

Télédetection" -SPT (Polynesian Remote Sensing Facility), the SMA has set up a comprehensive computer system to assist in effective management of lagoon areas. It integrates the SMA pearl culture information system with a standard geographic mapping base and enables geographically referenced data to be processed and utilised.

SIGMA POE RAVA relies on two data bases. The first contains general data from the pearl culture information system, i.e. all the administrative and technical information from concession applications and field surveys. The second comprises digital maps derived from SPOT images of the pearl farming atolls and islands of French Polynesia on which the pearl culture activities (structures, concessions, etc.) are represented by conventional signs. These maps were produced from SPOT images available by means of an image processing system developed by the SPT and with the assistance of the "Service Hydrographique et Océanographique de la Marine" -SHOM as regards geometric correction (UTM projection) of the maps.

Marine areas development planning

SIGMA POE RAVA has given the SMA a valuable tool for effective administrative and technical

management of pearl farming. The integration of all relevant data within a single computer system greatly assists the Department's staff in making the proper decisions on applications for new concessions. Concessions can henceforth be granted or refused on the basis of objective criteria such as availability of sites (or, inversely, overcrowding in certain areas), production statistics, mortality figures and environmental parameters. Analysis of data also allows comparisons to be made between the productivity achieved with different grafting, farming and collection methods in various parts of the same lagoon or in different lagoons. The results will be used for information and training of pearl farmers (in particular, students attending the "Centre de Métiers de la Nacre et de la Perliculture"). The system has already optimised survey procedures (use of the latest positioning techniques -GPS -, automatic generation of maps).

Lastly although SIGMA POE RAVA was specifically developed for pearl farming, it could also be used in connection with any other activities conducted in tropical lagoon areas, such as various types of aquaculture, fisheries, and even tourism, and greatly assist in drawing up comprehensive long-term development plans for marine areas.

Conflict resolution in the development of the Cook Islands pearl industry

By Julian Dashwood, SPC, 23rd RTMF, IP 30

In 1975, the Cook Islands government entered into a pearl farming agreement with an Australian company without consultation with the people of Manihiki or its island council. The island council, which is an elected body, has the responsibility of ensuring that the collective will of the people is taken care of through representation to government.

In the case of this Australian company, the government had not sought the views of the people, through the island council, with respect to this new development. As a foreign entity carrying out business in a very remote location, and without the people's blessing, the company naturally came into conflict with the inhabitants of the island. The company, which had to purchase oysters from the people for its farm (it was not permitted to carry out this activity on its own), found it difficult to meet its target, not because there were insufficient oysters, but because the people were reluctant to sell.

The company was forced to purchase oysters of a lower quality as people sold their best oysters to traders for mother-of-pearl. Company equipment would mysteriously disappear and the company

found it difficult to impose the 8-hour working day on its labour force. Apart from the problems that the company was experiencing with local attitudes and prejudices, it was also having great difficulties in recruiting and maintaining the services of Japanese pearl seeding technicians because of the extreme isolation of Manihiki.

By the late 1970s, the company was facing financial difficulties and was finding it hard to keep up its licence payments to the island council. This was the opportunity that the council had been waiting for, as grounds for approaching the government to terminate the company's licence. In 1981, the company was finally forced to curtail its pearl farming activities on Manihiki.

Developments over the last decade

The 1980s can perhaps be labelled as the decade that pearl farming became established in Manihiki. It was also the period in which government decided to repeal legislation pertaining to the management of pearl oyster resources that had been in force since the colonial era. New legislation was

introduced in 1982, which effectively gave island councils total control over management of the living marine resources in their respective lagoons. For the people of Manihiki, this was a very welcome move. A treasured heritage was no longer being controlled and managed by bureaucrats from the capital 700 miles away.

One of the first decisions that was made by the island council under this new management regime was to open the hitherto closed lagoon to the harvest of pearl oysters. This open harvest season continued unabated until very recently, despite the appearance of several indicators showing that the stocks of wild oysters were at dangerously low levels. The bulk of the oysters that were harvested from 1982 to 1987 were killed and sold off as mother-of-pearl.

By the mid-80s, one local Manihikian began establishing a pearl farm. By 1987, this person had collected over 30,000 oysters which were in various stages of readiness for nucleation. During the same year, approaches were made to the island council and government by no less than five pearl farming entities that were operating out of neighboring French Polynesia for permission to establish a pearl farm. One company received permission from the island council and started operations the same year.

Under the terms of the licence, the company was given permission to cultivate up to 300,000 oysters and to have these oysters seeded. In the meantime, the sole Manihikian who had been cultivating oysters for a number of years was still unsuccessful in obtaining a pearl farming licence from the island council. He needed this licence in order for him to be allowed to hire pearl seeding technicians. Threats of court action by this person only lead to a greater resolve on the part of the island council not to issue him with a licence.

One must understand that up to this point, no person, other than the foreign company, had been given a licence to produce black pearls. What most of the people had received from the island council was permission to collect wild oysters and to set spat collectors. As most people were selling and receiving good prices from this company for oysters that they either collected from the wild or from their spat collectors, they were not in the least concerned at the future implications for them if the island council steadfastly refused to issue Manihikians with what became known as pearl seeding licences.

The matter was finally resolved when the Minister invoked his power of veto and granted the farmer

in question the necessary approvals to bring in pearl seeding technicians. This action led to a deterioration of trust and co-operation between government and the island council. However, it did break the impasse as well as opening up the release, by the island council, of pearl seeding licences to the local populace.

One area that is often overlooked in terms of good co-operative approaches to management is the lack of effective communications. Prior to the middle of last year, there were no scheduled flights to Manihiki. Sea transportation was at its worst ever, prior to the introduction of regular air service to Manihiki.

It was during this period that relations between government and the island council were at its lowest. Opportunities for face to face dialogue with the island council and the people of Manihiki were extremely limited. A great many of the problems and mistrust that were inherent on both sides could have been laid to rest if the opportunities for frequent dialogue were available. With the greater interaction that now occurs between government and the people of Manihiki as a result of regular air transportation, problems of management and user group conflicts are slowly being resolved.

The island council has recently appointed a representative based on Rarotonga to service the needs of the pearl industry and to liaise with government on matters affecting the industry. The pearl farmers on Manihiki have formed an association and therefore are able to deal directly with government if they wish to do so.

Government, through its Ministry of Marine Resources, continues to provide management and scientific advice to the industry through the island council and extension services.

Pearl farming has grown rapidly in Manihiki over the last three years with the total number of oysters under cultivation approaching 500,000. It is estimated that the capacity of the lagoon to sustain a safe population of farmed oysters is between 500,000 to one million oysters. The 500,000 figure will be reached this year. Unlike other islands in the Cooks, the population of Manihiki has been steadily growing, as the promise of wealth and the worsening unemployment situation in New Zealand combine.

The future of the pearl industry on Manihiki lies with the island council. The time is fast approaching when it will have to make hard management decisions such as putting a ceiling on the number of oysters that can be farmed. It will also have to deal

with many issues that will prove extremely unpopular, such as limiting the number of licences and allocating oyster numbers for each licence. Government will continue to give the industry the

best advice that it can, however, one thing is absolutely certain, and that is the industry cannot continue to grow unchecked if an outbreak of disease is to be avoided.

Pearl shell survey project in the Solomon Islands

Source: SPC, 23rd RTMF, IP 6

Four exploratory surveys to assess the status of our gold-lip (*Pinctada maxima*) resources have been carried out by the Fisheries Division in the Western Ysabel and the Central Islands Provinces. It was found from the surveys that the resource around the Wagina area has been over-harvested through

the use of hookah gears, not much was available at the Ysabel sites and that the areas of the Florida Islands, Central Province possessed suitable habitat for gold-lip. Further surveys will be carried out in areas of the Western Ysabel, Malaita, Guadalcanal and the Central Islands Provinces.

Update on ICLARM Coastal Aquaculture Center's pearl culture project

Source: ICLARM

The CAC is planning to launch a project aimed primarily at mass cultivation of black-lip and gold-lip pearl oysters, *Pinctada margaritifera* and *P. maxima*. As a prelude to this, Mark Gervis undertook a five-month preparatory study, starting in November 1990, which has resulted in a

comprehensive review, co-authored by Neil Sims, entitled *The biology, ecology and cultivation of pearl oysters: Bivalvia; Pteriidae*. In addition a comprehensive bibliography of the pearl oysters has been prepared. It is expected that the documents will be published before the end of 1991.

Upcoming workshop

The First International Workshop on the Culture of Bivalve Molluscs will be held from 16 to 21 May 1992 at Charleston, South Carolina, USA.

Contact: Dr John Manzi, Marine Resources Research Institute, PO Box 12559, 217 Fort Johnson Rd, Charleston, SC 29412-2559, USA. (Tel: (803) 762-5033 -Fax: (803) 762 -5110)

Welcome to new members

The Pearl Oyster Special Interest Group is growing. We had received additional completed questionnaires from the individuals listed below. The previous lists of members are available in the first three issues of SPC Pearl Oyster Bulletin.

Aquilina B.
Paspaley Pearling Co.
PO Box 1006 -Broome -W A
6725 Australia

Benzie J .A.H.
Australian Institute of Marine Science
PMB 3 -Townsville -QLD 4810
Australia

If you are on the list and your name and address is wrong, please send us a correction. If you are not on the list and would like to be, fill in the form enclosed with the bulletin or write to us for a new one.

Gunzburg J.
Roko Pearls
PO Box 343 -Thursday Isl. -QLD 4875
Australia

Hunter G.
Centre for Pacific Development & Training
Middle Head Rd -Mosman -NSW2091
Australia