

The life reef food fish trade in the Solomon Islands

by Robert E. Johannes¹ and Michelle Lam²

Introduction

The Solomon Islands lie in the south-west Pacific, to the east and south of Papua New Guinea. The country consists of two roughly parallel island chains with six major island groups. There are some 992 islands with a collective land area of nearly 30 000 km² distributed over 1 280 000 km² of ocean. The Solomon Islands group is the second largest archipelago in the South Pacific.

The reliance of Solomon Islanders on marine resources is reflected by one of the highest per capita seafood consumption rates in the world. A survey conducted by the Japan International Cooperation Agency estimated per capita consumption of fish in Honiara at 47.9 kg in 1992. A family of 6.5 persons consumes 2.5 kg of fish per meal, four times a week. It is likely that rural fish consumption is even higher.

Inshore marine resources play a significant role in the lives of Solomon Islanders and are critical to the economy of the country. However, few management controls are in place to ensure that harvests remain at sustainable levels. The following is a condensed version of a report of a brief investigation of the dynamics of the live reef food fish trade in Western Province, Solomon Islands and the need for management.

Dynamics of the trade in Western Province

In Western Province the Live Reef Food (LRF) fishery started out in Vella La Vella Lagoon in 1994, and was pursued year-round by a company called IKA Holdings. Insufficient fish were obtained this way according to the company. So pulse fishing, targeting seasonal grouper spawning aggregations, was begun, first in Marovo Lagoon, then in Roviana Lagoon.

The primary targets of this fishery were three species of grouper: the flowery grouper, *Epinephelus*

*fuscoguttatus*³, the camouflage grouper, *E. polyphekadion*, and the coral trout, *Plectropomus areolatus*. All three aggregate to spawn in the same locations and during the same seasons and moon phases.

Humphead (Maori) wrasse *Cheilinus undulatus* were also caught⁴. Although this species fetches much higher prices in Hong Kong, fishers were paid the same price for it as for the grouper species (SI\$ 5/kg⁵ to the fisher plus 50 c/kg to the community). *E. fuscoguttatus* and *E. polyphekadion* are rather similar in appearance and fishers do not always distinguish between them, some believing the latter to be small individuals of the former species. Consequently *E. polyphekadion* did not loom as large in fishers' accounts of their catches as they do in official export statistics (see Table 1, next page).

Much lower prices were paid for the occasional *Epinephelus oligacanthus* and the snapper *Lutjanus rivulatus*.

Conveniently, the spawning season of the three species is roughly from October through January in Roviana lagoon and from February through June in Marovo lagoon. The beginning and end of the spawning season varies by about a month from one year to another. The spawning season is different again in Ontong Java, which has been the third focus of the LRF fishery in the Solomon Islands (not studied here), and where there are two spawning seasons per year.

The above species were caught primarily by local villagers (men, women and children) with hook and line. The line, plus special hooks designed to minimise deep hooking were both supplied by the company. Canoes with special salt-water holding pens were also provided by the company in some cases.

When a fish is brought up from deep water (greater than about 18 m), the gas bladder expands and makes the fish so buoyant it floats helplessly at the

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3. Sometimes misleadingly referred to as the 'giant grouper' in the Solomon Islands. Elsewhere the term 'giant grouper' is reserved for *Epinephelus lanceolatus*, which is called 'rava' in the New Georgia area.

4. This is one more piece of evidence that disproves the widely-used argument in the LRF industry in Southeast Asia that cyanide must be used to catch humphead wrasse because these fish cannot be caught with hook and line.

5. Equivalent to about US\$ 1.10. For comparison, Indonesian fishermen received from US\$ 6 to US\$ 10 for live coral trout after the Asian economic meltdown. Before then, in 1997, they were receiving roughly twice this amount (Erdmann & Pet, 1999).

Table 1: Total live reef fish exports in 1997 (Fisheries Division, unpublished)

Common name ¹	Date exported/Amount exported (kg)				
Scientific name ¹	2 March	24 May	7 Sept.	10 Sept.	Total
Flowery grouper <i>Epinephelus fuscoguttatus</i>	6500	5700	3000	2500	17700
Camouflage grouper <i>Epinephelus polyphekadion</i>	2000	3000	500	2000	7500
Coral trout <i>Plectropomus</i> spp. ²	2000	2500	400	2000	6900
Maori (humphead) wrasse <i>Cheilinus undulatus</i>	500	300	100	0	900
Total	11000	11500	4000	6500	33000

1. Common and scientific names given by exporters have been corrected.

2. Mainly *P. areolatus*

surface. The pressure must be released to save the fish. The company taught some fishermen to puncture the swim bladder by inserting a hypodermic needle in it. For cod the needle was inserted under the pectoral fin. This is the generally approved insertion point and avoids puncturing the gut. In coral trout however, the fishermen were taught to puncture the fish near the anus. (This seems a peculiar practice, although fishermen in PNG are taught to puncture coral trout, unlike cod, at the same spot. We cannot see how puncturing in this manner would avoid puncturing the gut, thus allowing infectious micro-organisms into the body cavity, as well as puncturing the gonads and promoting the spontaneous release of eggs. Can any reader supply us with the rationale for this practice?)

The prescribed practice was not always carried out, however. One reliable observer states that he remembers company officials complaining of high mortality within the Sasavele holding pen. In Sasavele the captured grouper usually had a greatly inflated swim bladder, so an official would grab it, and stick a rusty nail into its swim bladder in order to deflate it.⁶

The fish were transferred from the fishing canoes to floating holding pens. The pens were usually, but not always, owned by the company, and usually overseen by a local villager hired for the purpose by the company. About twice a month during the fishing season the company vessel, the *John Franklin*, would tour the lagoon and pick up the fish.

The fish were then transported to and stored in holding pens at company facilities at Liapari, Vella La Vella. There they were fed bonito rejected by the nearby tuna cannery in Noro Port. (This, once again, seems like a peculiar practice insofar as experience elsewhere has been that the *Epinephelus* spp. do not readily accept bonito flesh and coral trout usually reject it outright (Squire, pers. comm.).

The fish were held at Liapari until a sufficient quantity (typically 15 tonnes) was available to justify ordering a large, live reef fish transport vessel from Hong Kong to pick them up and take them back to Hong Kong. There they were sold to restaurants or transhipped to other coastal Chinese cities such as Guangzhou.

The fishery had ceased by the time of our visit, so we were unable to make first-hand observations. But interviews with fishers and with industry personnel revealed that very high mortalities of fish often occurred. Causes mentioned were foul-hooking, rough handling of fish by fishers prior their delivery to the cages, poor placement of village-based cages (i.e. in areas where water circulation was inadequate), failure to provide shade (sunburn can otherwise occur), overcrowding of fish, lack of feed, and failure to quarantine sick fish⁶. High mortalities sometimes also occurred while the fish were being held by the company at Liapari. In one case, according to a company representative, out of 15 tonnes of fish awaiting pickup by the Hong

6. One company representative actually volunteered that fish that die in the cages are sometimes fed to other caged fish!

Kong vessel, only 5 tonnes remained alive by the time the ship arrived.

We obtained no hard evidence that cyanide was being used, although one suspicious practice was reported. A company vessel was said to be equipped with a hookah compressor with long hoses. The gear was claimed to be used only at night, by the crew, in order to obtain 'kitchen fish'⁷. Villagers seemed well aware of the problems created by using cyanide and it seems unlikely that they ever used it, especially since they own their traditional fishing grounds (see below) and thus have a vested interest in protecting them.

Customary marine tenure

Traditionally, Solomon Island lineages own not only their land but also their coastal waters. The latter is generally referred to as customary marine tenure (CMT) (Hviding, 1996). The traditional ownership, or perhaps more correctly guardianship of these resources, and the associated right to decide who has access to them and under what conditions, is described in detail for Marovo Lagoon by Hviding⁸, and is fully recognised by both provincial and national governments. Outside resource users, such as LRF companies, are bound by law to obtain the permission of CMT owners before exploiting an area.

Within the CMT system there are the primary rights owners, who can dictate who may exploit their coastal resources and how. Secondary rights owners are those who, by virtue of intermarriage or other relationships to the primary rights owners are sanctioned to exploit resources in the waters controlled by the former. Their right to do so for subsistence purposes is generally taken for granted. To do so for commercial purposes often requires a formal request to be made to the primary rights owners—which may not always be granted.

Because CMT confers upon primary rights owners a vested interest in protecting their resources, various conservation measures were and are implemented when stocks of exploited species are seen to be overfished. As Johannes (1978) pointed out, all the basic conservation measures for marine fisheries that textbooks suggest were invented by Europeans at the turn of the last century, were, in fact, in operation in Oceania (including the Solomon Islands) centuries earlier. More recently Hviding (1996) lists among the recent methods used by Marovo Lagoon CMT holders to protect their stocks, the following:

1. limiting entry to the fishing grounds;
2. banning dynamiting everywhere in the lagoon;
3. banning the use of gillnets in some areas;
4. banning spear-fishing in some areas;
5. banning the use of traditional fish poisons in some areas; and
6. temporary closure of fishing grounds to let populations rebuild.

This somewhat lengthy discussion is aimed at establishing firmly in the readers' mind that primary CMT owners in Marovo Lagoon possess: 1) the incentive to control exploitation of their marine resources, 2) a general awareness of the need to do so, and 3) the legal as well as traditional rights necessary to implement and enforce (with government assistance when necessary) appropriate measures.

This is not to say that they are all dedicated conservationists, any more than are people in Australia or the U.S. In the Solomon Islands, as elsewhere, the lure of short-term benefits may override issues of long-term sustainability of natural resources.

Although the people of Roviana Lagoon also possess traditional rights over their fishing grounds, Aswani (1998, p. 217) states, 'people do not feel responsible for either limiting their own catch rates or enforcing their property rights against interlopers.' Nevertheless, 'marine tenure institutions have been successful in fending off the threat of large-scale fishery development in the inner lagoon.' Aswani (1997) also notes that chiefs periodically close shells beds to permit recovery from overexploitation and sometimes enforce gear restrictions.

It is well documented throughout the Pacific Islands that as the value of nearshore resources increases, so do disputes among traditional owners. This is clearly the case in Marovo and Roviana lagoons in connection with the LRF fishery. Several villages in Marovo are involved in disputes over primary rights to spawning aggregation sites. In addition, certain groups claim that their leaders have misappropriated the 50 c/kg fee the company pays, which is supposed to go to the village as a whole.

It is also clear from various comments we heard during our interviews that foreign companies do not always understand the traditional marine tenure system, and that it necessitates direct negotiations with traditional reef owners in order to exploit their marine resources. Some companies try to get provincial or national government authorities

7. A man who worked for this company in 1995 claimed that the crew poached giant clams at night.

8. I rely heavily on Hviding's work for my description here of the general workings of CMT in the Solomon Islands.

Table 2: Perceptions of villagers concerning the impact of fishing for the LRF trade on grouper spawning aggregations.

Village	Passage fished	Fish numbers decreasing	Fish sizes decreasing	Number of years fished for LRF trade
Marovo Lagoon				
Telina	Lumalihe	yes	yes	4
Rukutu*	Lumalihe	yes	yes	4
Chumbikopi*	Lumalihe	yes	yes	4
Sasaghana	Charapoanna	no opinion	no opinion	4
	Lumalihe	no opinion	no opinion	
Chea	Charapoanna	yes	yes	3
Michi*	Charapoanna	yes	yes	2
Vacambo	Monggo	yes	?	?
Ramata*	Veravera Entr.	too soon to judge	too soon to judge	1
Roviana Lagoon				
Hapai	Saikile	too soon to judge	too soon to judge	1
Saikile*	Saikile	too soon to judge	too soon to judge	1
Nusahope*	Nusahope	too soon to judge	too soon to judge	1
Sasavele*	Honiavasa	yes	no	2
	Kosianae Pt.**	yes	no	2
Nusambanga	Honiavasa	yes	yes	2

* Primary owners of the fishing grounds that encompass the spawning aggregation sites they fished

** This is the only aggregation site reported to be fished for the LRF trade that is not located in or near a reef passage. An employee of a recreational diving company in Munda reported discovering another spawning aggregation site at a location outside the lagoon. This site seems to be unknown to village fishers and supports REJ's opinion that in the Solomon Islands as in other Pacific Island countries fishermen's knowledge of the location of spawning aggregation sites for groupers, while often exceptionally valuable, will, nevertheless, not usually be complete. We refrain from identifying the site here.

to sanction their activities. Others have a vague understanding of the traditional system, but negotiate with the wrong villagers, i.e. ones who are not the primary owners of the fish grounds in question.

This apparently happened in Marovo Lagoon in connection with a LRF operation, and is the cause of a court dispute between Telina and Rukutu villages. For all foreign business with interests in Solomon Islands nearshore resources the Fisheries Division should consider providing a brochure describing the relevant laws and customs and the steps that need to be taken to observe them⁹.

Villagers' perceptions of the LRF fishery

What, then, is the status of the awareness of fishing communities in Marovo and Roviana Lagoons of the impacts of the LRF trade and its focus on spawning aggregations? Where more than two-year's fishing had been done for the LRF trade, four out of five communities interviewed reported

a decline in catch per unit of fishing effort and a decline in average size of the fish caught in grouper spawning aggregations (Table 2). (Sasaghana villagers were non-committal about the subject.) In two passages, Charapoanna and Lumalihe, these declines were seen to be very substantial. All four villages where, for two years, LRF fishing had occurred, reported a decline in catch per unit of effort, while two of them reported a decline in mean fish size.

Primary reef owners, as might be expected, tended to be more vocal about depletion than secondary owners, especially in Marovo Lagoon. Michi villagers, the primary owners of Charapoanna Passage, declared, for example, that due to the heavy depletion of grouper spawning aggregations perceived to have been brought about by the LRF trade, they were going to close the passage to all commercial fishing immediately. Furthermore, they hoped to be able to work with a nearby resort at Uepi to make the passage and the area around it

9. Indeed such a brochure would be useful for many Pacific Island countries, since the principles are similar for many island groups.

into a protected marine area. Similarly the villagers of Rukutu, primary owners of Lumalihe Passage said they intend to close this passage to commercial fishing for the same reason.

The people of Ramata are primary owners of three passages in which grouper spawning aggregations occur; Veravera Entrance (= Ramata Passage), as well as Lolomo and Pipa passages. In 1998 they opened Ramata Passage to LRF fishing. Out of a desire to protect their aggregations from overfishing, they are considering in future years to open two out of the three passes for one year, then only one the following year, then two again, and so on. It is questionable, however, whether the LRF fishery will be pursued at all in Western Province in 1999 (see below).

The people of Vacambo said that the state of the resource was their first priority and prices received were their second concern. They said they would like to be able to monitor their spawning aggregations if the government could advise them on how best to do it¹⁰.

One concern voiced by many fishers was the wastage of non-target species caught adventitiously. Since the company would not buy them, and since there were often too many of them to be consumed by the villagers, they went to waste. In some cases whole families would stay on the fishing grounds for a week at a time. There was thus no opportunity to return to their villages to distribute the non-target species they caught.

Some Marovo fishermen, primarily secondary owners of fishing grounds, justified their continued fishing by echoing the sentiments of one Telina man, who said, 'we know it's destructive, but the government gives us no alternative to make money from our fish.' (Several government and church schemes to provide a commercial outlet for iced fish in the area over the years have failed. Logistics in this remote area are a major obstacle, as they have consistently proven to be in remote areas throughout the Pacific Islands.

The most recent effort in Marovo Lagoon paid fishers similar prices for their iced fish to what the LRF company did for live ones. The problem was that the collection centre, situated at the only commercial airfield in the area, was far from the main fishing grounds and required that fishers have outboard motors (most of them don't) and make long trips.

Roviana fishers tended to be less concerned about depletion than Marovo fishers. In part, at least, this may be because the LRF fishery had not been operating for as long in Roviana as in Marovo and depletion was thus less obvious. In Roviana the low prices fishers received for their fish was their biggest complaint about the fishery. (This came second, after depletion, among the concerns expressed by Marovo fishers). Fishers from both areas also complained that any fish larger than 8 kg fetched only the price of an 8 kg fish. Fishers in both areas were well aware that the prices received in Hong Kong for their fish were several tens of times higher than the price they got. In Roviana they also complained about non-local crew of the company boat causing dissension in their villages.

The company announced that it would not be returning in 1999 to Roviana Lagoon. Fishers assumed this was because of their demands for higher prices. However, there may have been additional factors involved, such as the rumoured collapse of the parent company in Hong Kong.

In response to the cessation of the LRF fishery in their waters, Roviana fishers, judging by REJ's limited interviews, seemed unperturbed. In part this is probably because of a fish-buying facility, a village market and some demand for fish from tourist facilities at Munda, more conveniently located than the fish facility in Marovo Lagoon. They thus have a more practical alternative outlet for their catch. In addition, the price differential between live and dead fish was not great when taking into account loss of fish due to mortality in the live reef fishery.

The company has since gone out of business entirely. A new company is planning to set up in Western Province, but various setbacks it has experienced suggest that its plans for a new LRF operation may not succeed.

Figures provided by villagers and by IKA Holdings indicate that single aggregations yielded between 4 and 12 tonnes of fish per year, declining with time.

Companies' perspective of the LRF trade

In response to fisher complaints about the low prices they receive, company representatives point out, quite rightly, that the cost of shipping the fish back to Hong Kong is very great, much greater than it is to ship them from the Philippines or

10. Underwater visual census has already been taught to some fishermen in Marovo Lagoon and to some Fisheries Division personnel. If funds could be found, this training could be extended to Vacambo, but it would be expensive. With the need to provide SCUBA facilities in such a remote area, the costs would almost undoubtedly outweigh the benefits in terms of promoting a sustainable local fishery worth to the villagers, at most, only SI\$ 2–3000 annually.

Indonesia where fishers receive higher prices for them. They also point out that losses due to dying fish are very substantial. This is true, but we wonder if more could not have been done by the company to develop better holding practices. As it is, judging by what we were told, they were often very poor.

One reason that such high mortalities were experienced is that female fish are more susceptible to stress when they are ready to spawn and therefore they do not survive handling and caging as well as at other times. This is the main reason why the commercial live reef fishermen of Queensland, Australia have asked the government to ban LRF fishing during the grouper spawning season.

When we challenged the wisdom of targeting spawning aggregations because of their great vulnerability to depletion or complete obliteration we were given the following arguments.

1. The company can't operate at a profit without the efficiencies afforded by targeting spawning aggregations when transportation costs are as great as they are from the Solomon Islands to Hong Kong.

This argument is plausible only in the short term. If spawning aggregations disappear as a consequence of the LRF fishery, as has happened in other countries, this argument will sound very hollow.

2. The fish still spawn in the holding pens in which they are held.

This may be true or it may be that the females are just spontaneously releasing their eggs (e.g. see Fewings & Squire, this issue). In any event, the environment where spawning occurs is vital to the survival of the eggs, and holding pens are definitely not the right environment.

3. Fish do not bite when they are ready to spawn.

This argument is simply not true (see for example Johannes *et al.*, 1999). Moreover, it conflicts with the previous argument.

Management issues

The difficulties of managing LRF operations in the Solomon Islands include poor communication between national and provincial governments and between Ministries (e.g. the Foreign Investment Board issuing investment licenses but the Fisheries Division not knowing who is investing). It also includes inadequate communication within the Fisheries Division. The Research staff find recording fish caught difficult when licensing officers

sign export permits or issue licenses without proper checking. Also in one case an officer was placed on board an LRF vessel as an observer, only to be removed by another higher-ranking officer after company personnel had talked with him.

In the original report a lengthy section follows giving recommendations for government management and suggested LRF license requirements which are extensions of the general recommendations given by Johannes and Riepen (1995) and Smith (1997).

Satellite tracking

A live reef fish vessel travelling from Hong Kong to the Solomon Islands and back takes more than 40 days. As mentioned above, one company official said only 5 tonnes were shipped out on one occasion. On another occasion 4 tonnes of fish were reported as being shipped out (*Solomon Star* No. 832 8/9/95). It would not be economical for such a vessel (which typically has a capacity of 20 tonnes of live fish) to return with only 4–5 tonnes of fish. Therefore the vessel presumably picked up more fish on the way to or from Hong Kong.

Although it may have obtained additional fish from other countries en route, the possibility cannot be discounted that it fished for them illegally in uninhabited reefs in Solomon Islands Exclusive Economic Zone (EEZ). Such locations include Ricardo reef (located near Ontong Java), Edward Bank outside Isabel, Alite Reef off Malaita and Indispensable Reef off Rennel-Belona.

The targeting of remote reefs by the LRF trade is well known in Southeast Asia. As one Southeast Asian live fish dealer told REJ, 'we prefer the remoter areas because they are away from prying eyes.' And as Erdmann and Pet Soede (1998, p. 33) remarked concerning Indonesia, 'the most remote reefs in Indonesia are the most destroyed.' The existence in the Solomon Islands of these tempting reefs makes it important to keep tabs on LRF transport vessels as long as they are in the Solomon Islands EEZ. This might most easily be accomplished by requiring any live reef fish vessel entering these waters to carry a transponder enabling its movements to be monitored using FFA's satellite-based vessel monitoring system (VMS).

FFA member countries, including the Solomon Islands, are now able to track in their EEZs, the position, speed and direction of fishing vessels by means of this technology (see Richards, this issue, p. 15). A vessel's position can be pinpointed, then relayed to a monitoring station on-shore. The system may be pre-set to determine a vessel's position on a regular basis, or set to 'poll' a vessel thought to be acting suspiciously. A dedicated computer based

at the FFA Secretariat headquarters in Honiara identifies those vessel position reports which violate a set of rules stored in the computer.

Although the system was developed for tracking tuna fishing vessels, it could easily be applied to tracking other vessels, such as those that transport live reef fish from the Solomon Islands to Hong Kong. This would enable fisheries officers to determine whether such vessels travelled directly out of the EEZ from the port where they cleared customs, or whether they stopped off en-route at remote, uninhabited reefs (see above), perhaps illegally to take on board extra live reef fish. Pillaging of uninhabited reefs in the Pacific for various resources, such as giant clams and beche-de-mer, has been going on for decades and there is no reason to assume that the live reef fish trade is any more fastidious about the law than other foreign fishing operations. Indeed its record in some other countries is extremely poor.

Banning the LRF fishery

The effective control of the live reef food fish trade in the Solomon Islands would be expensive and time consuming. Moreover the income generated by it has been limited. An article in the *Solomons Voice*, dated 15 June 1995, quoted a spokesman for the Division of the Ministry of Commerce, Industries and Employment as saying that the live reef fish export could generate SI\$ 10 million per annum. So far, using company purchasing figures, and presuming that fishers are the prime local beneficiaries of the industry, it has generated, at best a gross income of an average of less than 3% of that, or SI\$ 260 000 (roughly US\$ 60–70 000¹¹) annually over the past three years.

Moreover, the LRF fishery has reportedly reduced the sizes of spawning aggregations, sometimes very markedly, in the areas where it has been operating for two or more years according to fishers. It has also stimulated disputes among traditional owners of the fishing grounds involved and resulted in the complete wastage of many tonnes of fish.

Johannes and Riepen (1995) point out that the live reef food fish trade, if properly managed, could be a sustainable, value-added type operation. The 'value-added' element in the Solomon Islands is debatable, however. Fishers get only a little more for live fish than for dead fish, and the industry says it can't afford to pay more. If the costs of all the dead fish that are wasted in the LRF operation are factored in, the LRF fishery may, in fact, be a 'value-subtracted' industry.

Taking all the above circumstances into consideration, the Solomon Islands Government may wish to consider whether the live reef food fish fishery is worth all the trouble that would be involved in regulating it effectively, or whether it should simply be banned outright from the country.

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11. Devaluation of the SI\$ during this period makes the exact calculation here impractical.

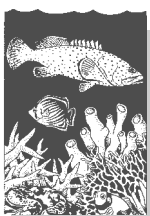
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Addendum

Note added in press: Contrary to what we expected based on the fieldwork we did in early December, the reformed LRF company began to operate again in Marovo Lagoon. In early 1999, they once again focussed on spawning aggregations, including the one at Charapoana where two tonnes of fish were caught in January. The traditional ownership of Charapoana has not yet been finalised as we had been led to believe, and the dispute will go to the High Court. (Christian Nielsen, pers. comm.).



Application of the FFA member countries' Fishing Vessel Monitoring System to track live reef fish transport vessels

by Andrew Richards¹

Introduction

FFA member countries now have the capability of tracking in their Exclusive Economic Zones (EEZs), the position, speed and direction of distant water fishing nation (DWFN) fishing vessels by means of a satellite-based vessel monitoring system (FFA VMS). Increasingly, government fisheries organisations worldwide are adopting such systems to assist in the management of their fisheries resources. In the Pacific, VMSs have been successfully introduced for domestic fishery management in Australia, New Zealand and Hawaii. Other countries, which have recently set up national VMS, include Argentina and Morocco.

Tools with which to achieve compliance

Several compliance measures are already in place in the western and central Pacific, notably air and sea surveillance, observer programmes, the Regional Register of Foreign Fishing Vessels and agreements on cooperation in surveillance between the FFA member countries. The FFA VMS provides a cost-effective tool to enhance these existing compliance measures.

What is a VMS?

A VMS is a technical system, which enables a vessel's position to be reported to a monitoring sta-

tion, without that station being on board the vessel. Modern VMS use satellite technology to pinpoint a vessel's position and then relay that information to the monitoring station on-shore. The system may be pre-set to determine a vessel's position on a regular basis, or set to 'poll' a vessel thought to be acting suspiciously.

Capabilities of the FFA VMS

The FFA VMS offers a range of capabilities that cannot be readily achieved by other means. The baseline form of the FFA VMS, in accordance with the stated preference of FFA member countries, will enhance the effectiveness of several other measures being implemented to assist with the sustainable development and management of the tuna resources of the western and central Pacific.

The VMS will assist with monitoring the position, speed and direction of DWFN vessels that are fitted with Automatic Location Communicator (ALC) devices.

The VMS is capable of simultaneously monitoring the position, speed and direction of up to 1000 fishing vessels at any one time with the potential to monitor up to 2000 vessels. A computer based at the FFA Secretariat headquarters in Honiara, Solomon Islands, known as the 'VMS Decision Engine' identifies those vessel position reports

1. Forum Fisheries Agency, Honiara, Solomon Islands