Reassessment Report for the Papa i Puleia Fish Reserve

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1. Introduction

The selected site called Papa-Palauli is situated on the southeast of Savaii (Figure 1). The shoreline is consisted of lava rocks, low cliff edge (5m), and fine/coarser sand beaches. Lagoon is very narrow and shallow and is of reefal sediments and coral rubbles. Seagrasses, microalgae and reef patches spotted the lagoon. The reef (barrier) is relatively narrow and gashed with a 'deeps' forming channel.

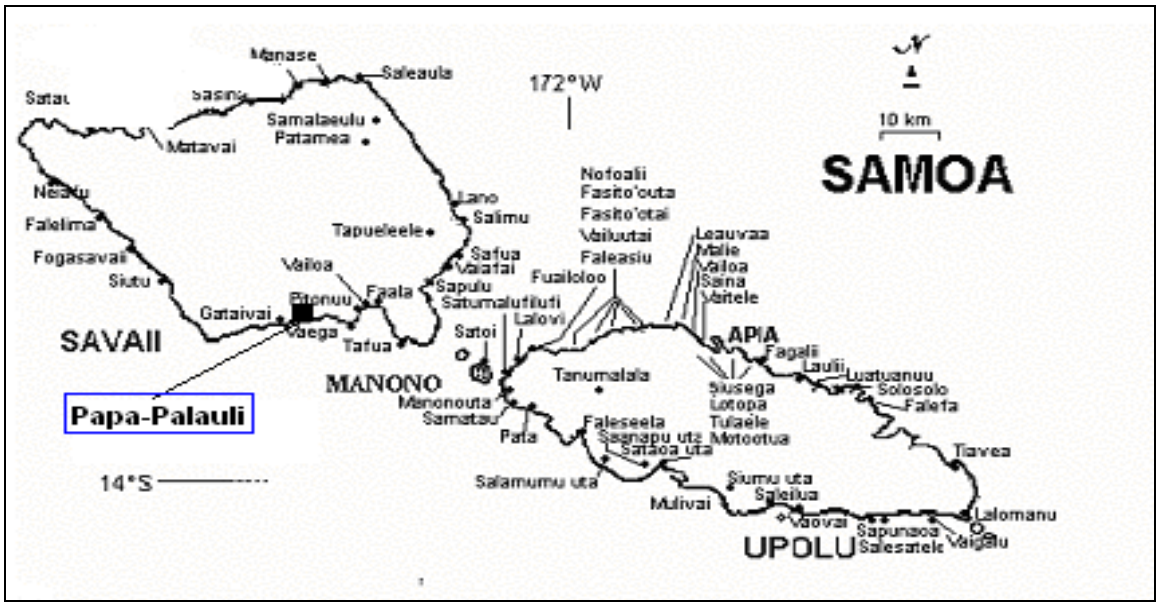


Figure 1*: Map of Samoa indicating the location of Papa-Puleia community-owned fish reserve.*

The establishment of the fish reserve was aimed at offering a sanctuary or a refuge area for fish and other marine lives to reproduce uninterrupted. It is scientifically proved that fish reserves are vital components of fisheries management anticipating that nearby areas where resources were depleted and exhausted will repopulated through larval dispersal. The community-managed fish reserve was initially surveyed on the 28 July 1998 to collect baseline information.

In addition, including of the Papa site as part of the GCRMN offers the opportunity for the regular monitoring of coral reefs at this part of the country. The first annual and bi-annual monitoring were done on the 23/05/01 and 11/06/02 and was follow by annual monitoring in years to follow. The latest assessment was on the 5th October 2007.

The main substrate groups recorded were the live corals with 59%, the algae group with 1%, the dead corals and the dead corals with algae with 8% and the abiotic group consisting of sand, rubbles and rocks with 32%.

In the fish category, the line surgeon, striated surgeon and the parrotfish were the dominant species with individuals with more than 200. However they were mostly adult species with an average size of 19cm and a total estimated biomass of 5,126.2kg.

This report will discuss the findings from this assessment which is a follow up from the last assessment carried out on the 5th October 2007.

1. Method

The surveyors used two methods along the five randomly laid transects for the reserve assessment. The Belt Line Transect method was used for the fish and invertebrate count. This is where one diver (middle) swims and pull the 50 meters tape while two divers are recorders on each side of the tape at about 2 meters apart. They select the most abundant species as indicator species and lengths are estimated.

Another method used was the Three Point Intercept Transect (3PIT) which was for substrate coverage. Similarly 3 divers are needed, one along the 50m tape and two on either side. All 3 are to stop at every 2 meters of the tape to record the exact substrate located at each 2 meter point. Different substrates had a unique code which consists of 3 letters that was extracted from the Australian Institute of Marine Science Survey Manual.

The assessment was carried out by the six staff of the inshore section namely Joyce Samuelu, Ulusapeti TiiTii, Lucille Aukusitino, Misipele Afamasaga, Mikaele Faamai, Tevita Apulu and Iona Sagapolutele.

2. Results

- ***Substrate Cover***

There were six main substrate groups recorded from the assessment. The live corals were obviously very dominant within the reserve with 71% of the substrate coverage. The abiotic group consist mainly of the non-living materials such as sand, rubbles and rocks. One of the common substrate totally missed from this assessment is the algae group which was recorded in past monitorings.

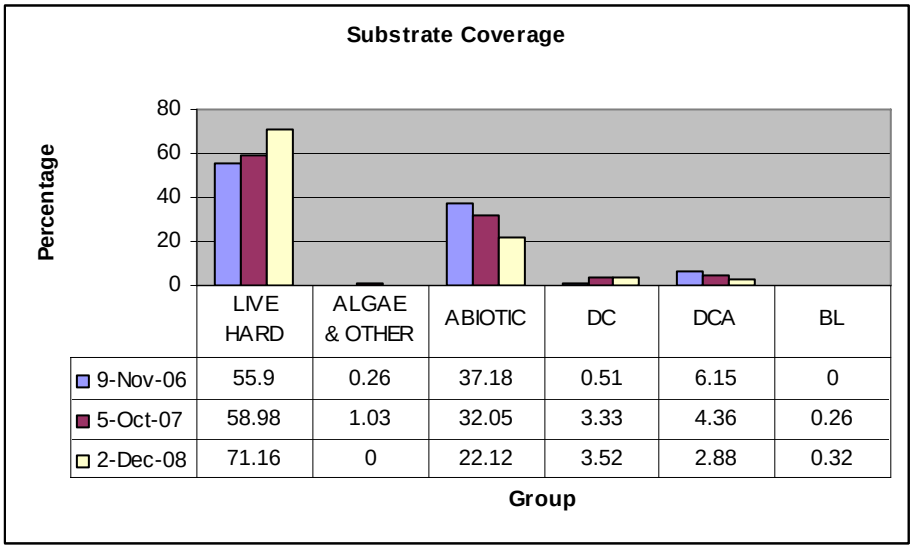
Table1: Summary of the different substrate recorded

Substrate Group	**Percentage (%)**
Live Hard Corals	71.16%
Abiotic	22.12%
Dead Corals	3.52%
Dead Corals with Algae	2.88%
Bleach	0.32%
Total	**100%**

- *Comparison of Substrate cover*

When comparing this current assessment with the results from the past three years of assessments, figure 2 shows the live corals as the only substrate cover increasing in percentage. The other groups all decline with the obvious decline of abiotic, the algae group were very few in the last three years while it was totally missed by this year's assessment.

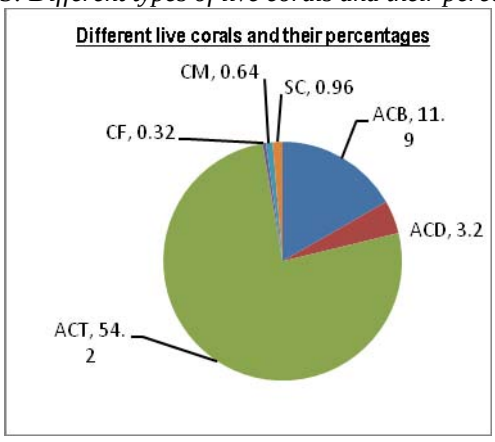
Figure 2: Percentages of different substrate groups recorded in the past and recent assessment



- *Live corals*

The live corals were by far the dominant substrate type. As shown by figure 3 the *Acropora* tabulate (ACT) was the dominant coral type, the Acropora branching (ACB) was next with just 11%, the other types include the Acropora Digitate (ACD), the Coral massive (CM), the coral foliose (CF) and the soft coral (SC).

Figure 3: Different types of live corals and their percentages



- ***Fish count and biomass***

As for the abundance of fish and invertebrates various species were observed but several were recorded as indicator species. The indicator species were mainly of adult species with average sizes above the 15cm and a total estimated biomass of 22.8 kg.

Table 2: Fish count during the assessment

Fish Name	**Fish abundance**	**Average length (cm)**	**Estimated biomass (kg/1000m^2)**	**Percentage**
striated surgeonfish	77	19	6.8	38.12%
parrotfish	51	15	4.1	25.23%
butterflyfish	24	15.5	2.2	11.89%
line surgeonfish	36	19.6	6.8	17.83%
wrass	14	16.7	2.9	6.93%
Total	**202**		**22.8**	**100%**

On the other hand invertebrate species abundance was recorded. There were four species counted within transects laid out namely greenfish, lollyfish, trochus, *Trochus niloticus* and giant clam.

Table 3: Invertebrate count during the assessment

Invertebrate Species	**Count**	**Percentage (%)**
Greenfish	139	72.40%
Lollyfish	45	23.44%
Tectus pyramis	5	2.60%
Trochus niloticus	2	1.04%
Giant clam	1	0.52%
Total	**192**	**100%**

3. Discussion

The Papa i Puleia fish reserve is a small reserve with an estimated size of 45,000 m2. However the diversity of live corals within the reserve area makes it a home to various marine habitats and abundance of them. The live corals as reflected by the results are very dominant. The nature of the area is very rough and the wave actions are very strong as the reef edge is very close to the shore. Thus the coral tabular (ACT) were dominant as their shapes protect them from being washed away by the strong waves. The branching corals were more abundant at the lagoon areas where the wave actions are less stronger and thus easier for the branching corals to establish.

The abiotic group consists mainly of sand, rubbles and rocks however the rubbles were mainly results of live corals being broken off from strong waves and dead corals that have eroded over long periods.

The fish species used as indicator species were mainly food fish, as it is target by the assessors to give us an understanding on the stock of food species within our reserves. The most abundant species include the line and striated surgeons and the parrotfish which were not only huge in numbers but also in sizes which reflects the maturity of the fish

species now home within the reserve. The estimated biomass from the assessed area of 1000m2 is a huge number and reflects the estimated weight of food fish available at the reserve at that particular time. This is one of the very few reserve in which big food fish are seen and an indication that the fish finds the reserve a real comfort zone for them.

The Papa i Puleia reserve is in very good condition as shown by the results, also observed during the assessment was the abundance of local found trochus and the introduced trochus *Trochus niloticus*, there were also quite a number of local giant clams within the reserve namely the *Tridacna squamosa*.

4. Conclusion

An overall feedback on the reserve is that there is a good number of fish and invertebrates supported by the abundance of live corals. These marine organisms are housed by various types of live hard corals mainly *Acropora* tabular which still remains as the dominant substrate coverage. The village can be congratulated for their continuous good effort in making sure that no one is to access and carry out any fishing within the reserve.