

**THE TRADITIONAL AND CEREMONIAL USE OF
THE GREEN TURTLE (*Chelonia mydas*) IN THE
NORTHERN MARIANA ISLANDS**

with recommendations for

ITS USE IN CULTURAL EVENTS AND EDUCATION

**A Report prepared for the Western Pacific Regional Fishery Management Council
and the University of Hawaii Sea Grant College Program**

by

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EXECUTIVE SUMMARY

Worldwide conservation status of the green turtle

Green turtles are classified as “endangered” by the World Conservation Union. They are listed in Appendix I of the CITES convention banning trade in endangered species. The US Endangered Species Act lists the species as threatened, with the breeding colonies in Florida and on the Pacific coast of Mexico as endangered.

Important biological considerations for green turtles in the Northern Mariana Islands

Both mature and immature turtles are found in the Northern Mariana Islands. From studies elsewhere, sexual maturity is thought to take 25 years or more. Nesting occurs on multiple-year intervals. Very little is known about natural mortality or survivorship in North Pacific populations. The extent of the population of turtles in the Northern Marianas, or if they represent more than one population, is unknown.

While it is known turtles migrate to and from nesting beaches, little is known about migratory patterns involving turtles in the Northern Marianas. One tagged at Tinian was found in the Philippines in 1995.

Although foraging turtles are present, nesting is not known to occur in the northern islands of Anatahan and beyond.

The very limited amount of research on turtles in the Northern Marianas makes it impossible to estimate turtle population.

Legal and administrative changes to the status of turtles in the Northern Mariana Islands under the Endangered Species Act, 1973

Regulations promulgated in 1978 allowed residents of the then Mariana District of the Trust Territory to take green turtles for personal use if customary, traditional and necessary for sustenance, a “subsistence use”, as part of an overall exemption under the Endangered Species Act given to the Trust Territory. NMFS undertook a comprehensive review in 1984, concluding that that the exception could not be substantiated for the Northern Marianas. The exemption was automatically removed with the dissolution of the Trust Territory in 1986.

In 1994 the Western Pacific Fishery Management Council was asked by a specific indigenous group in the Northern Marianas to consider a request for their cultural and ceremonial use of a certain number of turtles, citing a lack of research prior to the 1984 determination. The request, repeated in 1996, is for a limited take for ceremonial purposes and not for a reinstatement of the subsistence exemption.

Motivation for requesting a cultural use of turtles

Northern Marianas society has undergone large and often stressful changes in the recent past. Leaders of (mainly) the Carolinian community feel that greater cultural pride needs to be instilled, particularly in the youth, many of whom have little understanding or appreciation for their heritage. Since the utilization of turtles as a food source has been a part of their society in the past, it is felt that ceremonial use of turtles today would be a means to underscore the unique qualities of their culture.

Archaeological evidence of past use of turtles

The evidence is sketchy and incomplete. One site on Rota shows utilization of turtles more than two thousand years ago.

Historical references to the use of turtles in the Northern Marianas

The Spanish era records several ceremonial uses of turtle shell, including possible use as a medium of exchange. The latter could have been turtle shell items brought from the Caroline Islands by voyagers who visited and later colonized Saipan while Chamorros had been removed to Guam.

It is puzzling that there is so little mention in the written historical record of reliance by the early 19th century indigenous population on turtles as a food source, and little mention by Europeans of turtles on or around the islands. This is somewhat surprising, as the depopulation of the islands for 150 years with the forceful removal of all inhabitants to Guam might be expected to allow a large rookery worthy of note to develop.

While turtles were recorded as utilized as a food source during the German administration period, many other sources of meat protein were also noted as available and it is clear that there was not a primary reliance on turtle meat as a food source. Carolinians were noted as the best fishermen, canoe voyagers and swimmers, and adept at capturing turtles in the water.

The presence of over 70,000 Japanese, Koreans and Okinawans resident in the islands by the late 1930's contributed to degraded turtle habitat. This was caused by increased use of the shoreline, harbor improvements, and later, military preparations and the onset of World War II.

US Administration under the Trust Territory

Regulations pertaining to turtles were first introduced by the Navy administration in 1949. The wording of regulations protecting turtles remained essentially unchanged in later Trust Territory laws for 30 years.

The advent of mass Asian tourism to Saipan in the mid 1970's resulted in several prime beaches being developed as hotel properties making them no longer suitable for turtle nesting. Tourism also increased the demand for turtle products, particularly stuffed green turtles.

Several experts were asked to advise on turtle utilization by the Trust Territory, however there were no changes to existing laws regulating turtle use. As early as 1972 one consultant called for a special exemption permit for authorized cultural

activities throughout the entire Trust Territory. Another urged work be undertaken in conservation and education on Saipan.

Current links in oral tradition to turtle usage

While an extensive system of beliefs and taboos relating to turtles in the Central Caroline Islands exists, there is no single set of taboos or beliefs relating to turtles or turtle use from the ancestral home islands of the Carolinian people in the Northern Marianas.

The study was unable to substantiate detailed knowledge by elders or others in the community on Saipan of traditional practices or beliefs relating to turtles. However this is not unexpected as most island areas in the region have not retained such knowledge in the face of increased contacts with the industrialized world.

Those people who have spent time in the northern islands are the most knowledgeable about capturing turtles, however there is little knowledge of basic biology or turtle ecology.

It can be surmised from existing information that, at least for most of this century, turtles were not thought of as a source of basic nourishment but retained a place of importance as a delicacy to be served at special occasions. Most people middle-age and older are aware of turtles being one of the important food delicacies served in the past at fiestas and other social functions.

There is still a generally held belief among Carolinians that the turtle is "special". While there is no major nutritional dependence on turtles, whether or not "traditional values" vis a vis the turtle have changed is open to question.

Current use of turtles

Poaching of both eggs and turtles in the water or on beaches remains a problem. Turtles and eggs are sold illegally or used for surreptitious home consumption. Arrests are sometimes made, but sentences are not always severe. Poachers are not always the indigenous inhabitants, but sometimes Filipinos or migrants from other parts of Micronesia.

The lack of reliance by people in the Northern Marianas on the turtle for "sustenance" as concluded by NMFS in 1984 is supported. However, some civic and political leaders believe it is their "right" to use the turtle in a cultural context.

Conclusions regarding possible ceremonial use

The use of a very small number of turtles, perhaps one or two, could have a beneficial impact on the efforts of the Carolinian community at instilling greater pride in their culture. However, such an activity would have to be carefully planned and executed with vital educational components included.

There could be beneficial results for the turtle resource from ceremonial use by a heightened public awareness of turtle ecology and the need for continued conservation measures.

RECOMMENDATIONS

Potential for obtaining permission for a limited take

The only practical way at the present time to obtain permission for use of a threatened or endangered species is by requesting a special permit. Requests for permits to the appropriate government agency result in the issuance of a biological opinion as part of the permitting process. Other methods, such as delisting the green turtle as a threatened species or amending the law to allow ceremonial use as a new category, are impractical at this time.

Proposal for the ceremonial use of turtles in cultural events

A very limited number of turtles, perhaps only one, could be captured for ceremonial presentation to a deserving member of the community at an annual fiesta on Saipan. The capture should take place in the northern islands on a traditional canoe voyage as part of an exercise to census and tag as many turtles as possible. The recipient of the turtle(s) at the ceremony would be afforded the opportunity to tag and release the turtle as a metaphor for cultural survival, thereby emphasizing both its importance and the current necessity to increase the local turtle population before they can be utilized again as a food item.

The need for an educational component of any ceremonial use.

Education is seen as the best means to bring about change in the attitudes of poachers and those who support poaching. A long term approach is required, with a sustained educational effort based in schools as well as the community at large.

A sea turtle educational plan should be developed with the leadership of an experienced Environmental Education Specialist (EES).

The program should include an educational component as the focus of community work in conservation. It should be institutionalized within a government program or office and coordinated by a motivated and knowledgeable person with access to outside resources.

Coordination of research and education

Yearly monitoring of nesting, tagging and (satellite) tracking of turtles should be given research priority. Activities should be coordinated with educational efforts to provide hands-on experience for local residents.

PREFACE

This document has been produced for use by the Western Pacific Regional Fisheries Management Council and the University of Hawaii Sea Grant College Program. The Council has responded to a request by representatives of the Northern Mariana Islands to study the cultural importance of sea turtles in the Commonwealth. The Council's intention is to evaluate the information collected to determine if adequate grounds exist to seek an exemption from existing U.S. federal law to allow a limited take of green sea turtles for ceremonial purposes.

The author has been involved with turtles and the dependence of islanders on the continued healthy presence of this resource for over 25 years. Having undertaken fisheries work in more than 16 countries throughout Micronesia and Polynesia over the last three decades, including residency and involvement with turtles in the Caroline islands for many of those years, an appreciation has been gained for the place turtles occupy and the uses to which they are put in many island societies.

As a member of the IUCN/WWF Marine Turtle Specialists Group, the author has kept current with aspects of turtle conservation and advances in research that have produced encouraging results in many locations in the Pacific. However many of the pieces of the puzzle have yet to be discovered, and great gaps remain in scientific knowledge which might contribute to better management of this important resource. This reality should be acknowledged at the outset and encouragement given to those responsible for advancing our understanding of this species through research and education.

This report analyzes as much of the known information as possible from the fields of biology, anthropology and history, and places it in the context of today's political and cultural realities. Thus, it is not a study of the biology of turtles in the Northern Marianas, nor an exercise in environmental anthropology. Rather, the intention is to use information from all of these disciplines to offer guidance to both the Northern Marianas and the Council on the most practical way to proceed that will be in the best interest of the resource as well as the people of the Northern Mariana Islands.

The research and most of the writing for Section 8, Sea Turtle Education Plan for the Northern Mariana Islands, was done by Ms. Donna O'Daniel, a professional wildlife biologist and environmental educational specialist.

Additional valued assistance in undertaking this work has been received from the staff of the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Northern Marianas Division of Fish and Wildlife, the NMI offices of Indigenous Affairs, Historic Preservation, Carolinian Affairs, and Aging, Northern Marianas College Archive Collection; Micronesian Archaeological Research Services, the Micronesian Area Research Center, and numerous residents of the Northern Marianas who took the time to meet with me and share their thoughts and knowledge. Their help and guidance is gratefully acknowledged.

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1. INTRODUCTION

1.1 BACKGROUND

With the enactment of the Endangered Species Act (ESA) in 1973 and the subsequent listing of green sea turtles as a threatened species almost four and a half years later, residents of the then Marianas District as well as the five other districts of the Trust Territory of the Pacific Islands appeared to be on the verge of being legally prohibited from utilizing turtles in any manner. However the publication of the Final Environmental Impact Statement by the U.S. Department of Commerce in 1978 and subsequent federal regulations contained a provision for the continued “subsistence” taking of green turtles for personal use by residents of the Trust Territory, “...if such taking is customary, traditional, and necessary for the sustenance of such resident and his immediate family” (U.S. Department of Commerce 1978, cited in Balazs, 1983). This action granted an exemption to all inhabitants of all six districts of the Trust Territory irrespective of any differences in the real or perceived dependence upon sea turtles for subsistence. In this respect, the Trust Territory was unique, falling outside regulations which applied to all U.S. states and possessions, including those in the Caribbean (Balazs 1983)¹.

During 1981 and 1982 both Hawaii and Guam voiced objections to the regulations that excluded residents (or those qualifying as the native population, it is not clear from available documents) from any subsistence taking of green turtles. In response, the National Marine Fisheries Service (NMFS) undertook a comprehensive review of the situation, including the status of stocks, and the exemptions granted to the Trust Territory. By this time the former Trust Territory had politically divided itself into the Republic of the Marshall Islands (RMI), Federated States of Micronesia (FSM), Commonwealth of the Northern Mariana Islands (CNMI) and Republic of Palau, although the latter and the United States had not yet agreed on the terms of future political status. The Trust Territory still existed in name with a skeleton bureaucracy having relatively minor political control over RMI, FSM and CNMI.

The results of the review and NMFS decision regarding the subsistence take were stated in a Decision Memorandum of August 17, 1984, supported by several documents². The conclusions, as relate to the Northern Mariana Islands (NMI), were that “the administrative record for the listing of sea turtles demonstrates the CNMI received its subsistence exception because of its political status as part of the TTPPI and not because a need or cultural dependence had been demonstrated” and that any inequity which existed between treatment of the issue on Guam and the Northern Marianas would be resolved when the Covenant became fully effective and CNMI would be subjected to the same regulations as Guam (NMFS 1984). It was also stated that the information regarding subsistence regulations had been reviewed within NMFS as well as the state resource agencies (these are not named, but are assumed to be the Hawaii Dept. of Land and Natural Resources, Guam Division of Aquatic and Wildlife Resources, and the Northern

¹Balazs does make the important distinction between possessions of the U.S., and the Trust Territory as an area administered under a trusteeship agreement with the United Nations.

²Three specific documents were utilized in the Memorandum: *A Review of Subsistence Use of Sea Turtles in the Central and Western Pacific with Respect to Federal Regulations Authorizing a Subsistence Take of Green Sea Turtles in the Trust Territory of the Pacific Islands*, NMFS Administrative Report SWR-85, dated December 3, 1984 and published February, 1985; *A Review of the Uses of “Subsistence” Exceptions in Various Statutes and Regulations Relevant to Reviewing the Provisions for Subsistence Takings of Sea Turtles*, Memorandum of the General Counsel for the Southwest Region, NMFS, May, 15, 1984; and *A Review of Information on the Subsistence Use of Green and Hawksbill Sea Turtles on Islands under United States Jurisdiction in the Pacific Ocean*, a study contracted by NMFS and written by Dr. R.E. Johannes, undated.

Mariana Division of Fish and Wildlife or their predecessors), and that all had generally agreed with the conclusions and recommendations, “with the exception of the CNMI” (NMFS 1984).

From extant documents it is clear that the Northern Marianas’ position vis a vis its claimed right to resources of the territorial sea, contiguous zone, and exclusive economic zone remained constant in the period following the publication of the Decision Memorandum³. However it is less clear whether turtles were ever considered as a part of this position. Given turtles’ unique terrestrial phase and the resultant management authority of the U.S. Fish and Wildlife Service over this particular resource, the consequences of any stated claim might have meant even more complicated problems for Commonwealth negotiators and their U.S. counterparts.

In 1994 a specific indigenous cultural group in the Northern Marianas brought their request for use of turtles “for cultural and ceremonial purposes” before the Western Pacific Fishery Management Council during its meeting on Saipan (Elameto 1996). This request, as re-stated in 1996, cited a perceived lack of research prior to the determination of 1984 and subsequent removal of the exemption in 1986⁴, the importance of the use of turtles in certain festivals in the past on Saipan, and the contribution to the maintenance of culture and cultural practices that restoring this utilization of a relatively small number of turtles would provide. It is important to remember that the request was not for a return to the “subsistence” exemption available in the Marianas prior to 1986, but for a limited take that would be utilized in a specific manner. With encouragement provided at the MAFAC meeting in Honolulu during late 1996, the Council undertook to further define the issue and seek solutions. This report is intended to contribute to those efforts.

1.2 TERMS OF REFERENCE AND METHODOLOGY

The purposes of the study are threefold: to determine if there are adequate grounds on which to seek exemption from existing laws and allow a take of green sea turtles in the Northern Mariana Islands for ceremonial purposes; to identify ways in which conservation of sea turtles might be enhanced through cultural events; and to recommend possible conservation measures which might involve direct participation of residents of the Northern Mariana Islands. To enable execution of the work, a literature review was conducted to obtain ethnographic material relating to use of sea turtles, and a field study was undertaken to further collect and authenticate information on the cultural significance of green sea turtles⁵.

Preliminary contacts and discussions took place during April and early May, 1997. During May visits were made to the Pacific Area Collection of the Hamilton Library, University of Hawaii at Manoa, the Micronesian Area Research Center of the University of Guam, and Archive Library at

³See particularly the Memorandum of Agreement on Ocean Rights and Resources, signed by the Special Representative of the President of the United States and the Special Representatives of the Governor of the Commonwealth of the Northern Mariana Islands, April 12, 1990, and the statement of Lt. Governor Jesus C. Borja on the protection of indigenous fishing rights in the Northern Mariana Islands before the Committee on Indian Affairs, U.S. Senate, June 1, 1995.

⁴NMFS contracted a study for the purpose of assisting in determining the future of exemptions granted under the Endangered Species Act. The result was *A Review of Information on the Subsistence Use of Green and Hawksbill Sea Turtles on Islands under United States Jurisdiction in the Pacific Ocean*, by Dr. R.E. Johannes in which he extensively discussed both historic and current practices in all island jurisdictions, including those operating under Free Association with the United States. However only about one page was devoted to the Mariana Islands including Guam in a report of over 30 pages, and this apparently was the source of discontent with the level of research conducted.

⁵Appendix 1 lists people were contacted and/or interviewed regarding various aspects of this project.

the Northern Marianas College in Saipan. Activities on Saipan included attendance at the San Isidro fiesta in Chalan Kanoa on May 18, 1997, and various interviews and discussions with members of the community, government officials, and others. Over 50 people with knowledge of turtles or information regarding Saipan were interviewed or contacted during the course of the study. Of particular value to discussions with several residents on Saipan was the presence of a canoe and its crew that had arrived on Saipan during mid-April from Satawal Island in Yap, Federated States of Micronesia, 450 miles to the southeast. The canoe's navigator, Pius "Mau" Piailug, had been involved with the author in early turtle tagging and headstarting experiments in the Caroline islands almost 25 years ago, and has first-hand knowledge of central Carolinian usage of the green turtle. He had visited Saipan numerous times since 1973, six of them as navigator of a canoe from Satawal. On one occasion he and his crew were accompanied by several residents of Saipan on a voyage throughout the northernmost Mariana Islands.

1.3 DISCUSSION OF DEFINITIONS

It is indicative of both the complexity and sensitivity of this subject that some of the key terms are left undefined in both literature and legislation.

Subsistence NMFS (Farrell 1984) stated that "Subsistence is an important concept in an exception to the prohibitions of the Endangered Species Act of 1973". However he points out that

Despite the presence of a subsistence exception in the statute, the term 'subsistence' is not defined in the ESA. The U.S. Fish and Wildlife Service (FWS) has defined the term in regulations implementing the ESA for threatened and endangered species under the jurisdiction of that agency. 50 C.F.R. §222-227. However there is no comparable definition in the regulations implementing the ESA for endangered and threatened species under the jurisdiction of the Department of Commerce/National Marine Fisheries Service.⁶

Nevertheless, the final ESA regulations which contained a "limited subsistence exception for the residents of the Trust Territory of the Pacific Islands" (Farrell 1984) allowed personal consumption if such taking was "customary, traditional and necessary for the sustenance of such resident and his immediate family"⁷.

Traditional In his review of information on subsistence use of green turtles on islands under U.S. jurisdiction in the Pacific, Johannes (1984) discussed the terms "traditional or subsistence" and stated that "A book could be written concerning how and why these terms have been so variously defined", and goes on to discuss aspects of what might be considered traditional or non-traditional. However he simplifies his work by stating his aim to consider "the sale of turtles or turtle products to people who are neither one's relatives nor belong to one's village or local community as non-traditional".

The relevant NMFS approach to a definition, in the context of requests for a take of turtles for home consumption, was to say that simply because the practice occurred before turtles were

⁶In lieu of a legal definition, the Farrell memorandum contains a detailed description of the legislative history of both the Alaskan native subsistence exception to the Marine Mammal Protection Act and the subsistence exception granted residents of the Trust Territory under the Endangered Species Act. It concludes that "unquestionably the most important factor underlying a subsistence exception" is the "customary, traditional nature of subsistence taking", where a "particular cultural group has traditionally relied upon taking certain species of wildlife to provide the necessities of life. To ban the taking of such species is essentially to deny that cultural group the right to continue their traditional way of life."

⁷43 Fed. Reg. 32800 (f) Subsistence. As quoted by Lecky and Nitta (1995).

listed as threatened or endangered, or that the practice was followed “by recent generations”, was not to describe it as “traditional” because it was not something done in “cultural continuity with aboriginal practices”. The “traditional practices” that did not exhibit “cultural continuity with aboriginal practices”, were in NMFS’ view synonymous with “historical” and distinct (Lecky and Nitta 1985).

Ceremonial The latest request to have precipitated this report (Sablan and Elameto 1996) asks for a “cultural and ceremonial harvest” and cites the “cultural/ceremonial” importance of green turtles. It alludes to the practice where “the head of the turtle always had to be presented to the high chief”. In this context then, the term “ceremonial” is defined here as some form of social activity, perhaps involving ritual, prescribed by custom or protocol, which may or may not be conducted in a solemn or formal manner.

2. GREEN TURTLES, ISLANDS AND PEOPLE OF THE NORTHERN MARIANAS

2.1 SUMMARY OF GREEN TURTLE BIOLOGY

The following summary of important aspects of green sea turtle biology below serves as an introduction to the species. The summary is taken from Eckert (1993) inasmuch as the geographic focus in that report included the Mariana Islands.

Life Cycle Overview Eggs take approximately 2 months to incubate. Ambient temperature influences sex determination, with warmer nests producing mostly females and slightly cooler nests producing mostly males. When the turtles hatch and search for the ocean, it appears that their ability to locate the sea comes from primarily light attraction. Once in the water they align themselves swimming directly against the direction of water movement. Once in the open sea they may seek shelter in seaweed rafts or other floating debris. Post-hatchlings remain epipelagic (surface dwelling in the open sea) for an undetermined number of years before taking up residence in continental shelf habitats. The diet in the open sea is unknown. Very little is known about habitat use, movement, abundance or diet among North Pacific populations. In Hawaii the diet consists of some 56 species of algae, one marine sea grass, and nine types of invertebrates, with nine species of benthic algae predominating. Growth may vary widely with diet and ambient conditions.

The size at which immature turtles recruit into coastal waters and commence feeding as herbivores is unknown except for a few locations. In Hawaii it is when the turtles are about 35 cm SCL (Straight Carapace Length). Very little is known about natural mortality or survivorship among North Pacific populations.

Adults are benthic herbivores, subsisting mainly on algae and sea grasses. As adults they embark on long-distance migrations between resident foraging grounds and nesting beaches. Imprinting to the nesting beach and its environs occurs in both males and females and appears permanent, at least over several years. Homing mechanisms are well developed, nesting beach fidelity is high. Nesting occurs on multiple-year intervals. Non-breeding range is typically tropical. Of recent importance is the appearance of a life-threatening disease of unknown etiology which is afflicting turtles from California to Australia and Japan. This disease, marine turtle fibropapilloma, causes large tumors to grow both externally and internally, affecting the turtle’s ability to gather food and breathe.

Taxonomy of *Chelonia mydas* The single species is recognized for the region, although a question remains as to whether a separate subspecies, *C. mydas agassizii* (Bocourt 1868), sometimes referred to as the “black turtle”, occurs in the eastern Pacific from Baja California south to Peru and west to the Galapagos Islands. Eckert notes that “the ultimate resolution to the taxonomic question is important to the management of the *Chelonia* complex in the Pacific basin.

Morphology The genus *Chelonia* is readily distinguished from other sea turtle genera by a single pair of prefrontal scales, four pairs of lateral scutes, and five vertebral scutes. It gets its common name from the color of the subdermal fat, not color of the shell which is usually light to dark brown, sometimes shaded with olive. Carapace coloration changes as the turtle grows from hatchling to adult. Sexual dimorphism is evident in adult animals, with the male's shell more elongate and gradually tapered. The male's tail is very long, and each flipper contains a claw for grasping the edge of the shell of the female during copulation. Adult turtles vary in size depending on nesting beach, but average around 85-117 cm CCL (Curved Carapace Length) in the Pacific. The average CCL sizes of 97.3 cm for Hawaii, 99.5 cm for Baguan Island in the Philippines, 104 cm at Olimarao in Yap, FSM and 107 cm at Heron Island, Australia are somewhat larger than those reported for the eastern Pacific: 82 cm at Michoacan, Mexico, 82.9 at Playa Naranjo, Costa Rica.

Population Units Recent mtdna (mitochondrial DNA) analysis indicates that green turtle nesting beaches in general constitute isolated reproductive units. Several Pacific nesting colonies, including French Frigate Shoals in Hawaii and the Ogasawara Islands in Japan contain unique mtdna genotypes not observed elsewhere in the world. It is thus more or less held today that sea turtle "populations" are composed of genetically distinct subregional nesting aggregations, and suggests that management and conservation should proceed with an intent to conserve as many individual rookeries as possible.

Nesting Habits Eggs are deposited seasonally on tropical sandy beaches at both mainland and island sites. Mating precedes egg-laying by 25-35 days. Gravid females typically nest nocturnally, acting out an instinctual sequence which involves crawling onto the beach, selecting a nest site, preparing a bodypit, digging a nest chamber, egg laying, covering the eggs, camouflaging the site, and returning to the sea. This usually takes about 60-90 minutes to complete. The number of eggs deposited ("clutches") varies as does the frequency of nesting and number of nests in a particular season. In the central and western Pacific, the number of eggs is usually around 100 or so, with the frequency of nesting varying from 10 days to around three weeks. Female turtles may nest from less than three up to six times during a season. Tagging studies have shown remigration intervals to be two to three years in some areas.

Insular and Pelagic Range Worldwide, it is estimated "there are approximately 150 'extant nesting colonies', described as 'demographically independent units'. However only 10-15 of these are large enough to involve 2,000 or more nesting females per year" (NMFS/FWS 1996). Turtles are known from many of the islands of the central and western Pacific, however in undetermined numbers. From tag returns and other studies, the range of turtles in some areas such as Hawaii and areas of the Australian Great Barrier Reef are well known. However little is known of movements of turtles that nest in the Mariana Islands, except for one tagged at Tinian in 1995 that was found in waters off Mindanao in the Philippines (Anon. 1996).

Growth Few growth data are available outside Hawaii in the Pacific Ocean. Estimates in Hawaii are that it takes an average of at least 25 years to achieve sexual maturity. Near Heron Island, Australia, immature wild turtles exhibit a mean annual growth rate of 1.35 cm/year, indicating the average turtle requires 23 years to attain a minimum breeding size. As with many animals, growth typically slows upon reaching maturity, but except for these two examples growth rates and age at sexual maturity in other Pacific populations remain unquantified.

Conservation Status There are three relevant listings of the green turtle. First, under the U.S. Endangered Species Act of 1973, as amended, the breeding colonies of green sea turtles in Florida and on the Pacific coast of Mexico are listed as Endangered and all other breeding colonies are listed as Threatened (50CFR 17.11). Second, the species as a whole is classified as Endangered by the International Union for the Conservation of Nature (IUCN), which publishes a *Red Data Book* wherein those taxa listed are considered to be "in danger of extinction and whose survival is unlikely if the causal factors continue operating." Third, green turtles are included on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and

Flora (CITES), a designation which effectively bans trade in specimens or products except by special permit. The permit must show that the trade is not detrimental to the survival of the species and is not for primarily commercial purposes.

2.2 DESCRIPTION OF THE NORTHERN MARIANA ISLANDS

Geography Located from about 13 to 20 degrees north latitude, the Marianas have been described as being distributed in two north-south trending arcs. A third arc consisting of a submerged mountain chain marked by reefs and banks about 150-200 miles to the west of the two island arcs (Amesbury et. al. 1989). The northern arc consists of islands of recent volcanic origin, with Uracas, Pagan, Alamagan and Anatahan containing active volcanoes. Arable lands on some islands were commercially planted in coconuts as early as the mid-19th century. Their major drawbacks for human habitation, aside from volcanoes and limited size, are their geographic location which makes them extremely vulnerable to typhoons tracking to the northwest, and unpredictable rainfall conditions.

The southern arc islands contain more than 99% of the current population and are mostly larger than those to the north. They consist primarily of coralline limestone, and enjoy greater and more consistent rainfall (Amesbury et. al. 1989). Land area for all islands is listed in Table 1. Saipan supports the greatest population and has rapidly undergone urbanization in the last decade. It is approximately 46 sq. miles in area and is divided into three main geographic regions: a coastal lowland including Tanapag harbor in the west, a rugged northern and central upland comprising about two-thirds of the island, and a southern plateau where the current airport and much of the island's housing are located (Karolle 1987).

Table 1. Islands of the Northern Marianas

ISLAND	AREA (ACRES)	AREA. (SQ. MILES)
Rota	21,055	32.90
Aguijan	1772.8	2.77
Tinian	25,145.6	39.29
Saipan	29,811.2	46.58
Farallon de Medinilla	224	.35
Anatahan	7,987.2	12.48
Sarigan	1,235.2	1.93
Guguan	1,024.0	1.62
Alamagan	2,784	4.35
Pagan	11,731.2	18.33
Agrihan	11,705.6	18.29
Asuncion	1,804.8	2.82
Maug	518.4	.81
Farallon de Pajaros	505.6	.79

source: Department of the Navy, 1975

Different spellings, and in some cases completely different names for some islands are found in various references. The island most commonly known as Farallon de Pajaros is sometimes referred to as Uracas, and sometimes spelled "Pajaros"; the island of Agrihan is often spelled Agrigan, and Saipan's nearest northern neighbor is spelled both Farallon de Medinilla and "Mendinilla" in the literature. In addition, the Carolinian and Chamorro populations sometimes use different names for the same island when speaking their own languages⁸. To try and minimize such confusion, this report will utilize the names of islands in the Commonwealth of the Northern

⁸These sources of confusion are by no means limited to the Marianas. Voyagers, cartographers, historians and anthropologists have for years confused the names for some uninhabited atolls and islands in the Carolines to a point where it sometimes becomes difficult to distinguish a reference unless one is provided with a physical description of the island under discussion.

Mariana Islands listed above as they exist from south to north, and are found on existing US navigational charts for the area.

The entire Mariana Islands chain exists in a geologically active region. The U.S.G.S. National Earthquake Information Center recorded 218 events in the Mariana Islands region (including the seabed) from January 1, 1994 to October 15, 1995, reportedly mostly earthquakes larger than 4.0 in magnitude. Seismic data collection stations exist on Anatahan, Alamagan, Pagan and Agrigan, with information transmitted and recorded at the Seismic Unit of the Emergency Management Office on Saipan (Northern Islands Mayor's Office, 1996).

The salient geographic features of any island group of particular relevance to turtles are the availability of potential nesting beaches as well as coral reefs and lagoons to support possible food sources such as algae and sea grasses. Historically, nesting has occurred on the southern islands: mainly Saipan, Tinian and Rota. A complete description of beaches on those islands can be found in Eldredge and Randall (1980). The northern islands do not appear to possess suitable nesting beaches⁹.

Three species of seagrasses are found near the islands of Rota, Tinian and Saipan. In 1977 all were reported abundant in the lagoon along Saipan's west coast, with the largest, Enhalus acoroides having restricted distributions at Tinian where it is known only from Unai Chiget, and at Rota where it occurs in a narrow band in the West Dock area (Tsuda et. al. 1977). Seagrass and benthic macroalgae suitable for foraging green turtles is also reported from the windward side of Saipan (Wilkins and Meyer, undated).

Government The Northern Mariana Islands has its own constitution and is constituted as a commonwealth of the United States. Relations with the U.S. are governed by the Covenant to Establish a Commonwealth of the Northern Mariana Islands in Political Union with the United States of America. Not all U.S. constitutional provisions apply, and certain powers have been delegated by the federal government. Currently the CNMI possesses some characteristics of an independent nation such as control over immigration, minimum wage and land ownership laws, all of which have been keys to the current economic prosperity. The southern inhabited islands are each considered a separate municipality, with an elected mayor; and an additional mayor for the northern islands is elected by those who qualify as residents of those islands. Citizens are United States citizens, but like residents of other U.S. territories do not vote in national elections, and federal taxes are paid but retained in the local jurisdiction. Currently in the NMI most federal taxes collected are rebated to the taxpayer, a situation that has further encouraged residency by non-indigenous people.

Economy A combination of the key characteristics of Commonwealth law and the decision to allow in foreign capital and labor after 1978 has produced an economy totally unlike that which had existed during the prior Trusteeship period. Tourism has become the largest income source and its most dynamic industry. Almost all tourism is focused on Saipan, although the current construction of a 500-room casino on Tinian may change the focus of some tourism impacts.

Tourist traffic to CNMI has increased every year since 1985 except for a small 1.3 percent drop in 1991 due to the Gulf War. Japan, Korea and to a lesser extent the United States are the major markets now and are predicted to remain so into the next decade. The total number of hotel rooms doubled from 1987 to 1994; there are now over 3,000 hotel rooms at present, with more being constructed. Overall, the "total export value equivalent" of tourism was estimated to be \$463.5 million in 1994 (Osman 1995). Visitor arrivals in that year reached almost 600,000, and

⁹It is generally believed and accepted that turtles do not nest in the northern islands. To the extent possible, interviews with current and former residents confirmed that there is no current or historical evidence of turtle nesting on those islands. Those familiar with the northern islands say that the limited beaches of Pagan are black sand and get extremely hot during the daytime, with little or no vegetative covering above the narrow strand.

was expected to top 750,000 in 1997 (McPhetres, pers. comm.). Almost the entire tourist impact is absorbed by an island roughly 24 miles long and 2 miles wide; and much of it is focused on the beaches and lagoon environment in the form of ocean-based recreation.

Second to tourism has been the garment manufacturing industry. The total export value of garments in 1994 was estimated at \$319 million (CNMI Dept. of Commerce, cited by Osman). The industry directly employs nearly 7,000 mostly foreign workers on Saipan. An overall foreign employment ceiling in this industry is set by the government and can be adjusted. It has been estimated that “each garment manufacturing job roughly generates the economic impact of one other job in the economy” (Osman 1995).

Population and Demographics The population of the main islands of Saipan, Tinian and Rota has been subject to fluctuations involving various historical factors and events (Table 2 below contains a summary of population changes during the latter two-thirds of this century). The recent transformation of the economy, particularly on Saipan, has brought tremendous changes to the demographics of that island. The native Chamorros and Carolinians (apparently enumerated by inconsistent methods during various census operations but nevertheless numbering less than 19,000) are now a minority in the Commonwealth. Growth in full time residents is reported to have increased by 250 % from about 18,000 in 1980 to almost 60,000 in 1995.

Table 2 Population in the Northern Mariana Islands

ISLAND	1937(a)	1949(b)	1965(c)	1975(d)	1980(e)	1995(f)
Rota	7,621	681	1,243	1104	1261	2,500
Aguigan	0	0	0	0	0	0
Tinian	14,917	364	596	750	866	3,000
Saipan	23,685	4,898	8,664	12,387	14,549	55,000
Farallon de Medinilla	0	0	0	0	0	0
Anatahan	40	0	0	0	0	65
Sarigan	0	0	0	0	0	0
Guguan	0	0	0	0	0	0
Alamagan	24	136	0	25	18	62
Pagan	220	0	300	24	54	0
Agrigan	88	146	0	45	32	132
Asuncion	0	0	0	0	0	0
Maug	0	0	0	0	0	0
Farallon de Pajaros	0	0	0	0	0	0
Total	46,595	6,225	10,743	14,335	16,780	60,759

sources:

(a) Navy Dept. Mandated Mariana Islands, pp. 34-35 (figures for some islands from 1935)

(b) Compiled from data in US Navy, Civil administration unit, Saipan Quarterly report, Oct. 1-Dec. 31, 1949, cited in Bowers (1950).

(c) Trust Territory, June 30, 1965 (Vincent 1973:164)

(d) Dept. of Navy (1975) Environmental Impact Statement on Farallon de Medinilla bombardment range

(e) 1980 Census of Population, U.S. Bureau of the Census (PC80-1-A57A, 1982) quoted in Amesbury, Hunter-Anderson and Wells, 1989

(f) Rota, Tinian and Saipan are estimates from the 1995 census (McPhetres, pers. comm.); northern islands figures from Office of the Mayor, Northern Islands.

Almost all the garment workers are from Asia, with less than 10% from other Micronesian entities such as the Federated States of Micronesia. Jobs in construction and hotel services are held mainly by citizens of the Philippines, who are said to number over 22, 000 at last count (McPhetres pers. comm.). A large number of Koreans have moved to Saipan and seem to be involved mainly in small businesses such as stores, restaurants and specialty shops. Other non-

U.S. nationalities present in various capacities and working under contract in smaller numbers include those from China, Bangladesh, Myanmar, Nepal and elsewhere.

2.3 SOME RELEVANT SOCIAL PROBLEMS, ATTITUDES AND PRACTICES

When discussing the inhabitants of the Northern Marianas in their review of subsistence use, Lecky and Nitta (1985) stated once again what is well known and irrefutable: that “two hundred and thirty years of Spanish rule had a significant effect on the Chamorros and by the early 1900’s their Micronesian heritage was barely discernible” (Oliver 1961 cited by Johannes 1984). They did not however, address the Carolinian population at all, nor discuss what the Chamorro culture represented in the latter part of the 20th century¹⁰.

Social Changes and Problems The fast pace of transformation within the NMI economy has brought with it many changes as well as new problems for the indigenous population. It is well-recognized by civic and political leaders in the CNMI that many of the societal ills plaguing the U.S. and other developed countries are present today in the Northern Marianas¹¹. To say that the Northern Marianas and their inhabitants have undergone tremendous change in their social and physical environment would be an obvious understatement. That they have persevered in the face of such rapid-paced change, have retained control of their government and that a surprising amount of the social structure remains intact is perhaps less well appreciated.

Family structure is nevertheless changing as nuclear families are becoming more prevalent and wage labor is the norm. The availability of homestead land has physically distanced some adult children from their elders, and for the Carolinians clan cohesion has all but disappeared. As the island has developed, many families have leased lands to developers which once served as family farms. The availability of jobs in the service sector of the economy has meant many who were previously engaged in semi-subsistence farming and fishing now have full-time jobs in the cash economy. Others who either don’t qualify for or are not disposed to full-time employment nevertheless seem to want to accept the new lifestyles.

Drug abuse, prevalent on Saipan for 20 years or more among some age and social groups but previously mostly limited to marijuana and alcohol, is on the increase with crystal methamphetamine (“ice”) now used. Reported cases of child abuse, child neglect, juvenile delinquency and troubled youths increased each year from 1994 to 1996, with juvenile delinquency cases involving the court increasing 160% (Div. Youth Services 1997).

Diets have changed, particularly among the Carolinians, from basic home-grown commodities such as taro and breadfruit supplemented with locally-caught fish to store-purchased, often fatty and less healthful foods. The results of a lack of exercise and less healthful diet have had a devastating effect. Diabetes and related health problems are said to be of epidemic proportions in many segments of the population, with the hospital’s dialysis unit working 20 out of 24 hours daily and an entire ward set aside for diabetic amputees (McPhetres pers. comm.).

The island has undergone massive physical changes as well. Infrastructure is being stretched to the limit as recent economic change has brought about increased population and almost 700,000 tourist visitors per year. The number of motor vehicles has more than doubled in the past decade and old two-lane roads have become four-lane highways. Fast food restaurants are popular and

¹⁰To be fair, with respect to the Chamorros, they were concerned with “cultural dependence” on turtles, and not culture *per se*.

¹¹The following discussion is not meant to be an all-encompassing look at Northern Marianas society today, and the reader should not infer from the discussion on juvenile problems that the society is in total disarray. However it is indicative of the massive problems confronting leaders and their need to find solutions.

cellular phone and pager use is common. Schools have become more crowded and some public schools are on a staggered schedule as a result.

The main concern of those adults contacted during the course of the study, most of whom were in responsible positions in government and business, is the of the youth in the Northern Marianas. DYS reported serving a total of over 1,200 children, youths and adults during 1996 and reported that in 1996 criminal cases had increased over previous years. The numbers represented 260 juveniles (18 years old and younger) of CNMI descent, 137 non-CNMI Micronesians and just 30 from the rest of the community; staggering statistics when one considers that the overall population of Chamorro and Carolinian inhabitants is about 21,000 or less than one-third the total for the entire CNMI.

Juvenile offenses included alcohol consumption, theft, vehicle theft, assault with a dangerous weapon, assault and battery, illegal possession of a controlled substance, and other offenses more generally associated with the inner city than a western Pacific island society. The greatest number of offenses were for alcohol consumption, however the total for all types of theft, including categories of vehicle theft, burglary and theft, and armed robbery exceeded that number significantly.

The institutional response to these representative problems has been strong, although hindered by lack of trained staff and funds. The community has instituted activities associated with social work functions in the western model including a Division of Youth Services, an Aging Program to care for the elderly, and others. Organizations such as the Boy Scouts and Little League baseball flourish and receive wide support in the community. However many community leaders, particularly those from the Carolinians, feel that the recent move to a faster-paced society in general has left a greater gap between young and old. Coupled with that, many of the older generation capable of imparting tangible evidence of the Carolinian culture are no longer alive, and it is more difficult to convey an appreciation for their culture. This has led to a "lack of respect" and "an absence of cultural awareness" among younger people. More than one elder expressed disappointment in not being given the same respect from youths today that he had afforded his/her elders in the past.

Discussions with some of the leadership of the Carolinian community revealed one of the main reasons for seeking a ceremonial exemption was their belief in the need for a positive orientation of attitudes by the younger generation toward their culture. Older Carolinians believe that one trait setting Carolinians apart was their reliance on the sea. A utilization of turtles which mirrored that of their ancestors as well as the current inhabitants of the Caroline Islands was seen to be an integral part of their culture. They expressed the desire that cultural events and a subsequent greater awareness of their culture would bring about a pride that could overcome the attitudes and distractions of present-day life and contribute to a more stable society.

Chamorros and Carolinians The society of the Marianas today retains its pluralistic traits, and both officially and unofficially there exists a Carolinian/Chamorro distinction. Even though intermarriage has blurred this substantially, many government statistics are still expressed in terms of the two cultural groups. Officially there is a Governor's Office of the Assistant for Carolinian Affairs, which operates with the advice of a ten member advisory council drawn from the Carolinian community and employs an office staff of 11 to assist in such areas as language translation, Housing Authority and Public Lands issues, legal services, public works and road repair questions, arts and culture activities, health and dietary questions, land or land lease questions and educational problems (Anon: 1996). There is also a separate Office of Indigenous Affairs (which employs Carolinians) within the Department of Community and Cultural Affairs

(which is currently led by a Carolinian). One sees and hears references daily to Chamorro and Carolinian when referring to the peoples of the Marianas.¹²

Although not precise, the following description by Alkire (1984a) cites the roots of the perceived differences between Chamorro and Carolinian.

For many years, the Carolinians on Saipan have perceived themselves as an oppressed minority, discriminated against by both the majority Chamorros and the various colonial authorities. The Chamorros considered them to be unsophisticated, backward natives; and various colonial regimes saw them as uninterested in “progress”—or, in the German lexicon, oblivious to “order, efficiency, punctuality or obedience.” To the Japanese, they were “Kanakas”, a term of Polynesian origin that had assumed pejorative connotations. Most colonial efforts to develop Saipan along mercantile, industrial, or plantation lines concentrated on the Chamorros, who were more amenable to such developments probably because they had been so thoroughly Hispanicized during their residence on Guam.

Alkire also explained the roots of economic disenfranchisement by recording that

During the years of Japanese occupation, both Chamorros and Carolinians shifted away from subsistence cultivation and fishing to wage labor and dependence on rents received for lands leased to Japanese plantation owners. Since most of the large landowners by this time were Chamorros, few of the Carolinians benefited from rent revenues. In wage labor, the Japanese favored the Chamorros, training them to fill such skilled positions as hospital technicians, nurses, schoolteachers, policemen, mechanics, blacksmiths, and carpenters; Carolinians were utilized primarily as unskilled laborers and stevedores. (Alkire 1984)

During the latter years of the U.S. administration of the Northern Marianas, many Carolinians were highly politicized and formed the United Carolinian Association. As a minority they were concerned mainly about political representation; and increased emphasis on cultural identity was used as a means to underscore the unique qualities of the Carolinian culture¹³. For the past 25 years or more the idea of Carolinian ethnic identity distinct from the Chamorro has been a constant theme¹⁴. This is not to say that being distinct and remaining distant are the same thing. Most mature Carolinians raised on Saipan in a Carolinian household speak both Chamorro and Carolinian (as well as English with Japanese spoken by older people).

The role of fiestas The Marianas, including Guam, are well known for their community celebrations known as fiestas. The fiesta serves several social functions, one of which is to promote and cement social cohesion. Fiestas can be celebrated by families for such occasions as birthdays or baptisms and marriages. However the major celebrations in the Northern Marianas are connected with Saints days, and the most important on Saipan is that of San Isidro, the Patron Saint of Saipan. These celebrations bring the community together for a day of feasting and usually dancing. They are open to all and always include a large assortment of both local and imported food, in prodigious quantities. In the past the men of the village would fish and hunt in preparation for the fiesta. Delicacies such as fruit bat, reef fish, wild deer, and turtles were

¹²As one example, the inscription at the base of an official monument at the American War Memorial Park is dedicated to fallen US soldiers as well as “innocent Chamorros and Carolinians killed during the World War II Invasion and Battle for Saipan in June and July, 1944”.

¹³See Alkire (1984a) for a complete discussion of the Carolinian political situation during the 1970's.

¹⁴This is not to say that being distinct and remaining distant are the same thing. All mature Carolinians raised on Saipan in a Carolinian household speak both Chamorro and Carolinian as well as English (with Japanese still spoken by older people). Most Chamorros do not speak Carolinian unless their spouse is Carolinian.

particularly sought. The fiesta is preceded by a nine day period of prayer and services in the Catholic religion called a *novena*. The fiesta is usually held at a community hall or meeting place, and “nearly everyone contributes in goods, talent, money, or labor...” (Ashby 1975).

The fiesta of San Isidro is celebrated in the Chalan Kanoa area of Saipan, in what is known as “District 4” (from older U.S. Navy numbering of administrative areas). San Isidro is the patron saint of all of Saipan, and in Catholic tradition known as the patron of laborers. The fiesta is celebrated on a Sunday, even though the actual Saint’s Day for San Isidro may not coincide. It is preceded by a mass at the Mt. Carmel cathedral and a procession where participants walk approximately 1/2 mile to the site of the fiesta at a beach park in District 4 carrying a statue of San Isidro on a large platform. Both the entrance to the cathedral and the entrance near the park have gaily decorated arches under which the procession passes on its way to the site of the fiesta. Traffic is halted on the main road as it proceeds down the highway, with appropriate songs coming from those participating in the procession¹⁵.

At the San Isidro fiesta held on May 18, 1997, there was a mixture of old and new. A stage was erected at one end of the open-air (but covered) community hall, presided over by a master of ceremonies who addressed the crowd at various times in English, Carolinian and Chamorro. People arriving at the fiesta were urged to line up and obtain their food at a table approximately 30 feet long containing many types of locally and professionally prepared dishes. Although much local effort had been put into food preparation, it was necessary to purchase large quantities of professionally prepared food at local restaurants due to the number of people expected. All funds for the fiesta were donated by the community, and its organization undertaken weeks in advance.

A canoe from Satawal in the Caroline Islands had arrived the previous month, and the crewmen were joined by local Carolinian and Satawal residents in performing traditional dances led by their navigator, Pius “Mau” Pailug. Additional traditional dancing groups entertained throughout the day, including one group of elementary-school age youngsters led by the Conservation Education Specialist at the Division of Fish and Wildlife. Over ten singing and dancing groups performed throughout the day, with less traditional entertainment provided by several local bands. Three professional dancing groups made up of largely Carolinians usually employed as entertainers at local hotels performed both Micronesian and Polynesian dances. A Samoan group which performs locally also appeared, noting that while they didn’t usually dance on Sunday due to their religious beliefs, they considered Saipan’s date as actually in advance of that in Samoa and hence not a hindrance. No liquor was served, although numerous people attending the fiesta brought their own beer. There were no altercations or fights noticed at the gathering, and the entire mood was very festive. Japanese and Korean tourists, strolling along the beach in bikinis and swimsuits stopped to watch occasionally, and the only cameras present seemed to be those held by the tourists or non-indigenous people attending the fiesta.¹⁶

2.4 PERCEPTIONS OF TURTLE ABUNDANCE

When one seeks out people supposedly knowledgeable about turtles in the Northern Marianas, almost all who are queried believe strongly that there is no shortage of turtles. Not focusing on a nesting population (or lack thereof), they invariably mention numerous sightings in the water as evidence of an abundance of turtles, be it Saipan, Tinian or the northern islands.

The Fish and Wildlife Service found this same attitude during their work on Tinian:

¹⁵Approximately 200 people participated in the procession, however many more arrived at the site of the fiesta by car throughout the day. Attendance was estimated at 600-800.

¹⁶The proceedings were video taped however. These were mostly private, and no news media were present, as such a fiesta is perhaps not considered newsworthy in spite of the traditional dances.

Based on conversations with island residents, the abundance of juveniles in the water is misleading to many individuals who feel that laws protecting marine turtles are unnecessary on Tinian because of the year-round plenitude of turtles. There is little realization on the part of these individuals that populations of green turtles worldwide are known to undertake reproductive migrations every two or more years, traveling long distances between resident foraging grounds and nesting beaches, and that the turtles they observe so frequently in the water are a juvenile population that is distinct from the nesting population (USFWS 1996).

Wiles (1989), writing from a scientific perspective, shared a perception with the inhabitants of Rota that: "both large and small turtles abound".

3. THE HISTORICAL RECORD: SOURCES AND SUMMARY

A literature review and interviews with older residents of the Northern Marianas were undertaken to compile existing historical information relating to the use of turtles in the Northern Mariana Islands. A similar literature review was completed for information pertaining to past and contemporary use of sea turtles by communities in the Caroline Islands with which Carolinian communities in Saipan have maintained a cultural connection. A summary of sources appears as Appendix 3. The results of the review relating to the NMI have been divided by the various periods of external political control prior to the enactment of the Commonwealth Covenant. In this manner, a more detailed picture is presented including the varying historical, social, political and environmental factors that have shaped past and current attitudes. Many of these have also been factors in contributing to the current status of the turtle resource itself. Although several primary sources are available for later periods in history, of necessity numerous secondary sources have been consulted for descriptions of earlier periods.

In writing what was considered at the time perhaps the most definitive review on the subsistence use of turtles on Pacific islands under U.S. jurisdiction, Johannes (1984) quotes De La Corte (1870) as possibly containing "...the only surviving historic reference to sea turtles in the Marianas". While this may or may not have been the case at the time of Johannes' writing, much scholarly research, translation and publication of relevant documents have made several more references available. These documents coupled with the recollections of informants provide a more complete picture than that presented in 1984.

3.1 ARCHAEOLOGICAL EVIDENCE

Summary *The archaeological evidence is sketchy and incomplete. However from one well-studied site on Rota it appears that turtle was utilized more in periods of more than two thousand years ago, with lessening utilization during later periods.*

It is thought that perhaps two or even three thousand years before the birth of Christ, canoes first brought voyagers from the islands now known as the Philippines or eastern Indonesia to the Marianas. They are believed to have brought at least some food crops and even a few animals like the dog (Hezel 1983). Archaeologists have divided the periods of earliest habitation into a Pre-latte Phase lasting up to about 800 AD, and a Latte Phase which continued until the major cultural disruptions brought about by European contact and colonization by the late 1600's (Amesbury, et. al. 1989).

Generally, archaeological evidence relating to the use of turtles in the pre-latte phase appears sparse. While turtle shell (but not necessarily bone) is recognized by some archaeologists as a potentially non-enduring substance, this lack of evidence is somewhat puzzling. It may be that previous human habitation sites were destroyed by war or natural disaster. However Spoehr (1957) stated that archaeological records pointed to the use of turtles as a food source. He

mentioned several records of turtle bone found at unnamed archaeological sites and notes that unworked fragments of turtle plastron were found on Saipan.

The most complete detailed and dated description of turtle remains are found in Craib (1990). Excavations at Mochong on Rota found turtle remains in four test pits. The report noted that specific identification of the turtle was not possible, since no comparative collections were available when the analyses were undertaken. It also noted that most of the bone is carapace, "which is not an easily identifiable element". The report further states that

The capturing of turtle (e.g. *Chelonia*, *Eretmochelys*) appears to have occurred throughout the occupation of Mochong, although the amount of turtle bone in the deposits decreases dramatically over time. This assumes that no major changes in butchering practices and/or disposal of turtle bone occurred over the same period and that the decrease in amount of bone reflects an overall decrease in numbers of turtle captured. Although the amounts of bone are quite small, the variation between Horizon 3 and the later horizons is striking, representing about an 80% decrease.

The greatest amount of turtle bone appeared in the pits from roughly 800 to 354 BC. The author expresses surprise that so little turtle was found in higher (i.e. later) levels, as there were continued high densities of fishbone present. One pit had one bone only from the period 354 BC - 226 AD and nothing in later horizons despite the presence of fishbone¹⁷. The latest horizon to record the existence of turtle at the Mochong site is dated at AD 1240-1440. The author concludes by noting that "turtle shell was valued among Chamorro; presumably turtle meat was a prestige food."

The recent discovery on Rota of what appear to be very old cave etchings unmistakably representing among other things, sea turtles, may prove to be from one or more of the periods noted above. However at this time the dates of these cave drawings or etchings have not been determined.

3.2 EARLY CONTACT AND THE SPANISH PERIOD

Summary The historical record during the Spanish era highlights the import usage of turtle artifacts in two contexts. In (possibly) the pre-contact period a turtle shell was used as a peace offering to signal the end of hostilities between warring factions of the local inhabitants. The other significant use of turtle shell was as the raw material for worked disks assigned specific value and possibly used as medium of exchange. However the most interesting factor to emerge from a review of the written historical record is a dearth of information regarding any reliance by the indigenous population on turtles as a food source, and little mention by Europeans of turtles on or around the islands. This is particularly surprising when there was a more than 150-year hiatus where the islands possessing the greatest number of potential nesting beaches, Saipan and Tinian, were completely uninhabited. One would therefore expect any existing turtle population to have had the opportunity to multiply and become highly visible, or at least a dominant factor in the food sources of at least that portion of the population that had migrated from atolls to the south and east where turtles were utilized as an important source of protein. The lack of any mention of a significant population is puzzling.

Contact between the inhabitants of the Marianas and early European explorers began with Magellan's stop at Guam in 1521. The Spaniard Legazpi sailed from the west coast of what is now Mexico and claimed the Mariana islands for Spain in 1565 (Hezel 1983). However no permanent Spanish colony was established until the latter part of the 17th century. The native

¹⁷ Many circumstances might explain this discrepancy, including recognition of the turtle as a totem by later inhabitants; however environmental or biological causes cannot be completely ruled out.

inhabitants of the islands, later known as “Chamorro”, suffered a tremendous decline in population during the ensuing 100 years. Aside from active warfare carried out by the Spanish and the scourge of introduced diseases that decimated the population, most were rounded up and forcibly taken to Guam to be settled in villages, the easier to be instructed in the Catholic faith of their new rulers. During this period it is estimated that the population of native Chamorros declined from an estimated 40,000 to approximately 1,500 (Underwood 1973 cited by Amesbury et. al 1989).

The almost complete de-population of the northern Marianas (a few had managed to escape to Rota) ironically brought with it Spanish chroniclers who remain the sole sources of information on the Chamorro culture of the day. Father Diego Luis de Sanvitores arrived in Guam in 1668 and lasted just four years before being killed by the indigenous Chamorros during one of their uprisings. From his notes and letters Francisco Garcia published *Vida y martirio de el venerable Padre Diego Luis de Sanvitores* in 1683. A translation cited by Thompson (1945) gives a description of domestic Chamorro warfare and the means for one side to signify submission. Thompson prefaces the description by noting that

As in other parts of Oceania, native warfare in the Marianas was a sort of game in which rival groups would test their strength against one another. There was a great show of bravado, but as soon as one side had lost two or three men, it would send a turtle shell to the enemy as a sign of submission (Thompson, 1945).

Owing to the overt depredation and forced resettlement policies of the Spanish, by the early years of the 18th century all islands except Rota were devoid of human habitation. Tinian had been deserted since 1705, and in the early 1700's the Spanish decided to utilize it as a ranch and food source. By 1742, it was a thriving unmanned cattle “ranch” where Spaniards and Chamorros periodically went to kill and cure beef to both supply the garrison on Guam and provide for the yearly visit of the Acapulco galleon which generally stopped there on its way to Manila (Barratt 1988b).

During September and October, 1742 an English sailing ship, *HMS Centurion*, stopped at Tinian for supplies and rest. In a detailed account of the stay described by Barratt (1988b) one can find no mention of turtles or turtle nesting by the teacher of mathematics and navigation who was on board and who documents the island's flora and fauna in great detail. Since English ships of that period were known to regularly provision with live turtles caught when operating in the Caribbean and elsewhere, it is somewhat surprising that there is no mention of the animals at all in this account.¹⁸ It may have been the sailors arriving at Tinian abstained from turtle during their stopover owing to the great variety of wild fowl, cattle, and pigs present on the island. One account by a seaman contained in Barratt (1988b) mentions some of the crew becoming sick upon eating some of the fish caught in the lagoon upon first arrival, possibly from ciguatera. That might have made them less enthusiastic about capturing or eating turtles (even though ciguatera is known only from hawksbills). Whatever the reason, no mention of turtles from captain or crew of an English vessel of the period is puzzling if, in fact, there was a substantial population existing at the time.

In the opinion of several authors, even before the Spanish arrived in the Marianas there had been contact and trade between the Chamorros and the islands to the south and east, what came to be known as the Caroline group [for a detailed discussion see for example, Barratt (1988a), as well as Thompson (1945) and Joseph and Murray (1951)]. After the Spanish conquest, the

¹⁸According to Carr (1967) the green turtle was an important factor in the colonization of the Americas. “The British navy counted on green turtle to extend its cruising in the New World. The Spanish fleets took on turtle for the voyage back home to Cadiz...It was an ideal food resource, and it went into the cooking pots of the salt-water peasantry and tureens of the flagships alike.” In the Pacific, Captain James Cook utilized turtles captured in Fiji and elsewhere as a food source for his crew on his voyages of exploration.

Carolinians were reported to have avoided the Marianas in their voyaging. The first record made by Europeans of a Carolinian canoe on Guam was in 1721 when a canoe from Faraulep bound for Ulithi arrived there after a storm (Barratt 1988a). From 1721 well into the 19th century, numerous records of trading visits, most probably in search of iron, and voyages of colonization have been recorded by Europeans and are well known in Carolinian oral history (McCoy 1991).

Purposeful voyaging from the Carolines to the Marianas resumed in the late 18th century when a canoe from Lamotrek arrived at Guam in 1788 (Barratt 1988a).¹⁹ Canoes from the Carolines began visiting with regularity and their visits were recorded by Spanish officials (Driver and Brunal-Perry: 1996) and European visitors alike. By the early 1800's they had established a regular presence on Guam and were described by several Europeans including Louis de Freycinet, the commander of a French naval frigate and Adelbert von Chamisso, a naturalist who traveled with the Russian explorer Kotzebue. Freycinet reported that in 1816 more than 120 canoes set out from Lamotrek and nearby islands carrying more than 900 people hoping to resettle in the Marianas, their own islands and food supplies having been destroyed by a recent typhoon. However the flotilla met with another storm at sea and most perished. The Spanish heard of the incident and sent word that a new home would be available in the Marianas. There were already some Carolinians resident in the Marianas at the time, and in 1818 a party of about one hundred sailed to Guam, met with the Spanish Governor Medinilla y Pineda and arranged for settlement of Saipan (Hezel 1983). It was later said that the conditions of settlement were that the new inhabitants "embrace Christianity and promise to live with the Spanish and the inhabitants of their new homeland in perfect harmony" (Freycinet, quoted by Hezel: 1983).

The commencement of "authorized" Carolinian settlement roughly coincided with the cessation of the galleon trade between Acapulco and Manila in 1815. The Mariana Islands ended their previous close association with New Spain (Mexico) and in 1817 became a province of the Philippines. It is important to recognize that "the Carolinians who settled in the Mariana islands after 1817 brought those beliefs, attitudes, and social practices along with them despite their promises to Medinilla y Pineda to accept the Church's teaching in their new, more fertile home." (Barratt 1988a). The proximity of Tinian to Saipan meant that they moved there as well, while an undetermined number continued to exist in an enclave within the town of Agana on Guam.

Still all was not perfect, and the previously atoll-dwelling Carolinians remained essentially fishermen and gatherers. It was noted by a Spanish official in 1839 that "...there is no hope they will cultivate the land for their own use. As soon as attempts are made to make them work, the same thing will happen as happened in 1823, when, after they had settled on Saipan and had been baptized, some islanders of both sexes from the Islands to the South sailed back to their islands and to their ancestral jungles because they did not want to be obligated to cultivate the land for their own sustenance." (Driver 1996).

An important societal element from the Marianas was reported by Freycinet's expedition in 1824²⁰. More than a century later, Thompson described in detail Freycinet's findings, which

¹⁹Barratt cites a desire for iron and iron articles as the motivation; he also states that previously such a voyage might have been to barter for "turmeric, shell belts and tortoise-plate". This last is curious, as islands of the central Carolines, particularly Lamotrek and environs, have historically contained large numbers of nesting green turtles. The possible explanation that the "tortoise-plate" in question was hawksbill (being more suitable for implements) is also questionable as Satawal island just 40 miles east of Lamotrek was reported to contain large numbers of hawksbills owing to its total protection by the inhabitants there. More likely, "tortoise plate" might refer to green (and perhaps hawksbill) being *brought* to the Marianas for use in shell money.

²⁰This French scientific expedition arrived in the Marianas at Guam in March, 1819 and included the zoologists Quoy and Gaimard, a botanist and an artist-writer. They spent several months in the Marianas, visiting Tinian and Rota as well as Guam.

evidently were obtained by interviews with Don Luis de Torres²¹ on Guam in 1819 (Thompson 1945: 42). In her description, Thompson explains the existence of two types of shell “money” that was in use in the Marianas. No dates or periods are put forward for when this “money” was in use. Thompson’s description of Freycinet’s description of information gained from Torres has been reproduced by others, including in a recent CNMI history textbook where it is described as “necklaces and other turtle-shell jewelry...used as money by the ancient Chamorros” (Farrell 1996). Because of the importance placed on items made from “tortoise shell”²² and the questions raised, Thompson’s account is worth setting out here in its entirety.

Under the generic name of *alas* were included two types of shell disk necklaces: (1) the *guini*, a string of thin, regular, perforated disks, in width slightly less than the little finger and in length such that it hung down to the navel, after having passed twice around the neck; (2) the *lukao-hugua*, a string of thin, regular, perforated disks about the width of a thumb and the length such that, when hung around the neck, it reached the hip. Both the *guini* and the *lukao-hugua* illustrated by Freycinet are composed of tortoise shell. A fragment of a string of shell disks was called *ghintus*. A simple tortoise shell plate was called *lailai*; a tortoise shell plate perforated according to rule by the chief was called *pinipu*. The value of a *pinipu* was as many times three *lailai* as there were perforations in it. Thus a *pinipu* pierced with four holes was worth 12 *lailai*. The relative value of Marianas shell disks was as follows:

- 1 *pinipu* with 1 perforation: 3 *lailai*
- 1 *pinipu* with 2 perforations: 6 *lailai* or 1 *guini*
- 1 *pinipu* with 3 perforations: 9 *lailai*
- 1 *pinipu* with 8 perforations: 24 *lailai* or 1 *lukao-hugua*

The value of a *ghintus* depended upon its length. It was worth more than a *lailai* and less than a *guini*. The shell object of highest value was a *guineha famaguon*, a chest ornament worn by men. It was shaped like an elongated, truncated cone, about the diameter of six thumbs at the base and of one thumb at the point. It was composed of disks of shell. The *guineha famaguon* was considerably more valuable than other types of shell “money”, but its exact value could not be measured in terms of them.

From the above account, it appears that the ancient Chamorros had several types of “valuables” which fulfilled, wholly or in part, some of the essential functions of money (31, p.36). Freycinet defines five classes of valuables, namely *guini*, *lukao-hugua*, *lailai*, *pinipu*, and *guineha famaguon*. These served as instruments by which value could be condensed, accumulated, and, to a limited extent, exchanged. The first four, at least, served within limitations as measures of value and standards of deferred payment. There were two interrelated systems by which value could be measured, namely the *guini-lukao-hugua* system of shell-disk necklaces and the *lailai-pinipu* system of tortoise-shell plates. The value of each unit in one system could be expressed in terms of the other. The extent to which other objects of exchange could be valued in terms of these valuables, however, has not been recorded.

²¹Don Luis de Torres, a resident of Guam, was an important link in the retention of knowledge regarding early Chamorro and Carolinian culture. He had witnessed the arrival of Carolinian canoes in 1788, had traveled to the Carolines in 1804, and later served as Deputy Governor of Guam when Governor Medinilla granted Carolinians colonizing rights to Saipan. Although he never wrote a book or published an article, he was consulted by European explorers, ethnographers, zoologists, and others who reported his findings (Barratt 1988a: 31-44).

²²the term “tortoise” more correctly describes the land tortoises of the family Testudinidae and a few species of the family Emydidae, which are the only turtles fully adapted for a terrestrial existence (Pritchard 1979: 247). However writers from early times up to the present have often incorrectly referred to shells, jewelry and artifacts made from sea turtles as coming from tortoise or being “tortoise shell”.

The “tortoise shell” disks as described above appear to be very similar to those in use throughout the central Carolines and used in the manufacture of women’s shell belts known as *pwuun*, *saak* and *giin* (in the Satawal dialect) depending on the design and type²³. They are produced by laboriously filing and drilling disks of the appropriate size from the thin carapace plates of the green turtle and stringing them tightly on thin sennit ropes in sections divided by similarly produced disks of shell. Because of the thinness of the shell plates, it is possible to make them appear as almost a continuous strand, and the number of disks required, estimated by the author as over 1000 in a belt of the type known as *saak*, are not visible unless inspected at close quarters. Long strands as described for the *guini* and *lukao-hugua* would consume even more shell, particularly given the apparent larger diameter of the latter.

A participant of the Freycinet expedition, Jacques Arago published a narrative in 1823 that described the Carolinians’ regular trading visits to Guam. Hezel’s paraphrasing mentions that “Each year in April the canoes from distant atolls would rendezvous at Lamotrek and sail together the rest of the distance, arriving in Guam 15 or 20 strong. There the islanders, clad only in loincloths, went about trading their seashells, turtle shell, coir hemp, and woven mats for “piece of iron, copper nails and bad knives” (Hezel 1983).

The two descriptions from the Freycinet expedition may have some hidden but significant meaning. To be used in exchange, one would expect a medium such as that found in *guini* and *lukao-hugua* to possess two specific qualities: it should be relatively rare, as with precious metals and gemstones, and it should be worked, containing some element of relatively difficult human manufacture, as in cut diamonds or gold jewelry. For example, in the western Carolines the Yapese mined their stone “rai” on Palau and returned them to Yap after great hardship. Value was assigned not by size, but degree of difficulty of the piece’s acquisition and manufacture (Gilliland 1975).

In this context, it appears questionable that locally derived turtle shell from the Marianas would be used as a medium if it proved to be a relatively abundant and common material. It can be argued that the scarcity of turtles in the Marianas made the shell valuable as a source of raw material for the “money”. It is also possible that its acquisition or importation from other areas provided this attribute, or that shells were utilized from a combination of the two sources. The importation of turtle shell could easily have occurred in pre-contact times when the Chamorros sailed throughout the Carolines themselves, or could have taken place when Caroline islanders undertook their trading voyages to the Marianas, including those of the pre-Spanish era. In any case, in the absence of any information relating to self-imposed restrictions on turtle capture or utilization, the use of worked turtle shell disks as a medium of exchange points to a potential relative scarcity of turtles during the period in question, i.e. the 18th century.

Throughout most of the 19th century, the island of Tinian continued to supply a large amount of dried beef as well as meat from feral pigs to both Saipan, where the Spanish moved the leper colony from Guam, and to Guam itself.²⁴ Commerce and Carolinian canoe travel continued back and forth between the Carolines and Marianas, and within the Marianas as well. The Spanish government had little ability to travel among the islands, and often relied on the Carolinians and their canoes for transportation.

Owing to their canoes, the Carolinians were probably still quite mobile while resident in the Marianas, and those who lived on Saipan evidently had the ability to travel at will to Tinian and

²³Both men and women are seen wearing the *giin* in an old photograph of Carolinian residents of Garapan village on Saipan dated “in the 1890’s” (Russell 1982: 21). Photographs reproduced from the Thelinius German expedition and dated 1910 show similar belts worn by eastern Carolinian women on Lukunor as well as Lamotrek farther to the west (Vincent 1973:50, 57)

²⁴Saipan reportedly harbored a cattle tick which prevented herds from multiplying; the reason for fewer cattle on Guam is not clear.

other nearby islands. The increasing number of Carolinians and their potential effect on the resources of Tinian concerned at least one Spanish official, the *alcalde* or chief appointed local administrative official, in 1839. His concern was that the terrestrial protein sources of Tinian, “cattle, pigs and birds that abound in the wilds, or jungles”, would be decimated by approximately 137 new Carolinian arrivals on Saipan during the period 1838-1839 and leave little for the sustenance of the new leper colony on Saipan. He thus ordered that “the livestock not be harmed, that the *indios* gather only wild fruit from the jungles, and the fish and turtles that abound along the beaches” (Driver 1996).

This reference to an abundance of turtles, which along with fish would satisfy the dietary requirements of an unknown number of people resident on Saipan, is reinforced by the notes of another foreign visitor to Saipan during the period. In 1840 a whaling ship, the *Gypsy*, arrived at Saipan for a brief stay. The ship’s surgeon, D.P. Wilson noted in the ship’s log that the Carolinians were clad in loincloths and lavalavas, their bodies smeared with coconut oil, “living chiefly on turtle and fish and cultivating a little taro and yams in small patches” (Wilson 30 Aug. 1840 quoted in Hezel 1983).

It is difficult to determine how much (or how little) turtle, fish, and “a little taro and yams” would have been required to sustain the population in 1840 or later in the century. The population figures which are available show potentially highly fluctuating populations from about 1830 to the Spanish census of 1884. In spite of reported evidence of Carolinians arriving during the 1850’s after “earthquakes swamped their atolls and destroyed their property and homes (1849-50)” and “more than a thousand Carolinians brought with the authorities’ collaboration, to repopulate the Mariana Islands in the aftermath of smallpox epidemics (1856)” (Barratt 1988a), by 1884 a Spanish report listed the indigenous inhabitants of Saipan as 760 including both Chamorro and Carolinians. In the same report Tinian was reported as containing 231 indigenous inhabitants with a Carolinian majority²⁵ while Rota apparently had only a few Carolinians (Driver 1996).

3.3 GERMAN PERIOD

Summary The German administration period was relatively short-lived in the Northern Marianas. Almost all information comes from one source, the District Officer Fritz. Turtles were still captured and eaten, although mainly by the Carolinian community. The Chamorros also consumed turtles, but from Fritz’s writing it can be surmised that Carolinian fishing practices afforded them greater opportunity to capture turtles for this purpose. No mention is made of the capture or consumption of either nesting turtles or turtle eggs by either ethnic group, and although mentioned as food, turtle meat is not ascribed any particular stature.

In 1899 after the conclusion of the war between the United States and Spain, Germany purchased the Mariana and Caroline Islands from Spain for 25,000 pesetas or about US \$4.3 million (Hezel 1995). The United States took possession of Guam, and by 1901 most of the inhabitants of the Carolinian community which had existed there for almost the entire 19th century had moved to Saipan. The new U.S. administration attempted to have them assimilated into the general population and adopt western clothing and customs. However they resisted the enforced changes and subsequently moved north to join the Carolinians on Saipan (Spoehr 1954). Barratt (1988a) quotes the botanist Safford in 1905 regarding Carolinians on Guam; the statement may be indicative of general U.S. colonial attitudes towards the small enclave of inhabitants of their new territory.

²⁵About 250 Carolinians from Namonuito atoll west of Truk were brought to Tinian in the late 1860’s as agricultural workers for Mr. Johnston from Guam who possessed a lease on the island. They were moved to several islands before ending up at Saipan where they formed the nucleus of the Carolinian community at Tanapag village.

They never intermarried with the Chamorros, but retained their own language and customs, living like savages in small huts with only a few leaves spread upon the ground to serve as a floor and bed, and subsisting on fish, wild yams and fruits.

The new German District Officer for Saipan was Georg Fritz, who left an informative narrative describing the history and ethnology of the Chamorros on the island²⁶. His narrative quotes the population figures of the April 1, 1902 census, now including the 100 or more Carolinians from Guam, and are shown in Table 3.

Table 3. Population in the German (Northern) Marianas, 1902

		Chamorros	Carolinians	Foreigners	Total
Saipan	Garapan	891	524	42	1457
	Tanapag	76	97	1	174
Tinian		36	59	1	95
Rota		440	49	1	490
Sarigan		7	1	0	8
Alamagan		6	2	0	8
Pagan		35	102	0	137
Agrigan		14	18	0	32
		1505	852	44	2401

source: Fritz: 1904, p. 15

By this time the Carolinian canoes had ceased to visit the Marianas on trading voyages. Perhaps because trade goods could now be obtained through the sale of copra to itinerant traders and the larger German trading houses active in the Carolines or, as Fritz reported, because of a ban imposed by the Spanish late in their tenure “because of a few accidents” (Fritz 1904). In fact, the German administrative officer in Yap, Arno Senfft, had done everything he could to discourage inter island canoe voyaging in the western and central Carolines at the time, “because the government was obliged to pay the rescue expenses for those who were blown off course and stranded in the Philippines” (Hezel 1995).

In 1907 a destructive typhoon struck Woleai atoll, and the Germans subsequently moved large numbers of survivors to Yap, Palau and Saipan. Those who were removed to Palau and Saipan (the origin of Oleai village) reportedly had the salaries of any work they did in their new homes withheld by the Germans to cover the costs of their rescue (Hezel: 1995).

Fritz described in detail the current practices of Chamorros in Saipan during the period, including their houses, house and kitchen implements, clothing, sports, music, crafts, agriculture, hunting and fishing and so forth. His listing of animals eaten “besides fish and clams” include coconut crab, fruit bat, pigeons, ducks, snipes, sea birds, chicken, cattle, buffaloes, deer and turtle (Fritz: 29). From his explanation of cattle raising (“almost every Chamorro and Carolinian family has one or more head of cattle.”), the keeping of pigs and descriptions of the large number of feral chickens, particularly on Tinian, one gets a better idea of the sources of meat in the usual diet. The Chamorros are described as “eager hunters”, but it is explained that feral cattle on Saipan and Tinian as well as feral pigs, chickens and goats on Saipan “can be hunted by those empowered by the district administration.” These restrictions evidently did not apply to fruit bats, “jungle fowl”, wild ducks, pigeons and other birds (Fritz 1904).

²⁶A “confusing aspect” of the work is cited by the editor in his introduction to the second edition of the English translation (Fritz: 1989). Fritz apparently mixed his own observations with earlier accounts by others, and consequently made it difficult to determine whether the observations were contemporary with his administration or of an earlier, possibly precontact, period.

Fritz explains that fishing provides the main source of food for island inhabitants, “however fishing takes place only inside the reef”. He describes the Chamorro as competent inshore fishermen, using mainly nets but “neither a good swimmer nor diver”. Carolinians alone are said to “...go on the high seas to visit Aguiguan 25 sea miles away from Saipan and dive for trepang *belele* which they sell to the Japanese. They also catch turtle *hagan* and utilize weir traps inside the reef, a fishing technique not practiced by the Chamorros”. The Carolinian techniques of catching and cooking turtles are further described by Fritz:

When the fisherman sees a turtle near the reef, he hastens with his boat there, plunges into the water and grasps it with his arms to protect himself from the strong jaws of the animal. A captured female is sometimes pierced at the back end of the belly shell and a strong wire inserted. The turtle is tied in a suitable place to lure other turtles²⁷. The animal is killed by stabbing after which the blood is drunk directly from the wound. The turtle is then put on its back in a ditch before it is completely dead and a fire is lit over it until the meat is cooked²⁸. It tastes like the best beef. The broth accumulates in the shell and is drunk.

Fritz points out that the turtle shell is ruined in the cooking process, but that “the type found here is thin and worthless...the genuine turtle *carai* occurs here only rarely” (Fritz 1904). Actually, not all shell is ruined, depending on the intensity of the fire. The “genuine turtle” refers to the hawksbill turtle, *Eretmochelys imbricata*, whose thicker shell is the common “tortoise shell” of past island commerce.

There is no mention of the capture of nesting turtles (although that undoubtedly must have occurred) in the Fritz accounts. That the Carolinians would dive after turtles in the water is not unusual, however it can be surmised that since green turtles existing around Saipan today reportedly are of varying sizes including possibly those who are sexually immature, the varying sizes available to fishermen would have been in contrast to the purely sexually mature turtles they and their forefathers would have encountered in the atolls of the Carolines.

During the German period cattle continued to be raised on Tinian, with a cattle ranch owned by two Germans, Lotze and Stein and a Chamorro, Juan de los Reyes, holding the management lease. According to Farrell (1996), “sea turtles were captured for commercial use. Lotze and a Japanese named Isoda had a business license to catch turtles” . The probability is that, particularly on Tinian where cattle and feral pigs were abundant sources of food, the reference is to the hawksbill for sale to the Japanese handicraft trade. Johannes (1984) has been one of many to note that “tortoise shell” was not produced in the Marianas, and the reference is most likely to a situation where issuance of a license merely assumed the existence of a resource.

3.4 JAPANESE ADMINISTRATION PERIOD

Summary *The transformation of both Saipan and Tinian during the Japanese administration period happened fairly rapidly over a 12- to 15-year period. Industrialization in the form of sugar cane refining and the requirements of over 40,000 immigrants meant increased shipping, the building of a new dock and harbor area, and the urbanization of a large portion of the leeward coast fronting the Saipan lagoon. Little is known of pre-war turtle usage, and the availability of other sources of protein in an expanding money economy might have meant less hunting pressure from the indigenous community, although this cannot be confirmed. The 1944 invasion and its aftermath caused the greatest amount of habitat damage, to both beaches and reefs. The sequestering of the local population in camps until well after the war most likely lessened hunting pressures.*

²⁷This practice, called *efitifit*, is described as being practiced during moonlit nights for the Satawalese in the central Carolines (McCoy 1974).

²⁸Identical methods of cooking are described on Lamotrek atoll in the Carolines in Alkire (1965).

As with the Spanish, the Japanese presence throughout the Micronesian islands preceded actual political control. That came about with World War I and the effect it had on the demise of Germany's colonial ambitions. Peattie (1988) gives a full account of the Japanese era, including details of their commercial activities pre-1900 and beyond. He remarks that many of the early traders who operated throughout Micronesia were mini-trading companies:

usually operated on the margin of financial disaster; their small schooners crossed vast ocean distances to reach remote islands where lone representatives remained to manage small trading stores. These were established from the Marianas to the Marshalls, in order to distribute their Japanese wares -- cloth, axes, cooking utensils, lamp oil, and sometimes weapons and liquor-- as well as to collect the natural products of Oceania -- copra, turtle shell, mother-of-pearl and beche-dê-mer--for shipment to Japan (1988).

The turtle shell mentioned above, the "tortoise shell" of early trading accounts from throughout the Pacific, refers to the thick and hard shell of the hawksbill turtle, *Eretmochelys imbricata*, a trade item that had been sought for many years as the raw material for Asian-made jewelry, handicraft, and later eyeglass frames in Japan.

The Japanese saw the potentials for Micronesia, and particularly the Marianas, early after wresting the islands from the Germans and solidifying their control with a League of Nations Mandate after the end of the war. By 1925 there were 5,000 Japanese settled in the Marianas. Five years later there were 15,000 (Peattie 1988). The numbers continued to increase, brought about by crowded and unsatisfactory economic conditions for many at home. Most were recruited by the large sugar cane company that had been set up on Saipan and worked there or on Tinian or Rota, either as sugar cane laborers or tenant farmers. Colonization by nationals of Japan was considered permanent, with most immigrants coming from mainly the Ryukyu Islands (Okinawa in particular), with lesser numbers from "retarded areas of northeast Japan, and isolated areas of Kyushu". Officially, many immigrants were classed as farmers (44%), however 8% were classified as fishermen (Nishi 1968), most being employed in a commercial skipjack fishery based on Saipan.

By 1937 Saipan's population had increased to 46,700, with only about 4,000 being either Chamorro or Carolinian. The descriptions of pre-war Saipan are truly amazing when contrasted to the sleepy Spanish and German eras of wild cattle and pigs of just a few years before.

Except for the central mountain core, most of the island was now laid out to sugar cane...rectangular plots of about 36 acres, each bordered by breaks of trees and crisscrossed by narrow farm roads. Here and there were small plots of vegetables and fruit trees neatly tended. Coffee and pineapples flourished...and the marshlands converted to rice paddies. Beneath the towering smokestacks of the refineries at Chalankanoa, diminutive engines at the head of long trains of sugar-laden flatcars chuff-chuffed up the western shore of Matsue's narrow-gauge railway to the waiting freighters at Tanapag harbor. On the way they passed through Garapan, which had become a boom town of over fifteen thousand, mostly Japanese, its streets laid out in grid fashion and its blocks of densely packed, box-like wooden houses and stores...Only the clusters of poorer indigenous housing at the northern and southern extremities of Garapan and the occasional farmhouse of a wealthy Chamorro landowner around the countryside provided evidence that Micronesians had any place at all on this island. (Peattie 1988)

Tinian was a smaller version of Saipan, with 14,000 Japanese settlers by 1935. Rota's 800 indigenous inhabitants were eventually joined by more than 5,000 Japanese around the same period. Coming from a society where much of the natural resource base was both heavily utilized and regulated, it is not surprising that the Japanese used a certain degree of management

authority with respect to marine resources in the Marianas. In their 1937 annual report to the League of Nations on the mandate the Japanese stated that

In order to meet the need of the times the Rules for Subsidies for the Encouragement of Marine Products Industry were amended in December, 1935, and the Rules for the Fishing Industry in the South Seas Islands were enacted in March, 1936, so that a person desiring to engage in the fishing industry must obtain permission from the authorities, while fishing by natives is allowed to continue as of old without going through any formality²⁹. (Anon. 1937)

Interviews with older residents of Saipan in May, 1997 confirmed there were no restrictions placed by the Japanese on the access of either Chamorros or Carolinians to the sea or to conduct fishing practices. It is probable that the Japanese saw no threat to resources by so small a group of indigenous fishermen using basically subsistence tools. They were however apparently interested in protecting resources which were in demand as market commodities from a total population of over 40,000 living so close to the sea, and noted in their report that, "For the purpose of assuring the proper multiplication of nilotic-top shells, pearl oysters and tortoises, it is prohibited to collect them except in the specified period" (Anon. 1937)³⁰. These three resources were used in Japanese commerce and manufacture and thus important to conserve. It is interesting that no mention is made of sea cucumbers, for one older Carolinian interviewed also said that "the Koreans" had practically denuded the west coast reefs of sea cucumbers during this period, and that reef use in general was heavy (Lisua pers. comm.).

The social systems of both Chamorro and Carolinian were no doubt placed under great stress during this period. Carolinian clan or lineage activities had centered around the *ut* or men's house (also translated as "canoe house" or "meeting house") but most apparently fell into disrepair well before the war and no vestige of them remains today³¹. It was in these *ut* that canoes and fishing equipment were stored, meetings held, and fish divided from communal fishing expeditions. Alkire (1984) has described these as meeting houses which had "once helped to unify the community and facilitate decision-making".

Reef resources were evidently not used by a majority of the Japanese immigrants for subsistence or home use. It was reported at the time that the Japanese resisted accommodating local conditions and were, like western colonial emigrants elsewhere, more interested in creating a version of their homeland. "In particular the Japanese were reluctant to incorporate locally available foods such as breadfruit, yams, coconuts, bananas, pork and fresh fish into their diet. The immigrants preferred to import familiar staples, pickles, miso paste, seaweed, and rice from Japan. These imported goods were consumed almost exclusively by the colonial Japanese population" (Yanaihara 1940). Thus the greatest changes to the reef and turtle habitat were probably caused by industrialization, and the consequences of urbanization.

The World War II era and its aftermath in the Marianas can be divided into three phases: the increased militarization which in the Marianas case was stepped up only months before the U.S. invasion of June, 1944, the actual invasion and subsequent battles, and the prolonged period of detention of inhabitants by the U.S. occupying forces. As late as the end of 1943 Saipan was occupied by fewer than 1000 Japanese troops and had few fortifications (Russell 1994). However

²⁹Peattie notes that although Japan failed to heed directives from the League of Nations regarding the mandate after 1933, they continued to submit reports for five years after their withdrawal from the League (Peattie 1988).

³⁰Unfortunately the one copy of the 1937 report available for inspection during the preparation of this report does not contain the appendix which would have purportedly contained details of the regulation.

³¹A concrete substitute that has been constructed for community functions next to the office of the governor's assistant for Carolinian Affairs serves as a reminder of their former function and importance.

rapidly increased preparations followed the destruction of Japanese bases on other islands of Micronesia to the south and east, and the island was fortified and garrisoned with more than 30,000 troops within about a 6 month period. At about the same time, the Japanese sent about 22,000 civilian noncombatants back to Japan (Peattie 1988). The indigenous people that remained were sent inland, and their seaside homes taken over as sites for defense and supply installations.

The invasion began on June 15, 1944 with the bombardment of the island. Fierce battles were fought close to the beaches of the western shore, but the invaders had captured much of the shoreline in the southwest within 3 days. A subsequent amphibious landing took place on the eastern side about a week later. The fighting continued for weeks and the island was declared secured on July 9. Over 500 U.S. naval ships manned by 66,000 men supported the more than 105,000 combat troops that assaulted Saipan and later Tinian by sea. The Japanese lost almost their entire force of 30,000. The majority of the remaining civilian population of around 14,700 included 2,300 Chamorros and nearly 900 Carolinians were hiding in caves or in the jungles (Peattie 1988). All were eventually moved to relocation camps at the southern part of the island and remained there until after the war.

It goes without saying that the islands of Saipan and Tinian were totally and utterly devastated by the war. Photographs show huge mounds of supplies being delivered directly to the western beaches of the island, and offloaded where the town of Chalan Kanoa and small city of Garapan had once stood. The island of Tinian was almost completely made over with airfields paved where there had once been sugar cane. Huge amounts of supplies were brought to Tinian as well as Saipan for future war efforts elsewhere³².

3.5 U.S. ADMINISTRATION PERIOD

Summary It took some time for the islands of the Northern Marianas to recover from the devastation of World War II. Until the early 1970's there was little basis for an economy other than government, however with the development of tourism both the island and its inhabitants again underwent a second transformation that is continuing to this day. Regarding the status of turtles, it is of course easy to second-guess the bureaucratic decisions of almost 20 years ago, however one can't help but wonder what might have been the outcome today if the exemption situation in the Marianas had been looked at more closely by the administering authority, and in particular if the Trust Territory government had heeded the recommendations of Hendrickson and Pritchard in those earlier days.

American administration of the Marianas actually began over a year before the war ended. The U.S. military government was headquartered on Saipan, and all civilians were sent to the two relocation camps: "Camp Susupe" in Saipan and "Camp Charo" on Tinian. These camps held approximately 13,500 Japanese, 1,400 Koreans, and 3,500 indigenous people (2,600 Chamorros and about 900 Carolinians) in separate areas. It was necessary to feed these people, and the military reportedly provided 150,000 pounds of fish and meat per month. It was said that fish were sufficient during the fishing season of April-September, but as there was no way of storing it, there was a shortage during the other months of the year (Embree 1946)³³.

The Naval administration covered what officially became the entire Trust Territory of the Pacific Islands in 1948. Shortly after the war over 200 Chamorros who had worked in Palau for the Japanese were returned to Saipan. In Yap, Chamorros from the Marianas had resided for over

³²Not to make light of the human tragedy and devastation that took place, but in the context of this report one wonders what the effect on turtles might have been, either directly or through the devastation of their habitat and nesting beaches during nesting season.

³³No mention of turtles in the diet, either militarily provided or otherwise, is mentioned by Embree, and those interviewed did not recall eating turtle or turtle eggs during the period.

50 years, some as workers for earlier traders and some as civil servants and businessmen during the Japanese period. Shortly after the war Yap's Chamorro population of about 250, including many who had been born in Yap but had never seen the Marianas, indicated to the administration a desire to be removed back to their homeland. The Navy obliged and all were subsequently relocated to de-populated Tinian in 1947.

By 1948 civilians had been released from the camps and the Japanese and Koreans repatriated to their home countries. The U.S. Naval Civil Administration Unit was in charge of the islands until 1948 when a civilian government took over (Richard 1957). The Navy maintained various records relating to health and welfare of the populace, including production figures for fish and other food items, including turtle. The only record of this period located, the yearly report for 1948, reported 0.03 tons (60 lbs.) of turtle caught for sale during that year for the Saipan district (Bowers 1950).

Bowers reported that by the late 1940's the inhabitants had slowly returned to their pre-war fishing practices, with many adaptations.

The Carolinians, closer to their native traditions than the Chamorros, made canoes from logs up to about 1930; those which remained in use prior to the war were destroyed during the attack. Due to a shortage of timber, these could not be replaced, and since the war the Carolinians have utilized salvage materials for boat building. The most common adaptation is an aviation auxiliary gas tank cut in half and fitted with an outrigger and sometimes a sail. With a capacity load of two persons, they operate with safety inside the reef, but are never used outside. The Carolinians, in their ancestral pattern, also continue to build sheds along the beach for the storage of boats and fishing gear. These serve as masculine club-houses and are occasionally used by the bachelors as sleeping places.

While the US Navy continued its administration of the islands without interference, the scientific community in the United States appeared to recognize fairly early the need for conservation of resources in the new Trust Territory. In 1948 the National Research Council, in conjunction with the Pacific Science Board, held two conferences and made numerous recommendations such as the appointment of a Conservation Officer and implementation of a conservation education program (Coolidge 1948). Specific recommendations on water, soil, plant, animal and land use were also included. However most of the focus on fauna centered on the control of exotic animals and protection to native and migratory birds. Perhaps consistent with the low priority the species received elsewhere, turtles received no mention in what was otherwise a surprisingly comprehensive list of conservation recommendations, given the apparently limited amount of knowledge of the area. In any case, government priorities being otherwise, few of the recommendations were implemented.

Bowers (1950) noted that subsistence fishing was of major importance to the local native population, and "every effort should be made to preserve the marine resources in order to maintain a source of home food supply." He suggested that the Japanese conservation laws "should be continued or revised as needed", perhaps not aware that they didn't apply to indigenous people. At the same time he acknowledged that the Saipan lagoon was greatly overfished during the war and immediately following: "because of the heavy demand for protein food, even the smallest fish were taken". He also stated that according to his native informants, the lagoon on Saipan was fished with dynamite by the Japanese during the war, and by American soldiers with hand grenades after the invasion³⁴, concluding that, "whether the ecological balance in the lagoon will adjust itself to its former fish population without control is open to some question, even though the number of people fishing now is considerably smaller than in the Japanese period".

³⁴American servicemen in search of food or simply a change in diet made this a practice in many places throughout the Pacific theater of war. In the Solomons, a special detail was formed to fish for the servicemen there during wartime, and used explosives as their main means of fishing (for example, see Chapman 1949).

The naval administration however did enact “Interim Regulations” applicable to the entire Trust Territory in 1949 which included certain prohibitions and limitations regarding sea turtles. In reference to the entire Trust Territory, Richard (1957) reported that “a small business in sale of tortoise shell to Japan for use in handicraft work was carried on sporadically. The hawksbill provided the type of shell desired and the administration issued regulatory measures for its conservation” (Richard: 786). The interim regulation was followed by identical wording in Regulation No. 3-49, Article II, Limitations on Taking of Turtles (Richard: 1248)³⁵

No hawk’s bill turtle or sea turtle shall be taken or intentionally killed while on shore, nor shall their eggs be taken. No hawk’s-bill turtles or sea turtles shall be taken or intentionally killed in the water, except those whose shells are twenty-four (24) inches or more in length. No hawk’s-bill turtles of any size shall be taken or intentionally killed from June 1st to August 31st inclusive, nor from December 1st to January 31st inclusive.

When the Trust Territory administration was transferred to the Department of Interior in 1951, the U.S. Navy retained administrative control over the Marianas, citing security requirements (Hezel 1995). It wasn’t until ten years later that the entire Trust Territory was administratively placed under Interior Department control.

As life in the Marianas slowly returned to “ normal” (but not anything resembling its pre-war form) the natural resources of the island of Saipan were probably not capable of supporting the same kind of subsistence use they had in the past. Regarding food preferences, one observer noted that those of the Chamorro and Carolinian populations were quite distinct. The former “ have a sophisticated cuisine and many are excellent cooks”. He noted the use of food plants from outside sources and the influence of different countries, no doubt Spain and Japan at least, in their food preparation. He also described traditional food preparation, including that for taro, breadfruit, yams, fish octopus and crab, mentioning that taro and fish were “ party foods”. No mention of turtle was made in this context (Spoehr 1954).

In some contrast, Carolinian food preferences of the period were described as “still much closer to the original diet”. Spoehr noted that “as a subsistence activity Carolinian fishing was closely adjusted to Carolinian food habits” and that “the Carolinians are constant reef and lagoon fishermen. From each family one of the men will generally go fishing at least one day a week and often three or four times, in order to provide food for the family.” The vegetable foods were much like that of the Chamorros, however “the principal protein food has always been and still is fish, and the Carolinians retain command of the techniques that allow them to satisfy this want” (Spoehr 1954). Again turtle doesn’t appear on the menu, either as a staple or “party food”.

The Northern Marianas were returned to civilian control in the early 1960’s, and the Trust Territory headquarters moved to Saipan. An official of the Trust Territory government acknowledged “there had been no enforcement of the existing regulations governing the taking of turtles or their eggs” but that the government recognized the importance of conservation and was trying to do what it could within the funds available (Wilson 1969).

Commercial development increased on Saipan in the following decade at a faster pace than other Trust Territory locales, partly because of the relatively good condition of the island’s former military infrastructure, but also as a result of Saipan’s proximity to Japan and the increases in tourism. The two first large hotels were built along the beachfront during the 1970’s with many more thereafter. A new airport soon followed, and Japanese tourism became the major economic force on the island during the 1970’s.

³⁵The wording of this regulation remained codified in the Trust Territory in essentially the same form for more than 30 years, and still exists today in slightly amended form in the Federated States of Micronesia.

Beginning in 1971 the U.S. military began using an island approximately 50 miles north of Saipan, Farallon de Medinilla, for bombing and artillery practice.³⁶ The subsequent environmental impact statement conducted for the use of Farallon de Medinilla (completed in 1975 after activities had been going on for several years) made no mention of potential turtle habitat or the possible existence of turtles at the site.

In 1975 Dr. Peter Pritchard, an expert in turtles was sponsored by the World Wildlife Fund to visit briefly each District Center in Micronesia. He provided a report of his assessment of survival status to the Trust Territory, offering some recommendations. This report was later expanded and published as *Marine Turtles of Micronesia* in 1977. Prior to his arrival he had received information that turtles were being caught “in increasing-and now rather large-numbers in the northern Marianas.” Pritchard was able to only spend one day on Saipan, but saw “stuffed turtles for sale at several locations”. As a result of the rise of tourism, these items had become desirable and an easy commodity to market³⁷.

Pritchard noted that “at the Continental Hotel, three mounted green turtles were on sale, the medium-sized specimen was priced at \$200. This hotel also had a hawksbill shell on display that was not for sale. In a handcraft shop on Beach Road, thirteen stuffed green turtles (half grown to mature) were for sale; also three hawksbills and one ridley. The turtles were reportedly all locally caught”. He stated that “Saipan has several miles of beach on the west coast, but this area is rather extensively developed with hotels and other beach facilities, and few if any turtles nest there” (Pritchard 1977). He urged that work be undertaken in conservation and education, particularly in light of the fact that the Trust Territory headquarters were located on Saipan where much of this activity was taking place.

An even earlier suggestion made to the Trust Territory Marine Resources Division in 1972 prior to the existence of the Endangered Species Act, by a respected authority on turtles acting as a consultant to the South Pacific Islands Fishery Development Agency, was that there should be “special exemption by government permit for authorized...cultural activities...” (Hendrickson, 1972, quoted in McCoy 1974). It is not known if this recommendation was ever considered; but no such regime was ever enacted.

The subsistence exception for the entire Trust Territory was enacted in 1978. The NMFS legal review of six years later (Farrell 1984) cited three reasons why the exception was granted:

1. “turtle meat and eggs were a traditional, customary source of food in the region and that the taking of green sea turtles was an important part of the culture of certain inhabitants of the area, citing the Yap Island residents in particular.”
2. “The agencies were also persuaded that green sea turtle meat provided a major source of food for many island residents.”
3. “The agencies concluded that a subsistence harvest conducted in the traditional manner would not have a major impact upon the existing population of green sea turtles in the region” (Farrell 1984).

NMFS stated that the decision to authorize a subsistence exception for the TTPI was based primarily on work done which had documented the subsistence needs of the inhabitants of the Central Carolines, specifically the Yap District. There was no specific information offered

³⁶The military had used another location in the Northern Marianas until then (Naftan Rock off the coast of Aguigan near Tinian), however Northern Marianas representatives in the Congress of Micronesia requested a change due to its proximity to good fishing grounds and the destruction of seabird habitat.

³⁷While the development of tourism created a commercial value for turtles, their use as a special food source was not diminished. Thus, this new value was in addition to rather than a substitute for past esteem in which the turtle was held.

regarding subsistence, ceremonial or traditional needs in the Northern Marianas, and it was concluded that “the rationale for applying the exception to the entire TTPI rather than specific island groups where a need had been demonstrated is not explained in the final EIS” (Lecky and Nitta: 1985).

This leads the conclusion that the rationale was mainly one of expediency. Had the Trust Territory taken action to implement the various recommended steps for cultural exemptions, it might have made the imposition of the ESA’s turtle provisions more understandable and perhaps even palatable to citizens in the Northern Marianas.

3.6 THE GREEN SEA TURTLE IN EXISTING ORAL TRADITION

The research for this study included interviewing older people in the community and those knowledgeable about the use of turtles in the past. Information was sought that might shed light on cultural activity and knowledge specifically linked to turtles for two reasons: to validate the importance of turtles in fiestas, and (hopefully) discover environmental knowledge, innovations and practices relevant for conservation which might be used as a basis for future environmental activities³⁸.

In other areas of Micronesia these latter activities have been known to produce a “buffer” to the environment, in the sense that they can assist in preventing man from destroying the resources of his island (see for example Falanruw 1971). This aspect of traditional knowledge has been accorded greater importance in recent times, and has now been fully recognized by its inclusion in the Convention on Biological Diversity (1992) which requires governments to “...respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity” and to “...promote their wider application with the approval and involvement of the holders of such knowledge³⁹”. The importance of such systems was also earlier recognized by NMFS when reviewing the subsistence exemption in 1984⁴⁰, and no doubt played a part in their 1978 determination to grant the subsistence exemptions in the first place.

For a belief system (used for lack of a better term) to act as a buffer between man and his environment, it would logically contain substantial aspects relevant to that environment⁴¹. The Carolinians had migrated to the Marianas from several different areas within the Carolines and established permanent settlements in the 19th century as described earlier. And while it has been extensively documented that they retained large portions of their language and culture in their new homeland, it is not as clear that adaptations were made to traditional practices which might have reflected the changed environmental conditions they faced in the Marianas.

³⁸In many cultures of the Pacific islanders at one time possessed and in some cases continue to possess a wealth of environmental knowledge, including what might be termed “traditional systems of resource management”. In the classic sense, these might consist of practices such as taboos, bans, the imposition of seasons, wildlife preserves, marine preserves, land and lagoon tenure systems, systems of time reckoning, social stratification, religion, and population control (overseas voyaging, suicidal voyages, celibacy, prevention of conception, abortion, and infanticide), all of which can function to conserve island resources (Klee 1980).

³⁹Convention on Biological Diversity (1992), Article 8 (j).

⁴⁰Lecky and Nitta (1985) recommended that “NMFS and the FWS should offer to assist the low island communities in Micronesia to develop acceptable management practices to compensate for the decline in observation of traditional taboos that protect turtle stocks from over exploitation”.

⁴¹In addition to the following discussion regarding Carolinians, the reader is invited to speculate on the attitudes brought back to the Marianas by Chamorros who had been resident for more than 50 years on Yap and were sent to depopulated Tinian as essentially a new colonizing group.

Anthropologist William Alkire, who has worked both in the central Carolines and on Saipan, notes that “turtle taboos and use from Ulithi to Satawal, but particularly on Lamotrek, Elato, Woleai, and Faraulep--vary widely” (Alkire pers. comm.). In fact, in the Carolines there is/was no single set of taboos or beliefs, although certain aspects such as providing the head of a cooked or butchered turtle to the chief or chiefly clan seemed to exist on most islands. When speaking of the Carolines alone, he further reports that the differences in practice can be attributed not only to varying degrees of mission activities but also and more importantly to local politics, demography, and environment (Alkire pers. comm.).

Whether or not a belief system or systems had been transferred intact became moot in the current research, however. One of the problems in identifying ethnographic information relating to the cultural significance of turtles was that many of those who might have acted as informants had passed away, leaving little oral tradition on which the present-day researcher might draw. It became clear fairly early neither a body of traditional knowledge nor substantial fragments were now known to current residents of Saipan, Chamorro or Carolinian.⁴² Although some of the people in the Carolinian community queried about their past customs recalled being told that the chief or clan head always received the head of the turtle when slaughtered at the clan’s canoe house⁴³, fewer however could describe how that chief was chosen, the names or locations of the canoe houses, or other aspects of food distribution.

This absence of knowledge of an intact belief system in itself should not be surprising, as the influences of introduced religion, forced emigration, war, disease, and the other factors described earlier in this section all took their toll. In fact, even societies that haven’t experienced such cataclysmic events have moved from systems that were developed over centuries and now face similar problems in resource conservation as that confronting the Marianas. In 1993 Geermans produced a *Summary of traditional usage of turtles within the SPREP region* (South Pacific Regional Environmental Programme 1993). This document paraphrases extant literature in the SPREP region describing either extensive taboo or belief systems relating to sea turtles. Of the twenty-two countries mentioned, almost all of those with any such system of a substantial nature are described in the past tense; while the remaining descriptions placed in the present tense were quoting from historical accounts of from forty or fifty years ago (Geermans 1993). For three island areas there was no published information available whatsoever.

Within the limitations described above, there was still relevant information available. All those interviewed agreed that turtle was not an every-day food, but something that was reserved for special occasions. A Chamorro interviewed said that it was purposely hunted for inclusion as a special food at fiestas or other feasts; and was present along with other prized delicacies such as fruit bat and deer. When a fiesta was imminent, a turtle hunt would be organized. The turtle was usually captured in the water, with attempts concentrated on obtaining a large female because they knew that this has the best meat and fat. The turtles were grabbed in the water and physically manhandled into the boat or canoe. The hooking method, using a large hook and tether attached to a float on a long stick of bamboo as a flying gaff was reportedly introduced by the Okinawans who lived on Saipan during the Japanese administration period. The Chamorro noted that turtle was a very “potent meat” that made one sweat profusely after eating, and prevented sleeping. As such he conjectured that perhaps ancient people thought it made you strong. Also, unlike Carolinians interviewed, this particular person thought the meat to have a strong smell, and while very tasty and desirable at parties, it required cooking with different ingredients to mask the aroma. He felt that in his experience the younger people didn’t have an

⁴²The author readily admits that due to time and monetary constraints, not all older people were approached during the study, nor were all inhabited islands in the Northern Marianas visited. However almost all of those interviewed had at one time or another been resident on one or more of the northern islands of the chain, and from this it was surmised that no unknown body of knowledge might exist among those few residents still living on those isolated islands.

⁴³A fact corroborated by anthropologist William Alkire from his research on Saipan in 1971 (Alkire pers. comm.).

aversion to this smell as people had in his time. These attitudes were by no means held by the majority of those interviewed, who felt turtle to be one of the best-tasting meats they had eaten in the past, and made no mention of its aroma when cooked. Other Chamorros mentioned that the consumption of both blood and fat were considered medicinal for asthma or breathing problems, one of the few points that Johannes (1984) had included in his review.

Most of those interviewed were asked if they knew of any medicinal use of turtles, now or in the past. Except for the Chamorro belief in remedies for asthma, little else was found. Traditional Chamorro healers, *suruhanos*, used mostly medicinal plants in a “relatively unique body of knowledge in the unwritten method of apprenticeship learning” (MacMakin 1978). Understandably, terrestrial plants were much more practical to use as ingredients in specific remedies, insofar as they would be far easier to obtain.

In the post-W.W.II era, turtle was included in feasts on Saints’ days, and particularly the San Isidro festival that is held in Chalan Kanoa. Those who were witness to the usual manner of Carolinian preparation of turtles recalled that they were called upon to drink the broth from within the shell of a newly-cooked turtle (in the manner described by Fritz in 1905), and told that it would give them strength. At one particular Santa Remedio festival held in Tanapag village during the late 1960’s, a young onlooker recalled almost 40 years later that he had seen over a dozen turtles cooked on the beach and butchered in the standard Carolinian fashion, with the meat brought to the village for preparation and use at the fiesta.

People who have either lived or continue to take up occasional residence in the northern islands perhaps live more closely to turtles on a day-to-day basis, particularly on Anatahan. Subsequent to World War II, from 10 to 50 or so people were resident on the island and mainly involved in copra making. One former resident, now deceased, was considered one of the best turtle hunters on that island. He lived there during periods of early childhood and took up more or less permanent residence by 1954 when copra making was a viable economic undertaking. The hunting of turtles for the consumption of residents was often undertaken in the water using an Okinawan-style hook & line on a bamboo pole. There was always a fishing float attached to the line. A small boat was used to go to the areas around the coast near the village where turtles were most easily located. The turtles were reportedly easy to approach in daylight, and it was not a problem to hook them in the skin of the neck. The turtle would then swim off trailing the line and float, eventually tiring and return to the surface where it would be captured. Turtles were taken in this manner for food only when people needed or wanted them. For particular celebrations on the island some people would specifically search for turtles while others hunted pigs or goats.

According to one former resident, turtle meat was not preserved, but cooked right away and eaten. The meat that was dried for both use on the island and for sending to Saipan was from feral pigs, goats, and occasional carabao. Turtles which were captured in anticipation of vessel arrivals which would allow their transportation back to Saipan for sale or as gifts were kept alive in a depression in the rocks near the surf line. Regular habitation of Anatahan for the purpose of copra production continued from the early 1950’s until about the mid-1970’s when both copra prices declined and transportation and marketing, always subsidized by the Trust Territory as it was in other Districts, ceased when the Commonwealth came into being.

Another Carolinian former resident of the northern islands was asked if he knew what the diet might be of turtles in those islands from stomach contents when butchering. He was unable to answer, as the butchering process evidently disposed of all intestines. In fact until they were shown by some people relatively recently from Satawal island in the Carolines how to prepare the intestines they had simply discarded them and had not used them at all.

An older man who had lived on both Anatahan & Sariguan during the Japanese administration as a copra maker mentioned that he also worked with people from the Bonin islands shortly after the

war.⁴⁴ He reported that these people knew much about turtles and were very competent in the water. They voyaged from Saipan to Anatahan and captured turtles for return to Saipan for sale. During one particular trip he said they saw turtles in the water that were “stamped” (branded?) with Japanese characters. The turtle hunters avoided those turtles as well as at least one they reportedly saw that had a plastic tag attached with wires drilled into the marginal scutes of the shell. For him, the best part of the turtle was eating the flipper with the scaly skin scraped off, baked in the shell. When asked at the end of the interview if he had anything else to impart about turtles he might recall, the elderly gentleman said that in his experience people who campaign for office in the past were always the ones offering turtle meat as an incentive for people to vote for them.

Changing conditions in the Caroline Islands Although several people interviewed pointed to the Caroline islands as an area where traditional customs have ensured a limitless supply of turtles, in fact the Caroline islands face an impending crisis in turtle populations due to problems caused by increased human population, the current methods of harvesting and the abolition of the taboo and cultural system that supported the turtle population for centuries⁴⁵.

Not the least of the problems in those islands in the Carolines from where most of the Marianas Carolinian population traces its ancestry is that harvesting is now and has always centered on the capture of nesting females. Such problems were not foreseen when the District Anthropologist for Yap reported in 1957 that in that district although “...the intent seems to be that they should capture as many (turtles) as possible and collect their eggs as well” there didn’t seem to be a problem because the number captured each year by this method was “not excessive” and the assumption was that turtles would be forever replenished by the distant uninhabited islands in Yap District which “provide excellent breeding grounds for sea turtles” (Tobin et. al 1957).

Nor were they probably foreseen by the initial Carolinian colonizers of Saipan. Those chiefs and navigators who led the initial colonization were from Elato island, a high caste island in an ancient social system involving Elato as well as Lamotrek and Satawal (see Alkire 1965). It is most probable that the primacy of their arrival as well as their position and the island’s status in the Carolines cemented their claim to leadership in their new homeland. The three islands of Elato, Lamotrek and Satawal have historically had an abundance of turtles, either on the uninhabited reef islands of the two inhabited atolls (Satawal being a singular island rather than atoll), or on resource islands within relatively close sailing distance. However the numbers of turtles available for harvest has most certainly diminished in the past 30 years. Alkire tabulated 91 mature turtles harvested during a 12-month period in 1962-63 using sailing canoes to voyage among the islands and atolls where turtles are usually captured (Alkire 1965). Kolinski, who conducted research on nearby Elato and is familiar with the area believes that not nearly so many are harvested today, even though the motorboats which are exclusively employed in making trips to capture turtles make the task easier (Kolinski pers. comm.).

3.7 IMPLICATIONS OF THE HISTORICAL RECORD

Turtles were obviously present in the Mariana Islands at first contact with Europeans, however from the historical record it is unclear the extent to which they were part of the food source for either the original inhabitants or later Carolinian colonists. The presence of cattle and feral pigs

⁴⁴The Bonin (now Ogasawara) Islands were for a few years after the war administered by the U.S. Navy. The residents included several Caucasian families who were descendants of American whalers from the mid-19th century who had settled the island. At least one of these men was an accomplished captain and fisherman and was employed with several others on a fishing vessel the Navy arranged to be used by a mainly Carolinian crew from Saipan.

⁴⁵Problems were recognized as early as late 1960’s (see Wilson 1969 and McCoy 1974), but it was not until the late 1980’s when the Yap State Legislature authorized funds for turtle research that resulted in a better understanding of the resource (see Kolinski 1995).

on Tinian as the primary source of food for both the Spanish colony on Guam and as a source of provisions for the Manila and Acapulco galleons should have meant an abundance of animals that might at least have been given some mention by European chroniclers of life in the Marianas during the period. The importance attached to turtle shell “money” and the shell as an item of value used in acknowledging victory in local warfare points to a possible relative rarity of the animal or at least the high esteem in which it was held.

Permanent colonists arrived in the Marianas from the Caroline Islands beginning early in the 19th century, bringing with them attitudes and customs which they persevered in maintaining in the face of Spanish, and later German and (on Guam) U.S. attempts to integrate them into extant and developing societies. The use of and attitudes towards turtles by both Chamorro and Carolinian cultures is hard to document, owing to the major changes in society brought about by over 150 years of European domination, Asian colonization, and the physical and social effects of World War II⁴⁶. What can be surmised from existing information is that turtles were not thought of as a source of basic nourishment, but retained a place of importance as a delicacy to be served at special occasions. In the past this may have been partly related to not only the limited numbers of turtles on the inhabited islands, but also the difficulty with which turtles might be captured, particularly in light of likely limited use of the beaches for nesting purposes. In the days before diving goggles and later scuba, flashlights and motorboats, the most likely method of capture (aside from nesting females) would have been the capture in the water during daylight hours.

A lack of suitable nesting habitat may or may not be responsible for what can be viewed as a continuing dearth of turtles throughout recorded history. Certainly the limited areas suitable to serve as nesting beaches, particularly in the last 75 years that has included the physical changes brought about by Japanese administration, World War II, and the subsequent increase in human activity and economic development, have all played a role.

During the Japanese administration the first great wave of social changes occurred which significantly disrupted many cultural practices, diminished the focus on traditional symbols and greatly increased the immigrant populations of Saipan, Rota and Tinian. Through economic development, Asian immigration and later wartime preparation, huge changes in demography, economy, and no doubt cultural practices, took place on all inhabited islands.

In 1984 NMFS, on the basis of the Johannes study, concluded that areas of the Pacific including CNMI “have departed from traditional values and there is little evidence of a significant dependence upon sea turtles” (Lecky/Nitta 1985). While there can be no argument made today that there is a nutritional dependence on turtles, whether or not “traditional values” vis a vis the turtle have changed is certainly open to question. There is still a generally held belief among Carolinians that the turtle is “special”; and in spite of incremental losses of other aspects of their culture, they continue to approach this issue seriously and put forward requests for a ceremonial take.

4. BIOLOGICAL STATUS OF TURTLES IN THE NORTHERN MARIANAS TODAY

There are several complications in describing the status of turtles in the Northern Marianas today. Little actual research and data compilation has taken place, with the exception of work on Tinian in 1994-95 required of the U.S. military, and current efforts of the herpetologist employed by the CNMI Division of Fish and Wildlife.⁴⁷ Consequently little is known of the life history of green sea

⁴⁶For sources of information relating to the past and contemporary use of sea turtles by communities in the Caroline Islands, from where the Northern Mariana Carolinians originated, see Appendix 3.

⁴⁷The herpetologist’s major work and preoccupation is with the prevention of spread of the brown tree snake from Guam to the NMI. However he has an abiding interest in turtles and has

turtles that either nest or are observed in the Northern Marianas, including their migratory patterns, population distribution and population size. The draft Recovery Plan for U.S. Populations of the Green Turtle states that "Fewer than ten green turtles nest on the islands of Saipan, Tinian and Rota each year" (Recovery Plan: 6). A complete listing of comments in the Recovery Plan relating to the Northern Marianas is given in Appendix 2.

What is most striking in the published historical record is the lack of references to any large population of turtles which might have been utilized by either the indigenous inhabitants or recently arrived Europeans. If one accepts that some sort of cohesive taboo and belief system operated among pre-contact (or at least pre-Christianized) peoples in the area, and that the belief system acted as a buffer between man and his environment, then it is difficult to visualize how (absent some major cataclysmic population crash or disease of epidemic proportions) there could have been a nesting turtle population of the size of that, say, found in Ulithi or other of the Caroline islands to the southwest and southeast. For a variety of reasons we are left with no oral tradition of a large number of nesting turtles; and from the written record we have one mention by the Spanish in 1839 and one from a British whaling ship a year later of turtles abundant enough (along with the fish supply) to satisfy the needs of 137 newly-arrived Carolinian colonizers.

Coupling these known facts to evidence that there was apparently significant value placed on turtle shell products, both as a medium of exchange as well as ceremonial use of the shell in stopping warfare, and that this might actually indicate some scarcity of the raw material; the limited archaeological evidence of turtles in prehistoric times; and factoring in the limited nesting habitat on the three southernmost islands of the group (excluding Guam); one might conclude that in fact there might have been only a modest population of nesting or foraging population in the past, at least in the southern inhabited islands of the Marianas. This is not to say we know they were scarce, or at or near the apparent current nesting population; however it does provide a sense of magnitude and assist in placing the turtle in perspective with respect to the environment and the humans with whom they share it.

There are of course, too many biological unknowns at this stage to even hazard guesses as to what the turtle population or populations in the Northern Marianas represent(s). For scientific work we have the results of about two years of significant nest monitoring plus one turtle tag return from the Philippines. No results of the mitochondrial DNA analysis is yet available from the Tinian samples, and absolutely no census or other work is available from the northern islands. The nesting turtles found on Saipan, Tinian, Rota and presumed to be present on Farallon de Medinilla may or may not represent the same population as those juveniles found throughout the chain.

The juveniles found in the northernmost northern islands may or may not belong to the same population as those found in the southern islands, and the mature females found with juveniles at Anatahan may or may not be nesting later on one of the southern islands. It may be that the juveniles found in the Northern Marianas are from turtles that have nested in the Caroline or even the Marshall Islands; and since juveniles are never found around those atolls which serve as nesting areas, they may be in the Marianas as a stopover which is only a portion of an unknown migratory route as part of their life history. And if nesting females from the southern islands do return to forage on Anatahan, what was the tagged mature female doing in the Philippines?

In concluding her synopsis of the biology and population status of green turtles in the Pacific, Eckert (1993) states that

The survival of the green turtle in the Pacific is dependent on the implementation of scientifically sound conservation programs, which in turn should be based on a more

endeavored to compile information from volunteers and others on nesting and tagging in the last 2 years.

complete understanding of survivability, fecundity and longevity, and rates of recruitment and stock replacement.

To date, although the last three years have seen a start, very little work has been carried out in the Northern Marianas that would enable such a “complete understanding” to exist. This is not because turtle scientists do not want the work to proceed; they would very much like to seek more answers and learn more about the puzzle with which they work on a daily basis. Unfortunately other priorities, both within and without the CNMI, have been put ahead of seeking these goals.

An opportunity may exist for some work, however. In its “conservation recommendations” contained in the biological opinion allowing an incidental take of turtles (and megapodes) during bombing and gunnery practices on Farallon de Medinilla, the USFWS suggested the Navy fund “conservation and recovery projects of \$100,000 per year for three years”. The four examples offered by the Service (and possibly suggested or concurred by the CNMI) were eradication of feral ungulates on uninhabited islands, surveys to assess status, distribution and identify nesting areas of turtles and megapodes, basic research into the life history and demography of these species, and eradication of rats on Farallon de Medinilla or other uninhabited northern islands.

4.2 TINIAN

The only systematic investigations on turtles in the Northern Marianas have been carried out by the U.S. Fish and Wildlife Service on Tinian. Their work, undertaken “to assist in identifying, avoiding and minimizing military impacts to sensitive natural resources” on an island that is approximately 70% leased to the U.S. military, has resulted in quantification of nesting over a period of two years, 1995 and 1996 and part of a third, 1994. There are reported to be 13 distinct beaches or beach complexes on Tinian. While the existence of turtle nesting is “common knowledge” among residents, Pritchard’s 1977 report mentioned that Tinian had only “two small, marginal ones (beaches), but...no evidence these are used by nesting turtles” (Pritchard 1977). The reason for the discrepancy in the number of beaches is unclear, unless he was confusing Tinian with another island. In any case, the nesting studies on Tinian were conducted using U.S. FWS biologists, conservation officers from the Northern Marianas Division of Fish and Wildlife, and several “dedicated volunteers”.

The results of the turtle surveys are important in gaining a better understanding of the magnitude of turtle nesting in the Northern Marianas. The report cautions that, “because turtles do not nest annually, the size of the nesting population cannot be determined by one year of tagging data” (USFWS 1996). Although the report states that “virtually all beaches on Tinian are potential nesting beaches”, and “nesting of green turtles occurs regularly on this island”, the actual numbers of nests, and thus turtles, is not particularly large. In fact it is quite small when one considers this is currently the most suitable island for nesting in the Northern Marianas.

The nesting season was found to be almost six months long, from late January or early February until July and perhaps August. Hatching activity was thus set from April to September and possibly into October. The number of turtles nesting was hard to pinpoint, owing to the lack of manpower during the study. However based on the number of known nests and “false crawls” in 1994 (59 total) and 1995 (67 total) and the internesting intervals observed of from 10 to 13 days, the USFWS biologists estimate the number nesting in 1995 might be from six to ten (USFWS 1996). In 1996 it was reported from Tinian that there were fewer nests and false crawls (29), and four turtles were tagged. However monitoring in that year did not commence until April, whereas nesting had been reported as early as February the previous year. No information was available

for 1997. One turtle tagged in 1995 on Tinian was subsequently recovered in the Philippines. It is the only such return to date from turtles nesting in the Northern Marianas⁴⁸.

Aquatic surveys were also undertaken by USFWS during 1995. Five different transect locations were surveyed with almost all turtles sighted being juveniles (see Table 4 below).

Table 4. Results of USFWS Aquatic Surveys on Tinian (all *C. mydas*)

TRANSECT LOCATION	# SURVEYS AT LOCATION	DATE OF SURVEY	# TURTLES OBSERVED	SIZE CLASS	TIME IN WATER (minutes)
Harbor Wall	2	4/20/95	6	11 juvenile	25
		5/04/95	6	1 adult	45
Two Corals/ Barcinas Buoy	3	4/20/95	1	all juvenile	31
		4/27/95	2		35
		5/26/95	3		not recorded
Swimming Hole	3	4/11/95	5	all juvenile	35
		5/04/95	2		30
		5/26/95	4		not recorded
Carolinas Point	1	4/27/95	2	all juvenile	26
Barcinas	1	5/04/95	5	3 juvenile 2 adult	25

source: USFWS Research Report, May 30, 1996, p. 13

The results of the turtle work on Tinian was used by the Navy for two purposes: to minimize damage when planing exercises that would use the beaches of Tinian, and to recommend future management activities for turtles on Tinian. The Natural Resources Management Plan (NRMP) for the Military Lease Area on Tinian recommends an additional two years of tagging studies for turtles on Tinian. This project has not been funded to date (T. Sutterfield, pers. comm.).

4.3 SAIPAN

Conservation officers from the Division of Fish and Wildlife have begun more regular patrols in the last few years to both monitor nests and apprehend poachers or potential poachers. During the 1996 nesting season it was reported that there were 5 known nests on Saipan and two false crawls detected. No turtles were tagged on Saipan in 1996. Most of the nests, four out of the five, and both false crawls were found on Wing Beach, north of the village of San Roque. The eastern coast also contains some beaches known for turtle nesting; the area known as Marine Beach is one.

On Saipan, several people interviewed during the course of the research for this report mentioned being able to spot turtles in the water from the various cliff lines around the island's coast. One vantage point perhaps less well known is at the new Kingfisher golf course, where the best places to look over the cliff and see turtles are reportedly at the 14th tee rest house, the 15th hole green, and the 16th tee-off area⁴⁹. Another vantage point is reportedly at Naftan point on the southeastern coastline. Division of Fish and Wildlife employees who were in the water almost daily carrying out a sea cucumber study in May, 1997 reported seeing green turtles in the northern parts of Saipan lagoon every day they were in the water.

⁴⁸A poacher on Saipan reportedly captured a turtle in the last year with a "New Caledonia" tag affixed (no doubt one supplied by SPREP with their return address from when they were located in Noumea as a trans-equatorial migration is highly unlikely). The poacher reportedly cut off the flipper with the tag and disposed of it in the ocean, lest he be caught and his crime judged even more culpable.

⁴⁹An employee of the golf course stated that the best times are in the morning between 7 and 10 AM. He says he almost always sees turtles in the water at those locations.

The Division of Fish and Wildlife possesses 14 preserved green turtle carapaces and one hawksbill carapace, all confiscated within the last few years (Table 5 below). Unfortunately, no records exist to explain the circumstances under which these were confiscated; however all are said to be from Saipan. they are all undoubtedly prepared for sale to tourists, although all for the most part are too large to have easily fitted into a tourist's suitcase. The size of these turtles show most of them to be immature, falling within the range of immature sizes cited by Eckert (1993) for Australia's Great Barrier Reef⁵⁰. For turtles there, those of the sizes represented by the Saipan carapaces are estimated to take an additional 23 years to reach minimum breeding size of 90 cm from 60 cm (both measurements curved carapace length, CCL).

Table 5. Preserved turtle carapaces from Saipan in possession of Division of Fish and Wildlife, May, 1997
(All *C. mydas* except #15 *E. imbricata*)

	Curved Carapace Length (cm)	Curved Carapace Width (cm)
1.	61.0	55.0
2.	46.8	44.8
3.	44.8	41.6
4.	64.8	57.2
5.	39.4	36.6
6.	45.0	43.6
7.	42.2	41.6
8.	45.0	41.0
9.	41.4	41.2
10.	38.6	37.8
11.	45.0	40.8
12.	45.0	42.6
13.	95.2	86
14.	62.4	53.8
15.	53.0	46.2

source: Conservation officers, Division of Fish and Wildlife, CNMI

4.4 ROTA

Most of the information about turtles near Rota is anecdotal, with the best published sources being those of Wiles (1989) and Wiles and Rodda (1990). In 1984 four nests were found, two of which were robbed of eggs according to Wiles (1989). He further noted that while data on species abundance and ecology are lacking for almost all islands, his sightings of turtles around the island from terrestrial vantage points in 1984-1986 showed that "both large and small turtles abound". However a later comment somewhat contradicted this by stating that "turtles were still fairly common around the island in the 1960's but have become more scarce since then". From field work in 1988, Wiles noted that turtles are still hunted (illegally) on Rota, but much of this activity is believed to be done by fishermen arriving in boats from neighboring islands of Guam, Saipan and Tinian. They further mentioned that "reports of local residents catching and eating turtles are rare" .

In 1996 no nests were known to have occurred on Rota. The Northern Marianas Division of Coastal Resources Management is currently undertaking a comprehensive habitat conservation plan for the island, however it is not expected that the final plan will set aside specific habitat for turtles (Furey, pers. comm.).

⁵⁰Turtles resident in the vicinity of Heron Island, Australia, are considered immature from 60 to 90 cm, curved carapace length. Thus green turtle carapace #13 might be the only candidate for maturity in this list.

4.5 NORTHERN ISLANDS

All information from the northern islands is anecdotal, as there have been no known turtle surveys or activities undertaken. Innocencio L. Saures, Jr. a community worker on Agrigan whose father's family has been on that island for many years (and currently is the only family resident there) believes that turtles in Agrigan are smaller than those caught in Anatahan, or at least that there are some turtles on Anatahan that are larger than those found in Agrigan. He stated that it is quite easy for competent divers to catch turtles by hand; and easiest to accomplish when they are found resting under the coral. No nesting known is known for Agrigan; there are few beaches and what little sand is there is black and described as always hot. When asked to rank the islands in abundance of turtles, all those familiar with the northern islands said they believed Anatahan has more turtles than other islands.

One former resident of Anatahan who was there as both a boy and later as a school teacher, believes there are actually more turtles on Anatahan now than when he was younger. In the past the shipping to the northern islands was more regular, and particularly during the periods of Navy and Trust Territory administration, ships called regularly at several of the islands to pick up copra. During those times, beginning in about 1954, turtles of various sizes were sent to Saipan live for sale and as gifts for relatives. It was not unusual for ten to fifteen turtles to be captured and sent live to Saipan on the government ship. Since the cessation of such shipping coinciding with the end of the Trust Territory, he believes there are more turtles appearing at Anatahan (Wabol pers. comm.).

Several people familiar with the island of Anatahan mentioned that there is a depression in the rocks near the surf line called "*nenien wong*" (the place of or for turtles in the Carolinian language). Live turtles were placed there until the time when they were either killed or sent to Saipan. This depression could effectively hold captured turtles except in very rough seas when the waves could wash over the rocks & allow the turtles to escape. They also mentioned a particular area along the reef, possibly a surge channel in the coral, where turtles were most likely to be found during the daytime hours fairly close to the village.

The only other currently inhabited northern island is Alamagan. A number of people claiming to be familiar with the situation said that the residents of that island do not spend much time in the water, and tend to obtain all their protein from either shore fishing or terrestrial sources such as wild pigs and goats.

5. LOSS OF TURTLE HABITAT

One subject that is more easily described is the loss of habitat, particularly nesting habitat, for sea turtles on the southernmost islands of the Northern Marianas. Habitat loss on Saipan has been shown earlier to have occurred since the 1920's, particularly on the western beaches. The tourist boom of the 1990's has resulted in the construction of many additional hotels, both north and south of what used to be the main tourist area in Garapan.

Many of the 700,000 tourists per year who currently visit Saipan are younger people who take advantage of the hotels' proximity to the water, and participate in various water sports. Jet skiing, parasailing, sail boarding, water skiing and sledding as well as swimming, sailing, and boating in general all take place within the lagoon area. Organized snorkeling, "bottom walking" using hookah-type equipment, and to a lesser extent scuba diving, are also very popular with tourists⁵¹. During 1997 there were reported confrontations between some inshore spear and net fishermen

⁵¹During May, 1997 the practice of allowing tour groups to walk unimpeded over the bottom and on coral reefs, resulting in destruction of coral was documented by some dive tour operators. The resulting publicity caused the Coastal Resources Management Division to promise swift action to limit or outlaw such activities.

in Tanapag village and snorkel and scuba groups who visited the reefs in front of the village by boat. Many beach areas on the eastern side of the island are still undeveloped; and as they often lie at the foot of high cliffs and are exposed to strong winds and salt spray, may not be suitable for development.

To the south of Saipan, the island of Tinian still possesses beaches suitable for nesting (see below). However the current construction of a gambling casino and adjacent 500-room hotel will no doubt increase tourism to the island.

To date Rota has experienced little shoreside development in comparison with Saipan. During the study period the U.S. Fish and Wildlife Service was undertaking a habitat study, and it was not clear to what extent this would protect nesting beaches for turtles (see below).

North of Saipan, the island of Farallon de Medinilla has been used as a bombing and gunnery target since 1971. While the original environmental impact statement in 1975 did not address turtle habitat or nesting beaches, recent authorizations from both the National Marine Fisheries Service and U.S. Fish and Wildlife Service for military "aerial bombardment and gunnery practice" recognized two small potential nesting beaches⁵² and anticipated an incidental take during the bombing and gunnery. The authorization⁵³ was for the potential take of one each green and hawksbill turtle, plus the possible destruction of four nests on those beaches (USFWS 1997 and NMFS 1997). The destruction to surrounding coral was not known or documented, however a survey was to be made of the island in July, 1997 in anticipation of further military exercises.⁵⁴

The islands to the north of Saipan are all volcanic, and exposed to often violent tropical storms and typhoons which gain strength as they periodically track northwest towards Japan. Due to the absence of suitable nesting beaches, turtle habitat is defined as that below the high water mark, and with the exception of damage from military exercises at Farallon de Medinilla, any damage or destruction would be natural due to the storms or volcanic activity.

6. INTERACTION BETWEEN PEOPLE AND TURTLES TODAY

While it is not possible to describe a cultural group completely and generalizations could lead to misconceptions, it is worthwhile noting certain cultural traits and practices in the context of the request that led to this study. That request stated in part that, "A cultural or ceremonial harvest would be very important to the survival of our Carolinian people's culture and cultural practices... The head of the turtle always had to be presented to the high chief." (Sablan and Elameto 1996). When queried in Saipan about some of the meaning of the first part of this statement, several said that they wished to focus on two main features of their culture: the communal and cooperative aspects of activities involving Carolinians, and the respect for elders in the community. Both of these attributes are perceived to have seriously eroded in recent years and the use of turtles in this manner was thus seen to be a reassertion of cultural values believed essential in an increasingly complicated and difficult world. It was felt that the turtle could be used in this undertaking because of its stature as an important food source to be shared at special

⁵²It appears however that those beaches are "wave washed" and not suitable for turtle nesting (T. Sutterfield, pers. comm.).

⁵³Section 7 of the Endangered Species Act covers Federal actions such as the bombing practice which might involve endangered species and requires a "consultation and a biological opinion with an incidental take statement (when and where appropriate)" The activity "is reviewed by NMFS (or FWS) and then an incidental take MAY be authorized if certain conditions are met."(E. Nitta, pers. comm).

⁵⁴C. Kessler, pers. comm.. Kessler also noted that future surveys may be made more dangerous by the accidental dropping of anti-personnel cluster bombs during the 1997 exercises known as "Tandem Thrust".

times with specific portions reserved for chiefs (or in current times the community leaders), and the potential to arrange for a “ceremonial” harvest involving young people within the community could be an added asset.

Thus, while this report should show there is agreement today with the NMFS assertion in 1984 that there is no reliance on the turtle for “sustenance”, what seems to be in dispute is their “right” to use the turtle in a manner that would assist their culture to regain some of its most essential elements and thereby contribute to what is seen as a continuing battle against its disappearance. This of course is an attitude held by thoughtful people who may be civic, political or cultural leaders; it is not necessarily an outlook shared by the rank and file.

It is interesting to note the occasions on which turtle symbolism is used in various government-sponsored programs. The casual visitor to the Northern Marianas may not notice such representations, however it is apparent in several aspects of every day life. For example, in Saipan each of the elementary schools has been given a “mascot” by the Department of Education. Oleai school, in a predominantly Carolinian section, has the turtle as such a mascot and murals on the outer school walls as well as a large welcome sign at its entrance features the turtle. While it is hard to visualize any U.S. mainland school advertising itself as “the home of the turtles”, this is seen as a positive symbol on Saipan.

The Department of Youth and Cultural Affairs sponsored a program with the Aging office and produced T-shirts for the occasion. The legend, “Learn the Past for our Children of Tomorrow” featured a large depiction of a sailing canoe and turtle as symbols of the past.

6.1 POACHING

With the increased enforcement of laws outlawing the trade in stuffed turtles, turtle jewelry and other handicraft made from turtles, the main reason for killing turtles is to obtain the meat. Prior to the cessation of the exemption, killing a turtle still required a license issued by the CNMI government. Wiles (1989) reported that few licenses were sold in 1984 and only one turtle was known to have been killed legally. Today it is recognized that poaching continues to be a serious problem. One older man stated that he knew of turtle poaching continuing and that some of his relatives might be involved. He knew that when they caught a turtle they would take it into the bush to slaughter, and not show it to anyone. All were well aware of the illegality of their actions.

The USFWS report on 1994-1995 activities on Tinian reported two incidents of egg poaching observed and two incidents of poaching a nesting turtle from the beach were suspected during the 1995 season. In addition, residents of Tinian reported two incidents of turtle poaching to resident Service biologists during the 1995 nesting season. One report was of barbecuing of a turtle at Kammer Beach, and another of a fisherman with a turtle in his boat. The report concluded that

the amount of poaching during the 1995 season is not believed to be indicative of the normal amount of take on Tinian. The relatively low poaching rates during the 1995 season is believed to be a direct result of the constant presence on the beach of the researchers and conservation officers during this study. We estimate that half of the turtle nests were poached on Tinian in 1994. Many island inhabitants speak openly of eating both turtle meat and eggs, either in the recent or distant past. Take of both nesting turtles and their eggs for human consumption is clearly the greatest threat to these turtles (USFWS 1996).

The reasons given for poaching on Saipan are many. Conservation officers from the Division of Fish and Wildlife say that they have confronted Filipinos who say they are catching turtles for their own food use. However the officers believe that poachers are “working people with jobs” and that this is merely a ploy to gain sympathy. Those arrested or cited for poaching in the last 18

months (five in total) as well as known poachers come from various ethnic backgrounds: Carolinian, Chamorro, Filipino, Palauan and other immigrant Micronesians. The officers believe there are two main groups of Palauan poachers who might sometimes go out as often as three times per week to catch turtles. They also noted that some immigrants or Marianas residents from the outer islands of Palau say they were taught by their parents to poke sticks in the ground and look for eggs. Such poaching is carried out for the specific purpose of obtaining turtles. The officers interviewed do not believe that the take by poachers is occasioned by an incidental encounter by a fisherman with a turtle. This was reinforced by statements of one poacher to a DFW employee, bragging that he knew exactly where to catch turtles and could go to the spot at any time and get two or three within a very short time. More recently there have been unsubstantiated stories or rumors that some residents (the village of Tanapag is mentioned) are poaching turtles for sale in order to support drug habits.

There are 13 Conservation Officers and one supervisor within the Division of Fish and Wildlife who handle all forms of wildlife enforcement. They are responsible for enforcing hunting regulations, including seasons for deer on Rota, three species of dove, and coconut and land crabs. In addition there is a moratorium in place on hunting the Marianas fruit bat or collecting trochus in the entire CNMI, and of course turtles are protected (Anon.). In addition the DFW staff includes a herpetologist whose main job has been to organize and operate a program of snake detection and eradication aimed at preventing the brown tree snake from becoming established on the island of Saipan.

Conservation Officers are faced with two distinct types of poaching, involving three different stages of the turtles' life cycle. Most poaching activity seems restricted to Saipan and Tinian. On the beaches, poachers seek nesting females at night, and hunt for the nests to obtain eggs both in the daytime and at night. In the water, turtle poachers seek both immature and mature turtles. Turtle capture methods include harpoons thrown from moving or stationary motor boats, tethered hooks affixed to long bamboo or fiberglass poles usually used by divers in the water, and hand capture by divers without the use of hooks or other means.

Fines of up to \$1000 can be assessed for turtle poaching; in May, 1997, there were two pending cases. According to Conservation Officers, cases tend to get dragged out over time and the resolution is often relatively mild. One habitual poacher was given a choice of community service or time in jail. The community service required was to accompany the Conservation Education officer to schools to give talks on why it is wrong to poach and kill turtles. According to the Education Officer he quit after a few sessions, perhaps because of the social stigma in such a small community, saying that it would be better to be in jail. However there was no indication that the court ordered the offender to jail.

One of the officers more active in dealing with turtle poachers feels that one reason why poaching is so successful is that turtles are abundant, tame and easy to approach. It thus doesn't take long for the activity to be completed and the catch taken ashore; so officers are unable to apprehend them. He believes "there are lots of poachers", and that they are secretive and hard to track down. On Saipan turtle poaching is a directed effort, even in the water, with people specifically in search of turtles, either to satisfy a willing buyer or sometimes for home consumption. He was emphatic that it is very rare for anyone to say that they have been asked to go out and get a turtle for an elder.

Aside from the taste of turtle, the Conservation Officers felt that there is also an aspect of a preference for the delicacy as "forbidden fruit". This of course is not an attitude unique to the Marianas, as reports worldwide in the trade in endangered species attest⁵⁵. In the eyes of at least one Officer, some poachers treat their illegal activities as if it were a sort of game, serious but

⁵⁵As an example, on May 15, 1997, the British TRAFFIC Network released a report on "Whale Meat Trade in East Asia," saying that whale meat smuggled illegally from Japan is available in restaurants in Hong Kong.

with the advantage to the poacher, and would continue to do so as long as there wasn't enough enforcement. Overall, those officers interviewed said they get lots of reports of people report having been served turtle or having seen turtle being served. They think these reports are on the increase, although they can't tell if it is due to changing attitudes or simply increased poaching.

7. POTENTIAL FOR SEEKING A LIMITED TAKE FOR CEREMONIAL PURPOSES

The information collected from both the literature survey and field study suggests that adequate grounds exist for seeking an exemption from the Endangered Species Act that would allow a limited take of green sea turtles for ceremonial purposes. However, there are significant legal and administrative hurdles to overcome if such action is taken. An approach is suggested below that might offer the greatest chance of success under current circumstances.

7.1 POTENTIAL FOR DELISTING

As a threatened species, the green turtle is managed cooperatively by the National Marine Fisheries Service and the Fish and Wildlife Service under a Memorandum of Understanding that was formalized in July, 1977. This MOU gives jurisdiction over matters affecting sea turtles seaward of the mean low tide line to NMFS, and those matters affecting turtles above the mean low tide line were made the responsibility of the Fish and Wildlife Service (Lecky/Nitta 1985).

When the Endangered Species Act was reauthorized in 1988, an amendment was added which requires the Secretaries of Commerce and Interior to prepare a biennial report "on the status of efforts to develop and implement recovery plans for all species listed pursuant to this section and on the status of all species for which such plans have been developed". In the portion of its biennial report for July, 1994, to September, 1996, relating to the green turtle, the Department of Commerce (NOAA/NMFS) reports primarily on the species' status in Hawaii and Florida, listing estimated nesting populations for those areas only. It lists as the greatest cause of decline in green turtle populations in the U.S. the loss of habitat, while mentioning that worldwide, commercial harvest and egg poaching are the primary causes of population decline (U.S. Department of Commerce 1996).

The turtle's "recovery" is governed by a recovery plan (NMFS/USFWS 1996⁵⁶) that has as its goal the de-listing of the species as threatened. To even consider de-listing, the current plan says all of the following criteria must be met:

1. All regional stocks that use U.S. waters have been identified to source beaches based on reasonable geographic parameters.
2. Each stock must average 5000 (or a biologically reasonable estimate based on the goal of maintaining a stable population in perpetuity) females estimated to nest annually (FENA) over six years.
3. Nesting populations at "source beaches" are either stable or increasing over a 25-year monitoring period.
4. Existing foraging areas are maintained as healthy environments.
5. Foraging populations are exhibiting statistically significant increases at several key foraging grounds within each stock region.
6. All Priority #1 tasks have been implemented.
7. A management plan to maintain sustained populations of turtles is in place.
8. International agreements are in place to protect shared stocks.

⁵⁶On August 17, 1984 the NMFS "decision memorandum" removing the subsistence take from CNMI at the dissolution of the Trust Territory recommended that a recovery team be established and a recovery plan be completed by September, 1986. This appears to have been a rather optimistic time frame, since (through no fault of the scientists or experts who devised the plan) the current October, 1995 Draft has yet to be approved or implemented.

Since no distinct or unique Northern Marianas turtle population or stock (the definitions of those terms are invariably omitted from documents like the Plan) has ever been identified, the management of the species in its range under U.S. jurisdiction is considered as a single unit. Under U.S. jurisdiction in the Pacific, the decline is well known and also documented in many locations; however just as many lack adequate information and the “precautionary principle” is employed by those in charge, a wise choice given the options available.

Given the very, very long time it could take to accomplish all of the above, and the current status of the green turtle in the Northern Marianas (and elsewhere in the Pacific under U.S. jurisdiction) as “threatened” under the Endangered Species Act, there is little or no chance that the turtle would be de-listed and available for use at least during the lifetime of many reading this report.

7.2 APPLICATION FOR A LIMITED TAKE

Given the very low possibility of delisting, at least in the foreseeable future, due to the lack of information on biological status, there are essentially only two ways in which a limited take for ceremonial purposes might be allowed. The first would be to obtain approval for the take under one of the (currently) five reasons for which threatened sea turtles (in this case *C. mydas*) can be taken (50 CFR sec. 227.72(a) through (e)). These are:

1. scientific purposes or to enhance the propagation or survival of the species
2. zoological exhibition or educational purposes
3. aiding or treatment of sick, injured, or stranded specimens or disposal of dead specimens
4. the operation of a conservation program or research that is conducted by an employee of the NMFS or FWS, or a designee of those agencies
5. incidental taking during fishing or research not directed toward sea turtles

Under the first option, the location of the proposed take determines to which of the two U.S. federal agencies, NMFS or USFWS, a request for a permit would be made. Often, the two agencies review each other’s applications. The USFWS and NMFS are required to issue a biological opinion addressing potential impacts of the proposed activity which may result in the take in their respective jurisdictions only if the proposed activities are federal, such as in the case of military exercises, or involve the use of federal funds such as dredging and construction activities by the Army Corps of Engineers. The latter requirement might apply if for example a ceremonial use program involved federal funding.

From one other similar opinion, it appears the main concern is whether or not the take will “jeopardize the continued existence of the species”. Such an opinion (in the case of that cited) includes a description of the “proposed action”; a short summary of the biology and population of the species; an “environmental baseline describing the status of the species and factors affecting the environment of the species or critical habitat in the proposed action area...”; and a description of the effects of the action on the listed species, including cumulative effects. The agency then offers its Biological Opinion (USFWS 1997).

If a permit is sought for the use of turtles as a threatened species, there appears to be several factors taken into consideration regarding the longevity of the permit. According to the Endangered Species Coordinator at NMFS, factors taken into consideration by the permitting authority would include the nature of the activity itself and the potential effects that the activity might have on the species involved. Some continuing activities that have no injury or mortality related to it could go on for long periods under a consultation/opinion. Others might be for a one-time activity because of the take level (mortality and injury) or just because the project only happens once, such as construction or ocean dumping, etc..

The key at the present time may be as much in the numbers of turtles proposed as the manner of the proposition. In the proposed bombing and gunnery practice at Farallon de Medinilla, the USFWS acknowledged a potential take of one green *and* one hawksbill (the latter an *endangered*, not threatened species) and possible destruction of four nests. It was their opinion that this level of take (if it occurred) "is not likely to jeopardize the continued existence of the ...green sea turtle, or hawksbill turtle" (USFWS 1997). It is also worth noting that the one site visit made to the island was in November, several months after any potential nesting turtles would have either nested or had been in the vicinity. Recent work undertaken for the Council by coral reef biologist Alison Green described the island's reefs as the largest area of coral reef in federal waters outside Hawaii (Green 1997). There is another site visit planned for July, 1997, which is to include NMFS, and USFWS as well as Navy-contracted marine biologists, and it is expected that there should be a much better idea of the occurrence of turtles at the island after that trip (Sutterfield pers. comm.).

The second way would be to create an entirely new category specifically for ceremonial use. This would require an amendment to the current law. Such an amendment might be specific to the Northern Marianas (as the subsistence take was specific to the Trust Territory), or more general in geographic application. A basic hurdle to success in any attempt at amendment of the law is the current lack of biological information; however that is something that could possibly be overcome with time. There has been considerable concern expressed by one federal government official contacted during the course of this report that an amendment could "open the floodgates" to other groups seeking similar use. Examples were given of residents in the southeast US who have traditionally used turtle eggs in their local medicine, or residents of Puerto Rico who may have other traditional uses for turtles. In this context, the lack of solid and documented evidence showing extensive past *and* current ceremonial practices in the Northern Marianas could hinder any chance for success at amendment to the existing law.

Suggested Approach As mentioned several times, there is no dispute today with the NMFS assertion in 1984 that there is an absence of a need for turtles to provide "sustenance". However members of the community do wish to use the turtle in a manner that would assist their culture to regain some of its most essential elements and thereby contribute to what is seen as a continuing battle against its disappearance.

Of the five exemptions available, only two would seem to offer possible options. The take would have to be considered as used for educational purposes (#2) or as part of a conservation program operated by the federal agencies or their designee (#4). Even then, the final decision would not be automatic, and it would be left with those agencies to grant the required permits and monitor the activities.

Thus at least for the time being it would appear that a program seeking a permit to utilize a very small number of turtles (one or two as granted in conjunction with Farallon de Medinilla activities) would at least have the advantage of this precedent and the conclusions reached in that permitting process.

Should an exemption be sought, any program proposed would have to be accompanied by a significant educational program aimed at conservation and in reducing the numbers of turtles illegally taken in the Northern Marianas. Obviously the activity proposed by the Navy which might result in the take they were granted by the USFWS and NMFS did not include any such educational or scientific work that might have reduced the overall number of turtles killed, by whatever means, in the CNMI.

Whether or not a ceremonial take for educational or conservation purposes would be allowed is of course unknown at this time. If the take were granted but apparent population(s) were seen to be reduced, and/or if education coupled with enforcement doesn't lessen what appears to be a

high incidence of poaching, even a granted ceremonial take could be stopped or rescinded completely⁵⁷.

Other Considerations The acquiescence to military requests for a potential take notwithstanding, what must be remembered is the approach brought to the subject by those scientists and administrators who are in charge of granting the exemptions. The viewpoint is often first and foremost from a perspective of a worldwide decline in turtle stocks, the decline having been documented in many locales and being irrefutable in many locations elsewhere. In the Pacific region, the governmental responsibilities of such scientists and administrators is amplified to a serious concern for regional turtle stocks, as the *Recovery Plan for U.S. Populations of the Green Turtle* makes abundantly clear. In the broad perspective, scientists and administrators roll up their sleeves and go to work knowing that, "it is clear...that green turtles are declining virtually throughout the tropical Pacific...as a direct consequence of an historical combination of over exploitation and habitat loss" (Eckert 1993).

7.3 POTENTIAL ROLE OF CULTURAL EVENTS IN SEA TURTLE CONSERVATION

This section describes some ways in which cultural events could be used to broaden public knowledge of sea turtle conservation issues and initiatives in the Northern Marianas. In this context the application for a take under reasons #2 and/or #4 could be made. Whether or not including turtles in these events would lead to patterns of behavior for responsible and sustainable interaction with sea turtle resources is not completely known, however careful planning of activities should maximize that potential. The target audience should mainly be the younger generation, including elementary-age school children. However the 20-45 year age group must also be included and considered, as these age levels contain those physically able to undertake fishing activities, and would also be the group most likely to carry out poaching activities.

Due to the ban, there are currently no public cultural events where sea turtles play an important role. However both communal turtle hunts and the subsequent use of the fruits of those hunts in the fiestas of the past were the main activities undertaken that emphasized turtles. The hunts and fiestas served to solidify the community and promote cooperation among its members. The actual presentation of the turtle's head to elders or clan chiefs (probably a fairly mundane gesture and not in any grand ceremonial style if past and present practices in the Caroline Islands themselves are any indication) acknowledged their leadership and wisdom within the community.

The fiesta of San Isidro, representing the entire island of Saipan and having special significance to the Carolinian people, is suggested as the most appropriate existing cultural event with which turtles might be identified. This could be expanded to other fiestas later, however since this would be a unique undertaking involving a threatened species protected by law the best course would be to utilize just one venue at first.

Staged as an educational cultural event, the hunt for a turtle or turtles for the ceremony should be carefully planned and executed. Because of the current poaching situation on Saipan and Tinian, it would be best to obtain the turtle(s) from the northern islands. This would offer the opportunity

⁵⁷Federal agencies have the ability to step in and either modify permits or halt the activity if the impacts of the actions are thought to be greater or are modified from those initially requested. For example, on April 7, 1997, Associated Press reported that NMFS halted hopper dredging in Florida, South Carolina and North Carolina after the US Corps of Engineers projects to replenish beach sand had killed 19 turtles. NMFS had earlier agreed that the Corps could kill as many as 20 turtles during the dredging, which was reportedly a \$54 million Myrtle Beach, SC, project. However when the number of turtles quickly approached the limit, they stepped in to require that the hopper dredge be replaced by a hydraulic dredge to lessen losses. Reportedly, the Corps was also seeking a modification to allow as many as 30 turtles to be killed.

to highlight the continued prohibition against turtles on the main inhabited islands, and offer the opportunity for a turtle hunt to the northern islands which could expand cultural awareness. The use of a traditional sailing canoe (two of which currently exist on Saipan, having been sailed or brought from the central Carolines) and a voyage to the northern islands for the purpose of obtaining the turtle(s) would be an essential ingredient⁵⁸. A more detailed description of such a project is given in Appendix 4.

The large number of people present at this event and the current lack of knowledge of the biological status of sea turtles in the Northern Marianas argue against any large number of turtles being used. The numbers discussed in Saipan during the course of the research, 4 or 5 per fiesta, is far too many to devote to such an undertaking on an experimental basis and in any case the intention has always been stated as ceremonial, and not to provide a substantial amount of food for the fiesta. Thus there might be a need for only one or two turtles to accomplish the ceremonial goals. In fact, the availability of just one turtle might underscore the conservation needs, while at the same time lend a degree of prestige to those who either received or took part in the feast.

The organizers of the fiesta should seriously consider utilizing the turtle as a means to highlight a person or persons' (or group's) service to the community and in furthering cultural goals. The turtle could be used as a symbolic gift, acknowledging the contributions made to the community.

The recipient of the honor should be given the opportunity to release the turtle (tagged and unharmed) once it has served its ceremonial purpose. This is reportedly done in two locations in the South Pacific: Vanuatu and on Savaii in Western Samoa. The latter is contained in a ceremony undertaken mainly for tourists, while the former is in a village setting by the community alone.

The actual use of any turtle at the fiesta in such a presentation would have to be preceded by a large amount of both information and education, both prior to and at the fiesta itself. Turtle capture should be accomplished well in advance of the fiesta, done in a "traditional" and communal manner, and given wide publicity through television and print media.

7.4 INVOLVEMENT OF RESIDENTS IN TURTLE CONSERVATION AND RESEARCH

There is no shortage of recommendations from various sources on what needs to be accomplished in turtle research and conservation. The Recovery Plan contains 13 pages of single-spaced narrative describing the critical points on a regional basis. The 1996 USFWS report on Tinian activities is more specific with respect to that island, and suggests five activities:

- continued study of marine turtles on Tinian
- continued public informational activities on Tinian
- limiting of the use of military vehicles on beaches and certain maneuvers to the non-nesting season
- stopping all driving of personal vehicles on beaches and the limiting of recreational activities during the nesting season
- controlling of marine debris and beach trash

⁵⁸It has been suggested that turtles might be brought from the Yap outer islands by canoe to Saipan for this festival. However the author agrees with Dr. Peter Pritchard who stated as early as 1975 that what must be avoided at all costs is the use of turtles from the central Carolines by people other than the inhabitants. Pritchard cited an example where in the course of an "adventure expedition" by a canoe from Puluwat to Guam in May, 1972, the crew spent a week on Pikelot in eastern Yap District and collected thirty turtles. Although only a few were brought to Guam, removing all nesters for seven nights may well have constituted 25% or more of the green turtle population nesting at Pikelot that season.

The South Pacific Regional Environmental Program's Regional Marine Turtle Programme also has an extensive list of recommended activities for countries in the region.

In the context of direct participation, this report makes a distinction between *conservation* measures and *research*, although the latter can often lead to implementation of the former. It should be a goal of conservation measures undertaken to assist in removing the factors that are impeding increases to the population(s) present in the Northern Marianas. The major factors already recognized are (1) habitat loss, (2) poaching of nesting females and eggs, and (3) poaching of juveniles. It should be a goal of research to assist scientists in further defining the status of turtles in the Northern Marianas.

Turtle *management* on the other hand has always been in the hands of government. In the case of the Northern Marianas, this means the U.S. federal government's statutes as implemented and enforced by both federal and local agencies. Management can take many different forms and be based on several factors, including harvest limitations, usage limitations, location controls, turtle products, life cycle, and indirect measures such as controls of activities directly or indirectly affecting habitat (in SPREP 1993b), Smith presents a more detailed description of these categories and comments on their practicality and limitations).

Habitat loss is a difficult problem to approach on an individual or even community basis in the Northern Marianas. The government posture is decidedly pro-development and very large or influential segments of the community perceive the benefits of development as outweighing any negative aspects. Protection of known nesting sites is carried on by the Department of Fish and Wildlife, but it is doubtful that any expansion of those sites will occur. What will be required is to limit the shoreside development at those beaches now known to support nesting or which could attract nesting. On the U.S. mainland citizen groups often take the initiative in opposing development in these critical areas, or go to extreme measures to prevent development. One example was recently reported from Florida where, on June 16, 1997, a coalition of environmental groups filed a lawsuit against the U.S. Department of the Interior, charging that the U.S. government was not protecting sea turtles and was promoting development of important sea turtle nesting beaches on barrier islands adjacent to the Archie Carr National Wildlife Refuge in Florida. Their lawsuit seeks to block efforts that would make important sea turtle nesting beaches available for development.

Although confrontational actions are far from unknown in the Northern Marianas, neither the political base nor (at this time) the interest in such conservation activism seem to exist. It would be presumptuous for this report to advocate such activities or organization in light of current perceptions and attitudes that are prevalent today among indigenous people throughout the Northern Marianas.

Educational activities should thus be the focus for this aspect of conservation work. The departure point of any community group could be to raise the awareness of other inhabitants as to the importance of both turtle biology and habitat conservation. Commercial development such as new hotels, golf courses or other construction, particularly those projects containing night lights which can disorient turtles and discourage their nesting should be shown to be detrimental if they adversely affect nesting beaches⁵⁹.

⁵⁹Some commercial development might be shown feasible, as nesting beaches do not always have to be isolated. The town of Hiwasa on Shikoku island in Japan has as its major tourist attraction a nesting beach for Japanese loggerhead turtles that is in front of the town of over 5,000 inhabitants. The beach is carefully monitored, lights are shut off or reduced in the area during the nesting season, and the resultant spectacle of nesting turtles draws tourists to the area, fills the local hotel and provides visitors with a turtle museum in the town.

There are also other ways in which to give turtles a higher profile which are not costly or difficult to accomplish. In Samoa for example, articles were published in the local newspaper, there were spots on TV, video-taped interviews with people in each village, and sponsored turtle contests (one was titled The great Samoan turtle mystery). The instigator of many of these activities mentioned that one minor but perhaps clever tactic was to get the local newspaper to use a turtle 'space filler' , in this case a save the turtles logo in the Samoan language, which appeared regularly at no cost to us” .(Dr. Peter Craig pers. comm.)

With respect to harvesting, the Recovery Plan for the green turtle acknowledges the formidable problems in curtailing the practice throughout the Pacific. The strong statement contained in the Plan explains that

Harvesting is the single biggest cause of sea turtle declines and conservation efforts have failed to educate the harvesters and convince them to curtail or cease harvesting efforts... No amount of research, tagging, regulatory actions and protected areas designation will succeed in reversing this trend unless the turtle and egg harvesters are educated or convinced enough to cease or drastically curtail harvesting activities. It will be virtually impossible for enforcement measures to reverse these trends by themselves; Pacific islanders are not accustomed to fining or confiscating gear of friends and neighbors or imprisoning violators. Massive education and public pressure will be essential to save the sea turtle stocks from complete collapse throughout most of the recovery region.

Conservation Officers do not have the manpower, particularly on Saipan and Tinian, to monitor all beaches at all times. During the nesting season it might be desirable to enlist volunteers from the community to monitor such beaches, provide them with a means of communication such as walkie talkies and establish a “neighborhood watch” in nesting areas that are closest to villages. The Conservation Officers might then be able to devote more time to monitoring of the isolated or more remote areas. The Division of Fish and Wildlife already enlisted volunteers for such an exercise in 1996 on various islands, aimed at discovering nests and nesting turtles. The one step beyond, that of protecting such nests was not attempted.

Poaching of juveniles invariably takes place in the water, both at night and during the day. From reports of Conservation Officers it appears that specific turtle-hunting expeditions are organized by individuals or groups for the purpose of securing turtles, usually for sale as food. The two ways to approach this problem are to target the market through public educational means, and also to report sightings of poachers or information. The offer of rewards for information about poaching might be one way to encourage the community to become involved.

In American Samoa a different, unofficial approach was taken for a few years to save more turtles. Dr. Craig reported that, “whenever a live turtle was confiscated by enforcement officers, we informed the fisherman of the law but treated the situation as if the fisherman was 'helping' us study the local distribution and movements of the turtles. The fisherman was paid a small amount of money (\$10) and the turtle was released. I was pleasantly surprised how this small gesture often defused a potentially difficult encounter when a fisherman's valued catch was taken away. Over time, word of this effort spread. We received occasional calls from villagers (perhaps one every month or two) when someone had taken a turtle”.

Research Following is a list of possible turtle research activities that could be developed with the direct participation of the residents of the Northern Mariana Islands.

- visual surveys and counts: on the northern islands, enlist the help of residents to provide visual counts and to capture and tag turtles when practical. Provide training and materials for such residents and set up a regular collection of such data.

- use periodic trips to the northern islands, particularly those by organizations such as the Boy Scouts, to provide visual counts of turtles seen in the water from vantage points on land. If boats and competent swimmers are available, conduct counts in the water as well.
- on the southern islands, use school children, boy scouts or other youth organizations to assist in visual counts during field trips. These activities should be preceded by educational sessions and including aids such as a video which should be produced specifically for the exercises. Encourage school children to report sightings of turtles during beach excursions; provide forms and set up collection of such data.
- continuation and support of DFW volunteer work on nesting beaches during the nesting season; all 3 southern islands
- make sure turtle questions and subject matter is in inclusion in “college bowl” type science competitions; some of which are held regularly by the Carolinian Affairs Office
- produce television shows specifically aimed at public education in the Marianas (the Carolinian Affairs office has produced several on health matters and other issues affecting the community).

Additional considerations A complete distinction must be made between the activities involving a take for ceremonial purposes and the current conservation and enforcement activities on Rota/Tinian/Saipan. The latter should proceed and be enhanced and in no way compromised by the activities of the program. Since members of the communities in the northern islands are constantly moving back and forth to and from Saipan, follow-up should be maintained to see if the activities in the northern islands result in attitudinal changes on Saipan.

A project of this kind will require a large degree of direction on Saipan that will have to be provided at the local level. It may come from within the local Fish & Wildlife office or perhaps from the Northern Islands' Mayor's office or Office of Carolinian Affairs. In any case someone with an interest and background suitable to the needs of the program will have to devote full time to this project and be able to work with other agencies and individuals in its implementation.

Activities undertaken should not include “headstarting” or turtle mariculture. From the perspectives of both conservation and research, it would not be productive to attempt any head-starting of turtles, i.e. raising in captivity and releasing later in the wild. There are too few successful nests in the Marianas to attempt these activities. Likewise, nests should not be moved or disturbed for educational or other purposes. A complete explanation of the arguments against both headstarting and turtle mariculture can be found in Donnelly (1994).

Funding sources will have to be sought to implement the program. If the existing canoes from the central Carolines are involved in a ceremonial turtle hunt, then the Carolinians might be able to utilize some cultural funding and combine both the traditional sailing aspects with the turtle program. There is also the suggestion contained in the Farallon de Medinilla biological opinion by USFWS that the military provide funds to be used in habitat enhancement and other projects. This should be followed up by CNMI government officials and use in turtle activities considered as a priority.

The need for an overall coordinator is important. Such a person might be included under activities such as the Pacific Island Network of the UH Sea Grant Program, or gain assistance from the position of Resource Management Specialist currently being recruited by NMFS Honolulu Laboratory to coordinate implementation of the Pacific Sea Turtle Recovery Plans. In any case, the activities should be considered as full-time and an energetic and knowledgeable person recruited. If no person with the appropriate qualifications can be found from within the indigenous communities in the Northern Marianas identification of a suitable local counterpart would be critical to the program's success.

8. SEA TURTLE EDUCATIONAL PLAN FOR THE NORTHERN MARIANAS

8.1 BACKGROUND

Very little educational work for sea turtle conservation has been done in the NMI. Some sea turtle environmental education work was conducted in 1994-1995 in conjunction with the USFWS work on Tinian discussed elsewhere in this report. A biologist working with the USFWS program during that period reported it was evident residents had very little understanding of basic sea turtle biology. They did not realize how their behavior--interactions with sea turtles (including poaching of eggs and adults) as well as human impact on sea turtle habitat--had adverse effects on the sea turtle population on their island.

Environmental education efforts on Tinian involving sea turtles were conducted by a biologist on a volunteer basis. They consisted of presentations where basic sea turtle biology and life history were explained to as many classes as possible in the local school, both in the primary and secondary grades. Visual aids were used, including a brief 5-minute cartoon video highlighting four kinds of animals (including humans) that prey on sea turtles. The presentations, geared to the level of the students, were very well received by students and teachers alike and all expressed a desire to learn more.

A sea turtle poster contest was held among the junior high school art students with the assistance of their instructor. The students were enthusiastic about their posters and displayed some excellent work. An evening program was held in the local gymnasium to display the posters and the entire community was invited to come judge them. Flyers advertising the evening program were distributed to teachers and students in the school and displayed in stores and businesses in the community. Almost 200 people attended and participated in the judging of the posters. A 30-minute video on sea turtle conservation was shown, and a monetary prize donated by a local businessman was awarded to the winner of the poster contest.

8.2 RATIONALE FOR A SEA TURTLE EDUCATIONAL PLAN

Section 2.6 cites the absence of a cultural "environmental buffer" in the Northern Marianas. Taking into account the conclusions from the Green Sea Turtle Recovery Plan noted in section 8.4, it can be seen that sea turtle numbers will continue to decline throughout their range in the western and central Pacific region "unless the turtle and egg harvesters are educated or convinced enough to cease or drastically curtail harvesting activities" (NMFS/USFWS 1995).

Education is seen as the means by which real change may be brought about in the attitudes of those who undertake poaching of turtles and eggs⁶⁰. An educational plan should be aimed at a greater target than just turtle and egg harvesters and should include schools and the general public as well. It should consider several simple but important factors with regard to sea turtle conservation :

- Humans are the critical element in insuring sea turtle survival
- In order to foster an appreciation for turtles and their importance to the environment, people must first understand some rudimentary biological facts.
- An understanding and appreciation must come through education, for sea turtle biological studies alone will not help the species to survive without being linked to ongoing education.

⁶⁰Enforcement of current wildlife laws is also obviously important; however law enforcement resources are limited and in the long run cannot be expected to result in inculcating the positive attitudes required.

It has been demonstrated elsewhere that understanding an animal fosters respect, appreciation, and contributes to changed attitudes toward a species' protection and preservation. Among endangered species being saved through the implementation of an effective educational program in conjunction with research and conservation efforts are the Madagascar fish eagle (education work done by The Peregrine Fund), the St. Vincent parrot (education work done by RARE Center for Tropical Conservation), and many species of bats throughout the world (education work done by Bat Conservation, International).

8.3 OBJECTIVES OF A SEA TURTLE EDUCATIONAL PLAN

In order for an education plan to be successful it must have specific goals to serve as "yardsticks" for measuring progress. The specific goals of a sea turtle educational plan to be implemented in the NMI should be to:

- Instill a sense of pride in the residents of the NMI in the natural treasures which are theirs, including sea turtles.
- Impart a basic understanding of sea turtle biology and ecology--how sea turtles interact with their environment.
- Convey a basic understanding of the necessity to save sea turtles and their habitat.
- Recognize that the Northern Marianas share sea turtle resources with other countries in the western Pacific and southeast Asian regions.
- Foster an appreciation of sea turtles and their complex life cycles.
- Foster a desire to save sea turtles and the resources they need to survive (seagrass beds, coral reefs, sandy beaches, oceans).
- Motivate local residents--school children as well as adults--to participate in sea turtle conservation in the NMI.
- Stop the poaching of sea turtles and their eggs.

One of the keys to fostering an appreciation of the environment is to get people to take pride in their natural heritage. It is a natural tendency for all of us to perhaps take for granted the place in which we live and not realize that wonderful, natural treasures surround often surround us. By recognizing that the opportunities to observe sea turtles in the wild is something unique, something that most other people in the world never experience, residents of the NMI should be encouraged to develop a sense of pride in the sea turtles which nest on their beaches and forage in their waters. A desire to protect the turtles and their habitat should follow.

8.4 OTHER CONSIDERATIONS IN THE DEVELOPMENT OF AN EDUCATIONAL PLAN

The leadership and direction of an experienced Environmental Education Specialist (EES) will be essential in order for the foregoing objectives to be met. The EES should have extensive knowledge of sea turtles, especially green sea turtles. Other important qualifications include good organizational skills and an understanding of educational principles. A collection of basic sea turtle reference materials should be readily available to the EES (see Appendix 5).

A sea turtle educational program should be operated from a government office which can provide logistical support and effective organization within the community. It should strengthen communication among existing government agencies such as the Northern Marianas Division of Fish and Wildlife, the NMI offices of Indigenous Affairs, Historic Preservation, Carolinian Affairs, and Aging. In order to enhance its effectiveness, promote coordination in planning educational activities, and prevent duplication of efforts, the program should be run in close cooperation with the existing Environmental Education Specialist at the NMI government's Division of Fish and Wildlife.

In order to provide for a measurement of progress in the environmental education program, a questionnaire should be distributed at the beginning of the program and on a yearly basis thereafter. The results should be analyzed each time to see if progress is being made toward a better understanding of and appreciation for the plight of sea turtles in the NMI.

The educational program should have two main areas of focus: (1) the schools (grades kindergarten through college), and (2) the community.

Like any other kind of education, environmental education does not happen overnight. In order for it to be effective, it must continue year after year so that continuity is achieved and environmentally conscious ethics and principles become a way of life. It is the job of the EES to help people realize that they are *important* and *necessary*, as individuals, in the process of saving their natural resources.

8.5 ENVIRONMENTAL EDUCATION IN THE SCHOOLS

An example of a response to environmental education in schools occurred during the 1996-1997 school year in Hawaii. The USFWS funded a position for an Environmental Education Specialist for the Hawksbill Sea Turtle Project operated from Hawaii Volcanoes National Park⁶¹. Most of the effort was concentrated in the schools on the island of Hawaii, although schools were visited on the islands of Maui and Molokai as well. Teachers in the schools were overwhelmingly enthusiastic about having the biology and conservation of sea turtles presented in their classrooms. They were also eager to have educational materials which they could use with their students both before and after the EES visited. It was found that it was not difficult to "sell" sea turtles; in fact, it was just the opposite. Everyone, teachers and students, were eager to learn about them.

The same reaction could be anticipated in the NMI among the teachers and students, perhaps even to a greater degree because of their closer contact with the ocean. The job of the EES can thus be facilitated by this almost universal appeal of sea turtles.

Preparation Before administrators and teachers are contacted, sea turtle information packets should be assembled, the information in each packet being geared to the grade levels targeted. Because of the difference in levels of understanding, it is a good idea to have a separate packet for each of the following: grades K-3, 4-6, and 7-12. The packets should contain easy-to-understand background information usable by teachers to prepare their students for the EES's visit and follow-up materials the teachers can use in the classroom after the EES is gone. It is vital that educational tools be given to the teachers for their continued use, and they be encouraged to collect additional materials from other sources. A one-time "flash-in-the-pan" approach will be ineffective in promoting sea turtle conservation.

In addition, a central file maintained by the EES should be set up for each school in the NMI, including all elementary, secondary schools and the community college. These files ultimately should contain the following:

- names, addresses, and telephone numbers of administrators (principals, department heads, science coordinators, etc.) and teachers
- detailed records of telephone contacts (date, party contacted, summary of discussion, action items including materials to be sent)

⁶¹Many of the same principles of education that were used on Hawaii Island are used as the basis for a plan for the NMI.

- detailed records of school visits (dates, classes visited, topic(s) covered, type of reception by teachers and students, any additional materials left, date of thank you message sent, any follow-up to be done)
- Separate files of sea turtle articles and resource materials as well as a file of newspaper articles related to sea turtles.

An EES could probably be more effective in the field if the position included logistical support in the form of one or more assistants and/or secretaries as part of the program. Freeing the EES from administrative chores could enable more visits to be made to all schools in the Commonwealth.

A green sea turtle specimen or specimens should be obtained for use in the classroom and at educational community programs. Having an actual sea turtle specimen in hand facilitates the learning process by capturing the interest of the audience and being able to point out biological features of the animal. Care must be taken to explain that a permit is required to possess such specimens (this permit should be kept with the specimen(s) at all times), and permits are normally issued for educational purposes only because of the requirements of the Endangered Species Act.

Effective EES-Teacher/Administrator Interaction

Generally, in the primary schools the principal or science coordinator (if there is one) needs to grant permission for a school visit. The purpose for the request for a school visit (to each class preferably) should be clearly explained. It is best to have one of the teachers willing to coordinate the visit and do the scheduling for the different classes. The EES needs to specify how many minutes are needed for the presentation plus travel time between classes. In the secondary schools, the principal or other administrator can supply the name(s) of the biology and environmental science teachers, who should be contacted directly with information and explanations prior to any visit to their classrooms. It is wise to obtain information on what, if any, information has been given to classes earlier on turtles, and to utilize the EES as an adjunct to ongoing teaching and information, not a substitute for it.

Teachers should be strongly encouraged to expand their own knowledge of sea turtles and to incorporate a section on sea turtles into their curriculum, along with the educational tools provided to them. The EES should also make him/herself available as a source of information and guidance in all matters relating to sea turtles and their environment.

Classroom Presentations The length of a classroom presentation should be geared to the level of the students. As a general rule, presentations should be no longer than 15 minutes for kindergarten and first graders. Additional time (10 minutes) should be allowed for comments and questions from the students. Grades 2 through 4 should have presentations lasting 20-25 minutes, with additional question-and-answer time. Fifth and sixth graders have longer attention spans and can sit still for 30-35 minutes. Presentations for intermediate and high school students can be up to 50-60 minutes in length. High school biology students are often required to write a paper on a biological topic as part of the course requirements. They should be challenged to do a paper on some aspect of sea turtle biology or conservation topic.

Student Involvement in Sea Turtle Conservation Effective education includes an active involvement which reinforces that which is being taught. Oftentimes, unlike adults, young students invariably want to do something when they are convinced that something needs to be done. There are many things the students of the NMI can do to help protect sea turtles and their habitat. Section 8.4 lists research activities, some of which may be appropriate for schools to undertake. The assistance and cooperation of the teachers should be sought in conjunction with these activities. Two additional examples of possible activities are:

- Beach Clean-up Campaign Classes should be urged to "Adopt A Beach," clean it up initially, and monitor it on a regular basis for further clean-up. This not only will keep the beaches clean, it will also instill pride in the students in *their* beaches and the sea turtles for whom they are doing it. Educational signs could be placed near the beaches encouraging people to keep their environment clean.
- Sea Turtle Poster Contests Sea turtle poster contests are very effective for several reasons. Students get actively involved in thinking about how to visually portray the "sea turtle conservation" message and think about it while making their posters. They afford a means of involving the adults of the community as well, because they can be invited to be the judges. Posters should be judged on appropriateness of message, creativity in the visual presentation, and artwork. This is an excellent opportunity to have an evening sea turtle program where an educational video is shown and people are encouraged to ask questions. The prize for the winner of the contest should be solicited from one of the local businessmen or other professionals in the community. In that way, they can also promote sea turtle conservation.

8.6 SEA TURTLE ENVIRONMENTAL EDUCATION IN THE COMMUNITY

It is felt that if sea turtle education occurs only in the schools, it is doomed to fail. If the poaching of eggs and turtles continues, there may not be enough time for an enlightened "new generation" to grow up with their acquired attitudes towards sea turtle protection. Making the environment part of the consciousness of the average adult citizen is thus crucial to the sustained survival of the wildlife, especially the endangered wildlife, of the NMI. All citizens need to be aware of and have an appreciation for the value of wildlife, a clean environment, and monitoring compliance with wildlife regulations.

There are many educational activities that can be developed, promoted, and carried out on a community-wide basis in the NMI. Many would involve children and youth as well as adults, thereby integrating what the students are learning about sea turtles and sea turtle conservation in the schools with community events of social and cultural significance. To as great an extent as possible, all segments of society should be involved: government officials, news media, businessmen and hotel operators, professional people such as lawyers and doctors, homemakers, fishermen, tradesmen, laborers, and tourists.

News Media A good rapport with the news media is important and should be cultivated. Press releases featuring local events (poster contests, community education programs, nesting of sea turtles) should be issued to newspapers at every opportunity and the printing of in-depth articles featuring sea turtle natural history and conservation should be explored. Representatives of local TV stations should also be invited to cover local events. Radio shows, particularly those which attract younger people, also afford a good avenue for getting the message out.

Special Days/Celebrations Advantage should be taken of special days during the year to promote sea turtle education and awareness. Some possibilities include Environmental Awareness Week, World Environment Day (in June), and Earth Day (in April). A "Sea Turtle Awareness Week" could be sponsored with the following objectives: (1) to promote an awareness within the general public of the plight of sea turtles locally and worldwide; (2) to provide the community with the latest scientific information on the biology of sea turtles and how to conserve them; (3) to encourage media involvement in the issues; (4) to sponsor hands-on workshops on sea turtle population monitoring; (5) to enhance local ability to make informed decisions regarding such issues as coastal development, sea turtle conservation, and law enforcement.

Possibly the most important of special days to the residents of Saipan is the fiesta of San Isidro. If an exemption such as that described in Section 8.3 is sought and granted to obtain a live turtle for the fiesta's ceremonies, a booth should be erected to distribute educational information, both

oral and in written form. The booth could be manned by high school and/or college students willing and able to articulate basic sea turtle biology and conservation needs. This would be an excellent way in which students could do something in a very positive way to enhance sea turtle conservation.

Fishermen Although it is well known in the NMI that it is against the law to poach sea turtles and/or eggs, enforcement of these laws is often impractical, if not impossible, in the absence of public support of these laws. It is therefore imperative to concentrate efforts on those who hunt and have most frequent contact with sea turtles: the fishermen. The cooperation of fishermen should be sought in seminars and slide shows so that they will become more aware of the status and plight of sea turtles, their complicated life history, and what is required to promote their recovery. Educational efforts should be directed to individual fishermen as well as fishermen's groups and cooperatives. Ongoing exchanges of information should be promoted by making displays, leaflets, and other items available at fish markets, cooperative buildings and/or landing sites. Any such program should be carried out in cooperation with and assistance from fisheries personnel within the CNMI government's Division of Fish and Wildlife.

Local businesses Local businesses should be encouraged to participate in environmental education by displaying an informative sea turtle exhibit which could include a poster and pictures. This has proven effective on other islands where sea turtles are endangered. The exhibit at the Turtle Beach Bar and Grill on St. Kitts met with very positive results (Eckert 1992). It needs to be stressed to all types of businesses that good ecology is good economics. Among the main attractions for tourists are the crystal clear, unspoiled waters and reef systems that still surround the NMI. Local SCUBA dive professionals know that visiting divers are eager to see sea turtles. An intact environment, including robust populations of sea turtles, is a sound ecological and economic investment.

Libraries Public libraries can also display sea turtle exhibits. Librarians should be approached and asked to feature educational materials and games on sea turtle education and conservation. A "traveling display" could be made to circulate among the libraries and interested local businesses, banks, hotels, and medical offices.

Recreational use of beaches A public information campaign should be initiated to discourage people from driving on the beaches. Signs should be erected, announcements made on radio and television, and notices printed in the newspapers. If voluntary compliance is not forthcoming, a last alternative may be to prevent access by blocking the terminus of beach access roads.

Tourism As has been noted, tourism is the greatest single source of revenue and economic enterprise in the NMI. The islands receive almost 700,000 tourist visitors per year, most of whom stay in beach-side hotels and utilize adjacent beaches and the shallow lagoons for recreation. If tourists are not to become an increasing part of the problem in terms of environmental degradation, then visitor education will have to be a priority. In concert with such efforts, it is important that persons refuse to patronize any stores or restaurants where turtle products are sold. Tourists should also be made aware that it is unlawful for such items to be offered for sale and are subject to confiscation under the ESA and CITES. This information should be communicated through educational displays and posters in hotels, and through magazines and other literature available to visitors.

Other problems which affect sea turtles related to an increasing number of tourists include coral reef and seagrass bed degradation, indiscriminate anchoring, waste disposal, and beach-front construction which brings lights and activity to nesting beaches. Placement of a colorful, permanent display at each airport in the NMI that describes beach and marine etiquette could be instrumental in teaching tourists and residents alike to respect the environment. In addition, a leaflet should be provided to each tourist, perhaps distributed by Customs officials, requesting that visitors not buy any turtle products, collect marine life of any sort, disturb coral reefs

(trampling, anchoring, touching, collecting), drive vehicles on the beach, litter, and so forth. These educational items should be made available to cruise ship passengers and yachtsmen as well. Funding for educational brochures should be sought from local industries and businesses.

Language considerations Since the majority of visitors are from Asia may not speak or read English, the educational materials need to be prepared and available in their languages. Local conservation and educational materials should also be produced in Chamorro and Carolinian.

8.7 COORDINATION OF RESEARCH AND EDUCATION

Very little is known about the status of nesting and foraging sea turtles in the NMI and many basic questions need to be answered.

- Are the nesting and foraging populations the same or are they distinct?
- What is the size of the nesting population on each island?
- What is the average internesting interval of the sea turtles that nest in the NMI?
- Where do the turtles go after nesting?

An ongoing research program is required to answer these basic questions, the ultimate goal of which should be to provide information which will help biologists make wise decisions about the management of sea turtles in the NMI. Yearly monitoring of nesting turtles should be continued, which includes continued tagging of nesting turtles and nightly coverage of all beaches for nesting and hatching activity. A program of turtle tracking, involving the fitting of satellite transmitters on one or more turtle to determine activities and migrations after nesting would be an important step in defining future research needs.

A tagging program is also required, utilizing as many individuals of the foraging sea turtle population as possible. This would help determine the population size and perhaps eventually discover its nesting grounds. Ongoing tagging and recapture efforts will yield information on growth rates and foraging ranges and collection of tissue samples for mDNA analysis would provide information on how closely related the foraging population is to the nesting population⁶².

An active research program on nesting sea turtles in the NMI could and should provide hands-on experience with sea turtles for interested local residents. The information gathered would provide valuable educational material which could be shared with CNMI residents. Research "in their own back yard" conducted in part with their help would mean much more to them than that from areas far removed from the NMI. However it should be repeated that if the research program exists by itself, conservation of sea turtles will not be achieved. Research should go hand in hand with education and enhance its efforts.

⁶²Tissue samples were taken from several nesting sea turtles on Tinian in 1995 and are presently being analyzed at the SW Fisheries Science Center in La Jolla, CA.

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APPENDIX 1. LIST OF CONTACTS

The following people were contacted and/or interviewed regarding various aspects of this project. All are acknowledged and thanked for their contributions and assistance.

Jess Wabol, Saipan. Former teacher at Anatahan
Felipe Ruak, Saipan. Retired.
Mariano Taitano, Saipan. Organizer San Isidro Festival
Luis Limes, Saipan. Retired CNMI Education Department official
Jess Omar, Saipan. DFW conservation officer
Luciano Rangamar, Saipan. DFW conservation officer
Scott Vogt, Saipan. DFW herpetologist
Annie Marshall, Honolulu. US Fish and Wildlife Service, formerly with DFW, Saipan
Dr. Peter Craig, California. Former biologist in American Samoa.
George Balazs, Honolulu. NMFS turtle coordinator.
Noel Quitugua, Saipan. Office of Indigenous Affairs.
Joseph Ogumoro, Saipan. Mayor of Northern Islands
Inocensio Saures, Jr., Saipan. Community worker on Agrihan.
Scott Russell, Saipan. Historic Preservation Office.
Father Garry Bradley, S.J., Saipan.
Petrus Lisua, Saipan. Former resident of Anatahan & Sariguan
Pius Piailug, Saipan. Canoe navigator from Satawal, Yap.
Lino Olopai, Saipan. Office of Aging
Alan Davis, Saipan. Mariana HS science teacher
Melvin O. Faisao, Saipan. Member, CNMI Legislature
Jesus Wabol, Sr., Saipan. Past part-time resident of Anatahan
Rafael Rangamar, Saipan. Personal recollections.
Roque Santos, Saipan. Director, Division of Fish and Wildlife
Richard Seman, Saipan. Deputy Director, Division of Fish and Wildlife
Greg Quitugua, Saipan. History, experiences on Pagan.
Jesus Elameto, Saipan. Assistant to the Governor for Carolinian Affairs.
Douglas Rankin, Saipan. Salvage diver, artist.
Herbert Rosario, Saipan. Director, Northern Marianas College Archive.
Rafael Istomwer Lisua, Saipan.
Jacinto Taman, Saipan DFW.
Larry Ilo, Saipan, Saipan DFW.
Joseph Ruak, Saipan, DFW
Mark Skinner, Guam. Guam Humanities Council.
Marjorie Driver, Guam. Micronesian Area Research Center.
Omaira Brunal-Perry, Guam. Micronesian Area Research Center
Judith Amesbury, Guam. Micronesian Archaeological Research Services
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Mike Gawel, Guam Territorial Planning Commission
Eugene Nitta, Honolulu. NMFS Endangered Species Coordinator
Joe Kaipat, Hilo. UH Hilo student, former resident of Pagan, Rota, Saipan
Malua Peter, Saipan. Member, CNMI legislature
Samuel McPhetres, Saipan. Educational consultant
Dr. William Alkire, Canada. Anthropologist.
Susan Pulz, Oregon. USFWS
John Furey, Saipan. CNMI Coastal Resources Management.
Manuel C. Sablan, Saipan. Director, Coastal Resources Management office.
Curt Kessler, Saipan. Wildlife biologist, DFW.
Timothy Sutterfield, Honolulu. Wildlife biologist, Navy Facilities Engineering Command.

Steven Kolinski, Honolulu biologist and past turtle researcher in Caroline islands
Donna O'Daniel, Former USFWS researcher on Tinian and Hawaii environmental
educator
Susan Miller, Apia. SPREP turtle program coordinator.

APPENDIX 2. EXCERPTS FROM THE DRAFT RECOVERY PLAN (OCTOBER, 1995) FOR U.S. PACIFIC POPULATIONS OF THE GREEN TURTLE

The following excerpts are taken from the Draft Recovery Plan, and are intended to give an example of the current status of knowledge regarding the green turtle and its habitat in the Northern Mariana Islands. Some caution should be used in interpreting the following statements, as they are taken out of context and do not necessarily reflect the completeness of the Recovery Plan as a whole. Nevertheless it is instructive in providing a benchmark of current biological and environmental knowledge relative to the green sea turtle. Note further that some comments, particularly those relating to migration and movements, environmental contaminants, marina and dock development, and dredging indicate that the information may represent that known pre-1991 and has not been updated in this 1995 draft.

Page	Topic	Comment relating to CNMI
	POPULATION DISTRIBUTION AND SIZE	
6	Nesting Grounds	Fewer than ten green turtles nest on the islands of Saipan, Tinian and Rota each year. The extent of nesting on the northern islands is unknown
8	Insular and Pelagic Range	Green turtles are caught by divers in the Northern Marianas (Pritchard 1982a) and according to Honigman (1994) green turtles are found commonly in the waters of Tinian.
	BIOLOGICAL CHARACTERISTICS	
11	Migration and Movements	no information listed for CNMI
12	Foraging Biology and Diet	...only a few seagrass beds are found in the CNMI.
13	Growth	no information listed for CNMI
14	Reproduction	no information listed for CNMI
15	Offshore Behavior	no information listed for CNMI
16	Health Status	no information listed for CNMI
19	Regional Summary	Due to rapidly expanding development on Saipan, Tinian and Rota, hotels and human activities are beginning to dominate beaches used by nesting turtles. Sea turtles are considered a traditional food and are readily taken on nesting beaches or in coastal waters. Nesting seasons and sites, as well as feeding areas, are well known to the indigenous fisherman.

Page	Topic	Comment relating to CNMI
	PRIMARY TURTLE THREATS	
26	Directed Take	In CNMI, turtles are a traditional delicacy for most ethnic groups. Knowledge of existing regulations does not inhibit many people from eating turtles or their eggs. Female turtles crawling toward the nesting area are taken even before the eggs are laid.
27	Increased Human Presence	Nesting habitat along the sand beaches of the Saipan Lagoon is rapidly disappearing due to rampant development.
28	Coastal Construction	On Saipan, golf course, hotel and tourism-related development has severely impacted most of the historical nesting areas on the western portion of the island and residential development is beginning to threaten the eastern portion of the island. On Rota, nesting beaches appear limited to undeveloped private land due to heavy recreational use and shoreside tourist developments. Many of these “undeveloped” beaches are slated for development. On Tinian, the majority of the nesting beaches are on military-leased land where no construction is presently expected. Development of a large resort and casino on the southern side of the island will likely increase human disturbance on nesting beaches.
29	Nest Predation (non-human predators)	Not known to be a problem.
30	Beach Erosion	Not thought to be a threat to turtle populations, but typhoons are frequent and likely to cause beach erosion.
30	Artificial Lighting	High potential as a future problem in Rota where resort development is flourishing. Presently not a problem on Tinian, but there is a potential problem as development continues. Most houses and hotels adjacent to the lagoon area of Saipan usually have some form of beach lighting. The Division of Fish and Wildlife routinely reviews all major development projects adjacent to beach fronts through the CZM permitting process. A permitting condition restricts the orientation of night lights onto the lagoon beach area, and most establishments comply with this.
31	Beach Mining	Not a current problem
32	Vehicular Driving on Beaches	Although beach driving is a pastime on Saipan, the impacts are unknown.
32	Exotic Vegetation	Not a current problem

Page	Topic	Comment relating to CNMI
32	Beach Cleaning	In CNMI, beach cleaning occurs in front of the major tourist hotels, but this is not thought to be a threat to turtle populations.
33	Directed Take	Sea turtles are considered a traditional food item and are hunted illegally to this day. Federal laws protecting turtles are known, but hotly contested by the public. CNMI Customs Officers routinely confiscate turtle handicrafts (combs, jewelry, etc.) at the airport. Confiscation of turtle products is the extent of prosecution. Most of the turtle products originate from the Republic of Palau or FSM.
34	Natural Disasters	Undetermined problem, although CNMI is an area that is regularly hit with typhoons
34	Diseases and Parasites	No information listed for CNMI
35	Algae, Seagrass, and Reef Degradation	Saipan is the only island that has extensive seagrass meadows inside the reef system, but impacts to seagrass meadows are not known.
36	Environmental Contaminants	With the exception of sewage, environmental contamination is not documented. One potential source of contamination is the unregulated Puerto Rico landfill in the Saipan Lagoon adjacent to American Memorial Park. This landfill was originally a U.S. military dump which the Trust Territory continued to use...Other islands may also have "hazardous waste" areas, most likely associated with World War II activities...The current wastewater treatment plant situation does not appear to be a direct threat to sea turtles; however, habitat and food may be affected. In addition, a cumulative effect of general habitat degradation could be occurring from the numerous drainage ditches which empty into the lagoon.
38	Debris (Entanglement and Ingestion)	A possible threat; however, there have been no reports of turtle deaths due to debris entanglement or ingestion.
39	Fisheries (incidental take)	no information listed for CNMI
39	Boat Collisions	no information listed for CNMI
40	Marina and Dock Development	The major shipping area on Saipan is Charlie Dock, an outdated structure from WW II. Plans to expand and modernize the dock facilities may not be completed for another five years...

Page	Topic	Comment relating to CNMI
40	Dredging	Very little dredging is done in CNMI waters, however there are two dredging projects on Saipan that will most likely be completed within the next two years...The Tinian harbor facilities, originally constructed by the U.S. military, has been under discussion for rehabilitation, however, no funds or proposal has been submitted for review. The harbor area is known for turtles and therefore, minimizing impacts to sea turtles will become part of the permitting process if this project is approved.
41	Dynamite "fishing"	No information listed for CNMI
41	Oil Exploration and Development	Not a current problem.
41	Power Plant Entrapment	Not a current problem.
42	Construction Blasting	Not a current problem, however in Tinian Harbor caution must be observed if dynamite is used due to the numerous sightings of turtles there.
	CONSERVATION ACCOMPLISHMENTS	
45	Protected Areas	The government of the CNMI has not established protected areas in the Commonwealth although Managaha Island and reefs off western Saipan and the three Maug Islands have been candidate parks for some time. The CNMI government is presently evaluating a number of candidate protected areas throughout the Commonwealth, some of which may benefit nesting or foraging sea turtles.
46	Other Plans and Regulations	...Northern Marianas administers a coastal zone management program sponsored by NOAA. These plans are authorized by legislation or executive orders and include policies to protect coastal zone resources including beaches, reefs and lagoons - habitats important to nesting and foraging sea turtles.
47	Sea Turtle Conservation and Management Plans	No information listed for CNMI
47	Research and Education	No information listed for CNMI
48	Effectiveness of Conservation Accomplishments	<u>ineffective</u> ...conservation actions have failed to stem the precipitous decline of resident sea turtle nesting and foraging populations. Conservation efforts in...CNMI...are so inadequate that all nesting populations of both the green and hawksbill are likely to be extirpated from the islands within the next twenty years if not sooner. No amount of research, tagging, regulatory actions and protected areas designation will succeed in reversing this trend unless the turtle and egg harvesters are educated or convinced enough to cease or drastically curtail harvesting activities.

APPENDIX 3. SOURCES OF INFORMATION ON PAST AND CONTEMPORARY USE OF SEA TURTLES BY COMMUNITIES IN THE CAROLINE ISLANDS

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APPENDIX 4. OUTLINE OF POSSIBLE CEREMONIAL USE AND EDUCATIONAL PROGRAM

CEREMONIAL CAPTURE

A voyage to the northern islands should be undertaken prior to the San Isidro festival using traditional Carolinian canoes (two are currently present in Saipan). The canoe(s) may be accompanied by motorized vessels carrying media personnel or others, however all turtle-capturing activities should be conducted from the canoe(s). The canoe(s) should be manned by competent crews who should be fully instructed on the purpose of the voyage and under the command of someone knowledgeable about turtles and methods of capture in the water.

At present there are no known appliances or aids to turtle capture that would ensure the turtle is unharmed. Capture thus must be made in the water using divers to capture them by hand. Once a turtle or turtles are captured, additional turtles should be sought and captured for tagging and immediate release. A trained and qualified technician should be on hand to conduct tagging and data collection. If there are residents on the island, they should be instructed beforehand to conduct a census, either in the water or at strategic vantage points on land. While conducting the hunt, several of the crew should be detailed to accomplish such a census during turtle hunting activities.

As many turtles as possible should be captured and their carapace marked for future visual identification and census purposes. Balazs (1995) describes a simple method of engraving desired identification numbers 1-2 mm deep into a carapacial scute of the turtle and then applying a visible colored paint to the inscription.

The turtle(s) would be returned to Saipan by canoe. Because trussing a large turtle for the return voyage would be difficult, consideration should be given to capturing only smaller juvenile(s) which could be more easily transported.

Other important points:

- The focus of the capture activities should be at Anatahan or possibly Alamagan and Agrigan. This should eliminate confusion (or claims of confusion) between the activities in this program and turtles in any of the three main inhabited islands. Turtle(s) captured are to be returned to Saipan for use at the San Isidro fiesta.
- A preliminary assessment should be made of these islands and depths at which turtles might be captured documented. If it appears that free-diving is not feasible, either because of depth or a lack of experienced divers, consideration may be given to using scuba equipment. If scuba is employed, only qualified divers should be allowed to participate.
- If larger turtles are deemed feasible to capture, male turtles should be identified and targeted for capture rather than females.
- The activities preceding the actual take must include appropriate education and publicity, undertaken both on Saipan and at the site of capture.
- As many of the aspects of the preparation, voyage, capture and turtle research efforts as possible should be well publicized and documented. Extensive use of video for local Saipan TV use should be employed.
- A qualified biologist from the DFW, NMFS, or USFWS should accompany the hunt to assist wherever possible.

CEREMONIAL USE AT THE FIESTA

Maintenance of turtle(s) prior to the fiesta Thought should be given to display of the turtles at a suitable site at one or more of the hotels on Saipan possessing suitable facilities. If this does not prove feasible, a secure holding area should be erected and security arranged. While at either site, the turtles should be utilized for educational purposes such as visits from school children, which should include appropriate explanations and material.

The turtle(s) should occupy a prominent place in the proceedings, with appropriate explanations of the purpose of the turtle(s) capture. Educational materials should be made available and explanations given by the Master of Ceremonies or others before and during the fiesta.

If it is the intention of the fiesta to present the turtle to elder(s) or community leader(s) in recognition of past service or for other reasons, there should be an agreement beforehand that the turtle is to be released back into the water during the fiesta. Every opportunity should be taken to recognize this gesture as being in the best interests of both the community and the turtles. The turtle should be tagged (with a radio tag if possible) and released by the leaders.

ACKNOWLEDGED POTENTIAL PROBLEMS

It is understood that such a program could encounter both operational problems as well as create undesirable perceptions. These problems could include:

- the possible continued interpretation of Anatahan and the northern islands as a cornucopia of resources, including turtles, which could lead to increased poaching by Saipan-based boats.
- the difficulty of capturing turtles live and unharmed in the water. It is not known the extent to which this could be accomplished without specific equipment that may not be available to people participating in the program.
- the availability of suitable free-divers capable of carrying out the capture of turtles in the water
- the possibility that other cultural groups would object to the use of turtles by one specific group
- the inability to mount a strong environmental education program, negating the entire effort by enforcing the perception that it was all right to capture turtles.
- the potential for bad weather conditions precluding a take for use at proper time of the fiesta. The pressure would then be to obtain the necessary turtle(s) from other sources and further negate the value of the program.

APPENDIX 5. IMPORTANT RESOURCES FOR EDUCATORS

In order to be effective, an Environmental Education Specialist needs to have ready sources of sea turtle information and educational tools. Listed below are several such sources.

Research and Conservation Organizations

Center for Marine Conservation (CMC), 1725 DeSales St., NW, Wash., D. C. 20036 (202-429-5609)

The CMC publishes books, slide shows, posters, videos, and fact sheets, some of which deal specifically with sea turtles. It also publishes the newsletter *Marine Conservation News* and operates NOAA's Marine Debris Information Office.

Hubbs-Sea World Research Institute, 1700 South Shores Rd., San Diego, CA 92109

The editors of the *Marine Turtle Newsletter*, which contains news regarding biological and educational work on sea turtles around the world, are located at Hubbs-Sea World. It should be "must" reading for all EES working to help preserve sea turtles. Also, development authorities and other relevant groups (such as hotel associations, fisheries groups, and libraries) should be encouraged to subscribe to and read this publication.

South Pacific Regional Environment Programme (SPREP), P. O. Box 240, Apia, Western Samoa

SPREP operates the Regional Marine Turtle Conservation Programme. Sue Miller is the turtle campaign coordinator, and publishes the quarterly, *Environment Newsletter*. In 1995, SPREP produced an excellent sea turtle video entitled, "Let Our Turtle Family Live." The advantage of this video over other sea turtle videos available is that the locale depicted is in the Pacific islands.

Sea Turtle Restoration Project, of Earth Island Institute, P. O. Box 400, Forest Knolls, CA 94933. (415) 488-0370

This organization publishes a newsletter entitled *Viva La Tortuga!* plus a great deal of helpful educational tools. It also has ongoing projects to further the cause of sea turtle conservation, such as its "Turtle Safe Shrimp" project, in which local people and groups can participate. Knowledge of and participation in their conservation programs will enhance understanding that sea turtles are threatened worldwide and not just in the NMI.

Sea Turtle Survival League (STSL), a program of the Caribbean Conservation Corp. (CCC) 4424 N. W. 13th St., Suite A-1, Gainesville, FL 32609. (352) 373-6441

The STSL has published an *Educator's Guide* which includes extensive information about sea turtles and the threats they face, plus classroom activity ideas and worksheets. They also offer other educational materials for sale.

IUCN/SSC Marine Turtle Specialist Group (MTSG), Program Officer is located at the Center for Marine Conservation listed above.

The MTSG is responsible for tracking the status of sea turtle populations around the world for the World Resources Union (IUCN) Species Survival Commission (SSC) and is a valuable source of information about sea turtles and technical advice on conservation projects.

Videos

Several good videos are available on sea turtles, covering threats to their existence and different aspects of their biology and conservation. One drawback is that there aren't any specifically about green sea turtles in the NMI. Care must be taken when using them to explain their context and relate it to sea turtles in the NMI. For instance, all sea turtles worldwide face many of the same threats, so audiences need to be challenged to see what the threats are in the particular video being shown and to relate them to the situation in the NMI.

Sea Turtle Coloring Book

A sea turtle coloring book was published in the early 1990's with text in English and Samoan, for use in both American Samoa and Western Samoa, and in 1995 was modified for use in Hawaii, with text in English and Hawaiian. It is an excellent educational tool, especially for grades 4-6, and translation of the text into Chamorro and Carolinian should be pursued if not already completed.

Other Educational Materials

Other sea turtle educational materials have been printed and published by various organizations. Sea World has produced an excellent information booklet which includes in-depth information on sea turtle biology, illustrations and photos, and a thorough bibliography. There have been several articles on sea turtles published in different magazines in recent years and they are excellent for use with high school students and adults.

Proceedings of the 11th-15th (1991-1995) Annual Symposia on Sea Turtle Biology and Conservation

Each year's Proceedings is a separate volume. The Proceedings for 1996 and 1997 are not available yet. Copies of those that are available may be obtained from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 or from National Marine Fisheries Service, Southeast Fisheries Science Center, Miami Laboratory, 75 Virginia Beach Dr., Miami, FL 33149.

Recovery Plan for U. S. Pacific Populations of the Green Turtle (*Chelonia mydas*)

Copies may be purchased from the U. S. Fish and Wildlife Reference Service, 5430 Grosvenor Lane, Suite 110, Bethesda, MD 20814, (301) 492-6403 or 1-800-582-3421.

Biology and Conservation of Sea Turtles, Revised Edition, edited by Karen A. Bjorndal

This volume contains the Proceedings of the World Conference on Sea Turtle Conservation, held in Washington, D. C., 26-30 November 1979, with contributions on Recent Advances in Sea Turtle Biology and Conservation 1995. It is available from the Smithsonian Institution Press, Washington, DC.