AN ASSESSMENT OF THE PONAPE DORY PROJECT

by

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Introduction:

The Ponape Dory Project has been in existence for almost three years. It was begun in August 1972 with a Federal Office of Economic Opportunity grant of US $150,000. The initial grant was for a two-year period during which seven Oregon-type dories were to be constructed.

The three original objectives of the project were: 1) to develop a program that would train Ponapeans to build, equip, and operate small, highly mobile, open fishing craft without outside assistance; 2) to initiate a training program in boat handling and motor maintenance and repair; and 3) to institute a similar training and demonstration program in the fishing methods deemed most applicable to Ponapean waters in an effort to exploit the full potential of the dory as a fishing platform. This program was designed to provide the foundation for a practical ongoing commercial fishery in Ponape. Even though there is a small subsistence fishery that utilizes locally-built plywood boats and outboard engines operating out of Kolonia in conjunction with the Ponape Fisherman's Cooperative, the Dory Project can be considered as the only real attempt that has been made to date to develop a commercial artisanal fishery in Ponape.

Although this project has met certain aspects of its proposed goals--most notably the construction, outfitting, and operation of dories by Ponapeans--the fact remains that the dory fishery, as it is presently operating, has not developed as a self-sustaining, economically viable enterprise.

Of the 15 dories constructed by the project to date (seven in the initial stage and eight in the second phase), only three dories are actively fishing on a continuous basis. Currently, the Ponape Community Action Agency (CAA), the parent agency of the Ponape Dory Project, is subsidizing the boat shop with approximately US $70,000 per year.

Thus, in this report, both the major problem areas of the Dory Project, as well as its achievements, will be discussed. It is hoped that future fishery programs similar to the Ponape Project will benefit from a review and assessment of this project. The major problem areas encountered by the Ponape Dory Project fall into three distinct categories: 1) ongoing maintenance and repair of dories and engines; 2) loan repayments; and 3) fishing techniques.

During the period the project has been in operation, it has been constrained by two major problems over which it has had little or no control and which have seriously affected the financial operation of the project. When the project was initiated in August 1972, it was impossible to anticipate the massive repercussions that

world-wide inflation and the dramatic increase in the price of gasoline would bring. Since 1973, gasoline prices in Ponape have more than doubled, drastically affecting the daily operation of the dories. The original construction cost of a fully equipped dory was US $5,500. The second group of eight dories was estimated to cost US $7,000 each. However, subsequent inflation boosted this price to US $8,200 as of August 1974; and the price undoubtedly has increased in the past year. This represents more than a 49 percent increase in the construction costs of the dory during the past two and a half years.

Inflation has even more severely affected a similarly run dory project initiated by the Government of the Gilbert and Ellice Islands where the most recently constructed dories eventually cost A $11,300 (approximately US $15,100).

Ongoing Maintenance and Repair:

The Ponape dory is twenty-four feet, six inches in length and is constructed of mahogany frames covered with one-half inch grade AA marine plywood. The dories utilize a 155 hp model 250 six-cylinder Ford engine converted for marine use that is coupled with a two-stage Hamilton jet.

The first objective of the project (stated on page 1) has been met almost in its entirety. The dories that have been constructed in Ponape are of high quality and superior workmanship. The

Ponapeans who were trained to build and equip the dories have become skilled craftsmen. Those dories constructed more than two years ago are still in operation.

The same situation does not exist for the installation, maintenance, and repair of engines. Only as late as a year ago, the engine workshop in the Dory Boat Works was in extremely poor shape. However, this situation appears to have been remedied recently with the hiring of a new mechanic, who is reputed to be possibly the best in Ponape. His skill is clearly evident in that motor repair (other than the lag time required for the delivery of spare parts) no longer appears to be a major problem.

However, daily maintenance operations are still a persistent problem. Maintenance costs on the boat are estimated by the Ponape Dory Works to run approximately US $60 per month. These costs remain a problem despite the maintenance and repair policy that was instituted by the Ponape Dory Works at the initiation of the project. This policy was: 1) all parts and labor on necessary repairs, not occurring through negligence, would be covered by the Community Action Agency for the first 90 days of boat operation; 2) thereafter, parts would be supplied free for the next 90 days, but labor would be charged; and 3) after 180 days, parts, maintenance, and labor would be charged for in their entirety.

The monthly maintenance costs appear to be the direct result of problems encountered with the dory engines and with the continual

need to replace motor parts. The mechanical problems of the Ford 155 hp engine most frequently encountered by the project mechanic can be outlined as follows:

1. Many of the Ford engines have cracked exhaust manifolds. This problem is possibly the result of engine racing at excessive rpms. The manufacturer recommends that the jets be run at approximately 3500 rpms; but in trials made with the dories, engine speeds of 3700 to 4500 rpms were often noted. On flat bottom dories, the high engine rpms appear to be the direct result of the inability of the Hamilton jet unit to function efficiently in short, steep, choppy seas and on turns. Under these sea conditions the intake unit of the jet is unable to supply the required volume of water to the propulsion system. As a result, air pockets are formed causing the motor to race excessively and to overheat; conditions which possibly result in the cracked manifolds.

2. On the Ford engine, the starters are placed so low on the motor block that they are almost in the bilge of the dory. During the heavy rains that frequently occur in Ponape, the starters are often submerged in the bilge water and are eventually lost through rust.

3. The dory utilizes 40-gallon aluminum gas tanks that are custom-made on the U.S. mainland and are shipped intact to Ponape. Currently, in the Ponape Dory Works, approximately six tanks from the last shipment are useless due

to poor welding of tank seams by the supplier. These tanks have corroded and the seams have split. The project has been forced to absorb the cost of the entire shipment. Another problem resulting from the gas tanks is that the welded seams tend to pull apart as a result of the constant pounding of the flat bottom dories in short, steep, choppy waters.

4. In many dories, the electrical system shows signs of advanced corrosion in the wiring, especially in areas near the bilge. Apparently, this is the result of a lack of daily maintenance.

5. Initially, the original seven dories had hydraulic steering systems. Unfortunately, the rams on these steering systems tended to jam. In an effort to simplify boat maintenance and operation, the manager of the Dory Works replaced the entire hydraulic systems with a simple cable steering mechanism.

6. A constant problem with the dory engines is overheating. This is probably the result of insufficiently ventilated motor covers.

7. The outdrive unit of the Hamilton jet is constructed of aluminum. At the outset of the project, the dories developed extensive corrosion problems on the outdrive

units as a result of electrolysis. This problem has been remedied by placing zinc plates on the outside of the hull. However, some of the dory operators have been negligent in replacing the zinc plates, and corrosion is continuing to occur on the aluminum outdrive unit.

8. In the engine workshop of the Dory Works, there is a box filled with engine parts that have been replaced from the first ten dories. If the parts in this box are to be taken as any indication, the weak links in the engine are primarily the starters and the generator, and in some cases, the carburetor.

9. The hydraulic line pulling systems placed on several dories in the first phase of the project have never been utilized and consequently have been abandoned, and in some cases removed.

The question has been raised as to why gasoline engines were initially selected for use in the dories. Although many shortcomings are involved in utilizing gasoline engines for a project of this type, a major advantage is that this motor is basically an automobile engine that has been modified for marine use. A number of mechanics are located on Ponape as well as other Pacific Islands (such as the present mechanic employed by the Dory Project)

who have had wide experience working on automobile engines and require no extensive training for the dory engine. The Ford dealer on Ponape presently carries a line of appropriate spare parts. A former situation of a severe backlog of spare parts due to delay in reordering practices and poor management has been solved to some extent, but there is still a three-month time lag from the moment parts are ordered until they arrive on Ponape.

Another problem that currently exists within the project is the lack of follow-up on the initial motor maintenance training and troubleshooting program. Initially, only 30 hours of training were given to each new boat owner. This training included boat handling, engine starting and troubleshooting, and minor maintenance and repair.

In the case of most of the dory owners, this was the first time that they handled anything larger than an outboard motor. Thus, the introduction of the dories caused an extremely large "jump" in technology transfer. This particular training program should have been one of the foundations of the entire Dory Project; yet the initial session was the only training in motor maintenance that the dory owners ever received. Although the facilities for doing so presently exist, and although the services of an exceedingly capable mechanic are available, no follow-up maintenance and repair training programs have been organized.

Many of the problems regarding engine maintenance and repair could have been alleviated by simple preventive maintenance measures. Thus, any future programs should provide for long-term and sustained training programs in these particular areas.

Loan Repayments:

Discussions were held with the Economic Development Loan Officer responsible for loans made to dory owners by the Trust Territory Government. Currently, of the 15 dories constructed by the Ponape Dory Project, two are owned outright by the Community Action Agency; one belongs to the Office of Marine Resources; two have been repossessed by the Government for non-payment of loans and are kept at Marine Resources; two belong to government employees (a high school principal and a doctor) who paid for the dories from their government salaries and are only casual weekend fishermen; one dory was lost at sea off Guam; and one dory is used primarily in one of the outer islands. The remaining six dories have loans outstanding through the government-sponsored "Production Development Loan Program." Of these six loans, the best one is two months behind on repayments; the next is five months behind. All others are 11 to 15 months in arrears on payments. Out of a total loan of US $5,550, the largest sum that has been repaid to date on any dory is US $1,140 (see Appendix 1). No set standards have been made for repossession of the dories when an owner has fallen in arrears on

his payments. Although the "Marda" and the "Lisa" have been repossessed, the "Suana"--15 months in arrears--is still in operation; apparently not one payment has been made to date.

According to the Economic Development Loan Officer, the primary excuse for non-payment of loans is that not enough fish are caught to cover the operational cost of the dory, and the payment of the crew, as well as the monthly loan repayment. However, he is not of the opinion that this excuse is in fact always the case, since even the most effective dory in the fleet, the "Luck," is still five months in arrears on its loan payments.

Other owners have complained that the Dory Works does not provide sufficient help in maintaining and repairing the dory engines. There is evidence the fishermen feel that when a dory is experiencing mechanical problems, the crew is hesitant to go beyond the outer reef to the primary fishing grounds.

The fishermen's preference for trolling for skipjack tuna rather than on diversifying the fishery by incorporating other techniques (such as bottom hand-lining) is one of the main reasons the dory owners are not making money. Even during the off-season for skipjack, the dory fishermen still persist in trolling. This method of fishing uses an inordinate amount of fuel. With gasoline presently selling for US $0.62 per gallon, operating expenses for the dories have risen from US $12.50 per day in 1972 to more than

an estimated US $30.00 per day. The present catch rates from trolling are not enough to cover this expense as well as payment of the crew and the monthly loan repayment.

The financing of the boats is done for three years at three percent interest with a six-month grace period before the first payment is due. The monthly payments have ranged from US $150.00 per month for the first seven dories to US $210.00 per month for the second set of eight dories. Apparently, the original purpose of the six-month grace period was to give each dory owner an opportunity to learn the operation of his boat, to improve his fishing techniques, and to establish himself economically.

Since the project has already been in operation two and one-half years, it appears that the six-month grace period has not proved to be an incentive for the dory owners to make their loan payments on time. It is apparent that the dory owners feel little or no pressure to meet their loan responsibilities after the expiration of this six-month period.

The failure in the loan repayment system is that many of the fishermen have had little or no experience with systems of credit. A solution to this problem would be to require both a down payment and the initiation of immediate monthly loan repayments. The fisherman should be required to put some of his own equity into the dory; mere participation by the individual fisherman in the construction and outfitting of the dory is not sufficient.

An excellent sample of a fisheries development program which required equity participation is one initiated in early 1970 in Western Samoa. The government there provided outboard motors on credit; but each village wishing to participate in the project was required to construct its own fishing craft from locally available material as part of its equity contribution.

Fishing Techniques:

Appendix 3 (which gives catch data for the first nine boats in the dory fleet) shows evidence that neither catch rates nor the number of trips per boat came close to the levels anticipated in the original project proposal. The number of trips per month is approximately one-half of what was initially projected. A review of this situation shows that the two main problem areas appear to have been: 1) a general failure to train the fishermen to use the proper methods for the appropriate seasonal fishing, and 2) a general failure to have the fishing activities of each dory maintained for a sustained period of time.

Trolling, as mentioned, is by far the preferred method of fishing used by the dory fishermen in Ponape. Although bottom fishing is more economical in terms of fuel costs, very few fishermen consistently utilize this method even during the off-season for skipjack when it probably would prove profitable to do so.

During the early training stages of the Dory Project, the initial bottom fishing trials showed considerable promise. In three successive nights of bottom fishing in April 1973, 900 pounds of fish were landed the first night; 1,200 pounds the second night; and 700 pounds the third night. The few boat owners that go bottom fishing at the present time are not successful--primarily because they are not fishing at night in areas that are in deep enough water beyond the main reef and away from the main population at Kolonia. The initial bottom fishing trials were carried out on the outer reef edge in 40 to 120 fathoms of water, mainly off the southwest tip of the island. Other successful trials were conducted along the outer reef on the northeast side of the main channel near Kolonia.

When the Dory Project was begun, training courses in appropriate fishing methods applicable to the waters surrounding Ponape were an integral part of the program. However, these training programs were only two weeks long. Various methods of trolling and bottom hand-lining were demonstrated to the dory owners. When these initial training demonstration courses were completed for the first six dory owners, the program was discontinued by the project. To date, there has been no follow-up program. A sustained and ongoing fisherman's training program in suitable bottom-fishing methods for deep water reef species is greatly needed. A major problem with this fishery at present is an over-dependence on one species (i.e. skipjack) seasonal fishery. There is a great need to diversify the methods of the dory fishing fleet.

The other serious socio-cultural problem is that fishermen will not fish for more than three or four days in succession. As in many areas of the Pacific, fishing activity is sustained only long enough to earn sufficient cash to meet a family's immediate needs or to pay off local village obligations. Once these responsibilities are met, it is not unusual for fishing activities to be discontinued for up to as much as a week at a time--until cash reserves are again depleted. The concept of a "commercial" fisherman, as is known in the United States or Japan, is alien to their culture.

Originally, it was anticipated that the dories would carry trained permanent crews. Currently, none of the dories has a permanent crew, unless it is entirely a family operation. Dory owners have found it difficult to maintain permanent crews, and at present they normally select crews on a short-term basis only. A general consensus of opinion among the management personnel of the Dory Project is that the most successful boats are those operated on a family basis. A similar situation was true for the Dory Project in American Samoa. It thus appears that family operations provide a cohesion which does not otherwise exist.

The dories were designed to hold a total catch capacity of greater than one ton. From March 1973 to June 1974 (the period for which catch data is available), the most any one boat caught in a

single month while making no less than four trips is a little more than a ton and one-half of fish. A review of Appendix 2, which gives the average catch per trip by boat on a monthly basis from March 1973 to June 1974, shows that fish catches by the dories initially increased from an average 103 pounds per trip to a peak average of 230 pounds per trip in October 1973. Thereafter, catches fell considerably. The initial increases in dory catch rates can probably be attributed to two factors: 1) the existence of the fishermen training program, and 2) the onset of the 1973 skipjack season during the summer months. Catches dramatically declined immediately after the skipjack left the Ponape area. In order to help subsidize the fleet during this period, the CAA allowed boat owners to purchase gasoline for dory operations on credit. Until this credit subsidy was stopped in early 1974, the boat owners managed to acquire a US $10,000 debt to the CAA in fuel purchases.

In July 1974, the CAA instituted a new policy. Fuel purchases were no longer allowed on credit. Dory owners were expected both to buy their own fuel supplies and simultaneously to pay off the US $10,000 debt owed to the CAA. This was accomplished by deducting 10 percent of the total purchase price of each catch landed and sold at the Ponape Co-op and by applying it toward payment of past bills owed to the CAA. The initiation of this new fuel repayment policy placed an additional financial burden on the fishermen, making it difficult for them to meet the payments for the dory loans, the crew's wages, and the boat operations. This may be just one more

reason why the volume of the catch landed by the dory fleet at Kolonia declined. Faced with this further 10 percent deduction in their catch earnings, the fishermen apparently felt that their operations were even more unprofitable than before the initiation of this policy. It appears that, at present, this policy is no longer in operation.

Another major setback for the Dory Project was that the number of skipjack found off Ponape during the summer of 1974 was smaller than had been anticipated. High catch rates did not materialize during this period and thus earnings fell even further.

Catch and Effort Analysis:

With the aid of data collected from catch statistic forms submitted by dory owners in the Ponape Fisherman's Cooperative Association and the Department of Marine Resources, a table has been compiled (see Appendix 3) that lists the month of operation, the name of each dory, total number of trips made, total catch in pounds of tuna, total number of reef trips made, and the average number of fishermen aboard each dory per trip. Because there was no differentiation in the data in the prices paid for skipjack and bottom fish at the Ponape Co-op and because 82 percent of the dory trips made between March 1973 and June 1974 (the dates for which data was available) were for skipjack, this analysis concentrates

on tuna catch and effort data. Since the total reef catch was considerably smaller in comparison to total tuna landings, it was obvious that the Ponape fishermen's efforts were directed predominantly toward trolling for skipjack.

In terms of calculating total catch rates, the two most effective dories were the "Lisa" and the "Luck" (see Appendix 3). These boats also made the greatest number of trips per month. Differences in the fishing skills of the crews of the various dories were quite apparent. For example, the "Luck" made 40 percent fewer trips than the "Lisa," but caught only 15 percent less than the "Lisa" in terms of total catch. Although the "Lisa" registered the largest total catch (in pounds) during the period of study, the "Luck" had an average catch per month and per trip that was significantly greater than any other boat in the dory fleet. As regards catch per effort, the "Luck" was also the highest boat in the dory fleet with 70.1 pounds per fisherman per trip. In terms of fishing efficiency, the only other boat with a similar catch per effort was the "Marlin" with 66 pounds per fisherman per trip. The average catch per trip per dory ranged between 80 and 215 pounds. As would be expected, catches strongly correlated with the number of trips per month; total landings (in pounds) of fish increased as the number of trips increased.

In the original proposal for the Ponape Dory Project, it was anticipated that the fishermen would fish approximately 200 nights per year. However, data in Appendix 3 show that the dories were

averaging only 8 to 12 trips per month--one-half of the number of fishing trips predicted. In terms of maximizing the revenues for each dory, it should be noted that the number of fishermen on any particular trip apparently had no significant impact on the total tuna catch landed. This result is not too surprising, given the method used to catch skipjack, i.e. trolling. In order to maximize the individual fisherman's share on future trolling trips, only the minimum number of fishermen necessary (probably two fishermen and one helmsman) should be carried aboard each dory. More than two fishermen per dory only reduces the total share received per trip. Because the dory is designed for both trolling and bottom-fishing, the optimum crew size will vary with the type of fishing being undertaken. Each dory owner should maintain flexibility in varying the number of crew; a small crew should be used for trolling, while a larger crew should be used for evening bottom-fishing.

Dory Performance:

While in Ponape, the author made several short trips in both a flat bottom dory and a modified V-bottom dory in order to ascertain their performance capabilities. Due to heavy sea conditions on the outer reef, the dories were run only in the channel area inside the reef near Kolonia. Currently the flat bottom dory is being used by the Office of Marine Resources, while the modified V-bottom dory is owned by the Community Action Agency. Both dories are powered

by a Ford Model 250 C.I.D. six-cylinder engine equipped with marine conversion at 155 hp and coupled to a two-stage Hamilton jet. According to personnel at both offices, the performance of each dory was considered typical of other dories in the fleet.

As stated in the original project proposal, the dories were expected to achieve an estimated maximum speed of 28 miles per hour at 3,800 rpms. Both the flat bottom and modified V-bottom dories performed far below this predicted speed. The Marine Resources dory, the "Nekton No. 3," formerly the "Anatoki," is one of the original flat bottom dories utilizing the Hamilton jet. In tests with this dory, the maximum speed achieved was approximately 19 mph. The engine tended to race occasionally due to the slight chop found in the inner reef, and the hull was unable to reach a planing position even when running at maximum speed.

After the initial phase of the Ponape Dory Project, the dories were redesigned and constructed with a modified V-bottom in an effort to attain better performance with the Hamilton jet, especially in the short, steep, choppy sea conditions found around Ponape. The CAA owns one of the new modified V-bottom dories. This boat is also powered by a Ford marine engine connected to a Hamilton jet.

In test runs, it performed somewhat better than the flat bottom dory, attaining a top speed of approximately 21 mph. Excessive engine rpms similar to that found in the engine of the original

flat bottom dory were non-existent. Even so, the V-bottom dory was still unable to reach a planing position running at a top speed of 3,700 rpms.

Similarly designed dories in the American Samoa Dory Project were powered by a 135 hp gasoline Volvo-Penta with inboard-outboard drive. These dories were able to attain a top speed of approximately 28 mph. Although the American Samoa Dory utilized 13 percent less horsepower than the Ponape V-bottom dory, it was able to achieve approximately 25 percent more speed. Translated into savings on fuel expenses, it is apparent that the American Samoa Dory is approximately 25 to 30 percent less expensive to operate than the Ponape Dory.

Thus, a major problem appears to be that the jet drive unit mounted on the Ponape Dory was incompatible with the dory design. Landed in Ponape, the Hamilton jet unit costs approximately US $800.00 each. The original purpose of utilizing the jet unit was to allow the dories to travel in waters which were too shallow for either outboard or conventional through-the-hull straight shaft propeller driven boats. It was felt that the jets were a necessity in Ponape due to the extensive surrounding outer reef. However, a trade-off must be considered when the high initial investment required to purchase a Hamilton jet is compared to the cost of a conventional straight-shaft direct inboard drive. Every effort

should be made to reduce the cost of the dory to a level that can easily be afforded by the Ponape fishermen. Conventional through-the-hull direct-drive units can be installed for only a fraction of the cost of a jet unit. Utilization of a jet unit should be considered only in areas where it is absolutely essential that either wide expanses of shallow reef be crossed on a continuous basis or where boats must be beached daily.

The boat builders, the engine mechanics, and the manager of the Ponape Dory Works generally agree that the price of the dory had reached a level far beyond the means of the average Ponape fisherman and that the affordable price of any future design introduced into Ponape should be in the range of US $2,000-$3,000. This figure was based on the cost of a locally constructed plywood boat (approximately US $600-$800) and a 25 hp outboard (US $800), with the consensus that the local fisherman would be willing to pay a slightly higher price for a more sea-worthy and reliable design, capable of outer-reef fishing in all but the most serious weather conditions. Even so, the ability of the fisherman to afford a fully outfitted fishing craft costing between US $2,000-$3,000 may be somewhat questionable. The apparent repayment rate for the locally constructed fishing boats is not much better than that of the dories.

Serious consideration should be given to scaling down the design of the dories presently being constructed at the Ponape Dory Works. As stated previously in this report, the dory is

designed to carry a catch load of one and one-half to one and three-quarter tons. To date, daily catch rates made by the dories have fallen far below this design capacity. From data in Appendix 3, it appears that the maximum fish load presently required for the Ponape fishery is no greater than 800 to 1,000 pounds. Further consideration should be given to constructing a boat with a hull that can easily be driven at a top speed of 14 or 15 mph, that is no greater than 18 to 20 feet in length, and is capable of carrying a maximum fish load of 800 pounds. The power source should be not only reliable, but also economical in terms of fuel consumption.

SUMMARY:

In light of the experience gained during the past two and one-half years of operation of the Ponape Dory Project, several problem areas should be noted. It is hoped an assessment of this nature will not only help to alleviate the present problem areas in this project but will also provide a set of guidelines delineating possible problem areas that might be encountered in future small boat development projects.

A 1974 report on the Ponape Dory Project stated that if the mechanical problems the project was encountering were corrected and that if the price of fuel were lowered, the project could be expected to begin operating on a financially sound basis. The first point

has been rectified somewhat with the hiring of a new mechanic. However, the price of fuel has not been reduced, nor can it be expected to be lowered in the foreseeable future. Given the present catch rates and the high operating expenses required to run the dory, the Ponape fishermen are faced with an inordinately large financial burden.

One major problem area with the Ponape project was a lack of ongoing sustained training programs for: 1) fishing techniques applicable for use in the dory; 2) use and operation of the dory; and 3) maintenance and repair of dory engines. In most instances, initial training programs were discontinued after the opening phases of the project. Although seriously needed, no follow-up occurred in this area, especially in fishing techniques and motor maintenance.

The original estimates of catch rates (upon which the economic feasibility of the Dory Project was based) proved to be highly optimistic--not as to the general availability of fish, but in regard to the fishermen's performance. In particular, the projected plan called for 200 fishing trips per year. On the average, the actual performance came to less than half this number. As shown in Appendix 3, the dories averaged only seven to ten trips per month.

Another major problem area was the almost total dependence of the fishermen on a seasonal one species fishery (i.e. skipjack) and their unwillingness to diversify their efforts into forms of

fishing other than trolling. It was not uncommon for the dories to continue trolling for skipjack during the off-season. The consequent catch rates were so low that they were inadequate to cover the operating expenses, the crew payments, and the loan repayments.

The choice of jet-power for the dory propulsion system seems to have been a mistake. The incompatibility of the jet system with the dory design has resulted in poor speed, high engine rpms, and consequently poor fuel economy and high operating expenses. The carrying capacity as designed for the dories is far too great for the present landed catch rates.

It appears that the dories are over-designed and uneconomical for the type of artisanal fishery operation required for Ponape. They are too great a technological "jump" from the fishing craft previously utilized by the Ponapeans. Thus, a scaled-down design capable of outer-reef fishing should be seriously considered.

APPENDIX 1

Dory Boat Owner and Loan Recipient

Government - Production Development Loan

April 24, 1975

Name	Original Loan	Months In Arrears	Loan Balance
1. OLTER POLL "Lisa"	$5,000.00***	11	$4,196.31
2. KOHLE LUHKE "Luck"	5,600.00	5	4,749.86
3. I. BARTOLOMI "Suana"	5,550.00	15	5,550.00
4. ELTE R. SAMWELL "Marda"	5,550.00**	12	5,402.35
5. UKOLINO ROSARIO "Y. Fin"	5,550.00	2	4,351.24
6. F. PAULUS "Anatoki" (Marine Resources "Nekton No. 3")	5,000.00*	-0-	-0-
7. P. POLL "Marlin"	5,550.00**	-0-	-0-

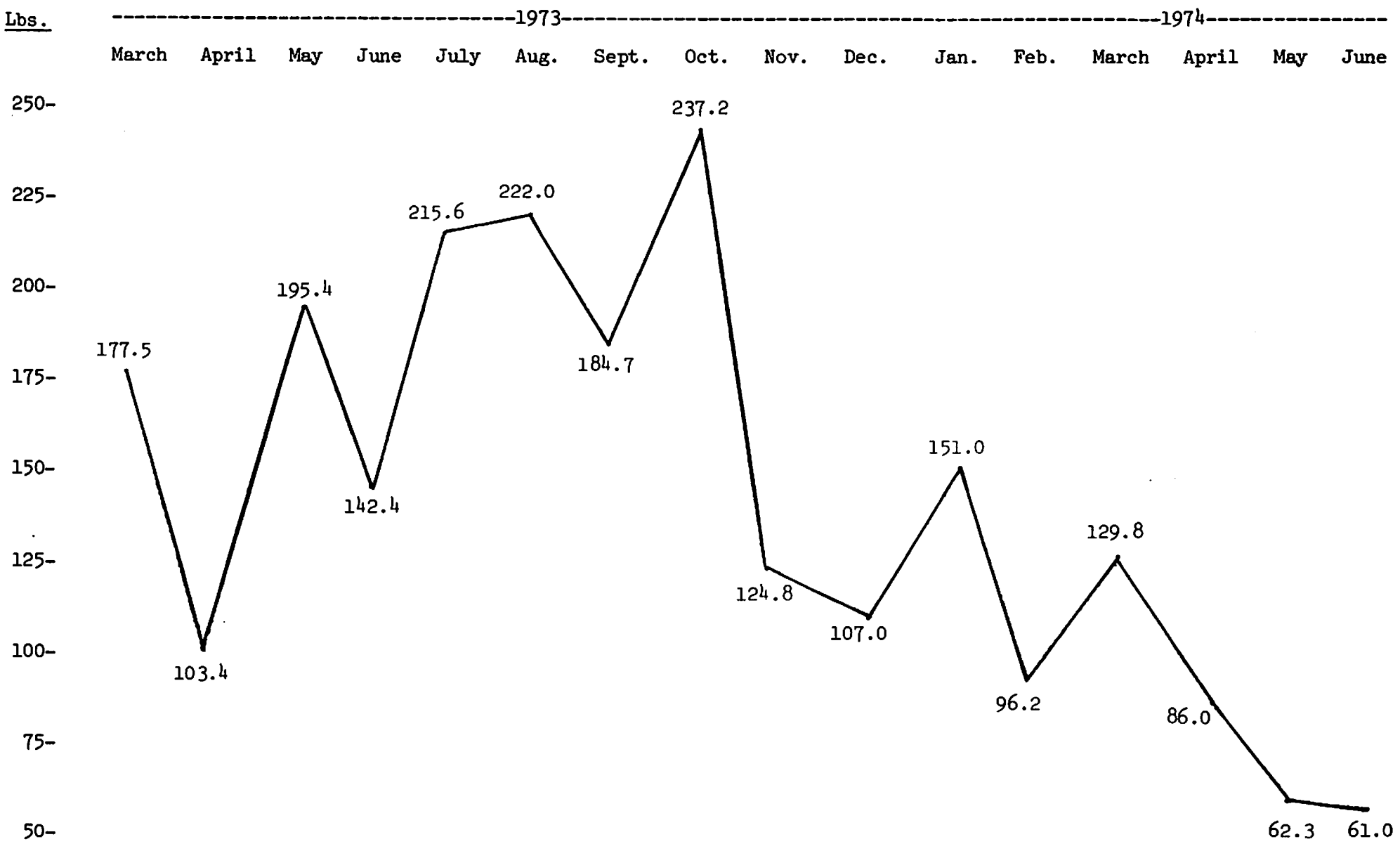
* Bought by Marine Resources

** Paid off by Insurance Co. after destroyed

*** Repossessed

APPENDIX 2

Average Catch Per Trip: By Month, March 1973 - June 1974



APPENDIX 3

PONAPE DORY PROJECT: Tuna Catch and Effort

VESSEL

	Limwehtu	Lisa	Anatoki	Marlin	Luck	Marda	Sea Queen	Suana	Yellowfin	TOTALS
MARCH 1973										
Total # Trips	4									4
Tuna Catch (lbs)	710									710
#Reef Trips	2									2
Avg. # Fishermen	3.25									3.25
APRIL										
Total # Trips	13									13
Tuna Catch (lbs)	1344									1344
# Reef Trips	3									3
Avg. # Fishermen	3.3									3.3
MAY										
Total # Trips	3	13								16
Tuna Catch (lbs)	171	2955								3126
# Reef Trips	1	0								1
Avg. # Fishermen	3.0	3.3								3.25
JUNE										
Total # Trips	3	14	6							23
Tuna Catch (lbs)	116	1799	1360							3275
# Reef Trips	2	1	1							4
Avg. # Fishermen	3.33	3.07	1.83							2.78
JULY										
Total # Trips	0	14	13	12						39
Tuna Catch (lbs)	-	2620	2242	3546						8408
# Reef Trips	-	3	3	2						10
Avg. # Fishermen	-	2.29	3.23	3.0						2.8
AUGUST										
Total # Trips	0	18	12	9	23					62
Tuna Catch (lbs)	-	3057	2273	1762	6669					13761
# Reef Trips	-	0	0	1	5					6
Avg. # Fishermen	-	2.39	3.08	3.22	3.61					3.10

APPENDIX 3

PONAPE DORY PROJECT: Tuna Catch and Effort

	VESSEL									
	Limwehtu	Lisa	Anatoki	Marlin	Luck	Marda	Sea Queen	Suana	Yellowfin	TOTALS
SEPTEMBER										
Total # Trips	0	13	6	8	8	10				45
Tuna Catch (lbs)	-	2448	367	1568	2357	1571				8311
# Reef Trips	-	0	0	2	1	0				3
Avg. # Fishermen	-	2.62	3.0	3.38	3.5	2.1				2.84
OCTOBER										
Total # Trips	0	16	11	13	10	15	8			73
Tuna Catch (lbs)	-	3042	1415	3052	3047	3393	3363			17312
# Reef Trips	-	0	4	1	1	0	0			6
Avg. # Fishermen	-	2.5	3.72	2.92	3.3	2.13	2.75			2.82
NOVEMBER										
Total # Trips	0	6	4	8	7	2	13	7		47
Tuna Catch (lbs)	-	1018	369	1089	1581	699	951	131		5865
# Reef Trips	-	0	1	0	0	0	10	5		16
Avg. # Fishermen	0	2.5	2.75	2.75	3.71	2.0	3.15	2.71		2.94
DECEMBER										
Total # Trips	1	8	2	1	0	1	3	14		30
Tuna Catch (lbs)	176	760	89	23	-	188	110	1863		3209
# Reef Trips	1	0	0	0	-	0	3	2		6
Avg. # Fishermen	4	3	2	3	-	3	2	2.64		2.7
JANUARY 1974										
Total # Trips	6	19	11	2	13	10	13	21		95
Tuna Catch (lbs)	452	3152	862	268	2803	988	2229	3585		14349
# Reef Trips	0	0	0	0	1	1	3	1		6
Avg. # Fishermen	3.0	2.63	2.0	3.0	2.54	2.6	3.0	3.43		2.8
FEBRUARY										
Total # Trips	9	15	6	9	1	6	2	8		56
Tuna Catch (lbs)	265	1771	338	760	124	636	120	1375		5389
# Reef Trips	3	0	0	2	0	0	2	1		8
Avg. # Fishermen	3.44	2.87	3.33	3.0	3.0	2.0	3.0	2.63		2.91

APPENDIX 3

PONAPE DORY PROJECT: Tuna Catch Effort

VESSEL

	Limwehtu	Lisa	Anatoki	Marlin	Luck	Marda	Sea Queen	Suana	Yellowfin	TOTALS
MARCH 1974										
Total # Trips	4	6	6	9	2	16	6	13		62
Tuna Catch (lbs)	167	711	377	1803	738	1809	563	1881		8049
# Reef Tripa	1	0	4	0	0	3	2	5		15
Avg. # Fishermen	3.5	2.33	3.0	2.33	3.0	2.31	3.33	3.62		2.85
APRIL										
Total # Trips	1	0	1	0	11	8	1	12		34
Tuna Catch (lbs)	73	-	69	-	1385	939	0	459		2925
# Reef Trips	0	-	0	0	6	2	1	8		17
Avg. # Fishermen	4.0	-	3.0	-	2.64	2.38	3.0	2.83		2.71
MAY										
Total # Trips	0	12	0	0	14	8	13	3	7	57
Tuna Catch (lbs)	-	674	-	-	1432	395	64	686	301	3552
# Reef Trips	-	1	-	-	7	4	13	0	5	30
Avg. # Fishermen	-	2.42	-	-	2.71	2.38	3.31	2.67	3.29	2.81
JUNE										
Total # Trips	0	8	0	0	8	6	4	4	5	35
Tuna Catch (lbs)	-	520	-	-	613	908	0	94	0	2135
# Reef Trips	-	1	-	-	8	1	4	3	5	22
Avg. # Fishermen	-	2.75	-	-	2.13	2.83	3.0	2.5	3.2	2.69
TOTALS										
Total # Trips	44	162	78	71	97	82	63	82	12	691
Tuna Catch (lbs)	3474	24527	9788	13871	20749	11536	7400	10074	301	101720
# Reef Trips	13	6	15	8	29	11	38	25	10	155
Avg. # Fishermen	3.31	2.67	2.91	2.94	3.05	2.32	3.05	3.0	3.25	2.86
Avg. # Trips/Month	4.89	12.46	7.09	7.89	9.70	8.20	7.0	10.25	6.0	
Avg. Catch/Month	386.0	1886.69	889.82	1541.22	2074.9	1153.6	822.22	1259.25	150.5	
Avg. # Reef Trips/Mo.	1.44	0.46	1.36	0.89	2.9	1.10	4.22	3.13	5.00	
# Months Fished	9	13	11	9	10	10	9	8	2	81
Avg. Catch Per Trip	78.95	151.4	125.49	195.37	213.90	140.68	117.46	122.85	25.08	147.21
Avg. Catch/Fisherman	23.85	56.7	43.12	66.45	70.13	60.64	38.51	40.95	7.72	51.47