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**Trochus management and exploitation in Pohnpei State  
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by

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The topshell Trochus niloticus became established in Pohnpei following the introduction of approximately 700 adults shell by the Japanese in 1939 (Izumi, 1987). Since that time, trochus has become a valuable export product for this area.

Most of the trochus sold in the state comes from the Island of Pohnpei (with 134 km or 84 miles of reef), with smaller amounts coming from the atolls of Ant and Sapwuahfik. A button factory in Kolonia (Pohnpei) is currently in operation and employs 24 people.

In an attempt to ensure recruitment of juvenile trochus, sanctuary systems were established in Pohnpei by 1958 (McGowan, 1958). The (approximately 16) small sanctuaries were difficult to patrol, and reef markers showing sanctuaries boundaries were easily moved or turn down. The present trochus sanctuary system consists of seven areas on the barrier and fringing reef of the island. With one exception, all areas have distinct natural or man-made boundaries (e.g. passes and shipwreck). All of the sanctuaries have good trochus habitat which includes rocks and boulders on the reef flat, an outer shelf (McGowan, 1970), an abundance of coralline algae and low filamentous algae (Heslinga et al, 1984).

Prior to 1985, trochus assessment was done by having skin divers dive at various areas of the reef. Estimated abundance was said to be "many", "few", or "none". From this information, decisions were made concerning having a trochus season, the number of days of a season, etc.

In 1985 a new system of trochus population evaluation was started. Scuba divers set a 100 meter transects along several depth contours in each area. Inexpensive capillary depth gauges were found to be superior to other types of depth gauges for determining shallow depth (up to 7 metres). Trochus encountered by the divers are place on a clipboard with edges, and a mark is made to show the size of the shell. With this system we have a better idea about the size and numbers of trochus which could be available for harvest.

The scuba transects evaluation of trochus population can help managers evaluate the populations of trochus, but his method has several limitations. During the day (when our surveys are conducted), most of the trochus are well hidden. Since trochus is a nocturnal animal, surveys at night could provide more accurate profiling of the population. Overtime or night pay for divers limits nighttime sampling of trochus. Because the survey is relatively labour-intensive (approximately 1.5 man-hours/transect), the number of areas which can be surveyed is limited. As with other trochus survey techniques, weather and surf conditions can limit surveys. Finally, scuba transects will not assess the juvenile recruitment on which future harvests depend.

From our scuba transects, we feel we can get information which qualitatively helps us to make management decisions for trochus management. It would be more useful to us to make management decisions on a quantitative basis to obtain maximum sustainable yield.

### **The 1986 Trochus**

The last trochus season in Pohnpei was held in 1986. The season was set for 28 days in late July and early August. Prior to the season, radio announcements and posters informed the public about the location of trochus sanctuaries, minimum size (3 inches or 7.6 cm) and restrictions on collection methods (no scuba diving). To discourage taking of trochus out of season, buying was restricted to five days after the closing of the season. Hours were set for buying so that Marine Resources Division personnel could monitor sales, and the amount of undersize trochus, and obtain catch-effort data.

Prior to the opening of the trochus season, Marine Resources personnel started patrolling the sanctuaries for poaching on a 24 hour basis. It was noted that before, during, and after the trochus season, people were seen moving out of the sanctuaries when the patrol boat approached the area. Due to manpower and boat restrictions, it was not possible to post a boat at each sanctuary on a permanent basis. Pohnpei state police was able to provide limited help during the season but increased disturbances due to alcohol abuse kept them very busy during the season.

Trochus buyers were instructed to operate from 8 am to 4 pm daily so that Marine Resources personnel could monitor sales, do catch-effort interviews, and check for undersized trochus. Several buyers dispatched trucks around the Island buying trochus without any inspection. These shipments tended to have large amounts of undersized shell (up to 15 % by weight) as well as occasional large rocks. No prosecution or fines were levied for undersized trochus during the season.

In an attempt to decrease poaching of trochus out of season, buyers were authorised to purchase trochus from fishermen only during the season and for five days following the close of trochus season. While this may have decreased the amount of poaching, much of the shell the fishermen sold was not cleaned adequately. This resulted in bad smelling odours and flies near the buyer locations. Purchasers of trochus exported to Japan also expressed dissatisfaction with the inadequate cleaning.

A limited participation survey was conducted during days three and four of the trochus season. On those particular days it was estimated that approximately 800 people each day were participating in trochus gathering. Due to the shortage of manpower, it was impossible to conduct good participation surveys.

Marine Resources personnel were able to conduct catch-effort interviews during inspections at the buying stations. These interviews showed a trend of decreasing catch per unit effort (CPUE) as the season progressed. It should be noted, however, that these interviews obtained CPUE information for each sale, but the date of collection was not noted.

During the course of the season, 14 citations were issued to people illegally harvesting trochus from sanctuaries. No citations were successfully prosecuted. Several of these citations were dismissed due to witnesses not appearing in court, improper handling of evidence, and the court's ruling that people were not to blame for ignorance concerning early closure of the season.

During the season, several trends quickly became obvious. First the rate of trochus shell coming into the buyers stations indicated that the amount of trochus harvested would exceed the amount harvested in any previous season. The previous season had a maximum landed value of US \$ 0.49/lb (US\$ 0.22/kg). In the first week of the 1986 season, the average buyer price was \$ 0.70/lb (US\$ 0.32/kg). This rise in price can be attributed to the opening of a button factory on the island which needed a certain amount of trochus for business operation. Skin diving surveys conducted in sanctuaries after the first week of the season showed without a doubt that people were harvesting trochus from sanctuaries.

Due to the large amounts of trochus coming into the markets and the exploitation of sanctuaries, Marine Resources personnel recommended during the first week that the season be shortened to two weeks. The Director of CNRS, on consultation with the Governor, agreed to an early closure which resulted in a season of 20 days rather than the originally scheduled 28 days. Resource managers take note: It is much easier to lengthen a short season than to try to shorten a season which is too long.

### **Proposed trochus management changes**

The following items need to be improved prior to conducting another trochus season in Pohnpei:

Public education. Marine Resources needs to conduct an education campaign concerning the reasons for trochus management to be conducted in the high schools, and municipal offices throughout the island. This program should include:

- Life cycle and growth of trochus;
- Reasons for sanctuaries;
- Sanctuary locations;
- Reasons for sizes restrictions;
- Methods of trochus meat preservation;
- Methods of communication of seasons and restrictions.

Cooperation with state and municipal officials. State and municipal officials will be consulted so that better enforcement of season and sanctuary restrictions is observed. Cooperation should include sharing of manpower, boats, and communication networks.

Changes in the buying system. During the previous trochus season, buyers were allowed to purchase shell on the roadside without any inspection. This practice resulted in many undersized trochus being harvested. All purchasing should be done in Kolonia so that taking of undersized shell can be monitored and people fined for taking trochus not within set size limits.

Changes in size restrictions. Previously, people were allowed to harvest trochus three inches or larger. Shell which is larger than 5 inches has limited value to buyers, due to worm and sponge holes. The larger trochus are more valuable as breeding stock, since larger trochus produce much more eggs or sperm than the smaller sizes. For any upcoming season, it would be recommended that collected shell be 3-5 inches (7.6-12.7 cm).

Changes in fishing entry. In order not to exceed a trochus quota for a given year, a system of licensing could be instituted. A limit number of licenses would be issued from each municipality. Each holder of a license would be entitled to sell to buyers a given quantity of shell and would be responsible for undersized or oversized trochus re attempts to sell to the buyers.

### **Information needed for better trochus resource management**

Several things are needed for more effective management:

1. an easy survey system giving animal size distribution and estimates of population size.
2. models which can estimate maximum sustainable yield base on surveys.
3. a broad-based public education programme to gain community support for trochus management.

### **References**

- HESLINGA, G.A, O. ORAK and N. NGIRAMENGIOR (1984) Coral reef sanctuaries for trochus shells. *Mar. Fish. Rev.* 46(4):73-80.
- IZUMI, M (1987) Summary translations of trochus research from South Seas Fisheries News, 1937-1939. FAO/UNDP Regional Fishery Support Programme, Suva, Fiji. Doc.87/2. 26p.
- MCGOWAN, J.A. (1958) The trochus fishery of the Trust Territory of the Pacific Islands. Report of the High Commissioner, U.S.T.T.P.I, Saipan. 46p.
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