Fishing for Culture

Philippe Max Rouja

FISHING FOR CULTURE:

TOWARD AN ABORIGINAL THEORY OF MARINE RESOURCE USE AMONG THE BARDI ABORIGINES OF ONE ARM POINT, WESTERN AUSTRALIA.

Ph.D.

Philippe Max Rouja

University of Durham Department of Anthropology

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"How powerful is this reversal of a famous miracle. Once two small fish alledgedly fed five thousand people. Our achievement is to make five thousand fish feed two."
(Patterson 1993:197)

"Good-bye" said the fox. "And now here is my secret, a very simple secret:
It is only with the heart that one can see rightly; what is essential is invisible to the eye.
The thing that is important is the the thing that is not seen…"
Le Petit Prince. Antoine De Saint-Exupery.

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BY

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Abstract.

This thesis attempts to demonstrate through the analysis of Bardi aboriginal hunting and fishing behaviour that individuals are being guided in their resource use by overriding ethical cultural concerns. It is demonstrated through an exploration of the relationships between Bardi Aboriginal fishing and hunting patterns, redistributive mechanisms, and animal physiology and behaviour, that daily fishing behaviour has ecological and social consequences that are the expression of Aboriginal theory and cannot be explained without an understanding of the deeper rationale of the people themselves. Analysis of the biology of individual fish and animal species and of the seasonality of Bardi fishing practices indicates that the Bardi deliberately avoid species as they reproduce, despite being readily available. Redistributive systems are shown to embody renunciative mechanisms. A division is elucidated between resources that the hunter shares and those he renounces or gives up. This division appears to serve an ecological function in that no single resource is the focus of two kinds of motivation in exploitation. It is shown that the consequences of these behaviour patterns are understood and actively maintained by the Bardi and are the manifestation of an overall ethic or theory that defines their interaction with their environment if not their culture. This thesis presents detailed descriptions of several spheres of Bardi knowledge including hunting, fishing, navigation, and systems of distribution.

Acknowledgments.

The author wishes to acknowledge the assistance of the following persons who made the completion of this thesis possible: The entire Bardi Community, especially Douglas and Katie (Mum) and the whole Wiggan family, but specifically Lucy, Tom and Ester, Roy and Margaret, Jesse, Gounie, Jabby, Eddie, Darrel, Jody, Lulu, Paul Sampi, Eric and Shirley, and many more, for their friendship, generosity, and willingness to teach of themselves; Professor David Turner, who has been my mentor for over ten years; Professor Robert Layton, for his patience, guidance and support throughout my four years at Durham; Dr. Robert Sands, my computer "guru", for his invaluable help; Horst at the One Arm Point Store, for his time and granting me access to the Bardi store records; the Sir Dudley Spurling Postgraduate Scholarship Committee for their financial support especially Joanne; Wendy at the Kimberly Bookstore, for mailing me books from across the globe; Patricia Summerfield from the Fisheries department of Western Australia; Dr. Moya Smith from the West Australian Museum; Malcolm Douglas for his support; Francoise Leperq, for her generosity; Eleonora, for valuable editorial support, suggestions, revisions and partnership (especially during fieldwork) over the last four years; My family, especially my parents Sandra and Pierre who have supported me tirelessly throughout this endeavour; and Shashi a constant reminder of One Arm Point.

Please be aware that one of my main aboriginal teachers passed away in December 1997 as this thesis was being completed. I have removed all his photos but the text still refers to him by his European name; Douglas. Sensitivity should be exercised when this thesis is taken to One Arm Point.

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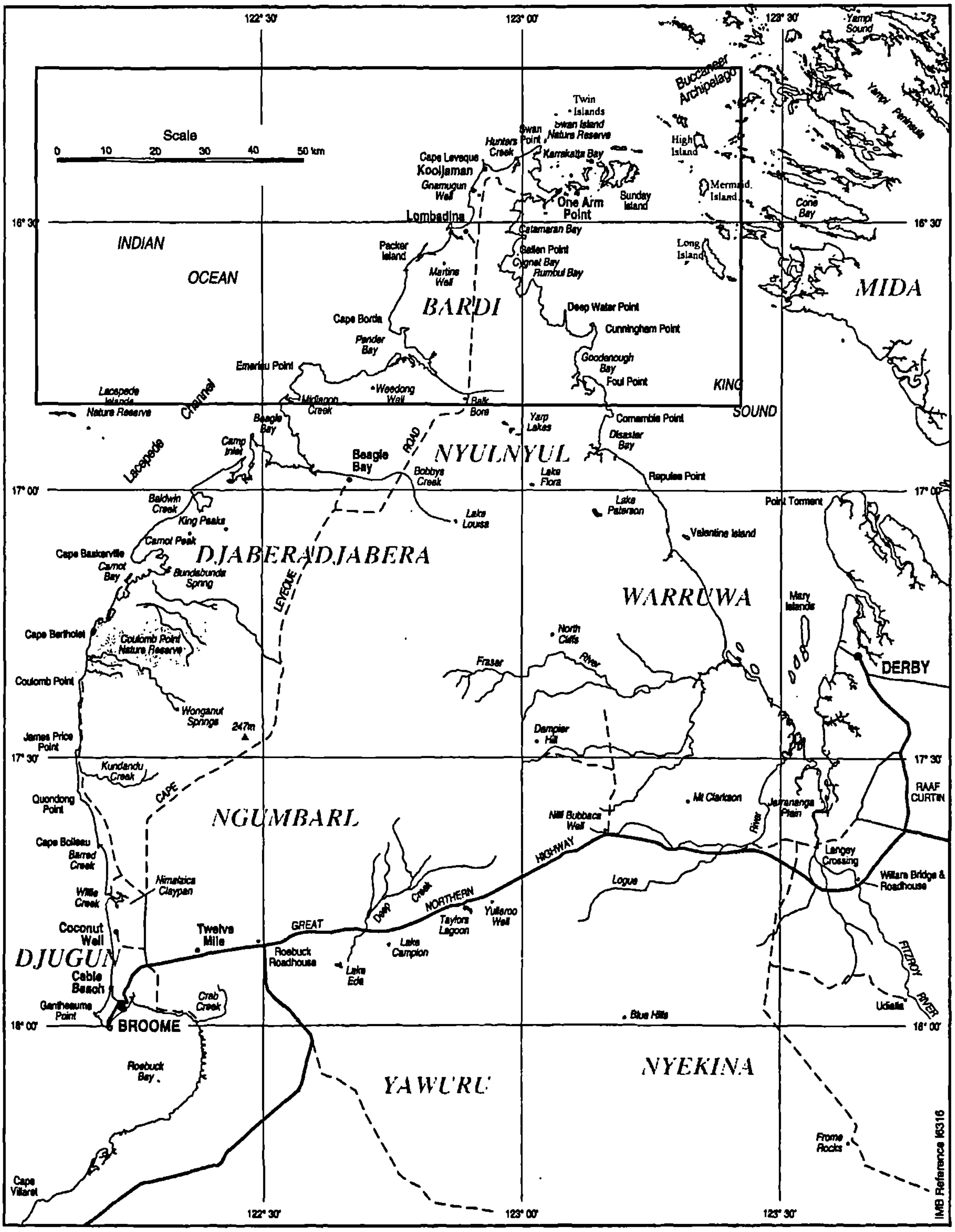

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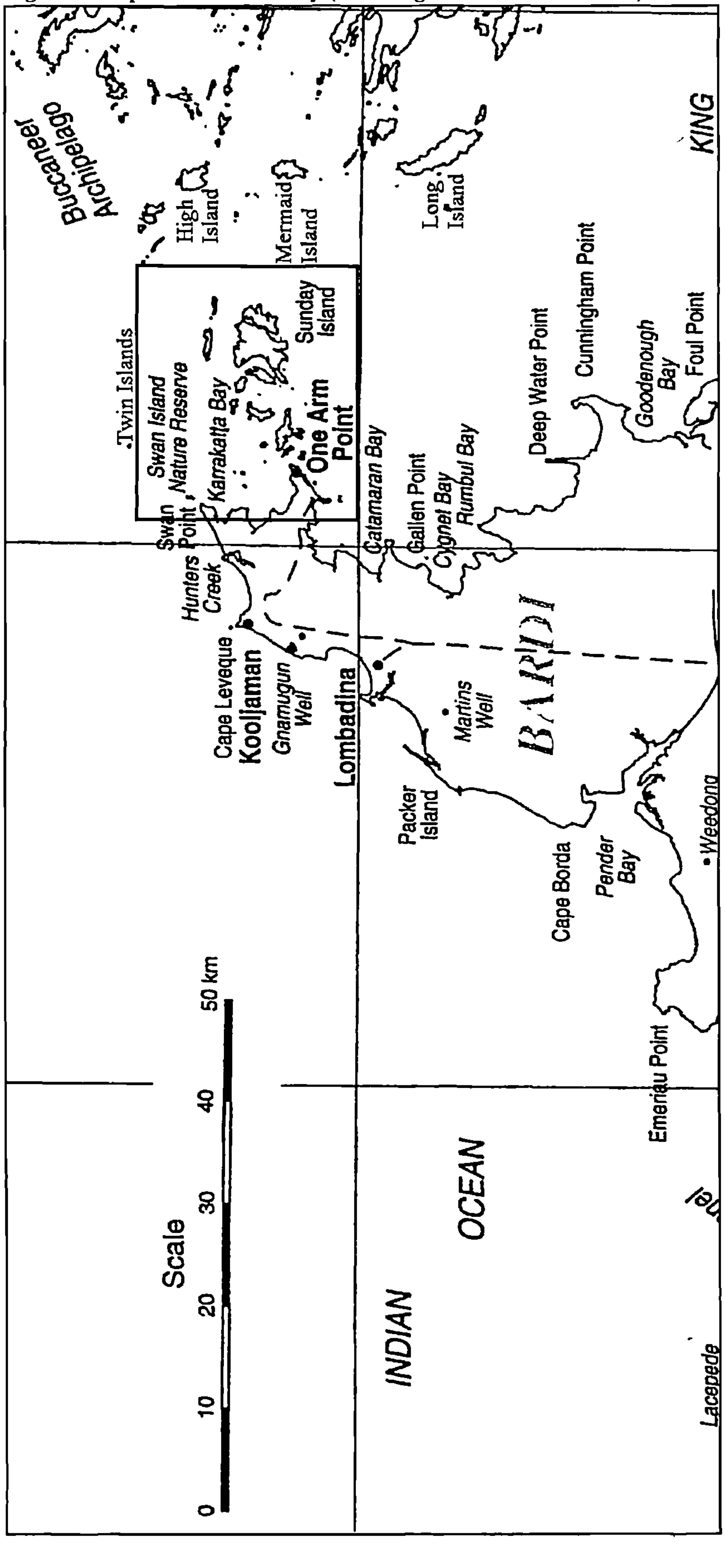

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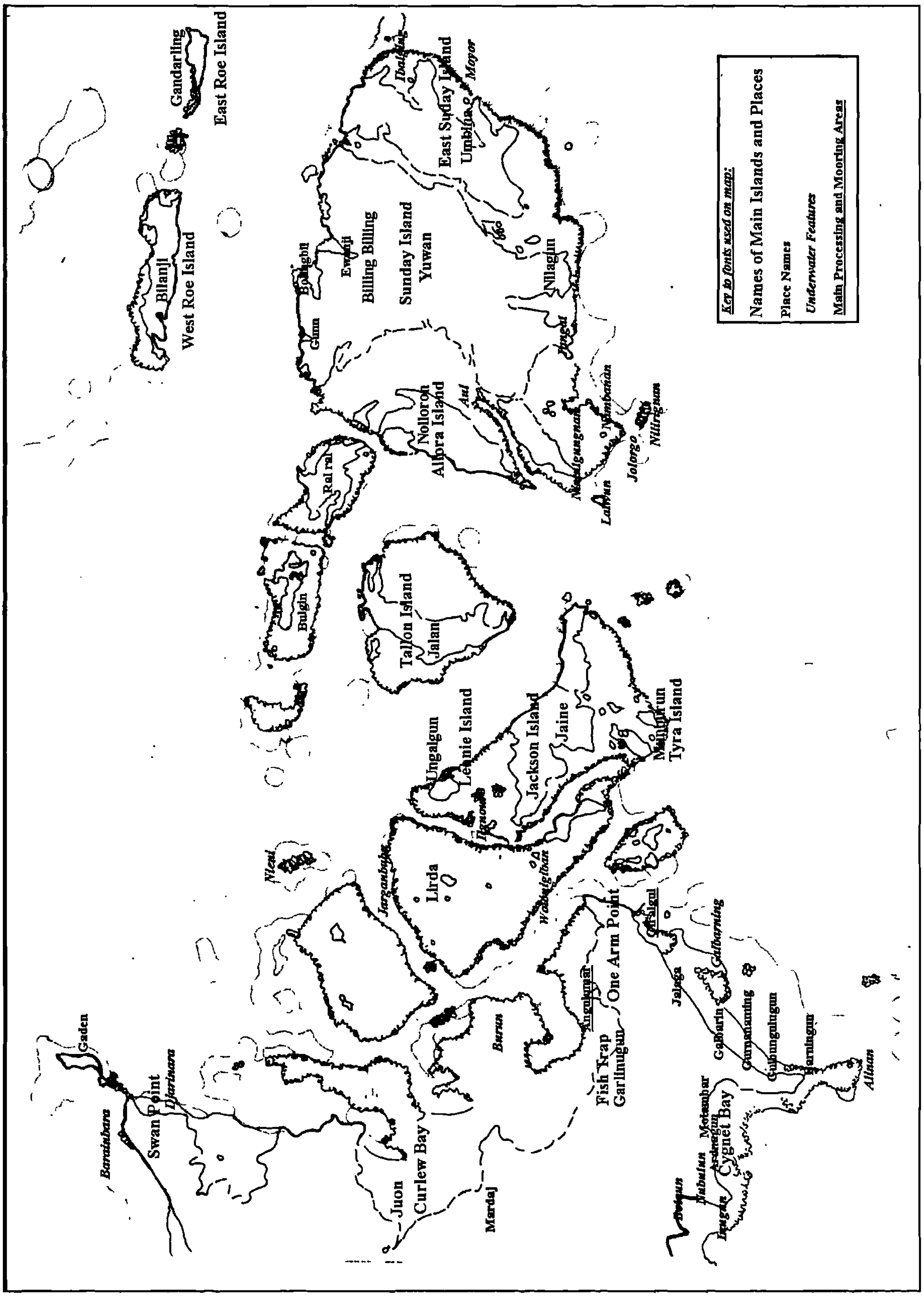

1. Introduction

I have been involved in research concerning maritime resource use since 1989 when I began working for the Bermuda Maritime Museum as a marine archaeologist searching for and surveying wrecks. Part of my work involved interviewing and working with some of Bermuda's oldest fishermen who were the first to discover and dive on most of Bermuda's wrecks. It struck me as paradoxical that these fishermen, who had such an intimate knowledge of their environment, were responsible for the degradation that led to the total closure of the Bermudian commercial fishery in the mid 1980's.

They possessed the knowledge and the intuition to use the sea effectively and yet they did not or chose not to foresee the effects and consequences of their actions. This started me on my present course, in which I try to understand the relationship between ideology, knowledge, and chosen strategy or practise in the use of maritime resources by coastal people.

In 1990 at the University of Toronto I took a course on the Australian Aborigines, focused on Groote Eylandt, Bickerton Island and Eastern Arnhem Land. Professor David Turner presented an Aboriginal rationale for resource use that demonstrated how they had effectively dealt with many of the problems that resource use strategies and specifically modern fisheries' management strategies suffer from, the tendency to overexploit and to act selfishly.

My interest in the subject prompted Professor Turner to invite me to act as his research assistant from January to April 1992 on Groote and Bickerton Islands in the Gulf of Carpenteria. Professor Turner was going over material collected by himself over a twenty five year period among the Aborigines of these areas concerning their music and songs, the results of which he has now published in his book, Afterlife Before Genesis (Turner 1997).

After my first encounter with Aboriginal people on Bickerton Island it became apparent to me that there were many intelligent but flawed theories dealing with Aboriginal resource use. There also seemed to be a dearth of strong ethnographic research describing the amazing complexity and skill of Aboriginal mariners. The finesse and intuition possessed by the Lalara brothers on Groote and Bickerton islands amazed me and pushed me to pursue my research in such a way as to bring it to light and to fit it into the larger picture.

I hope to keep to the spirit of the work of Turner, Rose and Swain. These writers all describe Aboriginal behaviour using the rationalisations of the people themselves. The ideas that emerge from such an approach appear to me to be the most accurate representation of the life of Australian Aborigines.

Understanding the Australian Aboriginal individual in his exploitation will not only catalogue a rare, ever changing and disappearing activity but will also lead to a better understanding of the cultural context within which the individual is functioning. It is at the individual level that we can better observe responses to the constant challenges that colonial contact has effected and continues to impose. It is probably easier to asses cultural change at the individual level than "en masse". If culture is manifest in the individual then fishermen will represent in their behaviour, their philosophy or world view.

Therefore I have chosen to conduct my research by working with the individual as he exploits his environment. This approach to learning about Aboriginal fisheries and resource use is supported by Robert Johanness' studies of marine ecosystems in Micronesia. (Johanness 1981: 1989)

In October of 1995 under the supervision of Professor Robert Layton at Durham University I left for One Arm Point, a coastal Aboriginal community in northern West Australia, for nine months of field work. In September of 1996 I returned to the Bardi Aborigines of One Arm Point for one month of further research based on the information collected in 1994\95.

I have been looking at methods of procurement with the Bardi fishermen at One Arm Point, cataloguing both the rationale and technique in fishing among different fishermen. I have also been determining the cultural and ecological parameters within which they function. I think of fishing not only as a realm of valuable and rare traditional technical knowledge as it applies to resource use but also as a reflection of deeper socio-cultural knowledge beliefs and attitudes. Part of this thesis asserts that fishing behaviour is in keeping with Bardi ideology or world view and that there is an ethos embedded in Bardi fishing behaviour that determines their approach to resource use.

This thesis aims to advance our understanding of Australian Aboriginal theories of resource use through the Bardi example. This research will contribute a comprehensive detailed ethnography of Bardi fishing strategies, techniques and technology to the field of anthropology. We cannot allow this unique '*specialised knowledge won from the sea over centuries by formally unschooled but uniquely qualified observers - fishermen - to disappear as the westernisation of their cultures proceeds without anyone seeming to care*'(Johanness 1981: ix).

Today The literature on Aboriginal resource use is dominated by studies that either hold deterministic theoretical positions in regards to the controlling aspects of their resource use, or appreciate the technical aspects but do not address the issue of motivation. What seems to be lacking are studies that demonstrate that we should view Aboriginal resource use as reflecting Aboriginal goals and values. The relevance of establishing Aboriginal theoretical control over their historical and future use of resources has never been stronger than it is today.

1.1. The Bardi, prehistory

The Bardi or their predecessors have inhabited the northern most tip of the Dampier peninsula in excess of 27,000 years. (O'Conner 1989) There is a strong argument for there being an invisible phase in the archaeological record that would put sites older that 30,000 years under the now present level of the sea. It seems likely that the area was occupied earlier than 27,000 especially when considering that the Kimberly is put forward as one of the more likely points of entry for the peopling of Australia at least 50-60,000 years ago (Flood 1995). The Bardi have always been considered coastal people living what could be characterised as a coastal, fishing, hunting and gathering lifestyle. *'Until the 1940's, ten months of the year were spent in concentrating on marine resources (supplemented by animals, reptiles, birds, plants and honey), with over 70% of the food intake derived from the* *sea.*'(Smith 1983:446) Much of women's subsistence activity took place in relation to the coastal zone presumably contributing an uncharacteristically high amount of protein (when compared to inland groups) to the diet through their activities. Many novel techniques of resource use have been noted among the Bardi in early records including the use of 'tank logs' hollowed out and buried as water storage devices (Kenneally et. al. 1996), and the famous mangrove rafts with which they rode the tremendous tides of the area, using these much as one might use a subway to travel from island to island or in the pursuit of prey and allowing them to travel remarkable distances. Fishing was undertaken with spears, specially designed boomerangs, and traps, the latter being used either as weirs for capturing the large mammal dugong, or as fish traps. Bardi fishermen have been using the huge tides to their advantage for millennia. This may account for the surprising lack of archaeological evidence in the form of shell mounds in the outlying islands. Rather than bringing large quantities of oyster back to particular camps where they could be processed, the Bardi would walk out to these at low tide where they lay on exposed rocky surfaces. Here they burnt spinifex grass directly on the exposed rock oysters and ate the muscle in place as the shells opened. [1] The Bardi then have been displaying a remarkable ability to make use and live off of this plentiful and sometimes dangerous environment for millennia.

Prior to European settlement it is thought that Aboriginal family groups were associated with particular estates or Buru. These Buru roughly grouped into four larger regional groupings (see chapter 1.5). Smaller family groups lived in particular camps running along the coasts within particular Buru shifting from camp to camp within and between Buru on a semi nomadic basis possibly following changes in the seasons and according to specific ritual calendars. As the larger estates were probably exogamous, families enjoyed ties that gave them access to all parts of Bardi territory. It is thought that traditionally the boundaries of these Buru extended into the sea as far as a man could swim. Elkin (1933)estimated that at the time of white settlement the population was approximately 1500, making

[1] As this thesis is predominantly concerned with the use of marine resources and how this has changed it necessarily covers historical aspects of Bardi fishing and so these will be elaborated in the text.

population density at one person to every 5 square miles. An even higher population density could be inferred if we consider that almost all the camps were situated along the coast, evidenced by the tendency for estate boundaries to become diffuse the further inland they went. The Bardi of the most Northern Buru were closely associated with the island living Djaui. With the establishment of the Sunday Island mission in the 1890's they were grouped together so that by 1932 Elkin considered them to be identical. Some Bardi still feel attached to traditional lands they are connected to through Djaui ancestors.

1.2. Research Rationale and Method.

In my research proposals I justified my academic motivation for exploring the field of Australian Aboriginal hunter gatherer marine resource use by arguing that there was a dearth of strong ethnographic research in this field. This position has subsequently been supported in a monograph published by the Institute of Australian Aboriginal Studies; A Sea Change in Land Rights Law: The Extension of Native Title to Australia's Offshore Areas, concerning the issue of Native Title as it relates to sea rights. It states;

> *'Although there is significant reference to Aboriginal association with the sea in the anthropological literature, there are few specific studies targeted at systematically documenting the use of the sea by Aboriginal people. This was recognised as early as 1965 by Stanner and is due to the fact that anthropologists and other scholars have tended to locate their work on dry land. The dearth of case specific, sea related, material is recently emphasised in a handout requesting presentations for a special session at the Australian Anthropological Societies annual conference, in which the convenors plead for anyone with case-specific ethnographic material to come forward.' (Meyers, O'Dell, Wright and Muller 1996: 9)*

My first period of field work among the Bardi Aborigines of One Arm Point ending in June of 1995 appears to have fulfilled Myers' request for 'the systematic documentation of Aboriginal use of the sea'. This thesis is the culmination of research carried out during this and a second fieldwork period in September - October of 1996. The first fieldwork period (November 1994 - June 1995) focused primarily on deciphering the basic elements of Bardi fishing. Fishing patterns, techniques, history, and taxonomy were catalogued as presented to me by my Bardi teachers in the context of daily fishing expeditions. The second fieldwork period, while still focusing on daily expeditions, investigated the redistributive mechanisms catalogued within the initial fieldwork framework and tested some of the patterns observed in that same period.

My research method was participatory in its approach, with the analysis implicit in this participation, in that it seeks to understand the rationalisations and motivations for observed behaviour within and through the context where they were observed. I felt, and still feel, that the only way to achieve this was through direct participation in the procurement activity of hunting and fishing.

Robert Johanness' results in researching tropical marine ecosystems in Micronesia supports a field work method that asks *'what can we learn from you?'* as opposed to *'how does this environment influence you?'* (Johanness1981: x). There are several key theoretical issues in anthropology that are relevant to the type of study I have carried out and these are elaborated in section 1 3. The active participation fieldwork method is the hallmark of traditional anthropology and needs no justification. My research method is guided by the understanding that Australian Aboriginal people are the active determinants of their activities in their environment and that any effort at understanding Aboriginal and specifically Bardi motivations must be made through them. The results of my research will demonstrate the strengths of this approach. This position does not represent a rejection of any theoretical position as affiliated with a particular school of anthropological thought. Rather, it represents an opportunity to reflect upon their relevance to material, both qualitative and quantitative, that has been collected through an unbiased fieldwork approach.

There has therefore been a strong emphasis on understanding traditional skills through active participation. In being taught Bardi technical knowledge I have experienced first hand how that knowledge is transmitted, passed on. This has granted me insights that would have otherwise remained invisible.

As I predicted in my research proposals, this created a unique partnership between informant and investigator. The exchange of information through personal interaction created a dynamic relationship that reinforced the value of Bardi traditional knowledge and skills. As a researcher, I had the full participation and enthusiasm of informants and was able to ensure that what was being researched was relevant.

Through active participation in the procurement of resources I was able to catalogue fishing techniques (variation and rationale), the use of different technologies by different individuals and their comparative use, and the effect /success of those techniques and technology. I also elucidated information concerning location and membership of estates, locations of rich ecological niches, information pertaining to prohibitions, redistributive mechanisms, and perceived relative nutritional value of resources.

My findings have an ethnographic rather than theoretical quality. As pointed out, there have been few research studies specifically targeting the cataloguing and analysis of Aboriginal marine resource use. Fewer studies focus upon open ocean fishing and navigation. The few specific studies have concentrated on the intertidal component of Aboriginal marine resource use, the collection and use of rock oysters, the use of fish traps, and other aquatic organisms open to harvest. (Betty Meehan (1982) & Moya Smith (1983))

This ethnographic quality does not negate the theoretical component of this thesis. It is, in fact, the main constituent of it, as it is in their fishing behaviour that the theoretical significance of Bardi subsistence is embedded.

What I have recorded and analysed is Bardi behaviour 'in the rough'. It is not Bardi behaviour presented through the lens of an interview process, or as they show the anthropologist 'X' or 'Y' method of fishing. I am confident that my data represents Bardi fishing as Bardi people do it when they are alone. My entire initial field work period was primarily spent accompanying Douglas Wiggan (Sr.) (see family tree diagram in appendix) on his and subsequently our daily fishing expeditions as, after two months of apprenticeship, I was considered a contributing fisherman in my own right. On occasion, when Douglas felt ill, I would accompany his son or nephews on their daily outings, giving me the opportunity to catalogue the technique of the younger fishermen. This put me in a position to record and analyse the differences between two generations of fishermen from the same Bardi family in the fields mentioned above.

The daily expeditions are the source of most of the material in this thesis. It is well known that Aborigines appear enigmatic when providing information. However, as fishermen observed in context and in action, information takes on an immediate pragmatic quality which is both the goal and the reward of this kind of participatory approach. Many of the erroneous assumptions and conclusions about Aboriginal resource use are the result of research carried out with very little if any direct participation and understanding of the Aborigines' own interpretation of their behaviour. My own work has made this very clear to me; information that I had thought to be of great importance and reliability appeared nonsensical when I began participating in the daily fishing expeditions.

Questions I asked on fishing techniques and resource use were posed, for the most part, in the context of the daily fishing expeditions. If I needed to expand my understanding of certain subjects I would ask questions when they were discussing issues pertaining to resource use among themselves. Usually, when it was clear to them that I had completely misunderstood a concept, they would take the time to explain it to me. It appeared to be important to them that I understood what was going on. My enthusiasm for their culture was evident and contagious, a simple question about no longer used historical techniques of night fishing would lead a group of young boys, unbeknownst to me, to go down to the reef at night and try it out. Tired of questions that asked only; 'where is your country', 'how are you related to this or that person', 'what do you eat', etc. the Bardi welcomed someone who participated fully and whose interests reflected their own. 'How can you tell if a turtle is male or female before you spear it?' 'When do this or that fish get fat?' 'What is the best wood for making spears?' 'Why doesn't anyone use that particular fish trap anymore?' 'Why are the young people chasing the turtle with engines instead of sculling for them?' My questions often reflected their own concerns and I was made privilege to an ongoing cultural debate as to the nature of change and what should be done about it.

Fishing is an aspect of their lives that they can fully rationalise and verbalise and I often left the men still debating issues I had raised as I went to bed, exhausted. My main difficulty became discouraging them from showing me this or that method of fishing as each tried to show me something different from the other. This lasted only approximately two months and within that time they were fishing as normal fishermen, but taking extra time to teach me and, more importantly, the younger fishermen; something they had not yet seen. Robert Johanness (1981) in Micronesia had similar experiences when working with indigenous fishermen and, though his work investigated the marine biology of the region, I used it as a loose guideline for my framework in collecting material both for the special attention it pays to their technical methods of procurement and for his special attention to what he calls 'curious data'. This refers to explanations or rationalisations for fish behaviour that in European terms seem nonsensical but, when investigated in context, make perfect sense. These 'curious data' are one of the justifications for my analytical method that seeks to understand the context before any attempt is made to try to understand the overall rationale.

This thesis aims in part to demonstrate that there is an overriding ethic that governs resource use in the Bardi context. It also aims to support the idea that this ethic is manifest throughout Aboriginal Australia in general, theoretically applicable in any environmental setting. It is difficult for me to present to the reader how and even if this ethic exists before I have deduced the Aboriginal logic for resource use and specifically fishing in the Bardi context. Therefore, I propose to begin my thesis by producing a descriptive account of Bardi fishing techniques and marine resource use strategies. This material, once presented, is analysed to establish what, if any, overriding principles are governing or guiding the individual in his day to day procurement behaviour. It is important that the magnitude of what is happening is not presented out of context if the reader is to understand how the Bardi subsistence strategies function. The richness of their fishing lore and the complexity and skill that they take for granted are amazing and are an invaluable lesson in fishing and navigation that should never be lost either for future generations of Bardi or for ourselves.

1.3. Theoretical issues in the study of hunter gatherers.

'Knowledge enables men to fashion fishhooks, lures, seines, dragnets, trawls and weirs, but when this happens the fish flee in confusion to the depths of the water.' (Chuang Tzu, Watson.(tr.) 1968:112-113)

One of the main goals of this thesis was to carry out research in marine ethnography and resource use that was relevant to the Bardi in their present situation. In today's climate of land rights and native title claims an intimate understanding of Aboriginal theories of resource use and the theories' expression in practise is extremely relevant. Boundaries of countries and traditional ownership are highly sensitive issues but no where more so than in the debate over ownership of the sea (M. Smith 1985, Meyers 1996). Ownership of the sea is already a controversial issue on an international scale with countries debating issues such as rights of access.[2] Native title claims of sections of coast and adjacent waters further complicate the issue of ownership. During my time at One Arm Point, Richard Court, the premier of West Australia, was contesting the applicability of the Australian supreme court's Mabo decision to his State. This ruling, put into legislation by the federal government, removed the *'terra nulis'* assumption of Australian colonialisation and set a legal precedent for the restitution of traditional lands to Aboriginal people. Despite backing by pastoralists, ranchers, industrialists, and pearlers/fishermen, his case was eventually thrown out. However the tensions between state and federal government remain and the West Australian government is one of the main contestants to Aboriginal claims over Crown lands in traditional country. The issue of sea rights is central to the Bardi native title claims.

This thesis supports Bardi claims to traditional areas of coast and open ocean with which they are associated and on which they continue to depend. It will be demonstrated that among the Bardi, marine resource use is based on an ethic of long term sustainability through conservation. The Bardi remain highly dependent on their traditional subsistence practises as an important source of nutrition. Marine

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[2] See Campbell and Wilson (1993) for an in depth account of this issue in Northern and Western Australia.

subsistence related activities are one of the main traditional activities still regularly practised by the Bardi. Securing access and control of this resource base for continued traditional use is of paramount importance.

This thesis seeks to elaborate the Bardi theory that guides their marine resource. The work of David Turner, Deborah Bird Rose, and Tony Swain validate such an approach in that they all have established the existence of Aboriginal theory and its profound effect on resource use.

Over the course of twenty years of research among the Groote Eylandt Aborigines David Turner realised that the Aborigines were maintaining complex systems of ritual and social organisation that had very specific implications in the realm of resource use. Turner discovered that on Groote and Bickerton Island, in the Gulf of Carpenteria, different family groups associated with particular stretches of land or country were totemically linked with particular resources within their country, and were consequently denied access to those particular resources. Turner eventually came to realise that the resources associated totemically with any country represented what those particular countries had in abundance. Owners of that country were effectively denied access to what they had the most of. Those, however, from neighbouring countries not totemically linked with these resources could consume them. Therefore, though one was denied access to what one had the most of, one always had access to what was in abundance in someone else's country. It appeared as if these Aborigines drew boundaries around abundances or surpluses of resources and then made them forbidden to those of that country.

> *"On an island that appeared to have no shortage of food the aborigines appeared to have imposed boundaries that made it impossible for a given people to be self-sufficient in their own country." (Turner 1989b:162)*

> *"Bickerton could have been an internally undifferentiated island belonging to but one People; indeed this would seem natural from our point of view. But no. (Turner 1989b: 55)*

When Turner returned to Groote and Bickerton Islands and relayed his discovery to the Aborigines he found that not only were they aware of the implications of these particular relationships to country but that they were a manifestation of an overriding principle or ethos. Property generally circulates from those who have it to those who don't. (Turner 1989b: 147). That Aboriginal systems seek to create and maintain interdependencies is not surprising, but that they do so through the limitation of available resources is incredible. Turner is not alone in his assertion that Aborigines limit individual self- sufficiency in order to maintain social relations of an interdependent nature.[3] His ideas are strongly supported by both Deborah Bird Rose and Tony Swain . Deborah Bird Rose (1992) describes the Yarralin as having applied similar principles, weaving lands and people into interdependent networks so that all groups are mutually interdependent. Tony Swain (1993) argues that this pattern: the fragmentation of abundant environments along philosophical lines into communities or countries that are non-self-sustaining and mutually interdependent as opposed to ecologically into self sufficient communities, is present in different forms throughout northern Australia and Cape York and that it suggests the existence of a common ethic or philosophy shared among Australian Aborigines that manifests itself regardless of ecological context.

The idea that Aboriginal systems show continuity throughout different environmental settings is not limited to these authors, specifically in relation to land tenure, ritual systems and more importantly so called 'sharing systems' (Dousset 1996, Sutton 1996, Williams E. 1987, & Layton 1986).

Redistribution of resources has been classified under the wide umbrella of "sharing systems" but Turner argues that a departure from such categorisation is necessary if we are to fully appreciate the uniqueness of the behaviour he catalogued. He argues that such behaviour is better described as renunciation. Individuals give up or renounce what they have without qualification.[4] If they were sharing they would be keeping some for themselves. If it was a system of exchange, either reciprocal, generalised, or delayed, it would not extend beyond a certain group (which it does, theoretically to anyone initiated into the Law) as one could

[3] I would also add that there are possibly positive ecological consequences to this behaviour.

[4] Renunciation is defined as the "consent to formally abandon, surrender, or give up," in relation to religious discourse in our tradition. Turner then is obviously imbuing it with wider meaning when applying it to Aboriginal material and though it inevitably remains inadequate in describing the complexity of the Aboriginal concept he feels that it comes closer than any other term to describing the Aboriginal idea he is trying to translate.

not collect what one was owed. Such theorem cannot account for giving up or renouncing to individuals one will never see again. Theories and models created externally and derived from classical economics assume that everything has to be defined in terms of self interest. Sharing and exchange models all assume that either consciously or unconsciously individuals or groups are calculating the costs of transactions. Turner argues that this is not what Aborigines are practising, that the principle being followed is one of renunciation not based on a cycle of exchanges but on the idea that property moves from those who have it to those who don't. It should not be surprising that Aborigines are functioning outside of the boundaries of theoretical models predicated on a Western market mentality. The idea of self interest might be irrelevant in a culture where people have tried to eliminate it from the social order.

The thesis attempts to elaborate the Bardi theory or explanatory model of their marine resource use. Turner's work is used as a guide not because it was assumed that the Bardi situation would mirror the Groote and Bickerton Island models as postulated by Turner, but because in voicing the Aboriginal view as theory he suppresses the tendency to treat Aboriginal knowledge as producing data while Western knowledge produces theory.

The methodology of the thesis is based on the assertion that those concepts operative on the ground level of Bardi society constitute a body of indigenous theory in and of themselves. Field research, therefore, focused on thick description with the primary objective of collecting information in as wide a scope as possible in the area concerned. The application of methods which seek only to collect "relevant data" to test external theoretical perspectives which do not incorporate the aboriginal perspective obviously work against the stated goal of exploring the Aboriginal perspective. As outlined above, one of the priorities of this research was to aid the Bardi in their fight for native title. Undoing the primacy of Western analytical privilege and placing it the hands of the people themselves is an important step in the argument for self determination.

In certain areas information I collected was of the same type as those collected to test formal economic models such as Optimal Foraging Theory. (i.e. data gathered during daily expeditions such as numbers of animals caught, fishing patterns, etc.). However, I specifically avoided the more intrusive data collection that characterizes such studies.

My fieldwork was based on relationships of friendship and mutual trust. In effect, the insights achieved in this thesis would have been missed without such relationships. Intrusive field work methods would have compromised my ability to forge such relationships, and quite frankly, my fieldwork would have promptly come to an end if such intrusive methods had been applied (see Appendix section 9.4). [5] Therefore for the reasons outlined above the data collection techniques necessary for testing OFT theories were not practical in my fieldwork situation.

In chapter 7 I have described and analysed the main aspects of redistributive mechanisms among the Bardi. In chapter 8 I will demonstrate that redistributive mechanisms not only create interdependencies between people but also play an important role in the conservation of resources and that conservation strategies in the Bardi situation are a reflection of deliberate efforts to achieve long term sustainability. It will also be put forward that new analytical categories, such as Turner's, must be used in order to achieve insights into the nature of these mechanisms.

1.4. History of the Bardi of One Arm Point.

The Bardi Aborigines are located at the north western tip of the Dampierland peninsula, named after the English explorer William Dampier who first described the inhabitants of the region in 1688. Dutch and Portuguese mariners had visited the peninsula prior to Dampier, some possibly wrecked in this area well known for its treacherous waters. Before contact with Europeans, people from the Indonesian archipelago had fished Northern Australian waters and visited the mainland for 200 to 800 years (Campbell & Wilson 1993). Today the populations of the main towns of the area, Derby and Broome, are extremely diverse constituting people of Macassan/Indonesian, Japanese European and Aboriginal

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[5] It is important to note that the general attitude toward anthropologists in Aboriginal communities ranges from one of indifference to mistrust.

descent. Most of these people were drawn to the region in the mid 1800's in order to take advantage of its rich marine resources. This influx of people constitutes an important part of the history of the Bardi over the past 100 years.

Early European encounters had little effect on the Bardi as these were brief and accidental (Stannage 1981). Though some portions of their land had been sold to pearling and pastoral interests prior to the establishment of the mission settlements in the 1890's these had only been used to provide small lay-up points or bases for pearling crews. Initially the Bardi were characterised as defensive and aggressive towards Europeans and, in recognition of the difficulty in navigating their surrounding waters, the Bardi were left to themselves far longer than their immediate neighbours to the South. Settlements developed as the Bardi began to congregate around the missions. Part of the mandate of the missionaries was to maintain the integrity of the Aboriginal population, preventing them from mixing with the people introduced to the region by the pearling interests. These missionary settlements were, therefore, largely restricted to people of Aboriginal descent and the missionaries themselves. They were never intended as trading centres or welcoming points for Europeans, the towns of Derby and Broome being already well established.

Two distinct missionary groups established themselves at opposite ends of Bardi traditional lands. Consequently, the Bardi experienced two separate histories, largely resulting from the character of the mission with which they became associated. This association was determined by the geographical location of their traditional estates. The Bardi are divided into four groups, roughly equivalent to the four directions: South: **Olonggong**; North-west: **Gulargon**; North: **Adiol** and East: **Baniol**. The **Olonggon** and **Gulargon** Bardi were attached to the Catholic Trappist mission at Lombadina, and the **Adiol** and **Baniol** Bardi became associated with the Anglican Sunday Island mission. For both, however, the missionary experience served to buffer the Bardi from the more aggressive type of contact they had begun to experience and that Aborigines were experiencing throughout the continent.

The Lombadina mission was purchased from Sydney Hadley as a small economic venture in 1892 by the Trappist monks already established at Beagle Bay. It was intended to be self supporting and the Aborigines were put to work raising cattle and were forced to abide by a rigid work ethic in order to earn their keep. Traditional ritual activities were actively discouraged by the missionaries who felt that the only way to christianise them was to prevent the process of tribal initiation. Pearling was attempted but never really succeeded and the mission never managed to be self supporting. [6]

Historical literature and records have allowed for a good reconstruction of Bardi life at the Catholic missions of Beagle Bay and Lombadina. Unfortunately, the same cannot be said for the Sunday Island Mission. Most of my information was collected from informants while on visits to Sunday Island with One Arm Point residents and through interviews with the oldest members of the One Arm Point community who had recollections of life during mission times.[7]

Sunday Island is the largest of a chain of islands immediately to the west of the Dampier peninsula. The Sunday Island mission was set up in 1889 by an Englishman, Sydney Hadley, apparently suffering from remorse for his previous ill treatment of Aborigines during his days as a lugger boat captain. Established under the auspices of the Anglican church with approximately 70 Aborigines, Sydney Hadley's approach to the Bardi was surprisingly open and, unlike at the Lombadina mission, traditional ritual culture was apparently encouraged.

> *'In his appreciation of the religious and social significance of their initiation rites the Englishman went so far as to insist on being himself put through all the rigours of the Law,...apart from discouraging sorcery, infanticide and the cohabitation of women with the lugger crews, he interfered little with their former pattern of life. ..It was no help to the other missions that customs they had discouraged were condoned on this nearby island and nothing could prevent the Beagle Bay and Disaster Bay people going there for initiation ceremonies during wet season walkabouts' (Durack 1969:162)*

As there was no opportunity for raising livestock on the island marine foods caught by traditional means continued to provide the mainstay of the Aboriginal

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[6] For a full description of the missionary activities at Lombadina and Beagle Bay refer to Mary Durack; The Rock and the Sand (1969).

[7]Fortunately an elderly missionary lady who had worked on Sunday Island returned for a visit during the first fieldwork period prompting many memories among elder informants.

diet and presumably that of the mission staff. Hadley appears to have continued the pearling but the character of this activity was fundamentally different. Shelling was carried out in order to support the needs of the mission alongside traditional procurement activities. This resulted in a smooth integration of commercial activity and traditional culture that continues to this day.[8] The Bardi did not receive an income for their shelling activities but were regularly provided with staple ingredients; flour, sugar, tea, oats, and barley which they consumed on a daily basis. The mission appears to have functioned extremely well with this combination of traditional hunting and shelling. Numerous Elders informed me that they never had any food shortages.

The focus of the Sunday Island mission's activities was far more marine oriented than at Lombadina and consequently the Sunday Island Bardi retained more of their traditional maritime culture. Today older Bardi freely acknowledge that the Sunday Island Bardi are the more experienced and most knowledgeable seamen.

The concentration of Bardi people who stayed at the mission[9] were capable of meeting their protein needs through traditional hunting and fishing activities. However, it seems likely that they were not able to fulfil their daily carbohydrate requirements from the resources available on Sunday Island alone. The mission, therefore, supplied carbohydrates to their charges and, as in many parts of Australia, initiated the Aboriginal dependency upon western carbohydrate sources.[10] As it is estimated that the Bardi received 70% of their food intake from the sea prior to contact (M. Smith 1984: 446) the impact of cheap carbohydrates on traditional exploitation patterns would have had less importance for the Bardi than for other Aboriginal groups.

In 1923 Hadley left the mission and returned to England. The mission was then taken over by United Aborigines Mission who withdrew their staff in June

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[8] The collection of trochus and pearl shell could be worked easily into traditional hunting fishing behaviour patterns and did not cause a significant disruption in these. (see chapter 6 & 7) The mission eventually came to control the trochus industry in the area. (Campbell & Wilson 1993: 100)
[9] The mission population was 113 in 1904 and can be estimated at anywhere from 200 to 400 at the time of its dissolution.

1962. After this the community began to disperse and in May 1964 when the United Aborigines Mission stopped delivering supplies 'the remaining pensioners and most of the people who had moved to the mainland were brought into Derby and settled on the town reserve. When the mission stopped delivering supplies it seems likely that Bardi, now acclimatised to Europeans and dependent upon some European foodstuffs, could not all survive on the island. Many of the older Bardi wanted to stay at the mission but the legal structures of the time placed the State in a parental role to the aborigine compelling the Bardi to relocate to Derby where the State could oversee their 'well being'.

While it appears that most of the Sunday Island Bardi were relocated to Derby some chose to return to their traditional countries. The family group I worked with was one of these, relocating to what is now the One Arm Point area. Though they too had to leave Sunday Island, part of the family returned to their traditional country. This was made possible as the result of an agreement reached with a rancher Mr Brown who in return for use of part of their land assumed the responsibility of overseeing the few families that stayed behind. While some of the Bardi initially worked for him, most were not actively involved in ranching, but rather continued to live much as they had on Sunday Island, following traditional hunting and fishing routines and supplementing their diet with European carbohydrate sources from Mr Brown's stores. Bardi Elders who chose to remain at One Arm Point after the closure of the mission appear to have made a concerted effort to maintain a level of traditional activity which precluded total attachment to, or involvement in, European work activities.

During this time some of these younger Bardi men worked as navigators, occasional labourers, and divers on Pearling luggers.[11] When the focus shifted from pearl collection to pearl farming one of the largest pearl farms was established in Bardi traditional waters adjacent to Cygnet Bay. Many of the Bardi who remained at One Arm Point during this period became involved in the set-up of these

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[10] Whether this can be seen as a deliberate strategy or a natural consequence of contact is disputable, it is well documented, however, that aborigines were presumably happy to supplement the hard work of traditional carbohydrate collection and processing with western alternatives.

[11] Douglas Wiggan as a young man travelled as far as the Trobriand islands working on such pearling luggers.

activities. However, to my knowledge, none of the traditional owners of the One Arm Point/Cygnet Bay area are still involved in any aspect of the pearl farms in their waters, nor do they collect payments of any kind.

The 1960's witnessed a veritable refugee crisis in Aboriginal populations throughout Australia caused by the closing of many missions and the disenfranchisement of traditional owners from cattle ranches due to legislation forcing employers to pay Aborigines equal wages. Most flooded into towns where they formed large communities on the outskirts. Dispossessed of the very foundation of their society, the land, they fell into apathy and alcoholism living in appalling economic and social circumstances.

The One Arm Point community as it is today was established in the 1970's to accommodate those Bardi that had been relocated to the town of Derby when the Sunday Island mission closed. Bardi elders believed that a return to their traditional country was the only way to save their culture. The Commonwealth Government was happy to embrace the idea perceiving the re-establishment of communities in traditional lands as the solution to an enormous social, economic, and demographic problem caused by Aborigines living on the fringes of white settlements. The Government had taken over the 'missions responsibility' for the Aborigines and, with Aborigines now treated as full Australian citizens, they were forced to provide them with citizenship entitlements. Consequently, millions of dollars were poured into Aboriginal communities and, by the mid 70's, One Arm Point had become an established Bardi town enjoying the rudimentary infrastructures of a 'white community'. The infrastructures were, however, both unsuitable and ill conceived for Aboriginal lifestyles. While this did improve the refugee situation and reinstate people in their traditional countries, it created a whole new host of problems that had largely been absent at the Sunday Island mission.

Those Bardi who had chosen to stay at One Arm Point at the dissolution of the mission may have felt a certain degree of frustration with those who had chosen to return only when white power structures made funds available for them to do so. The frustration was due in large part to the belief that the 'newcomers' were bringing with them many of the social problems they had sought to avoid. This accounts for some of the continuing feuds apparent in the community today.

The establishment of the One Arm Point community meant a more traditional lifestyle for those moving back from the towns. However, the retention of a traditional lifestyle was complicated for those who had chosen to remain there from the start. The problems experienced in the community today cause some Bardi to reflect on Sunday Island as being the last place where there were 'real Bardi people'. [12]

1.5. Kinship and local organisation.

Kinship and local organisation among the Bardi have been the centre of much debate since Elkin first elaborated their system in 1932. My research did not seek to elaborate on or inform the study of Bardi kinship specifically except where it was pertinent to marine resource use and distribution. In addition, it is difficult in today's situation to assess the landscape of social organisation with any confidence due to the breakdown of traditional systems. In no way can I hope to expand upon the issue of the type or full nature of Bardi local organisation and kinship except in areas where it pertains to the hunting and fishing activities of the individuals I worked with. What follows then is a brief attempt at describing the Bardi kinship and local organisation system with the understanding that the literature itself is not clear on the subject.

It appears that only two things can be said with confidence about the Bardi. Firstly, they do not possess moieties or sections. Secondly, the only existing marriage rule prevents individuals from marrying into preceding or following generations, or individuals with which one stands in an **Inara** relationship. This indicates that the only sanctioned marriages are between members of the same generation or one's grandparents or grandchildren's generation, a relationship category known as **Djandul.**

There appear to be other preferred marriages but there is some variety in the literature as to which these are said to be, (Turner,1980 vs. Robinson,1979). Elkin (1984) identified 42 separate clans or estates under the umbrella of Bardi territory

[12] These problems are further elaborated in Chapter 5 section 2 and Chapter 7 .

which covers the Northern tip of the Dampier Peninsula, and for all practical purposes, can now be said to include the lands of their closely related neighbours the **Djaui** or **Jawi** who inhabited the islands at the western side of the entrance to the King Sound. In 1979 Robinson
suggests that there were 46 of these estates within Bardi territory but could only trace 21 of the linkages associated with these. These countries are called **Bor** by Elkin and **Buru** by Robinson and are traditionally associated with identifiable patrilineal descent groups (Elkin, Turner, Robinson). Moya Smith identifies these as *'the basic units of the Bardi system of land ownership and kinship, ... translated as home, earth, ground or country. Individually they are owned by members of patrilineal descent group known by the Buru name. Each Buru comprises a constellation of sites, and each one has at least one permanent fresh water source. '(* Smith 1987:.43). The Bardi technically do not have totems. Anthropologists have therefore found it difficult to establish how individuals are affiliated with country. However, Elkin and Turner argue that the Bardi, while not having Totems per se, have equivalent connections to their land expressed through a spiritual intermediary in the form of spirit children called Rai. While totems are generally affiliated with the actions of ancestral beings and thus have specific meaning for the local ritual organisation within groups, it is difficult to establish what part the **Rai** play in this.

According to the Bardi, **Rai** are spirit children which present themselves, or are found by, men before they have children. These Rai inform the man that they are to be their father, telling them what their name is to be. These spirits then ask where is the mother and proceed to enter the mother and conceive or animate the child (For an in depth account of this process see Elkin 1984:435-481, Worms 1986, & H.J. Coate 1966). Rai are said to be resident in and, by some accounts, possessors of the actual **Buru** within which they are found. The child then apparently has some spiritual connection to his/her country due to the origin of his/her Rai. In this way Bardi have a specific spiritual association with their country akin to that expressed by totemism in other Australian Aboriginal groups. For a full investigation of the issue of totemism among the Bardi see Turner 1980, Robinson, 1979, and Elkin 1984. On the mainland these separate **Buru** fall into one of four main regional patri-clan groupings roughly situated in relation to four directions.

South, **Olonggong;** Northwest, **Gulargon;** North, **Ardiol** and East, **Baniol.** (Smith & Kalotas 1985: 317) Turner suggests that these are 'Brotherhood complexes'. These groupings are based on the actions of localised ancestral beings so that members of **Buru** in each of these groups share responsibility for sacred sites within their area and the specific rituals and organisation of associated Laws.[13] As there is some suggestion that prolonged occupancy of empty areas could lead to association with that estate, and the Bardi are a part of the larger ritual complex of the Kimberly (Elkin 1984), the Bardi could be seen to predicate connection to country and the formation of estates along the lines of other Aboriginal groups that posses totems. The **Djaui** are either a part of the **Ardiol** regional complex or represent a fifth regional grouping.

Buru themselves are certainly exogamous and Robinson, while not accepting that the regional groupings themselves are entirely exogamous, notes that they were *'broadly oriented toward external groups rather than others'* (within their own regional groups. (Robinson 1979:187)

This leads some to perceive kinship patterns among the Bardi as roughly equivalent to mainland subsection kinship patterns (Smith & Kalotas 1985) where idealised marriage patterns repeat themselves every three generations (Turner 1980). Subsequently the Bardi are thought to represent a more fundamental system which was previously shared with other groups (Turner 1980, Robinson 1979) and therefore reflect a tendency towards certain idealised marriage and relationship patterns which are rendered more concrete in other groups through the use of moieties and sections.

Traditional 'owners' of country are therefore the patrilineal descendants or **Buru** members attached to specific pieces of land. The **Buru** themselves appear to be named after the main settlement area within the tract of land. Buru are not very large, *'it is only two days walk approximately 60 km, between the most widely separated patrilineal estates. '(Smith 1987:* 40). As explained, attachment to

[13] The Olonggong regional complex was often characterised as being the strongest in matters of Law, not necessarily because of a particularly strong attachment to tradition but because of a number of extremely powerful sacred sites located in their grouping. Members of different Buru within the Olonggong complex were all characterised as sharing the same type of power.

country can be assumed through long term residence and today, as **Buru** become unoccupied, re-attachment by new residents occurs more frequently. In addition, some Buru become linked to now unoccupied Buru due to the proximity of countries. Some areas, while not belonging to one Buru, appear to be linked with several different Buru. These are generally small islands that cannot support full time residence and do not have sources of permanent fresh water. Affiliation to these probably represents rights established by members of adjacent Buru who frequently use these either as camping, fishing or landing sites. It is also likely that neighbouring Buru members share responsibility for unoccupied Buru, and specifically maintain sites that have ritual or spiritual significance.

Although One Arm Point, **Ardyoloun,** itself appears to be divided into seven main blocs or groups for housing, administrative, and political purposes, there are, in fact, over a dozen significant families functioning within the community. Each family is traditionally associated with a particular stretch of land. Inheritance of land is patrilineal - a woman's ownership of her father's country is lost upon marriage, replaced subsequently by a claim to her husband's country, though she still maintains an interest in her father's land.

In order to satisfy the administrative purposes of the welfare system, several instances exist of more than one surname being used to address the same family, causing considerable confusion For example, the family of old man Khaki, one of the traditional owners for Sunday Island, consists of three different surnames Mard, Stumpagee and Thomas. Given names become surnames as sons assume the first names of their fathers, furnishing the illusion of a broadly mixed community when, in fact, the majority of the families are either one in the same, or highly inter-related. Analysis and collection of data regarding traditional countries at One Arm Point is further complicated by the rifts within family groups who traditionally share membership in the same regional groupings and sometimes the same Buru as they assert ownership to the same tracts of land or push for recognition of rights to areas through matrilineal or matrimonial connections.[14]

[14] It is important to note that this is not necessarily a manipulative measure to lay claim to additional lands but usually is done in order to assume the responsibility for and the maintenance of rituals and sacred sites of areas where Buru members are now gone.

A list of countries, their boundaries, and corresponding traditional owners can be found on the map at the end of the chapter.

1.5.1. Use of Country.

Proximity to neighbouring country or prolonged use of or inhabitation of country can lead some to identify and be identified with particular pieces of country or small islands. Strictly speaking these are owned by another family group or have no particular owner, giving those who use them regularly assumed rights of access. I have catalogued numerous examples of this and, though there is not as much a sense of actual ownership and restriction of access to the particular area, there is a strong sense of ownership of articles left in these places such as dinghies, spears, wood for buildings, drums, water containers etc. Even direct family members are hesitant to borrow or make use of such articles though seemingly left abandoned for months at a time. There is much talk and speculation about articles that disappear from such locations. Those articles left in areas where the family groups tend to congregate, such as **Angulumar** or Turtle Farm boat ramp area (see Figure 4), are open game and people take freely of buckets, fishing lines, spears, and even fuel. Consistent abuse does breed some ill will but people tend to comment dismissively about things that have gone missing with little resentment, as if it is expected. My experience is that it all evened itself out in the long run. People did expect to find things as they had left them and if they were planning something particular, such as a two or three day trip over to Long Island, they would tend to announce it, and things that had been used or that were used in the meantime were replaced in some form. Before a particular day's outings there was a reconnaissance trip down to the mangroves to assess what was needed: fuel, spears, harpoons, fishing line etc. Rights of access to material goods seems to follow kinship lines,

Figure 4. Angulumar (High Tide)

but only within certain areas. The dinghy mooring areas are already divided into family/political groups; the largest and most notable being the Wiggan's and Davey's areas, **Angulumar** and **Giralgul** respectively (see Figure 4). These are both exceptional safe harbours, though fundamentally quite different. Access to one or the other, depending upon meteorological and tidal situation, would be most advantageous. There is very little if no sharing of mooring sites. Rights of access to material goods are played out among kin that share the same mooring site. Close or equivalent kin (i.e. those that have the same or equivalent kin designation or degree of relatedness) who operate from a different site are not a part of this system. There is a class of relatedness that seems to condone almost unlimited use of an individual's material goods, to the point that it can render the individual's ability to go fishing to naught. Douglas Wiggan used his nephew (sister's son) Trevor Sampi's dinghy for two months while his was being repaired in Broome. Douglas often commented that Trevor could refuse him nothing. I have seen Trevor, his dinghy set up ready to go fishing, give all his fuel to Douglas upon request and turn around and walk home with no apparent sign of disappointment. This is a special relationship and one of the few that could potentially be abused. There is an appearance of nonchalance in the use and sharing of dinghies and fishing/hunting materials among most kin but especially between fathers and sons. Sons seem to take freely from their fathers and it appears as if their goals take precedence Those families or individuals who abused such a system tended to be ostracised and any requests treated with suspicion.

1.5.1.a. List of Countries and their Traditional Owners:

Sunday Island (Yuwan): (north S.I.) Billing Billing - Angus
(south S.I.) Nilagun - Khaki (Thomas, Stumpagee, Mard)

East Sunday Island (Umbina): Katie Wiggan (via her stepfather Haikomo)

Jackson Island (Jaine): Ejai, Lennard (formerly Jackson)

Tallon Island (Jalan): Harry

least Roe Island (Gandarling)*: Angus

West Roe Island (Bilangi)*: Angus

Tyra Island (Munburun)*: Ejai, Lennard

Allora Island (Nolloron)*: Angus, Khaki

Gregory Island (Nounba)*: Turkai Wiggan

Pasco Island (Deeje)*: Coomerang (?)

East Twin Island (Joanan): ?

West Twin Island (Mourourdulun): ?

High Island (Olal): Turkai Wiggan (not related to Douglas Wiggan etc.)

Mermaid Island (Garar): Isaac, Tigan.

Long Island (Ungaliyan): Coomerang, Wilfred.

Cygnet Bay (Molambar)(Adoupun) (Karen): Wiggan.

'Fish Trap' (Garlinugun): Williams (Anna & Christina - the last remaining members)

Gumbanon: Davey.

Gnamagun: Sampi.

Easton Point: Ralph

Swan Point: James.

Cape Leveque Kuljamon Bor:. This is a curious situation and I am sure that those involved in the collection of genealogies for the Kimberly land council have a clearer understanding of the situation. **Kuljamon** has today been made into a tourist resort run by a co-operative of the Bardi Aboriginal association. I do not know who the actual owners are or what family names are associated with the local descent group associated to **Kuljamon** site or **Buru** that traditionally resided in the area. However, the area definitely falls within the **Gulargon,** North west regional complex, and members of neighbouring **Buru Gnamagun** (Sampi), seem to be responsible for the sacred sites of the area.

Hunter's Creek: Balligy (Sandy, Rose, &: Leylou).
(* refers to land which is linked to a family as a result of that land's proximity to that family's traditional country).

2. The King Sound: Ecology, Flora and Fauna.

2.1. Climate

The climate at One Arm Point can be characterised as following a typical monsoon wet/dry pattern, with a division in the dry season between hot and cold. The Commonwealth Bureau of Meteorology (1975) data show that Derby has a semi-arid tropical climate of monsoon character. About 620 mm of rain falls in a short period in the austral summer, between December and March. During winter there is very little rain.

Air temperatures are high for both wet and dry seasons (maximum temperatures commonly 33-39'C and 30-34' C respectively). The low temperatures vary more significantly between seasons, falling to 25.6' C in January and to 13.7'C in July. This is a significant drop, and is probably reflected in the water temperature which fluctuates seasonally rather than daily. As in other tropical areas the water temperature probably shows a marked seasonal variance lagging some time behind seasonal changes in air temperature.

It will be easier to elaborate the details of the climate in the next chapter on 'Bardi Conceptions' using the Bardi calendar as presented by Moya Smith (1987: 45) which elaborates six distinct seasons.

2.2. Tides

Tides are long oceanic waves generated by the gravitational pull of the earth and sun, causing a rhythmic rise and fall of sea level over a period of several hours. (Open University 1989: 43) At sea this change is almost imperceptible, but as the wave approaches the shallower coastal regions it's energy is converted into what we know as the tidal current, or ebb and flow.

The moon exerts the strongest tractive force on the world's oceans varying in different parts of the globe relative to its position in its 27 day cycle around the earth and the changing declination in respect to the earth during that period. The interaction of the moon and the earth produces the lunar tidal force.

Tides of the world however are governed chiefly by the gravitational pull of the moon and sun. The moon rotates around the earth every 27 days and the earth and moon around the sun on a yearly basis. Therefore the earth finds itself in different relative positions to the sun at different times of the year. The moon also is in different relative positions to the earth and sun on a monthly basis. In addition, by consequence of its association with the earth, the moon is also in different relative position on a larger scale to the sun on a yearly basis. The trajectories of the moon around the earth, and the earth around the sun are broadly elliptical, meaning that the earth and moon are closer to the sun at some times of year and further away at others, just as the moon is to the earth. Furthermore, due to the tilt in the axis of the earth's rotation relative to the sun, and the moon, the declination of the sun and moon differs on a yearly and monthly basis respectively. The directional pull of these tractive forces, generated by the moon, vary by 28 degrees to either side of the equator on a 27 day cycle for the moon, and 23 degrees on either side of the equator on a yearly cycle for the sun (which largely accounts for our seasons). All of these varied changing forces are however, regular and are therefore known as the harmonic constituents that contribute to the state of the tide at any particular time and place. It is this harmony that makes it possible to understand, if not the processes that cause the tide, the patterns that the tides follow. Although these patterns tend to materialise on a monthly basis they occur within a larger framework within which the monthly patterns are influenced on a yearly basis.

Effectively if one takes a single point on the equator it passes from a zone of full influence by the moon to a zone of no influence, to a zone of opposite influence, to a zone of no influence, to a zone of full influence over a given 24 hour and fifty minute period, meaning that the tide comes in, goes out, comes in, and goes out again during this period. [15] The degree to which the tide comes in and goes out (the tidal flux) is influenced by the angle and distance of the moon, and the relative position of the sun in relation to the moon. The sun also has a gravitational pull and, though less strong than the moon's, it can affect the overall changes in tidal level if the sun and moon are acting together or in direct opposition, either at the new or full moon, (syzygy) then the

[15] The earth is spinning relative to the moon in the same direction but rotates on its own axis once every 24 hours. As the moon is moving slightly faster than the rotation of the earth, fifty minutes ahead of this rotation, at the end of each day it has moved slightly ahead so that over a 27.3 day period the moon has travelled around the globe.

tides are correspondingly high and low. If however the sun and moon are at right angles to each other relative to the earth, first and last quarter moon, (quadrature), then they work in opposition. As the moon pulls in one direction the sun pulls in another perpendicular to it. Therefore when a particular area is not being influenced by the moon it is in fact being influenced by the sun and experiencing a solar high tide, the resultant effect is that while continuing to experience high and low tides because the lunar force is stronger, the earth as whole experiences highs and lows of less amplitude than normal. The tide follows this lunar pattern at One Arm Point with a one to two day delay on the most dramatic lunar effects. For example, the highest monthly spring tides are generated by the new and full moon, but usually only occur one to two days after these. The same is true for the restricted tides generated by the first and last quarter moons. The tidal sequence then follows a monthly lunar pattern experiencing on rotation, a **spring tide** (largest tidal flux) followed by a progressive lowering of the tidal flux until it reaches the smallest flux known a **neap tide**, then increasing the tidal flux climbing back up to a spring tide, and so on.

In addition as the moon revolves around the earth once every 27.3 days, it travels up and down from 28 degrees north to 28 degrees south and back again, resulting in a diurnal inequality of tidal levels. This means that the tides are predictably higher during certain periods at night than during the day and vice versa.

There are several key terms that need to be identified to the reader as they will appear repeatedly within the text. These refer to various tidal stages, all of which are identified by the Bardi. The two most common terms are the **flow** and **ebb** of the tide. The **flow** refers to the **coming in tide** or growing tide - put simply, the stage at which the water level is rising. The **ebb** refers to the **going out tide**, the tidal stage during which the water level is falling. As the tide flows it fills up the King Sound , the predominant directional force of the tide generated current being from west to east, down into the King Sound. As the tide ebbs and the water level drops, the predominant current is moving from east to west out of the King Sound.

The **current** is a mass of moving water much like a river: if it is constrained by either shallow bottom or barriers it tends to run swiftly, if it is not contained in its width or depth it tends to run slowly. The speed of the tidal current is in direct relation to these two factors and the size or mass of the water moving into or out of the area. A large of mass will be more restricted and tend to run faster whereas a smaller mass will tend to run slower. This is why during **spring tides,** when the tractive forces of the sun and moon work in conjunction (full and new moon) to move a larger than normal mass of water, the currents tend to be faster and stronger. Alternatively, when the sun and moon are exerting tractive forces perpendicular to each other, (i.e. not in association) around the first and last quarter moon, the mass of water moved is smaller and the currents slower. These less massive tides are known as **neap tides.**

When water currents move from restricted areas into more open or deeper water areas they tend to dissipate. This dissipation of their energy results in the formation of **eddy currents** which roll out from the sides of the current in a circular fashion, sometimes turning back into the tidal flow or current. Eddies are also known as **backwater currents** as they run part of their course in the opposite direction of the predominant tidal ebb and flow. These can usually be found on the outside of large tidal currents where the eddies are deflected by a mass of land such as an adjacent island, or on a smaller scale behind obstructions blocking the tide such as boulders or islands. These eddies can result in the formation of a variety of surface characteristics depending on bottom topography and the nature of the water encountered by the current. Eddies that find themselves flowing into another adjacent fast moving current from another source can result in the formation of **standing waves**, which are a series of white-capping large waves that sit almost immobile in one position, and, or **whirlpools. Whirlpools** are generally formed where two currents join in a confined area over a narrow deeper water channel. As the eddies cannot push out to the side of the current, they run down into the deeper less resistant water still following their circular pattern from the main current, creating a swirling shallow depression in the surface of the water. In extreme cases they can form deep troughs sucking down both air and water. [16] It is important to note that water will always take the path of least resistance and run from a high area to a low area more easily, therefore some channels can be seen to be filling up, flowing, and emptying themselves, or ebbing, in the opposite direction to the tidal flow because the channel is higher at one end than the other. The tidal currents tend to be strongest when the greatest mass of water is in movement in the middle of the tidal phase, though topographical features can affect this.

In this environment the tide represents one of the most immediate and dangerous features of the environment and cannot be ignored.

The coast line of the King Sound is macrotidal with semidiurnal tides, meaning that within a given 25 hr period the tide will come and go twice, the high and low tides being pushed forward by close to 1hr daily. The Equinotical spring tide range recorded at Derby is 11.5m; the mean spring tide range is 9.4m; the mean neap range is 4.5m. Tidal currents reach velocities of 1.5-2m/s in open waters and 1-3m/s and greater in narrow tidal creeks during periods of ebbing spring tides.

The ecosystems within the King Sound can, on the whole, be regarded as tide dominated. Derby, being at the Sound's lowest point, is affected by the slowest tidal ebbs and flows. One Arm Point and the associated islands experience the full effect of the tides as it rushes through and past them into and out of the King Sound. The main channel known as Pearl Passage frequently experiences a

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[16] Johanness (1981) when trying to identify the current patterns caused by obstructions in ocean currents shown and described to him by the Tobians and Sonorolese, after extensively surveying the literature in physical oceanography, was only able to identify some of the phenomena described by the locals, in texts recounting laboratory experiments carried out by hydrodynamic theorists. He recounts that there are three major current types behind obstructions: the Von Karman vortex trail, random turbulence, and the stable eddy pair, all of which I have personally experienced at One Arm Point. The Bardi recognise all of these and tend to frequent areas that produce the more stable eddy formations, specifically the stable eddy pair system, which as will be pointed out in chapter 3.6 2 is of special relevance to turtle hunting. These current formations obviously move from one side to another depending on the direction of the tidal current. The appropriate current for hunting turtle may only occur on one side of a particular barrier, and therefore is only useful for exploitation on a single phase of the tide. In addition, according to Johanness currents occur in different locales. At One Arm Point, however, they sometimes appear in the same location varying with the state of the tidal flow. The Bardi, cognisant of these changes, only go to certain areas at specific points during the tidal ebb and flow when the currents formed are of the right kind, leaving these areas when the patterns change. This may have as much to do with the change in the speed and power of the current over the tidal phase as with the change in the bottom topography creating a barrier to the current as the waters rise or fall.

phenomenal current of over 10kn. and there can be a noticeable slope on the surface of the water. I have personally seen a difference of four feet between the front and the back of a large boulder blocking the incoming tide.

The tide is full at One Arm Point approximately 1 hr before Derby. Due to the Coriolis force as the water enters the King Sound it will be piled or pushed into its southern or right hand side and as it flows out it will be piled up on the northern or left side. This can result in the curious phenomena of the tide coming in on the One Arm Point (Southern) side while still going out on the Northern side. In some cases as the tide is still going out of the Derby inlet it is already coming back in past One Arm Point.

The tidal regime affects the behaviour and feeding habits of most of the fish in the King Sound. Intertidal feeding habitats will be available for different percentages and times of the day over the course of the lunar month. Risks of predation on adults that engage in particular activities in intertidal habitat may also depend on tidally mediated water depth. (Sale 1991: 367) Many intertidal fish are adapted to tidal changes and can remain in rock ponds at low water, or can survive under seaweed. In many cases they return to the same place each time the tide goes out. Tidal rythmicity is known to be endogenous in several species and there may be some advantage in anticipating tidal movements if stranding is to be avoided while staying close to shore in order to continue feeding and reduce the chance of predation. (Bone 1992: 313) The large tides of the King Sound stop the box jelly fish from establishing themselves during the wet season, making this area one of the few places in Northern Australia where one can swim throughout the year.

The King Sound is protected from oceanic swell and waves by the islands of the Buccaneer Archipelago. Thus wave action is negligible except for that locally developed by strong afternoon sea breezes, summer storms, and in specific areas where tidal currents collide with each other or encounter geographical features resulting in spectacular albeit spatially limited collections of waves.

The tide is a defining characteristic of the King Sound and therefore of any cultures associated with this area..

2.3. The Coastal Zone

For the purposes of my research I will outline the main ecological zones of the area concerned in the King Sound. The Bardi themselves divide their environment into two distinct ecological zones called '**gara**', coastal or salt water side, and '**bindan**', inland or bush side. The focus of my work is on the '**Gara**' or maritime side.

> *'On the saltwater side are dunes, reefs, creeks, pools, the ocean itself, sandbanks, intertidal and supratidal mudflats, mangroves, paperbark thickets fringing the mudflats and rocky headlands of limestone, lime-cemented sandstone and Melligo sandstone'(Smith & Kalotas 1985).*

For a full account of the inland ecology of the area and its use by Bardi Aborigines see Smith and Kalotas (op. cit.).

I will be using Smith and Kalotas' classification system in describing the different ecological zones of the coast and establishing other categories for offshore zones including; rock and reef, sea grass etc. The huge tides of the King Sound (11.5m maximum) result in the formation of vast tidal flats which are one of the defining characteristics of the coastal and marine ecosystems in the One Arm Point area. All geographic coastal features are associated with the creations of tidal action and their fauna collections tend to shift depending on the state of the tide. As will be elaborated in the section on fish, it is recognised that the King Sound is distinctive for the degree of fauna crossover between ecosystems.

When discussing the various ecosystems it is important to note that they occur in varying degrees along the mainland coast, and within the islands adjacent to One Arm Point. Some islands may be composed of the full range of these features, while others only one or two. Their proximity however means that none of these micro-environments is ever far away.

2.3.1. Mudflats.

One of the most prominent and important features of the coastal zone are the mudflats which are usually associated with mangrove communities. While there is little work relating directly to the fish and mammal species in the King Sound, some detailed research has been carried out with regards to the botany of the area, which includes the mangals or mangroves.

There are four categories of tidal mudflats in areas of large tidal flux. The first, which occur inland of the mangrove stands, are the salt flats (high tidal). These support very little vegetation because they are limited by flooding from spring tides and storm surge which leave a permanent layer of salt over the mud . The larger, and most pertinent category for my research, are the saline tidal mudflats. These encompass most of the mangroves and extend seaward from their base. They are underwater at high tide and exposed at low tide.

The mud in the mangroves are in the mid to high tidal range and are the focus of the greatest deposition of material. The mud and sediment in this area shifts with the tide and harbours an abundant, diverse biota.

The mud and sand slopes which encompass the mid to low tidal levels (100 -500m wide) are underlain by mud/sand laminates. They are subject to less disturbance by the tidal flux and in the absence of mangrove communities can extend up to the high water mark.

Below these are the low tidal sand flats underlain by megarippled and shelly sand. (Semeniuk 1981: 201)

The low tidal areas dominated by sand shoals extend into the subtidal areas and generally are of a gentle slope. Sand can build up in some areas and form shoals or humps in the generally gentle sloping profile. These flats are inundated 95% of the time and experience the fastest tide generated currents of this ecosystem.

Mudflats have a gentle gradient which greatly affect the progress of the incoming and outgoing tide. As the tide flows towards its maximum height it loses velocity, thus the higher the mudflat area the less current it is exposed to and the less sediment transportation it incurs, hence the gradient forms shell grit, to sand, to mud/sand, to mud/mangal. In general tidal sediments become coarser seawards due to the increasing influence of tidal action. (Bearman 1989: 126) The higher areas naturally collect biological debris and material that would be swept off the lower areas by the tides. When the tide turns and begins to go out it progressively builds up speed so higher areas again experience less sediment transport out than lower ones. Some communities experience net income of deposition material and others are progressively losing material. It is a dynamic system that is deeply affected by storms and other environmental factors.

The mud/sand slopes are vegetation free but support burrowing fauna, primarily crabs and shrimp, and also some burrowing fish. The mangal mud flats maintain the greatest and most diverse fauna.

At the base of the mangrove stands, or where mudflats meet the shore without mangroves, there tend to be depressions that remain wet even at low tide. These pools can be anywhere from a few inches to a few feet deep and are an important feature in Bardi resource exploitation. As the tide goes out the water makes its way off the mudflats and tends to follow the same channels. These can remain wet and connected to open water at low tide. As the water returns to the mudflats on an incoming tide these channels can flood inshore areas before those further offshore.

Mud/sand slopes and sometimes the mudflats can merge into offshore reef, extending the land-mass from the coast extensively, especially during the low spring tides (see Figure 5). This has important implications in the resource use patterns of the Bardi at One Arm Point.

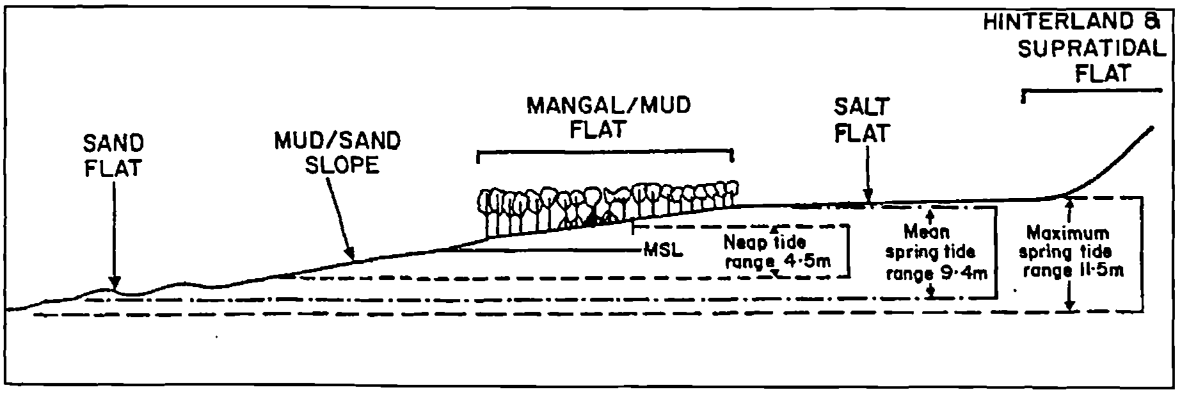

Figure 5. Generalised profile of mangrove and mud flat area in the King Sound.
(Semeniuk 1980: 202)

2.3.2. Mangal or Mangrove

Mangroves are forests in the tidal zone of tropical coasts, they are adapted to saline environments and typically they are completely covered by sea water at high tide except for their crowns, while at low tide the soil of the mangrove area and a strip between it and the sea are exposed. As we know from the tidal flux in the King Sound this process takes place twice a day and changes in amplitude monthly. In the One Arm Point area the mangroves are not affected by fresh water sources and so follow a typical coastal mangal type. The islands of the Buccaneer Archipelago effectively cut out most outer sea-generated wave activity promoting a high density of mangrove communities in most of the King Sound.

I will not go into detail of the botany of the mangroves but will instead concentrate on the effects mangal forests have on the exploitable fauna in the One Arm Point area. For deeper description of mangal communities see Walters & Breckle(1984) or Semeniuk (1980).

From the description of the tidal flats above we know that one of the richest parts of the coastal mud flat system is within the mangrove. This is due to the deposition of large amounts of biological materials at high tide. ' *Sediment under mangal cover is mud, sandy mud or shelly mud, thoroughly mixed by crustaceans, worms, fish and plants, and has abundant in situ mangrove root systems.*' (Semeniuk 1980: 795) The roots which support the mangroves bind and trap sediments and debris, slowing down tidal currents and accelerating the deposition of sediments, increasing the biomass within the system.

Living in and off the mud are a large variety of burrowing crabs, shrimp, fish and worms. Clinging to the roots and rocks are a variety of barnacles, oysters and algae. These contribute to the growth and richness of the mangal during their life-cycle, through their movement of sediment, processing of organic material, and eventually through death (Semeniuk 1980). A wide variety of fish live in and visit the mangal either for shelter or to take advantage of the rich flora and fauna. Some are herbivorous, feeding off associated algae and grasses, others carnivorous eating the associated worms, crustaceans and juvenile fish which traditionally move into mangroves to mature.

Another function of mangroves in the One Arm Point area is their role as anchorages. Most of the better anchorages are associated with extensive mangrove stands which involve navigation through these into tree sheltered beaches. Mangroves not only slow down the tide but also protect those areas directly behind them from winds, waves and storm surges. These areas are presently and historically important and a wide range of activities take place here, ranging from the permanent mooring of boats to the processing, distribution, and cooking of the day's catch. At One Arm Point these are some of the few areas where notions of property seem to be implemented.

2.3.3. Beaches

Sandy beaches occur along rocky shorelines and below dunes, following a typical sandy beach profile which extends gradually from above the high tide mark into deeper water. At low tide these can extend the great distances from the coast, merging with reef or rocks. In other areas sandy beaches occur in patches just below the high tide mark behind mudflats and reef, or on the inside of mangrove stands.

These are an important coastal feature that give easy access to islands and coast for the Bardi and a number of animals, most importantly the greenback turtle who need easy access beach areas for egg-laying. Turtle egg-laying plays an important part in the formation and maintenance of beach areas.

2.3.4. Rock formations and Reef

Rocky headlands tend to border sandy areas, mudflats and stands of mangroves, but in some areas make up the entire coastal strip. Along these coastal strips the slope can be very steep, sometimes cliff, consequently it is in these areas that the tidal currents tend to be the swiftest.

At sea there are permanent islands of stone that at low tide are perched high above exposed reef. Usually these stone islands are associated with a larger reef area and can be easily walked between at low tide. They can occur in the middle of these reef areas or on their edges where the reef drops off into deeper water. Rock formations also exist independently of intertidal reef areas, the edges of which drop steeply into deeper water on all sides. They can occur quite far from other features. Some of these only become apparent at low tides and sometimes only at the very low spring tides. Almost all tidally affected rock formations are associated with rock oysters.

The term reef encompasses a huge variety of environments, from reef flats which incorporate reef to separate, distinct coral heads. Reefs are difficult to describe as so many varieties exist under a single category.

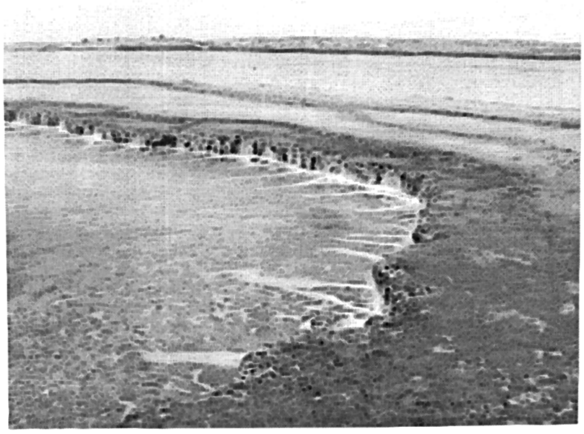

Figure 6. Reef flat, Low tide

The reef flats can be enormous (Figure 6) and are exposed at different tidal levels which affects the coral type, density, and residing and visiting fauna assemblages. Their slope and the tidal level all present different scenarios for resource exploitation, the elaboration of which in the next chapter will provide a clearer picture of their nature.

Coral heads or isolated coral blocks are less common and the distinction between them and the reef flats lies mainly in that they are not flat and are subtidal, being permanently below water. The coral makeup is quite different and hence so is the associated fauna assemblage. Small patches of coral do occur in the sea grass beds, but they probably cannot be characterised as reef.

2.3.5. Sea or Turtle Grass Beds

In the One Arm Point area sea grass is rare in direct relation to the coast. Most of the grasses that make up the sea grass beds do not tolerate low tidal exposure, but they also cannot be too deep and far from the sunlight they need. Nor can they tolerate prolonged exposure to wave action. Like the mangroves they therefore need calmer embayments and protected areas within which to flourish. These grass beds tend to predominate within the shelter created by the islands adjacent to One Arm Point and tend to begin where the coral flats and tidal mud/sand flats end.

2.4. Fish species.

Though there is some very specific and relevant information relating to most of the individual fish species exploited by the Bardi Aborigines at One Arm Point there is a dearth of research on these species in the particular area of the King Sound, as for most of the North West of Australia. The closest relevant data is based on studies carried out on the Great Barrier Reef on the North Eastern coast of Australia. While I may be able to suggest with some accuracy the physical reproductive and behavioural properties for many of the species encountered, I cannot assert that these data will be infallible. I will describe aspects of their physiology, spawning , feeding and habitats that are relevant to understanding Bardi exploitation of these species. In this section I will follow general classification schemes as used by marine biologists today. Since some of the classification systems can be either too general or too specific for my needs, I will follow the classification of fish according to their general feeding strategies as this is one of the primary determinants of their behaviour and their habitat. Please see Table 2 & Table 3 for a full list of species.

These are the relevant general categories in feeding habits:

Herbivorous: feed primarily on algae and sea grasses.

Detritus: filterers which feed on a variety of vegetation, plankton and small animals.

Piscivores: generally predators that feed on smaller or juvenile fish.

Carnivores: feed primarily on soft bodied invertebrates or crustaceans.

Crushers: fish that feed on molluscs and invertebrates using hard jaws to crush through tough exteriors.

For the description of species I will be focusing on certain specific traits such as fatness, spawning seasons, and territoriality as these are the most relevant to the Bardi governing much of their exploitation of fish..

2.4.1. Surgeon fishes (*Acanthuridae*)

At One Arm Point three species of Surgeon fish were described: *Acanthurus dussumieri* (the ornate surgeonfish), *Acanthurus grammoptilus* (the ring-tailed surgeonfish) and *Acanthurus nigricans* (the white-cheeked surgeonfish). Of these three only one, *Acanthurus grammoptilus*, was being exploited in large numbers during the period of my fieldwork.

Surgeon fish are herbivores, feeding primarily on the algae that are abundant on the shallow reef (Thresher 1984: 273), most are '*reef grazers who rasp small algae from hard surfaces*'(Barlow 1974: 333) also eating from algal turf communities growing on sub-tidal rocky surfaces. (Fishelson 1987: 37)

One of the most abundant of the herbivores found on the reef, they are typically laterally compressed fish (i.e. thin) with long low dorsal and anal fins. They have tough leathery, rather than scaly skin with sharp small mouths at the end of a blunt disc-shaped head. The scalpel-like spine at the base of the tail that gives them their name is a formidable armament for such a small fish and can sever fingers of unsuspecting fishermen. Acanthurids follow feeding patterns typical of herbivorous fish, restricting feeding to daylight hours, resting in crevices at night, and migrating daily from nocturnal refuges in the coral reefs to foraging sites on the inter-tidal, covering distances of 500 to 600m. (Fishelson 1985: 49, 1987: 37)

They form large schools during the day in and out of which individuals move according to their needs. Schooling is regarded as anti-predator behaviour, but in herbivorous fish it is also understood to be a tactic for feeding effectively in areas that are protected by territorially aggressive reef fish. Within a larger group harassment by aggressors is distributed over a larger number of individuals, allowing for effective feeding.

> *' The schooling appears to be a means by which Acanthurids can forage in a micro-habitat on a preferred resource while circumventing the territoriality of a herbivorous competitor.'*
> *(Reinthal & Lewis. 1986,: 1687)*

These schools are often mixed with parrot fish (*Scaridae*), wrasses (*Labridae*), and rabbit fish (*Siganidae*)..

Acanthuridae display aggressive territorial behaviour themselves and can aggressively maintain feeding territories, re-established every morning and after displacement by the tides. Craig (1996) noted a 99% return rate to feeding site for *A. linneatus* in American Samoa. (:27)

Most of the directly related literature concerning the physiology of Acanthuridae concentrates on the little that is know of the spawning cycles of the various species, the associated gonad development and the unusually high bacterial content of their gut to promote the breakdown of algae. There is very little literature on the fat or liver function but my own observations show that the species in the King Sound all have relatively large livers in relation to body size when compared to most other fish (with the notable exemption of *Siganidae*). There is said to be little obvious differences between the sexes, though apparently most species display temporary colour differences during courtship and spawning (Thresher, 1984: 273). *Acanthurids* spawn at dusk on an outgoing tide at the edge of the reef or near channels adjacent of strong currents. Spawning takes place in 'traditional' *spawning sites, which are revisited year after year.* Some *Acanthurids* have been observed in spawning aggregations in the tens of thousands, while others in smaller groups of ten to fifteen individuals. (Johanness: 1981).

Acanthurids, seem to have a peak in spawning activity in late winter and early spring based on gonad samples, but some spawning does occur year round. In addition it has been suggested that there may not be a specific spawning season in the deep tropics where sea water temperatures change only slightly (Thresher, 1984:274).

In the only specific study targeting fat in acanthuridae the authors noted that even when this species is spawning it retains significant fat deposits, in fact creating special reserves at the time of spawning (Fishelson, Montgomery & Myrborg 1985). Therefore even during seasonal peaks accanthuridae maintain significant fat deposits. Therefore this fish is fat all year round unlike most fish that suffer significant fat losses during spawning. In West Australia there are no legal fishing restrictions on these species, and they are not of commercial or recreational interest.

2.4.2. Spinefeet or rabbitfish. (*Siganidae*)

The other key herbivorous family on the reef are the *Siganidae*; spinefeet or rabbitfish. Three species are identified in the area of study. The first, and most important in Bardi exploitation, is the Golden lined spinefoot, *Siganus lineatus*. The Black spine foot, *Siganus fuscenscens*, and the smudge-spot spine foot, *Siganus canaliculatus*, were also present and exploited but to a much lesser degree.

Like the related surgeon fish *Siganids* are herbivorous and display similar behavioural characteristics. They have a tendency towards herding into large schools, and feed on a variety of bethnic (bottom) algae and sea grasses. They have a similar body shape to the surgeon fish but a smooth shiny silky skin. Like the surgeon fish they are found near boulders, on the reef flats, and between coral heads, but frequent in more important numbers the grass flats and inshore mangroves, feeding in large part on sea grass beds (Ngoile. 1992). They tend to stay in these shallow sea grass flats near mangrove areas, retreating to reef depressions during low tides (Johanness, 1981).

There is little detail of their spawning behaviour in the literature, but it is known that they aggregate to spawn at night or early in the morning on an outgoing tide. Peak spawning is documented for some species in spring and early summer (Thresher, 1984). Apparently these aggregations take place in 'traditional sites' ranging from near mangrove stands in the case of *Siganus lineatus*, to shallow reef flats, and the outer edge of fringing or barrier reef, for *Siganus canaliculatus*. (Johanness, 1981) They spawn in large aggregations or pairs. In Palau the departure of the smudge spot spine foot can be so abrupt '*that one day literally thousands can be caught, whereas the next day few or none are caught.*' (op. cit.: 182) They are called 'stupid' spawners in Palau because they are easily approached during spawning, which is why this species was one of the most intensively exploited.

> *' The large March or April spawning run near Airai used to be the object of considerable festivity and pilgrimages from other parts of Palau, but over fishing has greatly reduced the run in recent years. ...According to fishermen .. the fish .. can be seen migrating to and from the spawning grounds through the bridge channel.. In Palau the best catches of rabbitfish are made with nets during spawning*

periods.' Such extensive exploitation of spawning fish has resulted in a marked decline in numbers and average size. (op. cit.: 183)

In the Arabian Gulf of Qatar spawning seasons are affected by the water temperature and the lunar cycle. Gonad maturation took place in late winter/early spring, and spawning followed in late spring early summer. (El-Sayed. 1994) .

Like other seasonal spawners gonad maturation in Rabbit fish is probably related to a marked decline in the fat reserves stored up during the winter.

Most of the evidence regarding this species physiology is circumstantial and related to its commercial viability. *Siganus* have a tender and delicious meat with relatively few bones, and can be stored for up to 12 hours before processing. (Putro 1984.: 329) My own observations of procured fish show that, like the surgeon fish, it has a large liver in relation to its body size, but only during the winter, or dry season. Rabbitfish, in contrast to surgeon fish, also have deposits of white fat attached to the tripe in the gut, sometimes overwhelming the stomach cavity. Like the surgeon fish they ferment the food in their stomachs to digest complex carbohydrates.

It is thought that as with sea turtles, the primary productivity of algal turf is enhanced by grazing, suggesting that as with sea turtles it would be advantageous for herbivorous fish to occupy restricted feeding areas (Gerkinj 1984: 73), suggesting a high site return rate.

There are no fishing restrictions applied to this species in West Australia at this time. It is of no commercial value in Australia and does not feature at all as a species sought by recreational fishermen.

2.4.3. Mullet *(Mugolidae)*

There were six species of mullet present in the inshore water of the One Arm Point area:

Tiger or flat-tail mullet (*Liza argentea*), flat-tail or greenback mullet (*Liza subviridis*), diamond scale mullet (*Liza vaigiensis*), sea mullet (*Mugil Cephalus*), fan-tail mullet (*Mugil georgii*),blue-tail mullet (*Valamugil seheli*).

Mullet are detritus feeders or filterers that feed and inhabit inshore waters in tropical and temperate seas world wide. Mixing organic matter and living algae they will eat sea grasses, micro-organisms, bacteria, fungi, and small invertebrates. (Shelby 1984: 99 & Thresher 1984: 51) They feed throughout the water column and can be seen skimming the surface when algal bloom accumulates, or sucking the bottom mud and sand while standing on their heads, leaving hundreds of tell-tale conical depressions after they have explored the bottom. They tend to spawn at night in the spring and summer, aggregating in large numbers usually near the time of the full moon, migrating to their spawning grounds several days before the full moon, though this may differ significantly between species, some apparently spawning just prior to rainy seasons. (Pillay 1990: 378) Mullet are an important commercial stock in some countries especially as an abundant inshore fish. It is thought that these fish are highly migratory and it is doubtful that they maintain a territory though they are thought to use 'traditional' spawning grounds. Mullet tend to swim against the current. (op. cit.: 379)They are very seldom seen on the reef. In West Australia this is not an important commercial or recreational fish.

2.4.4. Jawfishes *(Opistognatidae)*

Though of very little importance in the Bardi fishery today these fish, better known as 'monkey fish' were an important food source historically. The one specimen which I caught in September 1996 appeared to be the either the Darwin jawfish (*Opistognathus darwiniensis*), or the leopard jawfish (*Opistognathus reticulatus*). These planktivorous fish inhabit the shallow sand and silt plains that surround reef and rocky outcrops, where they create complex narrow rock and coral lined burrows, above which presumably they hover feeding on plankton passing in the currents and into which they retreat in case of danger. These fish stay within or around their burrows throughout the tidal phases and defend them fiercely. (Thresher 1984: 111)

In the literature the depth of these burrows is not elaborated, but at One Arm Point they were in some cases over seven feet deep, (testing depth with a six foot throwing spear I was warned by Gounie that if I let it go there was a good chance I would not get it back). These burrows can be seen when walking about the dry reef at low tide. As these are permanent burrows they must presumably reach down into the low water mark. At One Arm Point jawfish colonise certain areas with large numbers of burrows being found in close proximity to one another. (op. cit.: 112) There is no spawning information for these species.

2.4.5. Parrotfish (*Scaridae*) and Wrasses (*Labridae*)

Parrotfish were relatively common at One Arm Point but surprisingly during the field work periods there was only incidental exploitation of these.

Wrasses are related to and take after the parrotfish, but have prominent sharp teeth. The wrasses, unlike their herbivorous cousins the parrotfish, could be found in all sizes with two main species being exploited in important numbers, the blue tuskfish (*Choerodon albigena*), and the blackspot tuskfish (*Choerodon schoenleinii*). Both these species are commonly referred to as 'blue-bone' because when filleted their internal bones are of a bluish green hue. The spawning of these fish has never been recorded despite their significance as a food fish in the Indo Pacific. There are suggestions of spawning in the winter for some species, and spring for others.

Wrasses, like parrotfish, forage about the reef and rocks during the day and sleep at night in crevices sheltered in the reef. They surround themselves in a mucous membrane and are easily approachable. They are both carnivorous and herbivorous, feeding and scavenging on what is most readily available.

These two species are greatly prized by recreational fisherman and there is a restriction of eight per species per day. I am uncertain as to the commercial importance of blue bone tuskfish in Western Australia.

2.4.6. Snappers (*Lutjanidae*)

There are four main species of *Lutjanidae* exploited by the Bardi at One Arm Point: Red emperor (*Lutjanus sebae*), Moses perch (*Lutjanus Russelli*), Stripy sea perch (*Lutjanus carponotatus*) and Mangrove jack *(Lutjanus argentimaculatus*).The first two are the most important in ritual and mythological significance, and the last two in exploitation.

Snappers are carnivorous leaning towards piscovourous depending on availability of foods. Common not only on the reef but also in most other shallow-water tropical habitats. They are a laterally compressed fish with a continuous dorsal fin and prominent spines pointing towards a long sloping forehead ending in large jaws with prominent sharp teeth. (Thresher,1984,: 121) Males are on average larger than females and some habitat difference has been noted between the sexes with males predominating on the reef and females preferring inshore waters. Spawning tends to coincide with warmer water temperatures and peaks close to the night of the full moon. Inshore snappers will take part in extensive migrations to traditional spawning sites on the outer reef in the week before the full moon, in water from 20 to 40m deep (op. cit.: 24).

Mangrove jacks, as the name suggests, are found in abundance in the mangroves, but they also frequent many different habitats. In Palau it is noted that they are best caught around the full moon when they are spawning, as at this time their stomachs tend to be empty. (Johanness, 1981: 168)

There is little literature relating specifically to the physiology of the snapper but it would appear that like other species its physiology is affected by seasonal changes in food availability and water temperature. My own research shows that the mangrove jack develops significant fat stores in the gut cavity during the colder water months and then loses them as the water temperature increases, presumably in conjunction with the development of gonads in preparation for spawning. In the winter or dry season the liver is of a minimal size, unlike the surgeon and rabbit fishes, but layers of flowing fat loosely attached to the back wall of the intestinal cavity occlude the entire cavity making it difficult to even see the tripe.

In West Australia snapper are of some commercial and recreational importance, and there are bag and size limits relating to the Red emperor; of 8 fish in this class per day with a minimal length of 410 mm; and a bag limit of 8 per day for the mangrove jack, with no size restriction. There are no restrictions on the stripy sea perch. (Fisheries 1995)

2.4.7. Groupers *(Serranidae)*

This was difficult group within which to identify individual species in the field, colours and patterning can vary within species and follow seasonal phases. To add to the problem these fish change colour dramatically upon procurement.

Photographs and drawings shown to the fishermen and fisherwomen drew varied responses in determining the local name for the variety of fish within this genus. I have tentatively identified the main species described and exploited by the Bardi, a job made even more complicated in the scientific nomenclature where the same common name sometimes refers to different species.

The identifiable species are: Goldspot cod (*Epinephelus coioides*); blackspot cod (*Epinephelus malabaricus*); flowery cod (*Epinephelus fuscoguttatus*); speckle finned cod (*Epinephelus ongus*); tomato rock cod (*Cephalopholis sonnerati*); coral trout (*Plectropomus leopardus*); and the Barramundi cod, (*Cromileptes altivelis*). These last two, being easily identifiable, are notable exceptions.

Groupers are carnivores and more specifically piscivores. They are a 'top level' predator characterised by bass-like bodies, small scales, big mouths and big appetites.' (Thresher, 1980,: 153) With a relatively long heavy body and the profile of a snapper they are skilled hunters and voracious eaters. Their colouring is the perfect camouflage and they characteristically ambush the fish and crustaceans which make up the bulk of their diet. Their eyes are adapted to dim light and they tend to stay in caves and dark shelters during the day, venturing out at dawn and at dusk. This species is not shy and will venture out to investigate anything that seems out of the ordinary. Characterised as solitary reef dwellers they can aggregate in specific predictable locales. (Johanness 1981,: 161)

During my fieldwork periods members of this species were as common among the mangrove roots at high tide as they were on the reef, with the exception of the coral trout which was found exclusively on or near the reef. Blaber (1986), supports such observations. '*Piscivorous fish are unusually abundant in mangrove creeks in the Dampier region of Northwest Australia.*' (Blaber 1986,: 329) Many of these fish have a territorial range, returning to the same areas at high and low tide. The flowery rock cod has been recorded living concealed under boulders at low tide apparently surviving with very little water burrowing into wet sand.[17]

[17] This is supported by my own field work where we often caught this fish in very shallow water 1-2 inches at low tide in mangrove pools beneath logs or in tree roots or on dry exposed reef in wet holes or crevices, sometimes pulling what seemed impossibly large fish from tiny holes.

Grouper are thought to spawn throughout the year, with a possible peak 'in the wet months' (Pillay 1990:415), with a high return rate to regular spawning sites. '*It is tempting to suggest that the use of specific spawning sites is a universal characteristic of epinephelines, local fishermen are often well aware of such areas and have apparently fished them for generations.*' (Thresher 1984,: 70) This idea is supported by the work of Johanness (1981) in Palau and Micronesia. Spawning year round epinephelus do not suffer the significant depletion of fats attributed to seasonal spawners.

Alternatively Plectropomus leopardus are thought to spawn seasonally. At Lizard Island on the Northern Great Barrier Reef the coral trout was '*observed spawning from September to November, during which multiple spawning occurred*'. Significantly an inverse relationship between fat and gonad weight was observed for the coral trout, indicating that deposits of mesenteric fat are probably being used in the processing of gonad products.[18] (Ferreira 1995: 653) This species therefore follow a physiological rythmicity based on seasonal changes whereby they accumulate fat during the non spawning season (usually cold water months and lose fat in warm water months when these spawn .

The large body of all these species mean that even a small examples have a good amount of what is usually firm but moist meat.

This is an important commercial and recreational species in West Australia, but the only recreational restrictions apply to the coral trout, and are in the order of 4 per day.

2.4.8. *Lutjanoid* Fishes, Emperors and Sweetlips.

This genus of fishes includes a wide range of snapper-like fish many of which are exploited at One Arm Point. It is a category that is still being sorted by taxonomy specialists so I will only identify those that were exploited or referred to in the field.

[18] Mesenteric fat would be fat that is attached to the membrane (mesentery) that is attached to the back wall of the abdominal cavity which supports the intestines.

The two most relevant are the genus *Lethrinidae* or emperors and *Haemulidae*, sweetlips or grunts. *Lethrinidae* include the Grey sweetlip (*Lethrinus laticaudiso*); Spangled sweetlip emperor *(Lethrinus nebulosus)*. *Haemulidae* include the Brown sweetlip (*Plectorhinchus celebicus*); 'Many spotted' sweetlip (*Plectorhinchus chaetodontoides*).

Separation of these species in the field was difficult as many share the same colouring and shape. Most *Lutjanoids* spawn in spring and summer. What distinguishes the *Lethirindae* and the *Haemulidae* is the relatively large size they can reach compared to the *Lutjanidae* fishes. They tend to frequent the sandy areas in deeper water around the edges of, and between, rocky outcrops and reef where they are exploited. They are sometimes seen around mangroves and over the mud/sand flats in front of them. Johanness found that some species of emperor in Palau spawned from November to April, others between April and June and others spawned all year round (Johanness 1981). I could find no reference to the spawning patterns or the physiology of the species around One Arm Point. It is likely that they resemble the behaviour of the snapper in most respects.

2.4 9 Trevally or Jacks (*Carangidae*)

Carangidae are a mid water to surface, swimming, predator feeding primarily on small fish and free swimming animals high in the water column. They tend to travel at high speed in small to very large shoals.
They have small scales, swept back fins and a very pronounced forked tail, generally silver in colour with various highlights according to age and species. Laterally streamlined, their bodies can be long and shallow or short and deep. The larger species tend to stay in deeper water while the smaller ones may visit the reef to feed on small fish. The mangroves in the King Sound are noted as having unusually high numbers of *Carangidae* within them at high tide, specifically giant trevally (*Caranx ignobilis*) (Blaber 1986). I have seen schools of gold spotted trevally (*Carangoides fulvoguttatus*) moving quickly inside the mangroves at high tide, and solitary fish meandering slowly through the mangroves, as if lost.

Around the world and especially in the Pacific these are an important food fish. The Palauan fisherman say that the giant trevally spawn in shallow water on the reef flat, on the new or full moon (Johanness 1981: 166). In Cuba the bar jack (*Caranx ruber*) show fluctuations in body fat or tissue lipid retention related to known spawning periods. There are two periods of body fat accumulation before two annual spawning peaks of the fish at this region: March-April and June-July, pointing to a positive relationship between a decrease in body fatness and spawning period (Bustamante 1989).

2.4.9. Queenfish (*Scomberoides*) and Mackerel (*Scomberomorus*)

There are two predominant queenfish; the giant or talang queenfish (*Scomberoides commersonnianus*) and the skinny or double spotted queenfish (*Scomberoides lysan*).

We seldom caught mackerel though they are and were apparently commonly exploited. The broad barred Spanish mackerel (*Scomberomorus semifasciatus*) was the most common and along with the giant trevally and the talang queenfish occurred in unusually high numbers in the inshore mangrove area in the King Sound (Blaber 1986).

Queenfish and mackerel share the features of the trevally noted above, but are more restricted to deeper waters, the queenfish sometimes being seen around rocky outcrops. The mackerel can be characterised an open water species; only once did we see one travelling across mud/sand flats in 2-3 feet of water, and after some chase he sped off into deeper water. There is little to relate from the literature on these species but apparently in Palau the mackerel follow predictable migratory routes and are caught most easily around the full moon with a trolling lure. Johanness suggests a summer spawning period, and an appearance at the reef edge on an incoming tide (Johanness 1981,: 186-187).

2.5. Discussion

As one can see, many of the species of fish relate primarily to one habitat in a given area. Normally each of these fish habitats presents a distinct fish assemblage, coral reef being characterised by grazers and omnivores, soft bottoms by small carnivores and mangroves by detritus feeders and piscivores. It appears that in the King Sound there is an unusually large overlap between habitats and fish species. It can be surmised that this is due to the large daily tidal flux. While the same species in other areas may be able to remain in a particular micro-environment indefinitely, fish in the One Arm Point area are perhaps forced in and out of particular areas by the tide..

In the King Sound an unusually high incidence of piscivores, generally found in deeper water, feed inside the mangroves at high tide,[19] but very few of the species related to the mangrove penetrated the deeper water (Blaber 1986).[20]

It would appear the most varied, if not the largest collection of fish in the King Sound would be found in and around mangrove areas at high tide, and that synonymous with this would be predictable influxes and outflows of particular deep water fish. In addition many mangrove related fish species would concentrate in remaining wet mangrove areas or other shallow water environments adjacent to the mangroves, waiting for the incoming tide.

2.6. Fish and Fat

> *Fats are the fatty acids esters of glycol and are the principal form of energy storage. They contain more energy per unit weight than any other biological product (Pillay 1993:98).*

Fish fat is one of the recurring and most important themes in this thesis and

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[19] Blaber's studies show that there are 113 species connected with the mangroves and 106 connected with deeper waters (below 20m) with 54 species common to both. In the King sound a significant number of the deeper water piscivores species penetrated the mangroves at high tide, (Blaber 1985, pg. 71) This is in contrast to other studies which show overlaps of 36 species between soft bottoms and mangroves, and only 13 between reef and mangrove, with a much higher total species representation (497 s: compared to 229 in the King sound). (Thollot. & Kulbicki. 1988)This is characterised as normal for the Indo-Pacific region

[20] The implications of this in fishing timing and strategy are important. Deeper water fishing would seem less appealing than shallower water fishing where one can encounter not only the shallower water species but also those from deeper water, whereas the inverse is not true. (see fishing of large deep water pelagic species inside mangrove channels in daily notes, fish of ritual significance and species associations.)

may be one of the determining factors governing Bardi resource exploitation. Fish fat refers to the presence of different lipids in the fish, either in the body, the meat, the liver, or in stores inside the stomach cavity. Different species of fish tend to store fat in different ways, though they all store some within the muscle tissues of the body.

From the species characteristics delineated above one may already understand that there is a connection with some fish species between spawning season and water temperature, resulting in a defined spawning season. It is unclear whether it is the temperature itself or its effects on fish food resources that instigate gonad development and spawning activities. What is clear is that most if not all fish follow certain physiological patterns that appear in many cases to be linked to the season, available biomass, and reproductive ability.[21] What induces fat storage is debatable but most of the literature tends to agree on what causes it to disappear. Lipids, proteins and carbohydrates diminish in the liver and muscle when (a) food is inadequate or (b) the gonads are maturing. It is known that energy reserves, which are generally deposited in liver and carcass, are considerably depleted during the spawning season. (Henderson, Wong, & Nepszy. 1996 : 127) Some fish are so physically depleted after spawning that they actually die. (Meffe, Certain, & Sheldon 1988) Seasonal spawning is linked to a decline in the physical condition of most fish and this decline is manifest primarily in the disappearance of fats from within the body of the fish. It is less reliable to assume this massive decline in fish that spawn more regularly. Different species of fish store fat differently and they also may lose fat differently, e.g. the Atlantic halibut retains much of the fat in its body while losing it from its liver (Haug & Gulliksen, 1988), while Acanthuridae (see above) maintain fats throughout their body, especially in the liver, creating special reserves during spawning (Fishelson, Montgomery & Myrborg 1985). Therefore for those species that have marked spawning seasons there are consequential seasonal shifts in their physiology, so that they show marked seasonal

[21] The onset of spawning is influenced by three factors: 1. the potential for larval survivorship, 2. timing to enhance the requirements of juvenile fishes, and 3. the reproductive capacity of adults controlled by seasonal change in environmental factors. (Pillay 1993: 371) The end of the spawning period is due to physical factors, brought on by storm driven surges or declining water temperature (both of these occur at One Arm Point).

differences in physiology. Those fish that spawn more regularly may not lose significant fats or tissue from their carcass. In seasonal spawners spawning and the linked gonadal development will be in an inverse relationship with the level of fat stores in the fish; when fish are fat their gonads are not developed and when their gonads are developed they are not fat. Those fish that spawn throughout the year maintain a spawning state of readiness
that can meet positive conditions (temperature, tide, nutritional biomass, etc.) at shorter notice and so do not display the marked physiological changes found in seasonal spawners. While the relationship between gonad development and stored fats may be the same, the range through which these fluctuate is perhaps less important as the periods themselves (spawning and fat storage) are necessarily shorter, so that the year round spawners do not experience the same levels of depletion of seasonal spawners.

It is common knowledge that aquatic foods are nutritionally superior to most others. Fish proteins have a high biological value and the fat in fish is a good source of essential fatty acids. Fish liver oils are the richest sources of vitamins A and D, fish flesh is rich in vitamin B complex, and ocean fish are an excellent source of iodine. (Devadas 1994) The physiological changes outlined above imply that there could be certain nutritional consequences dependent on the physiological state of the fish when it is caught. Higher concentrations of fat in non spawning fish certainly provide greater energy to the recipient in addition certain studies have shown that fish fat during the summer months is higher in saturated fats than in the winter months when it is higher in unsaturated fats. Unsaturated fats are apparently depleted more vigorously from the liver during the summer spawning period (El-Sayed, 1984: 77), so that the quality of the fat and the health benefits to the recipient may also vary seasonally. However, fish fat on the whole is felt to have certain health benefits, commonly marketed as omega 3 fish oil. The texture of fish meat is also known to be affected by the season when it is caught (Bjarnason 1995), but whether this is a function of the levels of fat in the meat is unclear.

Among Australian Aborigines the literature often refers to fatness as a preference expressed by Aborigines. Malcolm Douglas in one of his films indicates that the consumption of meat had important consequences for the hydration of people in the dryer parts of Australia and that great care was taken by Aborigines to process animals in such a way as to conserve or save the moisture water fats and oils in their flesh, generally achieved by cooking the animals whole and leaving the meat undercooked rather than overcooked so as not to dry the meat out. As will be pointed out the Bardi expressed a distaste for fish that was dry perhaps in some way reflecting this concern.[22]

It is important to note that wild foods show a greater variation than cultivated ones and therefore seasonal variations have greater impacts on their physiology and nutritional quality (Miller, James & Maggiore 1997:5).

It is clear at this point is that the timing of procuring and processing of most fish can be understood to have various nutritional implications especially with regard to the fat content of the fish. In addition it is obvious that the timing of procurement can perhaps have an effect on the reproduction of fish.

[22] A personal friend of mine obtained fresh water from the flesh of raw fish when marooned on a sand island, a practise that is apparently well known to the Bardi.

2.7. Marine Reptiles and Mammals

2.7.1. Sea Turtles.[23]

During my fieldwork four and possibly five different species of sea turtle were observed only two of which were exploited.

The first and most important is what is commonly known as the Green Turtle (*Chelonia mydas*). This sea turtle is the most commonly encountered and exploited sea turtle in the King Sound.[24] The Hawksbill turtle (*Eretmochelys imbricata*) is much less common and is seldom exploited, though there is the possibility that this species was more commonly exploited historically. The Leatherback turtle (*Dermochels coriacea*) and Loggerhead, *(Caretta caretta),* are rarely seen and I have only vague historical reference to the possible exploitation of these species. It is almost impossible to differentiate between the green turtle and the Australian flatback, *Natator depressus*, which is likely to be present in this area.

The Bardi Aborigines use different criteria in describing the sea turtles they exploit. Although these reflect the differences that our species nomenclature denote they tend to be linked to the exploitation of the species and, as will be made clear, refer more to differences in size, maturity, and stage in life-cycle or season.

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[23] During my fieldwork sea turtles accounted for a large part of the nutrition gained by the community through traditional means. The exploitation and consumption of sea turtle is central to my thesis in that all aspects of its procurement and consumption are regulated and predicated by cultural forces even though this is not immediately apparent even in active cultural participation. I am going to unravel this mystery in different sections under separate chapter headings so that the reader can appreciate the complexity of this topic within its context.

[24] The Australian flat back turtle (Natator depressus) is so similar in characteristics to the Green turtle that it would be very difficult to distinguish the two at a glance. Until the 1980's it shared the same genus as the greenback, Chelonia, but was eventually changed to Natator after a careful study of its skeleton. It is at this time difficult for me to assess what percentage if any of the turtles exploited at One Arm Point were flat back turtles, I am tempted to think that it is not particularly high and perhaps non existent. Flat backs all share the particular characteristic of having very fragile membranes on their flippers and even their shells, tending to bleed easily from even small abrasions. If I take into account the roughness with which all turtles were handled during my fieldwork a flat back turtle would have been instantly recognisable. I am however quite sure that on at least two occasions clutches of eggs were taken that belonged to this particular species.

Flat backs lay larger eggs than greenbacks and in smaller quantities, they also tend to dig their holes deeper. On at least two occasions we collected eggs from deep nests that totalled less than eighty eggs, and prior to a re-examination of photographic material I would guess that the eggs were slightly larger than normal.

The Bardi have observed and assessed behaviour and formed their strategies accordingly. Marine biologists' understanding of sea turtle behaviour, though not concerned with exploitation, can be used to help convey the Bardi rational for strategy formation in the procurement of sea turtles and more specifically the green turtle.

2.7.1.a. Green turtle

The green turtle has the highest profile of most sea turtles for two reasons; its historic food value, which drove it close to extinction in some parts of the world; and the subsequent efforts to assure its survival. Calipee, the cartilage from the plastron or chest plate of the turtle, is the base for the famous green turtle soup and the meat is regarded as a delicacy. The name is derived from the green colour of the fat of this turtle not from the colour of its smooth shell which can vary in colour from a mottled greenish brown to black or grey. Unlike the Australian flat back turtle which, though following the same range of colours is entirely mottled, there is certain pattern within the sections of the shell, not unlike the Hawksbill, but these become less distinguishable as the turtle matures and the carapace becomes increasingly thick and scratched. The shells of large older turtles are almost indistinguishable from the flatback except when wet. The chest plate is white or yellow. The male and female can be distinguished by the length of the tail. The female's tail is barely visible, reaching only the edge of the back of the carapace. The male's tail extends far beyond the edge of the carapace, though it can be tucked to one side making it difficult to identify. The male also has a flat nail at the end of its tail and a nail at the tip of each fore-flipper which he uses to keep hold of the female during mating.

The green turtle is a circumtropical species that can be found in the warmer areas of most seas. Green turtles in the Pacific tend to be smaller than their cousins in other seas and average 32 inches in carapace length and 144 to 278 pounds in weight. Adult Green turtles feed primarily on algae and sea-grasses but will also eat mangrove leaves and hydrozoans. 'They typically forage over broad expanses of shallow, sandy flats covered with seagrass or algae. Coral reef, worm reefs, and rocky bottoms may also be used for feeding especially when sea grass meadows are not present. Coral heads and large rocks near feeding grounds become handy sleeping shelters. Each turtle returns to the same sleeping shelter in the evening, even though the feeding area may be several miles away.' (Ripple 1996). It is thought that these turtles grow slowly because their diet is low in protein and vitamin D. They mature anywhere between 15 and 50 years of age. There are a few features of their behaviour which are perhaps relevant to this study. It is believed that to offset their low intake of protein these turtles tend to graze repeatedly on the same plots of seagrass, guaranteeing them a good supply of juvenile shoots, which are higher in protein. They also bask in the sun to take in vitamin D, either at the surface (I have frequently observed this behaviour) or on the beach (I have never seen this). These turtles also feed on box jelly fish during the wet season when they congregate at the mouths of rivers. Traditional fishermen are careful when butchering the turtle at this time as one can get stung quite badly, some simply will not eat it. The prime difficulty is in hunting turtle without getting stung by this deadly jellyfish.

Most turtles migrate between their feeding areas and their nesting beaches which are anywhere from 100 to 1000 miles apart. Mature males tend to migrate to these areas every year while the females go in two to five year cycles. It is in offshore areas of their nesting beaches that they tend to mate, the females carrying in them a clutch of over 100 semi-developed eggs ready for fertilisation. The male latches onto the front of the female' carapace with his front claws and holds the back of her carapace with the claw on the end of his tail and they swim or flounder along together anywhere in the water column but returning to the surface at intervals for air. Mating can last up to two hours after which females are left with small scars on the soft tissue of the neck, from where the male bit her to hold on, and deep scratches on her back.[25] Females can produce up to nine clutches of eggs in a breeding season at 12 to 14 day intervals, which she buries above the high tide mark, and hides by either creating a decoy nest, or by covering her tracks, in a nesting process that takes approximately two hours. The eggs incubate for 55 to 60

[25] The Bardi call these love bites, and look for these to try and identify females that have just been fertilised. Unfortunately the males sometimes make mistakes and latch onto other males leaving much the same marks, confounding Bardi hunters who are looking for egg laden females.

days before the hatchlings dig their way out of the sand and clamber into the sea. Females tend to nest in almost the exact location from which they were born establishing what are known as rookeries where many females of the same and successive generations all return to nest at their natal beach in huge predictable numbers. [26] Sea Turtle egg-laying activity significantly affects the ecology of the coastal zone, and areas that are frequently used as rookeries share certain characteristics which are a direct result of egg-laying activities. (Rogers 1989)

2.7.1.b. Hawksbill Turtle

The **hawksbill turtle** is much smaller than the greenback, measuring from 30 to 36 inches on the carapace and weighing from 90 to 130 pounds. This is one of the easier sea turtles to identify, both for its distinctive beak and its carapace. The shell is composed of thick plates or scales overlapping each other, that are a translucent amber with yellow, brown and black streaks. These are the source of tortoiseshell for which it was hunted and nearly driven to extinction, until an international ban was put in place[27]. The hawks bill was also prized for its eggs but intense exploitation of these was difficult because of their nesting habits which favour random isolated locales. They average from 150 to 200 eggs per nest. Large adults tend to live in deeper water while the smaller juveniles after the pelagic phase in their growth cycle return to shallower areas to feed on the reef. Sponges, despite their high toxicity are their primary source of nutrition, some traditional fishermen will not eat parts of the hawks bill turtle because they are said to be poisonous. The hawksbill swims significantly faster than the greenback turtle but needs to breath more often. It also favours clearer water.

Both these turtles feed mostly during the night, early morning, and late afternoon, sleeping for several hours during the day and part of the night. The hawksbill prefers sleeping in crevices in the reef while the greenback prefers sandy

[26] The importance of these features will be explored in later chapters on Bardi hunting and fishing. The fact that green turtles tend to follow patterns in migration, nesting and grazing lends a predictability to their behaviour that can be exploited.

[27] The Convention on International trade in Endangered Species of Wild Fauna and Flora bans the trade of wild sea turtle products, while all sea turtles are protected under the United States Endangered Species Act.

bottoms under overhanging coral or rock, usually returning to the same site (Johanness 1984: 58).

2.7.2. Dugong; Family: *Dugongidae*, Genus: Dugong, Species: Dugon

During the first session of my fieldwork there were only two instances where I recorded the capture and processing of these large sea mammals. This is due, in part, to my absence during the main or heaviest part of their hunting season, but also because they were in particularly short supply in both 1994 and 1995. The reasons for this will be explored later in this section. My return in September 1996 caught the tail end of an extremely successful dugong season. The two fishermen that I work with regularly, Gounie and Jabby, had caught approximately 40 and 30 respectively. During my four weeks there we caught another two and I recorded the capture of another seven. It was estimated that close to 500 dugong had been caught by the Bardi in this season.

Dugong are part of the order of *sirenians* to which the manatee and the now extinct stellar sea cow also belong. They were called *sirenians* because of their association with the mermaids or sirens featured in Greek mythology. This large marine mammal akin to a walrus has received little scientific or public interest until recently, perhaps because now they are dangerously close to following the fate of their cousin, the stellar sea cow, which was hunted to extinction by Russian hunters in less than 28 years in the late 1700's.

Dugong like most sea turtles are on the endangered species list. Like the sea turtle this is due mainly to the actions of Europeans who actively hunted them for their meat, fat, and hides, and due to the encroachment of their natural habitats (sea grass beds) which unfortunately coincide with the best bays and estuaries for anchorage.

Dugong can be found throughout the temperate coastal waters of the western Pacific and Indian oceans, and while many of these populations are endangered or on the verge of extinction, Australia boasts one of the largest and healthiest dugong populations numbering close to 70,000. The subsistence fishing of these animals by Aboriginal fishermen if kept within certain limits should have minimal impact on their survival. It is interesting to note that even scientists fighting for their conservation recognise that '*certain subsistence level hunting, including hunting of rare or endangered species, can be ... important to a particular people*'. (Reynolds and Odell, 1991: 15).

Dugongs may have been very difficult to hunt for Aboriginal peoples in pre European times, their thick skin, formidable size, shyness and extremely sensitive hearing, made and make dugong a difficult prey. The dugong is faster, stronger, and more active than its cousin the manatee,[28] which, along with a large relatively undisturbed habitat along the Northwest coast of Australia may account for its better survival rate. Once again the huge tides at One Arm Point which make navigation so difficult have left the habitat of the dugong relatively untouched throughout the region.[29]

Dugong are herbivores, feeding primarily on aquatic vegetation or sea grass much like the greenback turtle. Dugong, unlike the manatee which take food throughout the water column, feed exclusively from bottom vegetation. A large dugong can consume up to 200 pounds of vegetation each day, consuming not only the leaves of sea-grasses but also the roots and rhizomes leaving large straight tracks in the grass seabed where it has been feeding . The environmental impact of large numbers of dugong can be tremendous and is an important factor in understanding their feeding and migratory behaviour. Dugong often graze in large herds at the same location for weeks or months and can consume approximately 70 to 95% of the biomass in areas ranging from 2 to 7 ha. (Preen 1995: 201). It is thought that they migrate seasonally in response to changing weather conditions, but these migrations may be less than predictable or may simply follow a longer calendrical format. The Bardi believe that while there is some seasonal motivation to their migration there is something greater that influences their patterns of movement. It has been suggested to me that they tend to return to the One Arm Point area in waves over three to five year periods and my brief research would support this in principle. Why they tend to leave areas for such long periods of time is a mystery but I would suggest that it is perhaps related to their feeding behaviour

[28] Dugong have a fluked tail much like a dolphins or whales, while the manatee have a larger paddle shaped tail. This might account for their differences in speed and manoeuvrability.
[29] With the exemption of the pearl fishery nets which occupy two huge areas to the south of One Arm Point in Cygnet Bay and to the east of Long Island.

which is extremely intrusive and extensive. Perhaps areas take a long time to recover from their visits, and they are in effect left fallow so they can be replenished before returning. However, Preen (1995), suggests that sea grass beds recover in a matter of months from Dugong grazing, and may take much longer to recover from the effects of storm and disease. The dramatic effects of storms on seagrass beds and the consequent effects on dugong are demonstrated in Harvey bay where after floods and cyclones decimated the sea grass beds 99 dugong died of starvation (Preen & Marsh 1995). Dugong may then seek out those areas that are the least affected by storms in a given year. Preen (1995) suggests that the sea grass species that recover the best from intense grazing are the most nutritious and desirable. He says '*By preventing the expansion of Z. capricorni and increasing the abundance of H.ovalis, this grazing system, termed cultivation grazing, can improve the quality of the dugong's diet.*': 201. If dugong feeding creates underwater pastures of juvenile shoots of fresh seagrass that we know the green turtles are dependent upon for optimal nutrition, a boom in turtle numbers following a boom in dugong could be expected.[30]

Dugongs have a very low tolerance to cold, and water temperature changes, even slight, may dramatically influence their movements, both on a day to day basis and by larger seasonal fluctuations. Migration is seasonal, controlled by water temperature fluctuations, which affect them at a physiological level, and through the available biomass. Therefore they probably migrate to optimise both temperature and diet. (Anderson 1986)

Dugong can live to be 70 years old and become sexually mature at about ten years of age. There is a gestation period of 13 -14 months and mothers can stay with their calves anywhere from three to seven years. In Australia dugong breed and calve all year round. Dugong can dive to depths of 40 feet to feed but generally feed

[30] I will be curious to see if there is any such effect in the next two years after the windfall of dugong in spring /fall 1996, and if the Bardi would have predicted it or have noted it in the past. What one would hope to find is older men assessing the state of the grass and determining that it will not be long before the dugong return in large numbers or that this will be a good season for turtle. This is not much to expect of hunters who can by the breath odour of breathing turtle in the dark asses that it is not fat enough and let it go by when it could have been procured. Decisions are taken on the basis of this kind of information all the time, it is fact not guesswork.

in 10 to 15 feet of water. Their maximum dive time is approximately 8 minutes but when feeding they average 1.2 -1.5 minutes.

Dugong are very social animals and engage in complex social behaviour [31]. Many of their activities are highly co-ordinated; these range from meeting and travelling in large herds to synchronisation of movement in small groups. While feeding, groups of three or four manatee will synchronise their breathing, bottom time, and changes in direction. All these are important factors that are taken into account when hunting this sea mammal.

[31] The Bardi actually refer to the dugong as *'having culture'* and there are special names to describe family groups and their makeup. This will be explored in greater detail in Chapter 7.4.

3. The Bardi Environment.

In the preceding chapter I outlined the physical geography of the coastal area concerned and described the relevant characteristics of the main fish and animal species exploited by the Bardi at One Arm Point. In this chapter I aim to elaborate on these descriptions by introducing and outlining Bardi notions of the physical geography and the distribution of all of the species already described.[32] Whenever possible I will be using the same section headings, though the order in which these appear may vary in accordance with Bardi notions of their importance and relatedness.

Section 3.1 deals with the climate under the umbrella of Bardi representation of the seasons, while section 3.2 deals with Bardi understanding and representation of the tide. Section 3.3 Bardi Fish taxonomy groups together species in categories that are relevant to the Bardi and begins to describe aspects of their physiology and behaviour that are important in determining their exploitation. Section 3.4 deals with Bardi understanding of the two main marine animals exploited: the sea turtle and dugong. Section 3.5 further expands on the subject of fatness and its importance in Bardi resource use.

3.1. Bardi Seasons

Bardi understanding of the climate is embedded in their understanding of the seasons. Climate as a category has little value without the associated seasonal, floral and faunal changes that it brings about. It is under this section title that Bardi notions of the climate will be described.

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[32] My aim has not been to establish a comprehensive understanding or translation of Bardi concepts of physical geography but to explore those aspects of it which they found relevant to maritime ecology. Tide and season are the two main determinants of Bardi hunting/fishing activity, through their effect on the environment in a meteorological but also physical sense. The Bardi generally described geographical features to me in relation to their usefulness which is largely determined by the seasons and the state of the tide. Physical Geography is largely seen in terms of the ancestral beings that created the physical properties of the area, the idea of geography as separate from this is literally empty. The concept of geography in a European sense is only manifest in the most pragmatic situations, as my research deals primarily with fishing and not primarily with the issue of Bardi land or country, the physical geography in a physical sense is of importance to fishing techniques and analysis of fishing strategy. Geography in the sense of Country and ownership of country has been described in Chapter 1 section 1, and will be further discussed in Chapter 7.

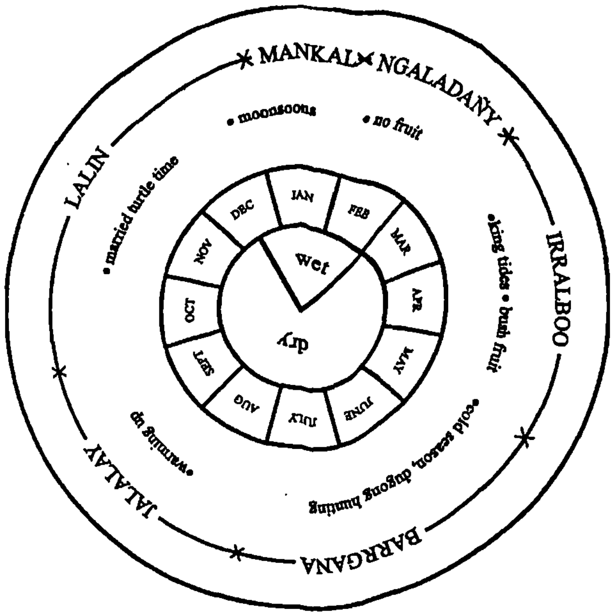

Figure 7. Bardi seasons wheel. (Kenneally et. al. 1996)

Much of the northern half of Australia is characterised as following a typical monsoon seasonal pattern, with a definite wet and dry season, but in the Dampier Peninsula the wet season is a bit of a misnomer. Though there is a wet and a dry seasonal pattern, in some years the supposed wet can last for as little as two weeks. Therefore it is not surprising that the Bardi recognise a general division between the wet and the dry like most Europeans, but also distinguish, within these, six distinct seasons (see Figure 7), 'distinguished mainly by wind and rainfall direction and intensity, ripening of fruits, and appearance, disappearance and 'fatness' of fish and animals.' (1985 Smith & Kollotas,: 322).

These seasons like ours vary in their onset and character from year to year and the Bardi still remain extremely sensitive to the environmental markers that denote the beginning or the end of a season. During my fieldwork these seasons were seldom referred to, while the environmental cues that define them were always discussed, ratified, checked, and acted upon. I will be following Smith and Kollotas's general schemata correlating Bardi seasonal concepts with European calendar months, recognising as they did that these are approximate associations.

In January 'the wet', monsoon, or **Mangal** season as the Bardi call it is beginning to set in . It is a time of ocean winds and storms, and heavy rain, but in some years the rains only last for two weeks. During the time I was there heavy monsoon rain fell only sporadically in late January and we had what was called a 'dry wet'. The beginning of the rain usually signifies the movement of married or egg-bearing turtles away from the area and the end of married turtle hunting season, at which time turtle eggs are collected. In One Arm Point, during my period of fieldwork the turtle hunting season never ended but shifted from married turtle to solo turtle hunting. It must be remembered that Smith worked with the Lombadina Bardi on the open ocean coastal mainland side of the peninsula and that the environment there is significantly different, the ocean winds would have a more inhibiting effect on this region on both turtles and fishermen in comparison to the protected island areas of the One Arm Point region. It is likely that more turtles live in the King Sound area generally and so the migration of female turtles returning to their feeding grounds would have more of an impact on the density of the turtle population in Lombadina.[33] It is interesting to note that during the month of January and early February a fair amount of turtle meat was taken by or given to families living in Lombadina/Jedajun and related outstations.

Smith notes that a variety of roots are dug during this season though there is little fruit available (Smith 1987). Very little if any camping takes place at this time of year as people take refuge from the rains in their homes in the community, therefore most fishing expeditions tend to leave from OAP.

Murduur fruit (*Terminalia ferdinandiana*) are ripe at this time of year and special stops are made when out fishing or hunting turtle to collect these small bittersweet fruit high in vitamin C from small robust trees that grow on the sides of rocky headlands. Many of the processing and resting sites in the islands are associated with these trees, even when their fruit is not in season.[34]

This is the time for the main circumcision law and the thick clouds that come in off the sea are seen as the indicator for the start of this Law. When the full moon appears behind the clouds its light is diffused into a wide halo, which represents for the Bardi a group of Aboriginal men dancing around the moon, indicating that it is time for that law to begin.

Ngalandany is the end of the wet, usually coinciding with the beginning of

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[33] The end of married turtle season on the whole would result in a drop in the overall numbers of turtles as these migrate away from the King Sound back to their traditional feeding grounds while others leave their mating grounds returning to their traditional feeding grounds in the King Sound. If turtles are not perceived as fat at this time it would not be surprising.

[34] This could indicate that they grew there as a result of human transport of the fruit from other areas. Murduur are "reported by researchrs at Sydney University to be among one of the richest natural sources of vitamin C in the world. 50 times higher that of oranges" (Keneally et al. 1996: 88).

February. The temperature is high and there is no wind making this the most uncomfortable hot and humid time of year. Smith relates that traditionally people called this the 'rubbish time' and that they moved around as little as possible, making maximum use of stone wall fish traps. This would fit with my observations but I had attributed their lack of movement to the proliferation of cricket test matches which kept Douglas and much of the family awake till all hours of the morning and sleeping most of the day. The use of fish-traps or the fish-trap raises some interesting questions which will be dealt with in further chapters. The main fish-trap man had died before I arrived and no one had taken up the slack or ventured to make much use of it since.

This 'rubbish' time may refer to the fact that there are no fat fish, married turtle are rare, there are no dugong, and only some stingray, and some mullet are still fat. The only fish caught were those taken trolling and, though people were glad to get these, few expeditions went out looking for fish.[35] It would appear as if **Ngalandany** is the leanest month for picky eaters.

The season **Iralbu**, starting around the end of February, is the season of the King Tides. These big tides open the reef flats to exploitation and I would imagine traditionally brought into action the permanent and semi permanent fish-traps along the coast.[36] This would also be the prime time for fish poisoning as access to small, fish saturated pools would be facilitated. Today this season is the focus for the collection of trochus shells, the one commercial enterprise in which the Bardi partake. It is doubtful that they historically exploited this species in anything but a haphazard manner. I recorded no particular historical uses for the shell, and the Bardi often assert that they learned how to eat the meat from the Malaysians that many of the older men found themselves working with in the early days of the

[35] Trolling is a fairly recent traditional activity and was not a historical technique used in this area.
[36] Some of the bigger fish traps are in the upper tidal range, and I would suspect that this is in part due to the amount of labour involved in building these. Naturally those that are more frequently attained by the tide, are also more subject to wear and tear, and so a higher trap would require less maintenance. Traps also need to be built when the tide is out, those higher on the tidal plane obviously will be easier to build and maintain.

establishment of the pearl farms.[37] There is a strong tradition of trochus shell collection started by the first missionaries in the early 1900's, who supported the mission, and justified their care of the Aborigines by getting them to collect pearl and trochus shell, which they then would sell.

Today the sale of trochus shells represents the main accountable independent source of income for the Bardi. The manner in which they treat this income varies significantly from other sources of income. The detail and rationale for this will be discussed in Chapter 5.1, Trochus.

Shell collecting on the whole however has always been an important activity. The collection of pearl shells for the creation of the highly valued **Turanga** ornaments worn by Bardi elders were possibly traded with other groups along with a wide variety of shells used as tools and cooking implements. Historically, the Baler shell is of particular importance as it served as the main cooking implement and water carrier. Large ones were used for preparing a turtle stew made from blood and eggs during married turtle time and the smaller shells were used for cooking the livers of stingray and the fat from some fish. Broken shells were also used in a variety of interesting ways, as knives in processing and cutting up turtle, grating tubers, shaping boomerangs and spears. This kind of shell collecting still takes place today, and small groups of mothers and their small children often take advantage of low tides to head out onto the mud and reef flats in search of their favourite shells. Most families have huge collections of spider, butterfly, nautilus, and baler shells, in their homes.

Smith characterises **Iralbu** as hot and windless and it is during this time that the water temperature is at its highest. Many of the corals and, presumably, fish are spawning and the water is said to be 'dirty' with coral bloom. When it is slack at low tide the water becomes so saturated with coral bloom and other flora that it stinks and stings the skin. Enclosed waters at low tide can reach bath water temperatures and Douglas and Old Mum recollect this as the time for certain fish not because they are fat but because large

[37] The meat is quite tough and difficult to extract and really only becomes palatable after being soaked in vinegar for a few days

numbers of Mackerel (**Gularganjan**) would congregate in shallow water near the old Mission on Sunday Island while later in the season fish would die in large numbers on the reef flats. Fish in general are not exploited during this season as most are said to be 'rubbish', except for the few species that are said to keep their fat all year long. Coincidentally most of these were historically procured through fish poisoning.

Closer to April south -easterly breezes begin to blow (**albubur**), and there can be light rain (**mambin**). On the Lombadina side the people traditionally shifted camps to the beaches and dunes to avoid the mosquitoes. Some fruit is ripe and the pandanus ripens with the rain. Near the end of this season the water temperatures begin to drop and old people begin expressing a longing for fish with nice fat. Experimental forays are carried out to test the fatness of certain fish. Goannas start to get fat and apparently so do kangaroos though there are none left on the peninsula. Younger men make long journeys with their favourite dogs to hunt these goannas which can be found in a few specific areas below Lombadina on the road to Beagle Bay. When the long grass begins to turn brown the stingray (**barnamb**) lips are no longer yellow, indicating that they are no longer fat. When the eucalyptus flowers blossom the dugong hunting season begins and even though in the particular year I was there Dugong were in short supply reconnaissance expeditions did begin in April. Among the Wiggan family and associated kin only three Dugong had been caught in April and May 1995, even though this was supposed to be their season.

Bargana is the cold season and this is the time for fish as many of them are fat. Many of the Bardi prefer their fish at the beginning of this cold water time in April, May as they are only just putting on their fat. Many Bardi, especially the women and younger men, say they cannot stomach the fatness of these fish at the height of this season in July. Much pressure is put on the younger fishermen to catch certain species of fish and it is during this season that the women leave their homes and begin line fishing in earnest. The mosquitoes are less prevalent and one can sleep outside making this the best time to camp.

Many families leave their homes in One Arm Point and relocate to the islands or the coast behind the beaches, though what were south east breezes in the

Iralbu are now strong south east winds and it is cold at night. People are burning fires to stay warm, and they situate themselves behind natural or manmade windbreaks to sleep. The tides are small, leaving the King Sound relatively calm. If Dugong are present it is the ideal time for night fishing (**undug**), especially under a full moon (**bingarr**). Camping provides the ideal situation for night fishing and many of the women line fish while the men are out hunting and the younger children are sleeping. This is one of the favoured activities of the older women and great efforts are made to get older invalid women, who normally stay at home, down to the beach at night to go line fishing for snapper (**Maran**) and rock-cod (**Bidip**). The small tides are not good for reefing, (though this is debatable) and people concentrate on fishing in earnest.[38]

Goannas are still fat in **Bargana**, as were kangaroo, and a variety of inland resources are exploited, (Smith 19 :324) especially sugar bag or **Mungun** which is ready to be collected, as are many ripe fruits. Today the Bardi at One Arm Point exploit these resources with four wheel drives as there are driveable tracks throughout the bush, usually purposefully created to get to these particular sites. They are treated as daytime expeditions and it was rare during my time there for people to spend the night inland away from the coast.

At the end of July beginning of August starts **Jalalay** season, known as the 'warming up' time. The wind shifts from the south east to the west and Moya Smith characterises this as the end of the Dugong season.[39] The tides are exceptionally low and reefing becomes the focus of activity again. Changes in the water temperature tend to lag behind changes in air temperature and some fish are still fat though many are beginning to go off their fat as their gonads begin to mature in

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[38] I have been told that trochus fishing can sometimes be better during neap or small tides as the shells are not taking refuge in pools or under rocks as they do when the reef is totally dry. It is probable that during this season fish fatness takes precedence over shelling, therefore, despite the fact that the tides are right for shelling, interest in shelling is less widespread. The yield of trochus collection curiously increases at this time and it is perhaps more accurate to say that shelling is no longer the focus of activity but that living in the islands, and spending more time fishing, allows them to exploit trochus as they come across them, by chance, in fairly large numbers. Roy and Margaret, when camping, would casually walk across to get shells, and, even though tide didn't go very low, or stay out very long, they did quite well, as they were in the right location. Shelling season may then have become the focus of activity traditionally during periods which historically offered relatively few exiting exploitation options or possibilities.

[39] It has been my experience at OAP that when the dugong do finally come in earnest the season is greatly extended, and they are hunted well into September.

preparation for spawning. During this season the stingray are beginning to get fat again. This is a transition season and a wide variety of resources are exploited as many fish are still fat, some stingray are getting fat and if dugong chose the King Sound in that particular year many are still around. In September the first married turtle are also appearing. The focus is shifting to exploiting married turtle, but these, appearing only sporadically, mean that fishing remains one of the primary activities.

The water temperature remains relatively cool into the beginning of the **Lalin**, in late September early October, when the air temperature has fully increased in the build up to the wet season. By this time stingray, gummy shark and mullet are fat but most expeditions are focused on married turtle. People are camping less as there is some rain, but some Bardi, especially hunters, will stay out in the islands for the day and overnight looking for married turtle until the end of the **Lalin** in late December. **Bingarr** (moonlight) hunting is especially important in this season. The men either scull in the tide looking out for the mating turtles' shells shining in the moonlight, or walk along the beaches waiting for turtles coming into the beaches, taking advantage of the high tides, to lay their eggs. Most expeditions during this season however leave from One Arm Point.

As the wet season, **Mangal**, approaches, near the end of December, the water has warmed up and almost all the fish that were fully fat in **Bargana** are now 'rubbish' and are not exploited. The weather becomes unpredictable, married turtle are rare, and stingray become the focus of exploitation, in part because they are fat and also because they can be hunted in estuaries and mangrove areas that are less affected by the weather. Historically the most important fruit were the **Ilara** (crab apple) and these are still commonly exploited this time of year.

Smith and Kalotas (1985) stress that most of these seasons are predicated by the availability, ripeness, or fatness, of certain resources coupled with meteorological factors. All of these are perceived in association with each other, and function as markers for events of importance, or for the readiness of plants and animals for exploitation. Some are relational; as one resource is declining in exploitability another is coming in. Others are associational; as the grass turns brown stingray are fat, or as eucalyptus flower it is time for dugong. All these elements are interconnected and each acts as a benchmark for the next. Association and relation are the keys to understanding Bardi patterns of resource use and may reflect the structure of an overall system that deliberately shifts its exploitation from one group of resources to another, not based solely on availability or ease of exploitation, but in an effort to maintain the sustainability of the environment and Bardi cultural systems.

3.2. Bardi Tides[40]

The state of the tide is affected by a wide variety of forces as outlined in Chapter 2.2. Bardi understanding of the tides seems to reflect a knowledge of these forces in all of their intricacies. Their understanding of the forces themselves may be limited but their effects are completely understood, to the point that perhaps even the most profound understanding of the forces at work would add little if nothing to their knowledge of actual tidal movements and changes in their area. In fact, their understanding exceeds what even the most knowledgeable student of tidal processes could predict for the tidal movements in the King Sound. My own understanding of the forces of the sun, moon, rotation of the earth etc. were of very little practical use on a day to day basis. While the timing of the tide and expected movements may be achieved through understanding of the interaction of these forces, the effect of the environment and geography of any particular area determine the end product.

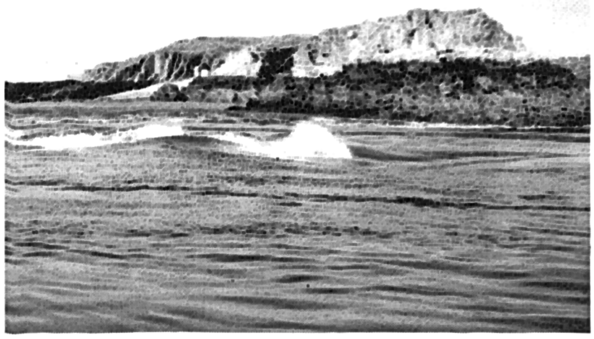

Figure 8. Slow current pushing over submerged boulder.

The particular characteristics of the King Sound create circumstances that only generations of inhabitants possessing direct experience could interpret. In effect, the Bardi way of understanding and communicating the tidal phases comprehensively covers all of the variables predicted by the conceptual models of tidal movements. The Bardi system not only accounts for all of the predictable elements of the tide from a conceptual point of view, but also includes all the

[40] I would like to make clear from the outset that it was very difficult to translate Bardi concepts of the tide into terms that relate to western tidal classification, as many of the processes they refer to relate specifically to the One Arm Point area. Additionally, many of their terms overlap in their context and meaning. I cannot, therefore, pretend to be representing their system with the accuracy that may appear in the following section. Though this section is the result of a great deal of work it is possible that the Bardi terms themselves are miss-spelt or wrongly attributed. However, I am confident that the processes they are referring to are accurately identified.

particular manifestations of the various tidal activities particular to the One Arm Point area.

The Bardi attribute separate names to distinct tidal phenomena that may only occur three or four times per month, or twice per year. What makes these phenomena particularly interesting is that many of these refer to tidal events that are unique to the One Arm Point area. In other words, their definition would have no relevance in any other context. To compartmentalise the One Arm Point area and adjacent islands as a single tidal model would be misleading. The small area of One Arm Point and the adjacent islands and bays all experience the tide in sometimes dramatically different (though regular) manners. One can be standing at the edge of a full slack tide in a particular bay and walk the 200 meters to the other side of the island or headland and find that the tide is still coming in or has already started to go out. The large tidal range (9m) experienced by the King Sound also means that any single area experiences a wide variety of different tidal phenomena (see Figure 11 & Figure 12) As the features of a particular area change within the scope of the changing tide, so too does the response of the water. What are large, open, calm, easily navigable bays at high tide, can become short, tight, dead-end channels between islands of boulders and reef at mid to low tide, fraught with fast currents and whirlpools only navigable by the most experienced. An incredible number of such variations appear and disappear over the course of the incoming and outgoing tide, depending on the cycle of the moon sun and their various interactions. The Bardi know them all.

The Bardi believe the tides are thought to be linked to weather patterns such as storm fronts etc. which are said to be either brought in, taken out, or broken up by tidal forces. I have personally seen these phenomena several times and yet have not been able to find references that support or deny this. The Bardi also assert that cyclones and other large frontal systems are broken up by the conflicting tidal forces that occur at variance on opposite sides of King Sound, the tides literally pulling them apart.

As pointed out earlier, fishing/hunting knowledge and effort is not solely directed toward exploiting nutrition from a given environment but also to maintaining one's safety in the course of these activities. It is likely that the skill actually used at the instance of exploitation is but a fraction of the skill needed to preserve the hunter's safety as he pursues his exploitation. This is especially true in the King Sound. The ease with which the Bardi navigate this complex and dangerous environment belies a depth of understanding and knowledge that is unfathomable. [41]

The main tidal currents are all named by the Bardi. The older hunters and fisherwomen can identify them all, listing all their different characteristics, and how these were and are handled and exploited depending on the different seasons, moons, etc.. An entire book could be written on the tides in this area so I will concentrate on those aspects of it with which I have direct experience and that affected the activities I was involved in during my time at One Arm Point.

The Bardi system of tidal classification is highly complex and I only came to feel confident that I had grasped a few of the most basic concepts after experiencing these several times '*in situ*'. I will attempt to outline those that can be easily assimilated using the basic understanding of tidal processes introduced in chapter 2.2.

The Bardi refer to all currents as **Lu,** strong ones are known as **Nalan,** though this is usually referring to the large predictable tidal currents. These large reoccurring currents have individual names and the major ones are included on Figure 10.

The strong tides we refer to as spring tides, are not identified as the wide selection of larger flux tides western oceanographers call spring tides, but refer to only the largest of these that occur over a two to three day period, at the time of, and just after, the new and full moon. These tidal phases are collectively known as **Guloun.** However, the predominant named currents generally refer to currents produced by the stronger tidal forces during the wider period oceanographers refer to as spring tides. The monthly phase of relatively small tidal ebb and flow known as neap tides are called **Gungin**, but again this name predominantly refers to the

[41] My own brief experience is fraught with anecdotes which indicate that, had I been alone, I would not be here today to talk about it. This, I am sure, is the experience of most anthropologists who have spent even a short time with Australian Aborigines in the bush. The tide affects everything and even a light current of two to three knots confuses the most simple task.

two or three days when the tidal flux is at its minimum over and just after the first and last quarter moons, and was translated to me as '**dead tides**'.

The Bardi system of classification distinguishes between the different stages of the Spring and Neap tides. The Bardi, like oceanographers, apply and understand conceptually the regular patterns of the tides. However, unlike these, who apply conceptual markers to distinguish the different tidal stages within the larger named framework, the Bardi's overall framework is based on these markers which are represented as distinctive named tidal categories each referring to a specific tidal event. The overall conceptual comprehension of tidal sequences is generally understood, described, and applied using these terms. For example, what we call diurnal tidal inequalities are understood and incorporated as part of the named tidal event, i.e. tide A is known to be higher at night than during the day. In addition, and perhaps most importantly, these specific named tidal events each have different implications for exploitation strategies and patterns, which are in fact only relevant to the One Arm Point area. What I am describing then is a unique tidal plan created, ratified, and passed on over hundreds of generations. In light of this ,I am afraid that I only feel confident describing the basics of the system.

The first of the tidal flows to which I was introduced was related to me at night while looking at the sky. The moon, **Guid,** was just starting to show as a sliver two days after the new moon. Douglas had left his dinghy just outside the mangroves at the mooring site **Angulumar** at about 6.30:m. At the time it was 'floating' and he explained that 'on this moon' boats left at a specific time floating the previous evening could be found the next morning at the same time, floating in the same place. This period of time was called **Bolong**.

The importance of a dinghy floating, or not, may not be apparent until one attempts to drag a motorised dinghy even a couple of meters through the mud to the edge of the water, especially when this is rapidly receding. The significance of a tidal sequence upon which one could be sure that a dinghy left floating that night could be found floating at the same time the next morning cannot be stressed enough. The position of dinghies on the mud flats, and the tide's relative situation to these, is one of the primary concerns of all hunters and fishermen as expeditions cannot take place if one cannot go to sea. A miscalculation of only half an hour can leave the dinghy dry or floating up to one kilometre away from the water's edge. In essence **Bolong** refers to a period of time during the tidal sequence when the tides are very regular. When consulting Tidal charts for the town of Broome some 250 km. south and attempting to calculate the timing of the tides at One Arm Point, 1 ½ to 2 ½ hours in advance depending on the tidal phase, the Bolong phase corresponds to a time when the ebbing tide at sunset and the corresponding tide at sunrise are at most ½ an hour out of synch. In other words, the tide at night (at One Arm Point and **Angulumar** specifically) around sunset is at approximately the same level as the next morning at sunrise.

The rule for this tide is that wherever you leave your boat floating (in 1-2 ft. of water) the afternoon or night before you will again find it floating (in the same depth) at the same corresponding time the next morning. This is conceptually difficult to comprehend as we know that the tides advance with every phase by about ½ an hour, but it seems as if during this particular lunar phase the differential volume of the tide (diurnal inequality caused by the declination of the moon) when the night time tides are always lower than the day time tides and the consequential rate of ebb and flow create circumstances where the timing of the ebb and flow relative to the dinghies position, result in the tide appearing to follow a regular 24 hour pattern over three to four days corresponding to the timing of the setting and rising of the sun and regular intervals before and after these. [42]

The tides during **Bolong** are spring and consequently of quite large flux. The tide, therefore, comes up high onto the shore and into the mangroves and goes out beyond the mud flats, exposing the reef flat entirely. During **Bolong** days the tide is already well on its way out at sunset and at sunrise so hunters try to leave early in the morning. I was
initially curious as to the Bardi did not opt to moor their dinghies over the mud flats in areas where the water stayed, and swim out to these when the tide was high. Swimming in mangroves is generally frowned upon but in areas such as

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[42] Douglas specifically referred to **Bolong** tides when the tide was two days past the new moon at which time night time low and the next mornings low occurred just after sunset and sunrise, the tidal difference between these being less than 5 cm. This would result in striking tidal regularity even during this relatively regular tidal phase.

Angulumar where animals are regularly butchered it is downright dangerous.[43] In addition, the tides can be quite strong even over the wide mud-flats and the dinghy will be turned around at least twice overnight, possibly dislodging the anchor and losing the dinghy (as occurred twice during my time there, both times to young men) . The mud flats far off shore have more rocks and boulders and the dinghy, when carried across these at night will crash, potentially damaging the hull or motor. Ideally, the Bardi prefer to keep dinghies inside of the mangroves where they can be tethered and immobilised, protected from the wind, waves, and current. It is only during these tides, **Bolong**, when the tide begins to go out very early in the morning around 3am. that they leave them out on the mud flats, though only just beyond the mangroves.[44]

During **Bolong**, hunters return on the high tide and unload their catch directly on the beach and, while processing shell ,or sitting on the beach push the dinghy out with the receding tide into position, floating at sunset so that it can be found floating the next morning ready for them to leave on the outgoing morning tide.

In almost all other cases, when the tide is going out in the morning around sunrise, the differences between the level of the tide in the evening and the following morning are extreme, and the hunter has to check the dinghy and readjust its position several times overnight to be sure to be able to make use of it the next morning. If he misses the tide he is forced to leave in the early afternoon, losing at least half the day and the only possibility of reefing on offshore exposed reef at mid day. In addition, if one misses the tide and goes out in the early afternoon instead of the morning, one is forced to return in the evening on the ebbing tide, forced to carry resources procured a fair distance over the mud flats up to the beach. If hunters happen to miscalculate this tide they generally give up and choose not to go

[43] As many things as the Bardi let me do, for the sake of a good laugh, they never took me up on my offers to swim out and collect the dinghy sometimes floating only twenty feet away.

[44] Hunters preparing or anticipating going on expedition the next day will rise early in the morning and walk down to **Angulumar** and either push the dinghy out or pull it in ,placing their dinghy in the appropriate position so that when they want to go out it will be floating in water approximately knee deep: On almost every outing in which I took part, the dinghy had been moved overnight from the position we left it in at the end of the day before. **Bolong** moon meant that this didn't have to be done.

out in the afternoon setting up the dinghy that evening in preparation for the next morning (see Table 4 March 14th 1995). During **Bolong** the hunter is less likely to get caught by the tide, allowing him to relax. Most hunters therefore, take full advantage of the regular tides at Bolong and it is a busy time for expeditions.

Bolong is immediately after **Nalan**, the days of largest tidal flux, and preceding **Gangin**, the time of lowest tidal flux.[45] Near the end of **Bolong** just prior to **Gangin** there is a short period called **Jumbalgnud** . It rests between the two and signals the end of Bolong and the beginning of Gangin, The tide is regular enough to be Bolong but is going out too late, and is not small enough in flux to be **Gangin**. During **Jumbalgnud** hunters can leave on an early outgoing tide and exploit the reef at mid day. Despite not having the ideal large tidal flux it in fact offers the best timing for expeditions.

Gangin or 'dead tides' cover the three to four days of lowest tidal flux, roughly coinciding with the first and last quarter moons. After **Gangin** the tides begin to increase in flux. This initial increase in the flux of the ebb and flow is called **Bornan**. The tide during **Bornan** is not of great flux and is low around sunrise not providing the best opportunities for exploiting the exposed reef flat as one would have to leave or return in the dark. **Bornan**, however, leads into **Jumbalgnour**, one of the better tides for exploiting the reef flat as it is both of large flux and is low 1 to 2 hours after sunrise, giving the hunter time to get to the reef and return in daylight. The tides of largest flux **Guloun** are best for exploiting the reef flat, but the speed of the tide makes it difficult to anticipate and so hunters can easily miss this tide. They therefore make repeated trips to the landing to check its progress, or spend the night in the islands close to a favoured reef in anticipation.

Ideally, hunters in dinghies prefer to make use of tides that expose the reef at mid day. They can leave on a high or ebbing morning tide, wait for the reef to be exposed, hunt fish and collect shells, and then return on the high tide all during daylight hours. Unfortunately, this corresponds largely to the timing of the neap tides which tend to be high around sunrise but which are not subject to the tidal flux necessary to expose the reef for collecting shell. **Jumbalgnud** is the only exception and, despite not being of great flux, is the focus of an important amount of shelling activity due to its timing. Although the hunter cannot be certain about the timing of **Jumbalgnud** tide, he knows that the tide will be coming up to mangroves at **Angulumar** around sunrise. The expedition thus can leave early in the morning from the beach on a high tide. Hunters leaving on a coming in tide in the morning can travel anywhere they plan as the crow flies, as most obstacles are submerged. This saves them much time and fuel, and they can visit sites that they may customarily not use because they are too far away. This tide, while comparatively not very low, exposes enough of the reef flat to make them worthwhile.[46] In addition, all the phases of the tide come into play during **Jumbalgnud** and the hunter can take advantage of them all, using all the methods of procurement at his disposal and exploiting a wide range of resources. While all the daily phases of the tide occur all the time they are not necessarily occurring within the daylight hours. In addition, the sequence of the tide, high in the morning, and high at night, allows the hunter to leave from the beach and return to the beach, which is especially important if a large number of resources have been procured during the day. As pointed out in section 5.1 this is especially relevant for trochus which are extremely heavy and unlike turtle or fish, can only be processed on the beach. This is less important today as four wheel drive vehicles can go out onto the mud flats, although the owners of these do not like to do it.

This tide has special relevance historically, before the advent of dinghies, when hunters either swam or travelled on rafts on hunting fishing expeditions, or when travelling between islands carried by the tides. **Jumbalgnud** being high in the morning meant that it was going out, or ebbing early in the day. Thus the Bardi could leave their camp with the tide and be carried to wherever they were going on this reasonably fast ebbing tide, hunting and fishing, as today, on the exposed reef flat and taking advantage of all the procurement possibilities offered by the full range of tidal ebb and flow. In addition, the reasonable amplitude meant that the tidal currents would have been strong but not dangerous, allowing people to travel

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[45] **Gangin** covers three to four days of low tidal flux whereas **Nalan** only covers one or two days.
[46] It is thought that the trochus shells make their way back up the reef as the tides make their way to neaps.

quite far in safety.[47] The same tide they travelled out on could also hasten their return as it flooded back in that same afternoon/evening, returning to their original starting point before sunset. Travelling on the outgoing or ebbing tide presents significant potential danger as one can be carried beyond the King Sound, unable to make landfall. It is known that the Bardi visited off shore islands on rafts beyond the King Sound, specifically Twin Island but also Brue Reef some 70 km's at sea. On this tide, even if accidentally carried beyond ones intended resting place, one could be sure to be pulled back either to these islands or back into the King Sound on the corresponding flow of the tide during daylight hours.

Other than during **Jumbalgnud** the Bardi roughly follow half day tidal sequences when exploiting the reef flat, leaving early in the morning and returning in the early afternoon, or leaving in the late morning and returning in the early evening. The best tidal sequences for this are **Jumbalgnour, Guloun**, and **Bolong.**

The Bardi sequence of tides is as follows:

Guloun➔ Bolong ➔*Jumbalgnud* ➔*Gungin* ➔*Bornan* ➔*Jumbalgnour* ➔*Guloun*
Spring (tide getting smaller) **Neap** (tide getting bigger) **Spring**
● New moon **1st ¼ moon** **○ Full moon**

➔Bolong➔ Jumbalgnud ➔ Gungin➔ Bornan ➔ Jumbalgnour ➔Guloun
(tide getting smaller) **Neap** (tide getting bigger) **Spring**
Last ¼ moon **● New moon**

Figure 9. Bardi Tidal Sequence.

[47] As they return on a high incoming tide they can hunt for turtle and dugong coming back into the grass flats.(see section 3.6.1)

Short Glossary :

Molongan - Coming in tide(general)

Mayurding - Going out tide (general)

Nurmul - High Tide (general)

Guloun - largest tidal flux tides

Gungin - dead tides(lowest tidal flux)

Nalan - strong tides or currents (spring) on Jumbalgnour, Guloun, and Bolong.

Lu -current

Algnarda - backwater

Gidid - whirlpool

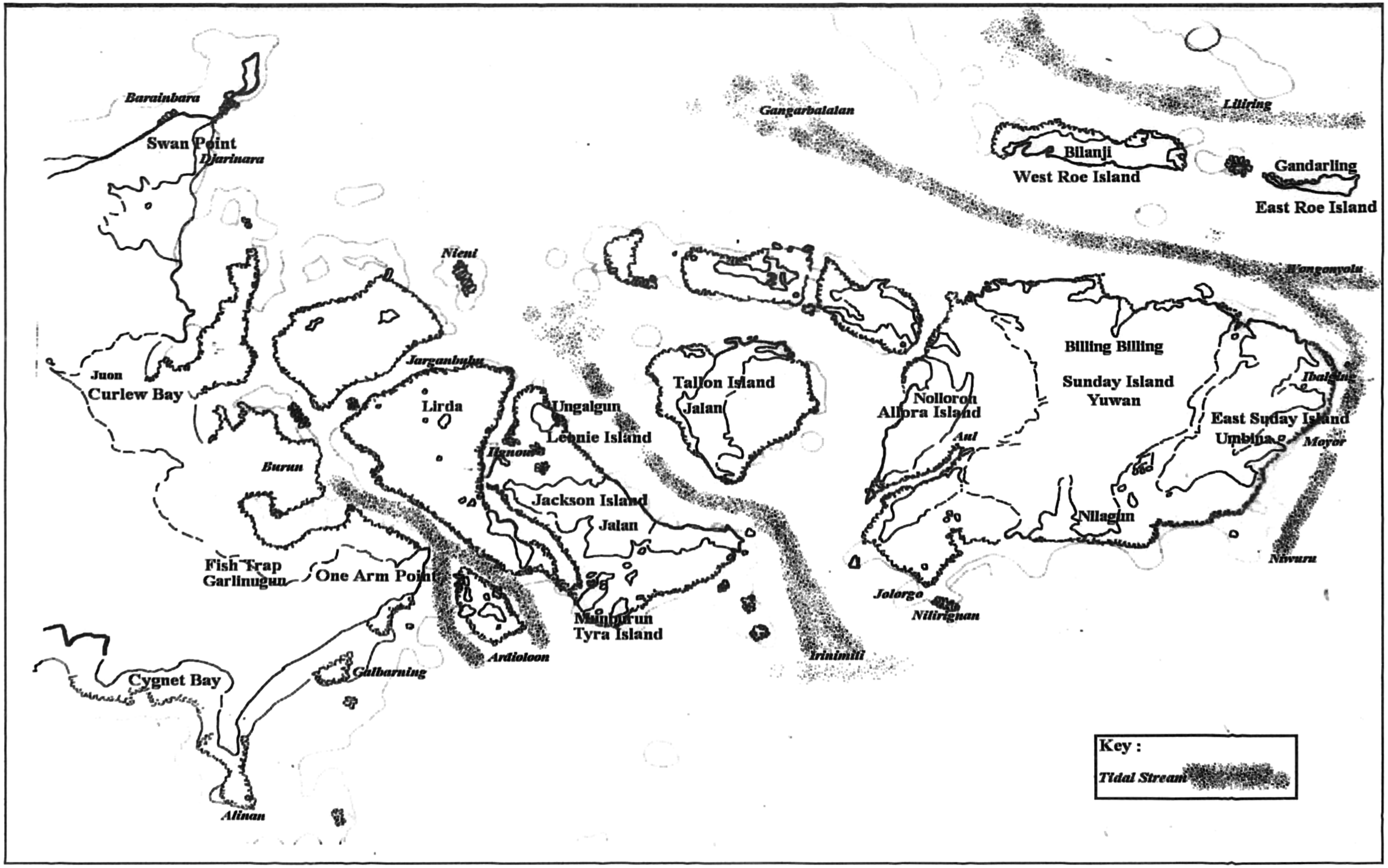

Figure 10. Map of main tidal currents on incoming tide.

3.2.1. Figures Demonstrating Tidal flux.

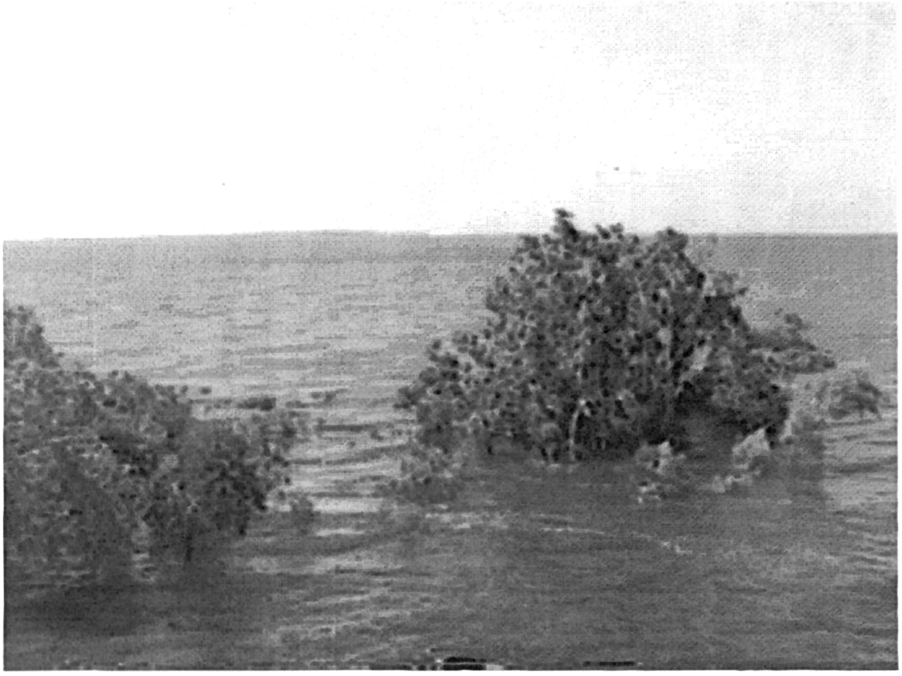

Figure 11. View from hill to East of Angulumar at high tide.

Figure 12. View from hill to East of Angulumar at low tide.

3.2.2. Using the Tides.

At sea perspective changes radically every few feet and pilots need a keen three dimensional sense of their place on the ocean. As the ocean is uniformly flat and of uniform substance, one is very rarely in a position to gauge one's progress and re-evaluate one's perspective from the spot where one floats at any particular moment. The frame of reference is always off in the distance. In the King Sound many of the features that one would normally use are temporally very restricted in that they come and go with the tide. Boulders and even islands can appear and disappear under an extreme tide as can passages and routes of return. In addition, distances over water are very difficult to gauge. Therefore to locate oneself requires much greater skill than on land.[48]

In the King Sound the state of the tide and concurrent water movements plays a crucial role in how the Bardi find their bearings. Older, more experienced hunters know the area well and how it is affected at different tidal stages and can look down at the water and know their specific location. It is essential to possess the knowledge of how the water reacts at different stages of its tidal ebb and flow and how geographical features, be they sub or supra-tidal, affect the water. This kind of knowledge is especially useful when travelling at night. Dinghies, even under power, react differently in different kinds of water and an experienced hunter can literally feel where he is from the particular way the dinghy is behaving in the water. Where an island blocks the tidal flow the water backs up on itself and creates eddies or small backwaters that bounce back into the tidal flow. These create turbulence in the smooth running surface of the tidal current.

I will illustrate a simplified version of what a hunter would feel from his dinghy as he returns from turtle chasing on the south side of east Sunday island, entering Escape Passage and going across to the south side of Jackson Island as the tide is in the middle stages of ebbing or flowing out (see Figure 13).

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[48] Quite honestly my first two months were spent in total confusion as to our actual whereabouts on the map, Douglas and others laughingly pointing out our position as we went along.

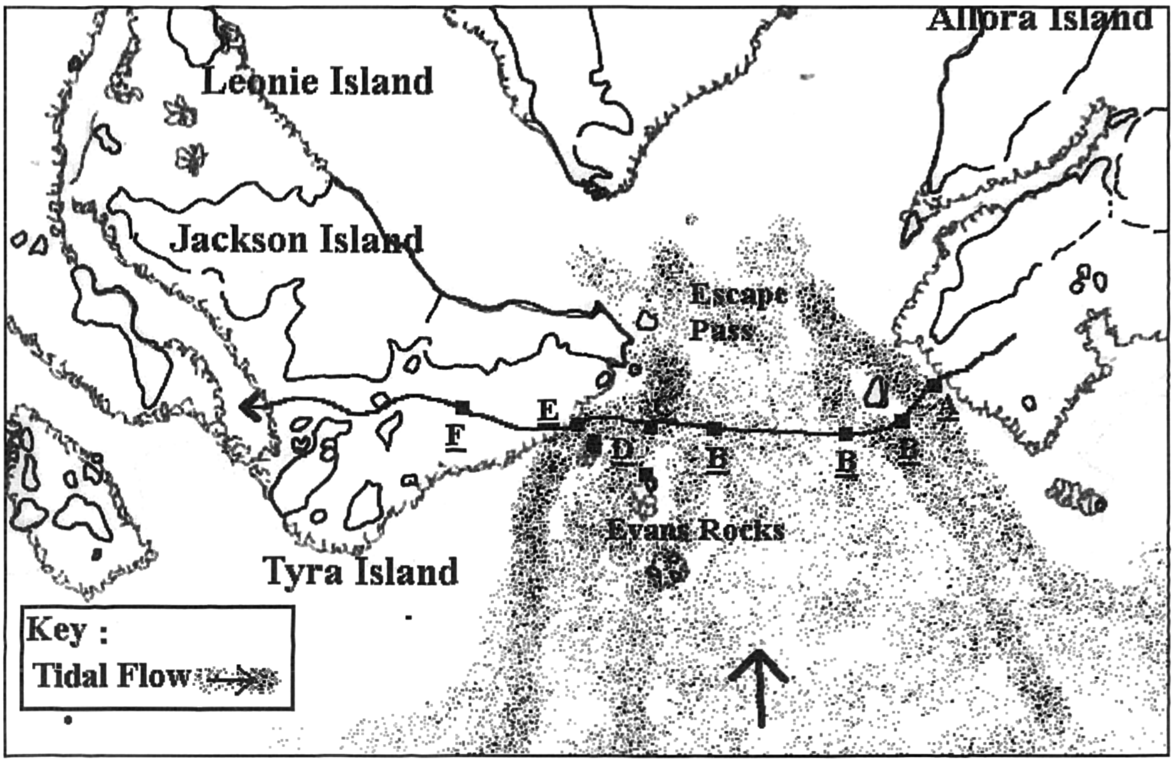

Figure 13. Using the Tides.

As the dinghy moves into the strong tidal current (**Lu**) (**A**) it will initially lurch, the bow being thrown up stream and the stern pushed downstream, quickly straightening out but with the engine wanting to twist toward the pilot, forcing the pilot to push against it so that it will stay straight and keep to the trajectory. The water is almost perfectly smooth but the dinghy occasionally lurches and dances as it hits different patches of the current (**B**). Before reaching Evan's Rocks the boat almost imperceptibly lifts as it passes over a series of underwater boulders that create a low smooth hill in the slick surface of the tide (**C**). Underwater features under fast moving tide may not cause the surface to break but they can cause small hills on the water suddenly pushing the boat up a few inches. As we pass Evan's rocks on their northern side, the downward side to the predominant current, we can see a series of standing waves 2 to 3 feet high resulting from the eddies reversing into the back of the boulder from where the split tidal current meets again (**D**). These are contained within a large triangle, its base at some twenty feet from the base of the rocks. Going through these the pilot slows down and carefully negotiates them, the boat buckling up and down in the waves. Through these the dinghy re-enters the tidal stream, experiencing the same lurch as before it heads toward Jackson Island. Here the channel narrows and, depending on the strength of the tidal current, one experiences a variety of phenomena (**E**). If the current is not too strong (either because we are travelling as the tide is approaching low slack, or if it is during neap tides.) as the dinghy approaches the eastern end of Jackson Island the water becomes slightly choppy and the pull of the tide lessens. If the tide is strong (either because it is spring tides or we are crossing these in the middle of the flowing out phase) there is a strong possibility that small whirlpools (**Gidid**) will form in the tidal stream caused by the short eddies of two fast moving tides meeting in a restricted area. In attempting to cross these, one has the impression that suddenly the dinghy has hit concrete. Though the engine can push through them, the craft dances about and is held high out of the water but the engine is under some strain and the boat feels rigid. Once past the apex of the island the water becomes calmer (if there is no wind) but will not be as smooth as the stronger tidal current (which is unaffected by most winds) (**F**). The dinghy here rides higher on the water but the stern sits deeper and there is less resistance from the water, the boat feels less rigid and the motor is not under strain. If we had chosen to travel down through Escape Pass running with the tide there would have been a strong sensation of being pushed, and despite this the engine would sound as if it were strained. The dinghy would also be felt to be sitting deep in the water over its entire length. If we had been running up against a fast smooth tide the nose would have been riding high but the stern deep, and the engine would be straining considerably.

These are just a few examples of how tides feel and one can imagine how an experienced fisherman with a mental map of the tides can accurately plot his location and progress even in the dead of night by the way the boat feels in the water. [49]

The current and state of the tide in one area also serve as cues to the state of the tide in other areas. Even over short distances there are dramatic differences in the tide. During the monthly spring tides the tide can already be full in the channel near the old homestead but still be coming in at the new outstation at Nilagun.

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[49] As we crossed the large expanse of water between One Arm Point and Long Island in the middle we suddenly felt the dinghy lurch to one side and I could see Douglas pulling the engine towards him saying '*hello there's that tide now, we gotta head up this way soon.*' looking/pointing north-west.

Different bays fill up at different rates and hunters take all of this into account as they move throughout the day. Not only does the tide affect exploitation possibilities by the way it affects the behaviour and movements of the different animals, but it also governs how hunters and fishermen can access these areas, and, as importantly how easily they can leave these areas and go home or move on to the next. As one can see there is an infinite number of variables constantly being addressed with regards to the natural processes of the area, the tide, fish and animal movements, habits, behaviour, the climate, seasons, geography etc. All of these have to be dealt with effectively to be successful in this environment.

3.3. Bardi Fish Taxonomy.

I have catalogued over 80 distinct species of fish in OAP, with their corresponding Bardi name. (see Table 2 & Table 3 in the Appendix) This section elaborates on chapter 2.2, introducing aspects of fish and marine animal physiology and behaviour as the Bardi perceive them and covering some aspects of their processing . Some of the main fishing techniques for species are introduced in this chapter and will be elaborated in Chapter 4 Fishing Hunting Environments and Techniques..

The Bardi, like Europeans tend to group fish according to the likeness of their physical characteristics. *Quite often when fish are described as similar in* appearance they seem to be of the same family, but some fish are grouped together because they share other features in common. Some fish are said to 'follow' one another and these share behavioural traits that cause them to be referred to simultaneously. Fish that are exploited using the same techniques can also be grouped together as can be fish who are regularly associated with certain topographical features. It is difficult to establish rules for categories and though it may seem easier to follow one standard feature (such as environmental niche, physical likeness, procurement technique) while noting the exceptions, this would be a misunderstanding of what the Bardi actually do.

Despite this I will be grouping certain species together in order to avoid repetition of features that some fish share in common. On the whole certain groupings of fish are more prevalent than others and these will be used in this section when describing the important species. The features that bring them together can be interpreted as those that are seen as the most important characteristics to the Bardi. Some groupings are related to shared features of their physiology, others to similar methods of capture or to physical similarities while others share a significant number of these features in common.

At the end of this section I will offer other important possible groupings and their rationale. To the best of my ability the categories that I am following are those that emerged naturally from my fieldwork.

3.3.1. Surgeon fish and Spinefeet; Gambal and Barbal.

3.3.1.a. Surgeon Fish (Acanthurus)*:*

Though there are three kinds of surgeonfish exploited: Ring tailed surgeon fish, *Acanthurus grammoptilus*; Ornate surgeonfish, *Acanthurus dussumieri*; and White-cheeked surgeon fish , *Acanthurus nigricans*; they all share the same Bardi name, **Gambal**. The most common are the ring-tailed surgeonfish, and were the only species in this family exploited in my fieldwork period.

Gambal are said to be 'fat' all year, and this is one of the few fish that is exploited year round. Its fat is manifest in the liver and the meat, giving the meat an oily quality once cooked.[50]

3.3.1.b. Spinefeet (Siganidae)*:*

The four spinefeet species exploited by the Bardi all have different names.

Barbal - Golden lined spine foot, *Siganus lineatus*. (see Figure 14 & Figure 18)

[50] **Gambal** is one of the few fish procured year round, though my research indicates that there may be some seasonal intensification, however all fish of this species procured during my fieldwork period had exceptionally large livers and oily flesh upon cooking.

Jimaramar- Black spine foot , *Siganus fuscenscens*; and Smudge spot spine foot, *Siganus canaliculatus.*

Mamalurolu- Spotted spinefoot, *Siganus punctatus.*

G/Jimariman- Happy moments Spinefoot, *Siganus spinus.*

These are fat much like Gambal in their liver and flesh, but also have a strip of fat attached to the intestine itself. The Bardi say they keep this fat only from April until October. The most commonly exploited of these were the **Barbal.**

During my first fieldwork period spinefeet were not exploited until late April when they were said to be '*starting to put on fat now* (late April) *and they'll be tasty* (after October) *but then not much flesh in them.*'

I have put these two separate families together because the Bardi say '*they follow each other'*. They are both similar in shape and size and as grazing herbivorous fish I have occasionally seen them travelling together in large shared schools, presumably exploiting the same bottom algae. However, 'following each other' also means that they share other traits in common, one of the most important of these being the 'quality' of their fat. Both fish are prized for their large livers and oily flesh though **Barbal** only manifest this during the colder water season. Both these fish, though small, have poisonous spines that can inflict painful wounds.

When gathered in large schools **Gambal** and **Barbal** will move around the reef in large, tight clusters, from which they will not break off. This is the main feature of these fishes' behaviour that was historically taken advantage of in their exploitation. Their tendency to stay together allows them to be pushed 'en masse' and the Bardi literally herd both of these fish into areas of low water or traps where they are then procured. However they both react differently under stress, so strategies employed for herding them are quite different and it was probably rare that they were exploited simultaneously using this method. The traps themselves were of the same type and these along with the techniques used for herding are explained in detail in the section on traps (4.1 1a).

Neither of these fish can be caught using hand-lines so traditionally fish trapping and spearing with light throwing spears were the only technique used in their exploitation. Today trapping these fish is rare and spear guns have somewhat replaced throwing spears. In many ways spear guns fulfil the same function as the lighter throwing spears used historically but they add new options in the exploitation of these fish. As these fish cannot be caught using hand-lines, exploitation of these in deeper water, on the edge of the reef or near boulders would have been impossible.[51] Today the largest number of these fish are caught with spear guns in deeper water on the edge of reef and boulders. This represents a dramatic departure from the more communal trapping and spearing oriented fishing used by previous generations.

While both **Gambal** and **Barbal** were both traditionally herded, **Gambal** were also caught using fish poison in pools left in the reef at low tide in which some of them take refuge between tides. (See section 4.1 1b). During my field work we went fish poisoning four times and I never witnessed any **Barbal** poisoned. '*You can only spear Barbal, can't poison them*' (Tape #3A. Old Mum, April 21st 1995, side B. #191)

Unlike **Gambal**, **Barbal** will not hide in caves or reef crevices and will always leave the reef if they can and are very seldom seen trapped in pools at low tide. **Barbal** are also common in the mangroves at high tide swimming between the branches and are often procured in these areas with spear guns. I have never seen **Gambal** in the mangroves. These fish are often the goal of fishing expeditions and are often exploited exclusively even in the presence of other fish.

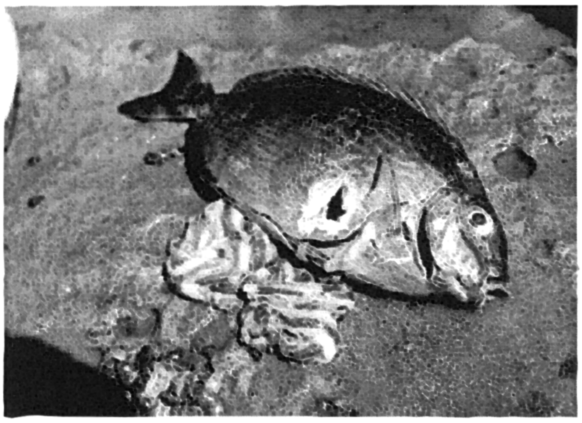

Figure 14. Barbal, showing gutting and fat on tripe.

Both these fish are gutted in the same specific way.(see Figure 14) A short cut is made from behind the lateral fin down to the anus in the shape of a smile, with just enough room to sweep a single finger through with which all the guts are pulled out. These are dark green and pungent.

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[51] Apparently it is possible to catch Gambal with a hook and line in one spot at **Nilagun** with a special crab bait, but only Katie Wiggan (Old Mum) had ever done it and this was as a child.

In **Barbal** the guts are lined with a strip of creamy fat (see Figure 15) that is directly attached to the intestine and cannot be ripped away, so a small hole has to be made with a knife tip or finger nail in the intestinal wall and its contents pushed out, leaving the fat on a clean tripe ready for cooking. This is then wrapped around a small stick and roasted over the fire. This fat is often the first thing eaten as it is roasted in the flames of a new fire which needs to burn into coals before the fish itself can be put to cook. I have never seen Gambal with this kind of fat and the gut contents are always thrown out.

Figure 15. Barbal displaying fat on tripe.

Gambal and **Barbal** are gutted behind the lateral fin in order to leave the liver intact, still attached to the inside of the cavity, just behind the head (see Figure 14). It is important not to pierce the liver either when spearing the fish or when gutting it as it will crumble and melt away in the fire.

The Bardi cook these like most fish, whole on the coals of an open fire. When the fish is cooked the liver is pulled out in one firm piece and eaten separately, the blackened charred skin is then peeled back and the meat is eaten. Some people throw the cooked fish into the water until it is cool enough to handle then they peel back the skin.

The skin of the fish does not fall apart in the fire and keeps the fish together making it easier to handle. By leaving the skin of the fish as intact as possible the flesh is less likely to dry out in the fire. Barbal cook very fast and must only be cooked on cooler coals. The cooked flesh of both these fish is moist and succulent taking on a smoked quality from being cooked in the fire.[52]

[52] Even prepared in this simple way it is by far the best fish I have ever eaten. Old people love all these fish but have various preferences, while almost all young boys dislike **Gambal** stating that it is too fat. Some adults also say they find it too fat and that they can eat it now but when they were young they could not stomach it. I feel this is rooted in a older Law that prohibited this particular fish to some younger people when going through Law.

3.4. Groupers (*Serranidae*):

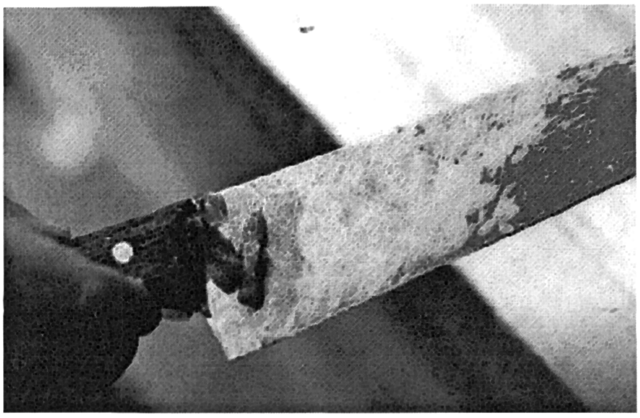

Figure 16. Serranidae Fat on Knife

The Bardi tend to group all of the *Serranidae* together because of the quality of their meat. Despite the fact that they have different types of fat their meat is said to always have taste. Grouper meat differs significantly from that of most other fish in that the flesh is tighter and moister and, when cooked, it does not fall apart like most other reef fish. When butchered it always appears to have fat in its meat (see Figure 16) Significantly three out of five of the fish in this group are considered to be fat all year.

3.4.1.a. Ingalan- Barramundi cod, **Cromileptes altivelis***: (see Figure 18)*

The small ones are never fat, but big ones are always fat. These fish are rare and highly prized and are supposed to be reserved for old people. Historically they were only ever caught through fish poisoning, but today they are caught, albeit very rarely, with spear guns.

> *'**Ingalan**, you only get little one like that (holds out hands 8' apart), no fat in them , but they got taste. But big ones, like the one you got and more bigger one, big chunk of fat, they always be fat, in the guts in the stomach. They have liver on top and then the fat under it.' (Tape #3A. Old Mum, April 21st 1995, side B. #112).*

3.4.1.b. Bidip- Goldspot and blackspot cod, Epinephelus coioides, Epinephelus malabaricus.

Bidip are most often associated with the mangroves, caught with fishing lines at night and speared with spear guns at high tide in the trees. At low tide these fish tend to remain in shallow pools left in mangrove creeks, sometimes burrowing into sand under boulders or logs to stay moist. Getting fat with Southeast wind in March and April they remain fat throughout the cold water season. As highly prized fish fishermen are always proud to catch them. During their season these are always sought during expeditions that take hunters into the mangrove areas at low tide (see chapter 4.2), they are also the object of special fishing expeditions put together by the women who catch these, along with **Maran**, with trochus meat and line at high tide from the beaches at night behind the mangroves when these fish move in to feed. We often found the women fishing this way on the beach at **Angulumar** at two or three in the morning as we returned from Bingarr (full moon hunting), (see Figure 17). Particular women are well known for their skill at this kind of fishing and it is not uncommon for individuals to catch upwards of 20 fish.

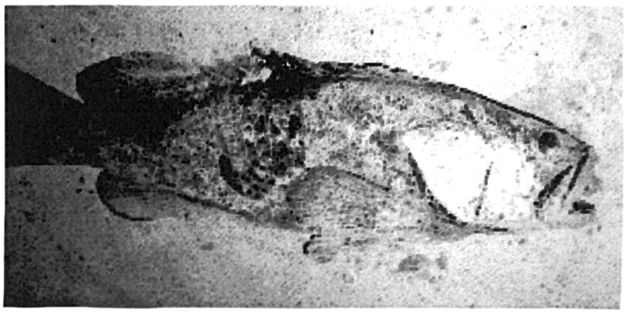

Figure 17. Bidip, caught at Angulumar

> *'You can get biggest **Bidip**, some **Bidip** you can get white fat out of them, they curled up in tripe, you know how turtle have fat and bullock have fat in their tripe, well **Bidip** have it like that, and you got to rip that fat right along, cut it away and chuck the guts out.'*
> *(Tape #3A. Old Mum, April 21st 1995, side B. #120)*

This fat is attached to the membrane that lies between and holds the intestines together in the cavity, it is technically between the intestines and not directly attached to the intestinal wall itself so you can cut away the membrane and the associated fat, and throw the intestines out.

3.4.1.c. Uloor- Maori cod, Epinephelus udulostriatus:

Like other grouper these are getting fat with the colder weather.

3.4.1.d. Bulgarani-

This name refers to potentially three different species of grouper: The Flowery cod, *Epinephelus fuscoguttatus*; speckle finned cod, *Epinephelus ongus*; and the tomato rockcod, *Cephalopholis sonnerati*. However, as explained in Chapter 2.2 7, these are very difficult to identify.

Bulgarani live on the coral reef flats taking refuge at low tide on the edge of the reef or in the small pools left on the reef. It was in these pools that exploitation was historically concentrated, using spears and fish poisons. Today they are still speared in pools when walking over the reef (see chapter 4.1 1c), but are generally caught with lines and spear gun on the reef edge at low tide, or on the submerged reef flat at high tide (4.1 2).

Bulgarani was always referred to as the 'Fat one' as this fish is always fat, so fat that you cannot see its guts. The fat is attached directly to the intestinal wall, as in **Barbal**, and a small hole is made in the gut and the contents are squeezed out. The fat is not cooked with the fish but is removed and cooked separately.

> *'Just fry it in a tin, we used to fry it in a baler shell, but now we (are like) white people we cook it in tin or pot. Before (we used to make a fire) pull all the flaming sticks out and leave the coals and then put that little baler shell.' (Tape #3A. Old Mum, April 21st 1995, side B. #180)*

The fish is then cooked whole and the cooked meat is either mixed in with the fat or dipped in it for taste.

3.4.1.e. Bindarral

Bindarral is the name given to two species of coral trout, *Plectropomus leopardus*, red and brown phase but especially Bar cheeked trout, *Plectropomus maculatus*.

The big ones (< 1.5 ft.) are said to always be fat but are preferred in the cold water seasons. The fat is not in the guts or the liver but is said to be in the meat. The small ones are never fat but are said to have taste.

> *'Little ones they're not fat , never, because they're little ones [>1 ft], they got taste in them, but they're not as fat as the big ones.' (Tape #3A. Old Mum, April 21st 1995, side B. #219)*

Bindarral move on and off the reef with the tide, preferring to lurk in larger crevices under boulders. Here they can be speared or caught with fishing line. It is difficult to assess the importance of these species historically.

3.4.2. Snappers, Sweetlips, and Emperors.

I have chosen to group all the snappers, sweetlips and emperors despite their obvious differences in habitat and behaviour because of their physical resemblance in body and head shape and because they get fat in the same season with this fat being manifest in roughly the same way. Apart from **Maran** (mangrove jack) most of these were procured either simultaneously or within roughly the same context.

3.4.2.a. Snapper (Maran) (see. Figure 18)

The Bardi identify four kinds of snapper, none of which were referred to as a group except when younger fishermen could not remember their names and said they were in the same family as **Maran**. They can all be caught with fishing line and spear gun .

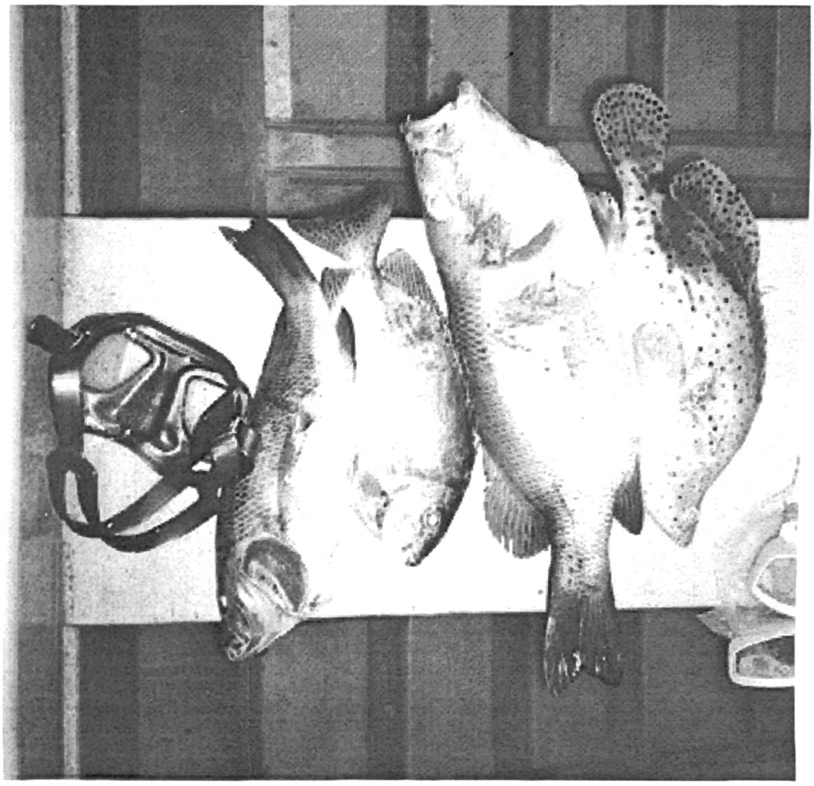

Figure 18. Maran, Barbal, Maran & Inglan.

Maran are actually the Mangrove Jack (*Lutjanus argentimaculatus*), and are a favoured species said to be fat from March to August and sometimes to November. These are considered bad when they have no fat, primarily because they become incredibly dry when cooked. This is the fish that Katie Wiggan described as 'smiling' at you while it was cooking if it was not fat. **Maran** are only ever seen in the mangroves and this is the focus of their exploitation. These fish are often one of the goals of fishing expeditions. Older women specifically target these fishing regularly for them during their season at night on the high tide from beaches behind mangroves where they use trochus meat for bait.

Before cooking **Maran** the guts are removed by pulling back the gills and ripping out the attached intestines, bladder, and small liver, leaving the fat inside the cavity. These fish can be so fat that the fat sometimes spills out. The fat consists of long white creamy strips of mesenteric fat attached to the back wall of the cavity.

*3.4.2.b. Inilir - Moses Perch (***Lutjanus Russelli***).*

Inilir are found in almost all environments but especially where beaches and mangroves meet. These fish are usually small (>10') , some are fat but some are not and they were not procured very often. Traditionally these were caught while waiting for the tide.

*3.4.2.c. Julu - Stripy sea perch (***Lutjanus carponotatus***).*

Julu get fat at the same time as mullet with the coming of the south east wind in April. They have a red orange fat inside the guts which is cooked inside the fish.

Julu and **Inilir** were never the goal of any fishing expedition but were happily procured when encountered.

3.4.2.d. Garagagnar, referring most likely to Red Emperor. **Lutjanus sebae.**

This fish was and is very rarely caught and is the focus of certain myths which govern the way it is handled. It was and remains a difficult fish to identify as it is rarely caught and its descriptions vary. It is possible that the fish they are referring to is the poisonous Sea perch, or China-man fish, which is poisonous at certain times of year and in certain areas. **Garagagnar** was only ever eaten by very old people and the name **Gandibinin** was often referred to when talking about it, which means 'up in Heaven'. This refers perhaps to this fish's role in the myth of a Galalang a mythical figure who ascended to the sky as a very old man, after eating this fish. This is difficult to assess as many of the fishermen adamantly refuted that it was poisonous asserting that it had the best taste and wonderful fat. Again the only way to accurately assess this fish's role would be to see it procured and consumed.

3.4.3. **Mardal, Sweetlips, Grunts, (*Haemulidae*):**

The name **Mardal** refers to the Brown Sweetlips, *Plectorhinchus celebicus*. and the Painted Sweetlips, *Diagramma pictum*, but I am also including the Many spotted sweetlip, *Pectorhinchus chaetodontoides*.

The 'many spotted' sweetlip had no particular name and, despite being commonly procured and its obvious connection to brown sweetlip, it was not **Mardal** and had no name, though it was said to be of the same family as **Mardal.** I suppose that they would call it a spotted **Mardal.**

These larger fish were seen relatively frequently when using spear guns on the edge of large boulders or on the edge of the reef flats in deeper water, but the Aborigines ignored them until they were in season. These are some of the easiest fish to spear because of their size. Very large ones (<4 ft.) can be chased by boat and harpooned. I have never seen these caught with a line.

These fish get fat when the weather starts to get cool in May - June, and lose their fat when the water warms up

> *'This is the time [now] that getting to the cold weather, They'll be tasty in May/ June, they'll finish after that, when it start to get warm up, they'll finish that fat, there won't be any taste in them.' (Season. 1, tape No. 3a , 21st April, 1995 #049)*

The fat is in the guts under the liver, very white and flowing loosely. It is not attached to the intestines.

3.4.4. Emperors (Lethrinidae): Mulin, Irarring & Gulurr

There are three emperors identified by the Bardi: **Mulin**, Spangled Sweetlip emperor. *Lethrinus nebulosus*; **Irarring** , Grey or blue spotted sweetlip emperor, *Lethrinus Laticaudiso*; **Gulurr,** (Western)Yellow fin bream. *Acanthopagrus latus (australis)..*

All these fish are said to get fat with the colder weather **Gulurr** getting fat 'with **Barbal'**. They are generally caught with fishing line, the larger **Irarring** are also caught with spears and spear guns. From the surface the larger **Irarring** can be confused with **Mardal,** though once in the boat these turn blue whereas the **Maran** remain grey.

3.4.5. Mullet (Mugiloidei):

The Bardi have names for six species of mullet. In two cases it is difficult to identify which species they refer to as they might be referring to two different species that look the same or to the juvenile version of a larger mullet. These are **Juldu**; and **Minimbor**, as pointed out it is possible that **minimbor** is a separate name given to all juvenile mullet, but this is complicated by the species *Mugil georgi* which even full grown remains relatively small. I am following the latter interpretation as the mullet on which I based my initial analysis which was given the name **minimbor** in the field was of the species *Mugil georgi.*

Amilj, Guluru- big Sea Mullet, *Mugil Cephalus.*

This is the biggest of the mullet but apparently is never fat.

Lungol -*Liza Argentea,* Jumping mullet or sea mullet.

This is the next biggest one. They get fat in March and April with the coming of the south-east wind, but soon after May they are no longer fat. The Bardi love this mullet and it is known for jumping. If you are fishing at night with a light on the edge of the beach this one can jump out at you and break your ribs.

Juldul - Blue-tail mullet, *Valamugil seheli.* Tiger or Flat-tail. *Liza argentea.* Alternatively both of these as juveniles could be **minimbor** as well. **Juldul** are fat all year.

Bilo - Flat-tail or green-back mullet, *Liza subviridis.*

This green and white or greyish green mullet is always fat and must be cooked with its guts still inside it.

Minimbor - Fantail mullet, *Mugil georgii.*

Minimbor is the smallest mullet and is specifically put aside for the little boys to eat. It is the only fish the young boys can eat during certain periods of their initiation. Minimbor it gets fat from January until March.

Jandul. Diamond scaled mullet. *Liza vaigiensis.*

This is the most recognisable of the mullet and are not known to have a season for fatness, apparently some are fat and some are not.

Mullet inhabit inshore areas with mangroves, preferring those adjacent to seagrass beds and mudflats. Mullet were an important food source historically, inhabiting inshore waters and moving with the tide in large groups and were probably trapped in the more permanent inshore fishing traps. Travelling in the morning and evening in small to large groups they will wait in patches of shade under mangrove branches during the day, making easy targets for stalking fishermen. Though they do not represent the food source they did historically, expeditions are still put together today with the goal of exploiting these species . The season for hunting these starts in mid October and runs through mid February. For such expeditions all the light spears in the neighbourhood are gathered up and taken in the boat. Swimming at the surface mullet are difficult to spear with spear guns so throwing spears remain the predominant tool used today. They are also exploited using small throwing nets and placed nylon gill nets, though during my fieldwork experience these were not very successful.[53]

All mullet seem to differ in their fat with at least one species being fat all year. Minimbor features highly in one of the older laws discussed in chapter 7.1.

[53] This is probably more a reflection of the fishermen involved who not being the most experienced were not very successful.

3.4.6. Monkey fish, Darwin Jawfish (*Opistognathus darwiniensis)*

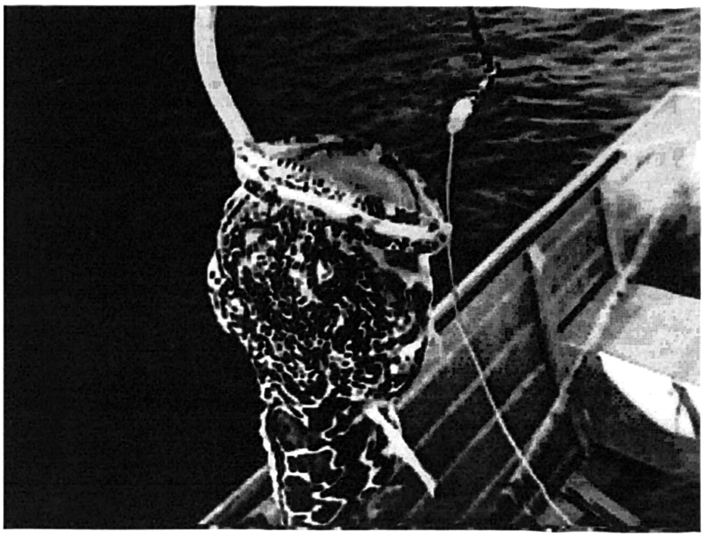

Figure 19. Monkey fish

This fish was of some importance historically and possibly traditionally but is no longer today. During my fieldwork only two specimens were caught despite the fact that they are considered to be fat all year, are relatively abundant and incredibly easy to procure.

Their deep burrows make them easy prey for Bardi hunters who only have to go out onto the flats at low tide, locate their holes, and block them with grass or seaweed. One then waits for one cycle of the tide to pass, returning again at the next low tide and removing the blockage from the hole, recuperating the now dead fish floating under it.

Though considered fat all year monkey fish were apparently only procured during times of bad weather when other methods of fishing were impossible or difficult. The apparent rejection of this fish today is possibly a manifestation of this old ethic. With dinghies and motors most days are good for fishing , and, along with store bought alternatives, the circumstances that would allow people to justify catching this fish never present themselves. Even though the older people often remember them fondly they are only ever caught by small children more or less accidentally as they play at line fishing in the shallows occasionally dropping a line down one of their holes. In September 1996 I caught one of these fish while casting with a hand-line from the shore, not sure of what to do with the fish and in awe of its shape and colour I put it back. Reporting this to my friends I was softly reprimanded and told that they would have enjoyed eating it but, despite their obvious partiality for this fish, none of them ever went through the simple procedure of procuring one.

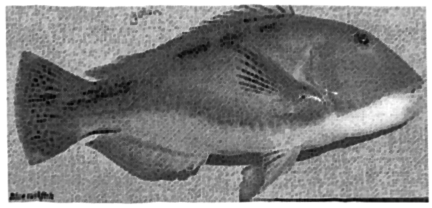

Figure 20. Gnumu

3.4.7. Wrasses (Labridae):

Barambal - Blackspot tuskfish, *Choerodon schoenleinii.*
Gnambi - Blackspot parrotfish, *Choerodon*
Golan - Blue tuskfish, *Choerodon albigena.*
Gnumu - Blue tuskfish, medium, *Choerodon albigena (sz.)*

Relatives of the parrotfish wrasses are an important resource to the Bardi and make a up a small but important part of the daily intake of fish. Tuskfish differ significantly from parrotfish in that they have teeth instead of beaks meaning that they can be caught with a hook and a line. On almost all the outings where women and children were involved they all went line fishing. In every imaginable situation and environment they managed to catch small blue bone (**Golan**) in significant numbers. Fishermen returning from a hunt are nearly never met with hungry children as even bluebone as small as 6' are thrown on the coals making a full meal for any small child. They are the perfect fish for children as their large bones stay attached to the carcass and do not come away with the meat. One could easily perceive the children as simply fishing for fun with their small hand-lines, but I have seen troupes of ten children put to bed with full stomachs from their playful efforts.[54] The ease with which they are captured also makes them the primary source of bait, the smaller ones usually sacrificed to make bait for continued fishing.

Aside from this middle size Blue bone, (1-2 ft.), are sometimes speared in pools on the reef and with spear guns in the mangroves as they frequent the adjacent seagrass beds.

[54] Children are in fact extremely adept at fishing, and as pointed out their contribution is not insignificant. The widely held view that children are less productive in hunter gatherer situations (Hawkes, K. O'Connell, F. Rogers, L. 1997) is questionable.

There are a few specific places where the Bardi like to line fish for the larger **Gnumu.**[55] These are usually upwards of 2 feet long and are considered a delicacy, but are only sought occasionally, (there is some indication that the procurement of this fish is restricted). These can be speared with throwing spears from the boat as fisherman cruise sandy areas around boulders, but more frequently they are caught by fishermen in these same areas using spear guns.

Wrasses with their large heads and flanks make perfect targets for throwing spears and guns even from the surface. Historically blue bone asleep at night, wrapped in their mucous membranes, could be found in the reef at low water with the use of burning saltwater paperbark torches. Here they were hit with a fishing boomerang or heavy stick and pulled out quite easily, with the added bonus of not damaging the flesh of the fish.

3.4.8. Trevally, Queenfish, and Mackerel.

Characterised as game fish all three of these species are fast, shiny, smooth skinned, mid water, piscivorous fish. They are grouped together because today they are all caught simultaneously with trolling lures dragged behind dinghies in deep water proximate to large boulders and underwater features

3.4.8.a. Trevally (Carangidae):

The Bardi identify four trevally around One Arm Point having separate names for the juveniles and adults of some species: **Giral,** Golden trevally, *Gnathandon speciosus;* **Molon,** Gold spotted trevally, *Carangoides fulvoguttatus*; **Jawilyl,** Gold spotted trevally (juv.), *Carangoides fulvoguttatus (juv.);and* **Galargie,** Giant trevally, *Caranx ignobilis.*

Determining the season for trevally was difficult as their flesh is always considered a bit dry but of the game fish commonly exploited trevally are the most appreciated. Caught mainly during the rainy season it can be assumed this is their

[55] The best place apparently is almost 100 km. away on the other side of the peninsula at Rumble Bay.

season, alternatively it could reflect a lack of preferred resources that are ready to be exploited. These are more difficult to locate when trolling but fishermen make the effort.

Giral, **Molon**, and **Jawilyl**, are extremely common and are caught in a number of ways. They visit the inshore waters at high tide to feed in the mangroves where they are speared with throwing spears and spear guns, caught with hand-lines. Historically these were regularly trapped in the permanent stone wall fish traps. Smith gives an account of a huge number of these fish being caught over one tidal phase in a single stone trap in the vicinity.

> *'It was [**Ngaldany**] the ideal time for visiting family in the northern Buru and making maximum use of stone wall fish traps, which occur only between Swan Point and One Arm Point. on one occasion we collected 60 trevally in one morning from such a trap' (M. Smith 1987: 46)*

Interviews with Bardi elders support that levels of return as high as this would not have been uncharacteristic historically. Trevally travel in large schools and on many occasions we left trolling sites with boatloads of these fish or were surrounded by walls of them while spear fishing . Though trevally visited almost all environments they were uncommon on the reef flat, preferring to travel to inshore waters at high tide through deeper channels.

There are also Giant Oystercracker, *Trachinotus anak.*, called **Anangnar** which resemble trevally. **Anangnar** are supposed to be fat in the rainy season, in January February and March. However they were also said to be seldom fat and always a bit dry though due to their large size they were said to have flesh.

3.4.8.b. Queenfish; Biringnan.

Biringnan. Giant or talang queenfish, *Scomberoides commersonnianus*, and Skinny or double-spotted queenfish, *Scomberoides lysan.*

During my fieldwork **Biringnan** were only ever caught while trolling, and people were generally disappointed when these fish were brought home, even if they had nothing else to eat. In February -March they are supposed to be fat.

However, people still complained that they were too dry and did not have enough flesh.

3.4.8.c. Gularganjan or Gulargangnan, **Mackerel Scromberomorus.**

These are some of the largest fish in this group, and are occasionally caught while trolling in the same areas where trevally and queenfish are caught. These fish are sometimes seen traveling at high tide over the mud/sand flats adjacent to the mangroves and they are chased with the motor and harpooned. However this is rare and particularly difficult as this fish is very fast and its shape does not present an easy target.

They are said to be fat all the time but their fat is not in their gut or their liver but in the meat.

> *'Fat right through, you don't get fat in their gut, you get fat from their body.' (Tape #3A. Old Mum, April 21st 1995, side B. #341)*

Gularganjan were exploited historically and possibly traditionally as they either beached themselves or were trapped on the reef between Sunday Island and Aul pool, in the hundreds for reasons unknown at a specific time of year..

> *'November, we used to see that water in between that island and that pool, Aul pool. They used to go there and watch, [from on the hill], they see all the water. 'Ah , there them', they used to go down and get them, certain time certain year, they used to get dry certain season for them. Mooring in the middle of that passage (Q. Were they stuck?) . Not stuck, that's every year. (Q. When?) Oh what time now, oh this that time [April 21st today] and [when] we used to see that [that] tide [was] right, someone , maybe 2 or 3, used to climb up, and sit on that hill, you know mooring, climb up that mooring,[56] to old homestead, tide used to go out, [they'd be] watching right there, [if] he never see them he go back home, [or] 'Oh there it is, [on] that big reef right in the center, splash and waves, 'hello they're already there', [then] everybody used to go*

[56] Mooring refers to an old mooring in the water, which was just in front of the steps to the old homestead where the missionaries used to tie up their boats, this is called the landing. It is important to note this because it indicates how their perspective of that hill is from the water side, by saying you climb up that mooring they are referring to its use as a running mark. One literally climbs up an invisible line from that mooring that takes you to the hill, the reference point for that hill is not a land marker but a water one.

there, all the men used to go there kill as much as they can kill, never leave mark, look for them till they get every one, hundreds of them in schools, tide was that low.' (Tape #3A. Old Mum, April 21st 1995, side B. #341 -402)

I am tempted to assume that this is a spawning aggregation caught by the tide but it does not fit with any descriptions given for the spawning of this family. It is more likely that schools of these fish were caught by fast receding spring tide through a channel they are accustomed to passing through unimpeded.

Figure 21. Giant trevally, speared following Gummy shark.

What makes the larger fish in this group distinctive is a shared behavioural characteristic of the larger species in these families which allowed them to be exploited historically by Bardi fishermen. Normally restricted to open water where they swim with incredible speed the Mackerel and Giant Trevally visit shallow inland waters adjacent to the mangroves where they are speared as they follow and feed with the slow harmless gummy shark. It was historically one of the only occasions that these very large fish were available for exploitation. Fishermen could spear them from rafts, mangrove trees, or while wading, and it is apparently impossible to dissuade these large fish from swimming with the small and harmless gummy shark. Even when missed they will scarcely take notice of spears falling through the water around them sticking like glue to the gummy shark. Perhaps also helping in their capture is the tendency noted by Johanness in Palau of these large fish to run toward shallow water when speared, sometimes stranding themselves. (Johanness 1981:166) Being particularly large this fish would probably be capable of surviving and escaping even if hit by several spears. Both of these tendencies to follow gummy shark and run for the shallows once hit would be invaluable in their capture. Jabby Wiggan explained to me that these large fish once injured will not run to open water because they would be instantly consumed by sharks so the hunters have several opportunities to capture the fish. The fish in the photo above was speared 4 times before being retrieved.

3.4.9. Shark (Carcharhinidae / Sphyrndae)

Sharks are encountered on a daily basis and, despite my initial apprehension, I soon learned to treat them with the same level of apprehension as the Bardi, which borders on a healthy respect and annoyance. Annoyance not because they made you feel uncomfortable but because they were always stealing fish. There are some areas on the One Arm Point coast where, like ringing the bell for Pavlov's dogs, simply releasing the trigger on a spear gun will bring two or three white or blacktip sharks racing to the area, expecting an easy meal. Fisherman avoid these areas and usually leave an area once the sharks have become too brave and are stealing too many fish. Bardi fishermen will only warn each other that there are sharks in the area if they are of a certain kind or above a certain size, (<8 ft.).

The larger and generally more aggressive sharks are left alone and treated with respect, however if they begin to frequent areas close to camps where turtle are butchered and children swim they are harpooned and dragged ashore. There are a few accounts of recent shark attacks but none were apparently serious..

In the larger channels near Sunday Island and coming directly past One Arm Point, swimming is avoided as it is here that the larger more dangerous sharks cruise. Some mangrove areas are also avoided as particularly large aggressive sharks sometimes move in on an incoming tide in unbelievably shallow water. Surprised by a fast incoming tide on one occasion, Douglas and I took an incredibly long and arduous detour through the mangroves to avoid crossing a section of mudflat creek only 25 meters wide and waist deep. We had crossed the same section only minutes before with the water up to our thighs hunting for incoming stingray. Wading back across this section would have left us with a 25 minute walk back to the jeep but with an imperceptible rise in the tide, we took a route that took us close to two hours.

Only days later did I find out why. In that particular area large sharks like to push their way into the creeks on the low incoming tide in order to feed on the fish trapped in the pools left in the mangrove creek before the tide gets too high and these swim into the trees where the sharks cannot get them. As young men, Douglas and his brother, having a particularly good day exploiting these same fish, ignored the rising tide a bit too long and found themselves in the muddy creek with a feeding ten foot bronze whaler shark.

This is a good example of the nuance and intimate understanding needed to exploit these environments safely. Sharks are but one of the most obvious examples of the dangers that are ever-present in this area. Small changes in the this environment have dramatic consequences and the ease with which the Bardi seem to exploit their environment hides a complexity and deep understanding that not only seeks to secure nutrition but that also guarantees self preservation. [57]

There are essentially two categories of shark as concerns Bardi exploitation: those that can be exploited and those that exploit. Two species of shark were exploited almost exclusively for their large liver and in this sense they could be grouped with their cousins, the ray. The two species concerned are the small Blacktip reef shark and the Gummy Shark.

3.4.9.a. Argoal or Argun. Blacktip reef shark. **Carcharhinus melanopterus.**

These medium sized sharks (> 7 ft.) cruise almost all the environments around One Arm Point and are extremely common. Treated as harmless, they often steal fish from fishermen using spear guns and so are treated mainly with annoyance, though they are not provoked.

Only the small ones (>3 ft.)were caught for food when they were fat in the Summer in January and February. Their fat is in the liver, and the liver as in most sharks is quite large, sometimes accounting for 25% of their body weight. Small ones were speared and caught with hand-lines, and the liver was immediately removed and the fish let go, swimming away, according to some fishermen,

[57] What probably distinguishes the Bardi from white people exploiting the environment is not only in their ability to find food, which is relatively easy, but not getting into trouble in the process. This factor is not often taken into account when formulating optimality models, the availability of a resource is mediated less by ones overall ability to procure it than by ones ability to procure it without getting hurt. Today, travelling in trucks and dinghies with jerry-cans of water and first aid kits we can conceptually focus on the procurement of food, forgetting what probably was an equal concern, that of immediate self preservation.

unharmed.[58] Some people say they used to eat the whole thing, but Katie Wiggan assured me that Bardi people never ate the flesh, eating only the liver. Only since white people have come and different Aboriginal people moved into the area did she hear of people eating the flesh.

> *'Now you get this ordinary shark, little ones, we used to only take the liver, cook them up only for liver,* ***Argun****. We just get them with line, pull them in four or five, take the liver, so shiny, but it's good, now they eat the body, they kill them and cook liver and cook body mix it up, we never ate the flesh, but now these young people they'll eat it. [laughing]' (Tape #2.B. Conv. Side A. Ol' Mum April 3rd 1995 #567-618)*

3.4.9.b. Rou. Gummy shark, **Mustelus antarcticus.**

These harmless wrinkled sharks are fat all the time and have a huge long creamy liver. These are not exploited today and were only exploited traditionally in a very specific ritualised way. He is or was caught in only two specific places at **Juon**, and Swan point with fishing lines. When relating to me this technique Katie Wiggan spoke very tenderly about this shark often referring to it in the first person.

> *'You can see all gummy shark right in the water in three different places, all the marks, on the beach where they got [left] these rocks. They used to kill them, used to see them [coming] and they go get them, take all the fat, put the liver [to] one side, and take the body, dig a hole with their hand, and bury them face down, cover them up and get stone and stand im up. That's the Law, they didn't want to throw it away. Over there in* ***Luon*** *[on] the other side [of] Sunday Island they used to do that same time, kill young ones coming in shallow water, you could just grab them by their tails, kill them cut them for liver and bury them, that's their Law, generations before, changing since white man (Q. are they sacred?) No not sacred, because they give that fat and they have to put those [stones?], because they are harmless they had to put them safely, bury them and put rock on their head. They used to come round in shallow water when they are fat, [but] nowadays [they are taken] after that [anytime?] Good tucker that liver, I used to help myself with that*

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[58] This was said tongue in cheek by a few fishermen but there still remained a sense in which they were not killing the shark. This peculiar practise may be related to the notion that sharks have memory and should not be hunted as they will take their revenge on the specific fisherman.

liver, my daughter and son used to eat it and put weight on.' (Tape #2.B. Conv. Side A. Ol' Mum April 3rd 1995 #489-567)[59]

Such observable sensitivity in the exploitation of a fish is rare but **Rou** are considered harmless and the Bardi feel sorry for them. In addition **Rou** are important because they are seen as responsible for bringing the uncommonly large game-fish into spearing range in shallow water close to shore. Large trevally, mackerel and queenfish stick to them like glue, and, as described in section 3.3 9, even if you miss them the first time they will always come back to that **Rou**. As he is difficult to spook, being quite tame, the fishermen find it relatively easy to catch several fish. They are said to 'come in on his back' and the gummy shark is seen as bringing these big fish in as a gift.

*'You know on the reef when the tide is coming in and the gummy shark comes in with all those big whitefish, they follow them [the gummy shark], you see them [whitefish] all the tails up, They [the fishermen] throw spear at them and kill them [in] shallow water, and then they run away [whitefish], [but] they [whitefish] come back look for him, that gummy shark, this was at Sunday Island. They used to wait for them, spear **Giral** and gummy shark, they kill it [**Rou**] for fat. They [the fishermen] never let them go, whenever they see them coming with all that Giral they either get those **Giral** or that gummy shark, only for fat.'*

There is also the possibility that this shark is considered sacred. In addition to being sung they are also identified as of the same family as a mythical shark **Lululur** that helped Bardi fishermen before white people came. When I first arrived I was told about a mythical shark that old people used to get fish and turtle from and that used to save peoples lives, giving them rides on it's back when they were caught by the tides. The older men could sing for him when they were in trouble and needed help. Old Mum remembers one bringing a whole turtle right up to the beach for her father and the men painted something on its head with white ochre before it went back to sea. This shark was called **Lululur** and he was supposed to be a giant gummy shark.

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[59] This could be an example of exploiting a spawning aggregation. If this is so note the level of ritualisation when catching a spawning species.

> ***Lululur**, spirit shark, pick up people drifting, they're not gummy what you see everyday coming in [with the tide]. We never see them [anymore]. [They used to] go there and pick up men, carry them to beach, [men] used to cut **balaloor** [plant for white paint] before they jump off and put it on his head [**Lululur**] and away he went.' (Tape #2.B. Conv. Side A. Ol'Mum April 3rd 1995 #414)*

When I talked to Old Mum (Katie Wiggan), and Gounie about this mythical shark they both said it was true but were doubtful that it was a gummy shark. They thought that it was more likely to be a whale shark because of their huge size and behaviour.[60] (There are huge gatherings of these plankton feeders at an annual breeding ground at Ningaloo reef 1000 km's south of the King Sound, so it is likely that some would be in this area).

The process of burying the Rou leaving a stone on its head is reminiscent of increase ceremonies described by Elkin (1985), and will be commented on in the final discussion.

[60] That this mythical shark is identified with the Gummy shark is logical as the shark is relatively harmless, quite tame, and can even be handled as he seems almost indifferent to human presence.

3.4.10. Rays (Rajiformes)

Barnamb:

Rays are distinctive in that they have a name for their class as a whole, **Barnamb**.

Rays are exploited primarily for their large livers. Those that only have this fat seasonally are never taken out of season. Many of the ray present around One Arm Point are not exploited despite being extremely common. The fishermen recognise that they are edible, occasionally procuring them to feed to their dogs, but most have never eaten them.

The identification of Rays proved difficult as the drawings and photographs in species listings guides did not match the rays I had seen in One Arm Point.

Garri. Ray that is like sand.

You eat them when the cold wind comes you have to wait for them to cool before eating them.

Nudgyil. Blue or purple spotted stingray, possibly *Taenuria lymma.*

Some people said they ate only the part just before the tail, but most said they had never eaten it.

Bungoor. Brown diamond shape, perhaps eaten.

Bibinan. Diamond shape with white spots, not eaten.

Ambean. Small manta ray. *Manta birostris*.

The large Manta seem to be absent from the area but the young ones were well know for jumping when they are frightened, 'doing their toilet' at the same time.

Jangarr or **Jandarr**. Large spiky ray, rosy sandy colour.

Jangarr are fat until the green grass has dried up and dropped. Though covered in spikes these are the least dangerous of the rays as they have no venomous tail spines and the spikes are fleshy and not dangerous.

When spearing **Jangarr** today these are chased and speared from a dinghy. Fishermen patrol submerged mudflats in slow dinghies looking out for the telltale large disc shaped markings these ray leave in the mud, hoping to scare them into leaving their camouflaged position. At this point they are pursued until they resettle in the mud and the fisherman can then easily drive the spear home. These ray are too big to be controlled by the spear on its own and the fisherman must dive down, find the ray's dorsal vents just behind the eyes and grip him through these with one hand while reaching under and grabbing the wire that has gone through him and into the sand, pulling both stingray and spear simultaneously to the surface.

> *'You just see the smoke where it took off, follow it with motor till it hides itself, then leap for it.' (Warren Wiggan 25th Feb. 1995 Notebook #5)*

Traditionally the hunter sculling on his raft, looking for a pale brown beige colour in the muddy light brown bottom, would have located the ray as it lay in its initial hiding place, and speared it before it even became aware of his presence and had the chance to take off.

These larger Ray are split into four main pieces, body, two wings and tail section, but I collected little information as to the way these pieces were distributed. It does not appear to follow the same patterns as the distribution of turtle and dugong meat. Distribution will be elaborated and discussed in Chapter 7.

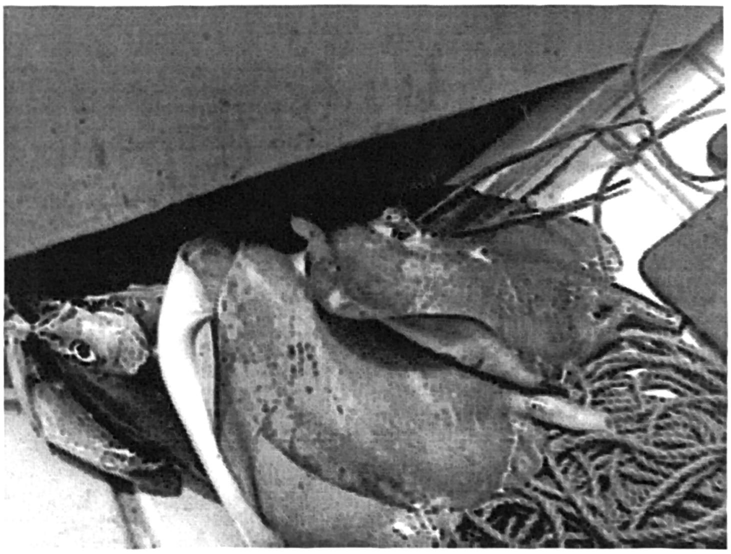

Figure 22. Three speared Rays (Iawing).

Iawing are a black and sometimes white-spotted stingray.
These were the main stingray exploited by the Bardi during my time there and it is likely that this was the main kind exploited historically as it can be exploited on foot in the pools left in the mangroves at low tide, or as they come into the mangroves on an incoming tide. They are fat from October through February and are known to be fat if their lips are yellow, those speared without yellow lips are rejected. **Iawing** are said to lose their fat when the seeds on the long grass have

started to fall , which coincides almost exactly with the season when most fish are starting to get fat.

Techniques vary less with rays as they are predominantly speared with traditional throwing spears while wading in knee-deep water or scanning pools left in mangroves or estuaries. People were more daring traditionally and in areas where the water was too cloudy, they hunted for them by touch. Standing in one spot on an incoming or outgoing tide fishermen waited for the stingray to swim past them, sometimes through their legs, and then as they felt their wings brush their legs or feet they would throw their spears. Stingray injuries are extremely painful, not just because of the toxins within them, but also because most barbs are at least three inches long and one third of an inch wide. Like a small blade they can sever achilles tendons or go through feet and shins causing permanent disability.

When stingray are caught they are immobilised by pushing the spear right deep through them into the sand or mud. If close to shore they are slid by the spear to the dry edge and the tail is cut off in one swift motion. If the fisherman is far from shore he tries to lift the ray up into the air keeping the tail at a distance. With the free hand he catches the end of the tail and clenches it between his teeth so that the tail is straight. With a sharp knife, or traditionally the sharp edge of a boomerang or irgil, he slides the blade down along the tail and under the barb(s) cutting them off, being careful not to lose them. Some fishermen cut the tail right off, but this places the hand directly in line with the rays angle of attack, which is done with a forward flick of the tail. The barb is then shoved point down into the sand. Barbs can still cause a vicious sting once removed even after a couple of hours, and were sometimes used to fashion points on throwing spears.

The fisherman tries to spear them in the thickest part of the head so as not to damage the liver, located in the chest area. If speared in the wing they can tear themselves free. The single rod spear is less effective than the three pronged spear at controlling or stopping movement in the stingray and there is a greater danger of it spinning around the spear and striking the fisherman. The reasons for the adoption and exclusive use of the single wire spear will be explored in the section on Bardi fishing technology.

3.3 11 Crabs, Lobster, Octopus and Rock Oyster *(Scylla)*

Narangu(a). Mud crab, *Scylla serrata.*

There is no particular season for mud crab and if asked most Bardi will respond 'anytime', but the Bardi do recognise that there is a difference in the meat dependent on the state of the tide. Mud crab are said to have more meat in them when the tides are going to neap. During the spring tides the crabs are lighter and even the biggest one can be 'rubbish' '*You can tell they are different, you live with the crab and you know it.*'

These large crabs which live in the mud, in, and at the base of the mangroves, tend to burrow into the wet mud under the mangrove roots at low tide when the mangroves are dry, and come out to feed at high tide when they are submerged. During the neap tides the mangroves remain wet over a longer period of the day and the crabs have a greater opportunity to feed and are therefore presumably more meaty.[61] Though there is no season for the mud-crab it is likely that exploitation of these increases during seasons which are lean in preferred resources. Expeditions for mud crab are timed perfectly to coincide with the receding tide. It is important to catch the tide just as it is leaving the mangroves when the crabs are on the move or else the crabs will have all burrowed in or walked out with the tide. This is one of the few resources that is exploited whenever it is seen perhaps because they have no particular season and they stay alive until they are ready to be consumed.

Lauauru, Niwarr. Hermit crab

The Bardi used to collect hermit crabs almost everywhere, but especially on the beaches behind the mangrove stands under leaves. They used to find the big ones and make them leave their shells by lighting a small fire and putting the smoke

[61] One older Bardi man disagreed with this saying that they were fatter after spring tides. It is possible they are fat as the tide is going to neap because they have just gorged themselves on the nutrient rich spring tides

over them then tapping them out, then they would take them and put them right in the fire. These are fondly remembered as very tasty but today they will not eat them because the children go to the bathroom everywhere and the crabs eat this.

Milgian. Octopus, *Octopus s:*

Of the several species of octopus available all were found and procured on the reef flat exposed at low tide. Though possibly consumed in the past, octopus is believed to be the best bait and some fishermen are convinced that certain fish can only be caught with it.

Judan judan. Ornate Spiny Lobster, *Panulirus ornatus*

Only a few men know where to find these lobster and then only on very low tides. Traditionally fishermen would take a small octopus and push it into the cave or hole and the lobsters would simply walk right out, but today when they are found they are either speared, or a piece of burlap bag or a length of tangled fishing line are shoved into the hole and the lobster now caught in it is pulled out.

Niwarda and Jarlgun. Rock oyster, *Saccostrea*

Rock oysters are perhaps the most common and easily exploited of resources in One Arm Point. They are literally everywhere, but are especially easy to access at low tide on rocks and boulders in the mudflats adjacent to shore. It is safe to walk on the mud and the Bardi traditionally carried dry grass out to these rocks burning it directly on the oysters, which then automatically opened to be consumed.

3.4.11. Miscellaneous Fish.

3.4.11.a. Jilanbu. Freckled porcupinefish, **Diodon holacanthus** *and Mauring. Spotbase burrfish,* **Chilomyterus spilostylus.**

Both these fish have a nice liver and these are treated in much the same way as stingray. To eat them you cut the liver out and cook it p separately in a frying pan tin, baler shell or grill it directly on the coals. The fish is cooked on the coals and the meat is scraped off of the inside of the skin and mixed with the liver. There was some mention that certain parts of the fish's guts were poisonous.

Porcupine and pufferfish are covered in toxic quills or spines which can cause severe allergic reactions in some. They must be picked up by the eyes and never the mouth. Their mouths, adapted to breaking through the toughest shells, are like a set of nutcrackers which can easily crush or sever the finger of fisherman.

3.4.11.b. Longtom, Belonidae and Gar fish, Hemirhamphidae

All these fish feed primarily at night in the mangroves and shallow water but stay in shady areas under trees during the day. These fish swim only at the surface and so are the perfect target for throwing spears. These are also attracted to the light, so hunters would light torches to draw them into traps using an overnight tide, or spear them as they came into the beach.

Jamalal. Stout longtom (with dots). *Tylosurus gavialoides*. (piscivorous)

One has to very careful of the bones in these long skinny fish. These get fat with the S.E Wind or cold water, and stay fat until October. They have a long strip of creamy mesenteric fat, but it was not elaborated how this was treated.

> *'**Jamalal** is fat with the SE wind when we call the council. [It gets] fat from the gill right down to the bottom, only just fat in one big long piece, they got empty bag [stomach cavity] from the gill right down, when they fat they [you] can't see any fish [i.e. meat] or anything thing in it only just cover it up with the fat. In special places you go and climb up on the tree when the tide comes in, anywhere, and they used to come in and just lay under the tree, that's their time for them. These days we get them with lines, we used to get them with spear' (Tape #3A. Old Mum, April 21st 1995, side B. #284- 331)*

Lin(g)mal. Crocodilian longtom. *Tylosurus crocodilus*.

Jamalal is bigger than this fish but today both are caught in the same way. The fisherman baits a hook and throws out the line with no sinker so that it sits on the surface, and then pull in.

Baboor, or **Biboor** refers to all species of garfish. They also get fat with the SE Wind and are no longer fat at the end of September. I assume that they resemble

Jamalal and **Lingmal** in their exploitation, but it was difficult to assess as none of these species were exploited during my time in the field. One or two unmotivated efforts were made to procure them when they were seen, but only so they could be used as trolling lures later in the day.[62]

> *'Fat one, [but] you got to be careful, plenty more bones than any other fish.'(op.cit.#266)*

3.4.11.c. Gululargun, Marlin, *Istiophoridae*

This name refers to possibly four species of Marlin: Black marlin, *Makaira indica*; Indo-pacific sailfish, *Istiophorus platypterus*: Indo-pacific blue marlin, *Makaira mazara*: Striped marlin, *Tetrapturus audax.*

The sail fish can apparently be killed simply by spearing them through their sail or back fin. This is said to incapacitate them completely and they float defenceless on the surface.

Traditionally after storms or cyclones when the water was still too rough to go fishing, people used to walk up and down the beach on the **Kuljamon** side looking for these fish which often washed up after bad storms.

3.4.12. Other important groupings:

1. Fish that are caught with fish poison: **Inglan, Bidip, Gambal,**

2. Fish that are fat all year: While some fish are said to be fat all year only a select few are mentioned as a group and these obviously are the most important ones: **Gambal, Bulgarani, Garagagnar, Inglan.**

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[62] This is probably a trolling technique brought in form elsewhere. These fish are commonly used as lures among game fishermen but as there is some doubt as to whether the Bardi used fishing line historically it is doubtful that they went trolling. Using bait without line however was not uncommon and several of these techniques are elaborated in the chapters on fishing techniques.

3. Fish with large livers: Rays, Burrfish, Porcupine fish, small blacktip reef shark, and gummy shark.

3.5. Processing fish.

Some of the more specialised processing techniques have already been outlined above next to the particular species concerned. This section will provide a brief outline of the general approach to fish processing. Historical and present processing techniques remain largely the same in that for most fish little or no processing is carried out between capture and cooking. Most fish are gutted but only minimally. While westerners, when gutting, tend to remove the entire contents of the gut cavity and sometimes even the gill set, the Bardi remove only the intestine of the fish, usually leaving the heart, liver, and membranes which are not associated with the actual intestine. It is possible that historically many fish were not gutted at all in order to keep the moisture in the flesh and some fish such as the wrasses are still treated this way today. Other fish such as the **Gambal** and **Barbal** contain pungent decomposing matter which needs to be removed before cooking or the entire fish will be tainted. By taking only the intestines the Bardi guarantee that they do not puncture or rupture the back wall of the stomach cavity which acts much like the skin of the fish, creating an impermeable barrier so that the flesh does not dry out during cooking. The skin on all fish is left untouched acting as the barrier through which the flesh is cooked. It is pulled of the meat and discarded once cooked. The Bardi try to minimise damage to the fish whenever possible as this maintains the moisture in the flesh. As pointed out if the fish is not fat the skin will crack open during

Figure 23. Fish on Coals.

cooking and presumably cause the flesh to dry out even more. This could be compared to eating a fish cooked in a frying pan without oil, as the flesh will be dry and tasteless. Today, if there is no firewood or if it is raining, some fish are cooked in a frying pan but the fish are still processed in the same way. While a few fish require specific processing techniques all fish were thrown onto coals of a fresh fire. In most fish the liver is cooked inside the fish but fat that was attached to the intestines (**Bidip** & **Barbal**), or that was spilling out of the gut cavity (**Maran**) was removed from the fish and treated in one of two ways. The fat from the intestine held in a membrane could be wrapped around a small twig and roasted above the fire, whereas flowing deposits of mesenteric fat traditionally were melted in a small thick baler shell placed on the edge of the coals, the meat of the fish dipped into it. Today this fat is sometimes cooked in a tin or in a pan alongside the fish. The liver of rays and porcupine fish is treated in the same way, but here the flesh of the fish or ray once roasted is shredded and mixed in with the melted fat. As one can see fish fat is one of the major concerns in processing fish.

3.6. Seasonality, Fish Fat, and Spawning.

Fatness appears thus to be the benchmark for the selection of many species of fish for exploitation by Bardi fishermen, so that fish are only procured when they are fat . As we know that fat and spawning are inversely related in some fish then we can assume that those species that have specific seasons for fat spawn seasonally. In addition we know that those fish that spawn year round maintain fat year round. It appears that those fish that the Bardi only catch seasonally tend to have seasonal spawning periods and that those that have no specific fishing season spawn all year round. This, in fact, is consistent with the information on spawning habits and fat content collected on individual fish displayed in Chapter 2. Therefore it could be said that in selecting for fatness the Bardi are selecting against catching fish when they are spawning (elaborated in chapter 6.12).

Spawning has been recognised by all fishing peoples and continues to this day to be the focus for exploitation by many fishermen. In some cases seasonal spawning runs are the only opportunity some fishermen have for the exploitation of certain fish, such as the North Atlantic salmon which live in the oceans until they run up rivers returning to traditional spawning grounds over several weeks once a year. Other fish are present in the particular environment year round with fishermen's exploitation peaking during spawning seasons when the fish come together in large groups at predictable locations where they are easy to procure. Spawning of fish in Palau as in may other Pacific areas is the main focus of fishing activity, so much so that recently measures have had to be put in place to control the taking of specific species (Johanness 1981).

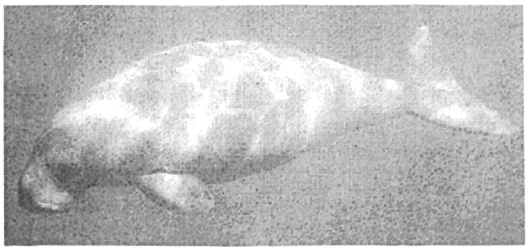
The detail with which other cultures relate spawning aggregations and the related fish behaviour show an intimate understanding of their environment and environmental processes. Fishermen in Palau are fully aware of the physiological changes in the fish they exploit, they are keenly aware of the state of gonads in these fish and follow them closely so that they can predict spawning. The Bardi are also keenly aware of the physiological changes in the fish they exploit but use them to predict whether fish are getting fat or not. Using some of the same criteria each group responds differently; the Palauans selecting for spawning as the focus of exploitation, and the Bardi selecting for fatness. The Bardi are aware of the timing, location and behavioural characteristics of fish they commonly exploit, including when they spawn and yet for the most part do not exploit them when they are spawning, explaining that these fish are 'rubbish', that they taste bad. This, in contrast to most other traditional fishermen, represents exceptional behaviour.

Though it is possible that the Bardi are simply being picky in a rich environmental setting selecting exclusively for fish that taste better from which they may accrue certain nutritional benefits, there are deeper ecological consequences to their actions that necessitate further elaboration. Prior to this we must establish whether the expressed preferences and patterns of behaviour relative to fish fatness outlined up to now effect actual behaviour in the field. This is done in Chapter 6 Daily Hunting and Fishing Expeditions.

3.7. Marine Mammals and Reptiles.

The two marine mammals exploited by the Bardi are the dugong and sea turtle. These are categorised and referred to generally under the category of **'Gulil'** which literally means meat.

3.7.1. Dugong, Odorr.



There appear to be three significant stages in the history of Bardi dugong hunting: the historic phase; the phase coinciding with the arrival of western technology and the present phase.

Historically it is more than likely that dugong were trapped in co-operative ventures and speared from rafts. Large numbers of people would create brush fences in particular bays where dugong came to feed. The dugong would then be allowed to pass through these fences into the bay and then trapped. Alternatively the Aborigines would form a human chain and push individual or small groups of dugong into areas of shallow water, preventing the ones they wanted to keep from leaving as the tide was going out. The dugong, while being rounded up, were prevented from breathing by people on shore throwing rocks and making noise whenever they came to the surface. Eventually running out of breath, the dugong would try to break through the human chain, or whatever barrier was in use. As they tried to break out of the enclosed area the Bardi men would wrestle with them, despite their size and strength the exhausted dugong would eventually be caught and drowned.

Dugong may have been speared or even harpooned and there is some historical evidence that harpoons fashioned from stone and bone bound together and attached to hand made rope were used. Malaysian visitors to this area certainly had such technology and may have introduced it. The Bardi elders all stressed the trapping technique as the predominant technique used in the past.

The second phase began at the turn of the century with the arrival of the first missions and, therefore, easy access to western technology. One of the most important of these technologies was the English harpoon. Fashioned from a solid trunk of wood and a single barbed iron shaft, (see Figure 24) the English harpoon was apparently the main harpoon used into this century, allowing Bardi hunters to stalk and harpoon dugong from their rafts, independently. The hunter could safely attach a rope to this metal shaft and let the dugong pull himself and the raft without danger of the harpoon breaking off. As boats increasingly appeared in the King Sound and hunting of dugong intensified, it appears as if the mammals became wary, perhaps avoiding those areas, especially at lower tides where they were traditionally trapped. None of the elder Wiggan brothers has ever seen dugong trapped, and were brought up harpooning them from mangrove log rafts, before subsequently learning to harpoon the animals while sculling with dinghies.

Figure 24. English Harpoon.

The huge tides made it difficult for boats under sail to negotiate the islands of the King Sound, and it was not until pearling luggers with motors were introduced that the pearling intensified. With these came the Japanese labourers, brought in especially to do the difficult diving, bringing with them the Japanese harpoon. Unlike the English harpoon, the Japanese harpoon had a detachable tip to which the rope was attached. Once the dugong or turtle was speared the spear itself fell away, leaving the small tip and rope inside the animal (see Figure 25). The heavy English harpoon, though effective, was wasteful; the wooden section tended to snap and the metal rod became severely bent as the animal struggled to get free. This meant that it required considerable maintenance and could only be used once in a day. The Japanese harpoon could be used over and over again in a single day, and could even be reloaded if the hunter possessed two tips, so that one could potentially put two

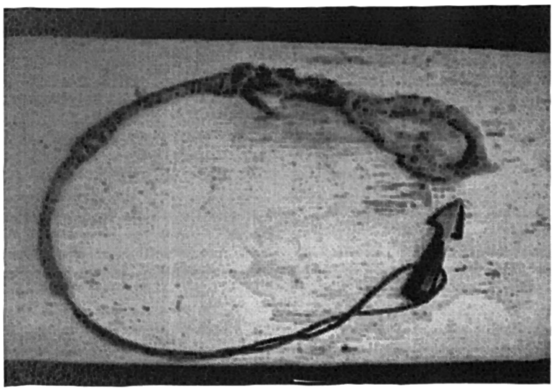


Figure 25. Harpoon tip with lanyard.

lines into a single animal, and continue hunting if a tip could not be removed easily from a captured animal.

The arrival of the outboard motor introduced the third phase of hunting which continues to this present day. The small dinghies, which previously had to be navigated like the rafts, could now be fitted with outboard motors. Initially these were of low horsepower, and hunters still had to use and follow the tides. When hunting for turtle and dugong they stopped the engines in order to scull. The noise emanating from these engines was tremendous.

Few of the Aborigines possessed motors at that time but some of the younger men garnered experience using them while working with the pearl farmers. Apparently, as the engines became more powerful and compact, the Bardi began to purchase them. Small community projects were started and funds were acquired for the purchase of dinghies fitted with outboard motors. These projects generally dissolved and the materials were inherited by the families that pioneered the projects. Initially, large family groups possessed a single boat with an outboard motor at the relative disposal of all, usually with an eye to exploiting trochus shells. These larger motors (<9 horsepower) were capable of propelling dinghies against everything but the strongest of tides and as a consequence, people were able to in part ignore the tidal phases and travel from place to place as they pleased. The increased traffic surely made the dugong and turtle even more wary but the majority of fishermen still only used the engines to transport themselves to areas where they would then scull for turtle and dugong. One of the traditional areas for sculling for turtle was in the lee of large boulders on the incoming tide. Fishermen could now arrive safely by dinghy with motor without alerting any potential prey as the turtle are constantly moving in behind the boulders for a rest from being carried by the tide. Dugong, however, were usually caught by surprise in shallow water areas as they fed. Hunters arriving by outboard motor in such areas would definitely scare them off before they had a chance to hunt for them.

Today most family groups have several boats and engines, possessed by individual members, but generally shared within the group: The older generation of fishermen were taught to hunt dugong by stalking them while paddling and sculling from rafts and dinghies. Even as they began to use the outboard motors they continued to turn them off and scull when they went hunting. Today's generation of hunters brought up stalking and sculling for dugong and turtle on these same dinghies watched their fathers or uncles occasionally give chase to these animals when spotted whilst travelling over the reef flats between sites. As engines became more powerful and available this method of hunting became more viable and prevalent, causing an increase in noise and an increase in suspicion on behalf of the prey. The impact of this will be further discussed in chapter 8.

During my fieldwork periods all the hunting of dugong took place from dinghies, either by sculling or while under power, or both. Therefore, most of the following discussion on Bardi understanding of dugong behaviour and its exploitation is relevant to present circumstances and techniques of capture. Though much of this knowledge is inherited, there have been, as delineated above, significant changes that have deeply affected this fishery. Present day Bardi understanding of dugong behaviour and fishing tactics draws on the past but also represents significant adaptation of traditional knowledge and understanding amalgamated with new and developing knowledge.

3.7.1.a. Dugong Hunting.

A great deal of experience is needed for dugong hunting, not just in capturing this large mammal but more precisely, in locating it. Dugong are known to frequent certain specific seagrass beds on certain tides and have apparently done so for generations. The trick is to catch these mammals while they are there. The dugong 'season' is somewhat of a misnomer as they seem to follow larger, less predictable, cycles that move them seasonally in and out of different areas over the course of several years. In a good year, dugong can be found and hunted almost everywhere; expeditions can set out to go sculling at night near any of the sea grass beds and dugong will almost be certain to materialise. It is in the leaner years that locating dugong in specific areas becomes more important. There is little chance in the leaner years of capturing dugong in a randomly chosen sea grass bed so Bardi hunters are careful to choose areas that they know from experience are the most favoured and where there has been some previous indication that dugong will be there.

There are a few ways of detecting the presence of dugong in a certain area. Most dugong feeding sites are used only during one particular phase of the tide, and, as they graze, they leave extremely visible long tracks in the sea grass beds. Dugong are forced to feed against the tide unless they are in calm water. When the tide comes in they feed facing one way and when the tide goes out they face another. Bardi hunters can tell from the direction and the extent of the grazing how many dugong have been feeding in a given area and on which phase of the tide, denoting both the likelihood and timing of their possible return.

The presence of Dugong feeding is also reported by the presence of floating grass debris sometimes seen miles from their feeding site carried by the tide. From this, experienced fishermen can safely estimate the area where the dugong is feeding. Anticipating the return of the Dugong to a particular area on a particular tide, the hunter can then place himself within sculling proximity before the dugong returns and surprise the dugong as it feeds.

While camping on the islands at night or fishing during the day, hunters and fishermen can sometimes see or hear dugong. If they are in a suitable position they might attempt to hunt immediately. However, as they usually are engaged in some other activity, they will take note of the location and the tide and return to the same area that night or the next day.

Dugong are highly selective in their feeding habits, using deliberate grazing techniques to enhance the productivity and nutritional quality of the sea grass beds upon which they feed. This suggests a high degree of commitment to certain patches of seagrass, as they tend to return again and again until supplies are exhausted. The older Bardi fishermen are cognisant of this behaviour and the location of these preferred sites.[63] In the run up to the **Lalin**, or cold water time, Douglas and I visited two of these sites whenever we were in the vicinity to check on the state of the grass. On at least two occasions Douglas made recognisance trips to this area alone looking out for dugong. When one had been sighted his two

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[63]Historical data collected, indicates that some of the sites used today by dugong feeding and for dugong exploitation have remained the same for at least the past century.

brothers and himself spent one night each camping on the adjacent island shore, waiting for the right tide. It is interesting to note that they were unsuccessful in their efforts. They acted as if they all knew this particular dugong, agreeing that they had all seen or heard the same one, and that he was very clever. As predictable as this particular dugong was, so too, perhaps, were his hunters.

It would appear as if solitary dugong make more difficult prey as on the majority of occasions, dugong were caught when they appeared in groups. Again this may be a reflection of the change in technology used in exploiting this species. Motors and noisy aluminium dinghies definitely impede the hunter's ability to scull silently into shooting proximity, and it seems reasonable that solitary dugong would be more wary than those in groups, and certainly more sensitive to sounds or movements in the water that it was not creating itself.

3.7.1.b. Sculling for Dugong.

During the day and even at night, if you are sculling, dugong can be followed by the sound of their breathing or located while underwater by watching for telltale grass debris floating to the surface from their feeding. While turtle feed by going up and down on the same spot, Dugong go under and across, grazing a track perpendicular to the facing current, then coming out or backing off and across the area just grazed and back up to the original starting point to breath. A skilled hunter will time these cycles and accurately plot the breathing site,[64] then scull vigorously but quietly while the dugong is feeding, and lying flat on his raft or ducking into the dinghy quietly when it comes up to breath,

the hunter tries to come within harpooning distance of the still unaware dugong. Ideally, the hunter would approach the dugong from a downwind position. Therefore, most sites that are used regularly tend to be frequented by dugong at

[64] A skilled hunter will time these cycles and accurately plot the breathing site by lining up two points on land behind it. This is especially important as the hunter, at the mercy of the tides and the currents, could quickly be shifted from his position and lose all perspective on the location of the breathing site. The subtlety and nuances of this kind of internal mapping are very hard to describe but the older men can maintain a fix on a patch of water while travelling almost 180 degrees around it, a feat that is almost impossible to conceptualise for any one who knows the sea.

slack tides, or are in areas that do not experience the full effects of the tides on the lee side of islands or in a temporary lagoon protected by a reef flat barrier. Here the hunter can approach the dugong from out of its olfactory and visual range. In a strong current, however, it would be impossible to skull up to the dugong from behind, so the hunter will, if possible, survey the dugong's movements from further up the tidal flow, and then go with the tide, controlling the speed of the raft or dinghy as much as possible in the hope of coming upon the dugong as it surfaces to breathe or as it is feeding on the bottom.

Today, this technique of dugong hunting is more successful at night, especially in open deeper water. Most of the hunting for dugong by sculling is done at night, though I am assured, as for turtle, that before the coming of so many outboard motors one could quite comfortably stalk dugong in broad daylight. Night hunting is generally pursued around the time of the full moon: the hunters can easily identify land and maritime features, and, the stillness of the night not only increases one's effective hearing range but, due to the lack of glare, ones actual visual range on the water as well. Such a full moon is known as a **Bingarr** moon which is also the name given to night hunting expeditions around this time. Night hunting, however, is not exclusive to full moons. In shallow water areas the movement of dugong and turtle underwater is signalled by a light green glow surrounding their entire mass, emitted by microscopic algae which, when disturbed in the water column, radiate this light. This green glow can be quite distinctive, clearly showing the outlines of fish and animals, especially on very dark nights and even in 'dirty' water.

Dugong, like other marine mammals, generally take three or four breaths at the surface, exhaling strongly with each one, hyperventilating their lungs in preparation for their next dive. This distinguishes them easily from turtles who take series of spaced out single breaths in which the inhale portion is the loudest. Apparently, the hunter can estimate the size and quality of the dugong even at night from the depth of its breathing and its strong breath odour.

When the dugong is within range, the hunter will either wait for it to surface, or if the water is not too deep, harpoon it as it feeds. Most dugong, sensing the attack, will spin on themselves in an attempt to deflect or dislodge the harpoon.[65] The hunter tries to hit the dugong on the back, just behind the head between its shoulders, where it will hopefully hit the spine. In this way if the dugong spins it will enter its side or chest, usually through the rib cage, perforating a lung if the hunter is lucky, making the capture of the prey much quicker. Dugong are very powerful and once speared can drag a dinghy or raft at high speed for several minutes. If severely injured, however, they tire quickly, eventually stopping and sitting on the surface to breathe. The hunter can then pull them in by the rope and grab the tail, submerging the head, thereby drowning them.

At present sculling for dugong, as for turtle, is more successful among the older fishermen. As will be elaborated in a later section, this is in part due to their greater experience with this technique and their greater patience, which I believe derives from a stronger traditional attachment to the technique. The 'eddy behind boulder' technique is employed exclusively while sculling as is all deep water capture. Sculling hunters generally set their sights on one dugong and procure that particular one. When several dugong are located at once the hunter will very carefully pick the one he wishes to procure and then scull almost exclusively for that particular one, often passing up other dugong are in a good position to be harpooned.

3.7.1.c. Chasing Dugong With Motors.

Chasing dugong with dinghies under power is generally done by the younger fishermen during the boom seasons for dugong. These hunters, taking advantage of the dugong's relative abundance, travel in a slow moving dinghy through certain areas where dugong would normally be found. Ideally these areas offer a limited number of exits, such as small bays or exposed reef lagoons, and the hunters advance from potential exits towards the shore or shallow reef. In this way, any dugong present in the area, upon hearing the motor approaching and wanting to leave, will have to swim past the dinghy in order to escape. The harpooner is standing on the front of the dinghy, spear in hand at the ready, and when the dugong

[65] See the section on technology, for how this affected the adoption of new methods of capturing Dugong.

is spotted swimming either in front of them or past them the harpooner signals to the pilot to speed up and cut off the animal. The hunter keeps the dugong in his sights and signals to the pilot which direction to travel in and at what speed to travel at in order to keep the dugong from swimming into deeper water.

When chasing dugong with the motor their speed underwater is tremendous and jumping with a harpoon into the water onto the dugong at high speed is difficult. Even if the hunter's aim is accurate there is not much penetrating power behind the harpoon as it is not travelling significantly faster than the quarry. The hunter ideally waits for the dugong to come to the surface to take a breath. At this point the animal has slowed down considerably and is at the surface where the hunter can aim directly at it, without accounting for the current, lift of the spear, or refraction. However, the dugong is aware of its pursuer (unlike in sculling). It will see the hunter jump and take evasive action. As noted above, when dugong are hit they usually spin and if they perceive the hunter early in his delivery and start this spin, there is a good chance, that even if hit, their rotation will deflect the harpoon or severely dampen its penetration, usually resulting in the dugong's escape. (see chapter 9.2)

Dugong, when pausing or surfacing, will sometimes try to lure the hunter into jumping, at which point the animal will double back on itself or turn and swim under the boat. This usually results in its escape, as the hunter has to take the time to climb back into the dinghy. Experienced hunters aware of these tactics will maintain the chase for longer, ensuring that the dugong is truly tired. If, in the early stages of the chase, the animal pauses or heads for the surface as if to breathe the hunter will slam his foot down hard on the front of the boat causing the dugong to take its evasive action, while the hunter keeps the dugong in his sight, maintaining pursuit. This way the hunter can eventually be sure that when the dugong pauses underwater it is truly tired, or that it is actually going to surface for a much needed breath, and not luring the hunter into taking a shot that it will evade. This technique is also a way for less skilled hunters to give themselves the perfect shot.

In many cases, usually involving less experienced hunters, several dugong are all chased at once as they usually are found in small groups. The hunter often loses sight of one dugong only to spot another swimming by. Many dugong are chased but many evade capture, perpetuating their fear of engines and their general wariness. Dugong are instinctively shy, much like their cousins the manatees of Florida, but they were quite tolerant of human presence and this was largely the aspect of their behaviour that traditional Bardi hunters were exploiting. It was not uncommon to approach these large docile mammals and stroke them. Still today dugong in undisturbed habitats are unbelievably tame and can be easily approached. The Bardi are very aware that it is largely as a consequence of their actions that dugong are as skittish as they have become, and in large part they blame the advent of the outboard motor. Even when not being actively pursued, the constant hum of outboard motors must greatly disturb the dugong's extremely sensitive hearing,[66] sculling for dugong which depends largely on surprising them as they feed is probably greatly compromised by their acquired wariness and perhaps perpetuates the use of outboard motors in their capture.

> *'In the old days people didn't harpoon turtle or dugong, just catch them by hand. Fifty men would line up to trap dugong in a bay. In those days they were tame and you could get close, now they are scared of motors and are much harder to trap. People on shore would throw rocks at them to keep them from getting up for air, so they'd get tired, then men would wrestle it to kill it, drown it. 15 - 20 men it would get past, but, tired out, one of the last men would get it.' (Douglas Wiggan 25th Feb. 1995)*

3.7.2. Turtle

There are five kinds of turtle traditionally exploited by the Bardi of which only two, the greenback and hawksbill turtle, are still exploited today: Loggerhead, *Caretta caretta*; Leatherback, *Dermochelys coriacea*; Green turtle, *Chelonia mydas*; Australian flatback, *Natator depressus,* and Hawksbill turtle, *Eretmochelys imbricata.*

The loggerhead and leather back turtle may have been exploited traditionally but possibly only as smaller juvenile turtles. Both these turtles grow to be very large and the Bardi called these huge ones **Unajun.** As they were difficult to handle on

[66] Sound travels up to five times faster and further underwater and even divers can hear motors that are miles away.

their rafts they were not hunted, while the loggerhead was apparently left alone because of its large head.[67] Their eggs, however, are still taken today when found and are a special favourite of some of the elders. They are slightly larger than most and the clutches are significantly smaller.

The two main sea turtles exploited were and remain the hawksbill and greenback turtle,[68] which are sought year round. Bardi distinguish between the larger and the smaller of these two species, the smaller of which are called **Angurbin**. Traditionally hunters would either swim out to turtles passing by and wrestle them to shore, or spear them from rafts. On receding tides, **Angurbin** were sometimes caught as they tried to leave the reef flats through specific channels. Today only older more experienced hunters know of these locations.

Turtle hunting also followed the same general pattern of change outlined above for dugong hunting, with the most significant changes being the use of the metal harpoon and the outboard motor. Today the predominant methods of turtle hunting are harpooning while sculling from dinghies and chasing turtles over the reef flat.

Sea turtles are exploited year round by the Bardi, though there are certain seasons when they are exploited more intensively than others. These correspond not only to particular seasonal patterns that the turtles follow but also to the seasonality of other resources procured in the area.

3.7.2.a. Undour or Married Turtle Season.

The main and most anticipated intensification of turtle hunting corresponds with the turtle's mating and egg-laying season in the **Lalin** from late September to early December. At this time turtles pair off and mate as described in section 2.4 1a. The focus of Bardi hunting is on the coupling turtles, specifically the females which are known as 'married turtles' or '**Undour**'. These mating sea turtles are

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[67] There is evidence that other aboriginal tribes treated Loggerhead turtles as sacred. (see Lawrence 1969)

[68] Again it is difficult to ascertain if any Australian flatback turtles are exploited because of their resemblance to the green turtle.

predominantly greenbacks and they can be seen swimming at the surface uncomfortably hitched together, usually being swept along by the tide.

Married turtle hunting has been the least affected by change and, in its technique, closely resembles traditional hunting methods. Married turtle are caught in a number of ways but the simplest and perhaps easiest involves walking along the long beaches at night, waiting for the turtles to swim into the beach to lay their eggs. 'Married turtle' hunting takes place on or around the full moon which is the main time for turtles to lay their eggs. However, during my fieldwork, turtles taken on the beach at night were caught while they were still in the water mating .The Bardi swim out to these mating couples and pull the female out from underneath the male and swim them back to shore. Once on the beach they leave the turtle on its back so that she cannot escape and return with a four wheel drive to pick her up.

Traditionally, without the benefit of four wheel drives to bring turtles back to the main camp, entire families would shift camp to these areas in preparation for the season. Turtles actually laying eggs were taken but unlike other coastal fisheries in Micronesia they were not the focus, perhaps because the mating turtles were just as easy to catch. The Bardi have a certain paradoxical sensitivity towards animals that are eaten daily that defies perception. Certain situations or states of being are considered special and animals in these states or possessing certain physical or behavioural characteristics are left alone (see section 7.4.3).

Even today during married turtle season some Bardi families move camp to favourite spots on beaches and islands from which they base their various activities. These spots are always preferred vantage points for looking out over large stretches of water, and as the children wander to fish and play, the older family members take turns watching the water with binoculars, looking out for **Undour** floating by with the tide. Boats are kept floating throughout the day by constant readjustment of the anchor. Although dinghies are used throughout the day dropping people off on different islands or reef to go shelling, fishing or returning to One Arm Point to get water, they are never gone for very long and there usually is at least one dinghy left on standby.

When married turtle are spotted there is usually much excitement as hunters and children run to the dinghies with harpoons and rope at the ready. The hunter is usually the person who has spotted the turtles or someone closely related, and he directs the pilot. Today the hunters put the dinghy into position to scull for the **Undour** using the motor. As the turtles are usually being swept along by the tide at the surface they are easy to keep sight of and hunters try to put the boat in line with the couple a few hundred meters away then stop the engine and begin sculling. In this way both the dinghy and the turtles are travelling at the same speed in the same horizontal plane and the pilot doesn't have to scull vigorously to catch them up, only scull lightly to move the dinghy across the tidal flow to meet with the **Undour**. As the dinghy gets closer all the occupants are silent and duck down. Aluminium dinghies are notoriously loud and great care must be taken not to bang the sides. Mating turtles are less skittish than individual turtles and can be approached more openly. They are said to be 'stupid' and hunters can easily get within harpooning range without them knowing. Nevertheless hunters still approach the turtles in silence knowing that if they are seen or heard the turtles will dive.

The turtles are floating at the surface not swimming with any speed, giving the hunter plenty of time to take aim. When the turtles are at the right angle the hunter jumps with the harpoon aiming it at the turtle on the bottom in the mating couple as this is always the female. The harpooned turtle then dives. At this point the hunter usually gets back into the dinghy and monitors the rope attached to the harpoon. Hunters usually have a feel for how good a shot they took and how well hooked the turtle will be. If the hunter is confident in his shot he may begin pulling in the turtle right away, but usually waits for it to come up for air. The startled harpooned turtle doesn't take long to resurface and the hunter reels in the line and pulls the turtle into the boat, where its flippers are grabbed and used to haul it in. In some cases if the hunter is not sure of his shot or, if he is being extra careful, he will wait for the turtle to begin to resurface and dive overboard following the rope down to the turtle where he grabs it from behind and surfaces with it, bringing it to the boat where it can be hauled in. At the surface turtles are less effective swimmers and even a solo hunter can pull one into a dinghy. Occasionally the hunter misses and spears the wrong turtle hitting the male instead of the female and there is much disappointment. It is also possible for an over ambitious male to trap another male in the mating couple by mistake also accounting for the occasional mistake on the part of Bardi hunters.

Before the advent of metal tipped spears and harpoons, it was necessary when spearing turtle to pierce them through the neck or rear as it was more difficult to drive the spear through the shell. Today older hunters still spear turtles in this way while the younger hunters predominantly drive the harpoon through the carapace or shell. It is only during the married turtle season that the older hunters reprimand the younger hunters for harpooning turtle through the shell. **Undour** are highly valued not only for their flesh, but especially for the eggs which they carry inside them, from which a special stew, called **Nurmu**, is made by boiling up the blood and eggs. Traditionally this was done by adding hot rocks to the mixture held inside a large baler shell. Today the same technique is followed using conventional pots instead of baler shells. A mature female at the beginning of the season can have as many as five clutches of eggs inside her at different stages of development. If speared through the back or chest the harpoon can penetrate the cavity where the eggs are kept and this can be contaminated with salt water making it impossible to make this special stew.

Almost all lookout points have been in use for this specific purpose as long as people can remember, usually used by the same family groups. These locations are representative of historical resource exploitation patterns, ideally situated to make use of natural features. The Wiggan family's main lookout spot is also their main camping ground, and has all the needed features relating to this.

The particular island used, Leonie island, is the most seaward in that particular group, and the lookout points on the island are both located on the seaward corner of the island (see Figure 3). From either of these spots one can look out to sea on an incoming tide and be sure that anything spotted floating in the distance will come through the deep water channel running past the island. In this way hunters (without the benefit of motors) could prepare themselves and their rafts or dinghies and set out into the tide as the turtles went by at the perfect moment. Sculling or paddling, they would then intercept the turtles in the way described above.

The tidal wave pushes its way into this channel, Escape Pass, past many islands as it enters the King Sound, giving the hunter many opportunities to get to shore downstream with the captured turtle. In fact behind most of these small islands there are strong backwater tides or eddies which run against the flow of the tide, pulling objects into shore. A skilled hunter with the prey now onboard could travel across the current towards one of these small islands where the current would pull him into shore. Waiting for the tide to change, the hunter could then easily negotiate his way back to the point of departure. Hunting on the incoming tide guarantees that hunters who lose control or are swept away are swept into the sound with its many islands and not out to the empty sea.[69]

3.7.2.b. Non married turtle hunting.

Solo turtles are still occasionally caught during Married Turtle Season but they no longer are the goal of expeditions. The hunting of solo turtles as an expedition goal resumes when Married Turtle Season ends, which probably coincides with the return of the turtles that migrated away from the King Sound to mate.

Historically, turtle were much more trusting. Apparently hunters could swim out and grab them as they went by. While this appears simple the Bardi have always had to
contend with the incredibly strong and dangerous tides. Pulling even a small turtle to shore in a light current could carry a hunter a few hundred feet in only a matter of seconds. In large part predicated by the tide, planning has always been an important aspect of Bardi hunting and fishing practises. Nearly all activities, no matter how mundane, include a strong element of planning, even if it is unconscious. Hunters

[69] This may seem to be of less importance today because of the use of outboard motors but most **Undour** expeditions still follow this same pattern. Outboard motors are temperamental and fishermen today are still at risk of being swept out to sea today. When sculling the motor is switched off so there is a greater chance that it will not start again. Gounie was swept out to sea in 1994 when his engine broke down. Largely due to his strong sculling technique he managed to land on East Twin Island some five or six kilometres out to sea, where overnight his dinghy was swept away. He was rescued the next day by Douglas, but his Dinghy was lost for five weeks, found at sea by a fishing boat outside of Broome some 300 kilometres to the south.

know 'instinctively' what they can and cannot do and what appears to be a simple procedure involves an incredible amount of knowledge and experience.

There is an easy technique for controlling sea turtles in the water and skilled hunters can literally make the turtle swim them back to shore or to the surface. The hunter grabs the turtle from behind pulling it to his chest and then slides his hand under one front flipper and behind the turtles head. Holding the turtle with this grip, much like a half nelson wrestling hold, the hunter can easily control the head and frontal area of the turtle. With its back flippers still free the turtle propels itself and the attached hunter in whichever direction the hunter pushes it's head. This technique is only necessary with the larger turtles as the smaller ones can easily be controlled by simply gripping the shell. Turtles can bite quite fiercely with their parrot like beaks but most are too traumatised to react aggressively and only seek to escape.

Turtles breathe differently than dugong, taking three to four breaths with a short interval between each, during which the turtle submerges a foot or so beneath the surface. Their breathing concentrates on the inhalation, this portion being the longest and loudest, making their breathing easily distinguishable from that of the dugong. Experienced Bardi hunters can usually tell from the sound and length of the breathing its size and general state of health. If downwind, one can actually smell their breath and apparently judge their fatness or meat quality.

Traditionally, turtle, like dugong, were harpooned from rafts or dinghies, largely as they were feeding, but the technique differs significantly. Hunters paddling on rafts or sculling will try to locate a turtle that surfaces to take the first of its four breaths facing away from him. If it is close enough the hunter will make his way towards it, sculling vigorously while it is submerged between breaths, ducking down silently each time it resurfaces. Standing on the front of the raft or dinghy the hunter would easily be seen by the turtle when it reaches the surface to breathe and it would take evasive action so the hunter ducks down until he is close enough to throw the spear. The hunter gauges the distance carefully, planning to come up behind the turtle within spearing distance as it takes its third or fourth breath. Between its second and third breath the hunter advances within a few meters of the submerged turtle and prepares the harpoon, hopefully taking the shot as it moves to the surface before it has the chance to see him. Turtles are seldom speared when more than a few feet below the surface even with metal harpoons. Since, in the days when wooden spears were used, the turtle had to be speared in the neck, the animal had to be at the surface, or just below, for this shot to work. Metal harpoons, though capable of going through the carapace, require not only force but technique to succeed. The wrong kind of throw will cause the harpoon to slide off the shell. If the turtle is too deep the force of the blow is diffused and the harpoon is less likely to penetrate.

Sea turtles, unlike dugong, can be caught in deep water as they travel on the incoming tide and as they take refuge in eddies behind large boulders during the strongest tides. Even a turtle moving in a fast moving tide can be caught from a raft or while sculling. As both the turtle and the hunter are moving at the same speed even though the turtle disappears from view between breaths, its position relative to the hunter remains the same and he can paddle or scull to it between breaths. Being carried by the tide as one hunts is not ideal and hunters prefer to be in situations where they have more control. Eddies behind large boulders are much safer as fishing spots and are one of the surest places to find turtles. Carried in strong tides sea turtles seek out places where they can take short rests on their way back into the Sound, the eddies or calm waters created by large boulders blocking the tide being the perfect spots. Experienced hunters know these area well and exploit the small currents that spin off the back of the boulder. In the calm area, they can sense where most turtles will be surfacing and scull themselves into position so that when the turtle takes its first breath it is directly in front of the dinghy.

This kind of turtle hunting is still common today, largely because hunters can get to these boulders with their outboard motors confident that once they have shut off their engines turtles will soon materialise as they are continuously coming in on the tide.

Today sculling for turtle in the tide or in their feeding grounds is usually done at night, as turtles are predominantly more plentiful feeding at night. They spend a good portion of the day sleeping and fishermen arriving by motor will scare them away.[70]

*3.7.2.c. **Chasing turtles with motors.***

Only the most stoic of Bardi fishermen have not used motors to hunt turtles, and the younger fishermen exploit turtle (apart from married turtle) almost exclusively using this method. Unlike dugong, who can only be found in their feeding grounds, sea turtles are found in almost all environments, and can be hunted using this method in almost any shallow water environment. The best areas however are the flooded reef flats and adjoining seagrass beds.

Turtles have to cross the reef flats to get access to, and leave, the seagrass beds and during the day they may sleep in cracks and crevices in the reef or bask on the surface above. Turtles startled by the sound of an approaching motor all tend to dive and head for deeper water crossing the reef flats to get there. On the reef flats they cannot dive very deep and can usually be spotted by hunters standing on the front of dinghies scanning for them.

Under chase the various species of turtle react differently. Hawksbill turtles run to deeper water no matter what obstacles are in their way, and these must be speared early in the chase or they will get away. Green turtles can be herded away from the reef edge and chased until they become exhausted and come up to breath. Turtles being chased use the same tactics as dugong, faking breaks for the surface and doubling back on themselves in an attempt to shake off their pursuer. When being chased hawksbill turtles will swim directly to deeper water, making it imperative to cut them off, but also making their trajectory fairly predictable. Green backs use a number of evasive tactics, turning sharply back on themselves or feigning surfacing then diving down in the opposite direction. Some of the Bardi

[70] Turtles in other parts of the world have customary territories at which they feed and sleep, and the indigenous fishermen of these areas exploit this tendency. The Bardi are aware of popular feeding and nesting areas but there is little indication that they exploited turtles while they were sleeping. The large tidal flux probably prevents turtles from habitually sleeping in shallow water areas where the Bardi could exploit them.

stomp on the front of the boat to startle the turtle as it comes up to the surface. I believe this is to delay the breath taking so that the turtle will become tired sooner or prevent it from surfacing and taking a breath while it is out of range. Despite being perfectly adapted to their environment turtles tire very quickly under the constant pressure of a pursuing dinghy and though capable of short bursts of speed they soon run out of steam. At this stage spearing is almost unnecessary as exhausted turtles can be physically jumped on and recovered quite easily. It is rare however to find turtles in circumstances that lend themselves to chasing them until they are tired enough to be jumped on and hunters are under a certain amount of pressure to harpoon the turtle before it escapes. The co-ordination of the young hunters is impressive as they launch themselves from a moving dinghy onto a moving target with remarkable success. Quite often while chasing one turtle the dinghy will encounter another and the hunter will harpoon this one instead.

The reef flats are everywhere and fisherman, even when they aren't hunting, are always standing on the front of their dinghies as they go over these at high tide looking out for turtle. If turtle is spotted they generally give chase. I believe this has strongly influenced the displacement patterns of fishermen, even when heading for a specific destination young hunters will usually follow routes that take them over submerged reef flats where they will take a chance and scan for turtle as they make their way across them.

3.7.2.d. Chasing vs. Sculling

Day-time expeditions for turtle usually start with some attempt at sculling behind boulders on the incoming tide or sculling over the reef flats, but frequently end with the hunters making their way to the larger reef flats where they can chase and capture turtles. Older fishermen seem to be more successful at sculling and seldom resort to chasing turtle, but it is difficult to determine whether this is because they have better technique or more patience. The younger fishermen perhaps get frustrated sooner and move on to the technique that they feel has a better return rate.

Chasing turtle at night is said to be possible, the phosphorescence indicating very easily the location of the turtle to the hunter. However, during my stay in One Arm Point, all turtles caught at night were caught while sculling usually at the full moon. Chasing them at night may be a bit of an Aboriginal myth, logical in theory but impractical in practise and sculling still predominates as the technique used for **Bingarr** hunting.

Most Bardi do not kill more turtle than they need, once one has been caught they relax. If there are several hunters in the boat each will try to get their own turtle but their efforts do not have the same exigency of the initial hunt. Older fishermen acknowledge that it is more difficult to scull for turtle than in the past but they still do it, whereas younger fishermen do not have the same experience and perhaps nostalgic attachment to sculling, and feel more comfortable chasing the turtles in the shallows and on the reef flat. However, it is likely that the engines themselves encourage the use of this technique and it is perhaps the feeling of movement and speed more than the efficacy of the technique that lures the younger generation of hunters into using it. It will be curious to see if, as hunters get older, they spend more time sculling and less time chasing. With this in mind it can be said that the older generation resorts to chasing as a last option while it seems to be the younger generation's technique of choice.

Sculling is possible in almost all situations except during the neap tides when the water is very clear. Turtles have excellent vision underwater and apparently when the water is clear they will not come to the surface near enough to be speared. Coincidentally this is perhaps the best time for chasing turtles on the reef flat. Turtles can be spotted very easily and the tide varies very little leaving the perfect amount of water over the reef flats for most of the day. It is possible that initially the older fishermen used this technique to catch turtle when other methods could not be used, the younger generation expanding its application until eventually substituting it for more traditional methods.

Running down turtles with motorised dinghies is a significant departure from traditional hunting techniques and has dramatically affected the behaviour of turtles and dugongs. As much skill and technique is required for this hunting method as for the more traditional ones, and most of the skills needed to be successful overlap. The major difference is that chasing turtles has significant impact on the behaviour of the turtle and a lack of selectivity that is not characteristic of Bardi resource use strategies. More traditional techniques allow the hunters the time to observe and choose their prey more discerningly. The new method creates circumstances that make it difficult to use other techniques. A spiral of dependence develops in which chasing turtles makes them more difficult to catch using traditional techniques, which in turn promotes chasing.

There is no doubt that before the advent of outboard motors turtle were perhaps more plentiful and certainly easier to catch while sculling, It is difficult to determine to what extent sea turtles were exploited historically as interviews with tribal elders were inconclusive on this point. Some felt that the new technique for catching them was making them scarce, not necessarily because it meant that they were catching more than in the past and that they were being over exploited, but because chasing them with motors has made them more wary and perhaps caused some to relocate to less trafficked areas. Tom Wiggan remembered that as a child turtles were rarely seen in Aul pool passage next to Sunday Island but that several years after the mission closed and the mission lugger stopped coming through the channel the turtles had returned in abundance.

Historical levels of exploitation are difficult to estimate but, considering the ease with which they apparently could be captured and their incredible abundance, it is likely that they were relatively heavily exploited. Today sea turtles are exploited year round and it is difficult to say if today's consumption patterns are an accurate reflection of those in the past. Although techniques have changed it is possible that consumption patterns and levels of exploitation have remained largely the same. Among the family group I worked with strong traditions still govern much of their exploitation and meat on the whole is still divided up and redistributed according to traditional Laws. This will be discussed further after the chapters on Bardi fishing expeditions which analyse the fishing habits of a small group of families.

The high levels of turtle exploitation were difficult to reconcile with what seemed to be sensitivities towards sustainability especially as they focus intensively on turtles as they reproduce. In fact the mating turtles they exploit during married turtle season and the feeding turtles they exploit year round represent two separate resources. The married turtles represent a set of turtles that have migrated from somewhere else whereas the feeding turtles are the permanent residents of the area, themselves leaving the area during mating season and migrating somewhere else to reproduce and lay their eggs. Taking mating turtles, therefore, does not interfere with the local population's mating and reproduction processes. Local turtles are effectively avoided when they mating. This challenges my perception that the taking of turtle could in no way be characterised as ecologically sound or with an eye to conservation. Perhaps just by luck they are able to exploit two separate resource bases in the same locale compromising the sustainability of neither. Perhaps they are aware of these migrations (though I don't see how) and are acting accordingly. Regardless it matches new fisheries management models that seek to control the parameters of the fishery, rather than the numbers of fish or species taken, to assure its sustainability. (Acheson/Wilson, 1996)

3.8. Butchering Turtle and Dugong.

3.8.1. 1 Turtle.

Sea turtles all share the same basic physical characteristics and each of the individual species is processed in the same way. The main distinction in processing practises is relevant to the goal of the processing, i.e. is it for personal consumption or to be redistributed? Only small turtles, **Angurbin,** are available for personal consumption by the hunter and his immediate family, whereas all large turtles are redistributed throughout the community following specific rules that will elaborated further in chapter 7. Despite this, **Angurbin** and larger turtle are generally processed in the same way.

The turtle are usually brought back in the dinghy to the anchorage, **Angulumar**, at One Arm Point, where they are butchered. Hunters like to bring them into the anchorage at high tide so they can be butchered near the beach and the meat carried above the high water mark, as is the practise for trochus. Fishermen will therefore try to come back at high tide. If not, they will leave the dinghy out on the mudflats with the turtle inside until the tide comes up so that they can be floated into the beach. Turtle can live up to two weeks out of the water if they are kept in the shade with a damp towel over them. The Bardi do not like to do this, and, at most, they leave turtle in the dinghy overnight. Turtle, when brought onto the beach, are turned upside down so they cannot escape.[71] Turtle could presumably be stored alive for at least several days. I have seen turtle tied in the mangroves overnight and then let go the next day, apparently suffering no ill effects. Turtle can apparently be kept alive for several weeks if so desired. Presumably, a hunter could catch two or three at a time and keep them alive until he needed them, allowing him to tend to other tasks. However, there appears to be no evidence that the Bardi ever did this.

Turtle can be butchered and processed in a variety of ways but for now we will limit the discussion to the basic butchering practises and some of the initial processing for consumption. Only one of the two main traditional ways of butchering turtle is still carried out on a regular basis, and this involves the complete butchering of most of the meat before processing. Though not done frequently today, the Bardi used to follow a much faster and simpler butchering process. This involved first killing the turtle and then making a deep cut just under the neck. Reaching through this hole with the entire arm, the butcher would remove the intestines. Special rocks used for cooking were heated in a fire and dropped through this cut below the neck into the now empty cavity inside the turtle. The fire used to heat up the rocks is usually started in a depression in the sand. Once the fire burnt down into coals and the rocks are hot, they were removed and placed inside the turtle. The turtle was then placed on its back upside down in the pit, covered completely in sand and coals, and left to cook from the inside out and the outside in. Once cooked they were presumably butchered and divided into pieces much as below. (As evidenced on September 24 1996 (notes) '*Gounie gets growled for eating the cooked turtle as he brings it in from the islands*')

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[71] In the Seychelles hunters flip them on their backs because it is apparently easier for them to breathe. When on dry land the weight of the shell pushes down on their lungs and suffocates them

Today, when turtles are brought back to the beach at **Angulumar**, people set out to fetch the necessary tools, knives, buckets, and hopefully some form of vehicle, preferably four wheel drive. Once these items have been collected, the butchering process begins. A single hunter can do the butchering on his own but the process goes much faster when he is accompanied.

The turtle is initially killed with a few swift blows to the head with a hand axe or hammer, usually penetrating through the skull. Hunters will cut off the flippers before making the first cuts into the body.[72] Traditionally these were either butchered and thin strips of meat extracted, or were hung from trees and dried, apparently remaining edible for some weeks.

The first cut is made around the **Lanjarr** or chest plate, this in effect covers the chest and belly of the turtle. Sea turtles, like tortoises, have a top and bottom shell, and though these meet on their edges, at the front the back, they are joined by loose folds of skin, within which sit the head, tail, and legs or fins. The hunter first cuts away the **Lanjarr** or chest plate starting at its edge, cutting through the skin around the front end of the turtle. Where the shells meet there is a seam through which a knife can cut quite easily. Though the chest plate is shell, it is softer than the back and is somewhat pliable. The hunter cuts through this seam on both sides of the turtle down to the rear skin section. Gripping the top part of the **lanjarr** he pulls it up, cutting away the meat that is attached to the inside of the chest

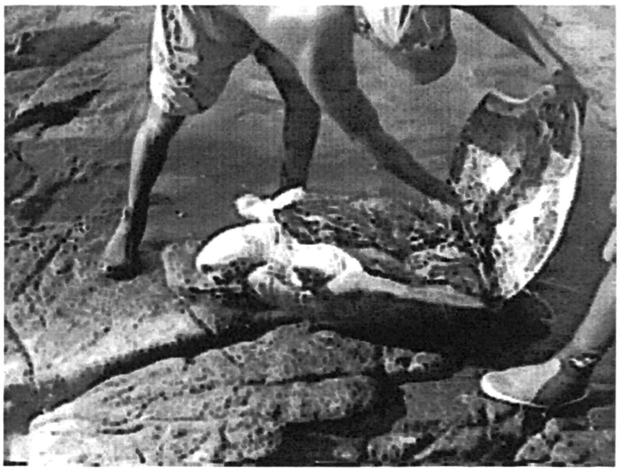

Figure 26. Removing the Lanjarr

[72] Traditionally, the flippers were kept and butchered themselves, but these are discarded today. I believe that part of the rationale for first removing the flippers is related to the involuntary muscle spasms that the dead turtle makes, sometimes quite violently, when being butchered. Though accustomed to killing turtle, the Bardi are still sensitive to suffering and the involuntary movements of the fins, if left attached, disturb them.

plate until he reaches the point at which it is attached to the skin at the tail. He then cuts through this skin to separate and lift away the **lanjarr**. In this way the chest plate is cleanly removed leaving the meat, the equivalent of the belly or stomach lining, in the turtle. The turtle is now effectively cut wide open, its contents held inside its carapace. The **lanjarr** is put to one side, shell side resting on the ground or sand. The butcher then very carefully cuts away the thin layer of meat or muscle covering the stomach cavity, **(Nindil)**. Cutting it away from the edges of the carapace he slices in a straight line just below the skin at the head and tail of the turtle. In this way the **Nindil** (see Figure 27), a relatively square to oval piece of meat only 1 inch thick and as wide as the turtle, is removed, and usually placed in a bucket or on top of the Lanjarr to keep it off the sand. The guts are then pulled out of the cavity and put into the water, the butcher then removing the liver and kidneys, sometimes cutting the liver into sections and taking a bite.

Figure 27. Removing the Nindil.

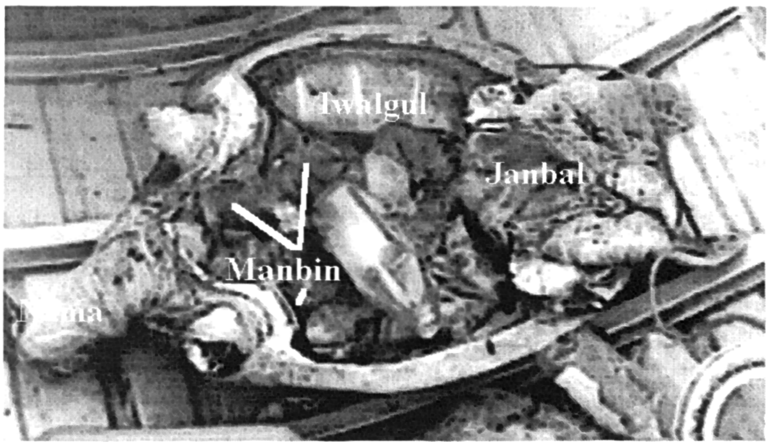

Figure 28. turtle emptied of guts left with main pieces of meat.

Up to this point, modern butchering methods mirror the more traditional ones. After this point, practises differ, depending on the butcher, but they only differ to the extent the turtle is processed. Some hunters butcher the turtle into three large pieces of meat, not including the carapace **(Iwalgul)**, chest plate **(Lanjarr)**, or abdominal muscle **(Nindil)**. These three main pieces are the equivalent of the front shoulders and rear triangle of the turtle (the hips and tail) . The shoulders (**Manbin**), are removed with the bone, separately left and right, and the head (**Nama**), is left on the carapace, its vertebrae being integrated into the shell. As pointed out, the back fins can be removed as a single section incorporating the tail (**Janbal**). This section is generally cut into two halves, as with the front section. Other butchers continue to cut these large pieces into smaller ones, following the natural lines in the meat, sometimes removing the bone. Today the head is discarded but old people still like to eat it, commenting that it is a shame the young people don't know how to eat it.

It is difficult to interpret whether continued butchering represents a more traditional approach. Interviews on the subject suggest that traditionally turtle were butchered into small pieces and that each piece was put aside until the owner came to claim it.[73] However, it is also possible that traditionally the hunter only carried out the initial butchering, cutting the turtle into large pieces and leaving these to be processed further by those to whom they belong. Today the change in the structure of the community and their attitudes to this 'Law' may affect how the Law can be carried out. Claimants on a single turtle being greatly reduced, the pieces to be distributed can larger. Alternatively, it is likely that butchering practises traditionally varied quite widely, dependent on group size, success of individual hunters, and proximity of owners of pieces.

Depending on the type and quality of the turtle, there can be several variations of fat. Green turtles are sought for the green fat that lines the inside of the carapace and **Lanjarr**, and ripples through the meat. If one is caught that is particularly fat, the shell is cooked in the fire, set in the coals like a huge bowl. The fat lining the shell melts and collects in its base as liquid oil, which is then drunk. Once drained off, the shell is turned
over and the inside roasted. When cooked, it is pulled off the coals and people cut away the gristle and small pieces of attached meat left around the neck and spine. On a particularly fat turtle, the outside edge of the carapace is cut away and eaten, sometimes

[73] As pointed out in the section on trochus, the situation on Sunday Island, with the large, high concentration of Bardi and Jawi Aborigines, was exceptional and probably caused the laws regulating redistribution and butchering practises to be exceptionally reinforced, accounting for their survival to this day.

extending two to three inches into the carapace between the incorporated ribs. The hawksbill turtle, though not fat like green turtle, is known for its meat, especially on the Lanjarr, which is roasted directly in the fire and cut away in thin strips. Unlike hawksbill turtles in the rest of Australia, they do not eat box jellyfish, as these are not found in the King Sound. The guts, however, are not eaten as they can cause allergic reactions in some (especially among women and children).

In the green turtle there can be deposits of fat incorporate into the membrane that hold the intestines together, which are carefully removed and put aside to be roasted over the coals, or distributed with a lean piece of meat. The green turtle's intestine can be emptied of its pungent organic contents, rinsed and cut into smaller sections, ready to be roasted over the fire. These are creamy in colour, lined on the inside with a thin yellow membrane. Once cooked, some Bardi pull away this membrane before eating, as it is quite acid to taste. The cooked intestine is very mild in flavour, resembling cooked squid in consistency and taste. If the carapace of the turtle is not being cooked on the beach, then all the individual pieces are put back into the shell and the whole collection is put into the back of a truck and transported into the community. Each of the sections that the turtle is divided into incorporates a good mix of meat and fat, but some pieces such as the **Nindil** (stomach lining), or **Janbal** (tail section), are always nice and fat. Pieces that are not fat enough and will be too dry when cooked are usually distributed with an accompanying piece of fat. There have been occasions when turtles are caught that are not fat and everyone is disappointed. It is difficult to say if this meat is wasted today but there is some indication that some hunters will throw such turtle away, a practise that apparently never took place traditionally.[74] The distribution and consumption of turtle and processing will be discussed in more detail in chapter 7.2.

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[74] Wasting of any food is deeply frowned upon by the Bardi, especially of turtle. However, there is definitely an aversion to fish and meat that is not fat, so it is not surprising that some is discarded. One of the main differences between today and the past is that it was probably much less common to catch turtle that were not fat, owing to the greater expertise of the older fishermen and the greater selectivity involved in their procurement techniques, meaning that one was less likely to make a mistake.
A curious phenomenon observed by the Bardi is that turtles that have been tagged by fisheries scientists in order to track their movements are never fat. They feel that the tag must interfere with their ability to swim and perhaps feed, or perhaps affects their physiology in some other way.

3.8.2. Dugong; Odorr.

The butchering of Dugong is a lengthy process generally taking three to four times longer than turtle. While turtle can be butchered easily by a single hunter, dugong would be extremely difficult, though not impossible, to butcher alone. Dugong cannot be pulled into the dinghy and must be lashed alongside and dragged to shore in the water. This creates a great deal of resistance, making it almost impossible to return to One Arm Point against the tide. In this situation, fishermen will stop on an adjacent island and butcher the dugong in situ, or wait for the tide to turn. Dugong hide is extremely tough and knives need to be extremely sharp.

The Bardi still use the same brand of knife their fathers and grandfathers first received from the pearlers, cattlemen, and the mission, and they argue that there is nothing better. The knives are made by an American company called Green River Works, now a subsidiary of Russell Knives, Massachusetts. They have been in production for at least eighty years and are still the staple of the sheep and cattle industry. The Bardi and most other Aborigines throughout Australia use what is called a sheep skinning knife; the blade is about 7 inches long with a light curve up from the handle. At first glance these knives hardly seem up to the task, made of high carbon steel they discolour almost immediately and rust within a few hours. However, the properties of the metal are perfect for the Bardi situation. While all the experienced Bardi are experts at sharpening these knives, using proper stones to create razor sharp edges, this particular steel can be sharpened using ordinary rocks or the metal shaft of a spear. Most fishermen always have one of these knives on their person which is conveniently stuck in their back pocket with the naked blade exposed.

Dugong are killed during the hunt, usually drowned once retrieved, after being harpooned and exhausted during the chase. They are butchered preferably on the slack tide or as the tide is going out, and are rolled onto dry beach or rock before being cut (this is a lengthy process and hunters do not want to be caught by the tide). They are rolled onto their backs and the hunters tentatively scratch three thin lines into the skin with sharp rocks or the tips of their knives. The first of these is across the chest, the next six inches lower across the upper abdomen , and the third approximately two feet above its tail, just below the anus. Those involved all confer and the lines may be redrawn if they are not pleased, sometimes moving these by only half a centimetre. The cuts must follow the 'Law' and the lines were traditionally drawn with ochre. During the fieldwork period the Wiggan family always drew these lines before butchering. However, the tradition appears to be weakening. This has strong consequences for subsequent distribution, essentially making it impossible to follow the redistribution traditions that the cuts are fundamentally related to.

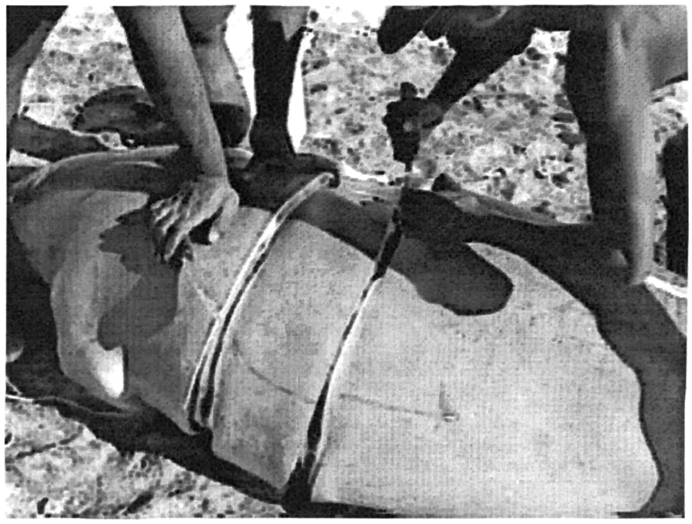

Figure 29. Top two cuts going across back of Dugong.

Once the tentative lines have been accepted the first cuts are made, sometimes by two or even three butchers simultaneously. The cuts across the chest and upper abdomen are no more than an inch or two deep, cutting through the skin and fat only. The cut through the lower body is deep, going through the skin fat and muscle to the vertebrae. Once the initial cuts are made the dugong is rolled onto its side and the cuts continued all the way round until there are three parallel cuts running the circumference of the body (see Figure 29). The lowest cut usually results in the removal of the entire tail with two or three feet of lower body

attached, these are **Gambal** and **Nigabum** respectively.[75] The Dugong, now on its stomach, is cut from the highest mark between the shoulders along the length of the spine, **Gandgi**, through the skin and fat. The skin and attached blubber between the two highest cuts, six inches apart, is cut free, the butcher working his way down from the back to the stomach on both sides so that the entire strip is removed as one piece. The same process is carried out for the larger section of skin running from the second cut to the third, except that, once the skin has been pulled away from the meat on the spine, about six inches on either side, the butcher cuts straight down into the meat until he is cutting along the rib bones. The meat between the ribs and blubber remains attached to the skin. Before continuing to remove this layer of skin entirely the butcher cuts away the muscle lying on either side of the spine from the shoulders down and puts these to one side.[76]

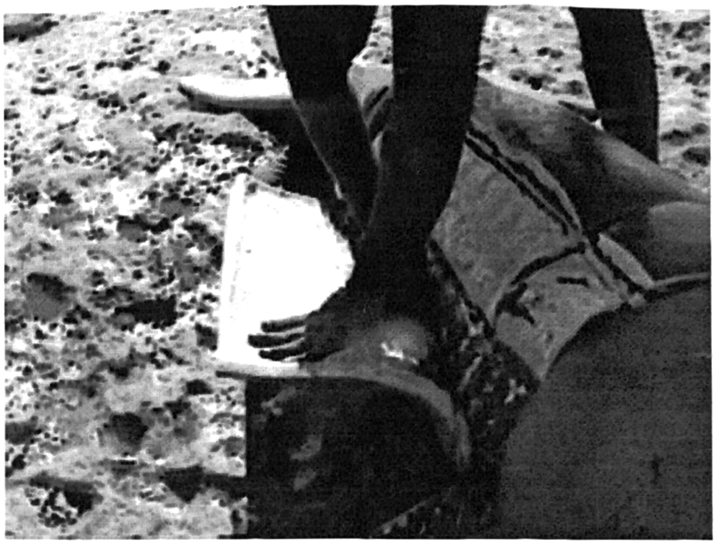

Figure 30. Cutting down the sides and across the ribs.

Reaching the bottom edge of the ribs, he pulls the knife back onto the inside of the skin leaving the meat of the abdomen on the carcass. In this way, a large section of skin, the length of the circumference of the animal, is removed. The leading edge on either side is free of flesh for the first six inches. It then has attached a layer of flesh approximately one inch thick for approximately two feet, the equivalent of the length of the ribs, coming to a central area approximately 2 feet wide of solely skin and blubber. Slits are cut in the outer edges of this so that it can be easily carried and put aside skin side down.. The stomach cavity lining, **Miring**, and abdominal muscle, **Nilang**, the equivalent of the **Nindil** in turtle, is then removed, cutting it away from the bottom edge of the ribs and across the chest and lower abdomen. This is put aside, either placed in a bucket, or on top of the large flap of skin just removed.[77] The carcass now resembles that of the turtle with its **Lanjarr** or chest plate removed, on its back with the ribs acting as the carapace holding in the guts, liver and heart.[78] As in turtle butchering, the guts are swept out and put in the water

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[75] This section of dugong includes cuts of meat that are roughly equivalent to short loin in cattle.
[76] These two long thick pieces of meat are the equivalent of sirloin in cattle.
[77] This muscle is the equivalent of flank in cattle.
[78] This method of butchering is unique to the aborigines. The Bardi appear to be treating dugong like turtle, where the animal cannot be gutted down its centre line because of the shell and instead is cut along the outer seam of the chest plate and carapace preserving the abdominal muscle as one piece. Common butchering practise does not retain the stomach lining or abdominal muscle in a single piece but slices right through it, gutting the animal before any other processing takes place. In the West the flank and plate in cattle are treated as fatty, inferior pieces of meat, which are not marketable. It is relevant to note that the Bardi butchering technique conserves much of the fluid inside the animal that would normally be lost when an animal is gutted.

where they can be cleaned. The liver is also removed, cut in sections, and put to one side. At this point the bulk of the carcass consists of the head, shoulders or fins, chest and the exposed ribs and spine. Where the ribs begin to get shorter, about six back from the chest plate, the spine and attached ribs are twisted off. These ribs are called **Irri** and the spine is called **Gandgi. Irri** are usually free, i.e. anyone can eat them, usually those present during the butchering and the hunter's family.[79]

It is at this point that the older and younger members of the Wiggan family differ in their butchering practise. The older generation will take on the difficult job of splitting the jaw of the dugong in two and separating the portions down the lines of the upper and lower jaw. The upper jaw portion includes the top of the head, **Nambu**, the fins and internal shoulders, upper back on the spine, and the ribs separated from the chest plate and five or six beyond that.[80] The lower jaw portion contains the chin, cheek muscles tongue, and the chest muscle on the detached chest plate. This entire piece is called the **Oroden**, but the chest muscle alone is called **Orolang.**[81]

The younger generation will not bother to break the jaw as their fathers do. The portions do however follow the same lines as they too make a cut down middle of the jaw line. From this they peel back the skin and cut out the cheek muscle, then cut away the chest muscle and chest plate up to the fins or attached ribs, as one piece. The upper back shoulders and ribs are then cut away from the head at the base of the skull and the entire head is removed. Again it is only old people who will eat the head itself.

There are several distinct pieces that are subject to distribution Laws and depending on their size and the fatness of the meat they are accompanied by a number of lesser cuts. There are however, four or five main pieces: the tail and cross-section of meat and spine; the chin, cheek and chest; the upper jaw, scull, shoulders, and upper ribs; the steaks off the spine; and the abdominal muscle and stomach cavity lining. It is difficult to ascertain how the ribs are divided as some are definitely considered free, while others are included with certain sections. The

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[79] Again we see the similarity with turtle where the carapace is also free.
[80] This would be the equivalent of the chuck and rib in beef.
[81] This would be the equivalent of the plate in cattle.

tail consists mainly of cartilage and traditionally was roasted over the fire then placed somewhere off the ground, once dried it kept for months, those who liked it, cutting off small pieces and chewing them.

As there are great differences in the community as to the enforcement and following of the Law regarding resource redistribution, it is difficult to ascertain some of the exact redistribution patterns and hence the dividing up of the kill. The Wiggan family try to keep to this Law as closely as possible despite it being sometimes impossible to pass meat on to people who are difficult to place in the correct relationship category either because they obtained divorces and remarried, had wrong marriages, or have simply opted out of the traditional system entirely and no longer wish to receive it. Many of the Wiggan family, under pressure from Old Mum, Katie Wiggan, have adapted by redistributing along other lines. However, the hunter and his family, still, as traditionally, do not get a share, only the meagre remnants of the carcass, which can be quite substantial in the case of dugong and even more so if there are too few people to redistribute it amongst.

3.8.2.a. Names of Processed Dugong Parts

Dugong are always butchered in the same specific way and then distributed following certain rules which will be elaborated analysed and discussed in and following the chapter on Bardi fishing expeditions.

Bardi Names.

Odorr - Dugong.

Nambu - Head

Irri - chest part, or more likely the smaller rib bones at the bottom of ribcage, these are shared on site, the bigger ones go with orolang.

Gandgi - backbone, all bones from the neck down to the tail.

Nung - the back bone after the ribs, this piece encompasses the entire cross-section of the dugong.

Gambal - piece of tail and inch or two (of vertebrae) that goes with the tail.

Nigabum - further down from nung is this part. a smaller narrower piece in cross-section.

Mili

Nilange, or **nilarang** - lining of meat under the skin and fat, covers the whole gut and rib section.

Miring - this piece lies under the Nilange and is the gut casing lining.

Orolang - chest, 'best part' , good mixture of meat and fat.

Oroden - chin part down

3.8.2.b. Names of Processed Turtle Parts

Traditionally turtle were either butchered or cooked whole, but today turtles are predominantly butchered and both species are butchered in the same way that is said to follow the 'law'. As with dugong the particular cuts of meat each have a different name and potentially a different destination. This will be elaborated in the following chapter 'Fishing Expeditions'.

Gulil. This initially was represented to me as the Bardi word referring generally to all sea turtles. **Gulil** in fact refers quite simply to 'meat' and can be used to designate all kinds of meat, though I feel at this time that this may refer primarily to meat that comes from the sea, either from dugong or sea turtle. It is primarily the younger generation that refer to turtle as '**Gulil**' , while the older generation tend to be more specific..[82]

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[82] I was taught the name **Gulil** during a particular season when only turtle was hunted and therefore was the only meat that was available. It is more than likely that only turtle was referred to as **Gulil** at that particular time as it was the only meat being sought. Aboriginal people are very direct, they tend not to expand their answers to questions beyond what is immediately being addressed by a question. At that particular time **Gulil** was turtle meat so **gulil** was turtle. During that season one could say **Gulil** and know that everyone would understand turtle.

It is hard to tell whether this is a breakdown of the language, even though the older Bardi seem to think so. Young men returning from a hunt are often pressed by elders to refer to what kind of **Gulil** they have procured, showing marked frustration at having to ask. The same frustration is experienced when younger people try to describe where they have been hunting or fishing on a particular day. Younger people have amalgamated many areas under general names. They refer to the whole of Sunday Island as **Nilagun** which to the elders only represents one small bay on the south side of the island. Fishing at **Nilagun** could represent hundreds of different possibilities, pressed for more detail they use relational terms to show them where they have been, at which point the elders repeat the actual name of that particular place. ' That's not **Nilagun** that's **Biling Biling**.' Young people are learning the minimum amount of Bardi to get along and so it is perhaps natural that they adopt more general terms..

Angurbin - this refers to small turtle and relates to both greenback and hawksbill turtle. I would estimate that it includes turtles from 12 to 20 inches in carapace length.

Undour - married turtle. A female that is carrying eggs can generally identified as the bottom half of two turtles mating or by bites and scratches left on its neck and shell after mating. It is also characterised by the absence of a discernible tail.

Nindil - the skirt or piece of meat that lines the stomach of the turtle.

Iwalgul - the carapace or shell.

Nama - the head.

Lanjar - the chest-plate.

Manbin - the front flippers left and right.

Janbal - the back flippers and tail section.

Nurmu - the eggs boiled up with hot rocks in a baler shell with blood and bits of flesh, till thick, but not too dry.

Gumanan - membrane in between the intestines with fatty deposits or the liver. Goes with person who takes the **Nindil.**

Iwalgul - the green fat.

Nimar

Unajun - the big sea turtles, probably referring to leatherback and loggerhead which weigh up to six hundred and three hundred pound respectively.

Ralral - young loggerhead turtle.

4. Fishing and hunting environments and techniques.

> *'Those lonely fishermen who believe that the fish bite at high tide left their rocks, and their places were taken by others, who were convinced that the fish bite at low tide'. (Steinbeck, Tortilla Flats. 1935)*

Hunting and fishing practise vary markedly from individual to individual - and this section is in no way meant to represent all of the individual styles of the fishermen I worked with. Fishermen of equal status could carry out their fishing activities in dramatically different ways and yet meet with the same measure of success.

This chapter then seeks to present an overview of various aspects of Bardi fishing and hunting behaviour looking at the interaction of the environment, species behaviour, and the different fishing techniques employed by the Bardi. Spear technology is described in the appendix. In an effort to simplify the presentation of this information, fishing techniques, and the important associated individual fish behaviour will be elaborated upon in the context of the ecological zone within which they take place. The section headings will be the same as those outlined in section 2.1. We already have an understanding of the physiology and behaviour of the various organisms being hunted as outlined in Chapters 2 and 3. This chapter will integrate all of these with the different ecological zones and the forces that affect them. In later chapters, when describing Bardi daily fishing expeditions, deducing Bardi fishing strategies, and discussing their implications we will not have to digress from the topic to describe the infinite intricacies of the environment, species behaviour and Bardi fishing techniques.

4.1. Fishing on the reef flat.

During the low spring tides the land area around One Arm Point and the adjacent Sunday Islands is almost doubled by the emergence of the mud and reef flats. Furthermore, during the spring tides, what in some places appears to be open ocean at high tide becomes solid land as the water recedes. While these spring tides are exceptional, the average tidal change experienced by the King Sound has no less of a dramatic effect upon the area. At low tide most of the smaller islands find themselves perched on the reef flat which becomes one large, barely submerged island riddled with pools and channels.

4.1.1. Fishing on the exposed reef flat.

The reef flat offers endless opportunities for exploitation and many of these have been outlined in the sections on individual fish species. Fish, however, are not the only fauna exploited on the reef there are several varieties of organisms to be exploited, from octopus to shells. (including the trochus shell which will be dealt with in chapter 5.1). Needless to say the reef flat is the focus of a wide variety of activities and represents, both historically and presently, one of the most important resource bases exploited by the Bardi. I will initially outline some of the fishing techniques that are no longer in use today before highlighting those that are still employed, describing how these have changed over time.

4.1.1.a. Traps on the reef flat.

One of the most important historical fishing activities associated with the reef flat is that of fish trapping. This technique utilised natural features to trap and then collect fish. Unlike permanent stone and mangrove traps that can be left unattended as they trap fish, there is a greater element of human activity involved in trapping fish on the reef as the fish must be herded into the traps and then prevented from leaving. Reef trapping, therefore, is usually restricted to the procurement of only a few species of schooling fish.

Reef fish do not generally find themselves beached on the reef because they know what routes to take as the water flows off. Sites that lend themselves to trapping schooling fish are generally large depressions high on the reef flat that drain out through well defined channels. Fish feel safe in these depressions because the current is still slow and they feel that they have an exit and can continue to feed without fear of getting trapped. Depending on the tidal range and the height of the site, fishermen can trap and then exploit the fish in a number of ways.

The easiest method is to trap fish in pools that eventually dry up or become small pools separated from the main body of water. This technique is known as **mololoman**. In these cases the fish are either or speared as they swim or hide, or picked up off the dry reef. When the site is not likely to be cut off from access to deeper water and remains relatively large, hunters let the fish pass one at a time or in small groups through one route of escape. Other hunters will line up along this route of escape spearing fish as they swim by. The fish that escape will be speared by other hunters further down the channel. Many species of reef fish can be exploited in this way and the Bardi are taking advantage of the fishes natural tendency to follow predetermined routes off the reef. All these methods involve preventing the fish from leaving the reef as the water recedes, as most fish will not naturally stay in receding or shallow pools. Other species are trapped and exploited on the reef flat by other means.

Gambal and **Barbal** are present on the reef flats in large schools, and though both these fish can be trapped and exploited using the techniques outlined above, the ability to herd these fish adds a new dimension to trapping. Not only are the Bardi able to exploit the natural channels and routes that fish take to get off the reef and control their exit, but they can also round up the fish and push them into certain areas where they will be easier to exploit. There are areas on the reef that lend themselves to this kind of fishing and there are a few well known sites that have been used for generations. Apparently many of these sites exist and all that is needed is an understanding of fish behaviour and the tide.

Gambal and **Barbal** are the only fish the Bardi exploit through herding and trapping and this is done differently for each family.

Barbal as a family do not feed exclusively on the reef flat or reef areas and are extremely common among the mangroves, mud flats, and seagrass beds. They are accustomed to swimming through and hiding in trees, branches, and weeds, but do not hide in caves or crevices. The Bardi know this and have developed strategies for trapping these accordingly. As **Barbal** will not hide in caves or crevices they are some of the easiest fish to spear once trapped: herding tightly together they will sit in open water where they can be speared. Trapping these, however, is more difficult. As they do not hide in caves and crevices and are accustomed to swimming past and through objects they are desperate to get off the reef and will not hesitate to swim past or through objects in their path. Trapping or herding this species using grass or brush fences left in place or carried by fishermen are ineffective. The Bardi learnt that this family could be herded and trapped by 'chasing' them as a group, controlling their movements by hitting the water with spears and rocks. Special areas were used for this and in some cases rocks were added to natural features to make these more effective.

Trapping this species actually begins on the incoming tide as large groups of these fish eagerly make their way onto the reef. At this time they are the most confident and the hunters would chase them and push them with the rising tide into predetermined areas which could be characterised as natural corrals. These fish, under pressure, tended to school together even tighter and the Bardi could easily push large groups of these into desired areas. Several different schools could potentially be herded into the corral at different times on the same incoming tide. A few Bardi would remain near the trap in order to keep them there throughout the high tide by throwing rocks whenever the fish would try to break out. Once the fish are trapped the fishermen can then take their time spearing the fish from the surface, or wait for the tide to drop and pick them up off the dry reef.

Apparently **Barbal** can even be trapped in large pools by one or two fishermen. Most schools under pressure can be concentrated at one end of the pool, and two fishermen in the water, advancing slowly, can keep them relatively stable in one end. If the fisherman advances too quickly, or closely, the fish will break past him, and the whole school will follow. However, once stable in one corner of the pool, a spear can be thrown across the surface in front of the school and they will not break past it. Fishermen, with throwing spears, can then select individuals in the school and spear them from above. This behaviour, which facilitates their easy trapping is called their 'Law'. The Bardi will say 'he can't go under that spear that is his Law'- you only have to lay it across the surface and they will not pass under it.

Gambal and **Barbal** differ in a few significant ways and this affects the way they are herded. Gambal are more prevalent on the reef and deeper water and are seldom seen in other environments. They move with the tide on and off the reef but occasionally will stay in pools on the reef, hiding in caves and crevices. When they feel threatened they will either swim for deep water or hide in such crevices. Therefore, unlike **Barbal**, they must not be chased as the schools will break up and spread out over the reef, or hide in crevices. However, they can be herded with noise or grass barriers. Not accustomed to swimming through the mangroves, grass barriers are very effective at controlling their movements.

Herding and corralling **Gambal** over a wide reef flat area is not possible and so **Gambal** must be hunted in areas where these fish can be herded, trapped ,and contained simultaneously. They are therefore less likely to be caught on an incoming tide as with **Barbal**, and the hunter has to exploit to a greater degree the types of channels outlined above. **Gambal** can however be trapped using the unattended spinifex grass traps. Large quantities of long spinifex grass are collected and carried onto the reef or tidal rocky shores at low tide to channels leading off the reef. Here they are laid down perpendicular to the shore and the tidal current, with rocks placed on their seaward end. As the tide rushes in, the grass is pushed flat to the bottom, and **Gambal** go in over these onto the reef flat. When the tide turns, it picks up the grass and stands it on end, the rocks preventing it from being washed away. **Gambal,** confronted with this barrier when leaving the reef will not pass through. The flimsy grass psychologically imposes an impassable barrier and the fish search for alternate routes of escape. If none are available they eventually retreat into reef crevices. The tide low and the reef dry, the fishermen return to the area and pull the **Gambal** from their holes, biting them in the head to kill them. **Gambal** are noted for a pair of sharp spines attached at the base of the tail and Bardi fishermen, wary of these, tend to kill this fish right away.[83] While Barbal can be cornered in large pools with a spear at the surface, this technique does not affect Gambal and these must be speared quickly once cornered or they will escape past the fishermen or hide in crevices where they are difficult to find.

[83] This is uncharacteristic of Bardi treatment of procured fish as most are not killed deliberately usually dying of asphyxiation in the bottom of the boat some time after they are caught. This is at odds with the behaviour of Groote Eylandt fishermen who always killed fish by knocking them on the head with a small stick immediately upon procurement.

4.1.1.b. Fish Poisoning

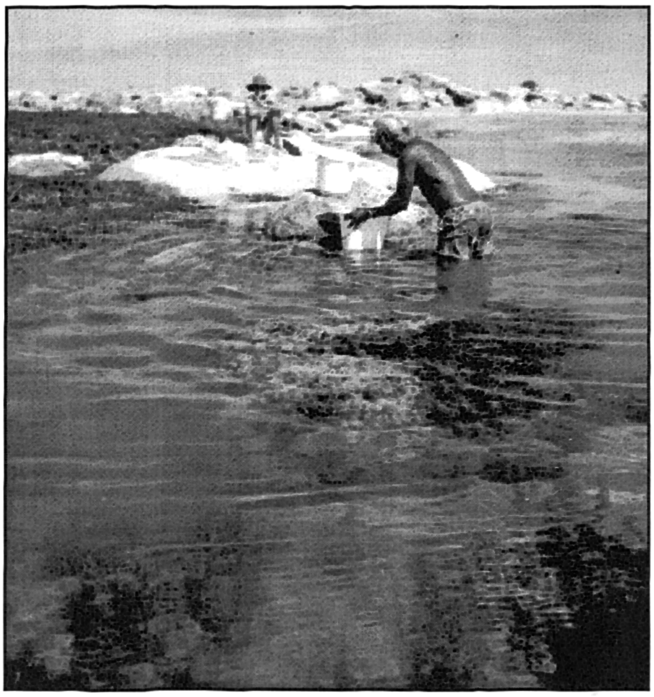

Figure 31. Fish poisoning

This is one of the oldest Bardi fishing techniques, carried out today in almost exactly the same manner as it was in the past. The branches and roots of several different kinds of plants can be used for this ranging from some species of mangroves to low lying shrubs. Those used during my fieldwork were most likely of the roots of the *Tephrosia:* and are called **ilngam** by the Bardi. These are collected from the low lying interior arid shrub and grass area on the small island opposite One Arm Point called Waterlow Island. The roots of the shrubs are gathered and brought to the beach where they are placed on rocks and pounded with round stones and crushed into a pulp. Large handfuls of sand are then thrown onto the crushing area and mixed with the pulp, soaking up the juices pushed out of the root. This mixture is then put into a burlap bag or bucket and carried to the dinghy. The fish poisoning site was never far away from where the roots were found and processed, and could have historically been reached on foot. The pools exploited were small by reef standards, never more than 3 feet deep, and all had small coral heads or rock formations in their centre.

Figure 32. Poisoned fish. (Mainly Gambal)

After the appropriate pool has been selected, the hunter wades in taking handfuls of the mixture. He then bends at the knees, sometimes submerging his head, pushing the mixture into crevices at the bottom of the small coral head or rock formation. He makes his way around this, pushing the mixture down so that eventually it appears as if an underwater bomb has exploded beneath the formation as billows of sandy mixture radiate out into the pool. The hunter, after distributing all the mixture, then steps out of the pool, sometimes onto the central head, and waits. Within a few minutes a few individual fish begin erratically swimming to the surface as if they were drunk. These are recovered and thrown onto the adjacent dry reef. Eventually dozens of fish begin emerging from their crevices, some unbelievably large, and the hunter speedily gather these and throws them on the reef.

The Bardi are exploiting the natural tendency of some species of fish to take shelter in these pools between tides, therefore, only certain fish can be caught using fish poisons. The main fish exploited are the **Gambal** (surgeonfish), **Inglan**(barramundi cod), **Bulgarani** (flowery rock cod), and squirrel fish.

Barbal, Golan and Blue bone are conspicuously absent from this list and cannot be poisoned despite their general association with the reef flat. One of the main advantages of poisoning fish is that the fish are not damaged in any way (see Fish Processing, chapter 3.4).

4.1.1.c. General fishing on the reef flat.

While the reef flat is still the focus of a wide range of fishing activities and techniques, it is the more specialised co-operative techniques, such as fish trapping, that are less prevalent today. However, general reef flat fishing has remained largely the same, and many of the techniques used today draw upon the knowledge of the more specialised historical techniques used to trap fish in the past. As pointed out in the section on trapping, the water follows predictable channels as it flows off the reef, through which many fish and small turtles leaving the reef are forced to navigate. Knowledgeable individual fishermen did not have to herd or trap the fish but simply wait near the ends of these channels and spear species before they leave the reef. This is one of the techniques that is still commonly used today. [84]

Some pools left on the reef are large and deep enough that fish seek them out as the tide recedes. It is here that large numbers of fish of all species can be found in concentration. Even so, they can be quite difficult to spear. Individual fish are wary in these pools and tend to hide or stay out of the range of fishermen. Schooling fish are notoriously difficult to kill 'en masse' as it is difficult to focus upon any one individual.[85] Furthermore, unlike in the smaller shallower pools, it is more difficult to break individuals off the school in order to spear them. Fishermen will try to herd **Gambal** and **Barbal** into one shallow end of the pool and then spear them from above with light throwing spears. Using a spear gun in shallow water is not only difficult but dangerous, awkward, and slow. It is difficult to focus when one's head is half in and out of the water and the recoil of the gun cannot be controlled unless fully submerged. Fish, when pushed into the ends of pools, are well hidden and tight against rocks or sea weed, and spear guns are too powerful in this context lodging themselves in the reef or rocks. In order to recover the spear, the fishermen are forced into the area and this spooks the fish. As unlikely as it may seem, traditional throwing spears thrown from above are much less intrusive and effective, but it is rare that fishermen team up as they did in the past - one herding the fish and the other spearing.

One of the primary fish still exploited in the traditional way on the reef flat are the **Bulgarani**. At low tide **Bulgarani** squeeze into what seem to be impossibly small crevices in one to two inches of water, or take refuge in crevices found in

[84] This usually works only on the spring tides as most fish have a strong sense of tidal rythmicity and it is only during the swiftest tides that they are forced to follow predictable channels.
[85] It is always amazes me that shooting into a dense mass of fish is futile.

larger more permanent pools on the reef flat. There is a great number of possible hiding places making these fish difficult to locate. Fishing on the reef flat for rock cod therefore is a more adventitious exercise and is usually an off shoot or an added bonus to some other activity that one is carrying out, such as collecting trochus shells or searching for octopus for bait, or simply crossing the reef flat to access another micro-environment such as the sand/ mud algae grass flats between the reef and the shore mangroves.

As the fisherman walks on the reef flat, **Bulgarani** in the vicinity take flight and push themselves into crevices in the reef causing a fair disturbance, alerting the fisherman to their presence. The fishermen pushes a light throwing spear into crevices in the area of the disturbance, softly and gently at first, feeling for movement or flesh. Once located, the fisherman drives the spear through and then levers the fish out. This process can take up to 15 minutes but some amazingly large **Bulgarani** can be procured in this way.

In the deeper (2-3 ft)permanent tidal pools on the reef flat, usually in conjunction with rocks or boulders, there is a greater chance of finding rock cod, but here these are too wary and the deep pools offer too many good opportunities for retreat into inaccessible areas where spears and spear guns are useless. The smaller of these pools are good for fish poisoning (see above).

Figure 33. Pools On Reef Flat

Traditionally, the exposed reef flat was also the focus of night fishing by torch light. Torches made from the rolled bark of the saltwater paper bark tree *(Melaleuca acaciodes)* were carried and used to find fish as they slept in shallow pools. Wrasses are notoriously deep sleepers and the Bardi would hit these over the head with a fishing boomerang held in the hand. Some of the elder Bardi liked this method as it did not damage the fish. Another simple method was to light a small fire on the edge of the tide and as fish swam to the light they would be hit with the fishing boomerang. Some would actually jump from the water to the fire, beaching themselves. The number 7, or fishing boomerang, was apparently the preferred tool for this kind of fishing, as the spear, when hitting the bottom, would scare all the fish away. The boomerang only penetrating the surface did not have this effect. Another simple but effective technique was to crush red claw crabs on the dry rock or reef as the tide was coming in. As the water hit this area the fish would go crazy and rush in, almost throwing themselves onto the dry land. Here they would be speared or hit with the boomerang.

Today all the Bardi wear some kind of footwear when spending any time on the reef flat. The reef is a hazardous place covered in dead shells and sharp corals that can collapse as you walk on them. The reef has always been hard on the Bardi's feet and traditionally they had devised methods of dealing with this. Despite the occasional reference to types of temporary footwear in the form of woven pandanus leaf soles tied to the feet, the method of protecting the feet while hunting on the reef flats traditionally involved rubbing the soles of the feet with a special leaf (*Distichostemon hispidulus* or *Gardenia pyriformis*) which made them numb to pain and presumably also toughened the skin. Australian Aborigines are known for their incredibly tough feet. However, after hours on the wet or damp reef even their skin becomes soft.[86] The leaf effectively blocked out all pain and perhaps helped to seal the skin from water. Hunters were sometimes surprised when they came back to shore to find that they had been quite badly cut but had not felt a thing. This leaf perhaps had an antiseptic effect as those who used it apparently never suffered from infections and healed quickly.

4.1.2. High tide on the reef flat, and deep pools.

Today the submerged reef flat is the focus of much more fishing activity than undertaken traditionally. It is primarily in the form of turtle hunting by the young men as outlined in section 3.6.2.c.

[86] The Bardi often complain that they have become soft since the white man came, loosely referring to the state of their feet.

Spear fishing over the reef flat is similar to fishing in large pools on the exposed reef, except that there is no possibility of cornering any fish. The species targeted are therefore those which hide in crevices when threatened. These tend to be the Lutjanoid (grouper) fishes, and the Sweetlip. Despite taking on postures of defence, these fish retain a certain confidence, and while inside or in proximity to their hideouts they can be fairly curious, even approaching the hunter at times. Their posture however, makes it very difficult to spear them. When watching the hunter they always sit at 45 degree angle to him, offering little in the way of a target, to take a shot would either miss the fish completely, or glance off, injuring and eventually killing, but not procuring the fish.

When fishing with spear-guns on the submerged reef, the tide generally needs to be slack and preferably neap so that the water is clear and the current is not too strong as it is difficult to control the spear gun in the strong currents and the fish are being swept by too quickly. Therefore, fishing with spear guns during the tidal changes is done in association with boulders and islands, where, as for turtle hunting, the fisherman can situate themselves in the lee of the boulder and wait for the fish to swim into the area to rest, where they are shot. Hunters today will either go line fishing or use spear guns on the submerged reef flat, though not simultaneously as fish will not bite when a spear-fisherman is in the water.

4.2. Fishing in mangroves and adjacent mudflats and seagrass beds.

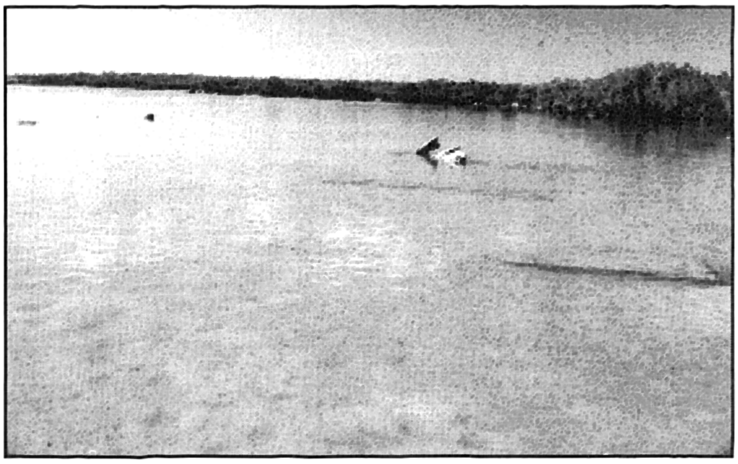
Figure 34. Submerged mudflats adjacent to mangroves at Juon (high tide).

Mangroves are present on all mainland coasts in the One Arm Point area and on most of the larger islands. Mangroves were and often are the sole focus of fishing expeditions as well as being fished in conjunction with the reef flat. Today the dry reef flat is often exploited until the tide begins to come in at which time fishermen float their dinghies into the mangrove stands and fish with spear guns in the submerged trees. Though fishing in the mangroves shares some similarities with fishing on the reef flat, trapping is less of a feature as the masses of tangled branches and roots make it difficult to block all avenues of escape. The mangroves and associated sea grass beds are the refuge and habitat of a wide range of species that cannot be found on the reef flat or elsewhere, and therefore, are still highly exploited today. Today the young men hunt in these areas much as their forefathers did with light throwing spears at low tide, hunting for mud crabs as the tide recedes, and sting ray in pools left in the channels between the mangroves. These are also hunted on the incoming tide as they swim back into the mangroves from deeper water. At high tide hunters swim through the mangrove branches with spear guns for mullet, **Maran**, **Barbal**, and **Giral**. Traditionally, hunting patterns were similar except that at low tide the hunters would find Maran collected in certain deeper pools where these would be speared. At high tide, without the benefit of spear guns hunters, would not spear fish in the mangrove roots but would wait in specific trees for the gar fish, **Baboor** and **Jimalal**, to swim in and under the shady branches where they were speared.[87] This was also the time

[87] These are surface swimming fish.

for spearing the larger game fish as they swam into the shallow channels following the gummy shark.

Mangroves were and still are, one of the most dangerous environments to fish in because of the presence of saltwater crocodiles. These areas were especially avoided at high tide, when crocodiles are more difficult to see and hear, and during their breeding and egg-laying season. Young fishermen will not go Spear fishing with spear guns in certain mangrove stands, usually avoiding those that are excessively thick and adjacent to mudflats, preferring sparser stands associated with rocky coasts.

Despite the risks of encountering crocodile, spear fishing with spear guns in the mangroves at high tide presents an ideal situation as fish are generally very confident within the shaded mangrove root and branch fortresses. **Maran** are highly prized during their season and the Bardi seem to be willing to take the extra risk of swimming in the mangroves to get them. As these fish swim, and in some cases, push themselves between the branches, they remain amazingly calm, without adapting threatened postures or taking flight when confronted with fisherman. The problem lies in getting a straight shot through the maze of branches and roots. The hunter therefore needs to dive under the mangroves and come up on the inside of these, finding a window or corridor within the branches where he can get a straight shot at the passing fish. The hunter hooks his feet in the roots below and crouches, submerging his head one to two feet under the surface. The fish tend to swim through the branches and through the corridor that the hunter has chosen, presenting a full on side view, making a good target. Once speared, the hunter resurfaces and removes the fish from the spear rod. Breaking a branch in the tree above, he pushes it through the gills of the fish and then suspends it inside the branches above the surface, in this way he can remain under the trees without fear of attracting sharks or crocodiles, or scaring off the remaining fish. The hunter moves around under the trees decorating them with fish as he goes along returning to collect them when he is done.

Rock cod can be speared at high tide in the trees, but these tend to take shelter in dark shady places during the day, only venturing out at night. As most spear gun fishing in the mangroves takes place during the day, fishing for rock cod usually involves locating them in their holes and spearing them there, making fishing for these at high tide near boulders the ideal time. In the mangroves the networks of roots makes this difficult so these are only caught at low tide.

As we know, rock cod have 'home' territories preferring to take refuge in wet areas in their vicinity than leave the area with the tide. Therefore, pools left in the mud between the mangroves roots and under dead tree trunks at low tide present the most obvious and predictable areas for refuge, and the hunter concentrates on these areas when looking for them. Their favourite hiding places are well known and checking these is always one of the goals of expeditions into the mangroves at low tide, usually put together to hunt for stingray or mud crab. The hunter pushes his spear into the sand next to these hiding places, hoping to incite this curious fish to investigate, at which point it is usually speared. If missed, the hunter feels for it with his spear and extracts it in much the same way as on the reef flat.

The sea grass beds, submerged at high tide, were the focus of most of the turtle and dugong hunting, stalking these as they fed, and today they are still used in this way though predominantly at night. Chasing of dugong and turtle today also focuses on these areas but especially where these are fringed by reef flats. At low tide, seagrass beds near the coast can become shallow lagoons fringed by reef flat where some species of fish and ray take refuge. Hunters would access these from the coast in the past, but today they are often reached by boat which are left on the reef flat edge from which the hunters walk across the reef flat and to these lagoons. Stingray and Mullet are the two predominant species sought here using light throwing spears.

4.3. Boulders

Deep water boulders provide refuge in the form of permanent shelter for some fish, and function as resting points for fish and turtle swimming in the tide. These boulders are, therefore, the focus of much marine activity and high concentrations of fish can be found in the lee of these as the tide comes in or goes out. Bardi hunters also find these useful for resting or waiting out the tide. Instead of putting down an anchor they will head to the lee of large boulders and wait for the tide to subside. Landing dinghies during the tidal flow is impractical as the tidal level is changing so rapidly that dinghies, if left unattended, will either end up stranded dry, or floating away in minutes. Additionally there are few opportunities for exploitation during the tidal flow except at the back of these large boulders.

Traditionally, fishermen would use these to take shelter and wait out tidal changes so as not to be swept away on their rafts, also using them for hunting the turtle that swim into these areas for the same reasons. Fishing lines may have also been used but there is some question as to their success in this situation. For catching fish, spear guns are by far the most practical tool in these areas and hunters can position themselves against the boulder or between the facets and simply wait for the fish to swim past. Large sharks are uncommon in such areas and the hunter mainly has to be careful not to be caught by the current and swept away.

In open water, boulders generally drop down to deeper water quite rapidly, but they can also be found in association with reef flat and sandy bottoms. These boulders are not as useful for the hunting of turtle but at high tide are the focus for a fair amount of fish. The fish in these areas are seeking out shelter and shade not provided by the outlying reef flat or sand. The fish are not as concentrated as in the above situation and the hunter instead of waiting in one area, swims around them, in an attempt to surprise fish as they rest in the shade or swim by. In open water fish tend to take on defensive or threatened postures in the presence of fishermen. It is in this situation that knowledge of fish behaviour is the key to procurement. Many fish will simply flee when confronted with a spear fisherman and must therefore be caught by surprise. The boulders allow both the fish and the fisherman to feel secure and help to hide the spear fisherman from the fish. The hunter is primarily aiming to catch the fish as they swim or feed unknowingly in front of or to one side of him.

Rock cod, especially coral trout, are usually associated with these boulders at high tide. These shelters are larger than those that they use at low tide and, once located, a variety of shots can be used in procuring these fish. With patience, a fisherman hovering in one area in front of a hiding place can incite this curious fish to progressively poke its head further and further out of its hiding place to take a better look, at which point it is speared. Like the snapper, they will look straight at you and will even come up to your face as you peer into a hole, sometimes so close that it is impossible to use a spear gun. As they rest relatively immobile and have wide heads, a good fisherman can usually spear them straight on. However, hunters prefer to look for an alternate entrance from which they can spear the flank of the fish as it looks in another direction.

Some of the older fishermen still use and prefer the gidgi, or Hawaiian sling, for spearing rock cod in caves as one can be quite close to the fish (1-2 ft)and still deliver a shot. The gidgi user can also take advantage of quick reloading of the weapon if the fish is missed. This is especially relevant in relation to rock cod as an injured or missed fish will not run away but will turn around and swim up to the offending implement in indignation. A relaxed and fast fisherman with a gidgi can reload in seconds and obtain a second and usually successful chance at procuring the fish.

The **Mardal** (sweetlips), and snappers, are also commonly exploited around such boulder edges and can do one of three things when encountering a hunter. Most will just simply take off and swim, either at a slow leisurely pace or with speed. To shoot a fish from behind is extremely difficult as the target is very small and the angle of the body makes it difficult to hit them squarely. Sometimes the fish may come out of the distance and approach the fisherman in order investigate, and then swim off again. In this case the fish is being curious but will only pass once so, if not seen, will be missed. The fish's posture remains relatively relaxed and a full flank or side is generally presented making a good clean target. This is the easiest shot to take. The third approach is one in which the fish is found hiding in a crevice or is caught by surprise as a hunter comes from behind. Here the fish will sometimes approach the spear fisherman head on, looking directly at him. Switching from angle to angle the fish is both curious and defensive, its body angle never presenting a good target, despite its proximity and station. If the fisherman stays relaxed, the fish will maintain this position for several seconds and will eventually turn, and in a flash disappear. Any erratic or tense movement on the fisherman's part will instigate this speedy exit. Despite proximity, this is in fact the most difficult situation for procuring snapper and sweetlip, and the key to success in this situation is an understanding of the behaviour of this fish. The fisherman can relax and wait for the fish to turn and leave, taking the shot at the point in which it presents its flank. However, if one shoots at this point it is usually too late, the sound of the trigger or the lifting of the spear instigates a quick exit, and at best the spear only glances the fish. An experienced fishermen will stay relaxed, gain the confidence of the fish, and then, before it loses interest and turns, take a shot directly at the head. While the head may be too small a target to hit, the fish generally reacts to the sound of the trigger or the fisherman's movements and turns to leave, at which point the spear is already launched and hits the fish in the side. It takes a fair amount of confidence and more importantly experience to make this work.

4.4. Beaches

Beaches are found in association with most of the features outlined above and so fishing and hunting from beaches can procure a wide range of resources. However, the resource most specific to beaches are turtle eggs.

Turtle eggs are collected during the **Lalin** or married turtle season and into the **Mangal**. Despite rookeries being well known, less turtle eggs were collected than must have been available. Smaller offshore islands with small beaches were often exploited for turtle eggs, and on three occasions we took eggs from East Roe Island on beaches that were no more than thirty feet wide. Perhaps the extremely long beaches on the other side of the peninsula cannot be efficiently scanned for turtle tracks. Turtle eggs are highly prized and fishermen will divert their expeditions in order to check beaches for turtle tracks. Once spotted, they generally return the next day to get them. Turtles tend to lay eggs at night so it is unlikely that fishermen would see them as they lay their eggs. However, as these marine animals push themselves up the beach beyond the high tide mark, they leave large permanent tracks in the sand up to five feet wide (see Figure 35) These are easily spotted from sea, but the Bardi will still need to locate the nest.

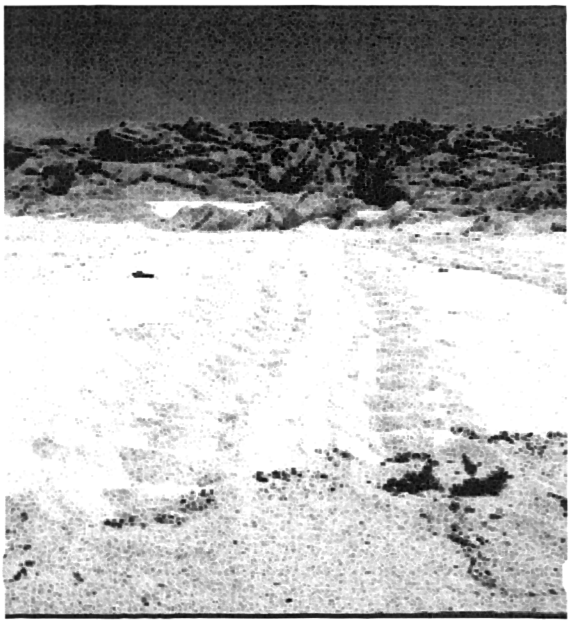

Figure 35. Turtle Tracks.

Most turtles create false nests in order to confuse predators: hiding the real nest they leave an obvious trail to the dummy nest. Most real nests are behind and to the left of the dummy nest. The Bardi knowing this, will push a metal rod or wooden spear through the sand in this area until they feel the sand give way. If the end of the spear comes up wet and sticky then they have found the nest. Slowly digging out the nest, they are careful not to break any eggs and remove them all. Turtle eggs are eaten raw but can also be cooked whole in the shell. These eggs are a delicacy and yet hunting for turtle egg nests was never the goal of any expedition except for when the tracks had already been seen and it was almost certain that there would be nests in a specific area.

Turtle eggs apart, beaches are not the focus of a great deal of resource exploitation, but are the base from which most expeditions set out and return. Fishermen will use beaches as safe ramps to haul up their boats, preferring to walk from these to the reef flats and mangroves if possible. On the islands the beaches are safe for children to swim and play, so most campsites are associated with beaches. This is not to minimise the possibilities for resource exploitation. As beaches are often associated with rocky coastlines many of the species of fish and fishing techniques that apply to boulders are used here. Rays and small sharks can usually be found near beaches and many fish swim past these. In addition hunters wading with light throwing spears can spear fish and rays as can fishermen cruising the shallow sandy areas off of beaches in dinghies. Fishing with lines at night can be very successful and the children usually meet with some success.

5. The Bardi Economy

I will begin this chapter with a section on Trochus shell collection as it is one of the main economic activities that the Bardi participate in.

5.1. Trochus, *Trochus niloticus.*

Trochus are a genus of gastropods. Of these gastropods, *Trochus niloticus,* are the only commercially viable species from which pearl shell buttons are made. Found throughout most of the tropical Pacific, the King Sound is the most southern coastal area on the west coast of Australia where they can be found. *Trochus niloticus* have simple gill systems that do not deal well with suspended particulate matter, meaning that they are generally restricted to shallower rocky areas in clean water. In the King Sound, trochus shells tend to be found in the middle to outer band of the reef flat. It is here that the tidal water runs clearest and fastest, far from inshore areas of sediment such as mudflats and mangroves. Trochus can easily survive on the reef flat at low tide but tend to find pools or shelter behind rocks and boulders to avoid exposure. They can usually be kept out of the water for a day or two and still survive.

The Trochus industry in Western Australia started in the 1890's and was initially controlled by Australian pearling interests, and later by missionaries active in the area. It is questionable whether trochus featured highly in the pre contact days of Bardi subsistence life as the meat is regarded as too tough to eat comfortably, needing to be soaked in vinegar for several days to be palatable. Trochus were probably only one of a wide variety of shells collected and probably did not feature as highly as the utilitarian baler shell and the ritually significant pearl shell used in for making **Turanga** ornaments.

The trochus fishery at One Arm Point has its origins in the pearling industry which had established itself in Broome in the 1870's. Pearling luggers visited King Sound to collect both pearls and trochus, and, prior to the establishment of the missions, the Aborigines made up a large part of the work force. 200 -300 Aborigines in the area of Broome on the west coast were employed by European and Indonesian pearlers who took advantage of their diving skills to harvest deeper waters. Some Aborigines from the area were used as 'crew' but it was more than likely their expertise as navigators to guide foreigners through the treacherous waters that was appreciated. Sydney Haley, who first set up the mission on Sunday Island in 1889, had been previously involved in using Aborigines as beach combers in the Dampierland peninsula, taking some of these and shipping them out to work on luggers, a process known as 'black birding'(Campbell and Wilson, 1993:20). The mission may have been initially approved to secure a European foothold in an area too remote to be controlled and frequently visited by Indonesian pearlers and fishermen. Hadley may have been trying to legitimise his claim to the area, and secure a consistent work force, the Aborigines at the mission apparently supplying him with the products of beach-combing and hunting expeditions. These items included pearl, trochus, and hawksbill turtle shell. Whether legitimate or not, this may have been a blessing in disguise as it could be argued that the establishment of the Sunday Island mission did not result in a substantial loss of traditional culture among the Bardi at Sunday Island. They maintained in large part their traditional ceremonies and Laws throughout the mission period, and the men at least continued their subsistence practises and distribution Laws, protected from the more unscrupulous pearlers and traders, some of which sold Aborigines to the highest bidder. This work did not remove them from their traditional territories and ,in large part, still made use of the traditional skills used in subsistence living, i.e. calculating the tides, gathering from the reef and hunting turtle. Subsistence activity was carried out alongside their work without much trouble, much as is done today, and was probably encouraged by the mission in order to supplement the meagre provisions they brought in, and the failed attempts made at farming.[88] That they were still able to support themselves while working for the mission gives us good indication of the level of activity required by the Bardi to subsist in this environment. It is important to note that many of the technological adaptations by the Bardi are not necessarily the result of choice but were forced upon them by the incoming culture's demand for greater production. After World War One, the pearling industry declined and the pearlers encouraged Aborigines to catch more turtle and dugong, presumably making available European technology to help in the process, hence the

[88] With the notable exception of the introduction of the Mango trees, which still produce today.

introduction of the English and subsequent Japanese harpoon.

Hadley ran the mission until 1922, leaving it to the United Aborigines Mission as the area was apparently fished out. The extent of *this later mission's* involvement in the trochus trade is unclear. Interviews conducted by myself seem to indicate that the Aborigines collected trochus in exchange for the mission's basic services of food, supplies, and transport between islands, not actually receiving payment in cash. The lighthouse keepers at Cap Leveque (**Kuljamon**) would trade tobacco for shells, but it is difficult to establish if this was in commercial quantities. The mission probably supported itself through the sale of shells, and the lugger owned by the mission made round-trips between Broome and Sunday Island on a regular basis to get supplies and presumably drop off quantities of shell. The mission itself, like others throughout Australia, presumably hoped that by centralising the Aborigines in one area, they could control their movements and christianise them. Sunday Island, in this respect, was a bad choice. As the largest and most central of the islands it had always been the hub of much of the traditional activity in the area. Aborigines coerced to the mission, though staying in uncharacteristically large groups, were not separated from their traditional countries by more than a short walk or an easy raft journey across the passage. Additionally, they were surrounded by the areas they had always traditionally exploited. Trochus shelling, as part of the work for the mission, probably fitted in quite well between their traditional subsistence activities as it still does today. [89] It is commonly

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[89] Throughout Australia aboriginal women's traditional subsistence practises were some of the first to be made redundant at the onset of regular contact with outsiders through the replacement of the carbohydrate sources that they traditionally collected and processed. This process has been documented by most anthropologists in Australia (see specifically Altman). Among the Bardi, however, women were and still are largely involved in the procurement of marine species, specifically harvesting organisms on the reef flat and in the mangroves at low tide. Therefore, their procurement and living patterns potentially suffered less of a change than those aboriginal women in more inland areas.
The issue of redistribution of fish and meat certainly was complicated by the bringing together of many of the individual family groups into one valley on Sunday Island, as these groups normally camped in separate areas of the island, on other adjacent islands, or on parts of the mainland coast. However, it is my feeling that the laws regarding resource redistribution may have been ratified and reinforced to meet the challenges presented by a larger semi-permanent proximate community, which may account for the systems survival into the present. This will be elaborated in later sections after the daily expeditions have been analysed.

acknowledged that the Bardi Aborigines at the Lombadina mission suffered a much greater dislocation from traditional subsistence and ritual patterns being forbidden from pursuing their 'Law'. One has to wonder if the Mission at Sunday Island may have accepted the inadequacy of the location in light of the working fiscal relationship they could maintain with the subjects of their mission. In fact, the mission under the control of the United Aborigines Mission may not have differed too radically in their interests in trochus and pearling from that under Hadley, as evidenced by their negotiating some of the principal land and sea leases that the major pearl farming companies still enjoy profitably today

Until the 1950's most buttons were made from shell and the market for trochus shell buttons was constant. However the advent of high quality plastic buttons caused the market to collapse until the mid 1970's when higher class fashion houses began requesting them once again. Demand for trochus world-wide currently exceeds supply, largely due to over-harvesting in the rest of the Pacific, the collapse of the associated traditional markets and the renewed demand for shell buttons from the fashion industry.

When the settlement at One Arm Point was re-established trochus collection was seen as the basis for entry of the Bardi Aborigines into the market economy. The community began harvesting trochus as an Aboriginal commercial enterprise in 1979. In 1983 the Bardi secured an exclusive fishing licence for the area administered by the Bardi Aborigines Association Incorporated. At One Arm Point today the trochus fishery is a commercial enterprise run on a licensing basis and, though these licences are potentially open to others, they are essentially restricted to the Bardi because of the 'Exclusive Zone' status of the Sunday Island Strait in the King Sound where only the Bardi are allowed to exploit the resources. Technically, any one seeking to cross the area with trochus from elsewhere needs a permit. From 1980 to present, the value of raw shell has increased almost ten fold with the value per kilogram jumping from $1.20 to about $10.00. The Bardi were the initial licensees, with 60 permits being issued, and these still collect the majority of shell in the area with provisional licences being issued to Aboriginal corporations outside One Arm Point in Lombadina and Derby.

There is some concern that the fishery is overexploited, evidenced by the longer distances travelled to remote areas by the most successful fishermen. However, the Bardi only collect shell from the exposed reef flat, never collecting them below water with breathing apparatus or while skin diving, leaving the subtidal populations un-harvested. In addition, there is a catch quota imposed on the Bardi trochus fishery in the form of a minimum and maximum size of shell in a effort to guarantee a reproductive and sustainable stock. For the moment it appears as if the trochus fishery at One Arm Point is relatively sustainable at traditional exploitation levels, due in part to the natural restrictions presented by the geography, specifically the tidal fluctuations, and the harvesting behaviour of the Bardi themselves.

The Bardi are always calculating the best tides and the best areas for trochus collection and each fisherman has his own specific places that he goes to for shell, the location of which is only shared with a select few. The Bardi do not dive or skin diving for trochus, only collecting them off the exposed reef flat. The areas for collecting shells are quite specific and restricted to a few key areas on the reef flat at specific times. This is one of the reasons many of the older fishermen with the greatest experience are the most successful even though they often go shelling alone. Tides today are largely understood and referred to in the context of their implications for reefing or shelling. The predominant view is that the best tides are the spring tides which expose the most reef for the longest period of time, and most Bardi will restrict their harvesting to these times. Others feel they achieve better results on less extreme tides when the reef remains wet. Despite having less surface area to exploit and less time to harvest, they feel that the shells are easier to find as they do not hide or take shelter as they do over the longer exposure periods.[90] Though many expeditions set out only for trochus collection and some Bardi individuals concentrate specifically on this harvest, most expeditions usually involve some hunting or fishing activity. In the same way most hunting and fishing expeditions usually offer some opportunity for trochus shell collection. It seems obvious, but fishermen naturally let certain areas lie fallow after they have been

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[90] It appears that the Bardi people prefer hunting them at low tide because there are less other compelling hunting fishing alternatives at these times, specifically for turtle and dugong.

extensively harvested. Campbell and Wilson (1993) state that the amount of shell sold in the One Arm Point community fluctuates throughout the year with a definite lull in the wet season or **mangal**. In the 1980s between 50 and 70 tons were sold each year.[91] They make the interesting observation that collection fell of dramatically in 1984 when much of the community labour force was employed in a community building project. It would have been interesting to investigate fishing and hunting patterns during this time and one could probably safely assume that there was a greater dependency on store bought foods during this time.

The trochus fishery is open only to licensed participants, but almost all Bardi from One Arm Point collect shells, getting the licensed members of the family to cash them in. Some trochus collection is done with a definite goal in mind and families will pool together the shell they gather over a period of time. When there is a definite need for cash, perhaps to buy a boat or truck, trochus shelling intensifies. The shells, once cleaned, can be stored almost indefinitely and individuals or families with a certain goal in mind will stockpile the shells at home until they have enough to get the lump sum they require. If the shells were cashed in as they were harvested and cleaned the funds would be at risk to the many responsibilities that individuals have within the community. It is almost impossible to hold funds in cash, so the shells can represent a type of savings plan, that is not cashed in until the goal has been reached. This is not to say that the Bardi cannot manage money, as many do hold quite extensive bank accounts. Money in these accounts is also considered safe. Loose cash, or funds that are not definitively earmarked for some purpose, are under the greatest threat of being whittled down.

The Fisheries department of Western Australia cannot realistically supervise or manage the fishery and therefore express some fear of over-harvesting. These fears however, cannot be substantiated and the wide ranging yearly catch rates do not give a good indicator as to the status of the fishery. Other Government and Aboriginal agencies try to encourage a relatively consistent catch rate in order to secure a consistent price and market share. Attempts have also been made to implement processing and value adding projects to be carried out within the

[91] The data I was given by the Bardi Aborigines Association from 1984 to 1994 show yearly fluctuations between 30 to 70 tons.

communities before sending the shells to market. However, these only have limited success. For example, a rough shell may be worth 3-5 dollars , while a polished shell, a process that takes at most 15 min., can fetch anywhere from 25-60 dollars. In this way, the Bardi could potentially curb their exploitation levels in the fishery, while making up for the lost income through value added projects. However, my research indicates that trochus harvesting is in keeping with traditional exploitation patterns and that the Bardi have adapted many of their subsistence activities so that they can be carried out in conjunction with the harvesting of trochus. What is a positive cultural adaptation to the circumstances of colonialism and the need for income, is seen by the various government agencies see as commercially non-viable. They are unable to recognise the Bardi achievement of reconciling their traditional cultural and present material needs, perceiving the inconsistent harvesting of the fishery and the lack of successful value adding initiatives as failures in a commercial sense. The inconsistency in harvesting of trochus may largely be a result of the Bardi restricting heavy trochus harvesting to periods or seasons when the returns from hunting and fishing activities are less appealing. The seasonal variations in resources sought may account for the wide variation in the amounts of trochus harvested from year to year. Longer range studies of the Bardi fishing and trochus harvesting patterns would be needed to come to any real conclusions, but I feel that trochus collecting is not a replacement for subsistence living

but is done in conjunction with it. If trochus collecting and processing were to be carried out in such a way that it restricted subsistence practises, people would either abandon it or push their cultural traditions further into decline. This may explain why many attempts at value added enterprise within the community have failed, as people are reticent to give up what has now become a traditional activity, well integrated with subsistence hunting and fishing. To dramatically change the trochus fishery on a large scale would involve sacrificing many of the traditional subsistence activities. The value added approach and the need for consistent harvesting while making good economic sense cannot take into account the cultural costs, and the subsistence replacement costs, i.e. the costs of replacing the associated nutritional returns from hunting and fishing, even when it is only done in association with trochus harvesting.[92]

The Aborigines at One Arm Point, however, are not the only people collecting trochus, as is evidenced each year by the impounding of a number of Indonesian fishing boats illegally harvesting in the King Sound.

Actually collecting the shells appears to be quite simple, the Bardi simply walk

about the reef in a variety of patterns collecting shells of adequate size and putting them in a bucket or burlap bag. On some reef there are boulders and rock formations and the trochus take shelter around and under these but they can also be found in the more open areas. Much of the reef flat is clear of large rocks and boulders and on these type of reef the Bardi follow various patterns in an effort to cover the reef well. The shells themselves are of a flat grey colour often encrusted with algae or other growths camouflaging them

quite well. Their conical shape and sharp top end are what the collector is watching out for and experience is the key to collecting these. A good trochus harvester can pick out their shape in almost any situation the less experienced only finding those that are extremely obvious it is not uncommon for more experienced collectors to collect twice as many trochus as the less experienced even when going after them on the same patch of reef.[93]

When the hunter has collected too many shell to carry he dumps them in a particular spot usually marked by some outstanding feature and continues to hunt.

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[92] There is some confusion as to the intention of the Fisheries Department in this area. On the one hand they are proposing that the area is currently over-harvested and in need of management control; on the other hand, they are asserting the Bardi cannot consistently return the level of shell needed to ensure proper commercial viability in the market place, perhaps in an attempt to justify that the fishery should be opened to other participants. Are they, in the realm of fisheries management, asserting that the Bardi are over-harvesting and then asserting that, in the commercial realm, they are under-harvesting and not meeting market demand? I would have thought that inconsistent harvesting producing various returns, some years high and some years low, would be perceived as more ecological than a consistently high return. There is a large body of evidence suggesting that quotas are, by and large, defunct as a fisheries management tool as fisheries naturally fluctuate quite widely from year to year, and that to insist on a regulated rate of return in a variable environment is one of the more damaging practises that can be imposed on a fishery (See Acheson and Wilson 1996).

[93] On one occasion Douglas challenged Leo and me to see who could collect the most shell in half an hour. Even though we were two against one Douglas managed o collect over fifty trochus to our fifteen.

One can cover a huge area of reef over several hours searching for trochus and it is exhausting work bending over to collect them and carrying them around. Smart collectors will dump their trochus on higher reef in an area where they can bring the boat in with the tide so that the shell only have to be carried a short distance to the dinghy. Loaded up the shells are brought back to the anchorage at One Arm Point, along the way most fishermen will stop to pick up firewood in anticipation of the job ahead. Most fishermen will try to Once back at One Arm Point the shells are carried up the beach above the high water mark where they are immediately boiled in an old oil drum over a fire. At low tide at Angulumar the main Wiggan family anchorage there is almost 1km of mudflats exposed between the water and the beach so trochus fishermen are careful to bring their trochus laden dinghies into the anchorage at high tide to avoid carrying the heavy load over a great distance. As most shelling activity winds down with the incoming tide, returning to anchorage on the high tide happens naturally, however if they return at low tide they will leave the dinghy on the mudflats and someone will bring it in as they return on the high tide.

The shells have to be cooked alive or else the muscle or snail cannot be extracted properly. After being boiled for 20 min. the shells are dumped out onto a piece of tin roofing flanked by two long tree trunks. Seated behind these facing the pile of shells people pick up the still hot shells holding them with the cone or point into the palm of their hand. The shells are repeatedly struck with their base against the log until the snail and its intestines are knocked out of the shell. This technique requires a great deal of practise and children are never allowed to help. The intestine has to be removed entirely from within the shell or else within a few days they become rank and have to be thrown away. If bags of trochus shell are found to stink the entire bag is rejected. This is a painstaking job, a bag of shells taking from 3 to 6 hours depending on the amount of people helping. The shells once cleaned, are rinsed in clean water then packed in large burlap bags and taken to the central depot for trochus the 'trochus shed' where they are weighed and catalogued . These are then locked in a separate area to be collected and shipped out at a later date.

The cleaning process can be an extremely social event and family and friends will sometimes sit throughout the day talking, cooking, and helping to clean the shell. It is a wonderful opportunity for watching the comings and goings of different Bardi going out on or returning from different expeditions. During the wet season people prefer to clean shell in the early morning starting before 7am to avoid the midday heat.

5.2. The place of the Bardi In The Kimberly Economy Today.

This section will discuss the role that the wider Kimberly economic infrastructure plays in the daily lives of the Bardi and, specifically, how this affects their marine resource use. I was not privileged to and am not at liberty to discuss financial matters that are essentially of a personal nature. The goal of this chapter is to demonstrate how marine resource use is affected by participation in the labour or cash earning market, and to establish to what extent Bardi marine resource use can still be categorised as a subsistence activity. The prevailing attitude among white Australians is that Aborigines are entirely welfare dependent and that subsistence is an illusory concept. It is, therefore, important to establish what part subsistence practises play in today's Aboriginal communities; how subsistence patterns are affected by the cash nexus, be it through participating in the labour or cash earning market, or receiving government support; and to determine to what extent the Bardi are still dependent on their subsistence practises (cf. Altman 1987). This chapter will argue that the key element that determines the character of Bardi market economy participation and use of cash, as in most Aboriginal groups, is a strong anti accumulation ethic. Like Altman I will argue that popular white Australian opinion underestimates the importance of subsistence activities.

It is important to note that these questions were not the focus of my research. My fieldwork was largely ethnographic in its approach to marine resource use and aims primarily to discover Aboriginal systems of resource use through participant observation. Obviously, the wider social context influences the type of strategies employed. As the context has changed, so has fishing behaviour. Through

my time in One Arm Point I have developed an understanding of the wider social situation and the state of the total economy but, as it was not the focus of my research, I cannot comment on the causes and consequences of change except as they have been communicated in the relevant literature. The following then is primarily intended to expand on the context of my findings and to try to establish the importance of the subsistence sector of today's Bardi economy.
(Statistics are taken from Crough and Chrisopherson's book Aboriginal people in the economy of the Kimberly, 1994)

Australian Aboriginal communities today can essentially be characterised as welfare dependent except in the few cases where substantial royalties are paid to certain communities. The structure of this dependence is however quite different from that assumed by most white Australians. Whereas the usual contention is that state governments support Aboriginal communities, the fact is that the Commonwealth government is by far the biggest contributor to Aboriginal communities.

The Commonwealth government of Australia raises the highest revenues of any authority primarily through the collection of income tax. It then pays out to the states and territories, which in turn distribute funds to the local councils through the local Government Grants Commission. The Department of Social Security is one of the only government agencies that relays funds directly from the Commonwealth to the individual. This agency, and not the state governments, is also primarily responsible for support of Aboriginal communities through its support of commissions such as ATSIC (Aboriginal and Torres Strait Island Commission), which in turn sponsor the CDEP (Commonwealth Department of Employment, Education and Training) programs.

The Bardi are located in the Broome shire region of Western Australia, one of the four shire councils in the Kimberly region which hold responsibility for local government. One Arm Point itself and all the Bardi are located in the most Northern tip of the shire of Broome. In addition, there are three ATSIC regional councils in the in the Kimberly, the Bardi are a part of the Kullari or Broome regional council. This region (the Kullari), has the largest government income as well as the largest expenditure in the Kimberly. It also has the largest internally generated income of the region, all of which goes to paying their large expenditure. Half of the funds obtained for the Kullari are spent on wages and allowances.

Both the ATSIC regional council and the Broome shire council have certain responsibilities in relation to Aboriginal affairs but ATSIC is by far the largest contributor and manager of state/Aboriginal affairs, mainly through its contributions in the form of CDEP projects. CDEP is the equivalent of inner-city work/training programs that seek to replace welfare and unemployment benefits with work /learn projects within which unemployed or dependants 'earn' their benefits. In Aboriginal communities, schemes under the auspices of CDEP have largely replaced unemployment benefits and other related welfare programs.

ATSIC also undertakes many of the building and housing projects in Aboriginal communities and employs training schools that pay Aboriginal people in their communities for their 'participation' in *situ* through the CDEP program, creating misleading statistics. Participation in CDEP and ATSIC schemes provide temporary employment and the Aborigine's wages are rated to the level they would be receiving if they were on welfare. These CDEP projects cannot be regarded as resulting in sustainable employment. In effect, there is the illusion that large numbers of Aboriginal people are employed in the community services sector, whereas the majority of positions are in part time manual labour oriented projects. The only truly permanent positions exist in the administration and representation of the various government organisations. The training itself is also illusory as there is little permanent employment in the communities for those trained with the specific skills. Many young Aborigines remain 'employed' by continuously partaking in training schemes for several trades without ever having a permanent position.

Through ATSIC the Commonwealth government spends more in the Kimberly than any other government department or council authority. While the rest of Australia receives unemployment benefits the Aborigines receive funding through ATSIC. Therefore, despite the fact that it is set up specifically to fund Aboriginal programs, ATSIC is in fact spending money on programs and services that any Australian citizen enjoys, such as education and health. ATSIC funding in the Kimberly region plays an essential role in the delivery to Aboriginal people of what would normally be considered local government services providing the same infrastructures that all Australian citizens enjoy. Despite this there is widespread criticism of Aboriginal programs, usually under the misinformed assumption that local taxes pay for Aboriginal services. In fact, the West Australian state government itself spends very little on Aboriginal programs.

5.3. Bardi Households

Today's residence patterns and location of households largely disregard **Buru** and estate membership by default, as all the Bardi are brought together in one of two communities, Lombadina and One Arm Point (see chapter 1 4). However, the location of the different family groups and households within the one Arm Point Community (and previously the Sunday Island Mission) reflect traditional residence patterns and curiously households may even be roughly situated in relation to each relative to the geographical location of their traditional estates. It can be expected that if the out-station movement is successful there will be a return to more traditional residence patterns .

It is difficult to typify the Bardi household. In the One Arm Point community itself houses are owned or rented by specific family heads, and consequently their close kin usually make up the membership. These families are still associated with specific areas though most do not actually reside there. There is a great deal of flexibility in actual household membership. The most stable households appear to be those of Douglas's generation. In this generation there is usually a good number of grandchildren in more or less permanent residence. Today there are many single mothers and most live in and out of their parent's home. Sons tend to move out by the age of eighteen and there are several houses where single young men, usually **bubli**, live together before getting married. Curiously, at One Arm Point there was not a single man's hut or house such as is typical of most Aboriginal communities. Older bachelors, it appears, usually lived with their mothers or sisters. The most permanent households are those of Douglas's generation and these are the main centres of activity. Even in these households residence is highly mobile. A typical house among my informants would contain a main older couple of Douglas's generation, one of their youngest unmarried sons, one or two of their daughters with children, and an unmarried or widowed brother or sister, usually the head's wife's brother. Older single women usually have some of their older grandchildren living with them, generally unmarried grandsons. The more or less permanent residents of any household are always supplemented by individuals who have nowhere else to stay. Any space is usually taken up by such individuals who only leave to make room for visiting friends and family. These visiting friends and family often stay from several days to several weeks, usually departing and leaving behind their adolescent children for extended periods of time. This does not take into account all the more or less semi permanent residents who sleep somewhere else but eat and socialise in and around the house.[94] Houses are situated in proximity to each other and are generally in clusters composed of the different family groups. The divisions between clusters could be a recent occurrence related to the ongoing feuds but are surprisingly concurrent with the traditional residence patterns shown to me at the abandoned mission on Sunday Island.

That the residential patterns at One Arm Point reflect those of the initial centralised settlement on Sunday Island might allow us to assume that today's co-residence and residential organisation are probably a reflection of deeper cultural principles that have their root in a pre established design, perhaps used during Law times when large numbers of Bardi came together.

Any statistics available relating to household income are also questionable. Aboriginal households are much larger than non Aboriginal, usually in the range of 50 to 100% higher with regularly up to 15 permanent residents under one roof. In addition to this, Aboriginal people receive proportionally low incomes, even if they are permanently employed. Whereas only 20% of the West Australia's non Aboriginal population are in the 0 to $8000 per year income range, over 48% of the Aboriginal population are. If we consider the larger household sizes of Aboriginal families and the higher costs of living incurred from living in remote communities

[94] One can see how difficult it would be to establish the income of any household at any single point in time or to measure the dietary intake of members of any one household.

(higher costs for basic food items, [95] transportation, and communication), one can see that if approximately half the Aboriginal households at One Arm Point are earning less than $8000 per year, and they are at least twice the average size of other households, subsisting on their cash earnings and provisions bought through the store would not be adequate. The subsistence economy therefore can be understood to be a crucial part of the life of the Bardi, not some luxury or sentimental attachment to old ways, but providing a real, important, nutritional contribution in a community where the average household income is not likely to provide the necessary nutrition from store bought foods.

5.4. The store

The store and Bardi subsistence work in conjunction to provide the nutrition required by the community. I found that for some food items the sales in the community store follow roughly the same seasonal patterns as Bardi fishing and hunting activities but in an inverse relationship. Tentative comparisons of my data on fishing seasonality put together during my fieldwork periods, and store sales, specifically sales and orders for meat, show a strong correlation between hunting/fishing season and purchases of meat. During dugong and married turtle season meat sales drop off dramatically and Horst, the store manager, only reorders meat every three to five weeks as opposed to on the normal weekly or fortnightly basis. [96]

In addition, the sales of meat from the community store show a definite increase during periods where CDEP projects are employing most of the men, indicating that when traditional subsistence activities are curtailed there is an increase in the sale of store bought foods, specifically meat. During these periods the collection and sales of trochus also fall off dramatically as in 1984 (see above). There is some indication in store records that a greater amount of meat was

[95] The average price of the Market basket in the Kimberly is 65% higher than in Perth costing an extra $163 per fortnight. At One Arm point Specifically the market basket cost is $410 per fortnight or $10,681 per year.

[96] In fact, based on my discovery of this association the store manager has decided to adjust his purchase orders of meat accordingly during certain months to avoid wastage in both haulage and in an effort to keep fresher stock.

consumed in 1984. Presumably as trochus harvesting dropped off in lieu of paid employment, people no longer had the opportunity to adventitiously or deliberately supplement their diet through subsistence activities and were forced to purchase meat from the store.

5.5. Income from welfare and work

The Bardi enjoy a wide range of benefits from the a variety of sources including pensions, child allowance, disability, etc. It can be assumed that any household has some access to cash income; the two most common and regular being pensions and family allowance. Some of the Bardi are permanently employed in administrative or assisting positions which also provide regular income. As explained, CDEP pays out wages in lieu of unemployment or social security benefits and this employs the largest number of Bardi men though somewhat sporadically. The Bardi also supplement their income through the collection and sale of trochus shell.

In One Arm Point many, if not most, of the younger men are 'employed' or receive their benefits under the auspices of a variety of CDEP programs that come and go. The payments or wages themselves, however, appear to continue even when no specific projects are underway or when they choose not to work or only work sporadically, simultaneously partaking in the regular daily fishing/hunting expeditions. Therefore, most men even when 'employed' are usually free to partake in regular fishing expeditions. This does not imply that all do take part, only that they are free to do so. In many cases, lack of participation in such outings has nothing to do with employment commitments. Some simply show more interest than others. Individuals such as Gounie and Jabby Wiggan only ever work when there is a big push community- wide for involvement in a new community project, usually preferring to fish and receive whatever financial support they need from relatives who have regular incomes. A good percentage of young men do nothing at all, whereas most tend to mix both work and fishing. It is difficult to establish how regularly other family groups go fishing but it seems as if at least one associated member of each household goes fishing on a regular basis.

The effects of large scale projects on daily activity can nevertheless be quite profound, especially during the initial stages when the incoming project co-ordinators are full of enthusiasm and motivation. The younger men will spend four to eight hours a day working on such projects. During my initial fieldwork period the construction of earth beaten houses had been proposed and commenced soon after I left. Apparently, at the outset of the project only the older men were fishing on a regular basis, all the younger ones being at work. However, by the time I returned in September1996 for my second fieldwork period, setbacks on all sides had occurred and the pace of work had slowed down so that all the fishermen I was familiar with were back on the water.

As pointed out in the section on Trochus there appears to be a correlation between trochus collection and the need for cash. It is, therefore, not unlikely that there is an association between the availability of revenue from other sources and trochus collection. In the records for trochus revenues in 1984 there is a strong drop in collection which was apparently due to the running of a CDEP building project that employed most of the men for a few months.[97] It seems to support the idea that trochus collection is largely carried out in order to procure cash as the Bardi, when gainfully employed and/or paid, tend to lose the motivation for trochus collection, though this may simply be a function of a lack of time. The latter is more likely as once money is obtained participants in CDEP projects lose interest and return to more traditional pursuits including trochus collection. It must be added that there are certain administrative pressures that encourage young men to take up work when offered lest they and the community as a whole lose other benefits.

As pointed out, there are regular sources of income that most households will have some access to. This is why men of Douglas's generation aged 50 and over do not work, getting the money they need from their pensions and spending most of their days engaged in subsistence related activities. Trochus fishing is predominantly carried out by this generation but the focus of such money making is

[97] It would have been interesting to measure the amount of traditional fishing activity during this time. I have been told that it decreased quite substantially.

usually for larger capital investments such as boats, engines or trucks, or in some cases flights related to hospital visits or funerals.

The fishery at OAP was extremely active especially among my informants, as most were from the older generation mentioned above.

As explained in section 5.1 trochus shelling is an important source of cash for the Bardi and can be seen as the perfect compromise between traditional subsistence practise and the need for cash. Trochus collection is obviously the preferred employment for generating cash largely because it does not depart too dramatically from traditional Bardi lifestyle. Overall cash use can be characterised as in keeping with the traditional Bardi ethos as applied in the realm of subsistence. This seems to be true of all Australian groups and is perhaps one of the most important insights achieved by economic anthropologists in Australia.

5.6. The interdependence of the Bardi and the wider monetary economy.

> *'The feature of economic activity in areas like the Kimberly region is the limited income-producing base and the restricted range of industries. Much of the Economic activity in the region is based on the provision of services to the local population.' (Crough 1993: 61)*

Participation in European economies by Australian Aborigines as producers is usually associated with the creation for sale of traditional arts and crafts. The Bardi participate in this economy only minimally and haphazardly. The only apparent productive activity that the Bardi take part in is the collection, cleaning, and resale of trochus shells on the international market (see section 5.1). Apart from this the Bardi appear to produce nothing in the way of marketable commodities. This lack of western economic production should not mislead one into assuming that the Bardi do not contribute to the wider economy. On the whole, the question of Aboriginal economic participation ignores the contribution the Bardi have made and continue to make to the economy as the original inhabitants of the area. N.G. Butlin (Butlin 1993), takes the novel view that the colonisation of Australia resulted in a net transfer of wealth from the original inhabitants to the white settlers. The original inhabitants not only possessed but were largely responsible for the imputed European value of much of Australia's resources which were assumed by the incoming colonists . This opinion makes the Bardi the longest standing participants of the European Kimberly economy and arguably its most productive in that they managed and vastly improved their environment. Aside from such arguments Bardi Aborigines, like most other Aborigines, played an important role in the establishment and maintenance of economic ventures in their regions. In some cases the Bardi are fundamentally responsible for the successes of many of today's profitable establishments. e.g. the pearling economy of the Kimberly.

The development of the Kimberly region has largely taken place on the back of the funding of Aboriginal and pastoral communities. This funding is one of the main sources of income for the wider white economy. Kimberly communities or towns have largely expanded and grown with the expansion of government funding of Aboriginal communities.

> *'It is arguable that the Aboriginal population of the Kimberly region can be regarded as the stable long-term demographic and economic base of the region. The Aboriginal population of the region can attract, and is attracting, substantial financial resources from the rest of Australia, particularly in the form of grants from ATSIC and social security payments. There are few other economic activities that can bring into the region this amount of income. Not only is the income brought into the region as a result of the Aboriginal population, the spending circulates in the region for a considerable period of time, providing employment in a range of businesses. Many of these businesses pay rates to the shire councils, funding the delivery of a higher range and quality of services in the region. While..., some of the government spending is in the form of social security payments a large amount of spending provides basic services and infrastructure to many Aboriginal people. <u>If Aboriginal people in the Kimberly region can be classified as welfare dependent, then much of the rest of the population will also have to be similarly described.</u> Despite this Aboriginal people are continually being blamed for undermining economic development, and for being welfare dependent. In fact a significant proportion of the people living in the Kimberly region are heavily dependent for their livelihood and standard of living on spending by the Aboriginal population and Aboriginal organisations.'(Crough 1993: 225)*

The wider European local economy of the Kimberly region is also highly dependent on direct government support and specifically dependent on the support which is provided to the indigenous Aboriginal population. The growth of the regional economy can in large part be attributed to the creation of infrastructure providing goods and services to the various Aboriginal populations, and the subsidies awarded to the residents with which they purchase European goods and support local businesses. This pattern of monetary flow through Aboriginal hands is not new and could be said to be the predominant pattern ever since Aborigines were taken into the market economy. Mary Durack (1969), shows that this has been the determining pattern since the mid 50's when Aborigines became wage earners for the first time under the charge of pastoral stations and ranchers. '*Station stores had become virtual shopping centres in which money paid out in wages at one counter were spent at another.*' (Durack 1969: 327)

Without these sources of funding and income the impetus for growth in the region as a whole would have been limited to the traditional industries of the Kimberly: pearl farming and mining, both of which can, and do, function relatively independently of the region as a whole. The whole of the Kimberly economy is essentially artificial, apart from these highly focused mining and pearling ventures. Even the success of the latter was highly dependent on local Aboriginal knowledge and labour, carrying out their activities on lands and seas leased from the Aborigines in their various countries or reserves, such as the Paspailly pearl farm at Cygnet Bay.

The growth of tourism in the region has expanded and is probably, aside from mining and pearling, one of the only self supporting industries yet it is dependent on the larger infrastructure that a reasonable community size brings. This increase in tourism is commensurate with the establishment of the infrastructure mentioned above and is generated, as for much of Australia, by interest in the overriding myth of the Australian Aboriginal.

The Bardi community at One Arm Point functions within the larger economic framework of the Kimberly region, almost totally dependent on outside funding for support. This leads many people to conclude that the Aborigines themselves are totally dependent on government support, the source of a great amount of criticism from the European community, many feeling that such dependence invalidates their present way of life. It is true that the Bardi are highly dependent on external funding, to enable them to buy European commodities, but this ignores the high level of subsistence independence that many Bardi retain. This dependence on government or outside sources of funding is largely based on a dependence on the trappings of western culture that have in part been forced onto the Aborigines from the outside. There is much evidence of Australian Aboriginal interaction with other cultures and early interaction with Europeans that indicates that they were largely uninterested in the material trappings of other cultures evidenced in the non adoption of many modes of technology. This suggests that the westernisation of Aboriginal culture was initially forced upon them from the outside, and cannot be characterised as change emanating from within their own culture, reflecting a deeper change in value systems. It is in keeping culturally that the maintenance of this European way of life is still the responsibility of the imposing culture. Most Aborigines today would prefer to be economically self sufficient. This does not necessarily mean that they wish to engage in western style market capitalism (though some do) but simply that they would like to have control over their access to the discretionary income they need to maintain the present standards of living they have become accustomed to. The welfare state itself is seen as an intrusion by Aboriginal people; another tool of the colonial government to control their lives.

> *'The old system of colonialism centred on the pastoral industry and church missions has been replaced by a new type of government welfare colonialism. This bureaucratic maze now forms the basis of the Kimberly economy. It supports a large rotating population of non-Aboriginal people who owe their employment and economic livelihood to the impoverishment of Aboriginal people who make up the overwhelming majority of the region's permanent population.' (Kimberly Aboriginal Law and Culture Centre 1996: 49)*

Most of the income and spending on Aborigines could be seen as providing them with a range of goods and services that are unnecessary in traditional subsistence living.

The question of their contribution to the economy of the Kimberly and their dependence on government funding becomes moot, however, when one reviews the actual economic situation of the Kimberley generally. The economic situation of the Bardi is no different to that of the many farmers, ranchers, and pastoralists in the Kimberly region who are also highly funded by the Australian Government. While 15% of the WA. Budget for the Department of Agriculture were spent in the Kimberly area only 1.5% of the state's agricultural production comes from the Kimberly area. In this light it seems hypocritical that taxpayer support of Aboriginal ventures and community are commonly characterised as useless ventures.

Aboriginal communities in the region maintain and nurture a way of life that functions in accordance with traditional patterns that are largely separate from the imposed European economic system. They maintain a traditional subsistence ethic that provides them with nutrition without participation in western markets. This attachment to a subsistence ethic is not only important culturally but provides them with a nutritional standard that could not be achieved through an attachment to the welfare state and participation in the market economy alone. The subsistence ethic is a reflection of deeper cultural values that are opposed to the behaviour patterns necessary for success in a western economic sense. The procurement strategies themselves are governed by this ethic and as a result preclude participation in the market economy as they do not result in the kind of exploitation that produces the surpluses necessary for market participation. In this sense the Bardi ,while obviously dependent on outside support, can be seen to be actively maintaining their independence. This supports part of my hypothesis which asserts that active, purposeful, goal oriented management is taking place. With all the knowledge and skills that I have demonstrated the Bardi possess in relation to their marine environment, participation in the market economy in this sphere would be easy. It then becomes obvious that other considerations are competing with the overwhelming push for participation in the market economy. Where the Bardi do receive cash either through participation in the market (the trochus industry, employment), or through government subsidies (pensions, family allocations), the results are in keeping with traditional ethics (see trochus section 5.1). This tendency is expertly demonstrated by the work of John Altman who looked specifically at this problem among the Gunwinggu of Arnhem Land. He determines that cash is distributed along the same lines as subsistence produce, that effectively - '*the anti-surplus forces evidenced in the subsistence sector have been transposed to the cash nexus.*'(Altman 1987:172), answering emphatically his initial question; '*If it can be demonstrated that sharing patterns in the non-cash nexus are transposed to the cash nexus, then egalitarianism can be shown to be independent of the social product (perishable food). It would then be cultural, rather than economic factors that result in the lack of household or individual material accumulation. Such a finding would counter economic determinist explanations for lack of accumulation in hunter-gatherer societies.*' (Altman 1987:153).

Altman's finding demonstrates that it is crucial to our scientific understanding of Aboriginal systems that our analysis looks beyond the constraints of our own value systems, specifically our economic values, in order to try to grasp the alien ethical nature of Aboriginal value systems. [98]

It is obvious that the costs of community living are not in proportion with incomes, which implies that sources of nutrition available through traditional subsistence activities are of great importance. There is also evidence of the seasonality of hunting and fishing practise affecting the consumption patterns of store bought foods. The sales of goods bought at the store vary with the seasons, demonstrating the impact and importance of subsistence pursuits. The need for cash could outweigh the benefits accrued from fishing, but the establishment of the trochus fishery allows both to take place simultaneously. Where the Bardi have an income the use of revenues is mediated by rules transposed from the subsistence sector, negating the imputed economic rationale assumed to govern the use of money.

[98] It is important to note however that it is through the use of traditional economic systems analyses that Altman was able to demonstrate categorically that Aboriginal culture functions on different ethical foundations than our own.

6. Daily Hunting and Fishing Expeditions

6.1. Introduction.

This section will attempt to test some of the information already elaborated against recorded procurement of specific species. I will therefore be going through each of the individual groups of species as outlined in chapters 2,3, and 4, in the context of their exploitation during the two periods of fieldwork to test if actual practise reflects fishing patterns proposed in chapter 4.

This chapter deals exclusively with data of fishing expeditions in which I was an active participant. As elaborated in the introduction to this thesis I feel that it is only through active participation in hunting and fishing that one can come to understand and become qualified to comment on Bardi hunting and fishing strategies. I have chosen to present in detail data I collected on daily hunting and fishing expeditions I took part in from January 1st 1995 to April 30th 1995 as I was hunting and fishing almost exclusively with Douglas, his son Jabby and nephew Gounie. These data refer then to the actions of three fishermen in the same family over a four month time period during which I partook in almost every fishing expedition that Douglas, Jabby and Gounie engaged in. While I have data for the months of field work preceding and following this time, data from this period are the most consistent and are unlimited in their depth. I know where, when, and how, each individual fish or animal in each data field was procured and processed. It is largely during this period that I began to understand Bardi hunting and fishing strategies and is the basis by which I was accepted as an adopted member of the Wiggan family and made privilege to the deeper rationales governing resource use and the general ethos toward not only resource use but cultural life as a whole.

These data are not meant to prove anything statistically but simply to demonstrate what and if any patterns of resource use are apparent. The data period covers three Bardi seasons; **Mangal, Ngaldany**, and **Iralbu** [99] (outlined in chapter 3.1), which should imply changes in fishing and hunting patterns from season to season if the Bardi are selecting for fish that are fat during certain seasons. If these data indicate that Bardi fishermen are following these particular seasonal shifts and adjusting their exploitation accordingly then it can be argued that they are selecting for fish fatness and against spawning among certain fish.

These data are listed in the appendix under table 2 and list all the fish caught by day and their numbers. These data have been analysed for each species and are presented here in the form of bar graphs. Data fields have been split into three columns according to the estimated beginning and end of the three Bardi seasons the data period covers. Each column displays a bar with the total number caught of the particular species in that season. The height of the column itself represents the percentage of each particular fish caught in that season, this percentage displayed on the y axis. In this way it is easy to visualise the differences in procurement over the three seasons. Again, these data are only meant to represent the presence or absence of fishing activity for specific species so that we can assess Bardi fishing patterns in the context of daily catch details. Each species section then elaborates further on the species in question with regards to how and when it was caught during the data period. See Table 4 for details of each species caught during the observation period.

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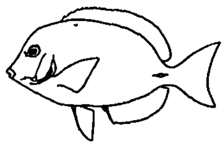
[99] Due to the extremely short wet season in 1995 many of the seasonal shifts started earlier than normal upsetting what might be expected for each of the seasons as they are predicted, and consequently the hunting of fat fish began earlier than might be predicted. However, while **Iralbu** is traditionally not the focus of fishing for fat fish it is within our expectations that fish are getting fat as it is the season during which the weather begins to cool so that by the time Bargaña begins fish that get fat seasonally have become fat. As explained the Bardi follow environmental cues for the seasons and so dates for their onset and end can only be approximations. In addition the seasonal maps put together by Smith & Kalotas (1985), Kenneally et. al. (1996), and the One Arm Point School show various discrepancies between them in establishing where seasons begin and end. The particular data period was chosen despite the fact that it appears as if fish are getting fat in the middle as opposed to at the end of Iralbu. The data is really only trying to demonstrate that fish are procured when they are fat and the data period has largely been chosen to demonstrate the absence and then the presence of fishing activity of certain species. This early seasonal shift might account for the small number of dugong in the King Sound in 1995.

6.2. Daily Catch Details For Fish

6.2.1. Catch details for Gambal and Barbal, surgeon fish and spinefeet.

6.2.1.a. Gambal, Surgeon fish



As we know **Gambal** are one of the fish species that are considered to be fat all year, and so consequently should be hunted all year and therefore be numerically highly represented throughout the data collection period.

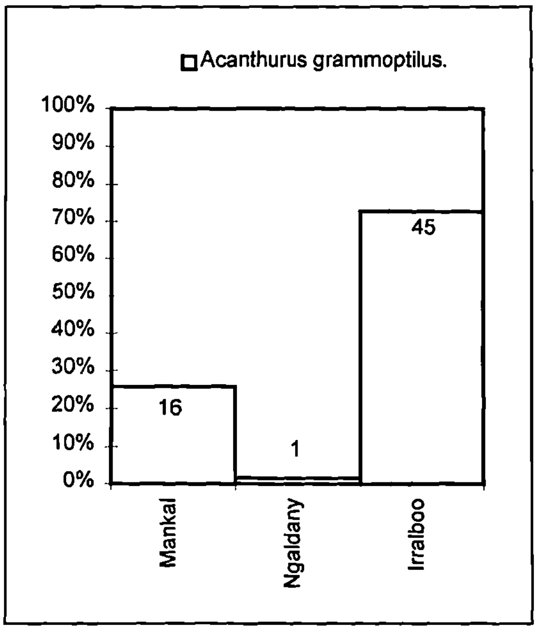


Figure 36 Gambal

As one can see from the charts **Gambal** constitute one of the largest totals of any single species caught, (62 in the three month data period) and were caught and consumed throughout the data period (and throughout both fieldwork periods).

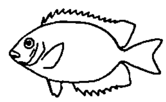
Gambal were historically and still are often the focus of the daily fishing expeditions, but the predominate fishing technique has changed dramatically.

Historically **Gambal** were caught by herding, fish poisoning, and with light throwing spears in small pools while reefing, whereas today they are primarily caught with spear guns. Gambal are caught if possible whenever they are seen (see Douglas chasing these as we returned over the reef 1st day) and hunters will not miss opportunities to procure them should they present themselves. In the daily collections of resources one often finds single Gambal included in the assemblages. (see Table 4 Jan 7th and 8th) In addition they were often sought prior to mid-day breaks taken on full day expeditions and if any had been caught they were almost always all consumed (see chapter 7.3). **Gambal** are still occasionally caught through fish poisoning and are in fact the primary goal of the fish poisoning technique and yet despite its usually dramatic results it is not carried out very often today. I observed it only five times during the fieldwork period and it occurred only when motivated by the older fishermen (see Figure 31).The use of spear guns, while perhaps not as dramatically efficient as fish poisoning nonetheless, provides many more opportunities for their exploitation than historically, especially at high tide, perhaps lowering the impetus for exploiting these on the specific tides that create the right environment for trapping or fish poisoning. It is possible that the combination of trapping and fish poisoning resulted in a greater number of these fish being procured in the past than today, especially when we recall that they are considered good to eat all year round. Although today's methods have less dramatic procurement results in numbers caught per fishing session, they do however allow the fisherman to exploit a wider set circumstances vis a vis states of the tide. Fishermen can go spear fishing independently whereas older techniques of trapping and poisoning required certain specific tides and in the case of fish trapping a good degree of co-operation. Again the breakdown of traditional knowledge systems and the establishment of new ones leads to the loss not only of direct knowledge of particular fishing techniques but the associated knowledge needed to make these successful, such as an understanding of the states of the tide, particular fish behaviour, etc..

Gambal are represented in the Bardi Law and have a status of sacred fish in certain contexts making them subject to certain specific rules and regulations. This also affects how these are procured and processed. The rules themselves pertain mainly to younger women, and boys at certain stages of the Law.[100] This law, known as

[100] These were extremely difficult to elucidate as the fish is primarily handled by those who are free to consume it. Questions as to the status of the fish in the context of Law are not relevant to them and questions and discussion usually focus on how wonderful it tastes and how to capture it. In addition the Law has changed since they returned to the mainland and many of the rules and regulations relating to resource prohibitions are not as strict. I have done my best to pull together what these restrictions were and how they operated in the context of the Law. As this is relevant to several species I am going to include it following the elaboration of this section on the species and expeditions. Many of these rules and rituals appear to have been dropped but as these were relevant to my understanding of Bardi resource use it was necessary to investigate how the Lawhad previously been carried out on Sunday Island.

Ouloulooung, is central to the understanding of the Bardi system of resource allocation and is described fully in chapter 7. As one can see **Gambal** are procured throughout the three seasonal periods.



6.2.1.b. Barbal

Barbal are considered only to be fat when the dry season began their season running from April until October, starting during **Iralbu** and ending in **Jalalay**. They were caught exclusively during these months despite seeing them in large numbers during expeditions prior to this time. Prior to the onset of **Iralbu** they were never procured except by myself on the fourth of March which technically falls within the seasonal time frame of **Iralbu** but precedes by almost 1 month the actual expeditions for their capture. When I arrived in the community in October of 1995 I did not observe anyone catching or consuming these fish, whereas in September of 1996 we were exploiting them in good quantities. At this time I was frequently told that September was the end of their season.

Older fishermen suggested that although the season for **Barbal** was long it historically was focused on certain tides at specific sites where the fish could be herded and exploited in large numbers. Groups or families would move to these areas several days in advance in preparation for the tides, exploiting the same sites year after year.

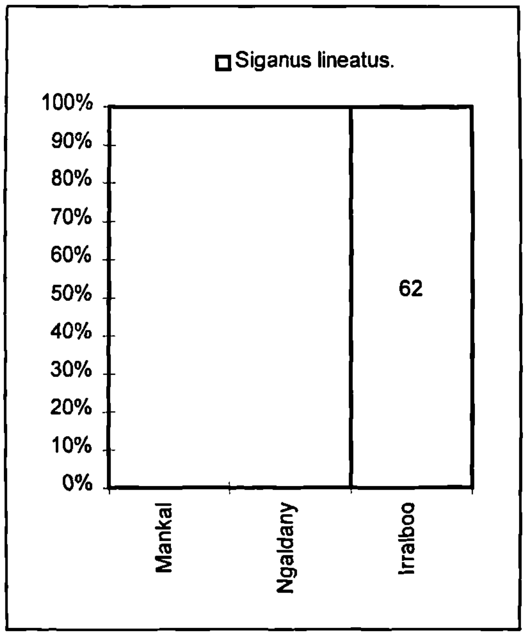


Figure 37. Barbal

During my fieldwork the only method used to capture **Barbal** was hunting them with spear guns around rocky sand shores, boulders on the reef, and submerged mangroves. Once their season started they were quite often the primary focus of the daily expeditions, and if they weren't, their hunting was usually incorporated in some way as we waited for the tide or on the way home. While living on the island camps (**ungalgun**) **Barbal** were hunted every day in and around the rocky shore, before, between, and after the daily expeditions. These short forays accounted in large part for the food consumed throughout the day.

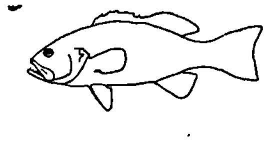
I never saw these fish being trapped and it was never suggested as a possibility, though on two occasions Gounie exploited their 'Law' and herded a large school into one corner of a large deep pool, keeping them there by floating a spear across the surface of the water in front of them while Jabby and Jerum speared them from above with light throwing spears.

Barbal, unlike **Gambal,** have no restrictions on their consumption. People often crave these fish. Women and young boys often expressed a distaste for **Gambal** and their preference for **Barbal** simultaneously. As the restrictions on **Gambal** apply to young men and women this is an interesting association. It seems likely that the **Barbal** are considered to be a safe alternative to the culturally loaded and sought after **Gambal**.

Barbal do not stay on the reef when the tide drops and so cannot be speared or poisoned in reef pools left at low tide. Though both fish can be trapped through herding they were never trapped together as they require quite different if not opposing techniques making it unlikely that traditionally these fish were exploited simultaneously. Today, however, expeditions for fish largely depend on spear guns and in the contexts suitable to using spear guns both **Barbal** and **Gambal** are present together. The two species crossover similar habitats and can be hunted simultaneously. Despite this change in fishing technique from trapping to spear guns there is not a corresponding change in the seasonality of capture of this fish.[101] As one can see from Figure 37 there is still a marked seasonality in Barbal's exploitation. This tell us that the selection for and against **Barbal** during specific seasons is deliberate.

[101] One could interpret the change in technique by the young as a fundamental change in values, and yet the traditional seasonal fishing patterns remain. This shows that values do not change as a direct consequence of changes in technology but are due to the changes new technology has wrought in the traditional learning process. One can see here that despite a change in technology and technique there still remains a deeper system or ethos at work that controls when these are applied.

6.3. Daily Catch Details for Groupers, *Serranidae*



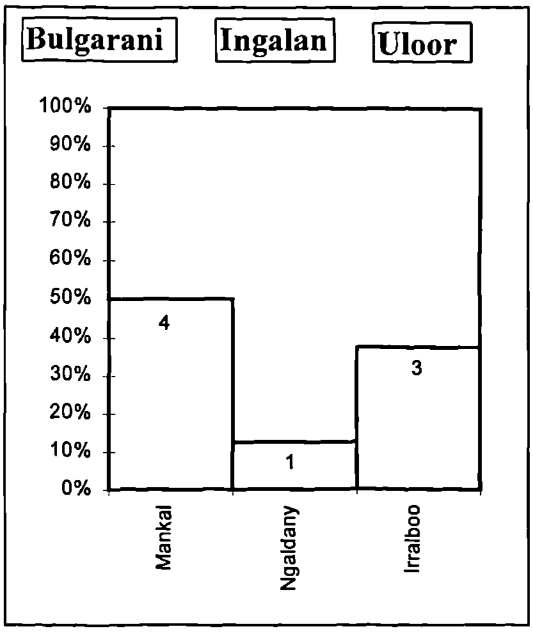


Figure 38. Serranidae Group

The fish of family Serranidae are always highly prized when caught regardless of season as they are considered good eating. While some are considered to be fat all year others such as the **Bidip** and **Bindarral**, are felt to have more taste or fat during the cold water seasons beginning at the end of **Iralbu** and are hunted more vigorously during this time. As explained the spawning patterns of the majority of *Serranidae* are less regimented by season, some spawning year round others only at very specific water temperatures, meaning that their spawning season is very short when compared to that of other species. Consequently *Serranidae* on the whole are not as depleted of fats as others and do not display the marked seasonality of fat retention and loss seen in other species. Large numbers are rarely caught. These fish rarely school and tend to be solitary hiding during the day, making them difficult to procure. Expeditions cannot make them their primary goal. During the daily expeditions they were seen as an extra, to be caught if the opportunity presented itself. This is evidenced by the relatively small numbers of these fish caught during the data collection period. Seasonality of procurement would not then be expected and these data appear to support this for all species (see Figure 38) except **Bidip** and **Bulgarani. Bidip** shows some increase at the onset of **Iralbu**.

Epinephelus malabaricus, or **Bidip** (see Figure 41) are taken throughout the year but actively sought on certain tides during the cold water time, beginning in the middle of **Iralbu** in April. Four of the six **Bidip** caught in the first month of **Iralbu** were procured by Jesse Wiggan line fishing at night on high spring tides in the mangroves at **Angulumar** using trochus meat as bait. Though this technique could be used throughout the year I only observed it being used during this time probably as the main fish sought during these outings are the **Maran** which only begin to get fat in **Iralbu**.

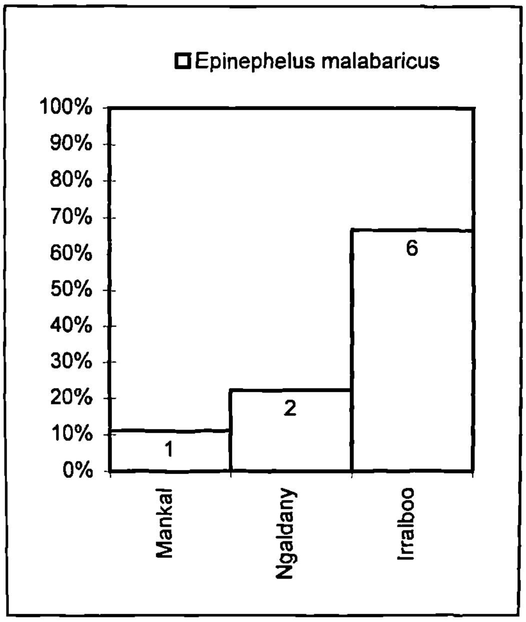


Figure 41. Bidip

Traditionally, Serranidae may have been a part of the focus of fish poisoning expeditions which could have procured significant numbers of these. Today however fish poisoning is rarely carried out. Nonetheless 2 of the **Inglan** and both **Bulgarani** were procured as a result of the two fish poisoning expeditions carried out during the data collection time period.

The rest of the Serranidae were procured either line fishing off the reef edge, with light throwing spears at low tide from under dead tree trunks in the creek at **Juon** or in crevices on the exposed reef flat, and while fishing with spear guns at high tide in the mangroves (See 4.1 1c and 4.2)

All of these are understood to be old peoples fish and are usually set aside and brought back specifically for them (see7.4 4).

Plectropomus Leopardus, coral trout, is the only species in this group known to spawn seasonally showing definite fat depletion during spawning and consequently are not caught until **Iralbu** after their spawning season (see. Figure 42). In September of 1996 these were caught in more significant numbers. Though the number is insignificant their absence is not, as it indicates again that fishermen are selecting for fish fatness and against spawning fish.

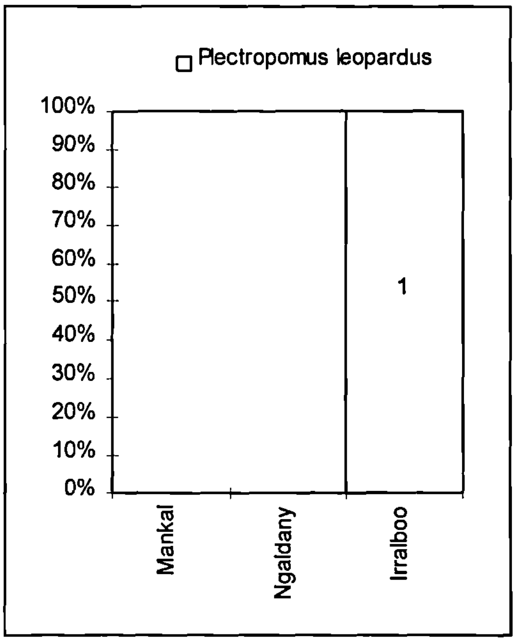


Figure 42, Bindarral - Coral Trout

6.4. Daily Catch Details for Snappers Sweetlips and Emperors.

6.4.1. Snappers, *Lutjanidae.*

6.4.1.a. Maran, Mangrove Jack

Maran (see Figure 43) begin to put on fat at the end of the summer usually at the onset of Iralbu, but their flesh recovers from spawning some time before actual fat deposits begin to be made and it is at this time that many of the Bardi prefer these fish, especially the women.

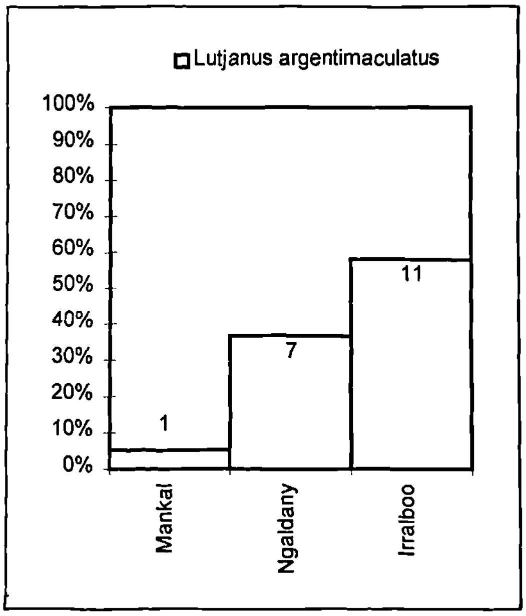


Figure 43. Maran

Of the 19 **Maran** caught during the data period five were caught by myself. I caught the Maran caught in Mangal when Douglas left me spearing fish as he hunted for stingray or **Iawing** at **Aul** pool. That seven were caught in **Ngaldany** was uncharacteristic but due to the short wet season, fish were felt to be recovering and putting fat on sooner. The 11 caught in **Iralbu** were all displaying overflowing fat deposits and some of the Bardi women expressed disappointment at not having caught more of these earlier when they were less fat. Prior to Christmas none of these fish were caught and it is safe to assume that none would have been caught until the end of the summer during **Ngaldany** if I had not caught one in **Mangal.** All but 6 of these were caught with spear guns in the mangroves at high tide, four were caught by Douglas with a light throwing spear in the tidal pools left in the mangroves at low tide adjacent to **Aul** pool and two by Jesse Wiggan line fishing at night at **Angulumar** with trochus meat. Later in **Iralbu** intensification of hunting **Maran** increased, on one night in April, Jesse Wiggan and her Daughter Carol caught 12 at **Angulumar** line fishing as above(6.3). This technique of line fishing was only used when the species targeted were thought to be getting their fat.

6.4.1.b. Julu, Stripy sea perch

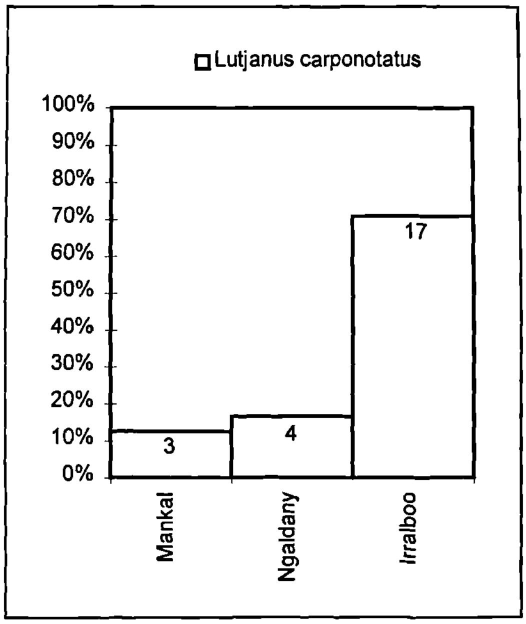
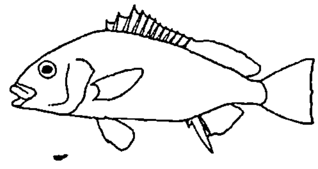


Figure 44. Julu

Julu (see Figure 44)were seldom associated with expeditions until they came into season(March/April). Though they were caught on hand lines prior to this by women and children, the majority were used as bait to continue line fishing. This largely accounts for their capture in **Mangal** and **Ngaldany**. In **Iralbu** we began spearing these in earnest usually with spear guns on the submerged reef flat around rocky shores or boulders at the back of the predominant current while spearing **Barbal** or **Gambal**. While they were never the main goal of expeditions they were understood to be associated with certain activities and were a part of the expected outcome of the day. **Julu** were often brought back to One Arm Point as they kept well and could last through the day. In **Iralbu** we can see a marked increase in the numbers caught at which point they were deliberately procured, whereas in similar circumstances prior to this time they were largely ignored. Therefore it could be said that where selective procurement techniques are being used one sees in the procured resource assemblages a greater adherence to the ascribed season for that species. This has important implications with regards to changes in technique which tend to move from more to less selective techniques.

Only one **Inilir**, *Lutjanus Russelli*, was caught, this in **Iralbu**, (see Table 6).

6.4.2. Sweetlips , Mardal



These data for sweetlips are less easy to analyse because sweetlips were in large part procured by myself. As I have described the Bardi tend to cater to the desires of white people whenever they take them fishing and consequently tend to fish the way they perceive white people to fish, which for the most part means trying to catch the largest fish. As one can already see the size of fish seems to be of little consequence to the choices made by the Bardi when fishing, where the most caught and sought after fish are among the smallest, specifically Barbal and Gambal. For the most part I followed and copied what other fishermen did but I cannot deny that when taking part in initial expeditions before understanding the rationale that the Bardi were following in my quest to be accepted and be useful to them I worked under the assumption that bigger was better, and would occasionally spear large fish as they came by (see Figure 45). Mardal are one of the bigger fish encountered regularly when spear fishing. The smallest sweetlip is actually larger than the average surgeonfish and approximately the same size as the Mangrove Jack. They resemble the Bermuda grey snapper, a delicacy in my home, so I eagerly procured these when encountered. Diplomatic as they were the Bardi did not correct my actions yet it soon became apparent to me that it was not because of my superior fishing skills that I was the only one catching these large fish but because the Bardi fishermen were ignoring them. Once I came to understand this and asked and followed directions as to what to catch and caught what I was told to catch exclusively Bardi and specifically older Bardi women would see me and ask me to bring them back specific fish, my adopted family often telling Aboriginal visitors that I hunted and fished like a Bardi man. This difference or change in my behaviour was a gradual one and it was only in September of 1996 when I went

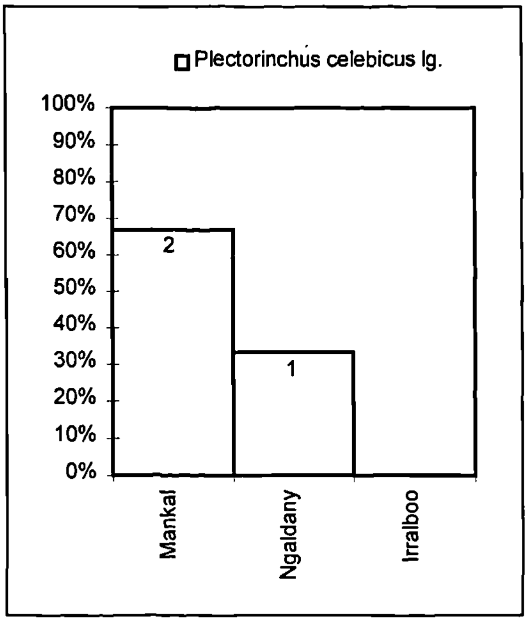


Figure 45. Large Mardal

along on two expeditions where Bardi took other white people fishing that I struck by how much they changed their normal routine to cater to the expectations of their guests and how different the Aboriginal ethos toward fishing was than the one I had arrived with. Therefore these data for sweetlips are skewed by my actions. The Bardi did not actually begin procuring these until the end of **Iralbu** and even then not in large quantities as sweetlips technically do not get fat until mid may early June. Again the early onset of the dry may have pushed the exploitation of them forward. While these data do little to demonstrate the seasonality of Bardi fishing practise toward this species I feel it is a good vehicle for exemplifying the difficulties of collecting data even when taking a participatory approach. It was however always useful to catch fish on which I had little information as immediately there would be an outpouring of information. Almost all of the **Mardal** caught in **Iralbu** were caught after April the 10th (see Table 4) At this point they were considered to be putting on fat and were caught regularly by the Bardi fishermen.

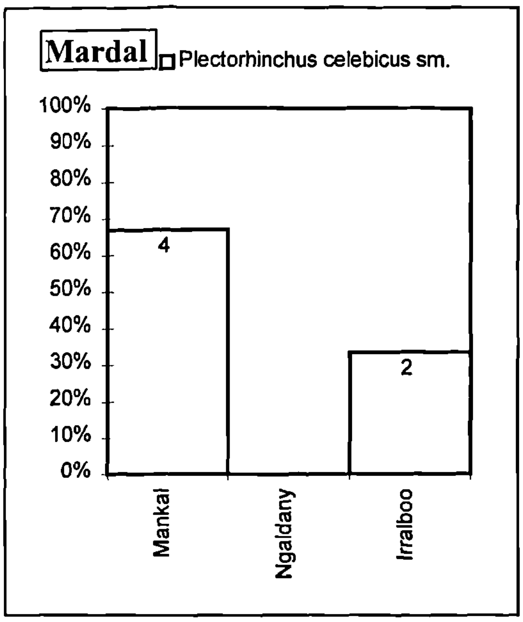


Figure 46. Small Mardal

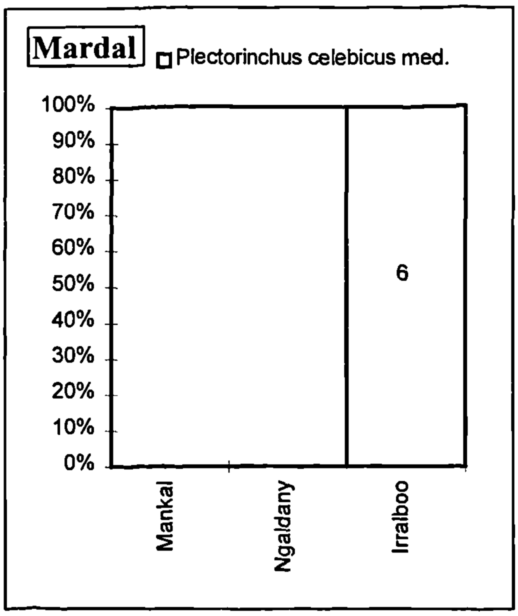
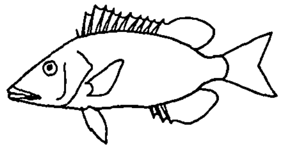


Figure 47. Medium Mardal



6.4.3. Emperors, *Lethrinidae*

Of the emperors, only the **Irarring,** *Lethrinus laticaudiso***,** were procured, both with fishing line. They were immediately used for bait to continue fishing.

Gulurr or yellowfin bream, *Acanthopagrus latus*, were only caught in **Iralbu** in association with **Gambal** or **Barbal** when using spear guns, this follows expected behaviour as these, though always present, get fat with **Barbal.**

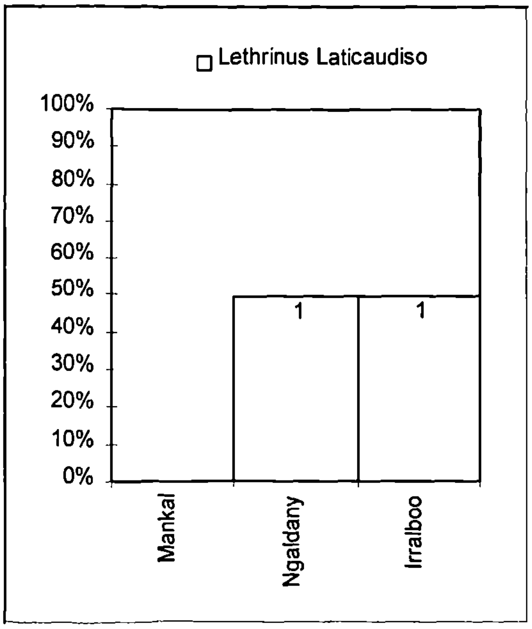


Figure 49. Gulurr

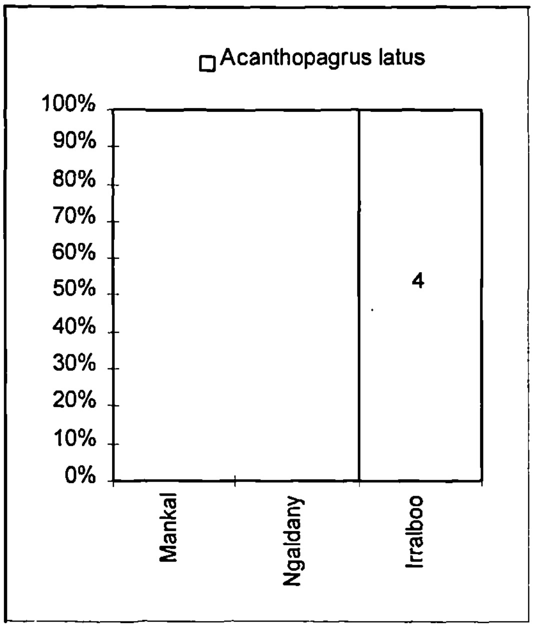
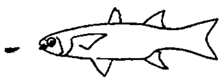


Figure 48. Irarring

6.5. Daily Catch details; Mullet



Mullet were difficult to analyse as some were said to be fat and others not coupled with difficulty in identifying species it is difficult to find patterns of exploitation. They were sought primarily before during and just after the wet season. As they are supposed to follow Iawing for their season this makes sense. During the two fieldwork periods there were no expeditions solely for mullet and these data reflect this. Subsequently through correspondence with my friends who always relate to me what they have been fishing it appears as if there are still expeditions for mullet between November and February. For two days prior to

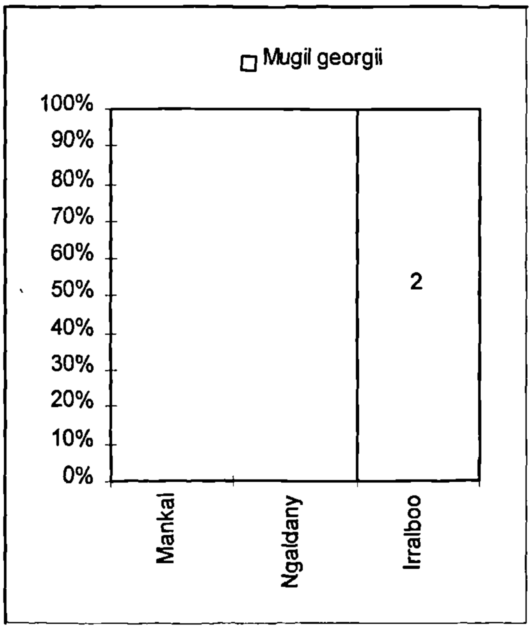


Figure 50. Minimbor

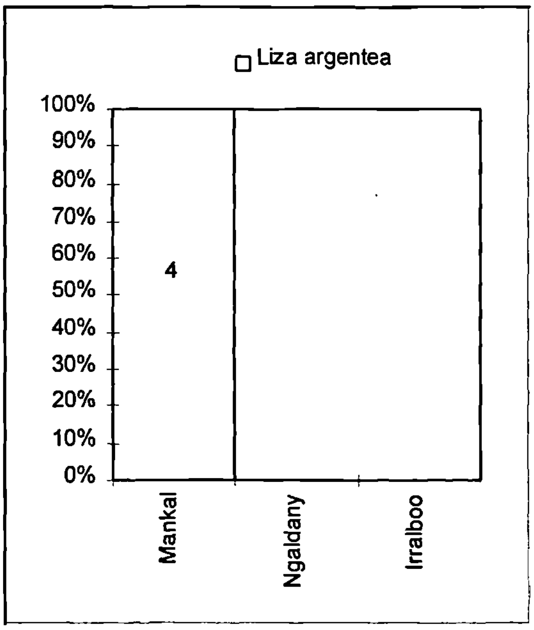


Figure 51. Juldul

expeditions the

fishermen make and repair light throwing spears and groups of three to seven fishermen either travel to the mudflats by truck boat or on foot. In hindsight and appreciating the behavioural characteristics of this fish from a western scientific point of view I can perhaps venture a reason for the lack of exploitation of this species during my time there. Mullet tend to move into the coastal areas in large numbers during the wet season where they congregate in areas where the fresh water runs into the sea. These areas usually associated with mangroves. As we had what can be called a dry wet in the 1994/95 fieldwork period it seems likely that the Bardi anticipated that the Mullet would not be present in significant numbers and therefore did not organise specific expeditions for these.

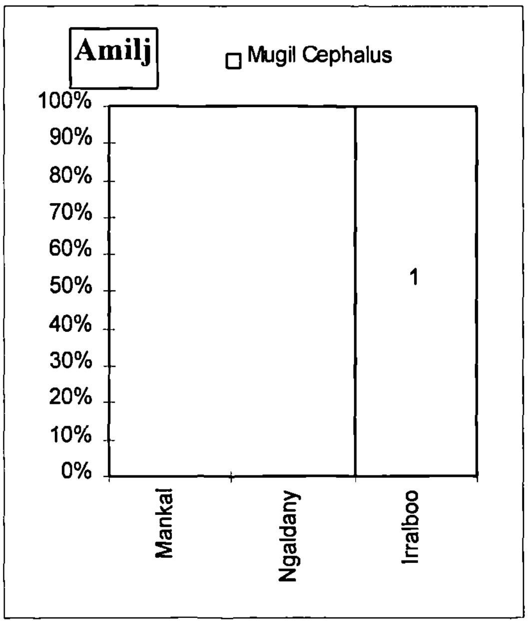
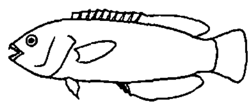


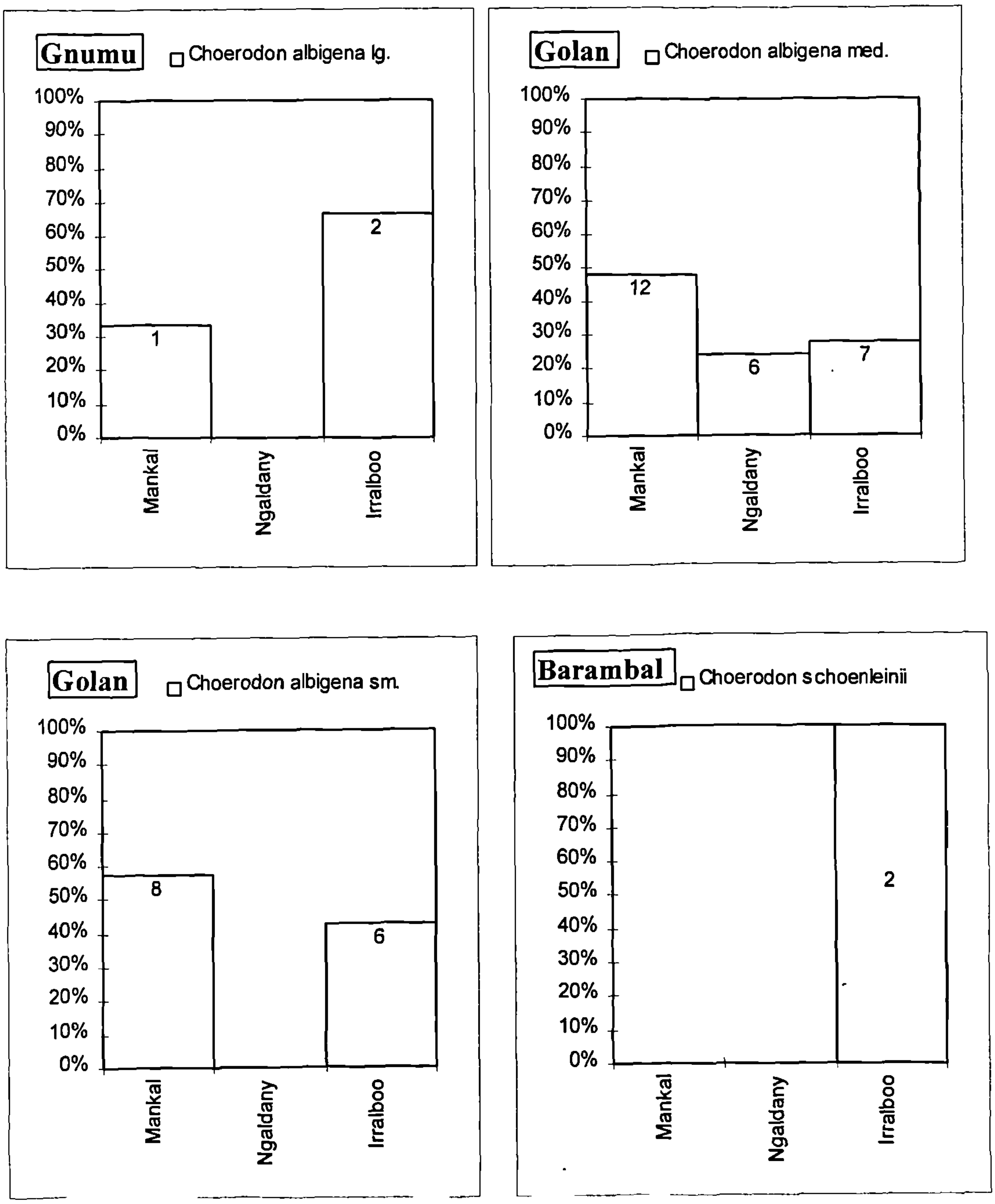
Figure 52. Amilj

6.6. Daily catch details; Wrasses.

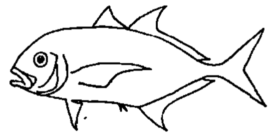


As can be seen from the charts a fair number of these were caught, the majority **Golan**, by children or women fishing with hand lines. The **Gnumu** and **Gnambi** were all speared with spear guns. There is no season for these fish and these data reflect this.

Figure 53. Wrasses (all species)



6.7. Daily catch details trevally mackerel and queenfish.



The season for most of these pelagic fish is considered to be February and March but even during their season it is not felt that this fish is particularly fat or tasty, with the exception of **Gularganjan**, Mackerel, which is said to always have meat. As pointed out in section 3.3 8 Moya Smith noted that these fish were heavily exploited by the permanent stone fish traps during **Ngaldany**. During my time there these traps were no longer in use and trolling expeditions were made specifically during this season to catch them. Though it was not the preferred fish of the Bardi it seemed to fill a gap during which time the stingray were losing their fat and other fish had not yet put on their fat. Though figures show that **Molon** ( ) and **Biringnan** (Figure 58) were caught in **Iralbu** this was prior to the 9th of March 1995 (see Table 4) after which the trolling expeditions stopped altogether and the only fish of this category taken were the small **Giral,** Golden trevally, and **Jawilyl**, Gold spotted trevally, which were procured with spear guns as they swam into the shallows during expeditions for **Barbal**
and **Gambal**.

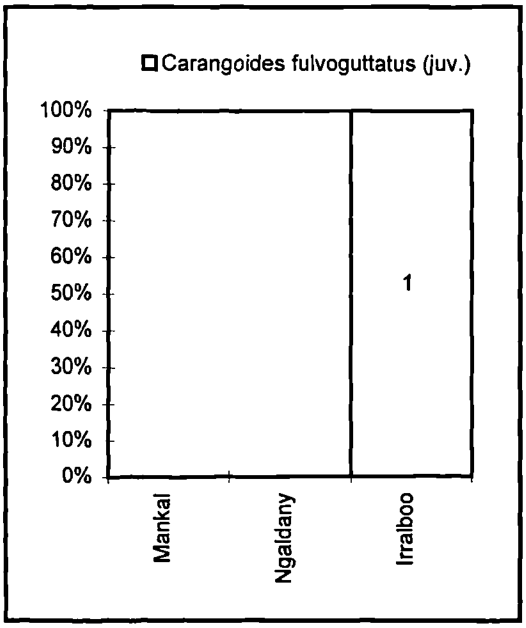


Figure 54. Jawilyl

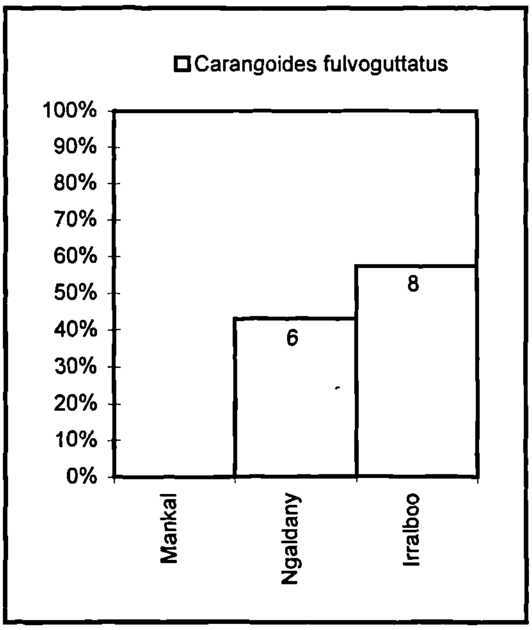


Figure 55. Molon

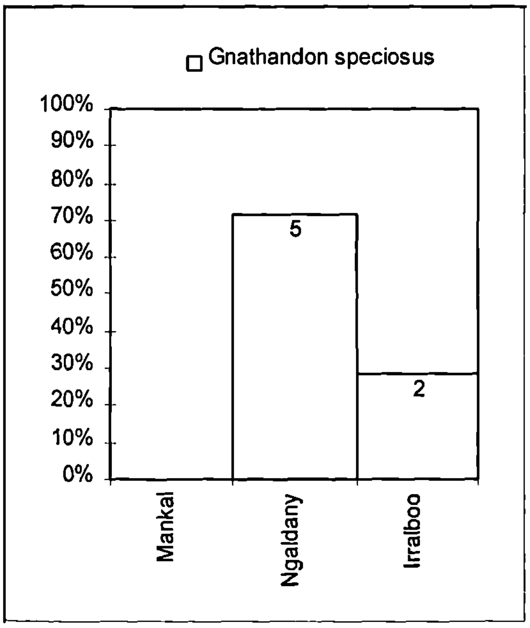


Figure 57. Giral

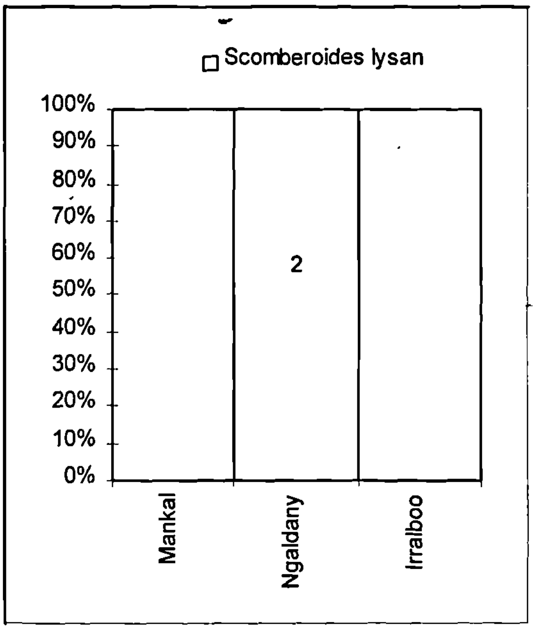


Figure 56. Biringnan

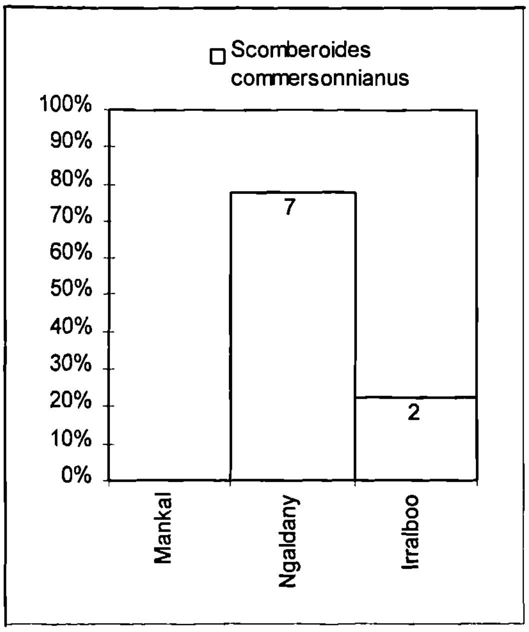


Figure 58. Biringnan #2

6.8. Daily catch details; mud crab

Expeditions specifically for **Narangua**, mud crab were uncommon throughout the fieldwork period, but during the data period and specifically during Ngaldany there were several expeditions into the mangrove mudflats in search of them, usually on rainy days that were not good for boat trips. This accounts for the large numbers caught in Ngaldany. Again there may have been more motivation to catch mud crabs during this season as other resources were finishing their season or had not yet started their season. As pointed out in section 3.3 11 there are several different rationale for determining the quality of mud crab over the lunar month and Bardi fishermen tend to disagree as to what is the best time to catch them.

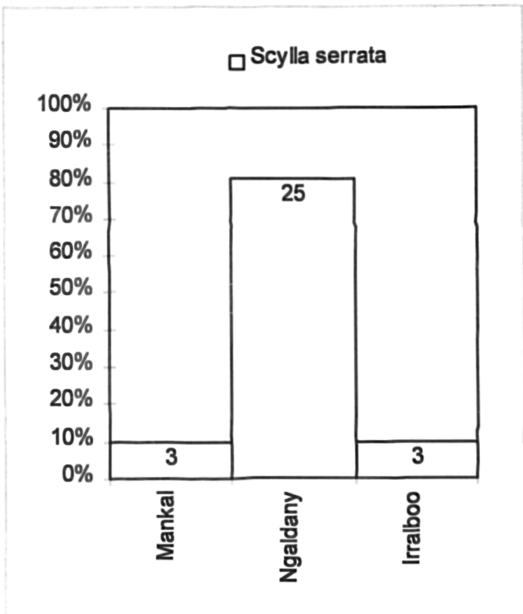
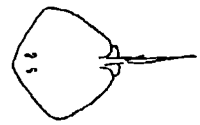


Figure 59. Narangua

6.10. Daily Catch Details, Rajiformes



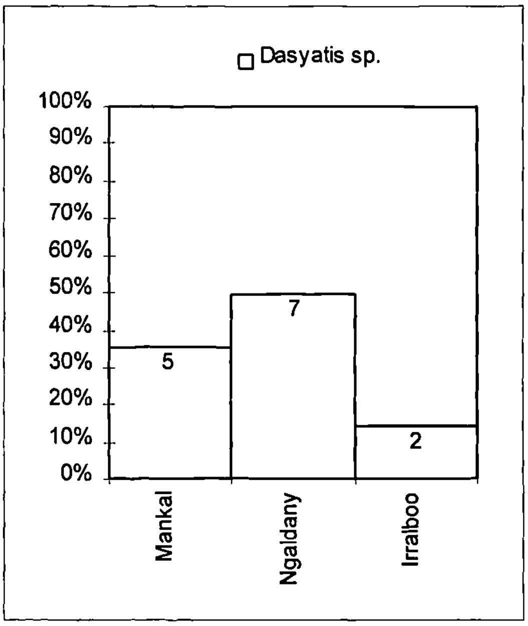


Figure 60. Iawing & Jangarr

At this time it is still difficult to determine what the exact species of stingray **Iawing** and **Jangarr** correspond to, but as both these species follow the same season I put them all together for the purposes of data collection. Only one **Jangarr** was caught during the data period. All other rays procured were **Iawing**, usually on expeditions specifically for their capture. The 2 **Iawing** caught in **Iralbu** were caught by Douglas and myself on a trip to Long Island for trochus shells. As the tide rose we walked over the reef and waded into the inshore mangrove pools spearing five and rejecting three as their lips were no longer yellow and therefore no longer fat. **Iawing** can apparently be fat until April but they are rare and expeditions for them stopped in **Ngaldany**. When I questioned Douglas as to the spawning periodicity of fish and its apparent inverse relationship to fish fatness he elaborated on this by adding that for some species, specifically **Iawing** not only did they avoid the animal when it was reproducing but that they only ever took from the new generation of animals each year. In the case of some fish (**Golan**) this meant taking only the smallest fish. With **Iawing** where there is little difference in the size of the old and young so fishermen discriminate their age by taking only those with full black skin avoiding the older ones which are mottled with grey. I unknowingly caught one of these and it too had yellow lips indicating that it was fat, but Douglas said that it was too old and we let it go.

6.9. Daily Catch details; Dugong and Sea Turtle.

6.9.1.a. Dugong

Only three dugong were caught during the first period of fieldwork in 1995. All three of these ere caught while sculling at high tide over the grass flats. While the exploitation of dugong is seasonal this appears to be largely as a result of the seasonal movements of the Dugong which have been described in 2.7 2, and 3.4 1. During the 1995 season for Dugong approximately 14 were caught community wide. In the 1996 season Gounie alone caught over 40 and a rough estimate would put the total number caught community wide at over 300. Quite simply the dugong migrated to the King Sound in huge numbers in 1996 making such exploitation possible.

6.9.1.b. Daily Catch Details Sea Turtle.

Species	Total #
Chelonia eggs	166
Chelonia mydas lg.	5
Chelonia mydas med.	3
Chelonia mydas mid.	19
Chelonia mydas sm.	5
Chelonia mydas w/eggs	3
Eretmochelys imbricata	1

Table 1. Turtle data period catch details.

A total of 36 turtles were caught during the data period. These were all caught in expeditions where I was present. Many more turtle were caught within the Wiggan family group than are indicted here. In fact the fishermen I worked with were some of the more conservative in the community when it came to procuring turtle, possibly because they still maintained the traditional redistributive mechanisms applicable to turtle meat. I often saw other hunters returning with boatloads of these. Only 3 married turtles were taken during the data period, this reflecting that married turtle season was actually over. These turtle only had small numbers of eggs left in them and they were taken adventitiously, expeditions not being mounted to procure these specifically. The eggs were taken from the outlying islands, on one occasion two nests being exploited at once.

6.10. Fish Strategies: Consequences.

These data indicate that the Bardi tend to exploit fish according to expressed preferences for fat resulting in a marked seasonality of fishing practise towards certain specific species of fish (**Barbal, Maran, Iawing**) . These particular fish are known to exhibit seasonal spawning periods during which they are no longer fat and so consequently are avoided during their spawning periods. Fish that are considered fat all year are exploited year round and exhibit no particular spawning period (**Gambal**, Serranidae). The Bardi appear to be following a strategy of fish procurement that seeks to avoid those fish that are obviously reproducing. They appear to have made a connection between their physiological state and reproductive readiness, manifest as fat or non fat, and avoid the latter.

One might wonder why this connection has not been understood about Aboriginal fishing prior to this? Altman recognises that there are some restrictions that are seasonally determined. 'These restrictions usually apply for ecologically sound reasons during the breeding season of the species concerned.' (Altman 1991:80) However he does not treat it as a wide ranging ban on breeding species nor does he make the connection between the preference for fat (even though he notes it) and the relationship it has with breeding cycles in some animals. Why haven't the Bardi and other Aborigines elaborated on this before? Though the preference for fish fat was elaborated to me as it has been to other anthropologists they did not elaborate on what are the obvious conservation consequences of such a preference and the related fishing strategies employed to meet it. It is somewhat surprising that even in interviews attempting to discuss issues relating to conservation the consequences of this behaviour were not elaborated. While it is possible that the older and most traditional fishermen are the only ones still aware of these connections, the younger fishermen all expressed a sensitivity toward procuring reproducing animals causing them to avoid them. It must be understood that conservation as a concept has its roots in a crisis management society where conservation has more to do with rescuing ecological systems under threat than assuring the sustainability of systems so that they never come under threat. It seems more likely then that Aborigines concerned with sustainability, with guaranteeing the reproduction and increase of species, may find notions of conservation foreign to their systems of resource use, so that during interviews on the subject of conservation do not see the connection to their own ideas. It is the experience of many anthropologists that it is only when one has made the connections and understood the implications of certain behaviour that the people themselves will elaborate upon them. (Turner)[102] This tells us a great deal about the way knowledge and practise is transmitted in Aboriginal society and why it has a hard time competing with an education system that spoon feeds children as opposed to leading them to the point where the knowledge emerges from and within the practise itself and becomes a part of the bearer. This further supports a methodology that seeks to understand resource use through actual practise. It should also be taken into account that few studies have brought together the fields of marine biology, oceanography, and anthropology, and this accounts in large part for the insights achieved in this thesis.

It is possible that to some of the Bardi, fish fat and the avoidance of reproducing species are two separate things. Upon discovering this connection I related it to several of my friends and they all agreed that there was indeed an ethic that sought to avoid fish as they were reproducing. The inverse relationship between fish fat and spawning ,and the consequent implications for fishing behaviour patterned on exploiting fat fish may not be obvious to all and in a way this has perhaps maintained the system as long as it has. The preference for fat fish actually maintaining the ethic where perhaps without it, in today's climate of

[102] I would expand this to add that information is context related and that interviews out of context yield mixed results. When I first arrived at One Arm Point I asked many Bardi elders if there were any sacred fish to which they replied; 'No all fish are the same'. On my first spearfishing outing, however ,I was asked by the Bardi women accompanying us to spear them a small fish. Q. 'any fish' I asked. 'any', they replied, so I speared the next small fish that went by an Acanthuridae (one that I would normally never spear). As I brought it to the surface they all put their hands up and exclaimed; 'no no we can't use that fish for bait that one is sacred'. The fish was **Gambal**.

change and loss of ethic, fish would be procured as they spawned. Douglas however was well aware of the connection and elaborated the rationale even further (see discussion chapter 8).

No other anthropologist has demonstrated the consequences of fishing patterns predicated on a preference for fat in fish and it would be interesting if the same connections apply to terrestrial resources. In all the literature surveys that I have done no one has understood this implication of a preference for fat and the underlying logic that Douglas so easily dismissed as just the beginning of what they take into account immediately taking me two steps further. Other anthropologists have referred to the preference for fat and the taste factor in food preferences but none have understood the implications as a conservation measure, deliberate or not. The only semi anthropological study of fishing cultures that deals with the issue of fish physiology as a determinant of hunting behaviour, the work of Johanness in Palau (1981), found the exact opposite association between spawning and hunting behaviour. The seasonality of hunting referring to an intensification that coincides with spawning and takes advantage of the natural behaviour patterns of the species at this time that makes them vulnerable and more easily exploited. It is exactly at this time that the Aborigines consciously choose to ignore these fish, though their presence is known and understood. Can it be a coincidence that the only fish they hunt year round are those for which they cannot make out an identifiable spawning period? We can assess that these are deliberate conservation measures (conservation in that they seek to maintain sustainable populations) because fishing patterns for many fish are not predicated on ease of exploitation or what could be called concern with returns on investment as postulated by OFT theorists. The Darwin Jawfish or monkey fish, though one of the easiest fish to procure has special restrictions governing its capture, limiting it to only those times when nothing else was available. Exploitation was restricted because it was recognised that the ease with which this fish are captured could make them vulnerable to over-exploitation and that this same ease of capture made them the ideal fallback resource in times of need. This conscious decision to set aside what is most easily available for future use in times of need might be considered nothing more than a survival strategy but that view ignores the fact that for this strategy to be effective the resource must first be conserved.

All of this evidence suggests that these are deliberate conservation measures put in place in what seems to be a bountiful plentiful environment. It is important to note that no other anthropologist has made this connection between selecting for fatness and spawning periodicity and are therefore not aware of this wider implication of Bardi resource use (it is entirely possible if not likely that this is a feature of Aboriginal resource use Australia wide).

The next chapter (7) deals with the rules and regulations that pertain to the procurement and distribution of turtle and dugong and expands on the issues introduced above in relation to their social context. The final chapter (8) then discusses all of these issues and their implications for our understanding of Bardi resource use.

7. Restrictions on resource use and consumption

> *'An apparent lack of restrictions on access to resources may mask elaborate if subtle rules governing the conditions of access. Such rules may pass unnoticed if not specifically investigated.' Williams & Hunn 1992: 10*

7.1. The 'Law' and resource use and allocation.

7.1.1.a. Ouloulooung. Initiation and resource use.

In this section I will describe the role of the Law in the realm of initiation as it relates to marine resource use among the Bardi.

Among the Njol Njol, neighbours of the Bardi of the Dampier Peninsula, Father Ernest Worms (Worms, trans. 1986) described the various initiation stages from childhood through adulthood. I have used these stages as a framework for deciphering the Bardi ritual chronology which is remarkably similar. In this section I will be presenting the overall framework and chronology of the various stages of initiation and describing the attached rules and regulations that initiates are subject to with reference to maritime resources.

Ernest Worms' description and categorisation of the various stages of the Law are a useful guide because they refer to the 'Law' at a time when it may still have been close to the pre-contact system. Today's Law, having suffered the full impact of westernisation, has been adapted to fit the changing lifestyles of the Bardi and has lost some of the stages to which certain rules apply, while others have been shortened to the extent that the impact of certain prohibitions of 'the Law' do not have any real consequences. Therefore much of the 'Law', as such has changed or, as Douglas would say 'We left that Law on Sunday Island'. The next section is therefore a reconstruction of the law and the rules that apply to certain stages of the Law that are specific to marine resource usage among the Bardi, though this is not meant to imply their function.

I will begin by outlining the various stages of initiation as described by Worms and amended in September of 1996 to Bardi specifications by Katie Wiggan, whom I knew as Old Mum (see kinship section in appendix chapter 9).

7.1.1.b. Degrees of initiation.

A. During Childhood

1. **Boogar:** little boy
2. **Larinyar:** black paint made from charcoal of burnt mangroves. (ready for circumcision)

B. During Adolescence

1. **Balel:** at the time of circumcision. }**Ouloulooung** (name of law they hold for Balel)
2. **Jabolo:** He is taught what not to touch.
3. **Jamunungur**, he is called **gambil**. He gets band round his arm and can now go in with the men to the Law grounds

C. During Youth

1. **Ganbiridge**:
2. **Rungur:** decoration with emu feathers.
3. **Bungana:** decoration with pearl shell
4. **Ilgoor:** receives his red paint (**Booman**). End of Boys Business.
5. **Jumungur:** emerges as a man and can choose whether or not he wants to continue progressing through further stages of 'the Law'.

D. During Adulthood

1. **Nien-gal:** married man.
2. **Djabul:** middle-aged man.
3. **Ibala:** getting to age, old man.

In the following paragraphs I describe the system as I have reconstructed it, noting which aspects of it are still practised.

The beginning of the ritual or Law period for most young Bardi men begins at childhood at 11 or 12 years of age, though this by no means represents the beginning of their learning and comprehension of the 'Law' per se. In fact, as with many Aboriginal systems of Law, it corresponds to a state of readiness for that

Law. The level of knowledge that a child of 11 or 12 years of age has accrued during his life as a functioning community member is substantial..

Among the Bardi the first Law seems to correspond with the development of a particular aptitude towards certain kinds of fishing and hunting. It is, perhaps, representative of the fact that a child at this age is beginning to demonstrate the physical abilities that could make him a contributing member of the community, as opposed to a full time dependent.

It is well known that Aboriginal children grow up with a great degree of independence and it is not until they begin ritual initiation that limitations upon their behaviour are progressively enforced.

> *'As the age for initiation draws near , the rein is gradually held more and more firmly in such a way that almost in the form of a game, a pre-initiation process is inserted discreetly between infancy and adolescence.' (Worms 1986: 151)*

As pointed out earlier I believe that Aboriginal Law does not force itself upon the candidate but rather the candidate becomes increasingly subject to its power as he progresses through it. The young boys, though perhaps not ritually introduced to the Law, nonetheless begin at a certain age to be more aware of it and develop a particular knowledge of it. Perhaps as they grow and become more physically adept at hunting and fishing, consequently spending more time hunting and fishing with their fathers, uncles, or grandparents, they become aware of the larger framework of Laws within which these family members function and so become ready to be initiated ritually into the level to which they are now becoming accustomed.

Considering the surprising level of childhood independence that Aboriginal children enjoy initiation is a rude awakening, especially with reference to matters of a secret/sacred nature. However, it has been my understanding and experience that the initiate is or was not taken for initiation until it was felt that he had already displayed a certain understanding of, and readiness to, assimilate the Law.[103] It is important to understand this as it is an essential aspect of Aboriginal culture and Aboriginal learning processes. It is all too easy to perceive 'the Law' as an imposed force pushed on the individuals from the exterior (an interpretation that I am sure has its roots in the classical disciplinarian roots of the education systems at the time, especially as many of the anthropologists were missionaries). While 'the Law', especially initiation, are extremely disciplined and forced upon the individual , it is also in many ways the individual who dictates the pace at which he goes through the Law.[104],

This is particularly evident when considering the later stages of the Law where it is left up to the individual as to how far he wishes to go with it once he has achieved within the Bardi structure the level of red ochre (see C. above). It is his aptitude and his willingness which determines the pace. Many Bardi choose never to go beyond this level .

As concerns the initial Laws at the earliest stage of childhood, I am aware of no ritual prohibitions or restrictions upon the younger children. However, it must be said that, at this age, their appetites are small and generally sway toward the smaller fish caught, or the 'free' pieces of turtle or dugong such as the carapace or short ribs, from which they are easily satiated. There is however some indication that this behaviour may be a reflection of an older now unspoken Law. In the stories of Galalang one of the more recent mythic Dreamtime figures he apparently says;

[103] Douglas often complained that the children being initiated today, though older than in the past (and therefore a bit too old to be circumcised), were not in fact as ready to be initiated as children in the past.

[104] For example, boys are given red paint when they begin to show a sexual interest in women. The Law does not give them this interest but responds to it. Therefore, the Law can, in part, be perceived as linked to an aptitude that the individuals already possess, not one which they have to achieve. It is important that part of initiation is seen as the bringing of an individual into his own, and not necessarily as the total recreation of the individual from one state of being to another, even though this may be how he is treated. I was led to understand that, traditionally, it was in some part the individual who dictated the pace, displaying a readiness that his boss men are sensitive to, allowing them to put into motion the necessary arrangement, and allowing the subject to proceed through certain stages of the Law. Douglas provided me with several examples of young men being taken off into the bush and initiated into certain Laws that usually would have taken place the following year on the normal ritual calendar. He explained that these boys were at the stage where they were ready for that law and they could not wait.

'you young people must eat the smallest fish. No one should be greedy or keep the best food for himself' (Durack 1969: 101) 105

Throughout my fieldwork at One arm Point this was never indicated to me as one of the laws, and in fact most of the fish species prohibitions that I am about to recount are believed to have disappeared.

The Law, when it was at its strongest on Sunday Island was full of rules and restrictions relating to the capture and consumption of fish, usually beginning in earnest at the onset of **Oulouloung** (see above stage B, 1-2).[106] It is at the stage of the **Oulouloung** Law that children begin to face very specific restrictions upon their consumption of fish.

'When they first come from Oulouloung, when they go to circumcision, they never eat fish,(but) that's in the early days, they couldn't eat the fish till they got their two front teeth out.' (Katie Wiggan. Tape conv. #1 Sept. 1996 500-506)

As pointed out this Law coincides with certain level of hunting/fishing prowess, and probably with the development of larger appetites. The restrictions and 'Law' that I will be referring to were said to be at their strongest on Sunday Island, much of these having been lost or put aside since the move to One Arm Point. The restrictions that

traditionally came into force during the Law periods and specifically at **Oulouloung** are all related to certain specific species of fish. The restrictions begin with an almost complete ban on the consumption of fish. Initiates are only allowed to eat one specific species, **Minimbor**, or small fantail mullet, *Mugil georgii*, (which,

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[105] This restriction to small fish while preventing children from eating larger fish that adults eat may also have the effect of restricting older Bardi from access to smaller fish. In this way children have a dedicated resource much in the way of older adults (it is just as important to make sure the bigger maturing children make the transition from children's food i.e. small fish to grown ups food it is perhaps the children's pool of resources that the Law is trying to maintain as opposed to controlling their access to grown up foods restrictions apply to some of the most common and sought after fish).

[106] **Oulouloung** is the name for several 'Law' gatherings, the longest involves the ritual of circumcision. Within **Oulouloung** are several Law sections that each boy must complete. At the end of each of these he is called by a new name (classificatory) by different relatives. Traditionally, the main part of this Law involved the boys going to bush for several months during which time they were circumcised and taught what they could and could not touch. Of particular interest to this thesis are the rules and restrictions imposed on these boys during this Law and, once they emerged from this ritual the set of Laws concerning certain species of fish.

coincidentally, is considered to be fat all year). It is difficult to assess how long this almost complete ban on species lasted. It appears that it may have only been applied while the initiates were in the bush or Law grounds, which took them over a wide range of territory sometimes for several months at a time (this period is now reduced to 1 to 3 weeks maximum). Alternatively, it may have been applied to the entire sequence of initiation (**Ouloulooung**), including the two or three breaks between specific related 'Law' activities.[107] The total restriction on fish could therefore last up to two years.

During this almost complete ban on eating fish, turtle, dugong, and terrestrial animals were not restricted and apparently are rarely withheld from people, save exceptional circumstances which are explained in the following section: <u>Other Restrictions 7.4</u>.[108]

Once the boys emerged from the bush, signifying the end of **Ouloulooung** (stage B-3), the ban on fish was lifted and the restrictions became more specific, applying only to several key species which I will list in the next section.

7.1.1.c. Species restricted after Ouloulooung:

Small Fish;

Gambal

Golan

Juldu

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[107] Dennis Davey and Douglas Wiggan both recounted how when they were young and undergoing Ouloulooung they made a trip to Broome and finding themselves in town and outside a fish and chips shop they had to watch all the others eating while they couldn't as they were only allowed to eat **Minimbor**. This suggests that the Law was spread out over the breaks between actual Law initiation as suggested above.

[108] There is, however, little danger of turtle and dugong being selfishly procured as they are always renounced once caught. It is quite a coincidence that during the **Ouloulooung** Law period they are only allowed to consume resources that they cannot keep for themselves if they catch them. Initiates are learning to depend upon others before they are given the freedom to apply their budding fishing skills at catching fish, the only resource they can potentially act selfishly with. The only items that initiates are restricted from catching are the things that have the most potential to be caught or exploited selfishly. They only have access to those resources which they can catch but cannot keep, necessitating interaction with others in order to consume certain resources which must, by Law, come from someone else. This facilitates dependence and renunciation simultaneously.

Jandul, and **Amilj**, the three species of mullet other than **Minimbor.**

Large Fish;

Giral, ,

Gnumu,

Galargie,

These species do not appear to be restricted from pre-initiate boys or young girls but there is a strong reluctance on the part of children and even young adults (especially women) to consume these culturally 'loaded' fish and they often express a distaste for these fish. This distaste, however, is articulated in such a way as to suggest a certain reticence to consume these fish, as opposed to a real dislike for the taste. People do not say '*that fish tastes bad*' or '*I do not like the taste of that fish*' as they do for items that they actually dislike. Instead, they will say things such as '*that fish is too fat for me*' or '*when that one is too fat they make me sick, I can't eat it*'. They are expressing an understanding of the quality of the fish and rejecting it because of that quality, i.e. its fatness. Supporting this idea are some of the comments made by older Bardi, especially women. They will often say '*when I was younger I could not eat that fish it was too fat and it would make me sick*'. Older women still say that they cannot eat too much of these fish as they will get sick. In some cases it is obvious that they really enjoy them which is especially notable when the fish are initially caught and such women will often get upset if fish are in season and no one is catching them. However, some women seem to actively dislike the taste, encouraging fishermen to catch them early in their season when they are just beginning to put on their fat. It is important to note that these women never request that someone catch fish that are not in their season for fatness.

It was stated that most larger species of fish were forbidden to the initiates until they received their red paint. However, those larger fish listed above were the only species that were identified to me as restricted. The restrictions on the remaining large fish may have been less stressed as they were not commonly caught.

The only restriction related to this Law outside of marine resources appears to have been **Mung** or sugarbag.

It is difficult to ascertain how long these restrictions lasted, but it appears that they were carried well beyond the **Oulouloung** initiation period, sometimes for several years until the boy achieved the stage preceding his receiving red paint (see above C, 4). One by one the initiate was gradually allowed to consume each specific species. As he progressed through further stages of the Law (B3 to C3), he was constantly monitored by his **Jawoulo**. When the **Jawoulo** thought that it was appropriate, he would approach the boy's **Yagu** and ask him to take the necessary steps to remove the restrictions, one by one. This could happen in one of several manners. In a strongly predetermined way, the boy's **Yagu** would ask the **Jawoulo** or another relative to catch and put aside one of these particular fish. Alternatively, he would go out and catch the fish himself. The **Yagu,** once in possession of the fish, would cook it and place it in a tree so that no one else would eat it. When the specific boy visited, the **Yagu** would take a piece of the flesh of that fish in his hand, and come up behind the boy and put it directly in his mouth. From this point on the boy could eat that particular species.

It could also happen that the boy's **Yagu** or **Jawoulo** would be consuming one of the restricted fish and, seeing the boy without any fish, they would feel sorry for him and place that fish in his mouth so that he could start eating it (this scenario was related to me as representing a certain amount of weakness on the part of the Boss men but did not seem to be frowned upon). In this way the initiate was introduced to one of the restricted species every six months or so. After several years (approximately 7) he had been introduced to all of the restricted species and was no longer subject to the restrictions. It is difficult to tell if there was any particular order to the introduction of restricted species into the diet. However, the last species to be introduced was always **Gambal,** *Acanthurus grammoptilus*. After the introduction of **Gambal** all the fish associated with restrictions initiated at the end of the period of **Oulouloung** had been fed to the young men and it was at this point that they were fed the **Mung** or sugarbag. This represented the end of this particular set of restrictions and coincided with the time of the Law for red paint (C,4).

7.2. Distribution and Consumption of Marine Resources.

7.2.1. Turtle and Dugong; renunciation in action.

> *'Some people catch turtle and don't eat it even though it is the main part of the meal, because they caught it, [in the past] they could only eat turtle caught by somebody else.' (Kevin George)*

> *'Before it was different. Now we eat the lot, we used to take it to them, if we wanted some or if they did, they came and got it, relations used to have some if they want a bit.' (Tom Wiggan)*

Turtle and Dugong represent large and freely available sources of nutrition at One Arm Point and today constitute one of the major components of the subsistence portion of the diet of the Bardi. Upon initial investigation, it was difficult to establish what was happening with reference to the distribution of the meat. It appeared as if some hunters kept it for themselves and their immediate family, while others seemed to be handing out pieces randomly, either upon demand or to those who were present when it was butchered. It was difficult to elicit information concerning the processing and distribution of turtle and dugong when conducting interviews. However, once actively participating in the daily expeditions and the processing and distribution of catch, an underlying system began to reveal itself. [109]

Moya Smith in a paper cataloguing Bardi stone fish traps (Smith 1997) briefly refers to the division of turtle, dugong and large fish into sections 'distributed to people in specific kin relationships to the successful fisher, or to people with particular rights over country or waters where fishing has occurred' (Smith 1997:5) While I have seen all of these species ,including large rays, divided

[109] Questions had to be posed to specific individuals about their own particular pattern of distribution. Though they are usually aware of other people's patterns, they may not know the details and, as there is no set pattern, they certainly cannot predict what someone else's pattern would or should be, so do not elaborate. When trying to reconstruct historical patterns, questions needed to be as direct as possible about an individuals past behaviour as general questions about the past receive generalised responses.

into sections, my research suggests that the redistributive processes attached to each species are fundamentally different. Though Smith does not refer to a type of redistributive process the interpretation mirrors the findings of Altman & Peterson (1988) who divide game into two categories large and small. Each category involving a different type of redistribution, with large game being shared beyond the household and small being kept within. This suggests that all large game is divided and redistributed in the same way (see above). Whereas I would agree that some parts of all these animals can be distributed according to specific kin relations my research indicates that among the Bardi the redistribution of turtle and dugong follows completely different lines than that of large fish and rays. The main distinction being that turtle and dugong are 'given up' whereas fish and rays are shared. I will be dealing with the sharing of large fish and rays alongside that of smaller fish and rays in section 7.3.

The rules and regulations pertaining to the consumption of turtle and Dugong are not in the form of restrictions on consumption relative to certain prohibitions imposed during certain periods of Law (see sections 7 1, and 7 2, above), or specific to certain generations, as described in section 7 4, but actually restrict the consumption of the procured turtle or dugong from the procurer or successful hunter himself. The animal he has caught is, *in essence*, *not for his own* personal consumption. This is neither a temporary restriction, nor one that only applies during certain seasons or certain phases of initiation, but is carried by each male hunter for life. As will be elaborated further in the discussion, we cannot actually explain this behaviour under the auspices of sharing but must use the terms 'giving up', or renunciation, to describe it accurately.

Whenever a turtle or dugong is caught the hunter butchers up the meat into specific pieces, (as described in chapter 3, section 3 5) and then gives up or renounces all of the main pieces along specific, though very personal lines, through the wider community. This law is enacted at the birth of the child, and it is at this time that the distribution patterns of that child are set. The patterns take immediate effect at the time of the child/young man's first kill of either turtle or dugong, then continuing for the life of that man.[110] It is difficult to establish the patterns of distribution today (and therefore even more difficult to establish past patterns of distribution), as each individual's pattern is set in a somewhat random manner at the time of birth.

While I cannot present a set pattern of distribution that all hunters follow, I can describe the process by which each individual's distribution patterns come to be formed with concrete examples for specific individuals. Today, only the rough vestiges of this system remain and even then it only functions within certain family groups which severely constrains the system. As might be expected, the system as it functions today is quite different from what took place traditionally. It does, however, attest to the adaptability, resilience, and importance of the system that it has managed to survive within the strained circumstances of the present Bardi way of life. I will be describing the system as I experienced it in 1995 and 1996 and contrasting this with the traditional system as it was described to me by Bardi elders.

Today, as in the past, when a male Bardi child is born, different individuals in the community choose to take responsibility for certain aspects of the child's development, usually relating to his progress through Law. Most of these individuals have to be in a specific kin relationship with the child in order to be acceptable , and need to be able to take on certain responsibilities. There are two main roles which need to be filled, that of the **Yagu** and **Jawoulo**. The relationship of the child to his **Yagu** is described in the section on Kinship, chapter 1.4 2. **Jawoulo** today are chosen from within a group of young uncles who already have or will be receiving their red paint at the time of the boys **Ouloulong**.[111] There are usually many individuals in the appropriate category to carry out the specific

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[110] Again we can see the relevance of initial initiation at the age that children have developed the necessary abilities to procure these resources. At this age it becomes necessary to socialise them to the Law so that they can start to fulfil the already predetermined behaviour set for them at birth.

[111] It may seem unlikely that the **Jawoulo** would take on this responsibility at the birth of the child as when the child is born these young men would only have been approx. ten years of age, but in my experience this appears to be the case. In two situations young boys reaching a certain age were reassigned new **Jawoulo** as their previously assigned ones were no longer suitable (one had not been fully initiated and the other had developed a drinking problem). In both cases the new **Jawoulo** assumed the pieces of meat dedicated to his predecessor, indicating that it is not necessarily as important for the Jawoulo to receive his piece as it is for the hunter to give it up .

function of a **Yagu** or **Jawoulo** but only one announces that he wishes to take on this role and be assigned as responsible for the specific child. This individual, once making this announcement, states which pieces of turtle or dugong he will receive whenever that child catches any turtle or dugong. In this way, at least two of the main pieces of turtle are spoken for. After this, the process becomes less structured but it appears as if different Bardi, both male and female, all choose a specific piece of turtle, or dugong, or both, to which they will be privileged to receive once the child begins procuring these. In this way the distribution of any turtle or dugong he may catch is already predetermined for him before he can even hold a spear.

It has been difficult to establish just what, if any relationship, the **Jawoulo** traditionally had to his charge, partly because of the breakdown of the traditional system and the consequent changes. I have been told that on Sunday Island the selection process was very different. Today, young boys often have their uncles as their **Jawoulo** but this is not traditional. Young uncles appear to have been forced to take over the responsibility of young boys that ordinarily would not be theirs. This is due to the fact that there is a shortage of acceptable men to take up the responsibility. It was stressed to me repeatedly by Old Mum that on Sunday Island people gave up their turtle and dugong to people on the '*other side*' (meaning distant or non relatives), certainly to no one as close as an uncle. The system of choosing one's piece was conducted in the same manner as described above, when a male child was first born, but the people who chose, other than the man who volunteered to be the boy's **Yagu** (who was one of several possible classificatory father in laws) were in distant relationship categories.[112]

It was difficult to put together with any degree of certainty the system of turtle and dugong redistribution as it took place on Sunday Island . It is freely acknowledged that the system today pales in comparison, and this was often reflected when I brought up this subject. It was felt that the 'real' Bardi, those who followed the Law, were all left on Sunday island, meaning that after the Bardi left Sunday Island between 1962 and 1964 the Law was never the same. People were

[112] It appears then, as if on Sunday Island, most of the meat was given away to other Bardi with whom the hunter did not have a close kin relationship.

more reluctant to talk about the present system than the system on Sunday Island but their knowledge seemed to be generally limited and one only received generalised statements that pointed to Sunday Island as the last place where the model had functioned, and that today the system had all but gone. As pointed out previously it was and is extremely difficult to elicit information in a question and answer format. It was only at the end of both my fieldwork periods that the pieces came together and I was able to clarify the basics of the system and how it may have existed in the past. 113 I feel confident that my understanding of the present system is accurate since the system, as it was related to me, can be compared to both my own experience, and data collected over 9 months of fieldwork. In order to reconstruct the historical patterns of redistribution on Sunday Island I related today's system to traditional patterns asking how the system has changed. As I will demonstrate the system is very difficult to understand as a set pattern of behaviour as it is extremely individual in its application. People today unless they lived on Sunday Island would have difficulty reconstructing the patterns of individuals that lived on Sunday Island.

In order to elicit the basics described above, I conducted extensive interviews and ratified the information obtained against the limited historical data and then tested the information against accrued specific knowledge of species behaviour, hunting and fishing techniques, processing, and the environmental constraints. I feel that a formative but accurate understanding of the system has been developed. This system represents an insight into Bardi and Aboriginal redistribution processes that has been largely ignored by anthropologists, with the exception of Turner (1989b), Rose (1992), and Swain(1993)

What is more difficult to ascertain is if the system on Sunday Island as it was described to me was in itself an adaptation of a pre-colonial situation much as the one today is an adaptation of the Sunday Island system. There are vague references that seem to indicate that this was the case, but I believe that the Sunday Island system, unlike today's, was not an adaptation that represented an attempt to rescue a collapsing system. The Sunday Island system co-ordinated the actions of

[113] Again one can see that a reluctance to discuss such issues can be due to a certain degree of deep shame that the system has fallen apart.

different groups and perhaps tightened and applied more vigorously the Laws that were present during the pre-colonial system in order to meet the challenges of a larger more sedentary community. In a sense, the ideal time to investigate this system in action would have been while the Bardi inhabited Sunday Island.

In the past, before the move to Sunday Island when one turtle was caught everyone would come down to the beach and have a piece. Smith comments that in the past '*different sections of the same fish turtle of dugong may have been consumed at different campsites as people returned with their portions to varying locations*'(Smith 1997:6). Though Smith does not elaborate on the mechanisms by which people came by pieces of meat it does support the idea that that people were taking possession of pieces, not consuming them in common with those from whom they received them. This supports the idea that the mechanisms outlined above were present in the pre Sunday Island system. My informants, however, gave me the impression that the system was less rigid than on Sunday Island[114] and that if the intended recipients were not present at the time of butchering, since, being distant relatives they were generally members of other groups and lived or camped in other locations, their pieces were redistributed on the spot. Therefore those who were present consumed the turtle.[115] In contrast on Sunday Island many of the Bardi and Djaui who normally lived apart were grouped together. Here the actual recipients of pieces were always potentially present and pieces of meat had to be definitively set aside for their intended recipients so that even if they were not actually present at the time of butchering there would be a piece waiting for them.[116] As before, everyone is said to have ended up with a piece, but on Sunday Island it is more likely that people were receiving pieces that were actually intended for their consumption according to the Law. These pieces then did not all come from the

[114] While all of my informants had been brought up on Sunday Island, they all spent extensive periods of time living traditionally in the outlying Islands and adjacent coast. During these periods (sometimes lasting several years) they lived much as their pre-contact Bardi ancestors did, making their analysis of past systems extremely reliable.

[115] In pre Sunday Island times it is more likely that the more distant claimants lived far away from the group and so their pieces would be regularly redistributed. What this guarantees is that anyone visiting has access to resources.

[116] With all the family groups accounted for on Sunday Island all the time it was less likely that a claimant or someone close enough to them would not be there to collect their piece. In the same way today meat is given up to close family members, as claimants either live too far away or are no longer on speaking terms.

same source and were definitely not all eaten at the same time or cooked in the same place as individual portions were taken back to different family households.

The pressures on the system caused by the grouping of the Bardi on Sunday Island may have caused the system of renunciation to become more concrete, as hunters who had previously operated in small groups, were suddenly faced with relations to whom they were obliged to renounce to in permanent proximity. Prior to this, this particular Law, though strictly followed, may not have been applicable much of the time due to the absence of some if not all of the intended recipients. At times of Law gatherings or when visiting other groups, visiting individuals would always be assured of some source of nutrition as it is likely that they were recipients to pieces of meat given up to them by members of other groups. In this way perhaps hunters and their families in unfamiliar territory would be assured of sustenance. This may however be an impression caused by the proximity of the Sunday Island system in time as opposed to the more distant pre-Sunday Island system. That this system continued to work under such pressures is certainly a comment on the effectiveness of the pre Sunday Island system.

Today's system differs drastically from the traditional system. This breakdown is due to a variety of factors, many of which have been elaborated in section 7 5 . However, three specific factors are particular to its breakdown: the advent of the freezer; four-wheel drive vehicles; and the move to living in houses.

Trucks and houses allow families and individuals to maintain a greater degree of independence and privacy in their actions than was traditionally possible. Trucks and cars allow hunters to transport large amounts of turtle or dugong meat with ease from the landing and butchering site at **Angulumar**, to the specific home. Without calling upon the aide of other Bardi, hunters they can drive down the dirt paths between the houses of close and distant relatives without anyone seeing the contents of their vehicles. People have a tendency to stay in their yards and houses and those to whom meat is technically due may not be aware that there is any to be had. In a fragmented community there is little chance of feuding families, who are in these particular relationships, maintaining or policing the system. Many people live too far away to make it practical to deliver them meat and, with the advent of the freezer, autonomy can be relatively easy to achieve.[117] Because of these pressures some family groups have chosen no longer to be a part of the renunciative system. This being the case it is not surprising to find that the system is almost in complete collapse between feuding families. The consequence is that not only are there fewer people redistributing the meat, but there are also less people to whom one can give up one's meat. The latter may in fact be more damaging to the system than the former as it makes it difficult for those who still wish to carry on the system to find the proper recipients.

Part of the reason for the difficulty in detailing the system is that people appear to be reluctant to discuss to whom they are supposed to renounce their meat. As most Bardi no longer follow the system 'to the letter' they find it somewhat uncomfortable to discuss the system, especially as it relates to themselves.
I will therefore use Gounie's distribution and receiving patterns as exemplary and elaborating on others patterns in relation to this one. Gounie became one of my closest friends and we spent a great deal of time hunting and fishing alone and so I came to learn of his distribution patterns quite intimately. Gounie is one of the most traditional hunters of his generation, the generation which has had to establish the renunciative system completely outside of the Sunday Island context making his distribution patterns the most relevant to the One Arm Point context. In essence he is the perfect example of the system as it functions at its best today.

When turtle or dugong are butchered the meat is divided into separate main pieces. These are all generally claimed, but there are however a number of pieces left after the butchering process that are technically treated as free. The butchering process has been elaborated in section 3.5, and the individual parts named in section 3.5 3a and 3.5 3b. What follows is a classification of these pieces as either claimed or free.

[117] The child's **Yagu** generally does not live in the same camp or block of houses and often lives in **Jedajun** or **Lombadina**. However, whenever he arrives he is always given a portion and special hunting trips are usually made so that when he leaves he is taking away a good portion of meat.

Claimed Pieces:

Dugong parts;

Nambu - top of the head and neck.

Gandgi - backbone steaks.

Nung - the back bone after the ribs, entire cross-section of the dugong.

Gambal - tail and 2-3 vertebrae in cross-section.

Nigabum -cross-section between **Nung** and **Gambal**

Mili

Nilange, or **nilarang** - layer of meat covering ribs and stomach.

Miring -.gut case lining

Orolang-chest

Oroden - chin part down

Turtle parts;

Nindil with **Gumanan.**

Manbin. left and right side separately .

Janbal.. left and right side separately

All of the above are the pieces into which the dugong and turtle are butchered. In many cases claimed pieces constitute pairs of the above. This is done mainly to ensure that the person receives a good combination of meat and fat as some pieces are predominantly one or the other. Pieces such as the **nindil** or **miring** have a very high fat content through the meat and so are highly valued. Meat that is low in fat tends to be very tough especially if the meat is eaten fresh. [118] In dugong the **Nigabum** is often combined with half **Nilange** as the former is mostly meat and the latter fat. Pieces on Dugong such as the **Oroden** and **Orolang** have the perfect

[118] Many people are unaware that almost all meat today is aged for at least 1 to 2 weeks in order to make it tender. I have interviewed several butchers on the subject and they all stressed that fresh meat tends to be extremely tough when cooked. A high fat content in the meat helps to offset this.

combination of meat and fat. On turtle the **Janbal** are felt to have a better combination of meat and fat than the **Manbin**.

Free pieces:

Dugong parts;

Irri - smaller rib bones at the bottom of ribcage

Turtle parts;

Nama-head

Lanjar -chest plate

Iwalgul - carapace

All guts and intestines for both turtle and dugong are free, except for deposits of mesenteric fat (**Gumanan**) in turtle which usually go with the **nindil**.

While the free pieces tend to not have much substance in actual weight of meat they are actually very satisfying. In turtle the associated gristle and oils that come off the shell (carapace or chest plate) make the little meat there very tasty and extremely rich. In addition parts of the shell are of a soft cartilage that can be eaten. The short ribs are usually quite fat and the bones are usually sucked dry of their marrow which is very plentiful when fresh. Today the free pieces of turtle can be quite substantial and feed several people. In the past the turtles caught were significantly smaller and consequently the free pieces would have provided less nutrition.

7.2.1.a. 1a Gounie's Patterns.

Gounie receives turtle and dugong meat from one of three sources. The first is related to his being the receiver in someone else's distribution pattern; the second to his role in procuring and butchering the turtle or dugong; and the third is through access to the free or unspoken parts of turtle or Dugong.

Gounie receives the **Jandul** and **Oroden** whenever Aaron Wiggan (Gounie's fathers brothers sons son) catches turtle or dugong respectively. Aaron has been effectively procuring these for two years without coaching. Gounie is his **Jawoulo** and saw him through **Oulouloung** in December/January of 1995. Aaron gives the **nindil** to Jabby with whom he usually goes fishing, one half of the shoulder or **Manbin** to his Great Aunt, Jesse Sampi (formerly Wiggan), and the other half to Yvonne Davey (Jesse's married daughter). Gounie then shares his piece with Old Mum and anyone who happens to be living in her house at the time. Usually one of her three sons are there and, if there is any meat, they will eat some of it. Old Mum's daughters, nieces, grand daughters, and daughters in law often spend the afternoon with her outside under the mango tree but I have never seen them eat turtle or dugong here, though they often eat fish, which they cook in a small hearth to the side of the house.

Gounie also has rights to pieces of meat when he has piloted the boat for another hunter, and he always claims the **Nindil** or **Miring**. These he again gives to his paternal grandmother Katie Wiggan, (Old Mum). When he butchers meat for other hunters he also has the right to a piece and again he usually takes the **Nindil** or **Miring**. As Gounie is the pre-eminent butcher of his generation it is difficult to contrast his actions with another. Jabby also butchers meat but usually with Gounie. When Jabby butchered alone he also took these same pieces to Old Mum's (see above), where he often stayed before his baby was born.[119] It seems likely that Gounie and Jabby are not claiming this particular piece of meat for themselves and then giving it to mum, but using their part in the procurement and processing of meat as an excuse to claim what should be mum's piece and then dropping it off. The **nindil** and the **miring** are the two most tender pieces of meat in turtle and dugong, and so are good pieces for older people who are generally lacking teeth.

Unless someone takes them away from the landing site and cooks them at home, Gounie usually has access to the free pieces of turtle or dugong that he procures. Here he and those present drink the oil as it drains off the inside of the

[119] Jabby now says that he claims such pieces for himself, *'See me,* [points to self], *if I go out with somebody* [as a pilot] *I have to have a piece, because I have a family, for my wife!'* Jabby on Tape #1 on Law and Fishing September 1996

carapace during the cooking and then pull meat off of the inside of the carapace once it is cooked. The short ribs of dugong are nearly always eaten at the butchering site. Usually a good number of people come down to the beach whenever dugong are caught and they all share in the short ribs on a first come first served basis, each getting one rib. Turtle are sometimes butchered during the course of daily expeditions, but even here the hunters eat only the **Lanjar** and intestines. None of the main pieces are touched. I have never seen dugong butchered during the course of an expedition. If the hunters are living in the islands they may be butchered on site at the end of the day, but the meat is put aside and delivered to One Arm Point the next morning, the short ribs cooked and eaten by those present.

On one occasion Gounie cooked an entire turtle he had caught while we were living in the islands. He then returned with the cooked main portions to One Arm Point to distribute them. Yet despite this he was reprimanded strongly for cooking it on his own.

In principle Gounie has several people to which he must give the meat he procures. His boss or **Jawoulo** was originally Old Muchu Davey and, as he is dead, he technically should be giving the meat to Muchu Davey's daughter, Molly Davey.

Old Mum comments:

> *'Gounie's boss was old Muchu Davey. Dolly, old woman, Brian Carter's mother in law, she had a son from old Muchu, they had sons. And he [one of them] [Muchu] picked Gounie but died from drink. Gounie is lazy to take people their meat but when he gets motorcar he always takes piece to Molly Davey. That's how it should be, now we don't hardly do it there is too much family problems.'*
> *Old Mum on <u>tape #1 On Law and Fishing sept.1996</u>. 407-425*

Gounie very rarely gets the chance to take Molly Davey her piece of meat. He comments that she is taken care of by her own family, but if there has been a particularly lean season and he is one of the few to catch dugong he will bring her piece.[120] Most of the time, however, he gives large portions of meat to his aunt Jesse Sampi. This is acknowledged as an uncharacteristic choice, her being his aunt, but he had no one else to give it to as many of his receivers are dead and others have no need of meat. Though she has now been technically assigned several pieces by other hunters, two of her brothers grandchildren, these hunters are still very young and they are not as consistent as Gounie.[121]

[120] It is important to note that none of the standard relationship terms describe Gounie's relation to Muchu Davey, therefore it is reasonable to assume that he is in a distant relationship category to Gounie.

[121] This is in fact a deliberate and manufactured compromise to deal with new circumstances. This relative flexibility of application but inflexibility of ethic shows the deliberate nature of these strategies and highlights that these are created ratified and imposed culturally from within not determined from the outside or because of ecological circumstances. This supports the notion that shared ethic can be maintained despite different environmental and even cultural circumstances and specifically supports the hypothesis that ethic is the governing force behind procurement strategies in the Australian Aboriginal context.

7.2.1.b. Collecting and consuming turtle and dugong meat.

Turtle and dugong that is brought back by the hunter to his residence is left alone by all household members except for the free pieces, if there are any left over. The main pieces of meat are treated as if they do not exist by all members of the household (see Figure 61). People who arrive to collect their piece do not do so in a demanding way but in a nonchalant, unassuming manner. They do not usually enter the house itself and, if in a vehicle, they will call out without leaving the vehicle. When people come to claim pieces it is difficult to tell whether they are the actual person to whom the piece is given up, or whether they are just a representative or descendent of that person. I have never heard these visitors ask for anything and yet the piece or pieces of meat are carried over in a plastic bag and handed over to the person who does not thank or really even acknowledge the transaction in any way. The visitor generally leaves immediately with no guise of politeness etc. and the hunter handing over the meat shows an equal disinterest in the transaction. The feeling is not one of indebtedness, nor one of generosity on the part of the receiver or the giver respectively. There is no sense that the receiver is imposing his need on the giver or that the giver is in any way bothered by the receiver's presence.

Figure 61. Claimed Pieces On Car

As pointed out the receiver rarely enters the household and one never sees those to whom pieces are given up eating from the free pieces. The receiver arrives, takes his/her piece, and leaves. If they happen to be hanging around, they will watch everyone else cutting into the turtle carapace or **lanjarr** but will not participate. Designated receivers of pieces, who happen to be close to the family and often spend large amounts of time within the household, will behave completely differently when collecting their piece. They appear to come to the house with a single purpose and, once receiving their piece leave immediately.

Today, once receivers have taken their portion and there are still pieces left over, people who are empty-handed tend to get them. Sometimes this is close family, but usually it is older ladies in the community who no longer have husbands or large families to provide for them.

As pointed out, the free pieces can provide a significant amount of food. The chest plate or **lanjarr**, for example, can effectively feed an entire family, though usually it is left for the children to consume. The hunter is not seen to eat from the free pieces of meat which he has procured. Despite not actually receiving a piece the hunter can feed some of his family if the free pieces are not consumed at the processing site, allowing him to take them home. This is today a common occurrence as the landing site and the houses are relatively far apart. Traditionally, the butchering and cooking sites would have been much closer together so it is more likely that the free pieces would have been cooked immediately and eaten by all present or handed out to the children who were traditionally always milling about such areas.

Today, if the free pieces are being cooked at **Angulumar,** the hunter's entire family will often come down and take part in consuming them. Therefore ,while it appears that the hunter's family gets some part of his catch it cannot be considered his share as it is not comparable in size or quality to the main pieces, and he does not actually control access to this portion or set it aside.

7.3. Distribution and Consumption of Fish.

There are many restrictions which are natural consequences of the seasonality of fishing practise. These have been outlined in Chapter 6, Daily expeditions. Many of the restrictions that are specific to individual species, but not related to seasonality, have also been covered (see 7.a and 7.1b above). In this section I will address the issue of redistribution of procured fish for its relevance to this chapter even though it has been covered in part in previous chapters.

Moya Smith (1997) notes that there were certain rules for the distribution of larger fish concurrent with rules for distribution of turtle and dugong (see above). While It appears as if larger fish and Rays are distributed with some specific rules, these rules are entirely different from those for turtle and Dugong, the primary distinction being that large fish are shared and not given up. Douglas states that, unlike turtle and dugong , fish does not have to be given up, unless someone asks, at which point he feels compelled to give it. In my experience the giving away or sharing of fish is perceived as completely different from the renunciation or giving up that takes place with turtle and dugong. The sharing of fish is perceived as a generous act, the only obligation being to share larger fish. There appears to be no obligation to share smaller fish and many if not most fishermen do not. While I have observed the sharing of large fish and Rays the only consistent redistribution I noted was that the best pieces were given to the oldest members of the community, usually the hunter's grandmother or great aunt. The hunter always kept a significant portion of the meat which he consumed him or herself. That I noted no pattern to the redistribution is probably a reflection of the breakdown of systems rather than an absence traditionally of such systems. Only two large fish were caught during both fieldwork periods and these were both shared throughout the community. On one occasion a large **Jangarr** ray was procured and the lower back section was cooked and put aside for the paternal Grandmother of the procurer. However research into this process indicates that it had nothing in common with the redistributive mechanisms for turtle and dugong meat.

Smaller fish made up the majority of the catch and in my experience it was not possible to ask someone in advance for fish. If one happened to be in the right place at the right time the fisherman generally shared part of his catch, but short of this the fisherman appeared to be under no specific obligation to keep or put aside any fish for anyone, though he was definitely expected to share it if asked. I often observed older parents complaining that their sons or daughters had caught some nice fish but that they didn't even give them '*one taste*'. With today's level of privacy fishermen can quite often keep fish for themselves and their households, but more often than not, if news gets around that there has been a good catch extended family will show up and either eat the fish within the household or take some of it away. A fishermen and his/her family are under no specific obligation to share the catch, but if they eat it all themselves others may gripe and make a fuss. This may predispose fishermen to eat fish during the course of the daily expeditions as, if the fish are eaten en route it does not become a contentious issue and no one can hold non distribution against them. Therefore it was a common almost regular occurrence during the daily expeditions to stop in the middle of the day or on the way back to One Arm Point and cook and eat nearly all the fish procured up to that point. It was not uncommon for fishermen to consume what seemed to be ridiculous amounts of fish, sometimes eating four to six apiece. It is difficult to assume that this is the main rationale for consuming fish during the course of daily expeditions as there is another possible explanation. It is likely that some fish will begin to go bad before they can be consumed at One Arm Point, almost forcing the fishermen to process and cook them in situ. Occasionally fishermen would bring cooked fish back to the community, but this was rare. Historically fish were divided up equally among participating fishermen where they were caught and then, presumably, redistributed within the households of those concerned when they returned to camp. Today however some fishermen seem to keep what they catch for themselves and their families, so that some took home substantially more fish than others depending on their luck and skill.

As one can see it is difficult to characterise the distribution of fish, it can be labelled as a sharing system however it is difficult to characterise as there are no formal structures to be followed, and furthermore there appears to be no obligation to share. Though it is implied that one should share, it either occurs or it does not. If one were forced to share one would set aside the necessary pieces, or divide the fish up along certain lines each time, but no such processes take place. Fish are given freely if asked but there is no guilt on the part of the procurer if there is not enough or if he or his family have eaten it all. Again it is less likely that people will know that there is fish to be had due to the high level of privacy provided by trucks and houses. A good interpretation of such sharing processes is done by Peterson (1993)who labels them as 'demand sharing'.

One of the most interesting aspects of fish redistribution is how it contrasts with the distribution of turtle and dugong. Unlike for pieces of dugong and turtle, where people seem almost indifferent to the fisherman's part in procuring and renouncing the resource concerned, people are thankful for fish and express gratitude when receiving them.

7.4. Other Restrictions

This section seeks to elaborate on other restrictions relative to marine resources.

7.4.1. Rainy day restrictions.

The monkey fish or Darwin Jew fish has the notable restriction of only being taken when other sources of fish are not available, generally during times of extreme weather. As described in chapter 3.3 6 & 6.12, this fish is extremely easy to procure and is considered to have taste all year and yet it's consumption is restricted to times when other sources of fish cannot be exploited. The advent of the community store as an alternative source of food in times of bad weather means that the Bardi never feel justified in mounting expeditions to procure these fish. This effectively means that today they are only ever caught, albeit rarely, by accident, by children with hand lines.

7.4.2. Totemic or spiritual affiliations.

The Bardi do not appear to have totemic identities as such. There were however, references to people having **Rai** or spirit children which assisted them or were always around them. Some of these had certain spiritual affinities with certain species, usually trevally, **Giral**, or small turtle, **Angurbin.** They would not consume these for fear of getting sick. However it remained relatively uncommon for people to have such associations, though this may be another reflection of the breakdown of tradition and Law. This was not my area of research so I do not feel comfortable focusing on the role of such species affiliations. It does appear that people who were associated with **Rai** had certain species specific prohibitions. For a complete analysis of **Rai** and their place in Bardi cosmology see Elkin (1937), Coate (1966) & Worms(1986).

7.4.3. Bardi Sensitivities.

This section explores the Bardi's sensitivity or empathy towards certain species and their environment, and its consequences.

7.4.3.a. Loggerhead Turtle.

This turtle was apparently left alone when it matured because of its large head which presumably reminded the Aborigines of a human head. There is evidence that other Aboriginal tribes treated Loggerhead turtles as sacred. (see Lawrence 1969)

The Bardi often express regret in the exploitation of certain species such as for the gummy shark outlined in section (3.310.b), and in certain cases could not bring themselves to kill certain species for a variety of reasons.

7.4.3.b. Married man/Married turtle

If a hunter's wife is pregnant he is unable to kill married turtle. Apparently, if he tries, he will miss, and it is therefore recommended that another hunter take the shot. This cannot strictly speaking be classified as a restriction, there is no Law that prohibits the specific hunter from catching married turtle. The restriction is not on the turtle itself as another hunter whose wife is not pregnant is capable of taking the shot. The statement is more one of fact than a rule and is based on the knowledge perhaps from experience that a hunter whose wife is pregnant will feel empathy for a turtle who is in the same state as his wife and will miss it. In this way he comes, due to his specific circumstances, to feel empathy for a resource he has probably killed his entire life. This situation gives us an important insight into the subconscious of Bardi hunters and the character of their sensitivities towards their resources. While one might expect that hunters would develop an indifference to the life of their commonly sought resources or that they never had any sensitivities one can see that there is an undisclosed connection with the animal and its life that only becomes obvious when the hunter's situation (pregnant wife) causes him to respond differently to a familiar situation and he can no longer act in his usual manner.

This situation gives us an important understanding of the character of Bardi resource use. While we can observe that it is effective we can now see it as compassionate. I put forward that this compassion is perhaps manifest throughout

Bardi hunting and fishing practises and can be seen to affect many of their resource use strategies.

7.4.3.c. Dugong have culture.

The Bardi often refer to the deliberate way with which certain species go about their lives, referring to their instinctive behaviour as their Law, and making parallels between their activities and human Bardi activities. Nowhere is this more prevalent than when talking about Dugong behaviour. The Bardi often comment on the seasonality of Dugong in the King Sound as reflecting a more conscious level of activity. Fish follow their Law and follow predictable seasonal patterns but the Dugong while having Law are also characterised as determining or choosing where to migrate, explaining why one year or season there can be a big mob of them and the next none, '*they choose a different place*', implying that they have a will of their own. This perhaps accounts for some of the cultural associations made for their behaviour, it is not uncommon to hear Dugong referred to as if they have culture. The Bardi are acutely aware that dugong, like humans, breast feed their young and many jibes and stories are exchanged between men as to the nature of their breasts and milk. They also characterise them as sharing certain cultural traits with themselves. **Inandinarr** is the name given to a trio of Dugong consisting of a mother an older calf and her new-born. The larger calf is always female and Douglas related this behaviour as reflecting Bardi cultural values, which imply that a son should not stay with his mother after a certain age even though it would be still acceptable for her daughters to do so.

> *'the mother (dugong) will kick away its son, it is a bad thing, but will keep a daughter with it and two month old baby and travel in three, they are called **Inandinarr**. (Douglas Tape 1 side A #547-593)'*

If ever the Bardi hunted **Inandinarr** they would not kill the old mother or the baby but kill the one 'in between'. If the youngest calf was old enough they would kill the mother and the eldest calf, leaving the youngest calf. They express great emotional distress when recounting stories of when they were forced to kill baby dugong when they mistakenly killed the mother. They would rather the baby be dead than wandering around looking for its mother. .

'When we accidentally killed a mother with a small baby we would catch it, (even though) baby meat is no good, too soft because it is nursing.' he then adds 'Today they would throw it out or let it wander around alone.' (ibid.)

Older hunters easily identify pregnant dugong and strictly avoid them. Younger hunters are less selective due to their lack of experience and the nature of the techniques they employ.

7.4.4. Age restrictions.

There is a wide range of species of fish and pieces of turtle, dugong, and stingray that can only be consumed by older people, either as a consequence of restrictions imposed through Law or simply for practical reasons. Most of these have been touched on previously. There are many fish that were traditionally eaten mainly by older people. Younger people who caught them brought them to their grandparents or great uncles and Aunts. They include almost the entire range of the *Serranidae* or groupers which coincidentally are predominantly fat all year. Today it is jokingly said that *Serranidae* are reserved strictly for older people, but it is phrased in such a way that it does not appear to be a restriction imposed by Law but rather a favourable way to behave. This family of fish all have a reputation for living a long time out of the water. I have observed one being brought back to life by a Bardi child in a sink of fresh water almost six hours after it had been caught and left dry in the bottom of the boat. This implies of course that the fish is fresher and accounts in some part for its being sequestered by the older generation as it would be one of the few fish that would make it through the day without becoming inedible, making them ideal to bring back to old people left at camp.[122] Most of these fish when caught were brought to Katie Wiggan, but when large numbers were caught they were consumed freely by all.

[122]As many expeditions lasted only half a day, decomposing fish was generally not a problem. Nonetheless, on most trips the fishing would occur at the end of the day after turtle or dugong hunting, presumably so that fish would not sit in the bottom of the boat for hours and decay. On full days out the group usually stopped for lunch and consumed all of the fish caught in the morning. When living in the islands any fish caught was cooked almost immediately.

One fish in particular is banned to all but the oldest people, and that is the 'china man fish' or 'red emperor'. During my field work I never saw nor heard of one being caught so it is difficult to predict what would have been done with it. Apparently it is reserved not simply to older Bardi but to Bardi that are so old that they have to be taken care of almost completely by their family. This fish is associated with the myth of **Galalang** who consumed it before he ascended to the sky. It is, perhaps, a strange coincidence but these fish are known to be poisonous in some areas and during certain seasons (Allen & Swainston, 1988 & Tuma, 1994)

7.5. On borders and rites of Access.

It is difficult to ascertain where borders and rights of access would have caused a problem in the use of maritime resources among the Djaui Worrora and Bardi. They were all living in common, they all knew each other, they all shared the area and intermarried. Who are the outsiders? They were all interrelated. There were no incoming groups. Boundaries, as such, appear to be emphasised today by the artificial lens used in order to identify and assert land rights. Even though boundaries extend into the sea my research indicates that it is likely, with reference to some marine resources, that the Bardi stressed rights of access to procured foods over rights of access to areas. The balance between these probably shifted according to the resource concerned. The redistribution of turtle and dugong seems to show very little concern for the owner of the area where it was procured (this is not to say that the hunter did not have to request permission to use the area which is unclear but that there appears to be no piece set aside specifically for him). In this way they could maintain the ethic of conservation and renunciation while dealing with a highly mobile resource base. They achieved this by stressing boundaries within the procured resources themselves. The beauty and creativity of the system is made all the more apparent when we come to understand that these boundaries are not inherent to the resources themselves but only once they have been procured. This is important as it deals with the problem of different individuals of either the same group or Buru or, more importantly, of different groups or Buru, procuring the same resources (in the same relative areas). By making the procurer the object of definition for the boundaries within the procured resource, the resource, while remaining truly free, is still owned. Unlike a country with an identifiable owning group, the turtle is technically a free resource or 'open country' until it is procured, at which time it finds its identity. The system is therefore able to maintain the positive relationship between different groups by preventing the possibility of accumulation for personal consumption through restrictions to access making over exploitation impossible thereby guaranteeing the sustainability of the resource. If ownership to renounce was predicated upon terrestrial boundaries that extended into the sea then the turtle would, in effect, as it wanders from one country to another, become the property of the particular land owning group whose country it was transient in. Consequently, as hunters carried by the tide went hunting they would be chasing and catching the same turtle in many different contexts. They would have to calculate the location of procurement and assign the cultural properties of the particular turtle based on where it was caught, constantly asking permission for access while being carried by the tide. The assignment of rights to the procured turtle specific to the hunter avoids all of these problems.

It is more difficult to asses the balance between rights to access and rights to portions with the distribution of fish. As these are not given up and only the large ones are cut into portions which are shared it seems likely that there would be some differences. Following what we know of their redistribution it would be safe to assume that at the very least the owner of traditional country where fishing took place would be in a better position to demand a share of the catch, which in principle he cannot be denied.

As there is little use of terrestrial resources today it was extremely difficult to get an idea of how access to these was mediated.

Regarding relations with outsiders, the environment itself predicates that outsiders would have been in a very difficult position as far as procuring resources without the help or advice of the local inhabitants. Asking permission for access is tantamount to asking for advice or directions in an unfamiliar territory. In many cases it would have been impossible for outsiders to effectively make use of the environment and would have probably been outright dangerous for them to do so unless accompanied by someone possessing the specific local knowledge. No one from the outside would expect to come to such an area and do anything independently. The Bardi themselves seldom talked about exploiting areas foreign to them unless they had permanently relocated to a new area such as Broome or Pender bay where they would hunt with those who had local knowledge. They never went beyond areas with which they were familiar unless it was with someone who had such experience.

7.6. Changes in Law and resource use and allocation.

> *'Today there is too much fighting to do much sharing. [before] People you don't like have the same rights as everyone else. Everything changed when the mission broke up all the sharing stopped'. September 1996 Katie Wiggan (Old Mum)*

The move to Derby was the most destructive for the Bardi. The ecology and geography and hence the resource base is totally foreign to them and those that still live there today only go fishing and hunting when they return to One Arm Point for family visits. People often complain that there is never any fresh food in Derby and, when making visits, they always take a good portion of meat and fish down with them. Without their traditional subsistence activity the Bardi became totally dependent on welfare and fell into drinking and crime, many of the young men dying prematurely or ending up in jail. The legacy of this time still affects One Arm Point which maintains a high level of alcohol abuse despite being characterised as a 'dry' community. Of the Wiggan family, whose traditional country is the actual One Arm Point area, a good portion returned to live in One Arm Point when the Sunday Island mission closed instead of moving to Derby. The Wiggan family had allowed a ranch to be established in the Cygnet Bay area. Here there was a small store, and the owner provided the basics to them. The young men who were brought up in this area such as Gounie are by far the best fishermen of their generation, many of their counterparts having comparatively little experience and skill. Gounie is looked upon as one of the most knowledgeable of fishermen even though he admits that his practical experience pales in comparison to that of his father and uncles Tom, Douglas, and Roy. These three all remained at One Arm Point working for the pearl companies when they first arrived to set up the pearl farms. The feuds are in part a result of old animosities resulting from the return of some of the Bardi who had moved to Derby. It is felt that they only returned to One Arm Point when funding for Aboriginal programs shifted focus to the reestablishment of traditional communities, returning to One Arm Point with an eye on administrative positions rather than through a real desire to return to traditional ways.

7.6.1. Freezers and change.

The impact of freezers must be seen in the context of the move to Derby from Sunday Island and the real breakdown in traditional hunting and fishing practises. Consequently, a good portion of the younger men of this generation were not brought up hunting and fishing. With the return to One Arm Point, fishing and hunting resumed for many of the older generation and those who had stayed behind, but a large proportion of the younger to middle aged men had never acquired the skills necessary or the motivation to hunt and fish in this treacherous environment. One could speculate that without much hunting and fishing going on, the knowledge and practise of renunciation or giving up suffered. With no way to enforce the renunciation, the feuds and the lack of good or active hunters, encouraged some to take care of themselves, to give up on the old system. With active fishermen pulling out of the traditional renunciative system altogether and large numbers of people feuding, the numbers of people receiving pieces of meat from hunters diminished and so the numbers of close family members that now needed to be taken care of increased. As freezers made their way into the community, some hunters reached unspoken agreements with those to whom they were supposed to renounce, deciding that each of them would keep any meat they caught and freeze it. In this manner they would not be dependent on meat from other sources and they could instead take care of those in their family who were not receiving a share anymore. This, of course, addresses the most shallow function of the renunciative system, that of providing meat to those who have none, but ignores the deeper positive social consequences that are the result of renunciation.

More specifically to the Wiggan family, one particular family elder and classificatory **Yagu** (see Bardi relationship terms in chapters 1 and 9) to some of the

Wiggans whom we shall call A, announced in 1974 that since they had acquired freezers they did not need to share anymore. What you caught you kept, and he and his family would begin to operate according to this principle. This apparently threw a good portion of the system into disarray directly undermining the Wiggan's attempts to maintain it. It is difficult to judge what led to this decision but it is viewed negatively by many as the abandonment of Bardi ideals, yet (strangely) it has not resulted in a breakdown of the relationship between the two families, perhaps because of an innate understanding of the problems and pressures that the system is suffering. It is, in a sense, a solution to the breakdown of the redistribution system, in which some were renouncing but not others. It is a decision that is a reflection of the breakdown of the system, not the cause of it. It seems likely that such a strategy would never have been adopted if the system had been functioning. Nonetheless, the event is specifically remembered. It is curious as it was not related to feuding between these two families and both were and are strongly traditional. As pointed out, the Wiggans obviously suffered the same setbacks as family A and yet chose to try to maintain the system. However, as the system broke down, taking care of those who were now left out became of primary concern. The Wiggans are one of the larger family groups at One Arm Point, whereas family A can be characterised as quite small. The Wiggans are perhaps in a better position to attempt to maintain the system amongst themselves. While this does not explain why family A chose to separate themselves from the Wiggans, it is possible that they were choosing to separate themselves from the more distant Bardi with whom they were supposed to be in renunciative relationships, who were no longer partaking in the system.

7.6.2. Disappearance of restrictions during and after Oulouloung.

Today the aspects of the Laws described in section 7.1 and 7.2 appear to have disappeared. During **Oulouloung** the boys are, as before, completely banned from all fish except **Minimbor**. However, they can now eat **Golan**, small blue bone, *Choerodon albigena*. The sections of actual Law related to **Oulouloung** (B,1-

B,2), now only last a few weeks and a few days respectively and the total ban does not apply to the time between Laws.

The specific restrictions on species initiated after **Ouloulounq**, outlined above in section 7.2, are no longer enforced, and after the boys emerge from **Ouloulounq** they can apparently consume any fish that they desire. It is, nonetheless, extremely uncommon to see young men consuming the restricted species just described. This is especially true of **Gambal**.

The reasons for the disappearance of the rules relating to **Ouloulounq** and beyond, regarding regulations on consumption of fish, are less obvious than the reasons for the breakdowns in group relations. As pointed out, it is difficult to establish where the responsibility lie for the breakdown of the system but the dramatic shortening of most of the sections of initiation from several months or years into several days may account in large part for the abandonment of these restrictions. In addition, as regards fishing, the co-ordination of fishing activities across the spectrum of Bardi families is now non-existent. Those techniques that required the co-ordinated activity of many fishermen, especially through trapping using the semi-permanent and temporary traps, are no longer carried out and groups of fishermen all tend to be small and from one particular family. These changes in co-ordinated activity surely resulted in less knowledge of fishing generally and of its role in law being passed on to younger men, and its subsequent disappearance from tradition. Why would knowledge of the Law regarding rules on fish consumption suffer such a loss while those concerning turtle and dugong remain intact? As we know, fish themselves do not seem to have been subject to overall rules regarding distribution and consumption in the way that turtle and dugong were. Apart from the ethic of sharing fish out between co-ordinating fishermen and the restrictions to certain initiates and age categories, fish itself is under no specific obligation to be given up or shared (with the exception of large fish), except perhaps at a loose level within the household once processed.

Laws regarding fish consumption outside of actual 'in Law' prohibitions are still generally carried out so we can assume that what is being lost is the Law and those restrictions that are affiliated with that Law. Fish that are restricted by age category are still avoided by younger men and middle aged women. In addition there is the maintenance of an ethic towards fishing that is still strong and is practised community wide. This is the total dedication to the seasonality of fishing practise.

7.7. Seasonality of Fishing Practise.

As pointed out in the preceding chapter, no one was seen to be taking fish out of their season, even among the least traditional of fishermen. Like the redistribution systems, seasonality of fishing practise was not outlined to me as a specific set of rules that had to be imposed on individuals from the outside, but as an internal rational way of approaching the resource base. The logic of this practise (once it was identified) was presented to me as related to fatness, taste, and general quality of meat. But, as with the giving up or renunciative principle, this behaviour had to be discovered within the 'mundane' activities of daily life. Just as I had to look deeper to discover these patterns of behaviour, one needs to look deeper to grasp the real non-stated consequences of such activity which can be found in the almost complete inverse association between fish fatness and spawning periodicity. At a basic level one can reduce this to a certain degree of pickiness or preference for the qualities outlined above. However, these data I have collected and the associations I have made between fatness and spawning periodicity, themselves ratified by the Bardi, indicate that there is a deeper ethic at work here, one so deep that it is a matter of habit that has survived all the effects of change, without needing to be imposed by law.[123] In addition when one contrasts this kind of fishing behaviour with that of other hunter fishermen, in the Pacific and elsewhere, one is struck by the uniqueness of Bardi fishing patterns, which function in almost total opposition to the patterns of these.

It seems obvious then that the Bardi are functioning according to unique principles of resource use that have unique effects on their behaviour. In the same way, 'renunciation' or 'giving up' can be seen as representing a unique approach to social organisation which cannot be reduced to fit deterministic theories, or

[123] Habit does not adequately represent the behaviour of Bardi fishermen. What I am implying is that this seasonality and its survival represents an intent so powerful that it survives to this day.

represented scientifically by pre-established conceptions of hunter gatherer social organisation.

7.8. Renunciation and the Law in The Breakdown of Cultural Systems

Referring to the issues of Law that affect maritime resources outlined above, I have tried to describe the factors that have led to the circumstances that we observe today. This section seeks to investigate how the issue of renunciation has affected the breakdown and maintenance of the systems described above.

It is perhaps impossible to summarise the reasons for the breakdown of traditional systems. They constitute a complex mix of changes, reactions to changes, and reactions to reactions, so that any one set of changes, or reactions, or breakdowns, is inextricably linked with the next. Changes and reactions are therefore felt across the full spectrum of Bardi culture. For example, the advent of the freezer and its effect on redistribution/renunciative traditions might not have had the same consequences if the system had not already been in the process of breaking down as a result of the constant feuding, itself a consequence of other breakdowns.

As David Turner points out '*Change in Aboriginal society is occurring and has always occurred. The question is whether it is within the parameters of a continuing tradition or outside of it.*' (pp233, Afterlife before genesis.) The breakdown of traditional systems among the Bardi are, in essence, a consequence of change generated from outside the parameters of their cultural context. However, the ways in which the Bardi have dealt with these changes can be very useful in helping us to understand their resource use strategies and, specifically, the place of the renunciative ethos within them. In the face of losing their traditions altogether, what they choose to maintain can perhaps in many ways be interpreted as what is felt to be most important. Today, the aspects of tradition the Bardi choose to preserve can help us to determine the underlying or governing principles of the original systems.

With circumstances and systems changing, people were pushed into re-determining their behaviour. Families and individuals found themselves either maintaining the traditional system or opting out, always as a consequence of the breakdown of traditional systems, but sometimes by choice and sometimes not. However, at some level, families or individuals were faced with a choice: either to pull out of distributive systems altogether and take care of themselves and their own families by storing meat and using it as they needed it, an option now made possible by freezing; or to attempt to maintain the traditional system among those people who were still interested. Over time, this second group of people, interested in the maintenance of traditional distributions systems, narrowed down as the feuds became more established and, consequently, the numbers of participants in the system decreased. Therefore, each successive generation came to apply the system within a smaller and smaller group. This phenomena is evidenced in the changes in distribution patterns from one generation to the next. Within the Wiggan group there are obvious differences: Douglas and his brothers technically give up their meat across a much wider and more distant relationship sector than Gounie's generation which is in turn much wider than Aaron or Willie's generation which distributes almost exclusively among immediate family members.[124] Today the system has contracted to the minimum possible and functions almost exclusively within the structures of established family groups such as the Wiggans. A large part of the motivation for maintaining the system under such difficult circumstances is attributed to the tenacity of Katie Wiggan, the elderly matriarch of the family who insists that they carry on the system as best they can. It was often said that those family groups without knowledgeable old people have little motivation to carry it on. Young men often reflected that they carried it on for 'Old Mum', Katie Wiggan.

If we examine the selection of **Jawoulo** for initiates as it is practised today, we can assess what aspects of the system are being maintained despite change and the limitations of today's context. In the past perhaps by design, the system

[124] As pointed out, Douglas' generation's distribution patterns were the most difficult to decipher. Most of the original recipients are now dead and their descendants who technically qualify for their pieces tend to live far away (being more distant or non relatives). Whenever these visited, however, great effort was made to provide for them and they usually left with several good pieces of meat. Where these lived close by they generally no longer came to collect their piece. The explanation for this was that they were themselves active fishermen, or were members of households that had active fishermen and did not need the meat. Where relationships of renunciation exist and the people are not being cared for from other sources (i.e. family) the hunter will strictly adhere to the Law.

assigned young men as **Jawoulo** to children with whom they were very distant Bardi relatives, or non relatives. Today, because of all the infighting, **Jawoulo** are selected from within a small group of close family members, usually what the Bardi call uncles. These can be understood to be uncles as we describe them, but among the Bardi this also includes people which are actually the child's FBS or FBZ sons. This has profound implications for the renunciative system which traditionally renounced the main pieces of meat to distant or non relatives. **Jawoulo,** as one of the principle recipients of pieces of meat, now stand in a relationship category that is much closer than it would have been traditionally.

Considering the level of antagonism in the community and the lack of appropriate candidates it is not surprising that family groups who wish to maintain such traditions, such as the Wiggans, need to turn inwards in order to try to maintain the integrity of certain traditions and so are forced to select individuals from within their own ranks to fill the necessary positions. Making uncles the **Jawoulo** for young boys, even though taking them away from what was traditionally done, actually maintains certain and perhaps the most important aspects of the tradition. It not only allocates the child a boss man but also allocates boss man status to young men who need to oversee two boys through **Ouloulloung** before they can be considered fully initiated and receive red paint. More importantly, it maintains the tradition of the hunter 'giving up' the main portions of turtle and dugong meat, keeping none for himself. This 'giving up' or renunciative ethic is the focus of what is being preserved. Despite changes, the principle of giving up is maintained. In fact, what we might see as the practical consequences of such actions (renunciation) from a western perspective, are no longer relevant. One would expect that the 'giving up' principle was nothing more than the vehicle for redistributing meat throughout the community and that when people no longer needed to maintain the system to insure against the risk of not catching anything over a future period, or to overcome the inability to store fish (due to the advent of the freezer and store bought foods), that it would disappear. The fact that so much trouble goes into guaranteeing that this type of behaviour carries on shows us, perhaps, that the consequences of such actions go beyond what they achieve in the material realm. Here again I would argue that what they are seeking to do is maintain this principle of renunciation because it is one of the governing and defining principles of the Aboriginal ethos. To lose it would in effect be tantamount to losing one's 'Aboriginality'. If we were to view today's behaviour without an understanding of how and why the system has changed and without the understanding that they are trying to maintain certain governing principles such as that of renunciation or giving up, one could interpret their behaviour (where they are giving up meat to immediate family members only) as emanating from the type of self-interest that so many anthropologists attribute to hunter gatherer behaviour, albeit with a twist since the hunter is still removed from immediate return self interest as he is still keeping none for himself.

Today's system, in which renunciation appears to match family self interest, is ironic. The irony is that, in an effort to maintain their tradition, they end up achieving in a material sense almost the opposite of what the traditional system accomplished - the redistribution of procured resources beyond the hunters/procurer's kin . Today's system has however, for some, maintained the principle of giving up or renunciation. The hunter still gives up turtle or dugong, keeping none for himself or his immediate family. While this renunciative behaviour may not follow traditional patterns, it can be seen as maintaining what they feel is the crucial element of it. Despite change, renunciation is still in action. Can we interpret this as indicating that the principle of renunciation is in fact the basis of the ethic that they are trying to preserve?

7.9. Bardi Renunciation and Sharing; Models and Implications for Conservation.

Monica Minnegal, following a more complex model that accounts for sharing systems as determining exploitation patterns, argues that hunters will take into account their commitments to share catch with others and that '*patterns of production can be expected to vary accordingly*', that the extent to which resources can be shared may affect the amount of a resource which can be usefully procured (Minnegal 1997: 27). It is true that when the Bardi hunt turtle or dugong they catch enough to meet the needs of those they renounce to. However, such a deterministic theorem is not applicable in the context of giving up or renunciation. The hunter cannot calculate the value to himself of his product and exploit it accordingly because it has no implicit value to him. The obligation to give up the resource completely, according to such theorem, would imply that there would be no motivation to exploit the resource and consequently none would be procured. This is clearly not the case since thirty six turtles were caught during the data period alone (see chapter 6.11). Altman (1987:172) has shown that traditional Aboriginal redistributive systems follow their own rationale (see chapter 5.6). A hunter's motivation when capturing turtle or dugong must therefore be generated by different criteria. I observed that the hunter, while appearing indifferent to the giving away of the turtle, took much pleasure in the hunt itself; part of the motivation appears to be as simple as this. Altman, when observing that hunters can give up control of their resources, argues that at these times the hunter exchanges his catch for prestige.[125] The giving up of turtle and dugong in the Bardi context cannot, however, be said to be motivated in terms of acquiring prestige as Altman argues (1991: 80). It is a part of a larger system whereby the hunter has no choice but to renounce his catch as do all the other hunters in the working system. It could even be said that the hunter never actually has possession of the resource as the pattern of its renunciation is predetermined before he catches it. The hunter does not capture the turtle and then stop once it is procured and ask himself; '*Should I keep it or give it away?; h*e simply gives it up.

Once captured, turtle and dugong represent a surplus or an abundance of a resource to the individual hunter. That it is given up completely appears to be in

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[125] Altman's own examples, however, describe behaviour that is closer to renunciation than exchange. He quotes an observation from 1888 describing the distribution of food among the Aborigines of Victoria. '*There are strict rules regulating the distribution of food. When a hunter brings game to the camp he gives up all claim to it, and must stand aside and allow the best portions to be given away, and content himself with the worst. If he has a brother present, the brother is treated in the same way, and helps the killer of the game to eat the poor pieces which are thrown to them, ... The narrator of this custom mentioned that when he was very young he used to grumble because his father gave away all the best pieces.., but he was told that it was a rule and must be observed. This custom was called yuura baawhaar, meaning exchange.*' (Altman 1991: 76) This does not seem like exchange, either of material goods or prestige, but rather simply giving up. The hunter, being thrown the worst pieces, hardly indicates that anyone is acknowledging some debt in the process but rather mirrors the behaviour I observed in the taking of pieces of renounced meat today among the Bardi, suggesting that, possibly, the rule being referred to is one of renunciation.

keeping with the ethic of renunciation as Turner and Swain have expressed it. While one of the outcomes of such behaviour may be a reduction of long term risk the individual never gets back as much as he gives out. Furthermore, the individual nver receives from those he gives to, reinforcing the idea that a renunciative rationale may be at work. In addition, the issue of risk is probably highly overrated in this rich environment where there are many other procurement options available to the
hunter. The costs of giving up these species might not be as important as one might assume. Where Minnegal sees such patterns of distribution as constraints on economically rational behaviour, Turner (1989) argues that these patterns of distribution reflect a deeper rationale; one that seeks to create interdependencies between people. In the case of the Bardi this would appear to be true as resources were traditionally renounced to distant kin. In addition among the Bardi this renunciation is not predicated on availability, it does not vary with seasonal shifts and relative abundance of resources as some anthropologists would predict (Bird and Bird 1997) but is a constant that is maintained regardless of circumstances or costs incurred in exploitation.

I have found that there is another possible consequence of this renunciative behaviour. When hunting for dugong and turtle the traditional hunter is not concerned with providing nutrition for himself or even his immediate family as he gives the resources up once procured. A hunter who catches dugong or turtle is only catching enough to feed those he is renouncing to. If he were sharing the resource with others he would be hunting for himself and the other, and he would probably procure more of the resource. The principle of renunciation can then be seen specifically to curtail the procurement of dugong and turtle.

Turtle and dugong are not, strictly speaking, the subject of any restrictions on consumption. They are hunted all year round if they are present, and in the case of turtle in any state (reproducing or not), the only restriction on consumption being levied on the hunter who procured them. Fish on the other hand are the subject of many restrictions be they due to participation in certain stages of Law, generation or age related restrictions, or seasonal restrictions relative to the fatness and spawning cycles of fish. However, when procured, many fish are not given up by Law. It appears therefore that those species that have few restrictions on consumption are forbidden to the procurer (as they are given up), and those that are inherently restricted can be consumed by the hunter. Neither resource base is the focus of exploitation that seeks to provide for the hunter and those he shares with simultaneously.

8. Discussion.

8.1. Bardi dynamic

Douglas often told me that the nature of his affection for the sea and the life he led was intangible to **Garria** 'white folk', that our concerns did not reflect theirs. He expressed frustration at being left out of the decision making processes that legally determined his rights within his own environment when he knew that Bardi ideas had sustained the resources since the beginning of time. After I began religiously to follow the example of my teachers in our daily expeditions and demonstrated some measure of success, I became privileged to a discourse that, to me, defines the nature of Bardi resource use as something that the Bardi are in control of.

Discourse appears to be one of the defining characteristics of the Bardi fishery. I assumed that I would arrive and ask questions. Instead, I sat and listened to an ongoing debate that seeks to come to grips with the challenges presented to the Bardi way of life through contact with Europeans. The older generation are a living testament to change, they can vividly catalogue the changes in fishing technology in their lifetime: the first outboard motor; the first aluminium dinghy; the Japanese harpoon replacing the English, and the changes that ensued in technique. They have an incredible perspective on the situation of the Bardi fishery and are fully aware of the consequences of their actions. They accept some of the responsibility for the loss of tradition and the changing attitudes of young fishermen, and are constantly seeking solutions to redress this. The young fishermen are not indifferent to their elders' perspective as they highly value and respect their expertise. In effect, each generation is interfacing with the last and the next. The older fishermen are ratifying the lessons of their childhood with new technology and the demands of changing social structures, and the new generation is learning from them. There are many debates over the nature of change. Some call for a return to the past, yet others justify their actions in the present. This ongoing debate demonstrates the dynamic of Bardi systems of resource use. They are not passively accepting change. Technology is not simply 'happening' to them. They are constantly assessing their actions in their environment, both cultural and environmental, and they fully accept the consequences of their behaviour and their effect upon these.

The fishery is not in crisis and yet they foresee problems, know the causes and are presently seeking solutions. There certainly is no lack of turtle or dugong at this time and yet there is already concern for the future. Today the problem is largely one of implementation. For example, concerned with the effect of motors on the behaviour of turtles and dugong and the consequent lack of success using the more traditional selective methods of hunting such as sculling, many hunters, including young ones, fear that the Bardi are slowly creating circumstances that will make it impossible to procure turtle and dugong without chasing them with motorised dinghies. They argue that a ban on the chasing of turtle and dugong should be implemented forcing a return to sculling. This would involve the acceptance by all fishermen of a period of reduced catch until the species concerned were able to reacclimatize themselves and begin to behave in a way that is conducive to exploitation through sculling . The divisions within their society, the fragmentation of their ethic through contact with whites, and the adoption of the technology concerned mean that such solutions are not likely to be implemented. What has been lost through contact and the slow attrition of values through the use of culturally shallow technologies,[126] is not necessarily the ethic that guides their resource use but the cultural cohesiveness that would allow them to regulate their exploitation by effecting change at the cultural level.

8.2. The question of over-fishing

Though it is difficult to assess the effects of the use of new technology among the Bardi it seems logical to assume that it has led to higher than normal or traditional yields. However, arguments that assert that Aborigines, aided by new technology, are actively overexploiting their environment are spurious. In the case of the Bardi it is important to note that the technology adopted by Aborigines is not of a commercial nature but rather reflects the level of technology used by most recreational fishermen. In addition though levels of exploitation may have increased

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[126] Shallow in that they do not have implicit in them the knowledge carried with traditional technologies.

per individual, there are certainly fewer individuals actively involved in the fishery than in the past. Though techniques may have changed, the seasonality of fishing procurement has not. Coupled with the remnants of the redistributive mechanisms, it seems likely that the Bardi still maintain levels of exploitation close to those achieved traditionally. The fishery at One Arm Point is more regulated than most western commercial fisheries, albeit without the imposition of any sanctions.

Despite all the changes in their lifestyle, the Bardi have not changed their ethos. In fact, the system as the Bardi follow it today could probably allow for much higher sustainable levels of exploitation of the fish and turtle population than were traditionally and are presently carried out. Unfortunately, the Bardi are not alone in their use of environmental systems today and the effects of exploitation must now be measured in the context of an overall reduction in the species and depletion of habitat far beyond the One Arm Point area. In the case of the hunting of egg-bearing married turtles the depletion of environments beyond the control of the Bardi where these turtles reside may have new consequences for this kind of fishing behaviour. However, the concern that Bardi are taking higher levels of turtle than traditionally evidenced by lower observable numbers in the actual environment must be balanced with knowledge of the actual situation. The apparent lowering in turtle numbers is probably related to the adoption of the outboard motor, which has offered both advantages and significant drawbacks. It is plausible that quite simply a large number of turtles have relocated to quieter areas.

Betty Meehan and Neville Whites' arguments (White & Meehan 1988: 38) that the use of power boats among Aboriginal people has taxed resources beyond the levels that prevailed in pre-European times does not take into account that the initial depletion of maritime resources in Australia, specifically of turtle and dugong, was caused by the incoming Europeans and that the subsequent depletion may have more to do with species relocation than increased numbers of these caught due to the adoption of new technology. It could be argued, as some Bardi have suggested, that after an initial increase in yields the use of European technology has led to a decrease in numbers caught. '*Somewhat paradoxically, technological advance in fishing might under some circumstances increase uncertainty rather than reduce it*' (Andersen and Wald 1972: 157). The increase in numbers caught may not be significant whereas the demography of the animals themselves may. Katie Wiggan, Old Mum , suggested that they caught as many turtle back then as they do today (tape 4a #395). The case may be, as some Bardi argue, that the new technology only makes up for what has been lost due to its adoption.

8.3. Aboriginal Theory.

Upon returning to One Arm Point in 1996 I elaborated to Douglas the connection I felt I had uncovered between fish fatness and spawning periodicity. Without hesitation he acknowledged this and began elaborating on the next level of the strategy as it applied to **Iawing** (elaborated in 6.10) and **Golan,** according to which only the new generation was specifically targeted for exploitation each year. In the case of **Golan** this meant focusing primarily on the procurement of only the smallest fish. This practise is in direct contravention of W.A. Fisheries conservation regulations that require Blue bone to be above a minimum size (400mm) . However, in the case of this fish which are protogynous hermaphrodites (Thresher 1980: 89), meaning that the young wrasse are predominantly female until they reach a certain size when they change to males, the wiser conservation measure would be to restrict the capture of the larger members of the species which are rarer and without which they cannot reproduce. Coincidentally, this is exactly what the Bardi appear to do.

The discovery of this type of 'coincidence' has perhaps been the defining characteristic of my research into Bardi marine resource use. These 'coincidences' have all turned out to have special implications for the interaction of the Bardi and their environment that defy conventional theory. Examined within the wider cultural context, one finds that other elements of Bardi culture, separated from actual resource procurement, have similar implications.

Analysis of this behaviour has uncovered two defining elements of Bardi resource use strategies:

1. The connection between a preference for fat fish, spawning periodicity, and the patterning of fishing behaviour .

2.The redistribution of larger species through renunciative mechanisms.

These two principles have the obvious effect of mediating exploitation in such a way as to preclude over-exploitation by controlling the numbers caught and by protecting the reproductive capacity of the species concerned, within an active subsistence fishery. Bardi fishing behaviour guarantees the sustainability of ecological systems and, consequently, the resource base.

The Bardi either implemented these systems as conscious policies or they were moved unconsciously by historical forces to behave in this way despite themselves. What I have found are certain relationships between taste preference, distribution systems, fishing practise and ecological circumstances that move beyond the realm of accident or coincidence and that represent intent on the part of the Bardi in the realm of resource use. The real questions concern the nature or character of this intent, and the way it is articulated as an abstract theoretical concept. As we can see, there is an overall concern with the maintenance of species at many levels; ritually (increase ceremonies); socially (distribution mechanisms) and in fishing practise. Much of their fishing behaviour does not reflect what we would characterise as basic material concerns. Their resource use systems appear to be perfectly engineered to preclude the compromising of environmental systems as we would assess them, and the re-distributive system appears to force people into interdependencies that regulate exploitation. The fact that there are no sanctions forcing the Bardi to behave in this way suggests that they are being guided by a deeper ethic. This ethic may or may not be articulated as an abstract theoretical concept but, as Douglas was fully aware of the consequences of his fishing patterns, it seems likely that it is manifest as an abstract guiding principle. This thesis provides the empirical evidence for the existence of Bardi theoretical formulations that determine their resource use and explain their society. The next step will be to return to One Arm Point and assess how this behaviour is articulated by the Bardi.

The work of David Turner presents an interesting parallel at this point. In the case of the Warnungamagalyuagba of Groote Eylandt, Turner articulated a concept for what he observed as renunciative behaviour. He eventually found out that the people themselves were aware of the theoretical formulations he had intuited as 'explaining' their society, both in an historical and a functional sense, articulated it in their language as gemalyangarrenama: ge, and used it as a creative force within their society (Turner 1989:289). In part due to Turner's work, my starting point assumed that Aboriginal behaviour was a reflection of internally logical articulated guiding principles. I have argued that Bardi fishing behaviour would reflect these principles. The defining elements that I have formulated (shown above) from the observation and analysis of Bardi resource use (ratified by Douglas) appear at this point to reflect in part the Bardi theoretical framework that explains their resource use if not their society.

9. Appendix

9.1.1. Kinship

My own work concerning kinship was limited to elucidating the relationships between the principle individuals with whom I participated in daily resource exploitation and those with whom they redistributed their catch. Therefore, by and large, the genealogies I collected were specific to one family group; that of the Wiggans. Though I had hoped to collect wider genealogies in order to more fully understand the relationships of the Wiggan family group to the wider community and more specifically to Bardi living in other communities such as Lombadina and Jedajun, this proved impractical. At One Arm Point itself the family feuds precluded me from collecting data of any kind outside of the family group with which I became affiliated. This was not necessarily due to the nature of my personal relationships with the other family groups which were always amicable, but because of the consequences such behaviour may have had for my relationships with the family group that I was affiliated with. In essence my fieldwork was able to move forward due to the friendly relationships I established with the Wiggan family. This, however, required a certain degree of faithfulness to their family group and specifically to the individuals with which I spent most of my time. This affiliation was in the best interests of my particular research as the Wiggans are the most traditional and active fishermen at One Arm Point.

In 1912 the Pallotine and Trappist monks setting up missions in Beagle Bay and Lombadina found that when attempting to compile genealogies for the Aborigines *'The ancient tribal marriage system had made no provision for miscegenation and the white side was not taken into account when working out tribal marriages. This meant that half caste half brothers and sisters could still be reckoned straight marriage partners in native law, which not only defeated its original purpose of preventing the marriage of close relatives but made the untangling of genealogies a task for the specialist. The Aborigines themselves were never confused by this.'* (Mary Durack 1969:226.)

As far back as 1912 local organisation was undergoing fundamental change. As exceptions are made over time these can come to be accepted as the rule. The consequences of 'wrong way' marriages for the associations between Buru and the interrelationships between these and between the larger regional groupings are important. Deciphering the original character of these relationships from genealogical data alone becomes extremely difficult.

The ongoing land rights disputes involving the collection of depositions from the Bardi by the Kimberly Land Council specific to **Buru** membership and genealogies meant that most of the Aborigines were somewhat exhausted with the subject and not particularly interested in going through genealogies once again. It seemed pointless to most to do it twice, especially since they knew that I was not directly working on their native title claim. Therefore, all of the genealogical data that I collected was from friends, specifically among the Wiggan family, and while they could fill in the genealogies of extended family members and other families at One Arm Point and identify the traditional owners or **Buru** around One Arm point, my data is really only relevant to these people.

The following then is the framework for the Wiggan descent using Katie Wiggan as the top of the tree. Though I have collected other genealogies they will not be presented. The perspective I am working from is that of the individual and his maritime resource use. The relationships of the main informants to other participants has been described as they become relevant.. While genealogical data outside of the Wiggan family group was collected it was not possible to compile entire genealogies for related participants. Despite this the nature and identity of the relationship in Bardi terms was carefully noted (see *list of Bardi relationship terms* in appendix), so that at the very least the **Buru,** and wider regional group membership was known, as was the type of relationship the participants shared.

9.1.1.a. Bardi relationship terms.

birri: mother (one's mother, one's mother's sistér, one's wife of the father's brother)

goul: father (one's father, one's father's brother, the husband of one's mother's sister)

irmour: aunt (one's father's sister, the wife of one's mother's brother)

gara: uncle (one's mother's brother, the husband of one's father's sister)

gidja: sister (one's sister, one's father's brother's daughter, one's mother's sister's daughter, one's husband's brother's wife)

bubli: brother (one's brother, one's father's brother's son, one's mother's sister's son, one's husband's sister's husband)

jal: cousin (one's father's sister's children, one's mother's brother's children)

yago: brother-in-law (one's husband's brother, one's sister's husband, one's **jal's** husband)

malarr: sister-in-law / wife (one's husband's sister, one's *bubli's* wife, one's **jal's** wife)

amba: husband

bor: son / daughter (one's children, one's nephew's / neice's from one's husband's brother, one's nephews /neice's from one's sister)

ala: son / daughter (the name that one's husband would call their children, one's nephew's / neice's from one's husband's sister, one's nephew's / neice's from one's brother)

gamini: maternal grandmother (one's great uncle / great aunt)

nyami: maternal grandfather

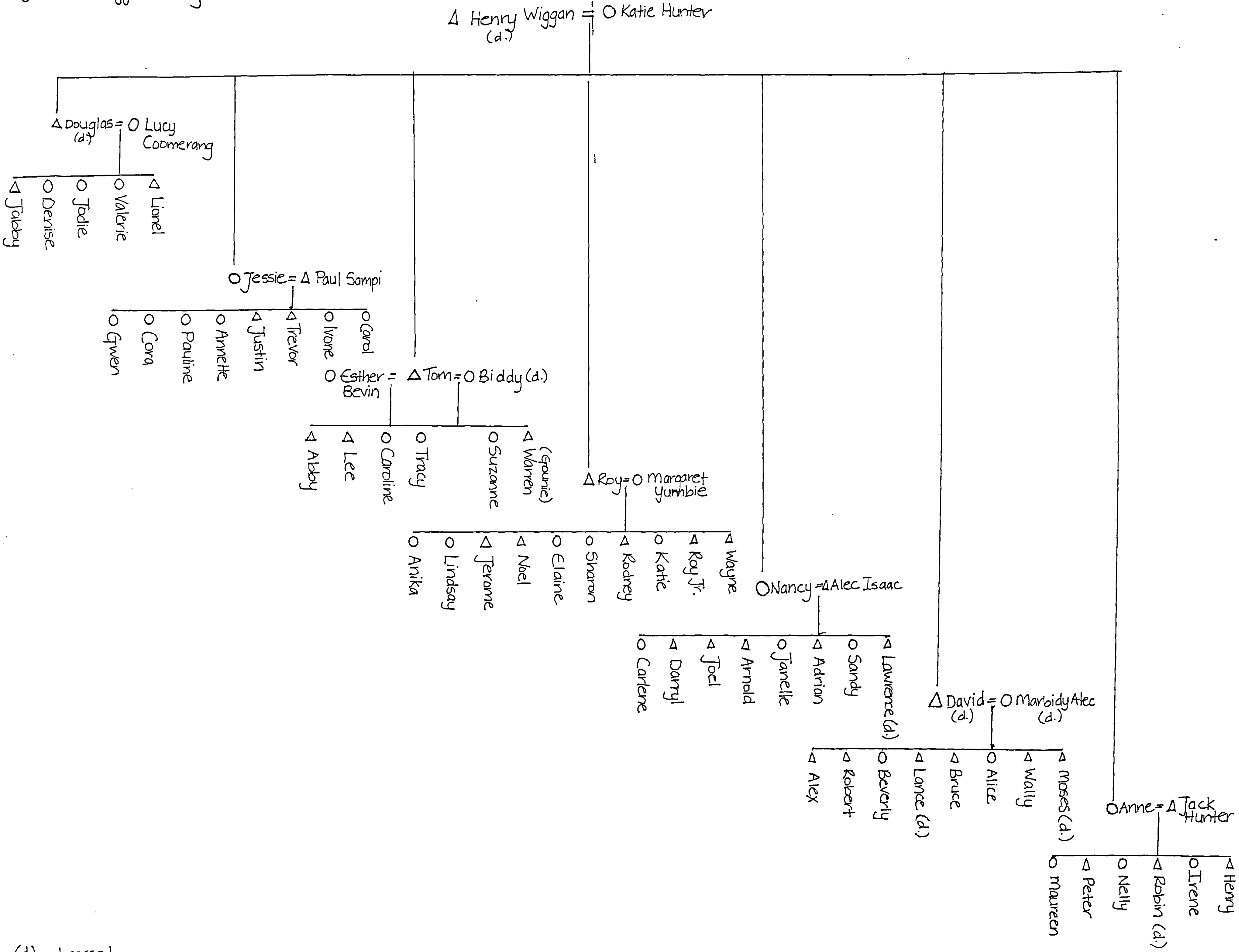
goli: paternal grandmother

galoo: paternal grandfather

gamar: grandchildren

rangan: mother-in-law, father-in-law

Figure 62. Wiggan Family Tree



(d.) = deceased

9.2. Spears and Harpoons.

Much of the information on spears and spear guns has already been introduced and discussed in contexts relevant to their use. This section aims to elaborate on some of the more technical aspects of their manufacture and use.

Spears are perhaps the most common of the tools used by the Bardi in marine resource exploitation and there are a wide variety of raw materials used in their manufacture. These raw materials are used according to their availability and functionality. Techniques of manufacture have remained largely the same and spears are selected and made today much in the same way as historically. There are many important elements that must be accounted for in the manufacture of spears. The function of and potential user of the spear being the primary considerations. Different woods have different properties relevant to spear making and these are taken into account in relation to the anticipated function of the spear. The manufacturer is limited by the properties of trees themselves meaning that only a small variety of trees lend themselves to spear manufacture. Primarily trees must provide long straight strong and small (diameter) sections of wood that lend themselves to being straightened through the application of heat. This limits the range of useful trees. Most trees in inland areas of the Pindan can only be used as juveniles when the young trees grow as single straight trunks aiming to place their leaves in the canopy above. After these reach a certain size they no longer lend themselves to spear making. Others found in the mangrove are taken as mature straight trunks growing in mangrove marshes or as branches on mature trees. These different varieties of wood have different qualities such as density and rigidity that affect the properties of the potential spear but also the possibilities for manufacture. Some spears once straightened stay straight others

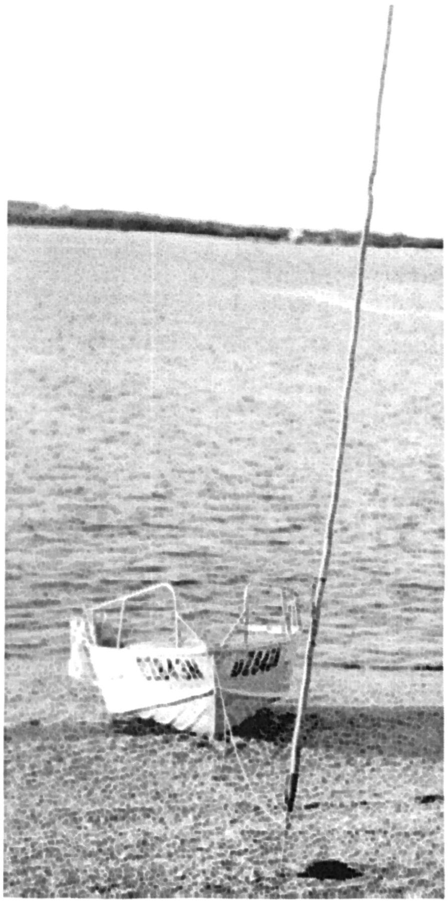


Figure 63. Large spear for harpoon

tend to return to their normal shape once wet and need to be periodically re-aligned. The density of the wood dramatically affects their performance; the smaller throwing spears to be used in the shallows tend to be made out of lighter more buoyant wood giving them greater lift, the spears fitted with harpoons are made of heavier denser wood to counteract lift.

The spear maker takes all of this into account when making spears. I have observed on several occasions at One Arm Point and Groote Island hunters returning to well known raw material sites to check on the growth of specific branches or trees that they have been watching, sometimes for several years. I believe the Aborigines practise the art of coppicing whereby specific young branches or stands of trees are promoted or trained to the desired shape over several years if not generations.

Spears can be used for several purposes but all have the same basic configuration consisting primarily of a long wooden shaft whose diameter increases as it gets to the bottom. Here, depending on the intended use, a single thick wire or metal shaft is secured, usually extending from the base for 1 to 4 feet . Those spears intended as harpoons, are significantly longer and heavier from 8 to 15 ft in length with a thick metal rod at the end of which is fixed the harpoon (see Figure 63). The general use throwing spears can be anywhere from 5 feet to 9 feet with varying weights of wire and wood. Women tend to have shorter spears used primarily for spearing mangrove crabs working on the reef flat and transporting catch. Spears are almost like bags or buckets used to carry any fish caught. The fish is pushed over the rod or wire of the spear through its gill rake so that it hangs almost as if from a clothes line. They cannot slide past the wooden butt of the spear so that if the spear is rested against a tree, dragged by the wire, or put over the shoulder, the fish are kept out of the water or off the ground.

Spears armed with harpoons are the predominant tool of the Bardi in the exploitation of dugong and turtle. The harpoons themselves consist of a short arrow shaped metal bit hollowed out at the back end to fit onto the shaft of the rod on the spear. Attached to this tip is a loop of braided steel wire wrapped in cloth so as to prevent the wire from wearing through the attached rope. When the turtle or dugong is harpooned the tip embeds itself in the animal and the spear shaft is retracted leaving the tip inside attached directly to the boat via the length of rope. The tip itself can be made from a variety of sources but is generally made from the lower unit drive shaft of a discarded outboard motor as it is already hollowed at one end.

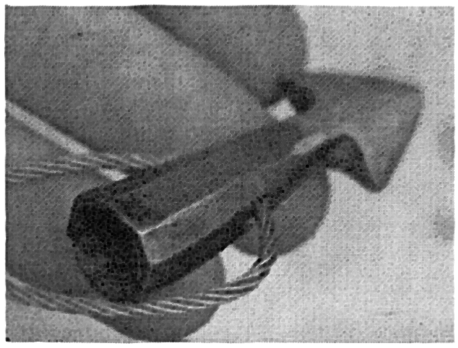


Figure 64. Harpoon tip.

Today harpoons are almost always used to procure turtle but on occasion throwing spear may be used to capture smaller turtle (**angurbin**). As explained, prior to the adoption of the harpoon hunters had to spear turtle through the flesh between the carapace and chest plate either at the neck or tail of the turtle.

Figure 65. Eddie jumping for angurbin with shorter throwing spear.

Spears can be designed specifically according to each hunters needs and preferences. The lighter throwing spears are more disposable than the larger spears intended for harpoons and therefore the latter are designed with more attention to personal preferences. The design of the harpoon varies primarily in two ways; the type of wood used and its length and girth, each of these put together relative to the hunters particular hunting style. Those hunters that throw the spear as they launch themselves from the dinghy tend to have longer lighter harpoons as the extra length makes the spear travel straighter once free of the hunters hands and the lighter weight makes them travel further and faster (see Figure 67 for technique). Hunters that tend to thrust spears into their prey whether from the boat or while jumping prefer heavier, thicker spears. In their case the spear does not leave their hands.

Consequently the prey needs to be closer to the boat and is less likely to be at the surface meaning that the hunter needs to push the spear through some of the water column. In this case the extra weight is needed to counteract the lift of the spear as it goes through the water column (see Figure 66 for technique).

Spears also react differently depending on the style with which they are thrown, different styles generally used for different situations and species.

The first style is akin to a tennis serve in that the hunter is throwing the spear from above and behind his head and following through straight down at and past the prey. This style is generally used when the prey is below or at some distance from the hunter and he needs to throw the spear some distance or into the current and penetrate deeply either through a carapace thick skin or into deep water. It is, therefore, primarily used in hunting turtle dugong and fish or rays on or near the bottom. Generally the hunter leaps from the boat following through the motion with his entire body. This style has a quality of total commitment as once a shot has been taken it is next to impossible to recover the spear quickly and take another. The same style is also used with lighter throwing spears when wading through shallow water hunting stingray, again the hunter is shooting down and through the animal as it rests on the bottom, trying to penetrate through the ray and into the mud/sand underneath.

A fish on the bottom being chased will generally tilt its body towards the surface to look at its pursuer. In some cases the fisherman chases the fish until it tires and pauses. At this point the fish will look up and give the fisherman the flank he is seeking and the hunter launches the spear. Some fish when surprised by a jumping fisherman will always follow the same escape pattern like the turtle or dugong doubling back on itself. The hunter anticipating this aims the spear at an area just behind the fish catching him as he doubles back. Dugong and turtle both have an extra element of predictability in their exploitation that fish do not have in that they need to surface to breathe. The animals however exploit this predictability and will sometimes fake breaks to the surface getting the hunter to commit, at which point the dugong will dive and roll deflecting the spear and turtle will suddenly dive down and out at an angle perpendicular to the original direction of travel.

The second style is somewhere between the motion and commitment of a tennis serve and the type of throwing motion used when skipping a rock across the waters surface. The spear is held out to the side and slightly above the hunters shoulder. When he throws his arm twists at the elbow and the spear leaves from the side of the body the hand turning over and not following through in one long motion the hand coming across the body. In this way the spear travels at a low angle that feels close to the horizontal. The power of the throw is not directed straight down but across. Therefore as it penetrates the water it naturally lifts and the spear travels through the water column horizontally sometimes at or just below the surface. The delivery of this throw is significantly faster but less powerful than the first and is usually only used with the lighter throwing spears. It is used by hunters wading through the shallows and is the perfect technique for capturing fish that travel at the surface such as mullet. This throw involves less of a commitment and the hunter often has two spears at his disposal and can take several throws in succession.

The throwing of spears is far more complex than summarised in the examples above incorporating many different techniques and individual styles and accounting for a great variability in target. Hunters have to take into account the behavioural characteristics of the target, the equipment being used, the geography and the state of the tide. Their ability demonstrates an innate understanding of the mechanics and the physics involved.

The current in particular is an important factor and requires a great deal of experience to be dealt with effectively. A description of one instance of capture by Eddie James, Douglas's sisters' daughters' husband, will be used to demonstrate this more effectively. Eddie does not tend to throw the spear but thrust it into the turtle, the spear appearing not to leave his hand.

In this particular case we were chasing a turtle with a motorised dinghy directly into a strong smooth tidal current. Eddie needed to account for the speed of the boat, the speed of the turtle, and the strength and direction of the current we were travelling into. Eddie when jumping for the turtle placed the spear almost three feet ahead of the turtle. Under normal circumstances one might aim slightly ahead of the prey in its anticipated direction of travel. However when spearing into water the spear no longer travels forwards (as it would in air), so it must be placed even further ahead of the prey than one might anticipate. In this case as we were travelling into a strong tidal current Eddie had to place the spear even further ahead of the turtle, not only to account for the spear not continuing to travel forward but because the spear would actually be carried back by the current as it travelled down through to the water column. In addition to accounting for the current the hunter also has to account for the lift of the spear. The spear as it hits the water tends in normal situations tends to lift. A shot taken directly at a target will not meet it at the angle the spear possessed as it entered the water, and so, may glance off the prey as opposed to travelling through it. The hunter compensates for this by throwing the spear closer to the perpendicular than one would naturally anticipate, this way when the spear lifts it lifts to the right angle needed to penetrate the target. In this particular example the direction of the current counteracts this lift and Eddie did not adjust the angle as he threw the. All of these calculations come together at the instant he launches himself from the dinghy at which point he is committed to the shot. Eddie instinctively accounts for all these variables to be successful.

Figure 67. Jabby displaying throwing technique.

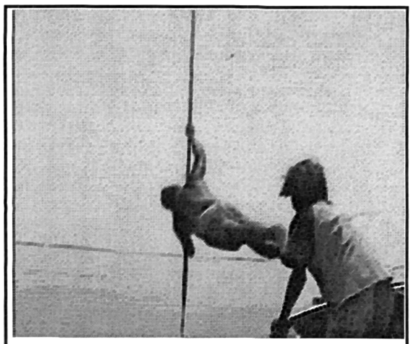


Figure 66. Eddie thrusting spear.

9.3. Appendix Traps. (general)

There are three basic kinds of traps:

1. rock (permanent)
2. rocks and mangrove branches, or brush fences. (semi-permanent.)
3. spinifex grass (single use).

Locations of these are well known, though some only by the older people who have had experience using them. All of these are dependent on the actions of the tide to assist in the trapping process and some can only be used on specific spring tides, therefore perhaps only three or four days a month.

As pointed out in the section 4.1.1a much trapping takes place on the reef flats, but some, especially the more permanent ones, exploit features on tidal rocky slopes and small bays (see section 3.6.1). Inshore areas are more affected by wave action and, unlike lower tidal areas, which tend to be flat, present a variety of features that are useful for trapping such as bottlenecks, small outcrops of rock, and vegetation. Most of these areas only get wet during tides of great amplitude such as the spring tides, at which point fish tend to move inshore in higher numbers to feed in fresh areas. The older Bardi knew their movements and placed their traps in areas that would not only intercept them as they tried to leave, but also where the tide left especially quickly, giving the fish little time to escape.

The semi permanent rock and mangrove-branch trap that I have experience with, made use of a solitary long thin stand of mangrove shrubs that had pushed their way through the rocky slope. Inshore of these trees the gradient of the slope was slightly greater than on either side, forming a small natural pool when the tide went out. The Bardi simply built up the mangrove stand with rocks and cut branches, also creating small walls of rocks and branches on the rock surfaces leading from the edges of the stand towards the shore, creating a large funnel on either side. In this way, as the tide went out and fish went to leave the shallows, they were guided by the outer edges of the funnel into the small basin of the mangrove stand. The fish would initially not be alarmed, assuming that they could now swim through the newly blocked mangrove roots. The fish, not able to push through, would try to head back out the funnel. However, the tide receding quickly would now be inside of its top edge, effectively trapping the fish. Kim Akerman and Moya Smith have both detailed the workings of the permanent stone trap at Gnamagun, so I will not go into detail on the functioning of these. During my time there the trap was never used, possibly because the last traditional owners of the area had recently passed away. Moya Smith has catalogued and reviewed almost all the permanent stone fish traps on the coast between One Arm Point and Lombadina (Smith 1987).

9.4. Ethics In Method.

My fieldwork depended on relationships of friendship and mutual trust as it was clear to me from the outset that intrusive methods of investigation would upset my ability to learn about Bardi resource use. I talked openly with Douglas about my work and my intentions and we discussed at length the status of anthropologists. In our discussions I explained the types of research that other anthropologists had carried out with other Aboriginal groups, including the type of data collection that OFT studies entailed. Upon hearing that researchers weighed their subject's food in order to analyse their daily intake, Douglas became extremely offended, immediately saying: *"What do they think we are animals? Next they will want to weigh our shit!"* This conversation came close to compromising our friendship and it took several days for Douglas to forget about it. I find it hard to believe that Douglas is the only Aboriginal person who feels this way. It is important that we understand that Douglas was more offended by the implication of the use of such methods than by the methods themselves. The application of such theoretical framework, while perhaps being scientific, were considered dehumanising. In addition it would have been impossible to quantitatively observe all the instances of capture, processing, distribution, and consumption of even one individual in a given day, never mind an entire household or community without drastically affecting their behaviour.[127]

[127] Douglas often awoke at one or two am to prepare meals for himself.

9.5. Tables.

9.5.1. Bardi Names and Species List, (listed by Bardi name).

Table 2. Table of fish by Bardi name.

Bardi name	Common name	Species	Family	Genus
Alignal(grn)	Green Turtle med.	Chelonia mydas med.	Chelonidae	Mydas
Alignal(grn)	Green Turtle med.	Chelonia mydas mid.	Chelonidae	Mydas
Amilj	Sea Mullet	Mugil Cephalus	Mugiloidei	Mugilidae
Anangnar	Giant Oystercracker	Trachinotus anak		Trachinotus
Angurbin (grn.)	Green Turtle sm.	Chelonia mydas sm.	Chelonidae	Mydas
Angurbin (hawk)	Hawksbill turtle sm.	Eretmochelys imbricata sm.	Chelonidae	Imbricata
Ardy	Trochus shell	Trochus Niloticus (bucket)	Gastropods	Nilotica
Ardy	Trochus shell	Trochus niloticus (bag)	Gastropods	Nilotica
Argoal	Blacktip reef shark	Carcharhinus melanopterus	Carcharhinidae	Carcharhinus
Baboor	Quoy's gar fish	Hyporhamphus quoyi	Hemirhamphidae	Hyporhamphus
Barambal	Blackspot tuskfish	Choerodon schoenleinii	Labridae	Choerodon
Barbal	Golden lined spinefoot	Siganus lineatus.	Siganidae	Siganus
Barnamb	All rays	Rajiformes		
Barol	Giant salmon catfish	Arius thalassinus	Ariidae	Arius
Bidip	Goldspot cod	Epinephelus coioides	Serranidae	Epinephelus
Bidip	Blackspot cod	Epinephelus malabaricus	Serranidae	Epinephelus
Bilo	Flat-tail or green-back mullet	Liza subviridis	Mugiloidei	Liza
Bindarral	Coral trout	Plectropomus leopardus	Haemulidae	Plectropomus
Bindarral	Bar cheeked trout	Plectropomus maculatus	Haemulidae	Plectropomus

Bardi name	Common name	Species	Family	Genus
Biringnan	Giant or talang queenfish	Scomberoides commersonnianu	Pomatomidae	Scomberoides
Biringnan	Skinny or double-spotted queenfish	Scomberoides lysan	Pomatomidae	Scomberoides
Bulgarani	Flowery cod	Epinephelus fuscoguttatus	Serranidae	Epinephelus
Bulgarani	Speckle finned cod	Epinephelus ongus	Serranidae	Epinephelus
Bulgarani	Tomato rock cod	Cephalopholis sonnerati	Serranidae	Epinephelus
Inandinarr	Dugong family	Dugong dugon grp.	Dugonidae	Dugong
G/Jimariman	Happy moments spinefoot	Siganus spinus	Siganidae	Siganus
Galargie	Giant trevally	Caranx ignobilis	Carangidae	Caranx
Gambal	Ring-tailed surgeonfish	Acanthurus grammoptilus.	Acanthuridae	Acanthurus
Gambal	White-cheeked surgeonfish	Acanthurus nigricans	Acanthuridae	Acanthurus
Gambal	Ornate surgeonfish	Acanthurus dussumieri	Acanthuridae	Acanthurus
Gandal	Great barracuda	Sphyraena barrcuda	Sphyraenidae	Sphyraena
Gandar	Tiger shark	Galeocerdo cuvier	Carcharhinidae	Galeocerdo
Giarda	Plain shovel-nose ray	Rhinobatos banksii	Rhinobatidae	Rhinobatos
Gidin	Small-nosed boxfish	Rhynchostracion nasus	Ostraciidae	Rhynchostracion
Giral	Golden trevally	Gnathandon speciosus	Carangidae	Gnathandon
Gnambi	Blackspot tuskfish?	Choerodon	Labridae	Choerodon
Gnumu	Blue tuskfish lg.	Choerodon albigena lg.	Labridae	Choerodon
Golan	Blue tuskfish sm.	Choerodon albigena sm.	Labridae	Choerodon
Golan	Blue tuskfish med.	Choerodon albigena med.	Labridae	Choerodon
Gularganjan	Mackerel	Scromberomorus	Scrombidae	Scromberomorus

Bardi name	Common name	Species	Family	Genus
Gularganjan	Broad-barred Spanish mackerel	Scomberomorus semifasciatus	Scrombidae	Scromberomorus
Gulil (hawk)	Hawksbill turtle	Eretmochelys imbricata	Chelonidae	Imbricata
Gulinjyl	Spotted moray	Gymnothorax eurostus	Muraenidae	Gymnothorax
Gulungargun	Indo-pacific sailfish	Istiophorus platypterus	Istiophoridae	Istiophorus
Gulungargun	Indo-pacific blue marlin	Makaira mazara	Istiophoridae	Makaira
Gulungargun	Black marlin	Makaira indica	Istiophoridae	Makaira
Gulungargun	Striped marlin	Tetrapturus audax	Istiophoridae	Tetrapturus
Gulurr	Yellowfin bream	Acanthopagrus latus	Sparidae	Acanthopagus
Gunjyal	Dusky flathead	Platycephalus fuscus	Platycephalidae	Platycephalus
Gunjyal	Sand flathead	Platycephalus arenarius	Platycephalidae	Platycephalus
Iawing	Black stingray	Dasyatis sp.	Rajidae	
Ingalan	Barramundi cod	Cromileptes altivelis	Serranidae	Cromileptes
Ini	Black botched moray	Gymnothorax favagineus	Muraenidae	Gymnothorax
Inilir	Moses Perch	Lutjanus Russelli	Lutjanidae	Lutjanus
Irarring	Gray sweetlip emperor/blue	Lethrinus Laticaudiso	Lethrinidae	Lethrinus
Jamalal	Stout longtom	Tylosurus gavialoides	Belonidae	Tylosurus
Jandul	Diamond scaled mullet	Liza vaigiensis	Mugiloidei	Liza
Jarlgun	Rock oyster	Saccostrea 2		
Jawilyl	Gold spotted trevally	Carangoides fulvoguttatus	Carangidae	Carangoides
Jewi	Samoan Hardyhead	Hypoatherina temminckii	Atherinidae	Hypoatherina
Jilanbu	Freckled porcupinefish	Diodon holacanthus	Diodontidae	Diodon

Bardi name	Common name	Species	Family	Genus
Jimaramar	Black spine foot	Siganus fuscenscens	Siganidae	Siganus
Jimaramar	Smudge spot spine foot	Siganus canaliculatus	Siganidae	Siganus
Jingarr	Soft spiky ray	Rajiform sp.lg.	Like sand	Ray
Judan judan	Ornate Spiny Lobster	Panulirus ornatus		Panulirus
Juldul	Tiger or flat-tail mullet	Liza argentea	Mugiloidei	Liza
Juldul	Blue-tail mullet	Valamugil seheli	Mugiloidei	Valamugil
Julu	Stripy sea perch	Lutjanus carponotatus	Lutjanidae	Lutjanus
Juwa	Burrowing snake eel	Pisodonophis cancrivorous	*Ophichthidae*	*Pisodonophis*
K/Garagagnar	Red Emperor	Lutjanus sebae	*Lutjanidae*	*Lutjanus*
Lin(g)mal	Crocodilian longtom	Tylosurus crocodilus	Belonidae	Tylosurus
Lurunbidingnan	Flyingfish	Cypselurus sp.	Exocoetidae	Cypselurus
Mamalurolu	Spotted spinefoot	Siganus punctatus	Siganidae	Siganus
Maran	Mangrove Jack	Lutjanus argentimaculatus	Lutjanidae	Lutjanus
Mardal	Painted Sweetlips	Diagramma pictum	Haemulidae	Plectorhinchus
Mardal	Many spotted Sweetlip med.	Plectorhinchus chaetodontoides	Haemulidae	Plectorhinchus
Mardal	Brown Sweetlips med.	Plectorinchus celebicus med.	Haemulidae	Plectorinchus
Mardal	Brown Sweetlips lg.	*Plectorinchus celebicus lg.*	*Haemulidae*	*Plectorinchus*
Mardal/Mauring	Brown Sweetlips sm.	Plectorhinchus celebicus sm.	Haemulidae	Plectorhinchus
Margalin	Hammerhead shark	Sphyrna sp.	Sphyrndae	Sphyrna
Margaling	Hammerhead shark	Sphyra sp.	Sphyrnidae	Lewini/mokarran zygaena
Marljanga	Bonefish	Albula vulpes	Albulidae	Albula

Bardi name	Common name	Species	Family	Genus
Mauring	Spotbase burrfish	Chilomyterus spilostylus	Diodontidae	Chilomyterus
Miarin	Red squirrelfish	Sargocentron rubrum	Holocentridae	Sargocentron
Milgian	Octopus	Octopus sp.	Octopus	Octopus
Milgian	Octopus	Octopus sp. sm.	Octopi	Octopus
Minimbor	Fantail mullet	Mugil georgii	Mugiloidei	Mugil
Molon	Gold spotted trevally	Carangoides fulvoguttatus	Carangidae	Carangoides
Moni	Sailfin catfish	Paraplotosus sp.	Plotosidae	Paraplotosus
Monkey fish	Darwin jawfish.	Opistognathus darwiniensis	Opistognathidae	Opistognathus
Morbo	Yellowfin tuna	Thunus albacares	Scrombidae	Thunnus
Moulour	Whitelipped Catfish	Paraplotosus albilabris	Plotosidae	Paraplotosus
Mulin	Spangled Sweetlip emperor	Lethrinus nebulosus	Lethrinidae	Lethrinus
Narangu(a)	Mud crab	Scylla serrata		Scylla
Niwarda	Rock oyster	Saccostrea		
Nurmu	Turtle eggs	Chelonia eggs	Chelonidae	Mydas
Odorr	Dugong	Dugong dugon	Dugonidae	Dugong
Raar	Blue-finned trevally	Caranx melampygus	Carangidae	Caranx
Radid	Yellowtail trumpeter	Amniataba caudovittatus	Teraponidae	Amniataba
Rawi	Northern whiting	Sillago sihama	Sillaginidae	Sillago
Rou	Gummy shark	Mustelus antarcticus		Mustelus
Uloor	Maori cod	Epinephelus udulostriatus	Serranidae	Epinephelus
Unajun	Green Turtle lg.	Chelonia mydas lg.	Chelonidae	Mydas
Undoor	Green turtle Married turtle	Chelonia mydas w/eggs	Chelonidae	Mydas
Urlur	Sand Bass	Psammoperca waigiensis	Centropomidae	Psammoperca

9.5.2. Bardi Name and Species List, (listed by species).

Table 3. Table of fish by species name.

Species	Family	Genus	Bardi name	Common
Acanthopagrus latus	Sparidae	Acanthopagus	Gulurr	Yellowfin bream
Acanthurus dussumieri	Acanthuridae	Acanthurus	Gambal	Ornate surgeonfish
Acanthurus grammoptilus.	Acanthuridae	Acanthurus	Gambal	Ring-tailed surgeonfish
Acanthurus nigricans	Acanthuridae	Acanthurus	Gambal	White-cheeked surgeonfish
Albula vulpes	Albulidae	Albula	Marljanga	Bonefish
Amniataba caudovittatus	Teraponidae	Amniataba	Radid	Yellowtail trumpeter
Arius thalassinus	Ariidae	Arius	Barol	Giant salmon catfish
Carangoides fulvoguttatus	Carangidae	Carangoides	Molon	Gold spotted trevally
Carangoides fulvoguttatus	Carangidae	Carangoides	Jawilyl	Gold spotted trevally
Caranx ignobilis	Carangidae	Caranx	Galargie	Giant trevally
Carcharhinus melanopterus	Carcharhinidae	Carcharhinus	Argoal	Blacktip reef shark
Cephalopholis sonnerati	Serranidae	Epinephelus	Bulgarani	Tomato rock cod
Chelonia eggs	Chelonidae	Mydas	Nurmu	Turtle eggs
Chelonia mydas lg.	Chelonidae	Mydas	Unajun	Green Turtle lg.
Chelonia mydas mid.	Chelonidae	Mydas	Gulil (grn)	Green Turtle mid.
Chelonia mydas sm.	Chelonidae	Mydas	Angurbin (grn.)	Green Turtle sm.
Chelonia mydas w/eggs	Chelonidae	Mydas	Undoor	Green turtle Married turtle
Chilomyterus spilostylus	Diodontidae	Chilomyterus	Mauring	Spotbase burrfish
Choerodon	Labridae	Choerodon	Gnambi	Blackspot tuskfish?
Choerodon albigena lg.	Labridae	Choerodon	Gnumu	Blue tuskfish lg.
Choerodon albigena med.	Labridae	Choerodon	Golan	Blue tuskfish med.
Choerodon albigena sm.	Labridae	Choerodon	Golan	Blue tuskfish sm.

Species	Familly	Genus	Bardi name	Common
Choerodon schoenleinii	Labridae	Choerodon	Barambal	Blackspot tuskfish
Cromileptes altivelis	Serranidae	Cromileptes	Ingalan	Barramundi cod
Cypselurus s:	Exocoetidae	Cypselurus	Lurunbidingn an	Flyingfish
Dasyatis s:	Rajidae		lawing	Black stingray
Diagramma pictum	Haemulidae	Plectorhinchus	Mardal	Painted Sweetlips
Diodon holacanthus	Diodontidae	Diodon	Jilanbu	Freckled porcupinefish
Dugong dugon	Dugonidae	Dugong	Odorr	Dugong
Dugong dugon gr:	Dugonidae	Dugong	Find out	Dugong family
Epinephelus coioides	Serranidae	Epinephelus	Bidip	Goldspot cod
Epinephelus fuscoguttatus	Serranidae	Epinephelus	Bulgarani	Flowery cod
Epinephelus malabaricus	Serranidae	Epinephelus	Bidip	Blackspot cod
Epinephelus ongus	Serranidae	Epinephelus	Bulgarani	Speckle finned cod
Epinephelus udulostriatus	Serranidae	Epinephelus	Uloor	Maori cod
Eretmochelys imbricata	Chelonidae	Imbricata	Gulil (hawk)	Hawksbill turtle
Eretmochelys imbricata sm.	Chelonidae	Imbricata	Angurbin (hawk)	Hawksbill turtle sm.
Galeocerdo cuvier	Carcharhinidae	Galeocerdo	Gandar	Tiger shark
Gnathandon speciosus	Carangidae	Gnathandon	Giral	Golden trevally
Gymnothorax eurostus	Muraenidae	Gymnothorax	Gulinjyl	Spotted moray
Gymnothorax favagineus	Muraenidae	Gymnothorax	Ini	Black botched moray
Hypoatherina temminckii	Atherinidae	Hypoatherina	Jewi	Samoan Hardyhead
Hyporhamphus quoyi	Hemirhamphidae	Hyporhamphus	Baboor	Quoy's gar fish
Istiophorus platypterus	Istiophoridae	Istiophorus	Gulular gun	Indo-pacific sailfish

Species	Familly	Genus	Bardi name	Common
Lethrinus Laticaudiso	Lethrinidae	Lethrinus	Irarring	Grey sweetlip emperor/blue
Lethrinus nebulosus	Lethrinidae	Lethrinus	Mulin	Spangled Sweetlip
Liza argentea	Mugiloidei	Liza	Juldul	Tiger or flat-tail mullet
Liza subviridis	Mugiloidei	Liza	Bilo	Flat-tail or green-back
Liza vaigiensis	Mugiloidei	Liza	Jandul	Diamond scaled mullet
Lutjanus argentimaculat	Lutjanidae	Lutjanus	Maran	Mangrove Jack
Lutjanus carponotatus	Lutjanidae	Lutjanus	Julu	Sripey sea perch
Lutjanus Russelli	Lutjanidae	Lutjanus	Inilir	Moses Perch
Lutjanus sebae	Lutjanidae	Lutjanus	K/Garagagna r	Red Emperor
Makaira indica	Istiophoridae	Makaira	Gululargun	Black marlin
Makaira mazara	Istiophoridae	Makaira	Gululargun	Indo-pacific blue marlin
Mugil Cephalus	Mugiloidei	Mugilidae	Amilj	Sea Mullet
Mugil georgii	Mugiloidei	Mugil	Minimbor	Fantail mullet
Mustelus antarcticus		Mustelus	Rou	Gummy shark
Octopus s:	Octopus	Octopus	Milgian	Octopus
Octopus s: sm.	Octopi	Octopus	Milgian	Octopus
Opistognathus darwiniensis	Opistognathidae	Opistognathus	Monkey fish	Darwin jawfish.
Panulirus ornatus		Panulirus	Judan judan	Ornate Spiny Lobster
Paraplotosus albilabris	Plotosidae	Paraplotosus	Moulour	Whitelipped Catfish
Paraplotosus s:	Plotosidae	Paraplotosus	Moni	Sailfin catfish
Pisodonophis cancrivorous	Ophichthidae	Pisodonophis	Juwa	Burrowing snake eel
Platycephalus arenarius	Platycephalidae	Platycephalus	Gunjyal	Sand flathead

Species	Familly	Genus	Bardi name	Common
Platycephalus fuscus	Platycephalidae	Platycephalus	Gunjyal	Dusky flathead
Plectorhinchus celebicus sm.	Haemulidae	Plectorhinchus	Mardal	Brown Sweetlips sm.
Plectorhinchus chaetodontoid	Haemulidae	Plectorhinchus.	Mardal	Many spotted Sweetlip med.
Plectorinchus celebicus lg.	Haemulidae	Plectorinchus	Mardal	Brown Sweetlips lg.
Plectorinchus celebicus med.	Haemulidae	Plectorinchus	Mardal	Brown Sweetlips med.
Plectropomus leopardus	Haemulidae	Plectropomus	Bindarral	Coral trout
Plectropomus maculatus	Haemulidae	Plectropomus	Bindarral	Bar cheeked trout
Psammoperca waigiensis	Centropomidae	Psammoperca	Urlur	Sand Bass
Rajiforms: lg.	Like sand	Ray	Jingarr	Soft spiky ray
Rajiformes			Barnamb	All rays
Rhinobatos banksii	Rhinobatidae	Rhinobatos	Giarda	Plain shovel-nose ray
Rhynchostraci on nasus	Ostraciidae	Rhynchostracio n	Gidin	Small-nosed boxfish
Saccostrea			Niwarda	Rock oyster
Saccostrea 2			Jarlgun	Rock oyster
Sargocentron rubrum	Holocentridae	Sargocentron	Miarin	Red squirrelfish
Scomberoides commersonnia	Pomatomidae	Scomberoides	Biringnan	Giant or talang queenfish
Scomberoides lysan	Pomatomidae	Scomberoides	Biringnan	Skinny or double-spotted
Scomberomor us	Scrombidae	Scromberomoru s	Gularganjan	Broad-barred Spanish
Scromberomor us	Scrombidae	Scromberomoru s	Gularganjan	Mackerel
Scylla serrata		Scylla	Narangu(a)	Mud crab
Siganus fuscenscens	Siganidae	Siganus	Jimaramar	Black spine foot
Siganus canaliculatus	Siganidae	Siganus	Jimaramar	Smudge spot spine foot

Species	Familly	Genus	Bardi name	Common
Siganus lineatus.	Siganidae	Siganus	Barbal	Golden lined spinefoot
Siganus punctatus	Siganidae	Siganus	Mamalurolu	Spotted spinefoot
Siganus spinus	Siganidae	Siganus	G/Jimariman	Happy moments
Sillago sihama	Sillaginidae	Sillago	Rawi	Northern whiting
Sphyraena barrcuda	Sphyraenidae	Sphyraena	Gandal	Great barracuda
Sphyrna s:	Sphyrndae	Sphyrna	Margalin	Hammerhead shark
Tetrapturus audax	Istiophoridae	Tetrapturus	Gululargun	Striped marlin
Thunus albacares	Scrombidae	Thunnus	Morbo	Yellowfin tuna
Trachinotus anak		Trachinotus	Anangnar	Giant Oystercracker
Trochus niloticus (bag)	Gastropods	Nilotica	Ardy	Trochus shell
Trochus Niloticus	Gastropods	Nilotica	Ardy	Trochus shell
Tylosurus crocodilus	Belonidae	Tylosurus	Lin(g)mal	Crocodilian longtom
Tylosurus gavialoides	Belonidae	Tylosurus	Jamalal	Stout longtom
Valamugil seheli	Mugiloidei	Valamugil	Juldul	Blue-tail mullet

9.5.3. Daily Catch Details January 95 - April 96

Table 4. Fish caught from January 1995 through April 1995.

Date	Species	Number
07 January 1995	Acanthurus grammoptilus.	1
07 January 1995	Chelonia mydas sm.	1
07 January 1995	Diagramma pictum	3
07 January 1995	Epinephelus malabaricus	1
07 January 1995	Liza argentea	2
07 January 1995	Scylla serrata	1
08 January 1995	Acanthurus grammoptilus.	1
08 January 1995	Choerodon albigena	1
08 January 1995	Lutjanus carponotatus	1
08 January 1995	Scylla serrata	2
10 January 1995	Acanthurus grammoptilus.	0
10 January 1995	Chelonia mydas sm.	0
10 January 1995	Choerodon albigena med.	4
10 January 1995	Choerodon albigena sm.	6
10 January 1995	Epinephelus ongus	1
10 January 1995	Octopus s: sm.	2
10 January 1995	Plectorhinchus celebicus	2
11 January 1995	Chelonia mydas mid.	0
18 January 1995	Carcharhinus	0
18 January 1995	Choerodon albigena med.	2
18 January 1995	Choerodon albigena sm.	2
18 January 1995	Epinephelus fuscoguttatus	2
18 January 1995	Plectorhinchus celebicus	2
19 January 1995	Acanthurus grammoptilus.	3
19 January 1995	Gnathandon speciosus	0
19 January 1995	Lutjanus carponotatus	2
19 January 1995	Trochus Niloticus (bucket)	1
21 January 1995	Acanthurus grammoptilus.	6
21 January 1995	Chelonia mydas sm.	0
21 January 1995	Dasyatis s:	5
21 January 1995	Lutjanus argentimaculatus	1
24 January 1995	Dasyatis s:	0
24 January 1995	Liza argentea	2
25 January 1995	Acanthurus grammoptilus.	5
25 January 1995	Choerodon albigena lg.	1
25 January 1995	Choerodon albigena med.	6
25 January 1995	Plectorinchus celebicus	2
29 January 1995	Scylla serrata	11
02 February 1995	Scomberoides	6
06 February 1995	Chelonia mydas lg.	0
06 February 1995	Chelonia mydas mid.	1
07 February 1995	Chelonia mydas mid.	0
08 February 1995	Gnathandon speciosus	4

Date	Species	Number
08 February 1995	Scomberoides	1
10 February 1995	Gnathandon speciosus	1
10 February 1995	Scomberoides lysan	2
11 February 1995	Chelonia mydas mid.	0
11 February 1995	Chelonia mydas sm.	0
13 February 1995	Scylla serrata	14
14 February 1995	Chelonia mydas sm.	1
14 February 1995	Eretmochelys imbricata	1
15 February 1995	Acanthurus grammoptilus.	1
15 February 1995	Chelonia mydas lg.	2
15 February 1995	Choerodon albigena med.	3
15 February 1995	Epinephelus malabaricus	1
15 February 1995	Epinephelus udulostriatus	1
15 February 1995	Lethrinus Laticaudiso	1
15 February 1995	Lutjanus argentimaculatus	7
15 February 1995	Lutjanus carponotatus	1
16 February 1995	Carangoides fulvoguttatus	3
16 February 1995	Dasyatis s:	2
18 February 1995	Dasyatis s:	3
18 February 1995	Trochus niloticus (bag)	1
19 February 1995	Carangoides fulvoguttatus	3
19 February 1995	Chelonia mydas lg.	1
19 February 1995	Chelonia mydas mid.	1
19 February 1995	Choerodon albigena med.	3
19 February 1995	Epinephelus malabaricus	1
19 February 1995	Lutjanus carponotatus	3
20 February 1995	Chelonia mydas lg.	1
20 February 1995	Trochus Niloticus (bucket)	3
21 February 1995	Dasyatis s:	2
25 February 1995	Chelonia mydas sm.	0
25 February 1995	Plectorinchus celebicus	1
25 February 1995	Rajiforms: lg.	0
01 March 1995	Chelonia eggs	86
02 March 1995	Carangoides fulvoguttatus	2
02 March 1995	Carangoides fulvoguttatus	1
02 March 1995	Choerodon albigena med.	1
02 March 1995	Lutjanus Russelli	1
02 March 1995	Scomberoides	2
02 March 1995	Trochus Niloticus (bucket)	1
04 March 1995	Cromileptes altivelis	1
04 March 1995	Dasyatis s:	1
04 March 1995	Epinephelus malabaricus	1
04 March 1995	Lutjanus argentimaculatus	2
04 March 1995	Lutjanus carponotatus	1
04 March 1995	Mugil georgii	2
04 March 1995	Scylla serrata	1
04 March 1995	Siganus lineatus.	1
05 March 1995	Trochus niloticus (bag)	1
08 March 1995	Carangoides fulvoguttatus	6
09 March 1995	Chelonia mydas lg.	0

Date	Species	Number
09 March 1995	Chelonia mydas mid.	0
09 March 1995	Dugong dugon	1
10 March 1995	Chelonia mydas mid.	1
10 March 1995	Trochus Niloticus (bucket)	9
11 March 1995	Chelonia mydas mid.	1
12 March 1995	Chelonia mydas lg.	1
12 March 1995	Chelonia mydas mid.	2
12 March 1995	Choerodon albigena lg.	2
13 March 1995	Chelonia mydas mid.	2
13 March 1995	Chelonia mydas w/eggs	1
14 March 1995	Chelonia mydas mid.	2
15 March 1995	Chelonia mydas mid.	3
15 March 1995	Trochus Niloticus (bucket)	7
16 March 1995	Chelonia mydas mid.	1
16 March 1995	Scylla serrata	1
18 March 1995	Acanthurus grammoptilus.	1
18 March 1995	Choerodon schoenleinii	1
18 March 1995	Lutjanus carponotatus	2
18 March 1995	Plectropomus leopardus	1
19 March 1995	Chelonia eggs	80
19 March 1995	Epinephelus malabaricus	1
19 March 1995	Lutjanus argentimaculatus	2
23 March 1995	Trochus niloticus (bag)	0
24 March 1995	Cromileptes altivelis	2
24 March 1995	Epinephelus malabaricus	4
24 March 1995	Trochus Niloticus (bucket)	0
25 March 1995	Dugong dugon	1
25 March 1995	Trochus Niloticus (bucket)	1
26 March 1995	Trochus Niloticus (bucket)	1
27 March 1995	Chelonia mydas mid.	2
28 March 1995	Chelonia mydas mid.	0
28 March 1995	Trochus niloticus (bag)	1
29 March 1995	Trochus niloticus (bag)	0
30 March 1995	Chelonia mydas mid.	1
30 March 1995	Trochus niloticus (bag)	0
31 March 1995	Trochus niloticus (bag)	0
01 April 1995	Acanthurus grammoptilus.	1
01 April 1995	Choerodon albigena sm.	3
01 April 1995	Lutjanus carponotatus	2
02 April 1995	Acanthopagrus latus	2
02 April 1995	Amniataba caudovittatus	3
02 April 1995	Choerodon albigena med.	1
02 April 1995	Choerodon albigena sm.	3
02 April 1995	Lutjanus carponotatus	2
03 April 1995	Acanthurus grammoptilus.	2
03 April 1995	Chelonia mydas sm.	1
03 April 1995	Choerodon schoenleinii	1
03 April 1995	Gnathandon speciosus	1
03 April 1995	Lutjanus carponotatus	3
03 April 1995	Siganus lineatus.	6

Date	Species	Number
04 April 1995	Acanthurus grammoptilus.	7
04 April 1995	Sargocentron rubrum	1
05 April 1995	Trochus Niloticus (bucket)	3
09 April 1995	Acanthurus grammoptilus.	1
09 April 1995	Chelonia mydas mid.	0
09 April 1995	Choerodon albigena med.	2
09 April 1995	Lutjanus carponotatus	3
09 April 1995	Siganus lineatus.	1
10 April 1995	Acanthurus grammoptilus.	8
10 April 1995	Choerodon albigena med.	2
10 April 1995	Lethrinus Laticaudiso	1
10 April 1995	Plectorinchus celebicus	1
10 April 1995	Siganus lineatus.	10
11 April 1995	Acanthopagrus latus	2
11 April 1995	Acanthurus grammoptilus.	8
11 April 1995	Chelonia mydas sm.	1
11 April 1995	Diodon holacanthus	2
11 April 1995	Gnathandon speciosus	1
11 April 1995	Plectorhinchus celebicus	2
11 April 1995	Plectorinchus celebicus	2
11 April 1995	Siganus lineatus.	12
13 April 1995	Chelonia mydas mid.	1
13 April 1995	Trochus niloticus (bag)	0
14 April 1995	Trochus niloticus (bag)	2
15 April 1995	Dugong dugon	0
15 April 1995	Epinephelus ongus	1
15 April 1995	Lutjanus argentimaculatus	6
15 April 1995	Lutjanus carponotatus	2
16 April 1995	Chelonia mydas mid.	1
16 April 1995	Dugong dugon	0
17 April 1995	Dugong dugon	0
18 April 1995	Dasyatis s:	1
18 April 1995	Mugil Cephalus	1
18 April 1995	Scylla serrata	1
18 April 1995	Trochus niloticus (bag)	0
19 April 1995	Liza vaigiensis	2
19 April 1995	Lutjanus argentimaculatus	1
19 April 1995	Siganus lineatus.	14
19 April 1995	Trochus niloticus (bag)	0
20 April 1995	Siganus lineatus.	7
20 April 1995	Trochus niloticus (bag)	0
21 April 1995	Siganus lineatus.	8
21 April 1995	Trochus niloticus (bag)	0
22 April 1995	Trochus niloticus (bag)	0
23 April 1995	Acanthurus grammoptilus.	10
23 April 1995	Plectorinchus celebicus	3
25 April 1995	Acanthurus grammoptilus.	7
25 April 1995	Choerodon albigena med.	1
25 April 1995	Lutjanus carponotatus	2
25 April 1995	Siganus lineatus.	3

Date	Species	Number
25 April 1995	Trochus niloticus (bag)	1
28 April 1995	Dugong dugon	1

9.5.4. Daily Catch Details September 1996.

Table 5. Table of fish caught in September 1996.

Date	Species	Number caught
9/12/96	Acanthurus grammoptilus.	2
9/12/96	Chelonia mydas sm.	1
9/12/96	Lutjanus carponotatus	5
9/12/96	Plectorhinchus celebicus sm.	3
9/12/96	Plectorinchus celebicus lg.	2
9/12/96	Plectorinchus celebicus med.	2
9/12/96	Siganus lineatus.	9
9/13/96	Acanthurus grammoptilus.	1
9/13/96	Chelonia mydas med.	1
9/13/96	Epinephelus malabaricus	1
9/13/96	Plectorinchus celebicus med.	1
9/13/96	Siganus lineatus.	3
9/15/96	Acanthurus grammoptilus.	2
9/15/96	Chelonia mydas w/eggs	0
9/15/96	Choerodon albigena sm.	3
9/15/96	Lutjanus carponotatus	2
9/16/96	Acanthurus grammoptilus.	1
9/16/96	Chelonia mydas med.	0
9/16/96	Chelonia mydas w/eggs	0
9/16/96	Choerodon albigena lg.	1
9/16/96	Plectorinchus celebicus lg.	1
9/16/96	Siganus lineatus.	28
9/17/96	Acanthurus grammoptilus.	2
9/17/96	Chelonia mydas med.	2
9/17/96	Chelonia mydas w/eggs	0
9/17/96	Gnathandon speciosus	1
9/17/96	Lutjanus argentimaculatus	1
9/17/96	Plectorinchus celebicus med.	1
9/17/96	Siganus lineatus.	11
9/18/96	Acanthurus grammoptilus.	7
9/18/96	Gnathandon speciosus	1
9/18/96	Plectorhinchus celebicus sm.	1
9/18/96	Plectorinchus celebicus lg.	3
9/18/96	Siganus lineatus.	7
9/19/96	Chelonia mydas w/eggs	1
9/21/96	Acanthurus grammoptilus.	1
9/21/96	Chelonia mydas w/eggs	1
9/21/96	Dugong dugon	1
9/21/96	Lutjanus carponotatus	1
9/21/96	Plectropomus leopardus	1
9/22/96	Acanthurus grammoptilus.	2
9/22/96	Choerodon albigena sm.	1
9/22/96	Lutjanus carponotatus	2
9/22/96	Plectropomus leopardus	6

9.5.5. Species Caught Per Season.

Table of individual species caught during data period with numbers caught per season and percentages per season including totals per season and for data periods.

Table 6. Table of individual species caught by season.

Species	Mankal	Ngaldany	Irralboo	Mankal	Ngaldany	Irralboo
Acanthopagrus latus			4	0%	0%	100%
Acanthurus grammoptilus.	16	1	45	26%	2%	73%
Amniataba caudovittatus			3	0%	0%	100%
Carangoides fulvoguttatus		6	8	0%	43%	57%
Carangoides fulvoguttatus (juv.)			1	0%	0%	100%
Chelonia eggs			166	0%	0%	100%
Chelonia mydas lg.		4	1	0%	80%	20%
Chelonia mydas mid.	2		17	11%	0%	89%
Chelonia mydas sm.	1	1	2	25%	25%	50%
Chelonia mydas w/eggs			1	0%	0%	100%
Choerodon albigena lg.	1		2	33%	0%	67%
Choerodon albigena med.	12	6	7	48%	24%	28%
Choerodon albigena sm.	8		6	57%	0%	43%
Choerodon schoenleinii			2	0%	0%	100%
Cromileptes altivelis			3	0%	0%	100%
Dasyatis sp.	5	7	2	36%	50%	14%
Diagramma pictum	3			100%	0%	0%
Diodon holacanthus			2	0%	0%	100%
Dugong dugon			3	0%	0%	100%
Epinephelus fuscoguttatus	2			100%	0%	0%
Epinephelus malabaricus	1	2	6	11%	22%	67%
Epinephelus ongus	1		1	50%	0%	50%
Epinephelus udulostriatus		1		0%	100%	0%
Eretmochelys imbricata		1		0%	100%	0%
Gnathandon speciosus		5	2	0%	71%	29%
Lethrinus Laticaudiso		1	1	0%	50%	50%
Liza argentea	4			100%	0%	0%
Liza vaigiensis			2	0%	0%	100%
Lutjanus argentimaculatus	1	7	11	5%	37%	58%
Lutjanus carponotatus	3	4	17	13%	17%	71%
Lutjanus Russelli			1	0%	0%	100%
Mugil Cephalus			1	0%	0%	100%
Mugil georgii			2	0%	0%	100%
Octopus sp. sm.	2			100%	0%	0%
Plectorhinchus celebicus sm.	4		2	67%	0%	33%
Plectorinchus celebicus lg.	2	1		67%	33%	0%
Plectorinchus celebicus med.			6	0%	0%	100%
Plectropomus leopardus			1	0%	0%	100%
Sargocentron rubrum			1	0%	0%	100%

Species	Mankal	Ngaldany	Irralboo	Mankal	Ngaldany	Irralboo
Scomberoides commersonnianus		7	2	0%	78%	22%
Scomberoides lysan		2		0%	100%	0%
Scylla serrata	3	25	3	10%	81%	10%
Siganus lineatus.			62	0%	0%	100%
Trochus niloticus (bag)		1	5	0%	17%	83%
Trochus Niloticus (bucket)	1	3	22	4%	12%	85%
Totals	**72**	**85**	**423**			
Total Catches (exc. September)		**580**				
September Catches		123				
Total Catches		**703**				

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