



## **SAMOA FISHERIES PROJECT**

an **AusAID** - assisted project of the Fisheries Division,  
Ministry of Agriculture, Forests, Fisheries & Meteorology.

### **The enhanced capacity of the Samoa Fisheries Division to facilitate management of commercial and subsistence fisheries, incorporating a review of the Fishery Regulations (1996).**

**The final report of the fisheries advisers and counterparts.**

**Kelvin Passfield, Lui Bell, Atonio Mulipola and Anama Solofa**



Samoa Fisheries Project milestone 38, November 2001  
Endorsed on behalf of the Fisheries Division

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Tanielu Sua, Assistant Director for Fisheries



GRM International Pty Ltd, 288 Edward St, Brisbane, 4000 QLD, Australia.

## **Table of contents**

### Executive summary

1. Introduction
2. Summary of activities completed by the Fisheries Management Advisor and counterparts.
3. Fisheries Management Strategies.
  - 3.1 Village-based fishery
  - 3.2 The outer reef slope fishery.
  - 3.3 Commercial
4. Data Collection and analysis
5. Fishery regulations
  - 5.1. Review of the Fishery Regulations 1996.
  - 5.2 Fishing Vessel Licence Regulations
  - 5.3 Fish processing establishment licence.
6. Environmental Assessments
7. Issues.

## **Appendices**

1. List of reports produced by the Fisheries Adviser, other project staff, and counterparts under component 2 of the Samoa Fisheries Project.
  2. Background information provided to the workshop on fishery regulations
  3. The proposed revisions for the Fishery Regulations 1996.
  4. Suggested names to differentiate local and introduced giant clams.
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## Executive Summary

This report summarises the activities carried out under component 2 of the Samoa Fisheries Project, i.e., Fisheries Management. These activities were supervised by the Fisheries Management Advisor, and involved the collection of relevant information, with Samoan Fisheries Division counterparts, and the preparation of the following reports, based on the information collected.

- A profile and management plan for the outer reef slope fishery (milestones 8 and 14).
- A profile and management plan for the commercial tuna fishery (milestones 13 and 18).
- A profile and management plan for the village-based fisheries (milestones 17 and 29).
- Samoa Fisheries Division data collection system: a users manual (milestone 20).
- Guidelines for analysis, interpretation and dissemination of fisheries data (milestone 31)
- Data Entry Manual

In the execution of these tasks, counterpart staff received training in order to improve the capacity of the Fisheries Research Section to carry out similar activities in future

The Fisheries Management Advisor also worked closely with the Aquaculture Advisor, other Project staff, and Fisheries Division staff to complete a revision of the Samoa Fishery Regulations, 1996.

The major changes suggested were:

- Setting minimum size limits for a number of species. Previously these size limits were related to families or groups of fishes, rather than individual species. Where a species was known to be sold in reasonable quantities at the market, and where it could be expected that a fishery regulation enforcement officer could learn to easily and reliably identify the fish, a species specific size limit was recommended. However, where several species had similar sizes at first maturity, and species differentiation was difficult, a combined minimum size was given.
- Ban on having any SCUBA equipment in the same boat, car, or on the beach, with spear fishing equipment (i.e. a total ban on SCUBA spearfishing).
- The provision that shark carcasses must be landed with any shark fins (i.e. no discarding shark carcasses at sea).
- Size limits for green and hawksbill turtles raised to 95 cm and 80 cm respectively, to reflect the average sizes at which these turtles breed.
- Ban on taking all other species of turtles
- Size limits on harvesting introduced clams, and appropriate Samoan names given (see appendix 4 for suggested names).
- Ban on exporting all giant clams, other than cultured specimens.
- Change definition of “berried” to also include animals from which the eggs have been removed.
- Permit required for the erection of a fish fence, with associated conditions attached such as length, and mesh size, and requirement to have the permit number clearly displayed on the fish fence
- The removal of schedule 2 for sea safety, as this is now covered by Ministry of Transport (MOT) legislation.
- Giving the Director the power to ban fishing for **any** species for a period of time, rather than specific species contained in a schedule.
- Ban on the use of any gear towed or propelled by a powered vessel for the collection of palolo.

## 1. Introduction

The goal of the AusAID assisted Samoa fisheries project is to “make a significant contribution to the sustainability of Samoa’s inshore and offshore marine resources, and to continue to develop the nation’s village-based and commercial fisheries”. In order for this goal to be achieved after the project is completed, it is necessary to leave a Fisheries Division that is capable of continuing to support the fishery sector, including commercial and subsistence fisheries, as it has in recent years. The particular role of the Fisheries Adviser in this regard was to improve the capacity of the Fisheries Division to collect useful data, and analyse this data to assist with monitoring and managing the fisheries.

In consultation with counterparts and other team members where possible, management plans were completed for three fisheries, i.e. the commercial tuna longline fishery, the outer reef slope small boat fishery, and the village level fishery.

## 2. Summary of activities completed by the Fisheries Management Advisor and counterparts.

The activities of the Fisheries Adviser over the period of the project were principally aimed at enhancing the country’s management capacity in the commercial and subsistence fisheries, under component 2 of the project. This was achieved through training counterparts in data collection and analysis techniques and producing management plans. A number of milestones and other reports were produced in conjunction with key counterparts and other Project staff, in order to document the process. These are listed in Appendix 1.

The following activity numbers refer to the corresponding numbers in the Project Design Document.

**Activity 2.1**, “management strategies to effect the objectives of the national fisheries policy”, was completed and documented in the following reports:

- A profile and management plan for the outer reef slope fishery (milestones 8 and 14).
- A profile and management plan for the commercial tuna fishery (milestones 13 and 18).
- A profile and management plan for the village-based fishery (milestones 17 and 29).

**Activity 2.3**, “Data collection and analysis systems that support fisheries management”, was completed and documented with the following reports:

- Samoa Fisheries Division data collection system: a users manual (milestone 20).
- Guidelines for analysis, interpretation and dissemination of fisheries data (milestone 31)

In addition, a draft Data Entry Manual has been produced. This manual gives basic instructions for new data entry personnel, and gives advice on how to improve data integrity. It is intended that this be an evolving document, to be modified and added to by users as required.

All of the above activities involved training varying numbers of counterparts in methodologies needed to complete the activities. Numbers of trainee counterparts ranged from one, to as many as twenty seven in the case of the Village Fishery Profile (Household Survey).

### **3. Fisheries Management Strategies.**

Because of the vastly different social backgrounds in which the commercial and subsistence fisheries operate, different management strategies have been adopted for each. The two different strategies are discussed below.

#### **3.1 Village-based fishery**

Recognising the difficulties involved in trying to manage remote fisheries from a central location, Samoa has adopted a community based approach to subsistence fishery management. This was facilitated with support from the Fishery Extension and Training Project, which ran from 1995 to 1998, with support from AusAID. Further AusAID support was provided under the current Samoa Fisheries Project (1999-2002). A prime consideration in selecting the appropriate management strategy was that of ensuring community ownership of the management. Thirty percent of Samoa's approximately 230 coastal villages now have village fishery management plans, and villages continue to join the programme.

The strategy to achieve effective village based management is for the Fisheries Division to encourage and assist each coastal village to develop its own Village Fisheries Management Plan. This involves encouraging a village community to analyse its fishing practices and problems, and suggest solutions. Community undertakings and actions to solve these problems may include introducing fisheries regulations and pursuing other conservation measures. These undertakings and actions are listed in the community-owned Village Fisheries Management Plan.

Questions are addressed such as how to encourage a village to manage its fishery sustainably and how community ownership of the plan can be assured. As fishery management is likely, in the short term, to reduce the amount of seafood available to the village, the strategy should also include support for the village, such as assistance with developing alternative sources of seafood.

The Fisheries Extension service is the catalyst to facilitate village level management. The extension process consists of meetings with village leaders (*fono*) followed by meetings with other groups, including women and the untitled men (*aumaga*), which may otherwise be overlooked in the process. It is believed that the participation of women is particularly important, as they are more likely to have a perspective which encompasses several generations, that is a long-term view, of the benefits of conservation.

A problem/solution tree is used to assist these groups to identify their problems, and suggest solutions. A fisheries advisory committee (FAC) is set up from members of these groups, and this FAC produces a Village Fishery Management Plan based on the problem tree and group discussions. A Village Fishery Management Committee (VFMAC) is then established, consisting of members of each of the groups

(stakeholders). The VFMAC is responsible for overseeing the management plan that is produced.

In community-based fisheries management, communities enforce their own fisheries regulations. These may include banning destructive fishing practices, regulating or banning certain types of highly efficient fishing gear, closed areas and seasons, size limits, releasing of females alive of certain species and protection of the marine environment. Some regulations may need to be legislated as village by-laws in order to control the actions of people from other villages who may break local village regulations. The right of villages to establish such by-laws is provided under the Fisheries Act, 1988.

The strategy adopted for Samoa's village based fishery management, and the basic principles and guidelines that have resulted, have become recognised throughout the region, and in other parts of the world, as a successful method of village-based or subsistence fishery management.

### **3.2 The outer reef slope fishery.**

The outer reef slope (ORS) fishery, in the context of the Samoa Fisheries Project, is considered to be village based, and as such comes under the village management strategy discussed above. The fishery is relatively small at present, consisting of less than 40 aluminium 4.3m boats powered by 15 hp outboard engines. These boats were promoted by the Fisheries Extension and Training Project (FETP) as an appropriate means to re-locate some fishing effort from the heavily exploited inshore areas to the less exploited areas outside the reef. The European Union (EU) provided a 66% subsidy towards the cost of a fully outfitted ORS boat. Based on a Fishery Division recommendation, the subsidy was limited to a maximum of two boats per coastal village, in order not to over exploit fish stocks. This subsidy is no longer available due to changing priorities of the EU Micro-project fund.

Data collection and observations indicate that about half of the ORS boats fish regularly, though not all of these fish according to guidelines set out for the ORS fishery. Although the boats were introduced to divert fishing pressure from lagoons to outside the reefs, there has been some misuse. A number of boats have been used to set fish fences and nets within the lagoons. Used consistently in these ways, these boats would significantly increase effort on the already overfished lagoon resources, conflicting with their original intention. Management strategies within the village must therefore also take in to consideration the potential inappropriate uses of these boats.

Possible management regulations include implementing bans on gillnetting, moving and setting fish fences, scuba spearfishing, and night diving for reef fish. However, as the vessels are village based, it is recommended that management be directed from the community, through the Village Fisheries Management Committees (VFMACs). A precautionary approach is recommended for the reef slope fishery, by initially limiting effort to two boats per village, and monitoring catch rates as far as is feasible given personnel and logistical constraints. Training on fishing methods provided by the Fisheries Division emphasises the potential for overfishing bottom fish stocks, and includes training on trolling and vertical longlining for the more resilient pelagic species.

In addition to the 40 ORS boats in the villages, there are approximately 200 aluminium 9m to 10m alia fishing boats in the country which primarily target albacore tuna using horizontal longlines. As larger vessels are moving into the tuna fishery, more of these smaller alia are dropping out. There is potential for these boats to change to bottom fishing on the outer reef slope with only very minor modifications to their fishing gear. If these boats regularly fish the outer reef, they are capable of over exploiting important reef fish resources on the reef slope. Government and the VFMACs should monitor the situation, in case some intervention is required either in the form of village bylaws, or through National legislation.

The Fisheries' Research Division and Extension Service should continue to assist the VFMAC with management by continuing to monitor the fishery. Where there are obvious areas of concern, such as breaking VFMAC regulations, or perceived overfishing of some species, the issue should be raised with the VFMAC for appropriate corrective measures to be undertaken, at the community level where possible.

### **3.3 Commercial fishery**

The strategy adopted for the commercial fishery in Samoa is often referred to as co-management. This is management by the Government in conjunction with other stakeholders such as fishers, boat owners, and exporters. The Commercial Fisheries Extension Service (CFES), set up within the Fisheries Division facilitated co-management of the Samoa longline fishery. The CFES has encouraged the private sector to take responsibility for the development and management of the fishing industry on a co-operative or shared basis with government. In keeping with this approach the commercial fisheries extension service has consulted with the industry and government stakeholders to determine the needs, identify problems and assist in the development of solutions to ensure that the fishing industry is managed in a sustainable manner (Watt et al, 2001). This was achieved through the formation of the Commercial Fishery Management Advisory Committee (CFMAC) under activity 2.2 of the Samoa Fishery Project.

The CFES facilitated the formation of a Commercial Fishery Advisory Committee (CFMAC), comprising of elected representatives from the private sector of the tuna fishing industry and appointed representatives from relevant government departments. Through this approach Samoa has achieved close consultation with the stakeholders, increased awareness of fisheries resource management issues and provided the opportunity for all stakeholders to have direct input into the fisheries management decision making process (Watt et al, 2001). Twelve meetings have been held to date.

The CFMAC, assisted by the CFES and other sections of the Fisheries Division and AusAID team, developed a management plan designed to control the growth of the tuna fishery through a licensing scheme that restricts the number of vessels over 10 meters in length (King et al, 2000). Specifically, the plan stated that the number of vessels be restricted to 25 in the 10 to 12.4m class, 15 in the 12.5 to 14.9m class, and 8 in the 15m and over class. Vessels under 10m (which includes most of the alia) were not restricted as it was agreed that this would effect the livelihood of a large number of fishers and boat owners associated with these boats. The plan was to be reviewed after 2 years.

Subsequent to Cabinet approval of the plan, and in contravention of it, Cabinet approved seven additional licences in the 15m and over class, bringing this to 15 licences in total. The Project and Fishery Division's view is that this plan be adhered to for the agreed 2-year period, after which it may be reviewed based on data collected over the period.

#### **4. Data Collection and analysis**

The review and improvement of the data collection and analysis system for the Fisheries Division has been an ongoing process. In the early stages of the Project, counterparts were too involved in senior management and administration to commit adequate time to the data collection system. The lack of suitable counterparts continued to be an issue until the last 8 months of the project, and this significantly delayed the transfer of skills. Significant progress has been made since the appointment of a motivated and efficient counterpart in April 2001. She has received considerable training, and has proven capable of managing the data system for the research section, provided that not too many other demands on her time are made.

One area that still requires improvement is in species identification, particularly for the inshore fishery, where there are a number of similar looking species in a family. This is of particular importance with regard to enforcement of fishery regulations, where a size limit is set for a particular species (see section 5.1, under Fishery Regulations). A workshop on species identification planned for November is hoped to improve this situation.

A significant improvement in quality of data collected and entered into the fisheries database has been achieved through on the job training, and stressing the importance of data integrity to both data collectors and data entry personnel. Of particular significance is a reliable system to collect, enter, and analyse data from the valuable tuna long line fishery. This will allow managers and policy makers to make well informed decisions on such factors as the number and type of boats to be licenced for the fishery to maintain an optimum return for Samoa from this valuable resource.

A database has also been established for entering and analysing data collected in household fishery surveys, such as the one conducted in October and November 2000. It is anticipated that this database will be used for analysing data from similar surveys, which should be conducted every 3 to 5 years.

As fisheries develop in Samoa, and the associated amount of data collected increases, there is a need to employ more staff in this activity. A recommendation to recruit a database manager was widely supported at the last Project Coordinating Committee meeting. As an interim measure, the Fishery Division has reassigned one staff member to supervise the data collection activities, and another assist with data entry. However, there is still a need for at least one more person to be assigned to the data unit to meet the increasing demands being put on the existing staff.

Valuable assistance with the fisheries database has been received from the SPC Oceanic Fisheries Programme, via visits from their programmer - research officer, who has assisted with queries and reports. He is due for another visit in November, when he will assist with the incorporation of formulae in to the database which will allow the



programme to calculate fish weight based on the length, as well as debug a number of Access database reports.

This relationship with the SPC should continue beyond the life of the Project, as this provides valuable ongoing technical support to the data unit. The relationship is mutually beneficial, as SPC require reliable data for incorporation into their regional database for use in managing the regional tuna stocks.

## 5. Fishery regulations

### 5.1. Review of the Fishery Regulations 1996.

The Project and Fisheries Division have been working steadily towards a review of the 1996 Fishery Regulations. There has been considerable stakeholder consultation, and observations have been made of activities in the fishery sector, and particularly around the Apia Fish Market and the Fishery Wharf, where most commercial activities take place. This provided background information to assist in the review of the regulations.

These ongoing activities culminated in a workshop held on 18 September 2001 for the Fisheries Division Staff. Appendix 2 is a draft discussion document, which was prepared for the meeting, as a starting point for discussions. During this workshop, existing regulations were discussed, and areas requiring amendments and revisions were highlighted. A Committee was established, chaired by Project Adviser Lui Bell, to make recommendations on the changes required to the regulations based on the discussion at the workshop.

The committee met regularly over a period of several weeks, revising the regulations. The most difficult part was revising the schedules of species covered under the minimum size regulations. This involved a major search of available data to obtain information on the size at maturity for those fish and other seafood items commonly sold at the Apia fish market. The suggested amendments were incorporated into a draft revision of the regulations, attached as Appendix 3. This will be sent to the Attorney General shortly for incorporation in to the existing regulations, after it has been endorsed by the Assistant Director, Fisheries.

The major changes recommended are summarised below, along with some background information used in the review discussion.

### SCUBA SPEARFISHING

**Background.** There has been a rapid increase in the past 12 months in SCUBA spearfishing. This is conducted at night, and a large number of the bigger fish responsible for a lot of the recruitment of juveniles are being taken. In particular these include the larger parrotfish *Bolbometopon muricatum*, *Scarus microrhinos*, and *Cetoscarus bicolor*, the large coral trout, *Plectropomus leopardus*, and the humphead Maori wrasse, *Cheilinus undulatus*. Up to 40 scuba tanks per day are seen to be unloaded at the Apia fish market. Assuming five days fishing per week, it is likely that between 100 and 200 tanks are used per week.

**Recommendation**

Prohibit the use of SCUBA gear or any other form of breathing apparatus for spear fishing (prohibit possession of a SCUBA gear and a spear or modified spear together, on the shore, in the sea, on a vessel or in a vehicle)<sup>1</sup>.

**MUD CRABS.****Background.**

Some parts of the world, for example Queensland in Australia, ban the taking of female mud crabs. Despite this, the information from mud crab research in Australia suggests that the regulations we have are probably sufficient, providing the size limits regulation is abided by (Neil Gribble, pers. comm.). Unfortunately, at present a lot of undersize crabs are still sold at outlets other than the market. We need to prosecute people selling undersize crabs in at these other locations. An information sheet explaining why we need to let the crabs grow to breeding size may also help.

**Recommendation**

The existing regulations are sufficient, but need to expand coverage of enforcement to outlets other than the Apia Fish Market

**TURTLES.****Background.**

The best way to protect turtle stock is to ban the taking of breeding females. A ban during the breeding season may provide this protection. An increase in minimum size to 95 cm. for green turtles and 80cm. for hawksbill turtles should be considered, as this is around the average size reported for nesting females of these species.

Incidental taking by longline vessels should be recorded wherever possible. Details on whether the turtle was dead, retained, or released alive should be recorded.

**Recommendation**

- Increase minimum size limits for Green and Hawksbill turtles to 950 mm and 800 mm respectively.
- Prohibit fishing for other turtle species including leatherback turtle
- Ban on taking turtles on their way to nesting.
- Any undersize hawksbill or green turtles or other species of turtles of any size caught incidentally be released if alive. Other species of turtles, apart from hawksbill or green, caught incidentally and are found dead must be reported to FD.

**LOBSTERS.****Background**

Current size limit, plus ban on berried females, is probably all that is required, provided the rules are obeyed and any infringements dealt with appropriately. SCUBA spear fishing is the current biggest threat to lobsters, as well as other fish and giant clams

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<sup>1</sup> Recently the Aleipata and Safata districts have placed a traditional ban on SCUBA fishing in their areas.

**Recommendation**

No change to existing legislation, as the ban on SCUBA spearfishing should also help protect the lobster stocks.

Change definition of “berried” to also include animals from which the eggs have been removed.

**CLAMS.****Background**

At present it is not illegal to sell clams out of the shell, i.e. in bottles. It is impossible to say whether these clams are undersize. Some clams are sold in bottles, and it is said that these come from Tokelau. However, as it is not possible to determine the origin of the clams, all sales of clams not in the shell should be banned. In any case, this would be supporting Tokelau law as well, where we believe there is now a total ban on exporting clams, though some are still reported to be exported illegally.

**Recommendations**

- Prohibit selling of fishery products on which minimum size limits are applied, in any other form except whole e.g. giant clams, trochus, and fish. An exception is given for lobsters for which a minimum size limit is given for the tail.
- Minimum size limit for introduced giant clam species, *T. derasa* (smooth giant clam, called manifi in Samoan), *T. gigas* (True giant clam) and the re-introduced species, *Hippopus hippopus* (Horseshoe clam) are 275mm, 550 mm [size at 7+ years old] and 190 mm [size at 6 years old] respectively. (see Appendix 4 for suggested Samoan names)
- Prohibit the export of all giant clam species except for cultured specimens targeted for the aquarium trade or when the Director declares such a prohibition lifted.

**SHARK FINNING.****Background**

Observer data by the National Marine Fishery Service in Hawaii has determined that 86% of the sharks caught on longlines are alive at the time of capture. They can therefore be released alive, thereby reducing by-catch mortality. The finning of sharks and discarding the rest of the shark alive is wasteful, and inhumane.

**Recommendations**

- Prohibit landing of shark fins without their associated carcass or carcasses. (Illegal to have on the boat more than 4 fins (= 1 set) per landed shark). A large fine of \$1000 or more is recommended for repeat offenders, as the practice can be very lucrative.
- Buyers/exporters of shark fins should be required to have a permit.

**MINIMUM SIZES FOR FISH (Schedule 1)****Background.**

The existing size limits usually refer to families or groups of fishes, rather than individual species. These should be revised into species, or into species with similar size characteristics. For example, some Lethrinids are juvenile at 200 mm, while others

are mature at that size. This is the same for Serranidae, Mullidae, Mugilidae, Scaridae, Carangidae, Acanthuridae, and others.

**Recommendation**

Fish that are commonly sold at the market, and which are not too difficult to identify, should be given a minimum size at the species level. Others may be left in families, or lumped together with several other species, especially where they have a similar size at first maturity. Recommendations for a revised Schedule 1 are attached as part of Appendix 3.

**FISH FENCES****Background**

Fish fences are an indiscriminate method of catching fish, which are semi-permanently set up at several locations around Samoa, notably Mulinuu Peninsula. At present they are not regulated, apart from a minimum mesh size in schedule 3.

**Recommendation**

Permit required for the erection of a fish fence, with associated conditions attached such as length, and mesh size, and requirement to have the permit number clearly displayed on the fish fence.

**BAN ON TAKING ANY SPECIES****Background**

The current regulations include a schedule 2, listing a number of species, which the Director may prohibit from being caught. This schedule should be removed, and the regulation changed such that the Director may ban the taking of any species (based on advice from the Fisheries Division).

**Recommendation**

Director may ban fishing for **any** species for a period of time, rather than specific species contained in a schedule.

**PALOLO**

Anecdotal data suggests that the annual palolo harvest is decreasing, and palaolo are being caught at fewer locations. Perhaps because of this, some people are now using gear towed from powered boats to catch palolo. If the decreased catches are because of over-harvesting, this is likely to make the situation worse.

**Recommendation**

Impose a ban on the use of any gear towed or propelled by a powered vessel for the collection of palolo.

## **ENFORCEMENT**

One of the issues discussed at the workshop was the fact that at present, regulations are only enforced at the Fish Market. There is a need for the regulatory officers to visit other sales points, such as outside local supermarkets, where some vendors now go to sell their undersize catch.

Appendix 2 is the discussion document that was provided to the workshop. Appendix 3 is the resulting recommendations for the revision of the regulations, which will be forwarded to the Attorney General's Department.

### **5.2 Fishing Vessel Licence Regulations**

Regulations for licensing fishing vessels were drafted by a sub-committee appointed by the CF-MAC consisting of representatives from the fishing industry, Fisheries Division staff, Samoa Fisheries Project advisors and the MAFFM legal advisor. The regulations were approved by the Office of the Attorney General and by Cabinet in August and September 2001.

### **5.3 Fish processing establishment licence.**

The Fisheries Division has implemented regulations for the licensing of fish processing establishment. These are designed to ensure seafood safety, and protect the reputation of Samoa as a quality fish exporting nation. They give the right for Government to inspect a fish processing establishment, and close it down if it is not found to comply with the Hazard Analysis Critical Control Points (HACCP) system of ensuring seafood safety. The regulations also prohibit the establishment from accepting any fish from an unlicensed vessel. These regulations will work together with the proposed National Seafood Safety and Monitoring Programme (NSSMP), which will establish a "Competent Authority" to certify fish processing and exporting establishments. This Programme is due to begin later this year with funding from New Zealand Overseas Development Assistance (NZODA).

More details on the Fish Processing Establishment Licence, including the NSSMP, and the Fishing Vessel Licence can be found in the report "Tuna Longline Fishery of Samoa" (Watt et al, 2001).

## **6. Environmental Assessments**

The responsible development and exploitation of Samoa's coastal waters requires that environmental impact assessments be conducted for activities that may impact the coastal zone. The Samoan Fisheries Project has a number of marine and aquaculture activities, some of which incur environmental responsibility for the Division of Fisheries. Because of this, a Coastal Environmental Specialist was included in the team of consultants for the project, to assist the Fisheries Division meet its obligations with regard to environmental impact assessment (EIA).

Although there is no clear guidelines in the Draft EIA Legislation for Samoa as to what type of impacts trigger the development of an EIA, due diligence (responsible management) suggests that all projects should be assessed for their potential to impact

the environment (Dews et al 1999). A study in 1999 ranked all the Division of Fisheries activities whether project initiated or otherwise, in order of their importance with respect to environmental impacts (Dews et al 1999). The six highest ranked activities (not in order of priority) were the clam hatchery, aquaculture of mud crabs, translocation of bivalves, aquaculture of tilapia, aquaculture of red claw and the construction of a marina complex.

To fulfil EIA obligations, the Coastal Environment Specialist, in conjunction with Fisheries Division and Division of Environment & Conservation (DEC) counterparts, prepared a full EIA for the Fisheries Division Clam Hatchery at Toloa. In addition, preliminary environmental assessment reports (PEARS) were prepared for each of the other five Fisheries Division activities that were deemed to have possible environmental effects:

- 1. Mud crab aquaculture
- 2. Red claw aquaculture
- 3. Marina development
- 4. Tilapia aquaculture
- 5. Translocation of Bivalves

After assessment of a PEAR the DEC can request amendments to the proposed activity, or request a complete Environmental Impact Assessment (EIA). If an assessment indicates that the proposed activity may have adverse impacts on the environment the Director will notify the proponent (Division of Fisheries) that an Environmental Impact Assessment is required and supply the reasons for the decision. The results of the PEARS indicate the construction of a marina is likely to warrant an EIA.

## **7. Issues.**

The main issue in relation to component 2 of the project is the delay in appointing a data manager to be responsible for the data collection and analysis unit. There has been a capable person acting in the position, and receiving training, since April. However, she does not yet have the required service time to be appointed to a senior level.

The other issue that is more difficult to deal with is the lack of enough dedicated and capable people within the research section to be able to effectively carry out all the tasks required. It is hoped that this will be partly addressed with the return of some staff from overseas training. However, there is still a need to recruit capable people to fulfil the increasing requirement for quality data for making well informed decisions on fisheries management.

## References.

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Gribble, Neil 2001. Queensland Department of Primary Industries. Personal communication to Kelvin Passfield.

King, M., A. Mulipola, K. Passfield & P. Watt, 1999. *Management and economic considerations for the domestic, tuna longline fishery in Samoa*. Samoa Fisheries Project Milestone 18. GRM/AusAID.

Watt, P., M. King, K. Passfield, A. Mulipola and S. Moala, 2001. *Tuna Longline Fishery of Samoa*. Samoa Fishery Project report. GRM/AusAID

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## Appendix one.

### **Reports produced by the Fisheries Adviser, other project staff, and counterparts under component 2 of the Samoa Fisheries Project.**

#### ***Profile of village fisheries in Samoa.***

Kelvin Passfield, Mike King, Atonio Mulipola, and Etuati Ropeti. Milestone 17, April 2001.

#### ***Village Fisheries Management Plan: Samoa's community-based management strategy.***

Mike King, Kelvin Passfield, and Etuati Ropeti. Project Milestone number 29, May, 2001

#### ***Profile of the commercial tuna fishery in Samoa.***

Kelvin Passfield and Atonio Mulipola. Project milestone 13, October 1999.

#### ***Management and economic considerations for the domestic, tuna longline fishery in Samoa***

M. King, A. Mulipola, K. Passfield & P. Watt. Project milestone 18, December 1999

#### ***Outer reef slope fisheries profile.***

Kelvin Passfield, Atonio Mulipola, and Sione Vaofusi. Project milestone 8, July 1999.

#### ***Outer Reef Slope Fishery Management Plan***

Kelvin Passfield and Sione Vaofusi. Project Milestone number 14, November, 1999

#### ***Samoa Fisheries Division data collection system: a users manual.***

Kelvin Passfield, Atonio Mulipola and Anne Trevor. Project milestone 20, March, 2000.

#### ***Samoa Fisheries Division Database Data entry manual.***

Kelvin Passfield and Anama Solofa, November, 2001.



## Appendix 2

### Background information provided to the workshop on fishery regulations, and recommendations of the regulations committee.

**These discussion points on the Local Fisheries Regulations 1996 were drafted by Lui Bell.**

Pursuant to the Fisheries Act 1988, the Local Fisheries Regulations 1996 were made and came into force in April 1996. The Regulations include conservation measures such as minimum size limits etc, fish aggregating devices and registration and safety requirements for local commercial fishing vessels.

Between 14 February 2000 and 12 June 2001, a total of 185 cases were made involving illegal possession/exposing for sale of fishery products as prohibited under Part 1 [Conservation Measures] of the Local Fisheries Regulations 1996. The vast majority of these were fishery products exposed for sale at the Apia Fish Market. Table 1 gives a summary of these cases.

**Table 1:** Apprehended cases under Part 1, Conservation Measures, of the Local Fisheries Regulations 1996, 14 February 2000 - 12 June 2001. [Source of Data: Mr. Tavita Sasi, Fisheries Division, Apia].

Fishery Product/Species	Offence	Number of Offences (cases)	Number of fishery product/specimens involved
<b>Fin-fishes</b>			
Caranx sp.( <i>Malauli</i> )	Undersize	4	10
Rabbitfish ( <i>Lo</i> )	Undersize	6	11
Surgeonfish (lined) ( <i>Alogo</i> )	Undersize	45	190
Surgeonfish (striated) ( <i>Pone</i> )	Undersize	32	108
Unicornfish (orange-spine) ( <i>Iiilia</i> )	Undersize	2	3
Other fish	Undersize	1	1
<b>Sub-total 1</b>		<b>90</b>	<b>323</b>
<b>Crustaceans</b>			
Spiny lobster	Egg bearing	43	76
( <i>Ula-sami</i> )	Soft shell	9	9
	Undersize	14	25
Mangrove crabs ( <i>Paalimago</i> )	Undersize	21	85
Reef crab ( <i>Kuku</i> )	Undersize	2	2
<b>Sub-total 2</b>		<b>89</b>	<b>197</b>
<b>Other</b>			
Sea hare eggs ( <i>fua gau</i> )	eggs	6	6 bottles
<b>Sub-total 3</b>		<b>6</b>	<b>6 bottles</b>

## REVIEW OF THE LOCAL FISHERIES REGULATIONS 1996

### 1. INTERPRETATION

We need to include "cultured" under this part as it is included under Part 1 Section 10 concerning giant clams.

If "aquaculture" is used, it should be included also under this section [Interpretation].

In addition, any other "special" words that would be added in the new text should be defined if not already defined under the Fisheries Act 1988.

**Definition in Fisheries Act 1988.** The definition of "fish" in the Fisheries Act 1988 may need refining to include fresh-water fisheries such as fresh-water prawns (to protect fishing prawns using chemicals) and coconut crabs. Alternatively, the definition can be included in the Regulations to say that "fish" as defined under the Fisheries Act 1988 and include fresh-water fisheries such as fresh-water prawns and eels and coconut crabs.

[Note: The interpretation of "sale" in the Regulations is worth noting. In addition to other expressions used to define "sale", it also includes "permitting to be sold". Thus it seems that for any illegal fish sold at the Fish Market, the Market operators are also affected under the law [if the rental fee paid can be taken as a confirmation of acceptance to use space to sell or permitting to sell]. If this is the case, it may mean that the Market operators would play an increased role in the regulatory arena.

### 2. CONSERVATION MEASURES

#### 2.1 Exceptions for Aquacultural/Experimental/Research Purposes

##### *Regulations 3, 6-13*

The only exception for possessing/selling of under-sized animals under the current Regulations is that for "cultured clams". Exceptions should also be made for other marine animals including, crabs, turtles, lobsters, slipper lobsters, trochus, pearl oysters, turbo shell, and even fin-fish, when used for aquaculture or scientific research/experimental purposes.

*These exceptions for Aquaculture/Experiment/Research Purposes can be worded and inserted under the Regulation for each specific animal as given in the current text, or a new sub-section can be inserted after all the Regulations to allow the Director, on advise by FD, to issue permits? for catching and possessing (live) undersized animals for aquaculture/experiment/ research purposes.*

#### 2.2 Review Schedules

##### ***Schedule 1: Minimum size of fish, which may be caught or sold, AND the list of fish and invertebrates, which are prohibited for sale.***

It may be necessary to add the word "possess" to the wording of "Minimum size of fish which may be caught or sold" as used in other non-fish regulations. Additionally, "possess" may need to be inserted in Regulation 3 (1) or 3(2).

Priority in applying minimum size limits for fin-fish should be given to species which are important in terms of consumption locally and those which are known to have

declined drastically. Unfortunately, with the exception of species, which have specific Samoan names (e.g. alogo, pone etc), landing data available are mostly grouped under families. Thus the importance of certain species within a family in terms of consumption locally is not available.

The current table in the Regulations (Schedule 1) should be detailed down to species level as 'lengths at maturity' etc for individual species within families vary a great deal. Thus it is inaccurate to lump species of a family under one size limit as is currently the situation with most species in the Schedule.

Table 1 lists the more important species, found in Samoa, for groups that are lumped together (in Schedule 1 of the Regulations), e.g. mullet, jacks and trevallies, rabbitfishes, parrotfishes, wrasses, rock cods and groupers, sea breams and emperors, goatfishes. Corresponding biological parameters for each species are listed as obtained from FishBase 99.

While listing fish in the Schedule to species level would be easy for some groups, e.g. Surgeonfishes and Tangs, as it includes only a few species which are easily identified, other fish groups would be difficult because of the many species in the group, wide range of lengths at maturity (Lm), and difficulty in identification to species level. This is particularly difficult with mullets where only two "kinds" are known in the Samoan language, "afa" for *Liza vaigiensis* and every other species is known as "anae". The differentiation between "afa" and other mullets is that the caudal fin as well the lower section of the pectoral fin of "afa" is distinctly yellow. Two important aspects should be taken into consideration when using minimum size limits to the species level. First, the species should be of importance in terms of consumption or/or of significance, e.g. if stocks have declined drastically. Secondly, the species should be easily identifiable without confusion with another species within the same genus, particularly if they have quite different Lm.

We can delete the minimum size for "atule" and "ga". These can be controlled by controlling net size, as we should only be targeting those that commercially fish these fish using nets and fences.

***Fish and invertebrates, which are prohibited for sale:*** This includes fish species that are often ciguatoxic in Samoa and eggs of sea animals that they deposit before hatching.

*[Note: If fish species level will be used in Schedule 1, it is vitally important that FD officers (as well as fishermen) will be able to identify species to be included. Thus FD officers enforcing the regulations should be familiar with the species identification, and who in turn will be able to show fishermen these species. Thus a training in identifying the species would be important for the FD officers].*

***Schedule 2:*** *The species of fish in respect of which the Director may declare a period or periods when fishing for such species is prohibited.*

Rabbitfish juveniles (pine lo)

***Schedule 3:*** Minimum mesh size for nets and fish fences.

### 2.3 Additional Regulations

- Minimum size limit for coconut crabs including berried females. (Although coconut crabs are not a significant resource, but inclusion would make regulations consistent with "threatened" species). [4" in the greatest distance across the width of its carapace (Palau);
- Minimum size limit for the introduced Trochus (*Trochus niloticus*) and Green Snail (*Turbo marmoratus*).
- Minimum size limit for introduced giant clam species, *T. derasa*, *T. gigas* and the re-introduced species, *Hippopus hippopus*.???
- Minimum size limit for Venus shell, *Gafrarium tumidum*, *G. pectinatum* (known locally as tugane), and Ark shell, *Anadara* sp. (known locally as pae or asi or asiasi). [Data on tugane should be available from USP Masters student Roseti Imo]
- Minimum size limits for sea cucumbers. Refer to Guidelines for size limit of sea cucumbers, Samoa Resources Profiles pp192-194
- To prohibit possessing, selling or purchasing of mangrove crabs, lobsters, etc from which eggs have been removed.
- Director to set a limited number of fishing boats to enter the deep-water snapper fishery (bottomfish) [through a licensing system]. May also consider boat size allowed
- Limit the number of aquarium fish operators.
- Limit/prohibit the export of giant clams of the species, *T. maxima* and *T. squamosa*, in any form, except cultured specimens.
- Prohibit the export and sales of turtle products.
- To accommodate for Aquarium fish catching, export etc (all forms of products including "bio-rocks"). [The LSE/DEC Act or Regulations on corals etc should be consulted].
- Permit to export fishery products.
- To prohibit harvesting of pearl oyster for commercial purposes (if stocks exist)
- To prohibit harvesting of the introduced species of Trochus (*Trochus niloticus*) and Green Snail (*Turbo marmorata*) except when allowed by the Director
- To prohibit selling of fishery products on which minimum size limits are applied, in any other form except whole. e.g. giant clams, lobsters, trochus, [Enforcement of Minimum Size Limit]
- To prohibit the commercial fishing etc of whales. [To comply with regional efforts]
- To prohibit the harvesting and selling of giant triton or Pacific trumpet shell, *Charonia tritonis* (*foafoa*) less than 20 cm in length. Prohibit commercial sales and export. Same for trumpet shell, *Cassis cornuta* (*pu*); spider conch, *Lambis lambis* (*palaau*). [*C. tritonis*-20 cm in length, when measured along the outside of the shell from one end to the other]
- To prohibit the use of SCUBA gear or any other breathing apparatus for the purpose of catching fish; to prohibit harvesting of fish and all other marine organism (animal and plants) using SCUBA, for export (e.g. for the aquarium market); [to prohibit possessing SCUBA gear and a spear or modified spear together, on the shore, in the sea, on a vessel or in a vehicle]. [It might also be worth considering diving businesses that hire out diving gear with respect to spear fishing].
- Introduce a permitting system to control the number of operating fish fences (pa i'a). May also limit fish fence size, and permit holder be responsible for the removal of damaged or rusting fence from the sea and dispose of responsibly on land.
- Limit size and/or type of gear for catching palolo

- Recognition of guidelines developed by FD for harvesting and exporting of marine animals and plants for aquarium purposes (refer Fisheries Resources Profiles)

## 2.4 Additional Section

**Fishery Statistics:** Requirement for sellers, retailers, restaurant operators, hotel operators, exporters etc of fishery products to provide accurate data to FD when required and allow FD personnel access to records and products for data collection and inspection. [Anyone engaged in fishing, fish processing, fish marketing or the export of fish or fish products to provide to the Assistant Director Fisheries such information and statistics relating to such fishing, processing, marketing or export and in such form as may be prescribed].

## 2.5 Permits

Permit to sell/retail fishery products. Are these required?

Permit to export fishery products including those for the aquarium trade

Permit to conduct research or fishing trials on any fishery resources particularly those species not currently fished on any level (including deep-water shrimps, deep-water lobsters etc).

Permit to introduce on import fish species for any kind (fresh, brackish or marine; animal or plant) for any purposes, particularly for aquaculture whether be farming or for experiment.

## 3. FISH AGGREGATING DEVICES

## 4. REGISTRATION AND SAFETY REQUIREMENTS

## 5. INTERPRETATION

## 6. OTHER

### 6.1 Corrections of Current Regulations Text

- Title and Regulations 4 and 16(3): Delete Western in Western Samoa.
- Regulation 3: Use CAPITAL S for schedule in "schedule 1"
- Regulation 6 (b): Capilius in Capilius maculatus should be spelt with an r thus Carpilius.
- Regulation 7 (1): use both "*laumei fai uga*" and "*laumei*" as both terms as used in Schedule II.
- Regulation 9: remove s from "telsons" (last word of paragraph)
- Regulation 13: remove "green" from "green snail" and substitute with "turban"??
- Schedule III a: add "than" after "less"
- Should there be a total ban on taking *Trochus niloticus* for at least 10 years, then to be reviewed?
- Should there be a total ban on taking *Pinctada margaritifera*?
- Ban on taking turtles on their way to nesting.
- Problem is though there are regulations, there is no enforcement whatsoever, except in the fish market.

## 6.2 By-laws

Under Part II 3 (3) (d) of the Fisheries Act 1988, the Director "may, in consultation with fishermen, industry and village representatives, prepare and promulgate by-laws not inconsistent with this Act for the conservation and management of fisheries".

Currently, only villages under the Fisheries Division Community-based Programme have by-laws gazetted, even though the Act clause infers that the Director may consult with "any" fishermen, industry and village representatives.

Given the above and the fact that a lot of villages (not necessarily under the above-mentioned Programme) have advertised over the radio banning certain "destructive" fishing methods, it is thus recommended that a campaign be launched to inform village communities that by-laws can be made for them even if they are not under the Fisheries Programme. The campaign can take the following forms:

- (1) advertisements over the media
- (2) presentation by the Fisheries Division during the monthly Pulenuu meetings.

[for by-laws which are specific to certain villages]

land crabs harvesting - tupa prohibit catching at night; mali'o restrict to 1-2 nights during spawning migration.

## Appendix 3

### The proposed revisions for the Fishery Regulations 1996.

## REVIEW OF THE LOCAL FISHERIES REGULATIONS 1996

Lui Bell, Anama Solofa, Atonio Mulipola, Etuati Ropeti, Kelvin Passfield and Savali Time, October 2001.

### Introduction.

The following is a draft of the review of the fisheries regulations. This is a culmination of a workshop for fisheries division staff held on September 19, 2001, and a subsequent series of meetings by the regulations sub committee that was formed as a result of the workshop. This draft, along with the revised Schedule 1, has been forwarded to the Assistant Director, Fisheries, MAFFM, for his endorsement before being sent to the Attorney General's Dept, where it will go through the legal process required to get it in to law.

In the following pages, some text has been ~~struck through~~, indicating that a change of text (given) is recommended. Other notes in parentheses are intended for the Office of the Attorney General, to assist in wording for the regulations.

### 1. INTERPRETATION

**Aquaculture:** "Aquaculture is the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants. Farming implies some sort of intervention in the rearing process to enhance production, such as, but not limited to, regular stocking, feeding and protection from predators."<sup>2</sup>

**Culture/farm:** verb form of aquaculture

**Berried female:** female crustacean carrying eggs externally including those from which eggs have been removed.

**Fish:** as defined under the Fisheries Act 1988 but also includes fresh-water animals such as fresh-water prawns and eels and species that live on land but use the sea during part of their life cycle such as coconut crabs and land crabs.

### 2. Alteration of Existing Regulations

Regulation 4: *Closure of a fishery.* The Director may, by notice published in a newspaper [OTHER MEDIA FORMS], which is published at least twice weekly throughout Samoa, declare the period or periods during which the fishing for any fish species is prohibited. [thus Schedule 2 is eliminated].

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<sup>2</sup> Part of definition by FAO

### 3. ADDITIONAL REGULATIONS

#### 3.1 Conservation Measures

##### *Coconut crabs:*

- Minimum size limit [100 mm (4") in the greatest distance across the width of its carapace; alternatively thoracic length of 33 mm]
- Prohibit sale of coconut crabs
- Prohibit catching of berried females.

##### *Introduced Trochus (Trochus niloticus) and (Turbo marmorata)*

- To prohibit harvesting of the introduced species of Trochus (*Trochus niloticus*, aliao nilotika) and Green Snail (*Turbo marmorata*) except when allowed by the Director. [Note: Minimum size limits need to be given when harvesting is allowed].

##### *Giant clam*

- Minimum size limit for introduced giant clam species, *T. derasa* (smooth giant clam, called manifi in Samoan). *T. gigas* (True giant clam,) and the re-introduced species, *Hippopus hippopus* (Horseshoe clam,) are 275mm, 550 mm [size at 7+ years old] and 190 mm [size at 6 years old] respectively.
- Prohibit the export of all giant clam species except for cultured specimens targeted for the aquarium trade or when the Director declares such a prohibition lifted.

##### *Sharks*

- Prohibit landing of shark fins without their associated carcass or carcasses.

##### *Turtles*

- Increase minimum size limits for Green and Hawksbill turtles to 950 mm and 800 mm respectively.
- Prohibit fishing for other turtle species including leatherback turtle
- Any undersize hawksbill or green turtles or other species of turtles of any size caught incidentally be released if alive. Other species of turtles, apart from hawksbill or green, caught incidentally and are found dead must be reported to FD.

##### *Form in which to sell species with minimum size limits*

- Prohibit selling of fishery products on which minimum size limits are applied, in any other form except whole e.g. giant clams, trochus, fish. An exception is given for lobsters for which a minimum size limit is given for the tail.

##### *Whales*

- Prohibit the commercial fishing of whales.

##### *Giant Triton or Pacific trumpet shell*

- Prohibit the harvesting of giant triton or Pacific trumpet shell, *Charonia tritonis* (*foafoa*) less than 20 cm in length when measured along the outside of the shell from one end to the other.
- Prohibit the sale and export of the shell of any size whether dead or alive.

##### *Trumpet shell*

- Prohibit the selling of giant trumpet shell, *Cassis cornuta* (*pu*).



*Palolo*

- Prohibit the use of a motorized boat dragging or pushing any large net whether tied to parts of the boat or held by hand to catch palolo.

*SCUBA*

- Prohibit the use of SCUBA gear or any other form of breathing apparatus for spear fishing [prohibit possession of a SCUBA gear and a spear or modified spear together, on the shore, in the sea, on a vessel or in a vehicle].

*Drift nets*

Ban on the use of drift nets anywhere within the Samoa EEZ ( there is already a regional ban on using this method on the High Seas).

**4. PERMITS***Exceptions for Aquacultural/Experimental/Research Purposes*

- Permit from Director is required for exceptions of any species mentioned in *Regulations 3(1), (2), and 6-14* and Schedule 1 when used for aquaculture or scientific research/experimental purposes.

*Aquarium fishery*

- Permit required to catch and operate an aquarium fish undertaking.  
[Guidelines to include forms on catching, export, inspection etc]. [Check LSE/DEC Act or Regulations on corals etc]

*Fish Fences (pa i'a)*

- Permit to erect and/or operate a fish fences (pa i'a).  
[Conditions include: fish fence size, distance from Fish Reserves and other important resources e.g. corals, migration path of a species, permit holder be responsible for the removal of damaged or rusting fence from the sea and dispose of responsibly on land, display Permit # on his fence etc].

*Export of Fishery Products*

- Permit to export any fishery products in any form including but not limited to those for the aquarium trade, live food fish trade, fresh or frozen fish, sharkfins, bech-de-mer for commercial purposes. Non-commercial export of fishery products requires certification from FD.

*Introduction/importation of aquatic plants or animals*

- Permit to introduce or import aquatic animals or plants of any kind for aquaculture and/or fishery resource enhancement purposes. [consult quarantine & DEC legislation for introduction for other purposes]

**5. ADDITIONAL SECTION**

***Fishery Statistics:*** Anyone engaged in fishing, fish processing, fish marketing or the export of fish or fish products to provide to the Assistant Director Fisheries [Head of Fisheries] such information and statistics relating to such fishing, processing, marketing or export and in such form as may be prescribed.

**6. FISH AGGREGATING DEVICES**

- Prohibit fishing boats or any other type of boat from using any part of FADs for mooring purposes.
- Prohibit persons/fishermen from using any part of a FAD for tying any type of fishing gear.
- Notwithstanding other Regulations, the Director may issue a permit to deploy a submerged FAD & float [Conditions to be available when issuing permit].

**7. REGISTRATION AND SAFETY REQUIREMENTS**

- Delete this Section from Regulations [taken up by MOT's Regulations]

**8. REVIEW OF SCHEDULES**

***Schedule 1 (Part 1): Minimum size of fish, which may be caught or sold, AND the list of fish and invertebrates, which are prohibited for sale.***

Need to add the word "possess" to the wording of "Minimum size of fish which may be caught or sold" as used in other non-fish regulations. Additionally, "possess" needs to be inserted in Regulation 3(2).

Priority in applying minimum size limits for finfish has been given to species, which are important in terms of consumption locally, and those, which are known to have declined drastically. Unfortunately, with the exception of species, which have, specific Samoan names (e.g. alogo, pone etc), landing data available are mostly grouped under families except species, which can be identified easily. The revised Schedule 1 (Attachment 1) is based mainly on biological data available from FishBase 2000.

***Schedule 1 (Part 2): Fish and invertebrates, which are prohibited for sale***  
Maintain.

***Schedule 2: The species of fish in respect of which the Director may declare a period or periods when fishing for such species is prohibited.***

Delete this Schedule as these are now accommodated in a new regulation paragraph which include all fish species.

***Schedule 3: Minimum mesh size for nets and fish fences.***

- Change to Schedule 2.
- Change wording: Unless otherwise..... the fishing gear referred to in this Schedule ~~may be used~~ "is prohibited to be used, offer for sale or be in possession":
  - a. Beach seine and castnets with a mesh size ~~NOT~~ less than 30 mm...
  - b. All other nets ~~shall have~~ WITH mesh size ~~OF NOT~~ less than 50 mm...
  - c. Fish fences ~~shall have~~ WITH a mesh size less than 50 mm...
- New SCUBA Regulation to be changed to reflect this change in Schedule numbering.
- Add paragraph to empower enforcers to confiscate illegal fishing gear.

**9. Authority to search**

A facility is needed to permit authorised persons to search any premises including any fish holding containers for fish suspected to have been caught by an illegal fishing method or fish that violates any of the Regulations.

## 10. CORRECTIONS OF CURRENT REGULATIONS TEXT

- Title and Regulations 4 and 16(3): Delete Western in Western Samoa.
- Regulation 3: Use CAPITAL S for schedule in "schedule 1"
- Regulation 6 (b): *Capilius maculatus*, *capilus* should be spelt with an r , i.e. *Carpilius*.
- Regulation 7 (1): use both "*laumei fai uga*" and "*laumei*".
- Regulation 9: remove s from "telsons" (last word of paragraph)
- Regulation 13: remove "green" from "green snail" and substitute with "turban"??
- Schedule III a: add "than" after "less"
- Regulation 3: Add the word "possess" in header
- Regulation 3 (2): insert the word "possess".

## 11. Penalties

Provide an option for imprisonment and consideration for repeated offences. [Use penalty units which have a value that can be varied, in place of Tala].

## 12. BY-LAWS

**Fines for by-laws:** Modify Fisheries Act Part II (5) to increase fines for by-laws. [Use penalty units in place of Tala].

**Public awareness:** Under Part II 3 (3) (d) of the Fisheries Act 1988, the Director "may, in consultation with fishermen, industry and village representatives, prepare and promulgate by-laws not inconsistent with this Act for the conservation and management of fisheries".

Currently, only villages under the Fisheries Division Community-based Programme have by-laws gazetted, even though the Act clause infers that the Director may consult with "any" fishermen, industry and village representatives.

Given the above and the fact that a lot of villages (not necessarily under the above-mentioned Programme) have advertised over the radio banning certain "destructive" fishing methods, it is thus recommended that a campaign be launched to inform village communities that by-laws can be made for them even if they are not under the Fisheries Programme. The campaign can take the following forms:

- (3) advertisements over the media
- (4) presentation by the Fisheries Division during the monthly Pulenuu meetings.

**Appendix 3 continued**

The suggested revision for the Schedule 1 of the Fishery Regulations, 1996.

*Source of Biological Information: Fish Base 2000*

Family	Species	Common English name	Samoan name	Current Minimum Length	Recomm'd Minimum Size Limit [FL](mm)
<b>Mugilidae</b> [Mulletts]	All species	Mulletts	Anae, afa, matapona, aua, ulupona	200 mm (7.9")	250
<b>Carangidae</b> [Jacks & pompanos]	<i>Caranx melampygus</i>	Bluefin trevally	Malauli apamoana	250 mm (9.8") -All species	350
	<i>Caranx sexfasciatus</i>	Bigeye trevally	Malauli matalapoa		350
	<i>Carangoides ferdau</i>	Blue trevally	Malauli ?moana?		350
	<i>Trachinotus blochii</i>	Snubnosed dart/pompano	Lalafutu		600
	<i>Selar crumenophthalmus</i>	Bigeye scad	Atule	150 mm (5.9 in.)	150 mm
<b>Siganidae</b> [Rabbitfishes]	All species <i>Siganus</i> sp.	Rabbitfishes	Lo, kiko, malava, pa'uulu	200 mm (7.9 in.)	200
<b>Scombridae</b> [Mackerels]	<i>Rastrelliger kanagurta</i>	Indian mackerel	Ga	200 mm (7.9 in.)	165
<b>Gerreidae</b> [Mojarra]	All species <i>Gerres</i> sp.	Mojarras/silver biddies	Matu/matuloa	120 mm (4.7 in.)	160
<b>Chanidae</b>	<i>Chanos chanos</i>	Milkfish	Ava	300 mm (11.8 in.)	300
<b>Scaridae</b> [Parrotfishes]	<i>Bolbometopon muricatum</i>	Green humphead parrotfish	Galo uluto'i	200 mm (7.9") All species	600
	<i>Cetoscarus bicolor</i>	Bicolor parrotfish	Fuga sina		450
	<i>Chlorurus gibbus</i> (= <i>Scarus gibbus</i> , <i>Scarus microrhinos</i> )	Palecheek parrotfish	Fugausi		350
	All other species		Fuga/fugausi/ fuga matapuaa		250
<b>Labridae</b> [Wrasses]	<i>Cheilinus undulatus</i>	Humphead wrasse	Lalafi/ Malatea	200 mm (7.9 in.) All species	1,000
	All other species		Lalafi/sugale		250
<b>Serranidae</b> [Rock cods, Groupers]	<i>Cephalopholis argus</i>	Peacock hind	Gatala uli	200 mm (7.9 in.) All species	250
	<i>Epinephelus merra</i>	Honeycomb grouper	Gatala aloalo/gatala pulepule		200
	<i>Epinephelus polyphekadion</i>	Camouflage grouper	Gatala aloalo		400?
	<i>Variola louti</i>	Lunartail cod or Yellowedged lyretail	Papa		410
	<i>Plectropomus leopardus</i>	Leopard coralgrouper	Ataata (utu?)		550
	<i>Plectropomus areolatus</i>	Squiretail coralgrouper	Ataata (utu?)		410
	<i>Plectropomus laevis</i>	Blacksaddled coralgrouper	Ataata ???		700
	All other species		Gatala/papa/ ataata		300

Family	Species	Common English name	Samoan name	Current Minimum Length	Recomm'd Minimum Size Limit [FL](mm)
<b>Lethrinidae</b> [Seabreams/ emperors]	<i>Lethrinus amboinensis</i>	Ambon emperor	Filoa/ Mataaleele gutumumu	200 mm (7.9 in.) All species	300
	<i>Lethrinus erythracanthus</i>	Orange-spotted emperor	Filoa apamumu		340
	<i>Lethrinus harak</i>	Thumbprint emperor	Mataaleele/filoa vai		280
	<i>Lethrinus nebulosus</i>	Spangled emperor	Mulogo		380
	<i>Lethrinus obsoletus</i>	Orange-striped emperor	Lauloa		300
	<i>Lethrinus olivaceus</i>	Longface emperor			400
	<i>Lethrinus rubrioperculatus</i>	Spotcheek emperor	Filoa pao mumu		280
	<i>Lethrinus xanthochilus</i> <sup>3</sup>	Yellowlip emperor			400
	<i>Gnathodentex aureolineatus</i>	Striped large-eye bream	Mumu		190
	<i>Monotaxis gandoculus</i>	Humpnose big-eye bream	Mataputa??		340
	All other species		Mataaleele, filoa		300
	<b>Mullidae</b> [Goatfishes]	<i>Parupeneus barberinus</i>	Dash-and-dot goatfish	Tauleia/Tusia	150 mm (7.9 in.) All species
<i>Upeneus vittatus</i>		Yellowstriped goatfish	Ulaoa		150
All other species		Goatfishes	Tauleia, vete		200
<i>Mulloidichthys flavolineatus</i>		Yellowstripe goatfish (I'a sina/Afulu)	Vete		200
<i>Mulloidichthys vanicolensis</i>		Yellowfin goatfish (I'asina/Afulu)	Vete		200
<i>Parupeneus ciliatus</i>		Whitesaddle goatfish	[Not reported in Samoa]		200
<i>Parupeneus multifasciatus</i>		Manybar goatfish	[Not reported in Samoa, but probably occurs]		180
<i>Parupeneus indicus</i>		Indian goatfish	Tauleia		220
<b>Acanthuridae</b> [Surgeonfishes, Tangs, unicornfishes]	<i>Ctenochaetus striatus</i>	Striated surgeonfish	Pone	200 mm (7.9 in.) All species	170 [150/ 200?]
	<i>Acanthurus lineatus</i>	Lined surgeonfish	Alogo		(200) 180
	<i>Acanthurus xanthopterus</i>	Yellowfin surgeonfish	Palagi		350
	<i>Acanthurus triostegus</i>	Convict surgeonfish	Manini		150
	<i>Naso unicornis</i>	Bluespine unicornfish	Ume		350
	<i>Naso lituratus</i>	Orangespine unicornfish	Iiilia (Umelei?)		230
	<i>Naso vlamingii</i>	Bignose unicornfish	Ume masimasi	nil	340
	<i>Naso brevirostris</i>	Spotted unicornfish	Ume ulutao	nil	340
	<i>Naso annulatus</i>	Whitemargin unicornfish		nil	560
	<i>Naso hexacanthus</i>	Sleek unicornfish		nil	420
	<i>Naso thorpei</i>	Thorpe's unicornfish	Not recorded in Samoa.	nil	340
	<i>Naso tuberosus</i>	Humpnose unicornfish	Ume-uluto'i	nil	340

<sup>3</sup> Not reported in literature to be found in Samoa. However photo of specimens from Fish Market indicates that it does occur here

Family	Species	Common English name	Samoan name	Current Minimum Length	Recommended Minimum Size Limit [FL](mm)
<b><i>Kyphosidae</i></b> [Drummerfishes/ Rudderfishes/Sea chubs]	All species <i>Kyphosus</i> sp.	Drummerfishes/ Rudderfishes/Sea chubs	Ganue	200 mm (7.9 in.)	250
<b><i>Lutjanidae</i></b> [Snappers]	<i>Lutjanus fulvus</i>	Blacktail snapper	Tamala	None	200 not common
	<i>Lutjanus monostigma</i>	One-spot snapper	Taiva		300 not common
	<i>Lutjanus gibbus</i>	Humpback red snapper	Malai		250
	All other species				250
<b><i>Holocentridae</i></b> [Squirrelfishes, soldierfishes]	<i>Myripristis violacea</i>	Lattice soldierfish	Malau mataputa?		120
Ephippidae [Spadefishes, batfishes and scats]	<i>Platax orbicularis</i>	Orbicular batfish	Koko	none	300

**Appendix 4.** Suggested names for local and introduced giant clam species

Scientific name	Common name	Suggested Samoan name
<i>Tridacna derasa</i>	Smooth clam	Faisua manifi
<i>Tridacna gigas</i>	Giant Clam	Faisua tele
<i>Hippopus hippopus</i>	Horseshoe clam	Faisua ipopa
<i>Tridacna maxima</i>	Rugose clam	Faisua umi
<i>Tridacna squamosa</i>	Scaly clam	Faisua taafua