict resolution; database management; SCUBA; statistics and data analysis; socio-economic and governance monitoring; and MPA effectiveness evaluation. Other DMWR staff from the Fisheries and Wildlife Divisions will be encouraged to participate in these training activities as appropriate.

Capacity building for DMWR's MPA Program may involve cross-site learning exchanges with MPA managers and staff and regional partners including: Samoa's Ministry of Natural Resources and Environment, and Samoa Fisheries that coordinate several MPA programs in that country, as well as the Samoa-based Secretariat of the Pacific Regional Environment Program that provides regional assistance to environmental governance programs. Additional partners may also include the Fiji, Palau and Cook Island Governments, the Secretariat of the Pacific Community, the Locally Managed Marine Area Network, and Pacific Island Marine Protected Area Community. Cross-site learning exchanges with regional partners will allow staff from American Samoa to communicate and exchange ideas with MPA staff in other areas. Successful approaches from other places may be attempted in American Samoa, but more importantly failures need not be repeated.

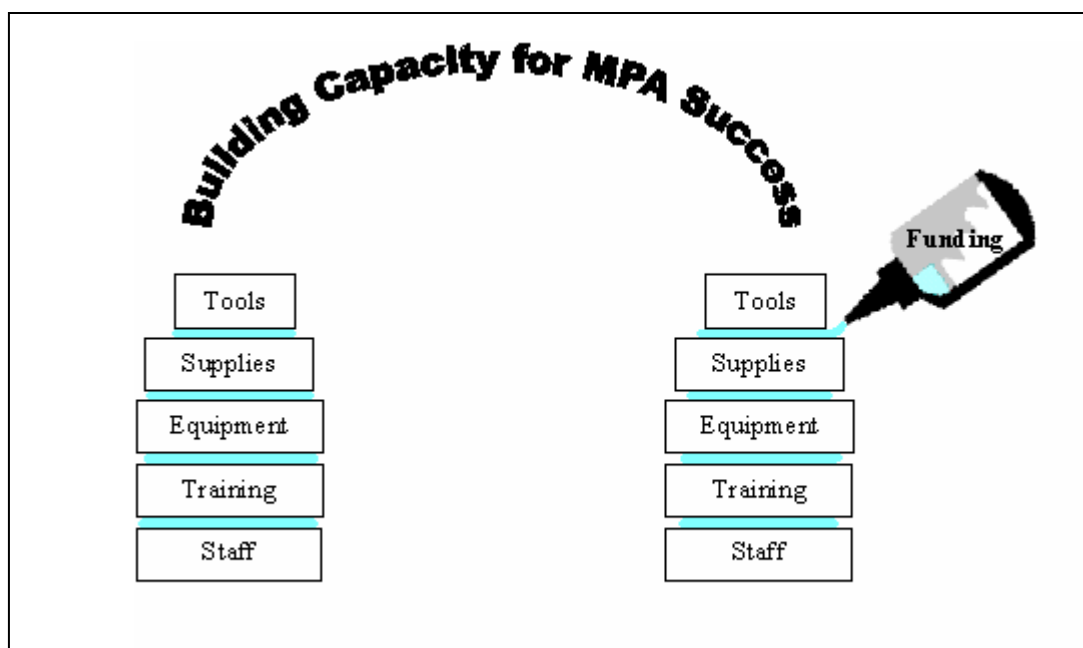


Figure 5: Capacity Building

5.2 DMWR Education Division

Training may be offered to DMWR's Education Division as a capacity building measure of DMWR's MPA Program. Training topics could include: MPAs; group facilitation; conflict resolution; SCUBA; socio-economic and governance monitoring; and MPA effectiveness evaluation. The MPA Program may produce educational materials that can help to build the capacity of the Education Division to educate the public about MPAs, including: posters, pamphlets and maps, CD-Roms.

5.3 Other Educators

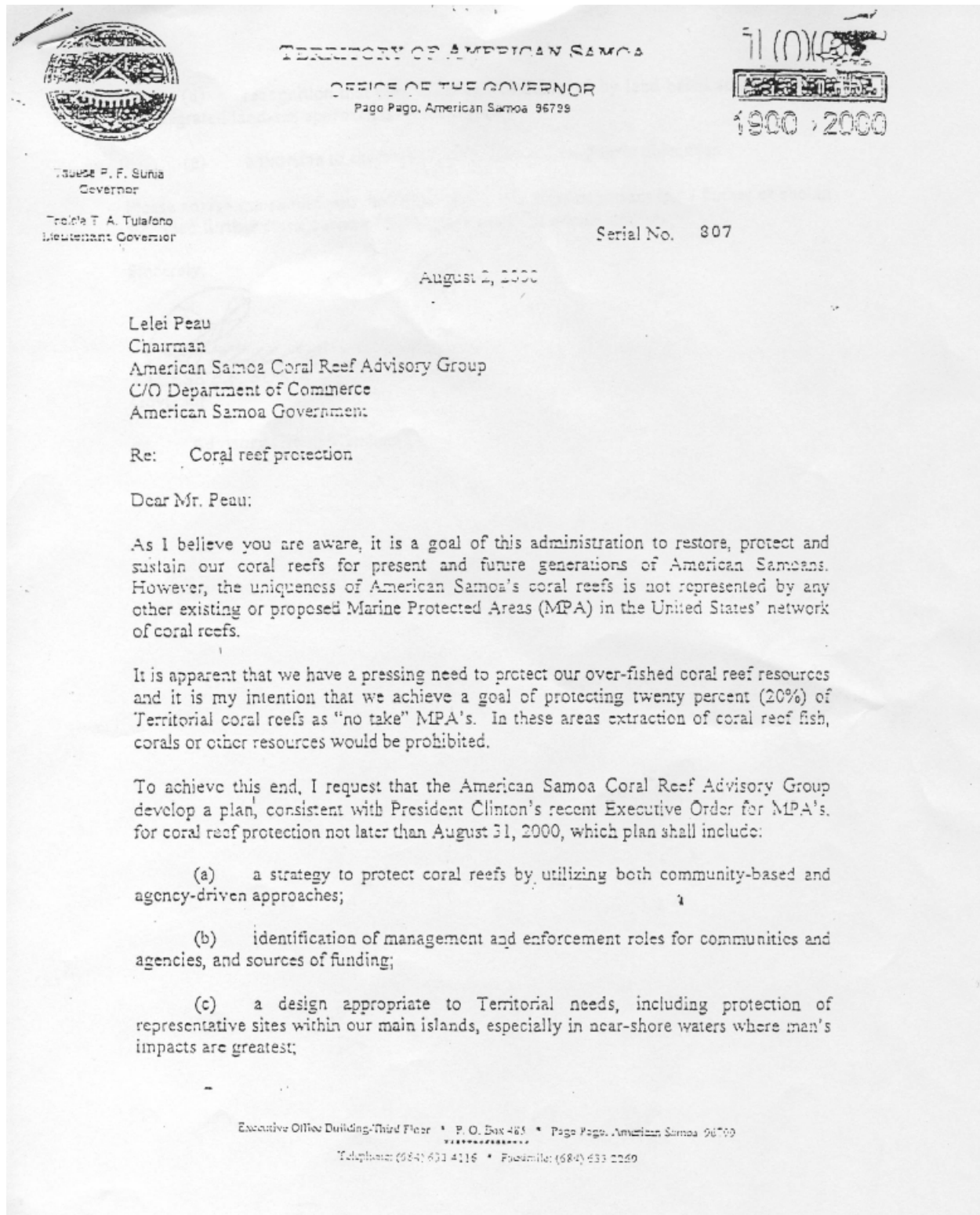
Educators working in American Samoa Community College, local schools, ASG, and non-government organizations can all potentially learn and teach about MPAs. In order to do this, these educators may need capacity building tools. These tools are people, money, equipment, training and educational supplies (Figure 5). DMWR's MPA Program staff will train other educators about MPAs as determined by DMWR. Educational supplies like posters, newspaper inserts, pamphlets, handouts, maps, CD-Roms can be provided by DMWR's MPA Program. MPA books can be provided to the ASCC and Feleti Barstow libraries. Other capacity building tools include a list of existing MPAs in American Samoa and maps of individual MPAs, made by a Geographic Information System (GIS) Technician.

5.4 Other Assistance

NOAA and other Federal partners may offer trainings that help to build territorial capacity in regards to MPAs. DMWR is working with NOAA, USFWS, and non-government organizations (NGOs) to provide training consistent with this American Samoa Coral Reef MPA Strategy.

Appendix

Governor Sunia's Letter Regarding Coral Reef Protection

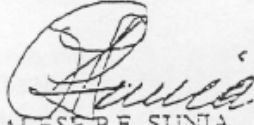


(d) recognition that coral reefs can be damaged by land-based activities, thus an integrated land-sea approach is essential; and

(e) a timeline to accomplish both short and long-term objectives.

Please advise me should you desire to discuss this most important issue further or should you need further clarification of the objectives of this administration.

Sincerely,



TALESE P.F. SUNIA
Governor

cc: Advisory Group Members

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