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SOME ASPECTS OF THE COMMERCIAL PRAWN FISHERY OF THE GULF OF
PAPUA, PAPUA NEW GUINEA

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Some aspects of the commercial prawn fishery of the Gulf of Papua, Papua New Guinea

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Introduction

Prawn surveys in Papua New Guinea (PNG) were carried out between 1955 and 1974, and the first commercial licenses for prawn trawling were first issued in February, 1975. Today PNG exports over 1,000 tonnes of prawns worth between K9 million and K10 million annually. The accounts of these surveys and the development of the prawn industry have been well documented by Rapson and MacIntosh (1971), Wilson and Tatamasi (1976). More recent research and development have been described by Tenakanai (1980), Gwyther (1981), Branford (1982) and Kolkolo (1983).

The principal grounds for prawns occur in the south coast of the mainland, especially in the Gulf of Papua and Orangerie Bay. Daru in the Western Province also support an artisanal fishery based on banana and tiger prawns. Prawn grounds also exist in the north coast off Sissano Lagoon, Murik Lakes, off the mouth of the Ramu river and in the Morobe Province. These grounds, however, have never been successfully proven to support commercial trawling.

Commercial prawn species

Over 40 species of prawns have been recorded from PNG although not all of these are of commercial value (Rapson and MacIntosh, 1972). In the south coast there four species groups which are commercially exploited. These are :-

Banana Prawns (50%) - Penaeus merguensis which form the basis of the Gulf of Papua and the Orangerie Bay fisheries make up to 50 % of the catch. P. indicus, the royal indian banana prawn also packed as banana, comprises 1.0% of the banana prawns.

Tiger Prawns (10%) - Tigers include P. monodon, P. semisulcatus, P. japonicus, although comprised only 10% of the catch, their high demand overseas make it a high value product.

Endeavor prawn (20%) - A significant part of the catch comprise

of "Greasybacks", Metapeneus spp, which have been erroneously termed as "endeavour". The true endeavour prawn M. endeavouri, is not common in PNG waters and is replaced by M. ensis. The other species are M. eboracensis, M. demani and M. papuensis.

Coral Prawns (20%) - The other significant part of the catch is a mix of other species occurring in small quantities. These include Parapeneopsis sculptilus, P. cornuta, Atypopenaeus formosus, Solenocera spp, and including the king prawn Penaeus longistylus.

Catch and effort data collection

Scanty catch and effort data are available in reports (eg, Wilson and Tatamasi, 1976) for the period of the surveys. Although the proper commercial prawn licences were first issued in 1975, proper catch and effort data were not kept by the operators until 1977 when the provision of monthly catch returns to the Fisheries authority became one of the conditions of the renewal of licenses. A computer-processed trawl-by-trawl data sheet was introduced in 1979 which made it possible for storage and routine analysis to be made at the National Computer Centre (NCC) (Annex 1.). Monthly and Yearly reports on the fishery for the last 10 years are made available by the NCC.

The Gulf of Papua has been divided into five minute square grids. These grids are then grouped into 17 fishing areas. The fishing effort was distributed in these 17 areas with much of the effort expended between Orokolobay and Freshwater bay at depths between 20 and 40 meters. These two areas contributed over 50% of the total catch but only constitute 13.1% of the total area (Figure #1).

The reported annual catch from the Gulf of Papua prawn fishery averages between 1,000,000kg and 1,200,000 kg (tail weight). The abundance of prawns as measured by the catch rates (c.p.u.e.) indicate high catch rates are experienced during the months of March to August and below average during September to February (fig 2). There are years of variations in the range between the maximum and the minimum which are attributed to the rainfall and temperature patterns experienced in the area (Gwyther, 1982) (Figure 3.)

The principle species, the Banana prawn, although spawn all year round, recruitment into the commercial fishery is seasonal as indicated by the changes in catch rates. The catches vary according to the condition at the nursery areas. High concentrations of juveniles occur during the long dry seasons and good catches in the fishery occur immediately after the start of the rainy season, (Frusher, 1984).

During the months from August through November, the Lobster, P.

ornatus, take an annual spawning migration originating from the Torres Strait through the Gulf of Papua to Yule Island. This migration had much influence on the catch rates of prawns in that, vessels tended to leave the prawn ground to trawl for lobster in the deeper areas. The effort was then mainly expended to locate the migrating ornate lobster stock, and prawns caught during this period were mainly by-catch to offset costs of searching for lobster (Wilson and Tatamasi, 1976).

For management purposes, a total ban on trawling for lobster was imposed in 1979, and again from 1983 to date. While quotas were set for 1977 and 1978. The management of the lobster seem to have had a direct effect on the catch rates of the prawn in that the catch rates during the off seasons were higher during the years when the trawl ban on lobster was imposed (Opnai unpublished data).

Change in Fishing Effort

In 1987 there was a drastic change in the fishery. The number of boats did not only double but the new boats that entered the fishery had more efficient fishing gear. The computer programme did not cater for any increase or change in the fishing effort. As a result the 1987 reports will not be immediately available.

The annual average number of licensed vessel operating in any one year during the last 10 years is 15. The highest number was 21, in 1986, while the lowest number was 11, during 1982 and 1983 (Table #1). Four of these vessel, owned and operated by national companies, were allowed to operate inside the 3-mile (inshore) area of the Drokolo Bay to Freshwater Bay in the eastern end of the Gulf of Papua. The rest operated outside the 3-mile (offshore) area from the North Fly in the west to Iokea in the east (Fig.#1).

Until 1985, all vessels fishing operating were of the large class vessels of over 20 m.length overall (OAL), 400 to 500 bhp main engine, and otter trawlers pulling two nets with head rope from 24 m to 30 m. During 1986, five vessels chartered from Australia had otter trawls that pull 4 nets. This method as stated by the Australian operators approximately double the catching power of the conventional type.

Additionally, two vessels chartered from Thailand also entered the fishery in August 1986 and left in December 1987. Each vessel was driven by 1125 bhp main engines. This is an increase of more than 100 % from the average of 500 bhp in the then existing fleet. Their power to pull two nets would also double that of the conventional Japanese fleet. Accurate catch and effort data from this two vessels are not available.

The conventional fleet on the other hand, over the years may have been increasing their own efficiency through increasing knowledge

of the fishing ground. In addition tried to out fish the new comers by adjusting the species catching capacity to catching banana prawn, the target species (Prawn operators, pers.com). These prawn companies own and operate 10 trawlers between them. During the last 10 years the total catch has increased from 780 to 1,300 tonnes and 60% were caught by these vessels.

Yield estimates

Gwyther(1981), estimated the maximum catch for all species that would allow the resource to be maintained at equilibrium was 1,200,000 kg, allowing for annual variations that may be influenced by other biological and ecological phenomena. This yield could be obtained at 100,000 hours trawling.

Based on the most efficient vessels in the fishery, the average trawling time per boat a year is about 6,912 hrs (average number of trawling days per boat per month is about 24 days) and hence, 100,000 hrs of trawling is equal to 15 vessels.

Gwyther (1981), also showed that the exploitation of banana prawn was approaching the maximum sustainable level of 640 tonnes of prawns to be caught by 13 vessels. The 1985 and 1986 catches were 678 and 569 tonnes respectively. The composition of the banana prawns in the catch showed a gradual decrease from 65% in 1977 to 45% in 1986 (Unpublished data).

The above could indicate that the prawn fishery of the Gulf of Papua may be showing signs of a decline at the present rate of exploitation. A detail statistical analysis of the catch and effort data is therefore needed to develop a model which may attempt to reflect the change in the fishery and from which a management plan could be based.

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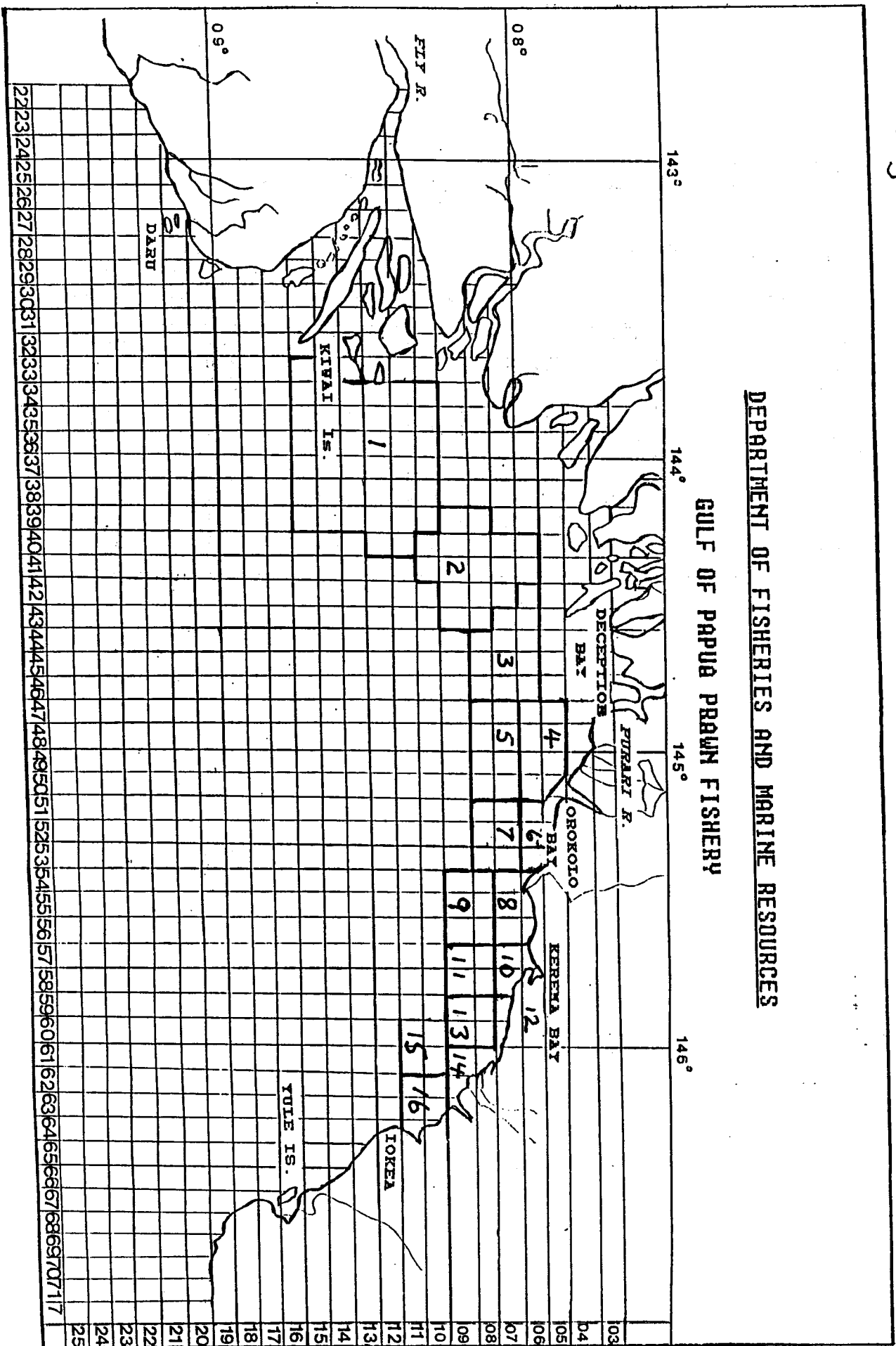
Table #1: The Total Prawn Catch (tonnes of tails) number of vessels and total effort from the Gulf of Papua Fishery during 1975-86.

Year	Number of vessels	Effort hours trawled	Ave. Hrs/vssl	Total Catch (Tonne)		C.P.U.E. (Kg/Hr)	
				All Spp.	Banana	All Spp.	Banana
1977	12	42,108	3,239	529	432	12.6	10.3
1978	13	67,272	5,175	997	548	14.8	8.1
1979	13	77,579	5,968	1,177	634	15.2	8.2
1980	13	69,617	5,355	1,178	666	1.9	9.6
1981	19	66,921	3,522	1,026	517	5.3	7.7
1982	11	60,113	5,465	879	419	14.6	7.0
1983	11	56,123	5,102	1,150	637	20.5	11.3
1984	14	74,709	5,336	1,128	483	15.1	6.5
1985	14	78,071	5,576	1,338	670	17.1	8.6
1986	21	93,622	7,802	1,321	569	14.1	6.1

Figure 1: The Gulf of Papua Prawn Fishery

DEPARTMENT OF FISHERIES AND MARINE RESOURCES

GULF OF PAPUA PRAWN FISHERY








LATITUDE SCALE (Read This Side First)

LONGITUDE SCALE

GULF OF PAPUA PRAWN FISHERY 1977-1986

Total Catch of all species group

TOTAL CATCH IN KG X 1000

-  Banana
 -  Tiger
 -  Endeavour
 -  Other
 -  Mix
- YEARS

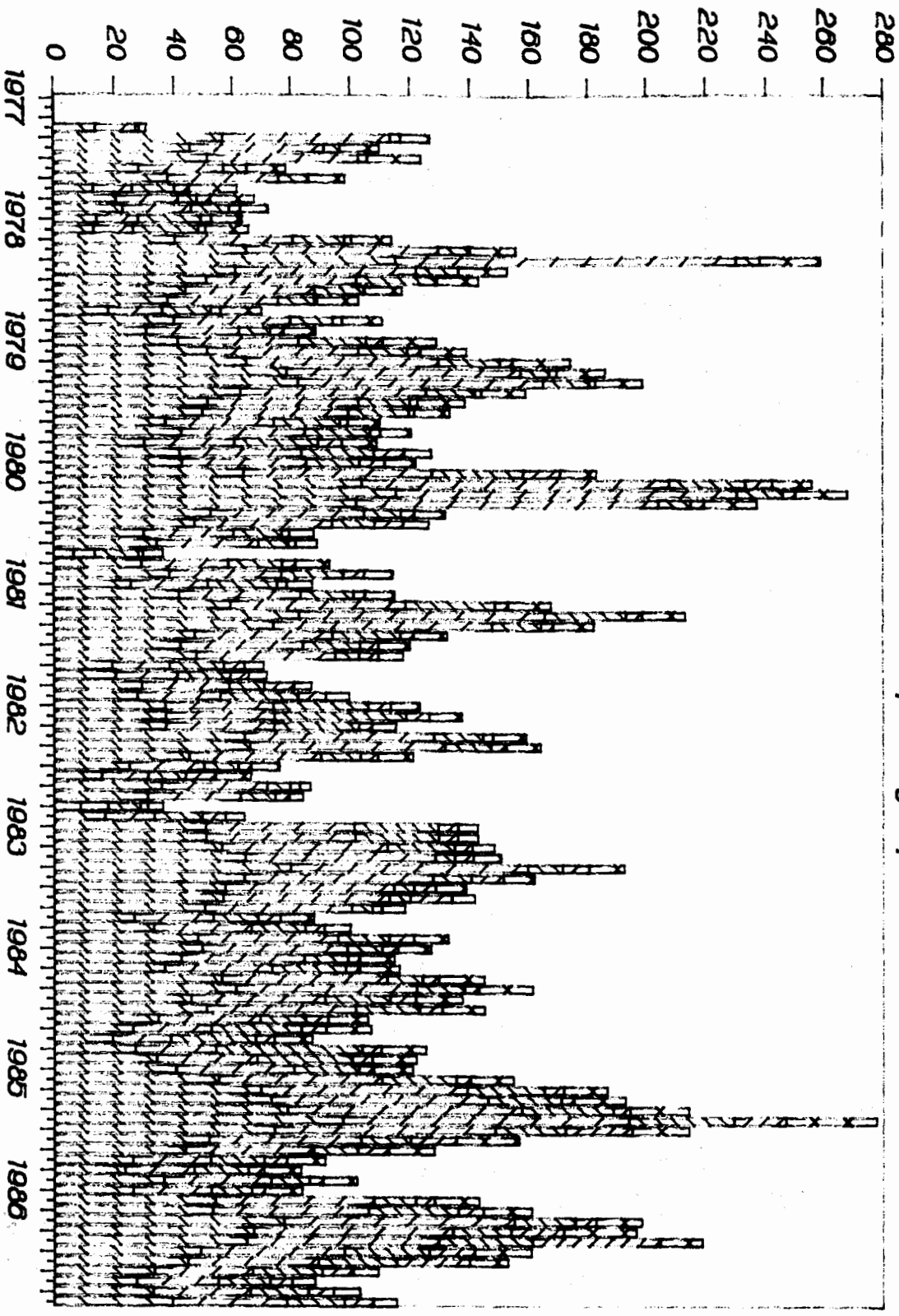
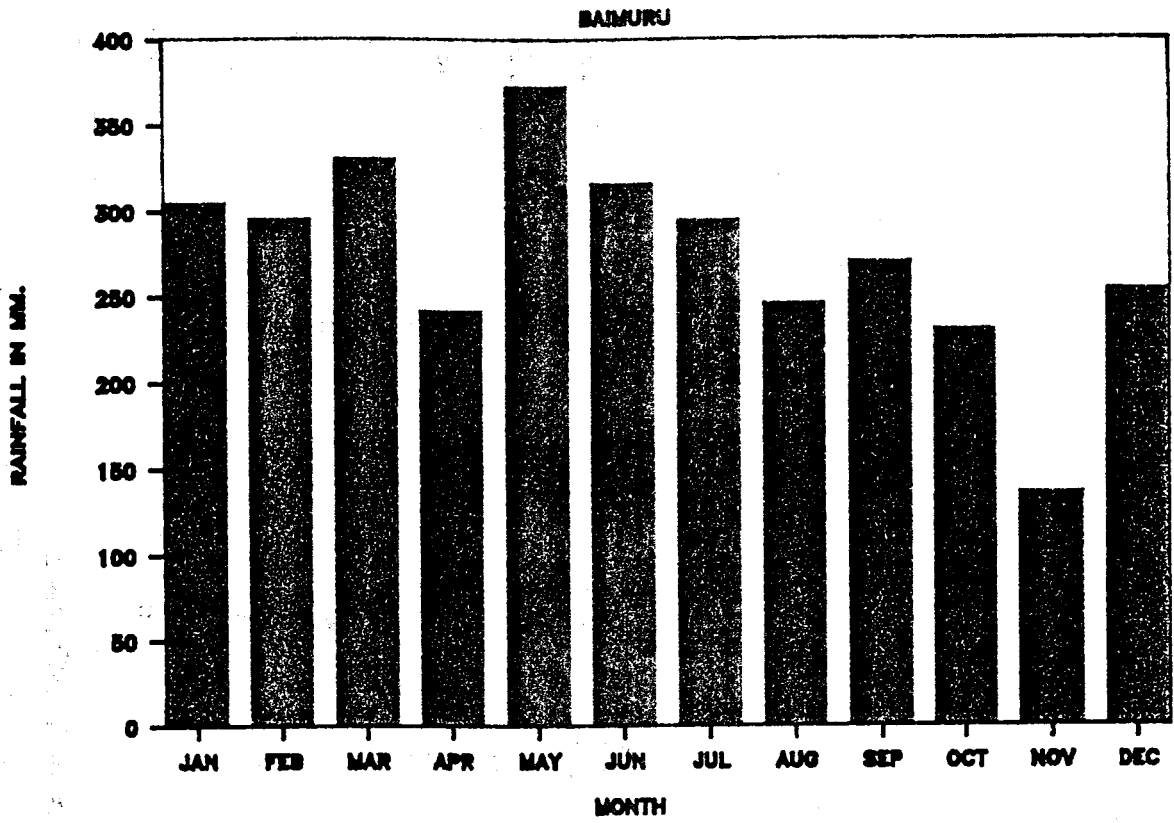


FIG. 3. AVERAGE MONTHLY RAINFALL RECORDED
IN THE NORTHERN GULF OF PAPUA

AVE. MONTHLY RAINFALL - NORTHERN GULF.



AVE. MONTHLY RAINFALL - NORTHERN GULF.

