

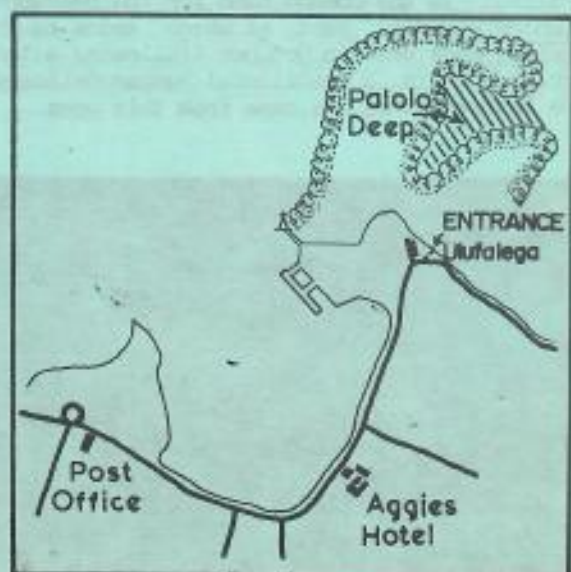
SEA TURTLES - W. SAMOA G.H. BALAZS
AND SPREP 1980s-1990s

ADVICE TO VISITORS

- * Palolo Deep is best enjoyed by swimming with a mask and snorkel. Flippers are an advantage.
- At low tide the level of water around the edge is about 300mm (1ft), while at high tide it is about 1.4m (4' 6") deep.
- * Choose a calm day to get the best conditions for viewing the marine life.
- * Wear sandals to protect your feet from cuts while walking out to the Deep at low tide.
- * Ensure that you have adequate protection against sunburn. Wear a shirt to protect your back while swimming.
- * Some corals, shells and sea urchins are poisonous—you are advised not to touch them.

For further information apply to:

National Parks and Reserves Section,
Forestry Division,
Department of Agriculture and Forests,
P.O. Box 206,
APIA.



PALOLO DEEP

MARINE RESERVE

ENGLISH COPY



Samoa i Sisifo
National Parks
and Reserves

O Malae ma Fanua Faaagaaga
o le Atunu'u

THE MARINE LIFE OF PALOLO DEEP

Coral reefs are very complex communities supporting a great variety of marine life. Apart from the coral itself and its predators (e.g. some starfish and the parrot fish) the reef provides a habitat for many plants and fishes. Each organism occupies a particular place or niche in the community, helping either to establish or break down the community. While the balance between building and destroying is maintained, the reefs and their communities will continue to flourish. When one element gets out of control, or the balance of nature is upset, the community can be quickly destroyed. For example, heavy infestations of Crown-of-Thorns starfish are known to have destroyed coral communities.

CORAL

Coral islands and reefs are so called because they are formed from vast numbers of coral animals. These coral animals are closely related to the familiar sea-anemone, and occur in all the oceans of the world whether warm or cold. However, it is only in the tropics that these animals (called polyps) are able to form reefs, because only where the sea temperature seldom falls below 22°C (72°F) and there is a good supply of sunlight can the polyps form a limestone skeleton. When the polyp dies its skeleton remains and provides a firm base for other polyps to grow on.

Over many thousands of years all these skeletal remains, together with those of associated organisms (like coralline algae) form an underwater mound or reef.



Some corals have both male and female sex organs in the same polyp while others exist as either male or female. In either case, the fertilised eggs develop as embryos inside the adult's body before being released as larvae into the sea. Once the larvae mature they explore the sea-bed in order to find a suitable spot to develop and begin to form their limestone skeletons.

The polyp will feed on the food swept around it by ocean currents. Food consists of plankton, the developing larvae of a variety of animals and an algae which lives inside the coral. This particular algae gets its nourishment from the coral's waste products.

Most reef building corals are "colonial". This means that when the polyp reaches a certain size (size varies according to the species) new polyps will develop by budding from it. These new polyps will in turn mature and further polyps will bud from them. Each polyp contributes to the bulk of the colony by forming its own skeleton. In this way the distinctive shapes of the various species of coral are formed.

PALOLO

'Palolo' is the common name for the reefworm (*Eunice viridis*), part of which swims to the surface each year in October (following a lunar cycle). It is a traditional Samoan delicacy. The Reserve takes its name from this worm.



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FISH

Many varieties of fish can be found in Palolo Deep. Each one fills a niche in the ecology of the reef and has adapted to its particular role. Watch them and you will see many of these characteristics.

Parrot fish have strong beaks to enable them to nibble at the coral.

Some fish have a fake 'eye' near their tail to fool predators into attacking the wrong end of the fish.

The Pipe fish is long and thin, allowing it to forage for food down amongst the coral.

Other fish have big mouths so they can eat small fish.

The brightly coloured Clown fish lives among the poisonous tentacles of the sea-anemone for protection and it in turn attracts other fish which become the anemone's food.

The algae growing on and amongst the coral provides an important food source for many species of fish, which graze it in much the same way as stock graze a field of grass.

There are many smaller fish living in and around the sheltered waters of the reef, which often seek protection amongst the coral. These become food for larger fish-many of which are an important food for humans.



INTRODUCTION

Coral reefs surround much of Western Samoa, protecting the coastline and forming shallow lagoons. Within the reef's protecting walls many deep, irregularly-shaped "holes" can be found on the lagoon's floors. These "holes" provide an ideal environment for the growth of fragile corals, which in turn provide a home for many varieties of tropical fish. Palolo Deep is one such "hole", which because of its accessibility and close proximity to Apia, gives the visitor a wonderful opportunity to easily and safely view tropical marine life in its natural state.

Palolo Deep is a Marine Reserve, so all marine life and natural features in the Deep are protected from damage or destruction.

This protection (under the 1974 National Parks and Reserves Act) is designed to ensure that the visitor's enjoyment of the Deep is not spoiled by careless or thoughtless use, and the Deep continues to remain undisturbed as a spawning ground and food source for the many varieties of corals, fish and plant life in the lagoon.

Visitors must ensure that:

- * they do not destroy or break pieces off the living coral. As some corals are very fragile, take care not to stand on them.
- * no fish or other marine life, or other natural features are removed.
- * no rubbish is deposited in the Deep.

In other words, please leave Palolo Deep as you found it.

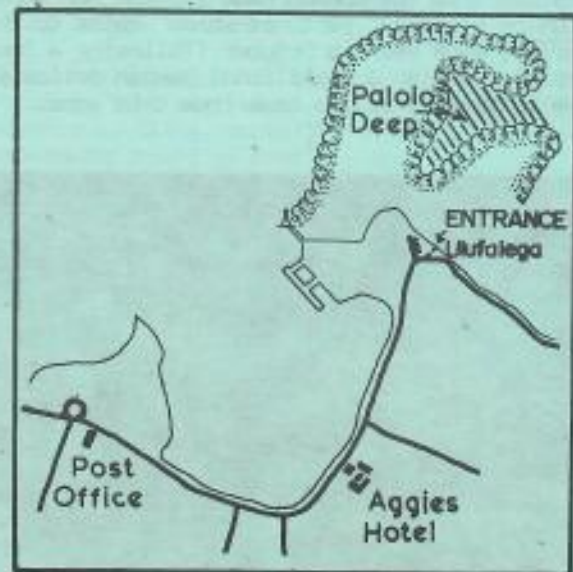


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STATUS OF WESTERN SAMOA'S SEA TURTLES

by Leon Zann FAO Fisheries Adviser

Introduction

The turtles are endangered world-wide because of overhunting for their shells and meat, and overcollection of eggs from their nurseries. The decline in the South Pacific populations has been hastened by the breakdown of traditional conservation practices (eg taboos on consumption of turtles by commoners), the use of power boats in turtle hunting, their commercial sale, and harvesting of eggs in the rookeries.

Two species of turtles are present in Western Samoan waters, the green (*Chelonia mydas*) and the hawksbill (*Eretmochelys imbricata*). The green is considered more common (Hirth, 1971) but probably does not nest in the area. Hawksbills nest mainly on the Aleipata islands of Nu'utele and Nu'ula, and on Namu'a. In neighbouring American Samoa green and hawksbills nest in the Swain and Rose Atolls. The Aleipata nesting season extends from October to June, with most activity in January and February (Balazs, 1981).

Turtle populations have greatly declined in Western Samoa because of human exploitation of nesting females and eggs (Witzell, 1972). Early last century they were said to be abundant along the coast of Upolu and Savaii (Williams 1837). Today the nesting populations are very small; from the number of beach tracks counted, Witzell (1972) considered no more than 45 females nested annually at Aleipata.

Attempts have been made to increase survivorship of young turtles by rearing of the vulnerable hatchling stage (termed 'headstarting'). Many hatcheries were established in the Caribbean and the Pacific in the 1970s, and although a large number of hatchlings were released, there has been much debate on their effectiveness (eg Allen, 1990; Woody, 1990). There has been no demonstrated increases in turtle populations but this is difficult to determine because of tag losses. It is also believed that on release the 'head started' juveniles have a high initial mortality and that the conditioning needed for them to later return to their natal beach (ie where they were born) is impaired.

Aleipata hatchery

To help replenish stocks of the endangered hawksbills, a turtle hatchery was established by the Fisheries Division at Aleipata in 1971 (Witzell, 1974). Two local staff and two Peace Corps volunteers were employed in the Aleipata hatchery and four temporary 'mini-hatcheries' were

constructed elsewhere. Batches of 500 eggs were collected from nests on the Aleipata islands of Nu'ulua and Nu'utele and transferred to a fenced area of sand at the hatchery. The hatchlings were reared in ten concrete tanks flushed once daily, and fed minced fish. After one month, in which they grew 30-40% in length and 100-120% in weight, they were taken 3-7 km from the reef and released.

Table 1. Results of Aleipata turtle 'headstarting' program

year	eggs collected	hatched (% survival)	Notes
1971	700	-	Commencement of project by PeaceCorps First full year of operation.
1972	2,000*/10,000*8	-	
1973**	4,656	3,257 (70%)	
1974**	6,231	4,951 (79%)	
1975**	5,159	2,460 (48%)	
1976			
1977			
1978			
1979	2,883	1,186 (41%)	
1980	4,208	3,257 (77%)	
1981	7,277	4,890 (67%)	
1982	4,420	3,740 (85%)	

(sources: * 1972 Fisheries Division Report. Balazs, 1981. Remainder: Fisheries Division Annual Reports

Education material on the hatchery program and on turtle conservation was conducted in schools and on the radio. Some 15,000 leaflets were distributed and two 30 min radio programs were produced. However, an attempt to pass protective legislation was unsuccessful because it was considered 'that it would interfere with Samoan custom' (Witzell, 1974).

The hatchery was closed under unclear circumstances in 1983. Although its costs were modest (WS\$7,000 pa), it was 'too expensive to operate' (W. Travis, per. comm.).

The success of the program is difficult to evaluate, but initial projections were grossly optimistic. Anticipated production was of 50,000 hatchlings pa by 1974 (1972 DAFF Annual Report) and projected annual yields of 7,000 males (200,000 lbs meat; \$14,000 worth of shell (Anon, 1972).

The projected estimates of the project's benefits are considered to be very unrealistic because: (1) mortality was underestimated (even with protection of early hatchlings, mortality is great); (2) growth rates are underestimated: (turtles are slow growing and long lived (reaching maturity at ca 10 years and living to 60-80 years)); (3) migration was not considered (turtles are highly migratory, greatly increasing yields might not be experienced locally). It is obvious that any benefits from

'headstarting' would take decades to be felt.

Present status:

There have been no studies of Western Samoan turtle populations since the closure of the Aleipata station but as the turtles and nesting grounds are still unprotected it is inevitable that populations of the hawksbill and green turtles will have further declined. Turtles are still sold in the Apia fish market (approx 20-30 pa in Apia at prices WS\$20-100). Occasionally some of these are purchased by *palagi* and conservation-minded Samoans, and released. Young turtles caught in gill nets are kept in the Malua pond but they are not fed and mortality has been high.

There are no details available on recoveries of tagged turtles. Several subadult hawksbills with notched shells resembling tagging marks were reported from Apia markets, and there is an anecdotal report of a recovery from a neighbouring country, but tag losses were great before the recent development of double and titanium tags. Although no surveys of turtles have been undertaken since the project closed, it is the author's opinion that the numbers of subadult hawksbills around Upolu are moderately high (ie averaging around 0.25-0.5 sightings per ocean dive), suggesting the program may have been partially successful in securing Western Samoa's wild turtle stocks. The headstarting program did successfully focus attention on the plight of turtles, and on conservation issues in Western Samoa at the time.

Protection:

The Fisheries Division is considering regulations under its Act to prohibit the commercial sale of turtles in Western Samoa, and the disturbing of nesting sites. The collection of turtles for traditional purposes would be allowed but should be reviewed if stocks are evaluated. Turtles are given total protection in neighbouring American Samoa.

The protection of the Aleipata Islands is a high priority of the Department of Lands and Environment.

An education program on the protection of turtles is desirable in Western Samoa.

Notes: One of the Peace Corps, Alan Banner, was killed by a shark at the Nu'utele Island on 16 April 1972. (Witnessed by W. Travis; details are described elsewhere). The turtle hatchery is now an Agriculture field station.

References

(Gillett and Sue (1987) list 16 references to turtles in WS, 10 of which described the Aleipata hatchery.)

Allen, C. H. (1990). Guest editorial: give 'headstarting' a chance. Marine Turtle Newsletter 51: 12-16.

Anon. (nd) Western Samoa Turtle Project. 10 pp. W S Fisheries Division files.

Hirth, H. F. (1971). South Pacific islands - marine turtle resources. A report prepared for the Fisheries Development Agency Project. FAO, Rome.

Witzell, W. N. (1974). The conservation of the hawksbill turtle in Western Samoa. South Pacific Bulletin, First Quarter.

Williams, J. (1837). A narrative of missionary enterprises in the South Seas Islands, with remarks upon the natural history of the islands, origin, languages, traditions and usages of the inhabitants. Appleton and Co., New York.

Woody, J. B. (1990). Guest editorial: Is headstarting a reasonable conservation measure? On the surface yea; in reality, no. Marine Turtle Newsletter 50: 8-11.

ANON.

Western Samoa

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FISHERIES DIVISION

ANNUAL REPORT

1974

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 - 1.1 Survey of fishing crafts and outboard motors.
 - 1.2 Supply of outboard engines and spareparts.
 - 1.3 Supply of fishing gear.
 - 1.4 Repair of outboard engines.
 - 1.5 Hire system for outboard motors.

 2. Commercial Fisheries Development.
 - 2.1 FAO Tuna Fisheries Project.
 - 2.2 Operation of Fisheries Division's boats.
 - 2.3 Three months commercial trials with bonus system for crew.
 - 2.4 Establishment of commercial fishing infrastructure.

 3. Turtle Project.
 4. Staff.
 5. Programme of Work for 1975.
- Appendix: Organizational chart.

3. TURTLE PROJECT

The Turtle Hatchery at Aleipata under the management of Viliamu Natagi, over the year collected 6231 eggs, hatched 4951 turtles and released 3263 turtles at an age of 1 to 3 months. The project has been in operation since 1971 and it should in 1975 be possible to gage the effect on the local turtle population. An effort to do this will be done by the Peace Corps Marine Biologist, Gene Feldman. In 1972 plans for a large scale turtle farming project was prepared and the Peace Corps Marine Biologist evaluated this proposal after his arrival here in August 1974. His conclusion is that farming of hawksbill turtle would not be economically feasible since the hawksbill turtle is carnevorous all its life. The cost of feeding these turtles with fish for three years would be prohibitive. The only turtle that has been farmed so far is the green turtle which is herbivorous. All turtles hatched in Aleipata are hawksbill, but green turtles are caught in Samoa and are reported to be nesting here. For the time being the proposal of farming turtle in conjunction with the Aleipata turtle hatchery is not realistic. The turtle hatchery should therefore continue along the present line of work until an assessment of the impact of this project on the turtle population in Western Samoa can be made in 1975.

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4. STAFF

Appendix I gives the Organizational Chart of the Fisheries Division as it is proposed for 1975.

There has been considerable change of staff over 1974. In April the Acting Chief Fisheries Officer was dismissed together with one coxwain. Luatua Vesi as Controlling Officer, has taken over most of the duties of the Acting Chief Fisheries Officer. In August Ueta Faasili went to UK for a one year Fisheries Course. Fili Suaeoa was appointed Fisheries Assistant from 19 August. Fili is an Alafua graduate and worked in the Fisheries Division from 1970 to 1973. He attended a one year fisheries course in UK in 1971. Fili will be in charge of the Village Fisheries Project which has high priority in 1975. Pale Taunai was also appointed Fisheries Assistant from 19 August. Pale has been working with the Fisheries Division since 1970. He has advanced to coxwain and now to Fisheries Assistant. Due to his long experience in navigation and fishing, Pale will be responsible for the operation of 3 of the boats belonging to the Fisheries Division, FD-1, FD-2 and FD-4.

From 23/9 Tau Faraino was appointed Inboard Engine Mechanic. Tau has a diploma from TTI and have extensive experience in the repair and maintenance of engines through his work with Polynesian Airways and various firms in Pago. Tau's main duty will be maintenance and repair of inboard marine engines in the boats belonging to the Fisheries Division. Ioane Mika was appointed Coxwain of the FAO tuna boat, FD-3 from 18/11.

from - Pritchard, G.H., 1979.
Encyclopedia of Turtles.

SAMO A

ough dwindling, populations of green turtles; about half of the eggs are laid on the island of Talang Talang Besar, about 40% on Talang Talang Kechil, and about 10% on Sakang Besar. In the old days the numbers of eggs harvested in these islands were astronomical; more than 3,000,000 were collected in 1836. However, at the present time, the Sarawak turtle population is in serious trouble, suffering from well over 90% exploitation of the eggs laid as well as increasing destruction of the adult turtles by fishermen from the Philippines and elsewhere. The average annual egg yield from 1927-1936 was 2,147,000; from 1967-1972 it was 321,000.

The seven Philippine turtle islands, in the Sulu Sea quite close to Sabah, together constitute an important green turtle nesting ground. In 1963, nearly 4000 eggs were collected nightly on one island, Taganak, and nearly as many on Baguan.

A complete enumeration of the Pacific Islands on which green turtles nest is beyond the scope of this book. However, the species still nests in reduced numbers on French Frigate Shoal, in the Hawaiian Leewards, and has the unusual habit of basking on the beach in the heat of the day on this and on other Hawaiian Islands, including Pearl and Hermes Reefs and Lisianski and Laysan Atolls. Diurnal emergence of female turtles for protracted periods has also been observed on Mornington Island in the Gulf of Carpentaria, Australia. The local Lardil aborigines consider such turtles come ashore to escape the attentions of over-zealous males, and Robert Bustard, who has visited the island, concurs with this opinion.

In March and April, 1976, I conducted a preliminary study of the marine turtles of the U.S. Trust Territory of Micronesia. Nesting occurred in several of the districts; in Palau the most frequented are the uninhabited or sparsely inhabited southern islands of Merir and Helen's Reef, while in the Yap District green turtles nest on Ullithi (islets of Gielap and Iar), Ngulu, Pikelot, West Fayu, Ifaluk, and Olimarao. In Truk District some greens nest on East Fayu, and on Oroluk in Ponape District. In the Marshall Islands the best nesting is on Bikar and Jemo, but some greens nest on Taka, Erikub, Ujelang, Jalut, Taongi, and Bikini. In most areas nesting takes place in the summer months (May to July), but on certain islands, notably East Fayu and Ngulu, some nesting occurs as early as February.

Harold Hirth, after a survey of green turtle stocks in the South Pacific, concluded that the most important breeding areas today were: Fanuatapu, Namu'a, Nu'utele, and Nu'u'ua in Western Samoa; Rose Atoll in American Samoa; Scilly, Mopella, and Bellinghausen Islands in French Polynesia; the Ha'apai Group in Tonga; Lau, Yasawa, and Mamanutha Groups in Fiji; and Ile Ouen, Ile Surprise, and Recif d'Entrecasteaux in New Caledonia.

In the East Pacific, green turtles are found from the central part of the Gulf of California south to central Peru. In Mexico, nesting takes place in the Revillagigedo Islands, in considerable numbers near Maruata Bay in the State of Michoacan, and apparently in even larger numbers in Oaxaca, about 25 km. west of Salina Cruz.* Nesting also takes place at Playa Azul, Michoacan, and in front of Mar Muerto, Chiapas. Major nesting grounds for this species in Central America have not yet been found, but good numbers nest on certain of the Galapagos Islands. The best nesting beaches in the archipelago are situated on the north coast of Santa Cruz Island (Indefatigable); on the west coast of Baltra Island (South Seymour); on the north, east, and west coasts of Santiago Island (James); on the south coast of Bartholomew Island; on the north-east coast of San Cristobal Island (Chatham); on the north coast of Floreana Island (Charles) near Cormorant Point; and on Barahona and Quinta Playa on the south coast of Isabela Island (Albemarle). In the Galapagos Islands, in addition to the normal green turtles (locally known as "black turtles"), there exists a minority of individuals, mostly females, which are distinguished by their bright yellow plastra, thick carapace shields, and tremendous obesity. These so-called "yellow turtles," greatly sought-after in former times for their high oil content, are never seen on the nesting beaches and never contain eggs at any time of the year. While the situation here merits close study, my tentative explanation is that these "yellow turtles" are a sterile mutant form of the "black turtle." Tremendously fat barren green turtles are also occasionally found in the Caribbean—the 649 pound female from Grand Cayman mentioned above was one of them.

A recent report in Science by Felger, Clifton, and Regal confirmed the amazing phenomenon of winter dormancy in green turtles in the north-central Gulf of California. In this area, during the cold months (approximately November to March), the turtles repair to certain habitual areas where they shuffle into the bottom mud so that they are almost concealed; they remain torpid until the onset of spring. Such hibernacula are now known near the islands of Raza, Angel de la Guarda, Salsipuedes, San Lorenzo, San Esteban, San Pedro Martir, and Tiburón.

Since about 1859, the Seri Indians of the coast of Sonora have exploited these turtles commercially, catching them by low tide on clear, calm days when the water is relatively clear and the turtles may be spotted by the exposed central part of the carapace show-

*The Maruata turtles nest from June to October; six or seven times during the season arrivals of about 1000 turtles come ashore, although the 'background' nesting level is nearer 50 turtles or fewer each night.

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The Times
Index - Gazetteer of the World

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note - lots of other Rose I. listed -

recent years even declined.

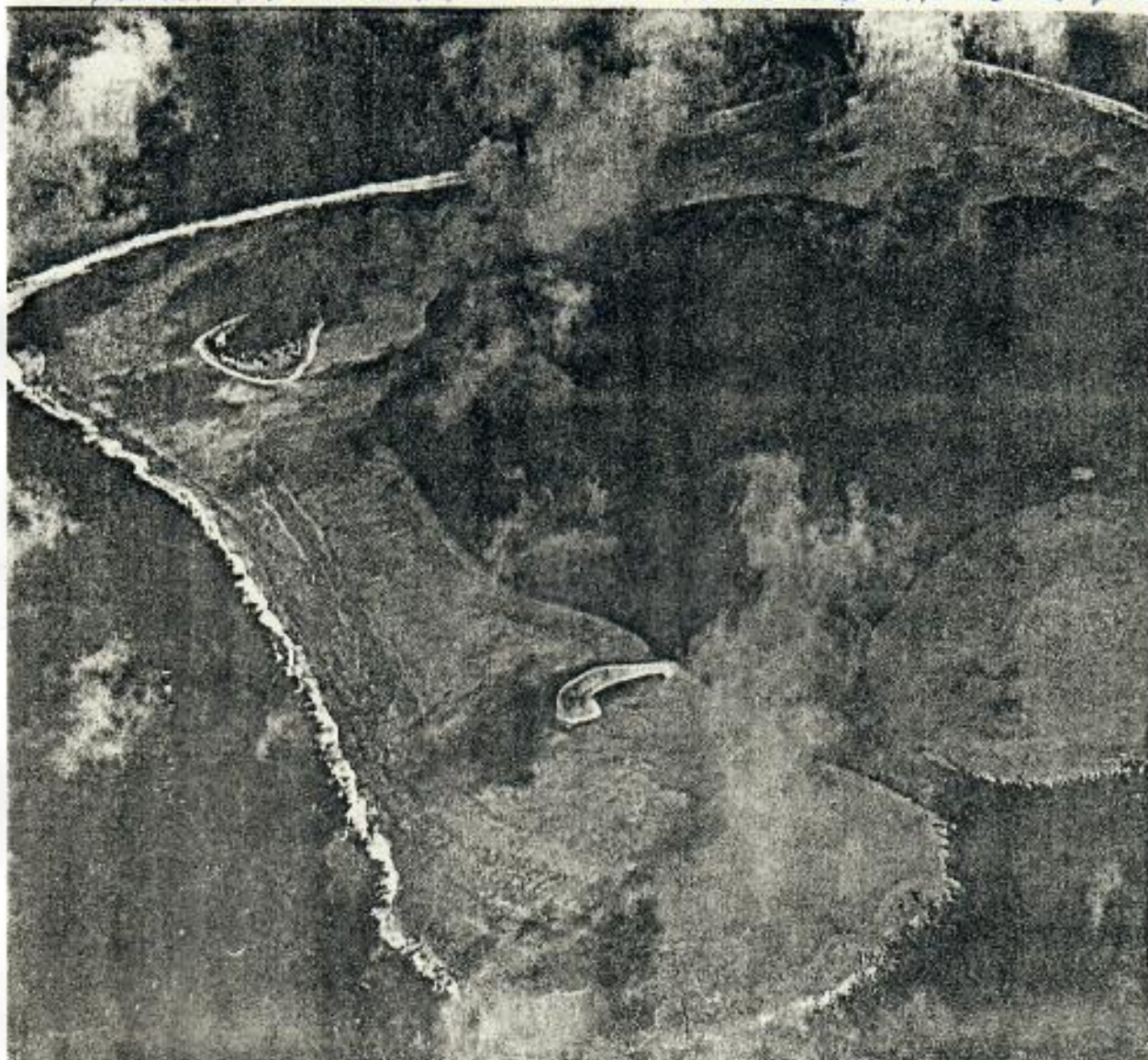
The evidence is troubling; intensive, indiscriminate fishing and abuse of our fishing waters have begun to impinge upon this worldwide source of protein. Eventually, uncontrolled marine harvests and factors such as pollution could upset the biological balance of all the oceans. Many edible species of marine life could be seriously depleted. So, just as primitive man abandoned the nomadic life of the hunter for farming and animal husbandry, modern man is turning toward the old dream of large-scale aquaculture.

The Japanese began intensive aquaculture

to raise animals, especially fish, on plant life. In other places the oyster, salmon, and shrimp industries are moving toward mass-production aquaculture.

True aquaculture eventually will develop its own brood stock. Today's fish farmer raises his fry from larvae or from eggs taken from female fish. But recently Dr. Ziad Shehadeh, using the facilities of the Oceanic Institute in Hawaii, has been working with mullet. He has succeeded, under laboratory conditions, in hatching mullet from eggs laid by captive fish. The long-range prospects are exciting: 12 adult mullet used as brood stock could

Rockefeller & Rockefeller, 1974. Problems in Paradise. Na



cases prevail which they could offer.

Misguided Imports Damage Islands

Our friend Gene Setzer, Vice President of the National Audubon Society, observes that the well-being of birds is "significant for all forms of life—like the miner's-canary." In such terms, our Pacific augury is not entirely encouraging. On Tahiti we saw many noisy mynas, a species introduced from India to control Tahitian wasps. The wasp still thrives, and the myna has proved an aggressive competitor of indigenous birds.

Beneath Mount Vaea in Western Samoa,

had destroyed the forest habitat of many birds. One species found only on Savai'i and Upolu islands, the tooth-billed pigeon, had seldom been reported in recent years; some ornithologists feared for its survival. So it was with excitement that, during our brief inspection of Savai'i, Gene Setzer found a tooth-billed pigeon, and officially reported the fact. But when he told a Samoan woman about his sighting of this rare bird, her reaction took him aback. "Yes, a marvelous bird!" she agreed. "Simply delicious!"

In the South Pacific, man has a long history of biological meddling. "Our mistakes were

A. Geo. 146: 782-93,



Sand specks of Rose Atoll National Wildlife Refuge (left), each a few hundred yards long, are important nesting grounds for the green turtle. In nearby Western Samoa, biologist Wayne Witzell measures hawksbill turtles (above) in a hatchery program.

Nuclear-Free Endanger Peace

Advertiser
de Jr., recent U.S. ambas-
ji, Tonga, Tuvalu, and
Kiribati, told a Pacific and
Council audience in
at the renewed call for a
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forward by people who
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strategic interests or who
to see the United States
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the Soviets to our dis-
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: Nuclear-Free practical

Viewpoints, Vila
at 21st South Pacific Con-
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strongly disagrees with
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coupled with the vulnera-
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cept anything less than a
e zone."

recognizes," he contin-
difficulties a nuclear-free
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On the other hand,
ges Pacific rim countries,
t Vanuatu cannot accept
s of any outside power
prejudice its environ-
ty or integrity."

nal Leaders

Union, Ponape
they have been used on
fronts by politicians and
t officials alike, Ponape's

traditional leaders have requested
that they be represented at the legis-
lature.

In a meeting January 14, the tradi-
tional chiefs said they should be
involved in important decision-
making by the state, adding many of
the major decisions affecting the lives
of Ponapeans were made without
their input.

One Hundred Ways to Serve Corned Beef

Tuvalu News Sheet, Funafuti
In a letter to the editor: We in Vaitupu
were surprised to hear on the
National News that Funafuti had run
out of meat. If having no meat in the
freezer is a subject worthy of inclu-
sion in the National News, we feel
that Vaitupu ought to be in the news
almost every day of the year.

On the same day, Vaitupu lost its
medical dresser, which means for
almost three months the entire
population of Vaitupu, including 260
students, will have to rely on the
medical services of one nurse.

We have learned to live without
fresh meat, and can offer the resi-
dents of Funafuti our recipes for "100
Ways to Serve Corned Beef," but we
view with alarm the prospect of three
months without adequate medical
services.

Palau Collecting Guns

OEK press release, Koror
The Olbiil Era Kelelau (national con-
gress) has extended the amnesty date
for surrendering firearms from
January 1, 1982, to April 1, 1982. The
Palau Firearms Control Law says that
all firearms possessed by citizens
other than police officers and military
personnel must be surrendered to
the government, and provides for a 15
year prison sentence for violations of
the law.

The first firearms control law was
enacted by the OEK in June of last
year, but that law was suspended by
the Trust Territory high commissioner
because of various objections raised
by the U.S. government. The OEK
then enacted another firearms con-
trol measure in early November
which accommodated the concerns
of the U.S. government.

*News Briefs items are drawn from the
region's news media. Because of space
limitations, material might be edited
slightly from the original sources cited.*

Chan: Big Gap

Hiri, PNG
Sir Julius Chan, prime
minister of Papua New
Guinea, decried the dif-
ferences between rich and
poor countries at the Com-
monwealth Heads of Government
Meeting in Melbourne in early
October:

"In 1979 the low income countries
of the Commonwealth made up 76%
of the total population, but enjoyed
less than 15% of the total Com-
wealth income."

"The average citizen of the indus-
trial countries," Chan continued,
"enjoys an income 41 times higher
than that of the average citizen of the
poorest countries."

He said that if the trend of the 1960s
and 1970s is projected through the
1980s, the gap will widen further. "In
1989, the average income in the rich
countries will be 52 times that of the
poor countries."

At Least 37% Aliens

News Bulletin, Pago Pago
Testimony presented to the Fono
Select Joint Investigative Committee
by two top immigration officials
revealed that there are 12,100 regis-
tered aliens in American Samoa, or
37% of the territory's population of
32,000. Privately, immigration officials
admit there are also a fair number of
unregistered aliens. (10,500 of the
legal aliens are Western Samoan,
1,100 are Tongan, and the other 500
come from 24 different countries.)

Marshall Islands Set April 1 Target

Office of Foreign Affairs release, Majuro
Marshall Islands Foreign Secretary
Tony de Brum left for Washington,
D.C., in February to begin what his
government hopes will be the final
round of negotiations with the U.S.
on the Compact of Free Association.
On his departure, de Brum said, "This
should be the end of the talks, and
that end is long over-due. We've
been negotiating this agreement with
the United States for 13 years, and
that's too long to negotiate for any-
thing. We, on the Marshallese side,
have been ready to wrap this up for a
long time. Now we want to conclude
the talks and sign the Compact by
April first of this year."

News Briefs

March/April 1982

Avec les Compliments
du
Secrétaire Général
de la
Commission du Pacifique Sud

Reference your letter of 23 May
1948. This is the original
paper to which you refer; I
hope it is as acceptable as a
photocopy would have been.

Best regards
Librarian

NOUMÉA
NOUVELLE-CALÉDONIE

SOUTH PACIFIC COMMISSION

REGIONAL SYMPOSIUM ON CONSERVATION OF NATURE - REEF AND LAGOONS

(Noumea, New Caledonia)

4th - 14th August, 1971

PACIFIC OCEANIC ISLANDS RECOMMENDED FOR DESIGNATION AS
ISLANDS FOR SCIENCE

by

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1. One of the principal objectives of the Conservation of Terrestrial Communities (CT) Section of the International Biological Programme (IBP) has been to ensure that a comprehensive series of sites is identified, safeguarded and maintained, where scientists and particularly biologists can, now and in the future, find the materials on which to base their research and acquire a better understanding of man's environment. Pressures due to population increases, demands on resources and advances in technology, mean that, without positive action to prevent it, crucial data can disappear forever almost over night. It was realized at an early stage of the CT programme that these considerations have particular application to relatively undisturbed islands, which by definition are usually oceanic, though off-shore islands (on the continental shelf but out of sight of the mainland) and even occasionally in-shore islands can fall within the same category. Characteristically such biotopes have highly specialised but often simplified ecosystems, which are therefore particularly vulnerable to disturbance.

2. Accordingly, as the first step in a series of projects designed to meet this situation, an IBP/CT initiative resulted in the adoption of a resolution by the 11th Pacific Science Congress meeting at Tokyo in August, 1966, aimed at promoting "surveys and recommendations which will enable the authorities concerned to establish an adequate permanent series of natural habitats conserved as a basis for research throughout the Pacific". The survey work, comprising the listing of and assembling of all available data on the oceanic islands of the Pacific Ocean - the first group selected for investigation - was taken to a sufficiently advanced stage during the next two years that a Technical Meeting, held under IBP/CT auspices at

Koror, Palau Islands, in November 1968 was able to make a provisional choice of some 35 islands which could be recommended as suitable for reservation for scientific purposes.

3. During the next year the provisional list was further considered and revised by specialists associated with IBP and a final selection of 39 islands was agreed. This was published in the December 1969 issue of the journal Micronesica, (actually issued in April, 1971) as an appendix to a comprehensive list of approximately 960 Pacific islands and atolls. The check-list, which, of course, represents some thousands of individual islands (since a single atoll not uncommonly comprises one or two hundred), gives for each island or island group a very brief summary of situation, size, physical character, past and present land use, conservation status and the extent to which it has been, or is being, scientifically investigated. From these data and the supplementary information which has come to hand since the check-list was compiled, the details relevant to and supporting the selection of the 39 islands recommended by IBP/CT as suitable for selection as "islands for science" have been extracted. The results are presented below in an Annex, listed country by country in alphabetical order of the countries to which each group of islands pertains and with a brief introduction to each group.

4. It is worth calling particular attention to two points. In the first place, although the scientific interest of many other sites may be comparable to that of the 39 now recommended, and certainly in many cases is much better known, the particular criterion governing the choice of the latter has been that they still have reasonable freedom from human inhabitants or impacts and other forms of disturbance. Hence, in most cases, no existing interests should stand in the way of making provision for the needs of science by affording these islands special and complete protection. Secondly, however, the list of recommendations is obviously not exhaustive: several important sectors of the Pacific Ocean are not yet represented, but surely contain sites equally deserving of recommendation. They have still to be selected.

5. The present selection is, therefore, intended to assist Governments concerned with the next stage of the project, namely the IUCN proposals for an international Convention on "Islands for Science" by suggesting not only a very modest number of specific sites but also the type of island which might well be considered for designation under such a Convention. If the initiative thus launched in respect of the oceanic islands of the Pacific by virtue both of their outstanding interest and the threats to which they are subject, is successful and leads to effective conservation or wise use of these islands, a most important precedent will have been set. The same pattern should and could well be applied not only to additional sites in the Pacific, including off-shore islands and some of relatively undisturbed peninsular, forest, mountain or otherwise suitable parts of larger and even very densely populated islands, but also to the islands of the other great oceans of the world.

ECUADOR

The tremendous significance of the Galapagos archipelago for science has long been recognised and was reflected as long ago as 1934 by the decision of the Government of Ecuador, within whose jurisdiction the islands lie, to set up a National Park in five of the larger of them. This was followed more recently (1963/64) by the establishment of a fully protected and supervised Reserve in the western part of Santa Cruz, associated with the Charles Darwin Foundation. Nevertheless, the CT Section of the International Biological Programme feels that the importance of safeguarding material for studies of evolutionary processes is so great that the Ecuadorian Government can be strongly recommended to consider scheduling some of the smaller, more remote or undisturbed islands under the terms of the proposed Convention. The eleven islands suggested, together with brief details justifying their choice, are as follows:

1. Darwin (Culpepper)

Area 233 ha, maximum height 198 m, situated at the north-west extremity of the archipelago; uninhabited and remote, being almost inaccessible except by helicopter; has been described as "perhaps the most completely undisturbed ecosystem left in the world"; no permanent water. The vegetation is a mixture of rather dry evergreen hardwood orthophyll forest dominated by Croton scouleri and broad-leaved evergreen orthophyll scrub: an endemic species of Scalesia has been reported. No species have been introduced by man, intentionally or otherwise, the surrounding 150 m cliffs never having been scaled. There is one unique form of Darwin's finch and two others shared with Wolf island, including probably the least modified of all the Geospizinae and one which has acquired the very unusual habit of puncturing the skin of Sula spp. and drinking the blood. The large colony of sooty terns Sterna fuscata is remarkable as being situated in closed forest.

2. Wolf (Wenman)

Area 466 ha, maximum height 259 m, on the north-west of the archipelago near Darwin island. Part of a volcanic crater, eroded on one side and surrounded by steep 100 to 125 m cliffs, which are almost unclimbable, so that the only easy landing is by helicopter. Uninhabited with no fresh water, except for ephemeral streams after rain, and no introduced species. The sloping summit plateau cut by sharp ridges is mostly wooded, the vegetation being similar to that of Darwin, dominated by Croton scouleri scrub forest and Opuntia scrub, the Opuntia and a Euphorbia, possibly, and a Scalesia, certainly, being endemic species. Soils are a mixture of humus and pumice with some guano. Both islands are key sites for the studies of adaptive radiation in the finches and other species, having the highest proportion of endemism to be found anywhere in the archipelago. Wolf has large seabird colonies, especially of

6. Santiago (San Salvador or James)

A fair sized island of 526 km² which is already included in the National Park declared in 1934. There is some spectacular volcanic scenery rising to a maximum height of 518 m and covered mainly by stunted scrub. Above 450 m there is some mesophytic vegetation. Although subject to disturbance through the intermittent visits of fishermen, removal of salt from the Bahia James sector and introduced rats, goats, donkeys and pigs, several special features of Santiago seem to justify recommending placing it in a special category under the Convention. The endemic race of the giant tortoise Geochelone elephantopus darwini still survives, though very scarce, as does the endemic rodent Nesoryzomys swarthi which is even nearer extinction; strict protective measures might be just in time to save these and other interesting animals such as the now everywhere scarce land iguana Conolophus subcristatus, the fur seal, flamingoes, petrels including such relatively restricted species as Pterodroma phaeopygia and no less than 10 out of the 13 species of Darwin's finches.

7. Pinzon (Duncan)

A rather arid island of some 18.4 km², rising to a maximum height of 458 m, the sparse vegetation including Croton and an endemic species of Scalesia, S. baurii. Despite destruction of eggs and young by introduced rats, the endemic race of tortoise G. e. ehippium is still quite numerous and the principal reason for including this island in the recommendations. Marine iguanas are also flourishing. The island is uninhabited and little disturbed.

8. Espanola (Hood: including small islet of Gardner)

The principal reason for the selection of this medium-sized island of 46.6 km² and maximum elevation of 198 m, is that it is the only known breeding station in the world of the waved albatross Diomedea irrorata. However, it has many other interesting features including the presence of endemic species of mocking-bird Nesomimus and lava lizard Tropidurus and subspecies of marine iguana and giant tortoise, the latter, G. e. hoodensis, being extremely rare; there are large colonies of seabirds in addition to the albatross. Unfortunately, the habitat in which a thorny leguminous mesquite Prosopis juliflora is dominant at most altitudes in a vegetation composed of microphyllous evergreen forest and more open steppe forest or woodland savanna, is being altered by introduced goats which compete for food with the tortoise and are probably responsible for its very serious decline and now threatened extinction.

9. and 10. Champion and Gardner

Two small islands south-east of Floreana (Sta. Maria or Charles). Floreana was included in the 1934 National Park so it is possible that the two islets also share in this status. Neither are inhabited and so far as

is known both are free from introduced species and very little disturbed - hence their selection. They still support an original fauna and flora, e.g. an endemic mocking-bird Nesomimus trifasciatus, now extinct on Floreana itself.

11. Fernandina (Harborough)

A single active volcanic cone 1,494 m in altitude, with a collapsed caldera and outstanding volcanic scenery. Of considerable size (635 km²) this is the last remaining big island of the archipelago which is still close to its virgin state. The local race of giant tortoise probably survives, G. e. phantastica. There are important populations of Galapagos penguin Spheniscus mendiculus, flightless cormorant Nannopterum harrisi, marine iguana and the now generally rare land iguana; there is also an endemic rodent Oryzomys. The island is densely clothed with an evergreen succulent desert scrub merging into microphyllous deciduous orthophyll scrub and deciduous scrub savanna.

JAPAN

One island under Japanese jurisdiction has been recommended by the CT Section of the International Biological Programme for inclusion in the schedule of the proposed Convention. A brief description of this, together with an indication of the reasons prompting its selection as a suitable "island for science" with an internationally recognised status, is appended.

VOLCANO ISLANDS

Minami - Iwojima

This volcanic island, sometimes known as San Augustine, rises steeply from the sea to a height of 970 m and is surrounded by cliffs which make it practically inaccessible. The total area is 375.5 ha and the summit usually cloud-covered: the upper slopes appear to be clothed with broad-leaved evergreen hardwood orthophyll forest. Has been described as "one of the least disturbed islands of the world". The seabirds known to breed there include wedge-tailed shearwater Puffinus pacificus, Audubon's shearwater P. lherminieri, the Bonin petrel Pterodroma h. hypoleuca, Bulwer's petrel Bulweria bulweri, red-tailed tropic bird Phaethon rubricauda and the rare Matsudaira's storm-petrel Oceanodroma matsudariae.

NEW ZEALAND

Three islands recommended for inclusion in the schedule of the proposed Convention, as internationally recognised "islands for science", are listed below together with brief details indicating the reasons for their selection.

The first on the list pertains to the Cook Islands which enjoy an independent status. It is understood, however, that the New Zealand Government still acts in an advisory capacity in relation to the Cook Islands' external affairs and its assistance is therefore sought in taking up the recommendation with the local authorities.

The other two islands fall directly under New Zealand jurisdiction. Both have in fact been declared as Reserves for the Preservation of Flora and Fauna so that their conservation is assured and it is hoped that there is or will be adequate provision for scientific supervision and study. Nevertheless, it is suggested that their inclusion within the scope of the Convention would not only confirm and strengthen their status but also reflect New Zealand's special interest in Pacific islands and key role in their management.

1. COOK ISLANDS

Suvarov Atoll

Comprises 25 islets totalling 40 ha in area on a diamond shaped reef; some evergreen hardwood orthophyll forest remains, but coconut palms have also been planted; formerly some pearl-fishing in the lagoon and a coast-watching station established in World War II, with a camp on the main islet which remained occupied until quite recently, but the atoll is now uninhabited; chickens and pigs were introduced on to the main islet and are now feral; the atoll is subject to hurricane damage. However, there are still important colonies of breeding seabirds of several species. This, in conjunction with the wholly undisturbed condition of some of the islets and survival of their original vegetation, suggests that the site is suitable for reserve purposes.

2. ANTIPODES ISLANDS

Antipodes

This, together with the small off-lying islet of Bolton and several rock stacks, could still be described, prior to the University of Canterbury expedition of January to March, 1969, as "the least known of all the sub-antarctic islands". The main island is volcanic, 62 km² in area, maximum elevation 402 m, covered with evergreen orthophyll short tussock grassland and extensive peaty, waterlogged areas with ferns and herbaceous plants maintained by the cool temperate climate. It is uninhabited and free from introduced species and appears to have recovered completely from any effects of early sealing expeditions. The flora includes several sub-antarctic endemics. An endemic species and an endemic race of parakeet occur (Cyanoramphus unicolor and C. novaezealandiae hochstetteri), the former listed in the IUCN Red Data Book, although this is an indication of vulnerability, if, for example, rats were unwittingly introduced, rather than of actual danger of extinction. The local race of New Zealand snipe

Coenocorypha aucklandica meinertzhageni is also listed in the Red Book for similar reasons (at least one other race has recently become extinct elsewhere). Breeding seabirds include three species of penguin, three albatrosses and at least ten species of petrel.

3. AUCKLAND ISLANDS

Adams

The only island of the group still in its virgin state and therefore rated as "of extreme importance". This is the southernmost unit of the volcanic Auckland archipelago, its area of some 92 km² constituting about a sixth of this, the largest land area in the Pacific sub-antarctic. It is uninhabited and still free from human impact and rats or other introduced animals; landing is difficult. Botanically rich with striking endemic plants in abundance. The endemic rail Rallus pectoralis mulleri, long considered extinct, was rediscovered in 1966; the typical race of New Zealand snipe Coenocorypha a. aucklandica, also listed in the IUCN Red Data Book, is still flourishing. The numerous breeding seabirds include wandering and light-mantled sooty albatrosses Diomedea exulans and Phoebastria palpebrata.

UNITED KINGDOM

Seven islands under U.K. jurisdiction have been recommended by the CT Section of the International Biological Programme for inclusion in the schedule of the proposed Convention. These are listed and briefly described below, together with an indication of the reasons for considering them suitable for designation as "islands for science" with an internationally recognised status.

PITCAIRN

1. Ducie

Coral atoll with central lagoon, land area 77.7 ha, maximum elevation 3.6 m; uninhabited, remote and rarely visited. Partly wooded. The island is the breeding place of 14 seabird species, including the little known Murphy's petrel Pterodroma ultima. Its designation would have no effect on any existing interest of the Pitcairn islanders.

2. Henderson

Elevated coral island and fringing reef about 30 km² in land area, with undercut precipitous cliffs, the level summit plateau having a deeply pitted surface and maximum elevation of 30 m; no running water, densely wooded.

Occasionally visited by Pitcairn islanders to cut Thespesia and Santalum, but landing is always difficult and the island rates as relatively inaccessible with little evidence of human disturbances except for a few coconut palms and citrus planted near the only landing-place. The minimal exploitation and considerable botanical interest are considered as justifying the designation of the island for scientific purposes: thus, the Santalum is an endemic species, hendersoniensis, and among the 18 tree genera Pisonia, Pandanus and Nesoluma are abundant. Altogether the 55 species of Angiosperms include 10 endemics, notably Bidens hendersoniensis. Thirteen species of seabirds have been recorded as breeding.

3. Oeno

Low coral island with a maximum elevation of 3.6 m and about 65 ha in land area. Occasionally visited by Pitcairn islanders chiefly for exploitation of the seabirds of which 13 species breed, but the natural vegetation is still little disturbed, except for the planting of some coconut palms, and constitutes with the seabird colonies it supports the principal scientific interest of the site. The plant cover is a mixture of evergreen softwood orthophyll forest and mesophyllous broad sclerophyll scrub and includes an endemic variety of Bidens hendersoniensis.

PHOENIX ISLANDS

4. Birnie

A very low atoll with one island about 100 ha in area, a shallow brackish lagoon and fringing reef; seasonal grassy vegetation of Lepturus and Cenchrus spp. Uninhabited with no sign of past human activity except for the construction of a 6 m high navigation beacon on the eastern side; landing is very difficult and the island almost inaccessible. It has been nominated as a bird sanctuary under the Pacific Ocean Biological Survey Programme sponsored by the Smithsonian Institution, some 22 species of seabird having been recorded of which ten are known to breed; these include brown noddy Anous stolidus, grey backed or spectacled tern Sterna lunata and blue-faced booby Sula dactylatra.

5. Phoenix

Coral island of 51.8 ha and maximum height of 6 m which has freshwater pools in its centre and a narrow fringing reef; sparse seasonal grass steppe, mainly of Lepturus. Seabirds are abundant, 26 species recorded of which 17 breed, including wedge-tailed shearwater Puffinus pacificus (20,000), Audubon's shearwater P. lherminieri (12,000), Christmas shearwater P. nativitatus (3,000), Phoenix petrel Pterodroma alba (225), lesser frigate-bird Fregate ariel (45,000), sooty tern Sterna fuscata (250,000) and grey-backed tern Sterna lunata (18,000). Rabbits released during the period 1859 to 1871, when the island was worked for guano, have become numerous and constitute the only existing disturbance. The island has been declared as a Bird Sanctuary.

EQUATORIAL OR LINE ISLANDS

6. Vostok

Small flat triangular coral islands 25.9 ha in area and of a maximum height of 4.6m, the centre of which is occupied by forest, the margins comprising beaches of coral sand and rubble rising more abruptly on the south and west, flatter on the east and broadest (90 m) at the south-eastern corner. The whole island is surrounded by a fringing reef, with one boat passage just north of the south-west corner. The central forest is composed solely of a fine stand of Pisonia grandis, the trees ranging in height from about 7.5 m on the east to 30 m in the denser western part. The only other vascular plant is Boerhavia repens, mainly along the eastern gravel flats (previous reports of the presence of Tournefortia have not been substantiated). Azure-tailed skinks Emoia cyanura and Polynesian rats Rattus exulans occur commonly in the forest; green turtles Chelonia mydas are seen off-shore, but have not been confirmed as nesting. Twelve species of birds, including nine seabirds and three migrant waders, have been recorded, of which eight of the seabirds have been proved to breed - the most abundant being blue-faced booby Sula dactylatra (over 100 pairs in 1965), red-footed booby Sula sula (over 1,000 pairs), great frigate-bird Fregata minor (over 1,500 pairs), lesser frigate-bird Fregata ariel (over 100 pairs) and black noddy Anous tenuirostris (over 1,000 pairs).

7. Malden

Atoll with triangular island 29.2 km² in area and highest (about 9 m) at its north-west and south-west extremities, with a central enclosed saline lagoon of 36.4 km² and a fringing reef; the rather unreliable rainfall, averaging 685 mm annually, supports a sparse flora of ten species including Lepturus, Sida and some stunted Pisonia, forming the mixture of evergreen orthophyll scrub savanna and seasonal grass steppe which is typical of many of the drier Pacific Ocean coral islands. Formerly inhabited (in pre-European times) by Polynesians, probably from Manihiki and numbering no more than 100 to 200 people, who have left behind them the remains of about 40 buildings. The atoll was also worked intermittently for guano between 1849 and 1927 but has since been uninhabited, though feral pigs, cats and goats remain a disturbing factor (which could probably be eliminated by a properly planned and funded campaign). Nineteen species of seabirds have been recorded of which 12 breed, including most abundantly the sooty tern Sterna fuscata, lesser frigate-bird Fregata ariel and red-footed booby Sula sula.

U.S.A.

Seventeen islands under United States jurisdiction or trusteeship have been recommended by the CT Section of the International Biological Programme for consideration as scheduled islands, to which the provisions of the proposed Convention would apply if the U.S.A. became a party to it. Several of them already enjoy a considerable degree of protection and in one case, the first on the list, the island has in fact frequently been mentioned in connection with the "Atoll for Science" project, an important U.S. initiative which is reported to be again under consideration, after having been shelved for two or three years. Nevertheless, it is believed that inclusion within the scope of an international Convention would be a valuable and desirable reinforcement of the status of some or all of the islands recommended and suitably reflect the concern already shown by the United States Government for their exceptional scientific interest.

In the following list a brief indication is given in each case of the reasons prompting the selection of the island as suitable for designation as an internationally recognised "Island for Science".

EAST SAMOA

1. Rose Atoll

A low coral atoll with two islets, totalling 700 ha in area, one being only a sandbank, the other containing some atoll phosphate and supporting a small amount of evergreen orthophyll softwood forest, in which Pisonia grandis is dominant and two other terrestrial species are Boerhavia and Portulaca. A few coconut palms have been planted in the past, but there is no other sign of disturbances and landing, which is difficult, is now formally prohibited by the U.S. Government. There are large seabird colonies, especially of boobies and frigate-birds. As already mentioned, the atoll was under consideration for designation as an "atoll for science", and may again be so, although an attempt to lease it for private occupation as a "retreat" was recently reported.

EQUATORIAL OR LINE ISLANDS

2. Jarvis

Island of 453 ha and maximum elevation of 7 m containing a central depression, about half the height of the rim, which does not form a lagoon. The island is arid with scanty vegetation described as a mixture of evergreen orthophyll shrub savanna, evergreen succulent steppe and seasonal grass steppe, in which only eight species have been recorded including Sesuvium, Sida, Boerhavia, Portulaca and Lepturus. Guano deposits were worked from 1857 to 1879 and, for a period beginning in 1935, there was a small station with a few shacks. But the island which is controlled by the

U.S. Department of the Interior is now uninhabited and undisturbed. Twenty-one species of seabird have been recorded, of which eight breed, including 1.9 million sooty terns Sterna fuscata; blue-faced boobies Sula dactylatra and lesser frigate-birds Fregata ariel.

3. Kingman Reef

A triangular reef with a deep lagoon and one flat island of 2.6 ha, largely composed of piles of dead coral; no terrestrial flora. The lagoon was used as a seaplane station from 1937 to 1938, the living quarters provided by an anchored schooner; the reef is still under Navy control, but there are no installations or current disturbances. The site is especially suitable for studies of marine life, which is very rich, and also of long-term colonisation by plants and animals.

4. Howland

Island of 189 ha and maximum elevation of 4 to 5 m; the island is dry and sandy with a sparse flora of six species of flowering plant, including Lepturus, Portulaca and Boerhavia, and a few Cordia groves in the south and centre, together constituting a mixture of broad-leaved evergreen orthophyll scrub or shrub savanna, evergreen succulent steppe and seasonal grass steppe. The island was worked for guano from 1858 to 1890; a settlement was established in 1935 and an airfield constructed two years later, but this was evacuated in 1942, after enemy attack, and is no longer serviceable; the island has since remained uninhabited. Of 26 species of seabird recorded, ten breed, principally sooty tern, lesser frigate and blue-faced booby, and do not seem to be seriously threatened by the Polynesian rat which obtained a footing during the era of human occupation.

HAWAIIAN ISLANDS

5. Pearl and Hermes Reef

An atoll with four islets, totalling 31.6 ha in area, on a circular reef: except for some casuarina, which may have been introduced, the low herbaceous vegetation is a mixture of evergreen succulent and seasonal grass steppe. The atoll has been very little disturbed; even the pearl oysters are not fished and reef fauna and flora are very rich. Seabird colonies have justified the incorporation of the atoll in the Hawaiian Bird Preservation Area.

6. Laysan

The case for scheduling this famous atoll, with its single island of 340 ha in the centre of which there is a saline lagoon, rests on the fact that despite the devastations of the past and the loss of many

species - no less than five endemic species of birds, including the rail, a honeyeater and a warbler, are extinct - protective measures at the eleventh hour have enabled a process of recovery to set in, which is of the greatest scientific interest.

The atoll was worked for guano from 1892 to 1904, rabbits being introduced in 1903. Attempts to control the latter made in 1912 to 1913 failed and by 1923, when they were finally eliminated by the Tanager expedition, their effect on the habitat had been such that only four of the 26 known plant species of Laysan, which had been dominated by sandalwood groves and fan palms, appeared to have survived. The low herbaceous vegetation, at least, is now recovering and forms a more or less continuous mat of mixed evergreen succulent steppe and evergreen orthophyll short tussock sward. A similar recovery is being shown by some of the endemic animal species which have survived: the Laysan duck Anas Laysanensis, almost extinct in 1909 due to exploitation by Japanese plumage hunters and still only 20 in number in 1923, has built up to a population of between 400 and 600. Another species included in the IUCN Red Data Book, the finch-bill Psittirostra c. cantans, an endemic race of this once widespread Hawaiian honey-creeper, has been transferred to a "green page", meaning that it is now rated to be out of danger (the population increased tenfold to c. 10,000 between 1938 and 1958). So far as is known the seabird colonies, of which those of the Laysan and black-footed albatrosses Diomedea immutabilis and niaripes are of particular importance, are also in a satisfactory state. The island is included in the Hawaiian Islands Bird Preservation Area (elsewhere referred to as National Wildlife Reserve).

7. Gardner Pinnacles

Two volcanic islets and a basalt stack, totalling only just over a hectare in area, emerging from a reef to a maximum height of 58 m. Landing is exceptionally difficult and the islets are almost completely undisturbed, which is the main reason for commending them for consideration. Vegetation is confined to algae and some Portulaca in crevices, but the basaltic rock is white with bird droppings and several species probably nest.

8. Necker

A volcanic ridge with five peaks, the highest about 84 m above sea level, and a total area of 23.6 ha. The sparse and stunted flora, nowhere higher than about 60 cm, is confined to five species, including Portulaca and Sesbania tomentosa, which form a mixture of evergreen succulent steppe and herb desert. Seabirds are numerous and the island is included in the Hawaiian Bird Preservation Area. There are important archeological remains of former settlement, but the island is difficult to land on and has long been uninhabited.

9. Nihoa

The island is the summit of an otherwise submerged volcanic peak of olivine basalt with very precipitous sides, 77 ha in area and rising to 277.4 m above the sea. It is now uninhabited, but as in the case of Necker there are many traces of ancient occupation. The flora comprises 20 species, including an endemic palm Pritchardia remota, and forms a seasonal grass steppe with patches of evergreen broad sclerophyll steppe scrub.

The fauna includes two endemic land birds, a "miller bird" now usually considered a full species, Acrocephalus kingi, though it is closely related to the now extinct A. familiaris of Laysan; and a race of the Drepanid finch-bill Psittirostra cantans ultima, which is probably now about half as numerous as the typical race of Laysan. There are many seabirds and the island is included in the Hawaiian Bird Preservation Area (or National Wildlife Refuge).

TRUST TERRITORY OF THE PACIFIC ISLANDS: MARIANAS

10. Uracas (Farallon de Pajaros)

Active volcanic cone, rising 207 m above the sea, mainly of recent origin but with one patch of older material. Uninhabited, seldom visited and still almost totally undisturbed, with no anchorages or good landing place. It is recommended mainly for these reasons, although possibly also suited to long-term studies of colonisation by plants and animals. For example, the only plants so far recorded are an endemic sedge Fimbristylis uracasana and, doubtfully, Miscanthus grass.

11. Maug

The top of a largely submerged volcanic cone, forming three small islets of a total area of 207 ha, the highest point reaching 218 m above sea level. The northern and western islets are columnar basalt with coarse seasonal grass steppe and stunted evergreen sclerophyll shrub, the eastern islet having some coconut palms, presumably introduced, as well as scrub. The eastern islet was for a time the site of a Japanese weather station and has a sheltered anchorage, but despite this there are few signs of disturbance and the islands are no longer inhabited.

12. and 13. Guguan and Farallon de Medinilla

The reason for including these two islands in the recommendations is that, due to difficult landing conditions, they seem to have been very seldom visited and to be almost completely undisturbed. Indeed they offer a virgin field for investigation and scientific study, a rare circumstance in the region. Guguan comprises two volcanic cones, one active and 279 m

high, the other dormant and reaching 301 m; it is cliff bound and intersected by deep ravines, in some of which a few breadfruit trees have become established, but otherwise the vegetation is very scanty; the total area is 414 ha. Farallon de Medinilla is a much smaller raised limestone islet of only 86 ha, with a flat-topped ridge, cliff-bound with caverns and signs of frequent landslides; it is only known from air photographs which show a deep chasm separating the northern and southern ends and a good vegetational cover of what appears to be broad-leaved evergreen orthophyll scrub, dense in places more open in others.

TRUST TERRITORY OF THE PACIFIC ISLANDS: CAROLINES

14. Helen Reef

An atoll with a small low island of 194 ha at its northern end. It is isolated and undisturbed, and now uninhabited though there are some indications of possible former occupation (remains of apparent structures etc.). The vegetation is described as typical but no details are on record and this is in fact another virtually unexplored site, which seems worth setting aside as a future scientific study area.

15. East Fayu (Truk District)

A small low-lying coral island of 39 ha, surrounded by a fringing reef; there is no lagoon, but a depression at the centre of the island which collects water. Although the island is occasionally visited by islanders from the Hall Islands, it is uninhabited and generally left undisturbed; many seabirds are reported to be present and presumably nesting.

TRUST TERRITORY OF THE PACIFIC ISLANDS: MARSHALLS

16. Pokak (Taongi)

A crescent shaped atoll with about 14 islets totalling 324 ha in area, with a maximum elevation of 3 to 4 m, dry and very stony (large storm-cast boulders inland as well as on reef), being largely composed of old reef conglomerates with some small dunes and sandy or gravelly beach ridges. Uninhabited since 1944, when a Japanese relay station and ammunition dump were destroyed; landing is difficult, there is no water and the atoll has been declared as a reserve by the District Administrator since about 1958, which may possibly give some degree of protection. As well as the various coastal features the botanical features are of special interest; eight or nine species of flowering plants, including the endemic grass Lepturus gasparicensis (elsewhere only found on Wake Is), dwarf Tournefortia scrub and Scaevola, which form mixed communities of mesophyllous evergreen broad sclerophyll scrub, broad-leaved evergreen orthophyll and sclerophyll steppe scrubs, an orthophyll dwarf shrub savanna and seasonal grass steppe.

The seabird colonies are among the most important of the central Pacific, with twenty species recorded as nesting, including enormous numbers of Puffinus pacificus, Sterna fuscata, Sula sula and Fregata minor. Wintering place of several species of wader. No adverse consequences yet recorded from the presence of introduced rats. The lizards may belong to an endemic race.

17. Bikar

Diamond shaped atoll with three islets totalling only 52 ha in area and with a maximum elevation of 2 to 3 m. However, there is a good deal of atoll phosphate present and the phosphatic "jemo" soils support a luxuriant 30 ha forest of Pisonia grandis as well as about 6 ha of Scaevola-Tournefortia scrub and some herbaceous Portulaca-Boerhavia patches. These constitute a botanically interesting mixture of evergreen softwood orthophyll forest, mesophyllous broad sclerophyll scrub and steppe scrub, and succulent steppe. A few coconut palms have been planted on the main islet, which is or was occasionally visited for fishing and fowling, though the Administration has imposed some degree of protection. Apparently, in pre-European times Bikar and also the previously listed island, Pokak, were protected by a tabu from exploitation. Like Pokak, Bikar supports large colonies of seabirds of altogether 18 species, dominated by Sula sula and Sterna fuscata. It also has the largest breeding population of green turtle Chelonia mydas in the Marshalls.

* * * * *

PAPER No 4
SESSION III - Country reports

DOCUMENT No 4
SECTION III - Rapports nationaux et territoriaux

THE STATUS OF MARINE CONSERVATION
IN AMERICAN SAMOA - 1971

by

Stanley N. Swerdloff,
Director of Marine Resources,
Government of American Samoa,
Pago Pago

LA PROTECTION DES RESSOURCES MARINES
AUX SAMOA AMERICAINES EN 1971

par

Stanley N. Swerdloff,
Directeur du Services des ressources marines,
Gouvernement des Samoa américaines,
Pago Pago

Summary

A brief account is given of the topography of the territory. The author points out that traditional conservation methods governing the use of reef resources have not been effectively replaced. An outline is given of current sources and effects of pollution, and of corrective action which is being undertaken.

* * *

Résumé

Après avoir fait une description succincte du territoire, l'auteur souligne que rien d'efficace n'est venu remplacer les méthodes traditionnelles d'utilisation des ressources récifales, qui en assureraient la conservation. Il donne un aperçu des sources et des effets de la pollution, ainsi que de l'action entreprise pour y remédier.

* * *

Background

The territory of American Samoa consists of five high islands and two atolls with a total land mass of approximately 76 square miles. This report will deal only with the four islands (Tutuila, Ofu, Olosega and Ta'u) and uninhabited Rose Atoll.

Tutuila, the largest island of the American Samoa group (18 miles x 6 miles), harbours 90% of the total population of 30,000. Settlements are restricted to the relatively few flat areas, with roughly 10,000 inhabitants clustered around Pago Pago Bay. Much of Tutuila remains in a fairly pristine state due to the inaccessibility of the central ridge system. However, population growth and industrial and agricultural development have resulted in environmental degradation in regions of dense population concentrations.

The topography of the Manu'a Islands (Ofu, Olosega and Ta'u) approximates that of Tutuila: steep central highlands with narrow coastal flat lands. The six villages of Manu'a are found along the coastal strands. Because of a relatively low population density and the absence of industry, the Manu'a group has generally escaped recent gross ecological changes. The introduction of electrical power in late 1971 will, however, provide a basis for industrial development.

Rose Atoll, four square miles in area, has been uninhabited for at least 70 years. Nevertheless, it has not been free from human manipulation. Coconut palms and several species of tropical fruits were planted periodically between 1900 and 1957. Fortunately, the reef and lagoon are untouched. The biological value of this isolated mini-atoll has finally been recognized, and Rose Atoll now occupies the status of a "scientific preserve".

Reefs and lagoons as sources of food

The Samoan people have historically relied upon reef and lagoon organisms as a substantial part of their diet. Numerous species of fish and shellfish were utilized as a source of protein, and the supply seemed inexhaustible. A 550% population growth in the past 70 years has, however, placed considerable pressure on reef resources. Traditional conservation practices have been discarded, but have not been replaced by modern management regulations. The only resource law now on the books prohibits the use of explosives and poisons in fish capturing. No size limits, bag limits or seasonal restrictions are in effect. The expected result is an impoverished marine fauna, in terms of both diversity and biomass. Degradation of the reef and lagoon environment, as a result of man's activities, will further debilitate the fauna.

Sources of degradation

1. Organic pollution: The effects of organic pollution are most readily apparent in Pago Pago Bay. Although 300,000 gallons of sewage receives primary treatment each day, the sewage treatment plant handles only a small portion of the wastes deposited into the bay. More than 60 raw sewage outfalls and polluted streams enter the static waters of the back bay. Untreated wastes from the two fish canneries are deposited at the rate of 400,000 gallons per day. Predictably, Pago Pago Bay has changed from a clear-water coral reef regime to a turbid, silty receptacle in the past twenty years. Turbidity increases noticeably several days after a heavy rainstorm, apparently caused by heavy plankton blooms resulting from organic nutrient influx from polluted streams. The increased use of agricultural fertilizers has accentuated this problem in recent years.

2. Oil pollution: Oil streaks often cover portions of Pago Pago Bay. Sources of oil pollution have been identified as: a) bilge residue from commercial vessels (primarily the longline fishing fleet); b) careless spillage at the fuel dock; and c) leakage from deteriorating underground fuel oil pipe lines.

3. Siltation: The frequent occurrence of heavy rainstorms in American Samoa removes the top soil from any surface devoid of vegetative cover. Increased agricultural usage of steep slopes and burgeoning construction projects (roads, housing sites) have resulted in erosion, with consequent deposition of silt in sheltered bays and on reef areas adjacent to stream outfalls.

4. Dredging: Dredging and blasting activities in at least 20 sites around Tutuila and the Manu'a group have resulted in direct destruction of the reef and the demise of corals due to siltation. A portion of this activity is justifiable as a means of supplying suitable access to isolated villages, but many of the dredging projects served only as a source of road-bed materials.

5. Inorganic rubbish: The impact of modern technology has its negative aspects. In recent years, reefs and lagoons adjacent to villages have proved to be convenient dumping grounds for non-biodegradable items such as tin cans, bottles and automobiles.

Effects of pollution

The debilitating effects of pollution are most obvious in the heavily-populated Pago Pago Bay region. High turbidity and siltation have resulted in the death of most corals in the inner half of the bay. Only the shallow reefs near the mouth of the bay, with a relatively high rate of water exchange, have remained viable. And a portion of that area has been destroyed by dredging. The obvious consequence has been a decreased production of favoured food organisms and the loss of a valuable aesthetic asset.

Extensive reef destruction has not been limited to Pago Pago Bay. Major dredging projects and increased agricultural and construction developments have silted over significant portions of Faga'itua Bay, Leone Bay and Pala Lagoon.

The Manu'a Islands, although free from extensive construction and agricultural usage, have suffered some reef destruction. Channels have been dredged at Ofu and Ta'u, and blasted at Olosega. Dynamiting for fish has also destroyed considerable reef areas in this island group.

Monuments to Man's thoughtlessness, in the form of accumulated inorganic rubbish, are found on reefs fronting many of the villages of Tutuila and the Manu'a Islands.

Corrective actions

The present administration of the Government of American Samoa is displaying an increasing awareness and responsibility for environmental problems. In April, 1971 an Environmental Quality Commission was established to restore and preserve the territory's natural environment. The Commission has been charged with the following functions:

1. Develop quality standards for domestic water supplies and waste discharges into territorial waters.

2. Draft such regulations and legislation as may be required to enforce such standards.

3. Draft appropriate regulations and legislation which will ensure that all construction and agricultural activities within the territory are conducted with due regard to soil conservation and watershed, shoreline and reef protection.

4. Create a public awareness and fuller understanding of the relationships between man's activities and his valuable natural environment.

With the help of several United States federal agencies, guidelines and procedures have been adopted which should significantly reduce sources of marine pollution. For example, proposed dredging activities are subjected to an arduous review by not less than six local and United States government agencies before a permit is issued. Further, discharges from industrial facilities must meet stringent quality standards in order to qualify for a regulatory permit.

Investigative programs, presently in the planning stage, will determine biological parameters of fish and shellfish populations, thus serving as a basis for management regulations.

American Samoa, like many of her South Pacific neighbours, is in a relatively favourable environmental position compared to more metropolitan regions. The territory's major developments have yet to take place, and while serious pollution and depletion problems do exist, these are largely correctable.

Library
Hawaii Institute of Marine Biology
University of Hawaii

SOUTH PACIFIC COMMISSION

Regional Symposium on Conservation of Nature

- Reefs and Lagoons

Proceedings and Papers

Held at Noumea, New Caledonia
at the Headquarters of the South Pacific Commission

5 to 14 August 1971

in collaboration with the

International Union for Conservation of Nature
and Natural Resources
(IUCN)

Published by the South Pacific Commission,
Noumea, New Caledonia. 1973

2-24-75 South Pacific Comm #6.65

SPREP

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PROE

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AP 2/15/2

With our compliments

28/5

Avec nos compliments

Dear George

1. Here is a copy of the French-Polynesian turtle regulations for your information.
2. I will see what I can do about getting applicators to the Marshalls - they didn't actually ask for any. Hopefully it's not too late.
3. They will be asked for a final report as a condition of getting the money.
4. Yes I have received your very helpful recommendations regarding the Japanese government.
5. As Suzie may already have told you, I doubt whether we will be able to hold a turtle meeting this year.

Kind regards

Adrienne Farago

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

PROGRAMME REGIONAL OCEANIE DE L'ENVIRONNEMENT

FISHERIES DIVISION
GOVERNMENT OF WESTERN SAMOA
PO BOX 1874 APIA, WESTERN SAMOA
12 SEPTEMBER 1989

Mr. George Balazs
National Marine Fisheries Service
2570 Dole St.
Honolulu, Hawaii
96822-2396
USA

Dear George,

Enclosed are some of the relevant papers from the recent SPREP meeting dealing with turtles. I had to leave a couple of days early, but we had finished up the proposed program and I believe it was to be submitted in the form as you see it. We also drafted a resolution to the meeting, and that may have gone through a revision or two but again I think it will say essentially what's here.

We were all sorry to have missed you. But Sylvia is right on top of things again, although she is about 8 months pregnant and is taking some time off soon. I mentioned (as you would have) that she seems to time her children for an important turtle meeting every 10 years which must mean something, although I can't figure out what it is...

In any case, I think she would be a very good candidate for the SSC Specialists' Group, and will write Keren to consider it. She still has good contacts in Papua New Guinea, and did an excellent job of providing the first draft of the project for us to work on. Others in the group that worked on the turtle program draft were Trevor Daly of Greenpeace Australia, Frank Antram of TRAFFIC (also Australia), Donna Kwen who is a grad student at James Cook University and who worked on Daru turtles, Christopher Dahl, the CCM Sea Grant extension agent from Pohnpei, Willie Aseqau from PNG's Conservation Dept., and Horace Nona from the Australia Fisheries Service who is a Torres Strait Islander and a keen one on traditional activities there. We had a hard time getting anyone from Fiji interested, as they were mostly interested in other working groups that dealt with terrestrial matters. Solomon Islands sat in on one or two of the early sessions.

As it stands now, Peter Thomas at SPREP seems to think that there is some funding already waiting in Australia for a comprehensive program. Greenpeace said they would be

interested in funding certain parts of it. It might be something that could get started later next year if things went well. The next Intergovernmental Meeting for SPREP to set their work program isn't until September of 1990, but some of the earlier consultancy work might be done before then. In all, it appeared that at least the SPREP Secretariat were optimistic about getting something started reasonably soon.

So, that's the story from Vanuatu. I should mention that Yoshio Kaneko from CITES in Japan was at the meeting for the latter part of it, and Bing Lucas from IUCN in Switzerland was present and played a fairly major role for the entire meeting. It appeared to me and others that Mr. Kaneko was primarily interested in seeing that there were no strong statements issued at the meeting regarding cessation of the turtle trade. This was queried discretely by Greenpeace and others, but I tried to explain what might be his situation and the sensitivities regarding a meeting such as this. In any case, it was our job to come up with a positive program for the region, not to issue platitudes about international trade which wouldn't have any effect or audience anyway. These kinds of institutional goings-on don't really interest me as you know, but I guess are central to getting attention to the problem and working on some solutions.

Sincerely,


Mike A. McCoy
Fisheries Adviser

DRAFT RESOLUTION

9/89

**SPREP REGIONAL MARINE TURTLE CONSERVATION
AND MANAGEMENT PROGRAMME**

The Fourth South Pacific Conference on Nature Conservation and Protected Areas.

recognizing that six of the seven species of marine turtles found in the world today are found in the South Pacific Region and that they are of cultural, economic and nutritional values for the coastal peoples of the region;

accepting that the long-term survival of migratory species such as marine turtles requires international and regional cooperative efforts;

concerned that marine turtles are threatened worldwide by variety of causes including commercial exploitation, habitat destruction, pollution, and incidental catches in fisheries;

noting that all species of marine turtles are currently listed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);

noting the recommendation (79) of the second Intergovernmental Meeting of the South Pacific Regional Environment Programme (SPREP) held in Noumea, New Caledonia in 1988 that a regional marine turtle management project be developed;

Having reviewed the draft regional marine turtle program prepared by the technical session of this conference;

This Conference:

adopts the regional marine turtle program for implementation within the framework of the South Pacific Regional Environment Programme;

requests that aid agencies provide funding and support for the implementation of the regional marine turtle program;

recommends that the next Intergovernmental meeting of the South Pacific Regional Environment Programme (SPREP) endorse the regional marine turtle program;

urges that the UNEP East Asian Seas Program note the regional marine turtle program developed by this conference with consideration given to the adoption of a similar program.

regulate

Wildlife personnel rescue and release 100 pound sea turtle

A mature female Hawksbill Sea Turtle (*Laumei Faiuga*) was saved from an uncertain fate and released back to the waters it calls home Friday morning. DMWR personnel were notified and confiscated the turtle in Pago Pago earlier Friday morning. Local biologists stated the marine mammal weighed about 100 pounds and measured 33 and half inches in length.

Preliminary reports from the Department of Marine and Wildlife Resources (DMWR) staff of biologists stated that "someone had picked up the turtle" on a road near Sailele and transported it to Pago Pago when the report was made to the department.

They speculated that the turtle may have come ashore to lay its eggs. "To our knowledge," said Tom Morrell, DMWR wildlife biologist, "no harm was done" to the turtle. He did acknowledge that the turtle risked dehydration, which occurs if the turtle is left out of the water for an extended length of time. The age of the turtle was estimated to be about 15 years old.

Shortly after the turtle was brought to the DMWR build-

ing in Fagatogo, the staff quickly prepared to escort the mammal to a point two miles out of the harbor where it was released.

The Fono, on May 25, 1990, enacted legislation adopting existing federal regulations forbidding any handling, capture, eating, harming or selling sea turtles themselves, their hatchlings or their eggs. These laws were adopted by the Legislature of America Samoa in order to preserve and protect sea turtles in the territory.

(All sea turtles are listed as "endangered" by the U.S. Fish and Wildlife Service (USFWS) and are protected by the federal government. Federal penalties for taking, capturing or harming any turtle or its eggs can mean a \$10,000 to \$20,000 fine and six months in prison.)

DMWR biologists tagged the Hawksbill before its release so as to keep some record of the turtle. "Very little is known about them," said Dr. Peter Craig, "and it is suspected that the sea turtles in the Pacific are rapidly declining."

He added, "Here in the territory, the sea turtles are far

less abundant than they were just a few years ago." These declines have been noted world-wide due to the over-harvest, destruction of natural habitat and incidental kills by fishing methods. "The USFWS lists sea turtles as endangered," said Craig, "because the turtles are in danger of extinction."

The tag was placed on the left front flipper of the animal as part of an on-going program which was begun years ago as an effort to understand more about these sea turtles. This way, the DMWR can collect more data on the distribution and abundance of sea turtles in the territory.

"We're extremely concerned," said Morrell, "that they're on their way out," citing weekly surveys carried out over a nine-month period in Swains Island where only eight sea turtle tracks were documented.

Earlier tagging operations showed strong evidence of sea turtles migrating over long distances. One turtle tagged in Pago Pago Samoa was discovered in Hawaii.

(Continued on page 8)

Today's paper includes a D section

PAGO PAGO,

AMERICAN SAMOA

MONDAY, JANUARY 21, 1991

50¢



Staff of the Department of Marine and Wildlife Resources return a confiscated Hawksbill Sea Turtle as they return it to sea. The department confiscated the animal early Friday morning, saving it from an uncertain fate. This species, as well as other sea turtles, are listed as "endangered" and are protected by federal regulations.

* TURTLE

from page one

Many other Pacific island governments are ahead of American Samoa in developing and implementing protection and conservation programs for sea turtles. Hawaii has a program underway in an attempt to protect sea turtles in order to raise their numbers. Fiji recently enacted a ban on all exports of turtle shells, especially to markets in Japan.

The South Pacific Commission is also putting together a recovery plan for sea turtles in the Western

SEA TURTLE SURVEY

"We want the people to realize that the turtle is an important resource," Craig stressed, warning, "and it is headed for extinction."

At present, the DMWR is conducting a sea turtle information survey. The survey is being spearheaded by assistant wildlife biologist Natasha Bartley and wildlife technician Kiso So'oto.

The two are interviewing knowledgeable residents in coastal villages of Tutuila and Manu'a about what they have observed of the turtles both past and present. This information will also help the department in learning more about such marine turtles.

Although the survey is a month old, some shocking statistics have begun to arise.

So far, there has been six confirmed kills of sea turtles in

the territory, and the DMWR suspects that they were eaten. Also, the department has reported three sightings of persons raiding the turtle nests on the beaches and taking all the eggs.

"People should understand that taking the eggs will only hurt the village in the future," said Craig.

He elaborated that turtles instinctively return to the beaches where they were hatched to lay their eggs, just as salmon return to spawn. When enough eggs are taken, then the number of turtles which grow to maturity swiftly declines, thus a village lessens the worth of its beaches as a haven for turtles which have been a strong part of Samoan tradition and culture.

"The prospect of extinction is not wholly a cultural issue," said Morrel. "It's a biological one."

He added, "The turtle is faced with extinction. If we don't take action now, the turtle may be lost."

"We have to educate the people that there is definitely a real problem here," was another comment made by a biologist. But, Mrs. Bartley, a local, made a statement that struck closer to home.

She said, "The turtles are a part of our culture and if we don't protect and conserve that part of the culture, then it will die. When that part of our culture dies it will be lost to our families forever..."

The department urges anyone with information concerning sea turtles to contact their office at 633-4456.

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

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FAX MESSAGE

FAX No.: (692) 95447 or 96960 No. of pages: one (including this one)
 To: DANNY WASE, DIRECTOR, MIMRA
 From: Adrienne Farago, Project Officer Biodiversity Conservation, SPREP
 Date: 21/4/92 File: AP 2/15/2
 X4:11:00.E:043
 Subject: RMI Turtle Tagging Proposal

Message:

Dear Mr Wase

My name is Adrienne Farago and I have been recently appointed to the South Pacific Regional Environment Programme as their Project Officer (Biological Diversity Conservation). I replace Peter Thomas, who was then known as the Protected Areas Management Officer.

I am writing in response to your fax dated 17 March, about your proposal for turtle tagging in the Marshall Islands.

SPREP's Regional Marine Turtle Conservation Programme has been managed by Paul Holthus since Peter Thomas left last year. Now that I have commenced duties I will probably be taking over management of the Programme from Paul.

As you may know, SPREP has recently moved from Noumea to Apia, and our files were in transit for a few weeks. In addition, Paul has been on duty travel for a few weeks, and I have been unable to discuss the Programme with him. He has just returned to Apia. In the meantime I have sent your proposal to George Balazs for comment, and will contact you again as soon as I hear from him.

I apologise for the delay in responding to your query.

Yours sincerely

Adrienne Farago

ADRIENNE FARAGO

Project Officer (Biological Diversity Conservation)

RETRANSMITTED
 By
 George Balazs
 from Honolulu

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

PROGRAMME REGIONAL OCEANIE DE L'ENVIRONNEMENT

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ADRIENNE FARAGO

Project Officer (Biological Diversity Conservation)

*RETRANSMITTED
By
George Balazs
from Honolulu*

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B.11 -
 553-3778
 567-6696 (work)

FAX MESSAGE

FAX No.: **Hawaii-1(808)943-1290**

No. of pages: **...five.....** (including this one)

To: **George Balazs Nat.: Marine Fisheries Service**

From: **Adrienne Farago, SPREP**

Date: **21/4/92**

File: **...AP.2/15/2.....
 X4.11.00.E.043**

Subject: **MARSHALL ISLANDS TURTLE PROPOSAL**

Message:

Dear George

My name is Adrienne Farago and I have been recently appointed to the South Pacific Regional Environment Programme as their Project Officer (Biological Diversity Conservation). I replace Peter Thomas, who was then the Protected Areas Management Officer.

SPREP's Regional Marine Turtle Conservation Programme has been managed by Paul Holthus since Peter Thomas left last year. Now that I have commenced duties I will probably be taking over management of the Programme from Paul.

As well as contacting you in order to introduce myself, I am also writing specifically in response to a proposal from the Marshall Islands Marine Resources Authority for a marine turtle tagging and monitoring project (attached - 3 pages).

Would you be able to comment on the proposal please and tell me if it is sound and worth funding? From what I can gather from Peter Thomas' notes, it seems as if you discussed it at your turtle meeting last year, but there is no record of the resolution, except for a cryptic comment that suggests that you might have discussed sharing the cost of the vessel charter - which at \$14,000 seems a little excessive, especially as the boat belongs to the Marshalls.

In addition, I wonder if you could do me one more favour - we have been finding it almost impossible to send faxes to Micronesia from here, and I have not been able to contact Danny Wase to let him know what is going on. Would you be kind enough to retransmit the attached fax (1 page) to Danny?

Thank you very much - no doubt we will be in contact again on many turtle-related matters. I look forward to receiving the go-ahead for the project (and other comments), and to meeting you in the not-too-distant future.

yours sincerely

A. Farago

Adrienne Farago

Project Officer (Biological Diversity Conservation)

T R A N S M I T T A L S H E E T



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
 Southwest Fisheries Center Honolulu Laboratory
 2570 Dole St. • Honolulu, Hawaii 96822-2396

Commercial: (808) 943-1221
 Telefax: (808) 943-1290

TO: SPREP
 REGIONAL MARINE TURTLE CONSERVATION PROGRAMME

TELEFAX FOR: PAUL HOLTHUS/ADRIENNE PARAGO DATE: 4 June 1992

FROM: GEORGE BALAZS *[Signature]* TELEPHONE EXT: 808-943-1240

NUMBER OF SHEETS TRANSMITTED (including this page) 5

MESSAGE:

DEAR PAUL AND ADRIENNE: THE ACCOMPANYING MEMOS FROM RAY CLARKE PROVIDE AN EXCELLENT APPRAISAL OF THE CHARTER VESSEL BEING CONSIDERED FOR THE PENDING MARSHALL ISLANDS TURTLE PROJECT BEING REVIEWED FOR SPREP FUNDING. I HAVE HAD LENGTHY DISCUSSIONS WITH RAY SINCE HIS RETURN FROM MAJURO. I FULLY AGREE WITH RAY'S RECOMMENDATION, i.e., THE VESSEL IS IDEAL FOR THE TASK, THE PRICE IS VERY FAIR, AND THE OWNER (CHARLES DOMINICK) IS CAPABLE AND COMMITTED TO THE PROJECT. I HAVE ALSO SPOKEN WITH MR. BILL PULELOA AND HE IS IN STRONG AGREEMENT WITH THIS CONCLUSION.

I PRESUME THAT SOME SUBSTANTIAL LEVEL OF FUNDING WILL BE FORTHCOMING FROM SPREP. I RECOMMEND THAT THE MARSHALL ISLANDS' GOVERNMENT BE NOTIFIED JUST AS SOON AS POSSIBLE AS TO WHAT LEVEL OF FUNDING WILL BE MADE AVAILABLE. QUICK ACTION NEEDS TO BE TAKEN IN THE NEAR FUTURE IF THIS PROJECT IS TO TAKE PLACE ON SCHEDULE. IT SHOULD BE REITERATED BY SPREP THAT A FINAL WRITTEN REPORT WILL BE EXPECTED, INCLUDING ALL TAGGING DATA, WITHIN A REASONABLE TIME AFTER THE PROJECT ENDS. PLEASE ALSO KEEP IN MIND THAT I NOW HAVE 1000 TAGS IN MY OFFICE THAT CAN BE USED IN THE MARSHALL ISLANDS (ALL TURTLES TO BE DOUBLE TAGGED), HOWEVER THERE WERE NO APPLICATORS IN THE PACKAGE. PLEASE SEND ME AT LEAST 4 (5 PREFERRED) AT YOUR CONVENIENCE.

PLEASE FEEL FREE TO TELEPHONE ME (OR FAX ADDITIONAL QUESTIONS) IF NEEDED. I SPOKE BRIEFLY WITH SUZIE GEERMANS BY TELEPHONE BEFORE SHE LEFT FOR PALAU. I AGREE WITH HER THAT IT WOULD BE BEST TO HOLD OUR ANNUAL MEETING IN AUGUST OR SEPTEMBER. I AM SURE SHE WILL DO WHATEVER IS NEEDED TO PULL SUCH A MEETING TOGETHER.

CC COL LIMPUS

BEST REGARDS,

[Signature]





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Area Office - Southwest Region
2570 Dole St. Honolulu, HI 96822-2396
PH: (808)955-8831 FAX: (808)949-7400

F/SW013:RPC

MEMORANDUM FOR: F/SWC2 - George Balazs
FROM: F/SW013 - Raymond Clarke
SUBJECT: Review of planned charter vessel for RMI
SPREP Sea Turtle Tagging Project.

Attached are excerpts from my trip notes pertaining to activities investigating the sea worthiness of the planned charter vessel for the RMI turtle tagging project and contacts as requested by Mr. Holthus and Mr. Pueloa. Please pass them along to Mr. Holthus and Pueloa. If I can be of any further assistance feel free to contact me.

w/ attach.



(R. Clarke 06\01\92)

Notes from my trip report:

Wednesday, May 20:

1530 Met with Mr. Capital Bani, MIMRA staff, to discuss particulars on the SPREP funded turtle tagging project. Bani was aware of the planned project but had not made any specific plans as yet. I queried him as to the availability of a skiff that could be used to move around the lagoon at Bikar. Bani indicated MIMRA had a 16' Yamaha skiff available, but it weighed between 5-600 lbs. If this skiff is to be used the chartered vessel will have to possess a crane of sufficient capacity to load and unload a 600 lb. skiff. Bani also indicated MIMRA has a relatively new 25 hp. Yamaha out board engine available for the skiff.

1630 Met with Mr. Charles Dominick, local contractor and owner of a 55' vessel tentatively planned to be used on the SPREP turtle project, planned for later this summer. (Paul Holthus requested I survey the vessel and give him an opinion as to it's sea worthiness and value (priced at \$1000/day)).

I was given a complete tour of the vessel and it appeared in relatively good working order. The engine room appeared clean, as did the galley and sleeping quarters. There is a winch on the port side of the after deck, reportedly of 2,000 lb. capacity, and room on the back deck to store an 18' skiff. The vessel has a large main hold and reportedly has a 10,000 gallon fuel capacity. There is no fresh water making capabilities aboard however, fresh water can be brought in bladders or drums and stored in the hold. There are bunks for 5 below and 2 above deck.

In the wheel house there are ample electronics, HF and VHF radios (only one each though), a portable GPS system, and a depth finder, all relatively new and in working order. There is a furuno radar, (12 and 24 miles) which appeared to be relatively new but it was not functioning (reportedly due only to the lack of the appropriate fuse). The vessel has an old 13' Boston Whaler and a 30 hp Eveinrude outboard. The aft end of the vessel is covered with an awning and there is a steering station above the wheelhouse that has enough space to store some gear.

In terms of safety equipment; I was told there were ample life preservers but no EPIRB was visible. I did not check the first aid equipment available.

Mr. Dominick indicated that if this vessel was felt to be insufficient, he was in the process of purchasing a 110' utility vessel from the Gulf coast. The vessel was not expected to be in Majuro until mid-july. He felt the 55' vessel should be sufficient and that the larger vessel would have to anchor outside the lagoon at Bikar, while the smaller vessel (the 55' vessel) could anchor right in the lagoon. He recommended the smaller vessel for the

project.

Recommendation - R. Clarke

Overall the vessel appears adequate for the work as described.

There are a few items I would recommend: make sure there is a functioning EPIRB on board, a spare HF radio should be brought out, the radar is functioning and first aid supplies are available.

Overall the vessel should be adequate for the job, as described by Pueloa and Holthus. The price seems fair also.

On the use of a Peace Corp Volunteer: I spoke with Kee Kee Minor, PC Coordinator about the use of a volunteer for the project. She is supportive and said there may be the possibility of getting a PC named David Minert to assist with the project but it would have to be approved by the Ministry of Education (because they have the 'rights' to all the PC in the RMI).

I discussed this with Cathy Relang who is an advisor to the Secretary of Education and she seemed resistant to the idea. She wants to send a Marshallese on the trip instead. She questioned me why it had to be a PC ? and I said no reasons were given.-- I do not want to get any further involved in this. (If the use of a PC is planned the first step will be to have Bill P. give C. Relang a call. Bill P. knows her by her maiden name C. Oliverio let them work it out.)



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Area Office - Southwest Region
2570 Dole St. Honolulu, HI 96822-2396
PH: (808)955-8831 FAX: (808)949-7400

June 3, 1992 F/SW011:RPC

Ms. Rita Escher
Chancellor
College of the Marshall Islands
Majuro
Republic of the Marshall Islands
96960

Dear Ms. Escher:

The South Pacific Regional Environmental Programme (SPREP), in conjunction with the Marshall Islands Marine Resource Authority (MIMRA), is planning to conduct a sea turtle tagging project at Bikar Atoll for two weeks in July 1992. A team of biologists will travel by chartered vessel from Majuro to Bikar aboard a 55 foot chartered vessel. The charter vessel has the ability to safely anchor inside the atoll, however, a small boat is needed to move around to the various turtle nesting sites once anchored. Would it be possible to use the 18 foot fiberglass boat and outboard engine provided to the College of the Marshalls by the Pacific Island Network (PIN) for this purpose? The turtle SPREP/MIMRA project's need for the boat fits well with the original intention of providing the boat to the COM in the first place; i.e., that it be made available for projects enhancing COM marine research capabilities and assistance in research projects. We apologize for the relatively short notice of this request. If the boat and engine are not available please inform us at the earliest possible convenience, so that alternative plans can be made. Thank you in advance for your cooperation on this request.

Sincerely,

Raymond P. Clarke
Republic of the Marshall Islands
PIN agent

cc: B. Miller, UHSG
S. Ware, OA DAS



MARSHALL ISLANDS MARINE RESOURCES AUTHORITY

BIKAR ATOLL TURTLE RESEARCH PROJECT

1. Introduction

1.1 Of the 29 atolls and 5 low islands comprising the Marshall Islands, Bikar atoll has been identified as one of the major marine turtle nesting sites in the central Pacific. The atoll is a full day's voyage from its closest inhabited neighbor, Utirik atoll, and is located at approximately 12 deg. N., 170 deg. E., or about 400 miles from Majuro, the capital of the Marshall Islands. A single narrow and shallow pass allows only small draft boats to pass into the lagoon.

1.2 Prior to the advent of mechanized vessels, Bikar was not often visited. Voyages undertaken to capture turtles and collect eggs were limited by weather and the traditional craft employed. More recently however, this remote atoll (and others like it) have been called upon more often as travel between islands becomes easier and more frequent. Today it is not uncommon to hear of three or four trips per year to Bikar in order to procure turtle meat and eggs. Foreign fishing vessels in adjacent waters have also been known to illegally visit the atoll to supplement their provisions.

1.3 The 1988 SPREP report on "The Northern Marshall Islands Natural Diversity and Protected Areas Survey" concludes that

"the quality of habitat on Bikar, together with the isolation of the atoll and the lack of human interference, combine to make the atoll an outstanding green turtle nesting area of national (and possible international) significance."

The report strongly recommends further research into the status and distribution of green turtles in the Marshall Islands, as well as specific conservation recommendations to be based at least partially on the results of such research.

2. Project Objectives

2.1 The project will gather initial data on the numbers of turtles nesting at the above-named sites, and tag as many turtles as possible with regionally-recognized tags.

2.2 The project will provide tagging and data collection experience for the staff of the Marshall Islands Marine Resources Authority under the direction of an experienced and competent team leader.

2.3 The project will, at least for a short time, establish a physical presence at the atoll to discourage the illegal entry of foreign fishing vessels into the area.

2.4 The project will heighten awareness of turtle conservation within the community and hopefully lead to ongoing data collection and a continuation of conservation education and this type of project in the future.

3. Project Description

3.1 A suitable vessel will be employed to take a team of three technicians and one team leader to Bikar atoll during the early summer of 1992. It is planned to utilize the LO MOR, a new 25 meter patrol boat being provided to the Marshall Islands by Australia for fisheries and conservation surveillance. Depending upon weather and the patrol boat's schedule, the team will spend from 7 to 10 days at Bikar. Stops will also be made at Erikub atoll and Jemo island to survey nesting activity and tag nesting turtles at those two sites.

3.2 While on each island, the team's main emphasis will be the collection of data and tagging of nesting female green turtles at Bikar atoll during what is hoped will be the height of the nesting season in the summer of 1992.

3.3 Large signs in several Asian and European languages will be erected at each of the locations describing the prohibitions against landing or taking of marine and terrestrial fauna.

3.4 If hatchlings are present, a small number will be returned to Majuro for raising at various schools in cooperation with science and conservation classes to promote awareness of turtle conservation. An attempt will be made to release these reared hatchlings at their island of origin when the patrol boat makes a subsequent voyage there.

3.5 To help ensure the success of this project, particularly the on-site training of local personnel, the government of the Republic of the Marshall Islands has sought the aid of the Division of Aquatic Resources, Department of Land and Natural Resources of the State of Hawaii. Employees in this agency have been actively engaged in a similar turtle tagging project in Hawaii for the past decade and have developed and refined a viable measuring and tagging procedure which will assist in this study. The team leader from Hawaii identified to work with this

project has previously worked in the Marshall Islands and is familiar with the local customs, language and government protocol.

4. Budget

<u>Item</u>	<u>Estimated Cost</u>
Vessel charter 14 days @ \$1,000/day	\$14,000
Supplies during tagging	1,500
Hatchling grow-out materials for schools	1,500
Airfare and DSA for Hawaii DLNR/DAR constituant/team leader	4,000
Total	\$21,000

COPY

April 28, 1992

Adrienne Farago
Project Officer
Biological Diversity Conservation
South Pacific Regional Environment Programme
P.O. Box 240
Apia, Western Samoa

Dear Sir,

My name is Bill Puieloa and I have been identified as the turtle tagging consultant for the upcoming Marshall Islands tagging project for this summer.

Very recently I was contacted by Mr. George Balazs to confirm my participation in the project. Additionally, the subject of the charter vessel for the project was raised and discussed. It is our understanding that the current proposal submitted by the Marshall Islands lists the use of their own government patrol boat at a project cost of US\$14,000. However, this may have been an inadvertent change from the original plans to hire a private vessel to accomplish the task. Mr. Balazs and I both agree that utilizing a non-government boat at least for the inauguration of the project would be in the best interest for all concerned. The reasons are as follows:

1. chartering a private vessel will allow us more control over the project as well as providing more latitude; a vessel under exclusive contract would allow us to dictate a specific itinerary thus ensuring adherence to project objectives;
2. a government vessel may be diverted at any moment for a myriad of reasons thus stranding researchers on remote and inhospitable sites for an indeterminate period of time; similar circumstances in the past have been known to quickly deteriorate into life threatening situations;

3. it is our understanding that the patrol boat was a endowment from the government of Australia with a directive to conduct only maritime surveillances; any deviation from this mandate may be considered a violation of a bilateral agreement; furthermore as Australia is a major contributor, it would seem that any project insensitive to her interests might cause Australia to be a less supportive of future SPREP projects.

My own suggestion is that SPREP advocate the charter and use of a privately owned vessel for the inauguration of this project as originally intended. This would enhance the accomplishment of project objectives as well as ensure maximum logistic support to researchers. Once the project is properly established and ongoing, variations from a set agenda will be less critical and the use of government vessels may be tolerable at that time. Until then, the charter of a privately owned vessel at a project cost US\$14,000.00 should be endorsed. The prospective platform has been identified and is currently docked in Majuro. It has been recently completely refurbished and is of ample size and tonnage to ensure the accomplishment of project goals within the projected time frame. Successful sea trials have been completed and the vessel is ready to go. My own participation in this project will to a large degree depend of the choice of the support vessel and the resolution of the conditions listed above, particularly 1 and 2.

Trusting that I have been of some assistance, I will remain

Sincerely,



Bill Puleloa, Biologist
Division of Aquatic Resources
P.O. Box 248
Kualapuu, Molokai, Hawaiian Islands 96757

telephone: (808) 553-3778

Fax: (808) 567-9014

cc: GB

TRANSMITTAL SHEET



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

Commercial: (808) 943-1221
Telefax: (808) 943-1290



SPREP -

TELEFAX FOR: ADRIENNE FARAGO DATE: 29 APRIL 92FROM: GEORGE BALAZS TELEPHONE EXT: 808-943-1240NUMBER OF SHEETS TRANSMITTED (including this page) 3

MESSAGE:

Dear Adrienne -

Many thanks for your FAX of 21 April. I responded to you by letter, but it probably has not reached you yet.

I resent the FAX to Danny Wase the same day I received it from you.

The accompanying letter from Bill Rubloa has my full support. In addition, the SPREP turtle meeting in August 1991 endorsed the Marshall Islands proposal. It is a solid project to fund. The

research at Bikar should take place in July, if possible. That should be the peak of the turtle nesting season.

I look forward to meeting you in person. Best wishes,

George Balazs



copy to
SUZIE



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

31 March 1992

Mr. Paul Holthus
SPREP

Dear Paul:

TO: ADRIENNE FAARU
5/5/92

I'm not exactly sure where to write to you, so thought I would take my chances that you are still in Noumea. Please let me know if everything should now be sent to Apia. Also, is a fax there now operational?

Limpus and I spent March 14-16 in Nagoya attending another meeting on the biology of the hawksbill and continuing interests by the bekko business in Japan to hunt this species. This was the third such meeting we've gone to in the past 4½ years. They pay all expenses, of course, and we continue to tell them there is no future in the hawksbill business and that they should diversify into something other than endangered species. They would rather not listen to that advice, however. Their latest focus is on "sustained use" of hawksbills in Cuba, using a population dynamics model developed by Takeyuki Doi and Rene Marquez. In Nagoya we (20 sea turtle persons) spent 3 days challenging the various flimsy biological assumptions used in the Doi/Markquez harvesting model. I'm not all that certain just how much of an impression we made. For example, several times during the meeting it was stated that "research of hawksbills" by Doi, Marquez, and other bekko interests would soon start in the SOLOMON ISLANDS. We had no success ascertaining the what where and when of this research. However, both Col and I stressed the point that the SPREP program was THE regional marine turtle program of the area, and that any 'research' sponsored by bekko industry, or Japanese government (MITI) really ought to (read= must) coordinate with SPREP headquarters. Again, it's unclear how much of a real impression we made on them. Consequently, Col and I strongly advise that a letter be sent by Vili stating briefly the scope, nature and prominence of the SPREP turtle program to the region (which includes Solomons), and that we invite Japanese researchers and their affiliates to please inform SPREP what they would like to do so that full coordination and appropriate cooperation can be undertaken. The letter should be sent to three individuals. 1) Mr. Naoyuki Mizoguchi, Managing Director Japan Bekko Association, Sumitomoseimei Bldg, 7F, 7-1 Manzai-machi Nagasaki-City, 850 Japan; 2) Mr. Satoshi Oguri, Vice Chairman of bekko Division, Japan general Merchandise Importers Assoc., Room no. 0407 World Trade Center Bldg, 4-1 2-chome, Hamamatsucho, minato-ku, Tokyo 105, Japan; and 3) the same person and address with MITI that we sent the SPREP resolution regarding the reduction of bekko imported from the SPREP region. I believe it would be very important to cc the same letter to one another among those three individual. It's important for each one to know that the others have also been written to by the head of SPREP.

-OVER-



The cancellation of the Rainbow Warrior for the southern Palau trip was a real disappointment. I only learned about that 3 weeks ago. I'm not at all certain I want to make that trip on a 55' dive boat with 15 people aboard. I'm in a "hold" mode right now, waiting to hear more details from Jim. If I decide not to go, I would recommend that Suzie take my place. Although from a safety standpoint I don't know if I'm doing her any favor at all!

Let me hear from you when your time permits. Ray Clark has given me a few shreds of information, but nothing fully reliable.

Best regards,


George Balazs

cc P. Limpus

SUZIE - DID COL EVER GIVE
YOU A COPY OF THIS LETTER?

~~cc P. Limpus~~
APPENDUM only sent to Suzie -

Thanks also for the memo regarding Palau
because of the change in field staff
I realize I will not be able to go
Ph well, maybe next time!
(at told me)

The cancellation of the Rainbow Warrior for the southern Palau trip was a real disappointment. I only learned about that 3 weeks ago. I'm not at all certain I want to make that trip on a 55' dive boat with 15 people aboard. I'm in a "hold" mode right now, waiting to hear more details from Jim. If I decide not to go, I would recommend that Suzie take ~~my~~ place. Although from a safety standpoint I don't know if I'm doing her any favor at all!

Let me hear from you when your time permits. Ray Clark has given me a few shreds of information, but nothing fully reliable.

Best regards,


George Balazs

cc C. Limpus

↑
SUZIE - DID COL EVER GIVE
YOU A COPY OF THIS LETTER?

~~cc C. Limpus~~
ADDENDUM only sent to Suzie -



~~COPY TO SIZE~~

U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Science Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396
(808)943-1221 • Fax: (808)943-1290

5 MAY 92

TO: ADRIENNE FARAGO
SPREP, APIA

3 PAGES

FROM: GEORGE BALAZS
FAX 808-943-1290

DEAR ADRIENNE:

HERE IS A LETTER I SENT
TO PAUL HOLTUS SEVERAL WEEKS
AGO. I AM RESENDING TO YOU
BECAUSE IT CONTAINS SOME HELPFUL
INFORMATION AND RECOMMENDATIONS.

I TRUST THAT YOU RECEIVED
MY EARLIER FAX AND CORRESPONDENCE
REGARDING THE IMPORTANT TURTLE
WORK TO BE DONE IN THE MARSHALLS.

BEST REGARDS,

Py Balazs



SPREP

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

PO BOX 240
APIA, WESTERN SAMOA
AP 2/15/2
TELEPHONE: (685) 21929
FAX: (685) 20231
5 June 1992



PROE

copy to Balazs

PROGRAMME REGIONAL OCEANIEEN DE L'ENVIRONNEMENT

PO BOX 240
APIA, WESTERN SAMOA
TELEPHONE: (685) 21929
FAX: (685) 20231

Mr Hikaru Matsunaga
Minister
Ministry of International Trade and Industry
Japanese Government
3-1 Kasumigaseki 1-Chrome
Chiyoda-ku
TOKYO
100 Japan

4 identical letters
(see c.c.'s)

SPREP Regional Marine Turtle Conservation Programme

Dear Mr. Matsunaga

I am writing to advise you about the South Pacific Regional Environment Programme's (SPREP) Regional Marine Turtle Conservation Programme. As you probably already know, SPREP operates on behalf of twenty-two Pacific Island governments and administrations to protect the environment and improve resource management in the Pacific. It is recognised regionally and world-wide as the environmental programme for the South Pacific countries.

Recognising the highly migratory behaviour of marine turtles and the cultural and subsistence importance of these animals to the people of the countries of the South Pacific, and recognising that the conservation and management of marine turtles require both national initiatives and regional and international co-operation, a recommendation was passed at an Intergovernmental Meeting in 1988 that a regional marine turtles programme be created.

Since then a formal Regional Marine Turtle Conservation Programme has been approved and funded, primarily with the assistance of the Canadian, Australian and American governments and/or institutions. The programme covers all of the island countries and territories of the South Pacific region.

The Programme undertakes activities in a growing number of countries. At this stage these include the Solomon Islands, the Federated States of Micronesia, Fiji, Palau, Papua New Guinea, Vanuatu and now the Marshall Islands. The programme incorporates conservation work (eg protection of nesting areas); population census, tagging and monitoring; the creation of a regional database; public education (eg posters, T-shirts, school education); staff training; research; and legislation and regulation review.

The Programme has a very high profile within the region and is strongly supported by the member governments as the marine turtle programme for the Pacific.

I am interested to learn that the Japanese government and other organisations are also sponsoring activity related to turtles in the Pacific, for example in the Solomon islands. I believe it would be extremely productive for all our activities for you to integrate your expertise and activities into the South Pacific Regional Marine Turtle Conservation Programme. I would therefore like to invite any Japanese researchers and their affiliates to please advise me of what activities are being proposed; so that full co-ordination and co-operation can take place, activities are not duplicated, and the Pacific countries are not inconvenienced by overlapping and unco-ordinated activities. I would also be happy to answer any queries you may have on the Regional Marine Turtle Conservation Programme.

I look forward to hearing from you soon.

Thanking you in advance

Yours sincerely,

(signed 8/6)

Don Stewart
Acting Director

cc Mr. Naoyuki Mizoguchi
Managing Director, Japan Bekko Association
Sumitomoseimei Bldg, 7F
7-1 Manzai-machi
Nagasaki-City
850 JAPAN

cc Mr Satoshi Oguri
Vice Chairman Bekko Division
Japan General Merchandise Importers Assoc.
Room No 0407
World Trade Centre Bldg
4-1 2-chome
Hamamatsucho
Minato-ku
Tokyo 105 Japan

cc Mr Iwao Hara
Chairman
Japanese Tortoise-shell Federation
4-23, Sake-Machi
NAGASAKI CITY
850 Japan

AF/af

PO BOX 260
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231



PO BOX 260
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231

FAX MESSAGE

FAXED ON

9 JUN 1992

SPREP

FAX No.: MARSHALLS(692)95447/96960/3685 No. of pages: ^{one} (including this one)
 To: Mr Danny Wase or Mr Capital Bank MIMRA
 From: Adrienne Farago: Project Officer (Biological Diversity Conservation)
 Date: 9 June 1992 AP 2/15/2
 Subject: RMI Turtle Tagging Proposal Budget: XB102-AC02AA

Message:

Dear Mr. Wase

I am writing in response to your request for funds for your turtle tagging proposal at Bikar atoll. I apologise for the delay in replying.

Your proposal is very much supported both by SPREP and by the turtle 'experts' SPREP regularly consults for advice, and we would very much like to see it go ahead.

There is only one problem, and that is the cost of the 14 days of vessel charter. Unfortunately there is simply insufficient money in the Regional Marine Turtle Conservation Programme to provide such a large amount to one country for one tagging exercise.

I gather from notes left behind by Peter Thomas that this was discussed at last year's Regional Marine Turtle Conservation Workshop, and that a compromise whereby the cost of the vessel would be shared between SPREP and Marshall Islands was proposed. Would this be acceptable to you? This means that we would provide in total \$14,000 instead of the \$21,000 you requested.

In addition, could you please itemise in more detail the \$4,000 requested for airfares and DSA.

I will be happy to request transfer of the money to you as soon as you advise that the lesser amount is acceptable, and the more detailed costings are provided.

Yours sincerely

Adrienne Farago

ADRIENNE FARAGO

Project Officer (Biological Diversity Conservation)

cc George Balazs fax no (1 808) 943 1290

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

PO BOX 240
ATA, WESTERN SAMOA
TELEPHONE: (685) 23929
FAX: (685) 20231



PROGRAMME REGIONAL OCEANIQUE DE L'ENVIRONNEMENT

PO BOX 240
ATA, WESTERN SAMOA
TELEPHONE: (685) 23929
FAX: (685) 20231

FAX MESSAGE

USA 1(808)9431290
 FAX No.: AUST(617)277676 No. of pages: three (including this one)
 To: Suzie Geermans, Colin Limpes, George Balazs
 From: Adrienne Farago SPREP
 Date: 10 June 1992 Budget: AP 2/15/2
 File: KB102 AC92AA
 Subject: Turtle matters

Message:
Dear Suzie, Col and George

- Paul and I thought it might be a good idea to get in formal contact with all the turtle countries, to try and get a handle on up-and-coming projects so that I can plan both for budgets - (SPREP is doing its now), and also getting tags done. Attached is a draft for your comment. Is there anything else that needs to be said? Does it need to go to anyone else?
- Do any of you have a list of the participants to last year's Turtle Workshop? Peter Thomas left me the draft of a Workshop Report to finish off, but there is no list of participants.
- ANPWS have suggested as part of their formal input to the forthcoming IGM that the RMTCP be continued and that Suzie be retained for a longer term contract (2-3 years). (Sorry to be talking about you like this in public Suzie - I hope you don't mind). Could I get some advice and suggestions about a longer term work programme for such a longer term contract? Could you also advise me on the future of the database? When will it be ready to move to SPREP and just be maintained in a low-key fashion? I suspect that the database alone will not be enough work for 2-3 years. Comments? Suggestions?

Thank you very much for your help.

Adrienne Farago

ADRIENNE FARAGO

Project Officer (Biological Diversity Conservation)

PS Colin I hope I have the right fax number for you - is the same as Suzie. If not, Suzie could you please pass this fax on and let me know what the correct one is?

REGIONAL MARINE TURTLES CONSERVATION PROGRAMME

Dear

My name is Adrienne Farago and I have been recently appointed as SPREP's Project Officer (Biological Diversity Conservation). I am taking over most of the tasks that used to be administered by Peter Thomas (then Protected Areas Management Officer), some of which Paul Holthus has been looking after since Peter left.

One of my projects is now the Regional Marine Turtles Conservation Programme, and the purpose of this letter is to catch up on a number of matters with all the countries involved in the Turtle Programme.

1. As you know, part of the Letter of Understanding accompanying all financial assistance given to in-country turtle projects is the requirement that:

a copy of all turtle tagging forms be returned to SPREP. Please ensure that the originals of these forms remain with you.

a financial report on expenditure of all money be given to SPREP within six weeks.

Unfortunately if these requirements haven't been fulfilled it will be very difficult for SPREP to justify to donors giving countries more money for the next phase of in-country turtle monitoring projects.

2. I would now like to receive proposals for the next phase of your country's turtle projects. (Some countries have already provided these). The proposals should contain:

a short status report of where the whole project stands

a list of how many turtle tags remain with you including their numbers, and how many applications

proposals for the next twelve months or so including a timetable

budget requirements (this doesn't have to be detailed at this stage, although a detailed breakdown will be required before the money is transferred)

an estimate of the number of tags required.

All proposals will be sent to the Technical Advisory Group for comment, and together with the excellent work being done by all the countries participating, this will help to ensure that the previous high quality of projects continues.

3. In accordance with the agreement at the Second Meeting and Workshop of the RMTCP in 1991, I expect to be able to organise the Third Workshop in early 1993.

In summary:

1. Please send turtle tagging forms and financial reports to me immediately if you have not already done so.

2. Please send proposals for the next year or so if you have not already done so.

Thank you for your participation in this project, which I believe is one of the most successful currently-being co-ordinated by SPREP. I look forward to meeting most of you soon.

Yours sincerely

ADRIENNE FARAGO
Project Officer (Biological-Diversity Conservation)

FORM LETTER TO ALL TURTLE COUNTRIES

Fiji	Swami Krishna (Fisheries)/Tim Adams
FSM (Pohnpei was participant at 1990 workshop)	
Yap	Steven Kolinski Peace Corps
Marshalls	Danny Wase
New Caledonia	Jean Louis d'Auzon(cc SPREP Focal Point)
Palau	Demei Otobed/Noah Idechon
PNG	Willie Asigau/Molean Chapau
Solomons	Henry Isa/Sylvester Diake
Tahiti	Philippe Siu (EVAAM) ccSPREP Focal Point
Tokelau	SPREP Focal Point
Vanuatu	Ernest Bani/David Esrom
Western Samoa	SPREP Focal Point

George Balazs, Colin Limpes and Suzie Geermans

TRANSMITTAL SHEET



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
 Southwest Fisheries Center Honolulu Laboratory
 2570 Dole St. • Honolulu, Hawaii 96822-2396

Commercial: (808) 943-1221
 Telefax: (808) 943-1290

SPREP- RMTCP

TELEFAX FOR: Adrienne Farago

DATE: 15 JUNE 1992

FROM: George Balazs

TELEPHONE EXT: 808-943-1240

NUMBER OF SHEETS TRANSMITTED (including this page) 1

MESSAGE: Dear Adrienne: Many thanks for your recent faxes regarding pending Marshall Is. project ^{and} draft letter to countries/offer by ANPWS for 2-3 years funding of turtle project consultant. I feel that your letter is excellent as written. My only suggestions would be that you perhaps call special attention to the new SPREP Apia address; and make some mention of requesting feedback/results of the educational aspects/benefits of RMTCP funding. I'm concerned that the good ideas we originally had for grade school educational projects may not have been realized, ^{therefore} and need more encouragement/funding/follow-up. Besides putting regional tags on as many turtles as we can, the education of youngsters will surely be the most lasting and meaningful thing RMTCP can do on behalf of sea turtles.

That is a very generous offer by ANPWS, and something that must be given careful consideration. Is there enough for a full-time person to continue doing in RMTCP? Absolutley yes, in my view. But the exact duties, and where they will be conducted throughout the year, are the sorts of things that need to be decided, in close consultation with all of us (including Suzie, if she indicates an interest in staying on). Clearly, the annual RMTCP ^{meeting} would be the best place to do that.

Note that Suzie will not see your fax for at least another week or some, since she is currently in the southern islands of Palau assessing nesting turtles in that area of the region. Expeditions such as ^{at this} are exactly the sort of thing that our RMTCP turtle person should be involved in when "ships of opportunity" set sail. I hope that more of these will be possible.

According to my notes, the following individuals were present at the last RMTCP meeting: Trevor Daly, Andrew Smith, Tanya Leary, Dan Iwase, Mike McCoy, Philippe Siu, Swamy Chrisna, Paul Holthus, Colin Limpus, Suzie Geermans, Peter Thomas, ICOM representative, Solomon Islands' representative (elected as chair for meeting), PNG representative(s), Balazs, and Marie-Therese and Andrea as secretarial support.

I've just looked at the group photo taken at the meeting and see that 20 people are in it. So I'm obviously missing some names, but I hope what I've given you here helps.

Best regards,



d-011-182-30331

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

PO BOX 240
APIA, WESTERN SAMOA
TELEPHONE: (685) 21929
FAX: (685) 20231



PROGRAMME REGIONAL OCEANIE DE L'ENVIRONNEMENT

PO BOX 240
APIA, WESTERN SAMOA
TELEPHONE: (685) 21929
FAX: (685) 20231

COPY

FAX MESSAGE

FAX No.: USA (1)(808) 9431290
To: George Balazs
From: Adrienne Farago
Date: 30 June 1992
Subject: Turtle Meeting

No. of pages: one (including this one)

AP 2/15/1
Budget: XB102 AB02AA

Message:
Dear George

Vili doesn't really want SPREP staff to have any distractions prior to the IGM in September, and because I will be on leave straight after, until the end of October, this means we can't have our Technical Advisory Group meeting (the 4 of us) until November I'm afraid. We will have it here in Apia - at least you can get to see where we are now. Vili is also very concerned that we don't have any 'expert' meetings without any Pacific Island country participation at all. He recommends that, say, 2 country experts participate. Perhaps the chair from last year's workshop (Sylvester Diacke, Solomons) and one more? Who do you think would be the best country people to attend?

I have not yet heard back from the Marshalls since the last fax I copied to you. Have you received the applicators for the Marshalls yet?

regards

Adrienne

Adrienne Farago

SPREP

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

PO BOX 240
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231



PROE

PROGRAMME REGIONAL OCEANIC DE L'ENVIRONNEMENT

PO BOX 240
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231

AP 2/15/2, ~~04~~1/24

17 June 1992

Mr. Jeff Canin
Sea Turtle Campaigner
Greenpeace International
P.O. Box 51
BALMAIN 2041
SYDNEY, Australia

Video: Extinction is Forever

Dear Jeff

Thank you for the copy of the video, which I enjoyed watching - except for the exceptionally gory bits in the first half, which distressed me a great deal. As a matter of interest, what is your relationship with Trevor Daly, who attended our Regional Marine Turtle Conservation Programme (RMTCP) Workshop last year?

I am pleased to hear that you made the video "with SPREP in mind". Were you in contact with SPREP before you started, in other words was SPREP involved in working together with you on the project? (I have only been working here since February, so it may have happened before I started). For future reference, SPREP has recently appointed an Information and Publications Officer (Wes Ward) whose job it is to work together with Project Officers like myself, on such information/publicity/awareness projects.

I definitely think the video is worth distributing and would be happy to help. A few comments though - I don't know whether it is too late for you to do anything about them or not - let me know:

the quality of both sound and colour left a little to be desired. Of course you know better than I the money, time and other constraints under which you were operating, but it does detract a little from the message.

I found a certain amount of confusion about who the target audience is. The first 20 mins setting up the rationale for turtle conservation will be well known to anyone at the stage of being trained to recognise, tag, measure etc. turtles. I realise it is too late to do anything about this, but I thought it worth passing on to you anyway.

I think the part which describes how to recognise the different turtles (by counting the number of scales etc), was well explained, but will be difficult for anyone to remember or copy down. I therefore think the video needs to be shown in conjunction with some kind of written description. You are no doubt aware of the little poster which Greenpeace helped to fund (copy attached), and I think that that or something like it should be used together with the video.

Right at the end where you have Greenpeace's address to write to for further information, could we please add SPREP's address (here in Apia) and logo too. I hope that is possible, because it really is necessary that that be done for the video to be distributed under the auspices of the RMTCP. Wes Ward could give you a good copy of the logo if you need it.

As far as translations are concerned, I have no idea how much money that involves, and can therefore not make any commitment. Do you have any idea of what it would cost? If you don't, I think it is a good idea for Suzie to send a copy of the video out to all members of the RMTCP, with a covering letter from SPREP asking whether they are interested in having it translated into their own language, whether they could organise to get the translation done themselves in-house, and if not, asking how much it would cost for them to get it done elsewhere. We would then have to see what the response was and whether the budget could stand it. If too many countries wanted it done and for us to pay, we would put them in priority order of involvement in the RMTCP.

Would you send a copy of the transcript together with the video itself to each country? This would make translation much faster.

Let me know your response to all the above, particularly putting SPREP's name and logo at the end, which is the only precondition. I will liaise directly with Suzie about the covering letter.

Yours sincerely,

Adrienne Farago

Adrienne Farago
Project Officer (Biological Diversity Conservation)

cc Suzie Geermans and Colin Limpus
c/o QNPWS
PO Box 155
North Quay
QLD 4002
AUST.

✓ BALAZS, George
US Dept of Commerce
National Oceanic & Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Centre
Honolulu Laboratory
2570 Dole St
HONOLULU Hawaii 96822-2396
USA

Att. (not with cc's)

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

PO BOX 240
APIA, WESTERN SAMOATELEPHONE: (685) 21929
FAX: (685) 20231

PROGRAMME REGIONAL OCEANIC DE L'ENVIRONNEMENT

PO BOX 240
APIA, WESTERN SAMOATELEPHONE: (685) 21929
FAX: (685) 20231

FAX MESSAGE

one - letter not attached.

FAX No.: MARSHALLS (692)9 5547 No. of pages: (including this one)
 To: Mr Danny Wase or Mr Capital Bani: MIMRA
 From: Adrienne Farago: Project Officer (Biological Diversity Conservation)
 Date: 22 June 1992 File: AP 2/15/2
 Budget: XB102-AC02AA
 Subject: RMI Turtle Tagging Proposal

Message:

Dear Mr Wase

Thank you for your fax of the 15 June regarding the turtle tagging proposal at Bikar atoll. I am particularly pleased to hear that Bikar is being considered by the RMI Government as a national conservation site. If there is anything SPREP can do to help with that process, please don't hesitate to let me know. Amongst other related programmes, SPREP is currently in the preparatory phase of a major South Pacific Biodiversity Conservation Programme looking at the setting up and initial management of a series of diverse conservation areas - terrestrial, marine and combined. Your proposal may fit in with the guidelines of that project, in which case small amounts of funding may be available to start the project off. In fact a letter was sent to RMI in about February, from Mr Iosefatu Reti, Team Leader of the project, asking for proposals of this nature. The letter was sent to the SPREP Focal Point - the General Manager of the EPA, Majuro

I am pleased that the level of funding we can offer for the turtle project is acceptable to you. I hope that you will be able to raise the other \$7,000 - please let me know as soon as you have all the money organised (ie that the project will definitely go ahead this year), and I will request telegraphic transfer of the money. Attached is a letter that will be sent to you by mail when the money is transferred. Could you please indicate that it is acceptable to you, and that you will be able to sign it as a condition of receiving the money. Note the requirements for a report, the tagging data and the financial statement to be sent to SPREP within 6 weeks of the project. I will need to know the name of the bank, and the number and name of MIMRA's account, to which you would like the money transferred.

Please note (see attached letter) that the money SPREP is providing is for the supplies, hatchling grow-out material for schools, the airfare/DSA for the consultant, and ~~half the vessel hire~~. You will need to seek other finance specifically for the other half of the vessel hire. I presume that your government is not able to fund the project to that extent? Or would it be possible to carry out the project in another (cheaper) boat?

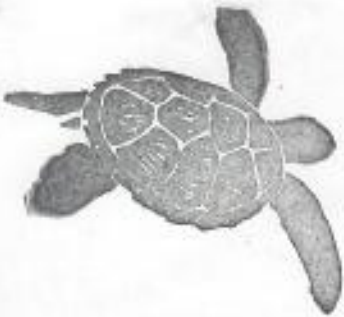
* There are 1,000 turtle tags with George Balazs at the National Marine Fisheries Service in Honolulu, to be used for your project. Also the tag suppliers have been requested to send him four applicators direct.

Best wishes, yours sincerely

ADRIENNE FARAGO

cc: George Balazs fax no TI 8083

TRANSMITTAL SHEET



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396



Commercial: (808) 943-1221
Telefax: (808) 943-1290

SPREP_-RMTCP, APIA, WESTERN SAMOA
TELEFAX FOR: ADRIENNE FARAGO DATE: 29 JUNE 1992

FROM: GEORGE BALAZS TELEPHONE EXT: 808-943-1240

NUMBER OF SHEETS TRANSMITTED (including this page) ONE

MESSAGE:

DEAR ADRIENNE-

MANY THANKS FOR YOUR COPIED FAX OF 22JUNE TO MR. WASE, AND ALSO THE THE LETTER TO JAPANESE MITI. BOTH LOOK EXCELLENT. YOU HAVE MADE A GENEROUS OFFER TO THE MARSHALLS, AND I HOPE THEY WILL SUPPLY THE REMAINING MATCHING MONEY. I BELIEVE WE HAVE SOME URGENCY HERE, IN THAT THE WORK SHOULD BE UNDERTAKEN NO LATER THAN MID-AUGUST TO BE RELEVANT (IDEALLY IT SHOULD BE IN MID-JULY, BUT I UNDERSTAND THAT WAS IMPOSSIBLE). WORK DONE LATER THAN MID-AUGUST WILL, WE SUSPECT, MISS THE PRIME OF THE NESTING SEASON (BASED ON WHAT WE KNOW ABOUT OTHER NORTHERN-LATITUDE NESTING SITES FOR GREENS).

YOUR IDEA FOR THE FOUR OF US TO GET TOGETHER FOR A SMALL MEETING SOUNDS APPROPRIATE AND WORTHWHILE TO ME. IN ORDER TO GET AUTHORIZATION FOR FOREIGN TRAVEL, I NEED TO SUBMIT NOTIFICATION AT THE EARLIEST POSSIBLE DATE (MY AGENCY OFFICIALLY REQUIRES 120DAYS NOTICE TO SUPPLY THE PROPER PAPERWORK). HOWEVER. I CAN USUALLY GET APPROVAL WITH 45-60 DAYS NOTICE. PLEASE, AS SOON AS YOU KNOW THE LOCATION AND APPROXIMATE DATES FOR THE MEETING, LET ME KNOW SO I CAN GENERATE THE NECESSARY REQUEST.

TO MY KNOWLEDGE, ^{THERE ARE NO} RMTCP PROJECTS (OR ANY OTHERS, FOR THAT MATTER) IN POHNPEI. IRONIC, SINCE AS YOU KNOW MOSES NELSON OF FSM WAS THE CHAIR FOR OUR FIRST RMTCP MEETING IN NOUMEA. STEVE KOLINSKI (OF YAP) AND I HAVE RESPONDED TO CORRESPONDENCE FROM A SCHOOL TEACHER IN POHNPEI WHO WANTED TO TO HEAD-STARTING (WE GENTLY DISCOURAGED HIM AND ENCOURAGED SEA TURTLE EDUCATIONAL ENDEAVORS). I CAN'T RECALL HIS NAME RIGHT NOW. I PRESUME YOU WILL ALSO ASK SUZIE THIS SAME QUESTION ABOUT POHNPEI, SHE MAY KNOW SOMETHING I DON'T.

Best Regards,



NOTE: WHEN AVAILABLE, I WOULD LIKE TO HAVE A COPY OF THE BUDGET BREAK DOWN AND LETTER-OF-AGREEMENT FOR THE MARSHALL'S PROJECT.

SEE ARTICLE
I'M
SENDING
BY
REGULAR
MAIL

PO BOX 240
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231



PO BOX 240
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231

AP 2/15/1, MTG 2/1

7 July 1992

Dr. Scott A. Eckert
Pacific Recovery Team Co-ordinator
Southwest Fisheries Science Centre
P.O. Box 271
La Jolla
CALIFORNIA, USA 92038-0271

Recovery Plan for marine turtles in the Pacific Basin

Dear Scott,

My name is Adrienne Farago, and I have been appointed as SPREP's Project Officer (Biological Diversity Conservation). I am responsible (amongst other things) for SPREP's Regional Marine Turtle Conservation Programme. Hopefully Paul Holthus will have mentioned my name to you when you met recently.

I am writing in response to the letter to the Director, Vili Fuavao, from Dr Nancy Foster, regarding Vili's participation as a Technical Advisor to the Pacific Sea Turtle Recovery Team. We are very pleased that you consider co-ordination between your Pacific Sea Turtle Recovery Plan and SPREP's Regional Marine Turtle Conservation Programme (RMTCP) sufficiently important to extend this invitation to Vili.

As you know, SPREP co-ordinates regional and national efforts in the various environmental areas it is involved in, and as such cannot provide detailed technical expertise in the many dozens of programmes which it runs or co-ordinates. Our assistance to you would be better used to ensure co-ordination between our two programmes. Rather than technical advice, we would be pleased to provide general membership of a steering committee for your Plan. If this is acceptable to you, Vili would be glad to be a formal member of a Steering Committee, although in practice I, or rather the person occupying my position, will comment on documents, attend meetings (if finance is available) etc.

In addition, I imagine it is very likely that George Balazs, who is very closely connected with the RMTCP, is also on your steering committee. I think we can both rely on him to provide an excellent link between the two programmes.

As you probably already know, the objectives of the RMTCP are very similar to those of the Recovery Plan, making co-ordination between the programmes critical. Presumably you will be concentrating on the US Territories and their EEZs, while so far our funding has not allowed us to operate in those areas. I have attached a copy of our Programme document for your information. While elements of this are now slightly out of date, it will give you some idea of our activities. I would be very pleased to receive from you a copy of the outline of your Recovery Plan so far.

I look forward to continuing contact with you.

Yours sincerely,

A. Farago

Adrienne Farago
Project Officer (Biological Diversity Conservation)

Att.

cc **George Balazs**
Leader, Marine Turtle Research
National Marine Fisheries Service
Southwest Fisheries Science Center
Honolulu Laboratory
2570 Dole Street
HONOLULU
Hawaii 96822-2396
United States of America



AP 2/15/1, MTG 2/1

7 July 1992

Dr. Scott A. Eckert
Pacific Recovery Team Co-ordinator
Southwest Fisheries Science Centre
P.O. Box 271
La Jolla
CALIFORNIA, USA 92038-0271

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I look forward to continuing contact with you.

Yours sincerely,

A. Farago

Adrienne Farago
Project Officer (Biological Diversity Conservation)

Att.

cc George Balazs
 Leader, Marine Turtle Research
 National Marine Fisheries Service
 Southwest Fisheries Science Center
 Honolulu Laboratory
 2570 Dole Street
 HONOLULU
 Hawaii 96822-2396
 United States of America

PO BOX 240
 APIA, WESTERN SAMOA
 TELEPHONE: (685) 21929
 FAX: (685) 20231



PO BOX 240
 APIA, WESTERN SAMOA
 TELEPHONE: (685) 21929
 FAX: (685) 20231

FAX MESSAGE

FAX No.: MARSHALLS (692)9 5447
 To: Mr Danny Wase or Mr Capital Bani: MIMRA
 From: Adrienne Farago: Project Officer (Biological Diversity Conservation)
 Date: 21 July 1992
 Subject: Funds for RMI Turtle Tagging Project

No. of pages: ^{three} (including this one)
 AP 1/6/1 AP 2/15/2
 Budget File: .XB102.AC02AA

Message:
 Dear Mr Wase

I have received the details of your bank account into which the \$US14,000 is to be transferred. There has been a slight change of policy in SPREP, and I will now require a signed copy of the attached agreement before I can organise the transfer of funds.

I would also still like confirmation that you have been able to organise the remaining \$US7,000 required for the project, and that the project will definitely go ahead in August this year.

If the project is still going ahead, please sign the attached agreement and return by fax as soon as possible. The original of the agreement will be posted, and I would be grateful if you would sign and return that also, for our permanent records.

I am sorry for any inconvenience. I hope to hear from you by return fax.

Best wishes, yours sincerely

Adrienne Farago

ADRIENNE FARAGO

CC George Balazs fax no (1 808) 943 1290

SPREP

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

PO BOX 240
 APIA, WESTERN SAMOA
 TELEPHONE : 685 21929
 FAX : 685 20231

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PO BOX 240
 APIA, WESTERN SAMOA
 TELEPHONE : 685 21929
 FAX : 685 20231



AP 2/15/1

21 July 1992

Mr Danny Wase
 Marshall Islands Marine Resources Authority
 Ministry of Resources and Development
 MAJURO
 Republic of the Marshall Islands 96960

Funding of Bikar Atoll Turtle Tagging Project

Dear Mr Wase

SPREP has agreed to transfer \$US14,000 to your account No. 0039 000016, called 'Republic of the Marshall Islands', at the Bank of Hawaii, Majuro Branch. This represents funding for part of the Republic of Marshall Islands 1992 marine turtle conservation programme under the South Pacific Regional Marine Turtle Conservation Programme (RMTCP). These funds are to cover the costs of:

BIKAR ATOLL

vessel charter	\$ 7,000
supplies during tagging	\$ 1,500
hatchling grow-out materials	\$ 1,500
airfare for team leader	\$ 1,000
consultant for three weeks	\$ 3,000

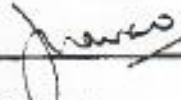
TOTAL	\$14,000
--------------	-----------------

The principal sponsor is the International Centre for Ocean Development (ICOD) of the Canadian Government, and even though this organisation no longer exists in its previous form, it would be appreciated if acknowledgement of ICOD and SPREP's support is ensured in any publicity or information items relating to the projects.

It is a requirement of the support that a full report on each project is furnished to SPREP within six weeks of completion together with an accounting of the funds spent. In addition, copies of all tagging data sheets must be sent to SPREP for entry in the Regional Turtle Data Base so a record of the tagged turtles can be maintained. Originals of the tagging sheets should remain with you.

Please signal your agreement with the conditions and budget outlined above by signing and returning this letter to SPREP. The funds will be transferred as soon as a signed agreement is received.

Yours sincerely,



Vili Fuavao
Director

Mr Danny Wase
Director
Marshall Islands Marine Resources Authority
Ministry of Resources and Development
MAJURO
Republic of the Marshall Islands 96960

SPREP

PO BOX 240
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231



PROE

PO BOX 240
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231

With our compliments

Avec nos compliments

Dear George

8/6/92

I hope this satisfies your ~~concern~~
concerns about Japanese turtle
research being co-ordinated with
SPREP. Whether we get anywhere
is another matter of course! I'll
let you know if we get any
replies.

Regards

Adrienne Farago

ps. There are
4 turtle pieces
on their way
to you from
Australia. PLEASE
CONFIRM
RECEIPT!!

SPREP

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

PO BOX 240
APIA, WESTERN SAMOA
AP 2/1572
TELEPHONE: (685) 21929
FAX: (685) 20231
5 June 1992



copy to Balazs
PROE

PROGRAMME REGIONAL OCEANIEEN DE L'ENVIRONNEMENT

PO BOX 240
APIA, WESTERN SAMOA
TELEPHONE: (685) 21929
FAX: (685) 20231

Mr Hikaru Matsunaga
Minister
Ministry of International Trade and Industry
Japanese Government
3-1 Kasumigaseki 1-Chrome
Chiyoda-ku
TOKYO
100 Japan

4 identical letters
(see c.c.'s)

SPREP Regional Marine Turtle Conservation Programme

Dear Mr. Matsunaga

I am writing to advise you about the South Pacific Regional Environment Programme's (SPREP) Regional Marine Turtle Conservation Programme. As you probably already know, SPREP operates on behalf of twenty-two Pacific Island governments and administrations to protect the environment and improve resource management in the Pacific. It is recognised regionally and world-wide as the environmental programme for the South Pacific countries.

Recognising the highly migratory behaviour of marine turtles and the cultural and subsistence importance of these animals to the people of the countries of the South Pacific, and recognising that the conservation and management of marine turtles require both national initiatives and regional and international co-operation, a recommendation was passed at an Intergovernmental Meeting in 1988 that a regional marine turtles programme be created.

Since then a formal Regional Marine Turtle Conservation Programme has been approved and funded, primarily with the assistance of the Canadian, Australian and American governments and/or institutions. The programme covers all of the island countries and territories of the South Pacific region.

The Programme undertakes activities in a growing number of countries. At this stage these include the Solomon Islands, the Federated States of Micronesia, Fiji, Palau, Papua New Guinea, Vanuatu and now the Marshall Islands. The programme incorporates conservation work (eg protection of nesting areas); population census, tagging and monitoring; the creation of a regional database; public education (eg posters, T-shirts, school education); staff training; research; and legislation and regulation review.

The Programme has a very high profile within the region and is strongly supported by the member governments as the marine turtle programme for the Pacific.

I am interested to learn that the Japanese government and other organisations are also sponsoring activity related to turtles in the Pacific, for example in the Solomon Islands. I believe it would be extremely productive for all our activities for you to integrate your expertise and activities into the South Pacific Regional Marine Turtle Conservation Programme. I would therefore like to invite any Japanese researchers and their affiliates to please advise me of what activities are being proposed; so that full co-ordination and co-operation can take place, activities are not duplicated, and the Pacific countries are not inconvenienced by overlapping and unco-ordinated activities. I would also be happy to answer any queries you may have on the Regional Marine Turtle Conservation Programme.

I look forward to hearing from you soon.

Thanking you in advance

Yours sincerely,

(signed s/b)

Don Stewart
Acting Director

cc Mr. Naoyuki Mizoguchi
Managing Director, Japan Bekko Association
Sumitomoseimei Bldg, 7F
7-1 Manzai-machi
Nagasaki-City
850 JAPAN

cc Mr Satoshi Oguri
Vice Chairman Bekko Division
Japan General Merchandise Importeers Assoc.
Room No 0407
World Trade Centre Bldg
4-1 2-chome
Hamamatsucho
Minato-ku
Tokyo 105 Japan

cc Mr Iwao Hara
Chairman
Japanese Tortoise-shell Federation
4-23, Sake-Machi
NAGASAKI CITY
850 Japan

AF/af

SPREP

SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME

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FAX: (685) 20231



PROE

PROGRAMME REGIONAL OCEANIC DE L'ENVIRONNEMENT

PO BOX 240
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231

AP 2/15/2

12 August 1992

Mr George BALAZS
US Dept of Commerce
National Oceanic &
Atmospheric Adminis.
Nat Marine Fisheries Service
Southwest Fisheries Centre
Honolulu Laboratory
2570 Dole St
HONOLULU Hawaii 96822-2396
USA

Turtles

Dear George,

There must have been some misunderstanding about the Yap proposal, as I thought Steve Kolinski had sent a copy of his proposal directly to you. Never mind, it is enclosed now for your comment.

Thanks for your Western Samoan information. I think for this first year of their involvement they are going to stick to education. It's starting off with a spot on their regular Department of Environment radio programme in a few weeks, talking about turtles and asking people to contact the Department if they have seen, harvested etc. any turtles.

I have just got something from French Polynesia, which unfortunately I am going to have to get translated. I think it might just be a report from their last expedition. I have records of a discussion at the last RMTCP Workshop to fund \$10,000 for a survey of Scilly Islands, Bellinghausen this year; however I should add that there is a letter on the file saying that if SPREP pays the first year of their turtle programme, they would be able to carry all the costs themselves from 1992-93 on. If I got a proposal (and they would have received my 'request for proposals' fax by now), I would remind them of that undertaking. However one way or the other we should be able to do something this year. You may wish to contact them and liaise on a detailed proposal.

Yours sincerely,

Adrienne Farago

(Ms) Adrienne Farago
Project Officer (Biological Diversity Conservation)

ps The postcards are wonderful!

SPREP

PO BOX 240
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231



PROE

PO BOX 240
APIA, WESTERN SAMOA

TELEPHONE: (685) 21929
FAX: (685) 20231

With our compliments

Avec nos compliments

Dear George

9/7/92

Copy of Marshall Islands/Bikar Atoll
budget breakdown + agreement,
as requested.

I still haven't heard from either
you or Stockbrands whether the 4
applicators have reached you yet.

Adrienne Farago

AP 2/15/1

9 July 1992

Mr Danny Wase
Marshall Islands Marine Resources Authority
Ministry of Resources and Development
MAJURO
Republic of the Marshall Islands 96960

Funding of Bikar Atoll Turtle Tagging Project

Dear Mr Wase

On 9 July, SPREP's Finance Manager was requested to transfer \$US14,000 to your account No. 0039 000016, called 'Republic of the Marshall Islands', at the Bank of Hawaii, Majuro Branch. The funds were marked to the attention of the Secretary of Finance. This represents funding for part of the Republic of Marshall Islands 1992 marine turtle conservation programme under the South Pacific Regional Marine Turtle Conservation Programme (RMTCP). These funds are to cover the costs of:

BIKAR ATOLL

vessel charter	\$ 7,000
supplies during tagging	\$ 1,500
hatchling grow-out materials	\$ 1,500
airfare for team leader	\$ 1,000
consultant for three weeks	\$ 3,000
TOTAL	\$14,000

The principal sponsor is the International Centre for Ocean Development (ICOD) of the Canadian Government, and even though this organisation no longer exists in its previous form, it would be appreciated if acknowledgement of ICOD and SPREP's support is ensured in any publicity or information items relating to the projects.

It is also a requirement of the support that a full report on each project is furnished to SPREP within six weeks of completion together with an accounting of the funds spent. In addition, copies of all tagging data sheets must be sent to SPREP for entry in the Regional Turtle Data Base so a record of the tagged turtles can be maintained.

Please confirm receipt of the funds, and signal your agreement with the conditions and budget outlined above by signing and returning this letter to SPREP.

Yours sincerely,

Don Stewart
Acting Director

Mr Danny Wase
Director
Marshall Islands Marine Resources Authority
Ministry of Resources and Development



COPY

REPUBLIC OF THE MARSHALL ISLANDS
MARSHALL ISLANDS MARINE RESOURCES AUTHORITY
MINISTRY OF RESOURCES AND DEVELOPMENT
MAJURO, MARSHALL ISLANDS 96960

September 8, 1992

Ms. Adrienne Farago
Bio-diversity Project
South Pacific Regional Environment Program e
P.O. Box 204
Alia, Western Samoa

Dear Ms. Farago:

Enclosed are two turtle tags numbers R5586 and R5587 which were returned to the office of the Marshall Islands Marine Resources Authority.

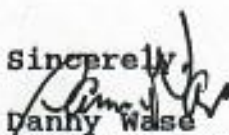
They were taken from a turtle which was captured by Hiram Kejak on the the lagoon side close to the Majuro International Airport on September 2, 1992 during a night spear fishing trip. The turtle entered the commensal supplies of the fisherman and his family.

The poster which advertises the tagging program indicate "that for each tag returned, SPREP will give a reward of a T-Shirt or a Cap". Mr. Kejak eagerly awaits his rewards.

We think that this turtle was tagged during the recent tagging project here in the Marshalls. That it was one of three tagged and released in Majuro Lagoon. This will be confirmed by Mr. Puleloa's reports.

Meanwhile we are attempting to contact Mr. Bokmij concerning the particulars of the tag return he made earlier in the year.

Thank you for your time and attention to these matters of importance.

Sincerely,

Danny Wase
Director, MIMRA

CC Suzie Geerman
William Puleloa ✓

SUZIE GERMAN'S
QNPWS - 13th FLOOR

COPY TO ADRIENNE

1 OCT. 92

SPREP

Dear Suzie:

My ear problem, plus some other personal complications, have prevented me from joining Philippe on the follow-up expedition to Scilly. As you might guess, this was difficult decision but one that was impossible to control. They'll be others, I'm sure.

I'm a little concerned that some further clarification may be needed with regard to the use of my "Univ. of Hawaii" addressed Inconel tags in French Polynesia last year. Let me explain again, and copy this note to Adrienne so hopefully no confusion will exist.

I should mention first that I've been providing tags for many years to Pacific Islanders who have written and requested them. Since SPREP became regionally involved in this research I've referred all inquiries in that direction. But some past emergencies have arisen that required exceptions. Last year's trip to Scilly was one of them. Before leaving for Tahiti Philippe informed me that SPREP had not yet sent him tags, and he was very worried about their arrival. He asked me to bring a supply of my own, just in case they would be needed. Prior to our departure, some tags did reach Papeete, but if I remember correctly they only numbered 25. In addition, when we started to apply them at Scilly we quickly discovered they were seriously defective, cracking along the "R" that the tag company had foolishly stamped too close to the bend of the point. When we returned to Papeete we found that a large number of SPREP tags had indeed arrived, two days after our departure!

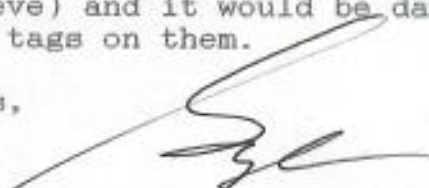
Also, with regard to the October 1991 Scilly trip I should mention that the 15 headstarted turtles that Philippe took to release were simply too small to apply SPREP tags. Consequently, the Inconel⁵ (which are about half the size of SPREP's tags) ended up being used on those turtles. Even then, the tags may have been a bit large.

The second "emergency" circumstance occurred when Steve Kolinski discovered that the number of turtles nesting at Gielop in 1991 far exceeded the supply of SPREP tags he had been given. An urgent appeal went out to Noumea, but the routes of air shipment to Yap wouldn't allow the tags to reach the Gielop resupply vessel in time. Consequently, I was urgently faxed by both Peter Thomas, and Steve's office in Yap, to airmail some of my tags direct to him.

As you probably know, to remedy similar problems that may arise in the future I requested that a couple hundred SPREP tags be sent to me to keep on hand. They are still here in my office, in the event the need exists.

Glad I had the opportunity to recap the above so that everyone understands the circumstances. Since Philippe still has, I presume, SPREP tags in his possession I imagine he'll be using them on nesting turtles during the forthcoming trip. But again he has headstarted juveniles (about 80 this time I believe) and it would be damaging to the animal's survival to put large SPREP tags on them.

Best regards,



CC: ADRIENNE
FARAGO

PAKED 11-01-92
1 PG 3:00
SK

TRANSMITTAL SHEET



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

Commercial: (808) 943-1221
Telefax: (808) 943-1290

TELEFAX FOR: ADRIENNE FARAGO

DATE: 9 NOV. 92

FROM: GEORGE BALAZS

808-943-1240
TELEPHONE EXT: _____

NUMBER OF SHEETS TRANSMITTED (including this page) 1

MESSAGE: DEAR ADRIENNE: I TRUST YOU HAD A PLEASANT VACATION AND ARE NOW RESTED AND BACK AT WORK ON MARINE TURTLE AND OTHER SPREP MATTERS.

SUZIE JUST RECENTLY SENT ME A VIDEO, PRODUCED EARLY THIS YEAR, BY GREENPEACE. I'M NOT VERY FAMILIAR AT ALL WITH THIS PROJECT. IT IS MY UNDERSTANDING THAT IT IS UNDER CONSIDERATION FOR DISTRIBUTION BY SPREP. THE SPREP CREDIT AND ADDRESS APPEAR AT THE VERY END ONLY. THERE IS NO TITLE AT THE START OF THE VIDEO (OR ANY WHERE ELSE THROUGH THE TAPE. MAJOR PORTIONS OF THE COPY I RECEIVED ARE VERY POOR QUALITY (IE, SEGMENTS THAT ARE COPIES OF COPIES OF COPIES, I SUSPECT).

SUZIE ASKED ME TO "REVIEW" THE VIDEO, AND TO GIVE MY OPINIONS TO THE TWO OF YOU. CLEARLY THERE ARE SOME SHORTCOMINGS, IF THE TARGET AUDIENCE IS SPREP ISLAND NATIONS. THERE ARE OTHER PROBLEMS I RAN ACROSS. ON THE OTHER HAND, THE VIDEO PORTRAYS SEVERAL EXCELLENT CONSERVATION POINTS.

WHAT DO YOU HAVE IN MIND FOR THIS VIDEO?

BEST REGARDS,

George Balazs



Form CD-29 (7-84)		U.S. DEPARTMENT OF COMMERCE		1. TYPE OF AUTHORIZATION		2. TRAVEL ORDER NO.	
TRAVEL ORDER				<input checked="" type="checkbox"/> TEMPORARY DUTY		<input type="checkbox"/> RELOCATION-A signed CD-150, Request for Authorization of Travel and Moving Expenses, must be attached.	
3A. BUREAU NAME/ORGANIZATIONAL UNIT NOAA, NMFS, SWFC, F/SWC2, HONOLULU LABORATORY				3B. PRESENT OFFICIAL STATION HONOLULU, HI			
4A. TRAVELER'S NAME BALAZS, GEORGE H.			4B. TRAVELER'S TITLE ZOOLOGIST			4C. SOCIAL SECURITY NO. 546-54-0156	
5. PURPOSE AND JUSTIFICATION STATEMENT To participate in the Annual Steering Committee meeting of the SPREP Regional Marine Turtle Conservation Programme in Western Samoa, November 17 - 20, 1992. P.O.C. Janine #(808)943-1231						6A. TYPE OF TRAVEL CODE 2	
						6B. PURPOSE OF TRIP CODE 1	
						6C. BUREAU CODE NO. 14	
7. ITINERARY From Honolulu, HI to Apia, Western Samoa and return to Honolulu, HI.							
8. PERIOD OF TRAVEL		8A. BEGIN ON OR ABOUT 11/17/92		8B. END ON OR ABOUT 11/20/92		9. ACCOUNTING CLASSIFICATION CODE *	
10. MODE OF TRANSPORTATION						11. ESTIMATED COST	
<input checked="" type="checkbox"/> COMMON CARRIER <input type="checkbox"/> BUS <input type="checkbox"/> RAIL <input type="checkbox"/> EXTRA FARE (Justify in item 14) <input checked="" type="checkbox"/> AIR-COACH <input type="checkbox"/> AIR-EXTRA FARE (Attach CD-334) <input type="checkbox"/> PRIVATELY-OWNED VEHICLE <input type="checkbox"/> AUTO <input type="checkbox"/> PLANE <input type="checkbox"/> RATE PER MILE _____ CENTS (See FTR 1-4 or FTR 2-2.3) <input type="checkbox"/> (1) DETERMINED MORE ADVANTAGEOUS TO THE GOVERNMENT <input type="checkbox"/> (2) FOR CONVENIENCE OF TRAVELER (See FTR 1-4.3 and 1-4.4) <input type="checkbox"/> RENTED MOTOR VEHICLE (See FTR 1-2.2c(2) and 1-3.2) <input type="checkbox"/> OTHER MEANS (Specify)						A. TRANSPORTATION (Billed directly to Government) \$ 0 B. OTHER TRANSPORTATION INCLUDING POV MILEAGE \$ SUBSISTENCE EXPENSE (Per Diem/Actual) \$ OTHER EXPENSES (Item 13) \$ TEMPORARY QUARTERS SUBSISTENCE EXPENSE \$ RELOCATION EXPENSES (Other than listed above) \$ SUB-TOTAL B \$ 0 TOTAL (A & B) \$ 0	
COMMON CARRIER REFUNDS When a ticket is exchanged for one of lesser value, the carrier should issue a receipt or a ticket refund application and is required to make refund directly to the appropriate accounting office.		ACCOUNTING OFFICE ADDRESS: NOAA, WASC Finance Division, WC1 7600 Sand Point Way, N.E. BIN-C15700 Seattle, WA 98115-0070					
TRAVELER'S POTENTIAL LIABILITY NOTICE Travelers are accountable for all transportation tickets, Government Transportation Requests (GTR's), or other transportation procurement documents received by them in connection with their official travel. If trips are cancelled or itineraries changed after tickets (or GTR's) are issued to the traveler, the traveler is liable for the value of the tickets issued until all coupons have been used for official travel purposes or all unused tickets or coupons are properly accounted for on the travel voucher.							
12. SUBSISTENCE EXPENSE In accordance with the DOC Travel Handbook or as specifically approved by an authorizing official under unusual circumstances. See FTR 1-7.3 and 1-8.1c. RATES AUTHORIZED: Western Samoa: Lodging NTE\$95+M&IE\$47							
13. OTHER EXPENSES AUTHORIZED <input type="checkbox"/> MEETING REGISTRATION FEES <input type="checkbox"/> HIRE OF TAXIS BETWEEN LODGING AND/OR PLACE(S) OF BUSINESS <input type="checkbox"/> EXCESS BAGGAGE (Justify in item 14) (See CTR 1-5.2) <input type="checkbox"/> CASH <input type="checkbox"/> GEBAT <input type="checkbox"/> OTHER (Specify and Justify in item 14)			14. SPECIAL PROVISIONS/REMARKS *No cost to Government; all travel expenses paid directly by The South Pacific Regional Environmental Programme (SPREP).				
Travel voucher must be submitted within 5 days after completion of travel, and travel advance balance must be refunded at that time unless another trip will be made within 30 days.							
15. SIGNATURE OF REQUESTING/ APPROVING OFFICIAL <i>Richard A. Neal for</i>			TITLE Science and Research Director, Southwest Region			DATE 7/23/92	
16. SIGNATURE OF AUTHORIZING OFFICER <i>Michael J. Tillman Acting for</i>			TITLE ASSISTANT ADMINISTRATOR FOR FISHERIES			DATE 7/28/92	
PRIVACY ACT NOTIFICATION The following information is provided in compliance with the Privacy Act of 1974 (5 USC 552a). Solicitation of the information on this form is authorized by 5 USC, Chapter 57 as implemented by the Federal Travel Regulations (FPMR 101-7), E.O. 11609 of July 23, 1971, and E.O. 11612 of March 27, 1962. The Social Security Number (SSN) on the CD-29 is mandatory and will be used as an employee identifier. The SSN serves as a primary validation for accountability and payment authorization in the Department of Commerce centralized travel system. Failure to provide the requested information will result in a delay in obtaining a valid Travel Order, Travel Advance and the procurement of common carrier transportation.						CERTIFICATE OF AUTHORIZATION BY DESIGNATED AUTHORIZING OFFICER You are hereby authorized to travel at Government expense under and in accordance with the Federal Travel Regulations. The number of this order must appear on each voucher claiming reimbursement for expenses incurred consequent to this order.	

Faxed 11:15 am
RM 11-19-92

TRANSMITTAL SHEET



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dale St. • Honolulu, Hawaii 96822-2396

Commercial: (808) 943-1221
Telefax: (808) 943-1290

SPREY

TELEFAX FOR: GERALD MILES

DATE: 19 NOV 92

FROM: GEORGE BALAZS

TELEPHONE EXT: _____

NUMBER OF SHEETS TRANSMITTED (including this page) 1

MESSAGE:

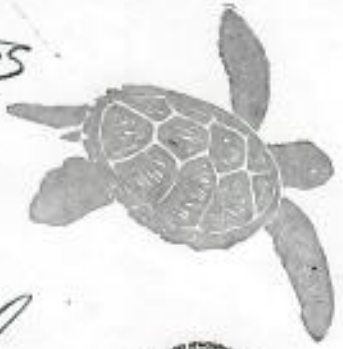
DEAR GERALD - THANK YOU FOR

YOUR FAX, WHICH I JUST NOW RECEIVED
WHEN RETURNING TO MY OFFICE FROM A
TRIP. SORRY FOR THE DELAY IN RESPONDING,

I'M SIMPLY NOT AT ALL FAMILIAR
WITH SAUVEGARDE TURTLE PROPOSAL. HOWEVER,
I CAN SAW DEFINITELY THAT YES,
TURTLES IN NEW CALEDONIA ARE OF
REGIONAL SIGNIFICANT. WE KNOW THAT
FOR CERTAIN BASED ON THE RECOVERIES
THUS FAR MADE.

I HOPE THIS HELPS.

BEST REGARDS,



9/90

SAMOA MARINE
MARINE ENTERPRISES (SAMOA) LTD

Mr. G. Balazs
National Marine Fisheries Service
2570 Dole Street
Honolulu
Hawaii 96822-2398

P.O. BOX 4700
MATAUTU
APIA, WESTERN SAMOA
PHONE: 22 721 - 23 253
Marine Maintenance • Salvage
Exploration • Photographs
Advisory service for all underwater activities
FAX (0685) 20-087

Dear Mr. Balazs

Thank you for your reply of the 31st. January and I apologize for not getting back to you sooner.

The cyclone that went through us left us without an office for several weeks but now we are back to normal under a new roof. It also destroyed about 80% of our stock of clams and 50% of our brood stock. Not to worry we know how to avoid it next time.

The Turtles were released not by choice.

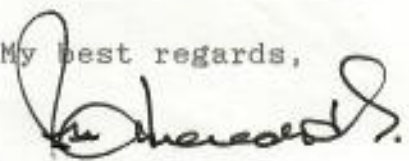
The Island that we have leased is the Island of Namu'a. The one closest to shore plus 42 acres of surrounding sea adjacent to the Island. My mothers family is from there and they live right opposite the Island and we have employed them to work on the project and live on the Island. My father also holds a very high title there. I'm sure you might be familiar with Luamanu's family in Aleipata as they worked at the turtle project several years back.

I became interested in this project through the success of the Fisheries Department in spawning clams. It breaks my heart that nobody has followed up the success of the green mussel that the Fisheries also successfully developed. We supplied the Fisheries with brood stock to start their original experiment. They in turn promised us one thousand spats to start a farm of our own. That is how we got started. Being a lover of the sea I proposed that we also revive the turtle project and to turn the island into a bird sanctuary. A lot of work has been put into the initial stages of acquiring leases and the surrounding villages consent for us to venture into this project. There is no turning back now.

We are now trying to gather as much information as possible to make this project a success. We are also seeking assistance from anyone or any organization for the project. Our aim is to have by the end of this year at least fifty thousand to a hundred thousand clams in the surrounding sea area. We are at present negotiating with Australia for the purchase of one thousand *Tridacna gigas* spats. We hope these would be here by next month. We have also been collecting turtles as part of this project not for sale but for conservation purposes.

I hope this explains what our main aim is for this project.

My best regards,


P.A. Meredith. (Leutele Pita)
MANAGING DIRECTOR

GHB



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

May 30, 1990 F/SWC2:GHB

Mr. Foua Toloa
Director of Agriculture
and Fisheries
Ofiha O Na Matakupu Tokelau
P.O. Box 865 Apia
Western Samoa

Dear Foua,

Thank you for your letter of 11 May 1990. It was good to hear from you again so soon. Yes, I will drop a note to Semu giving encouragement for the sea turtle stamp topic. He once described a trip he made to Tokelau in a flying boat as being "as rough as riding across the back of a leatherback turtle"! So I know he has turtles in his blood and will be eager to endorse this idea.

It would appear from your letter that you would like to have me travel to Tokelau again to follow up on the same ideas from my first visit. In fact, you mentioned that you hoped this could be done "at my earliest convenience". Let me assure you that I would indeed like to return to Tokelau to provide help in whatever way you feel appropriate. Tokelau and your people hold a special significance to my interest in the research and conservation of sea turtles. Unfortunately, there are no funds available to me within our agency to undertake such a trip. I regret that such is the case, at least for the foreseeable future.

Please continue to inform me about your progress in conserving Tokelauan sea turtles. Best regards.

Sincerely,

George H. Balazs
Zoologist





U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

May 25, 1990 F/SWC2:GHB

Mr. P. A. Meredith
Managing Director
Samoa Marine
P.O. Box 4700
Matautu, Apia
Western Samoa

Dear Leutele,

Many thanks for your informative letter about the work you are doing in waters surrounding Namu'a Island. I have personally visited there several times in past years to learn about the endangered hawksbill turtles nesting on the island. As you know, small numbers of these turtles also nest on Nuutele and Nuulua. I hope that your project will serve to protect the turtles insuring their future presence in Samoan waters. There are very few nesting turtles remaining at present.

If you have the need for numbered identification tags to attach to turtles during your project, please let me know. I can easily make them available to you. The tags are inscribed with the address of the University of Hawaii.

Sincerely,

George H. Balazs
Zoologist





U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

January 31, 1990

F/SWC2:GHB

Mr. Peter Meredith
Samoa Marine
Box 4700, APIA
Western Samoa

Dear Mr. Meredith:

I am writing in response to a recent request on your behalf sent to me by Bob Gillett of FAO/UNDP in Fiji. I have enclosed an assortment of literature on sea turtles which I hope will be helpful to your new project. Since I have visited Aleipata on several occasions, I would be interested in hearing more about your plans for a clam and turtle hatchery. Which of the several islands off Aleipata have you leased?

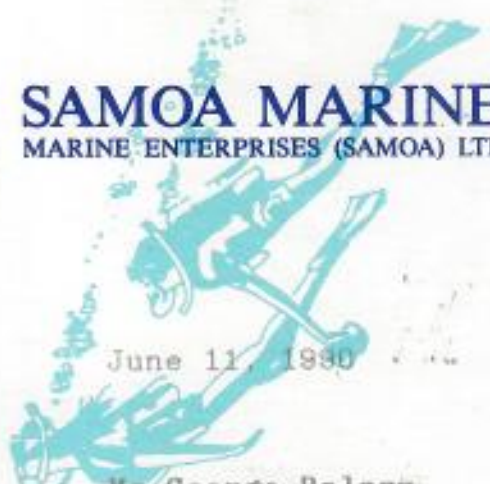
Sincerely,

George H. Balazs
Zoologist

cc: Robert Gillett



SAMOA MARINE
MARINE ENTERPRISES (SAMOA) LTD



June 11, 1990

Mr George Balazs,
U.S. Department of Commerce,
National Oceanic and Atmospheric Administration,
National Marine Fisheries Service,
Southwest Fisheries Center Honolulu Laboratory,
2570 Dole Street. Honolulu, HAWAII 96822.

P.O. BOX 4700
MATAUTU
APIA, WESTERN SAMOA
PHONE: 22 721 — 23 253
Marine Maintenance • Salvage
Exploration • Photography
Advisory service for all underwater activities

Dear Mr Balazs,

I would like to thank you sincerely for your letter dated 25th May 1990 received.

It is good to know that you have been here and are aware of the turtle production aspects. Also your feelings that our proposed project will benefit this particular species. Yes, our main intention is to help turtles survive in Samoan waters.

I will in future keep you posted on the project as it progresses and will advise the need for identification tags. I would very much, however appreciate any further contributions from you.

Thank you sincerely,

A handwritten signature in black ink, appearing to read "Leutele P.A. Meredith". The signature is fluid and cursive, with a large loop at the end.

Leutele P.A. Meredith.
Managing Director.

SOUTH PACIFIC COMMISSION

FIFTH TECHNICAL MEETING ON FISHERIES

Noumea, New Caledonia
10 - 11 August 1972

THE FUTURE (OR FATE) OF THE WESTERN SAMOA TURTLE PROJECT

by

W.W. Witzell
Fisheries Division, Apia, Western Samoa

SUMMARY

1. The Fisheries Division of Western Samoa initiated a hawksbill turtle (Eretmochelys imbricata) project early in 1971 with insufficient funds allocated by the Western Samoa Government. In spite of an ambiguous beginning due to conflicting opinions from various UNDP turtle experts, the Western Samoa Turtle Project (WSTP) is a tremendous success. The project is presently conservational in design, coinciding with some basic life history research of the hawksbill. Part of the program includes educating the Samoan people on the subject of turtle life history and the merits of the conservation project. The Fisheries Officer is attempting to continue the project in the face of financial disaster. The Government of Western Samoa, in spite of some support, will not allocate additional funds, nor will the South-Pacific Commission, which suggested the project.

2. In comparison to most conservation/research programs, this particular one is inexpensive to operate. The WSTP does need, however, some financial support to continue, even if only at its present low subsistence level. The entire success of the project depends on mechanical support, i.e., outboard motors, water pumps etc., and these are falling into disrepair due to their great antiquity. Without new equipment the WSTP will be forced to close down by the next nesting season (October 1972).

3. If substantial funds are made available, the WSTP would be able to improve its present program tremendously. Since nothing is known about the Pacific hawksbill turtle, except its inevitable extinction within a matter of 15 - 20 years, this work is of paramount importance.
4. Plans have been discussed, and some initiated, to expand the present program in two areas. The first is the research into the feasibility of farming hawksbill turtles until maturity. Crude feeding studies have already been initiated and contact with Dr John L. Ball at the University of Hawaii has been established. Disease work resulting from tank rearing the turtles has also been started with the help of Dr S.B. Collard at the University of West Florida. The concept of turtle farming would need 2 - 3 consultant experts initially in order for a successful program.
5. The other proposed area of expansion is twofold. One is an expanded public information program and the other is an inter-territorial turtle information exchange service. The first area would entail the compilation of an island turtle handbook, a short 8 mm turtle conservation movie, radio tapes, slides, photos, pamphlets etc... in the appropriate island languages. One goal of which is to help respective governments pass turtle conservation legislation. Western Samoa has already started the above program in its entirety but lack of funds has left a good deal of it unfinished.
6. The inter-territorial turtle information exchange is also of utmost importance for any meaningful turtle program to succeed in the South Pacific. Meetings should be held at regular intervals in a centralised locality which is easily accessible to all interested countries. The WSTP should serve as a base of information exchange, proper housing at the site is already available for any visiting delegates.
7. These two broad areas of expansion have been recommended by Western Samoa to the U.N. turtle experts, who completely supported them and in turn, re-recommended them in their respective reports to UNDP. However, due to the total lack of overall funds, no material expansion has taken place and, in fact, severe curtailment of the project is inevitable unless a financial solution is soon forthcoming then this highly-promising but only semi-developed program will fold.

LIBRARY OF
GEORGE H. BALAZS

SAMOAN TURTLES

LIBRARY OF
GEORGE H. BALAZS

Many years ago, Samoa's beaches were visited by large numbers of turtles who came ashore to lay eggs. Each turtle would lay about 160 eggs at a time, coming back in 2 weeks to lay more eggs. A single turtle may come back as many as 5 times to lay more eggs in a year, leaving a total of 800 eggs on the beach. When the mother turtle is through laying her eggs, she leaves the beach to swim about Samoa in search of food. A mother turtle does not eat her babies. The mother will come back to the same beach in 2 or 3 years to lay more eggs. The babies that hatch are eaten by crabs, fishes and sea birds. Maybe 2 babies out of a 100 will grow up to become a mature turtle, the rest will have been eaten. When the baby turtles are mature, they will return to the same beach upon which they were laid as eggs to lay their own eggs.

Many years ago there were many turtles laying eggs on Samoan beaches and living in Samoan waters. Now, turtles only lay eggs on 3 small islands off of Aleipata. Never again will any turtles return to lay eggs on the other beaches. This is because the Samoan fishermen have eaten all the turtle eggs and killed the mothers on the beach.

The small islands off Aloipata have very few mother turtles laying eggs. Very soon, maybe 5 years, there will be no more turtles in Samoa. This is what happened in Fiji and Tonga. The fishermen killed all the eggs and now there is no more turtles at all.

The Fisheries Division of Western Samoa is trying to increase the numbers of turtles in Samoa. In Malaola, at Tepatasi, fishermen collect turtle eggs and hatch them. The baby turtles are placed in tanks and fed fish for a month. The babies are now strong and can escape from the birds and fish that want to eat them. The little turtles are released 3 miles outside the reef at night. In 5 years they will return to lay eggs.

If any turtle eggs are found by Samoan fishermen will buy the eggs for 1 sene each if they are fresh. We will pay 2 sene an egg if the fishermen lead us to a nest before they dig it up. If the eggs are more than 2 days old they will all die if taken from the beach. That is why the eggs must be fresh.

The turtle project at Tepatasi needs the help of the Samoan Fishermen

- 2 -

if we are to save the turtles of Sanos. Please do not take turtle eggs from the beaches and kill them, there will be no turtles left to come back and lay more eggs.

Thank you.

LIBRARY OF
GEORGE H. BALAZS

FISHERIES DIVISION
DEPARTMENT OF AGRICULTURE

19 August 1971

PROPOSAL AND PLAN FOR A TURTLE RANCH AT ALEIPATA TO
DETERMINE THE FEASIBILITY OF DEVELOPING AN EXPORT
INDUSTRY FOR HAWKSBILL TURTLES

By: Alan C. Banner.

I. Introduction:

Research completed at the Aleipata Turtle Hatchery during the first half of 1971 has shown that the primary nesting turtle in that district is the Hawksbill turtle, a species valued for the high quality of the shell. Although a full year's cycle has not yet been completed, it appears that diligent collecting of turtle eggs can probably produce at least 4,000 hatchlings yearly. This does not include the collection of eggs in the other areas of Western Samoa.

Although the Hawksbill is a slow growing turtle with poor tasting flesh, there is a considerable world market for its shell and, indeed, its whole body as mounted by a taxidermist. The possibilities of marketing young hawksbill turtle was recently emphasized by a SPIFDA turtle expert in turtle cultivation, Dr. John Hendrickson. Dr. Hendrickson inspected the Aleipata Turtle Hatchery during the first week of August, 1971, and was quite enthusiastic about the possibilities of developing a consistent, though small, turtle ranching industry in Western Samoa. He felt that the government should continue collecting and hatching eggs, and then raise the young to a point where they are marketable size. A certain percentage should be released back into the ocean to insure the propagation of the natural stock. According to Dr. Hendrickson there is a considerable market for stuffed Hawksbill turtle in the Ryuku Islands of Japan, for this species of turtle has certain traditional symbolism to the Japanese people.

On the strength of Dr. Hendrickson's recommendations, it is hereby proposed that the Fisheries Division establish an experimental turtle ranch in an effort to determine if this would be a suitable "cottage industry" to introduce to Western Samoa. In the following section the overall plan of the ranch will be discussed.

II. Overall Plan:

Continue Hatchery

The work of collecting the eggs, transplanting them into the hatchery, and then holding the hatchlings, should continue. The research associated with this work i.e. tagging adult turtles, collecting data on the position, size, and fatality rates of the clutches, etc., should be continued.

Stop releases

Beyond this, the program of releasing the hatchlings after a week or so of captivity should be discontinued. However, 10% of all hatchlings should eventually be released in the open ocean in order to perpetuate the wild stock. The special care and treatment of these will be discussed later.

Test living conditions

In order to determine the best way to raise the

young turtles a variety of conditions should be experimented with, keeping in mind the fact that eventually it is hoped that a technique will be devised which will allow private persons to raise turtles at their homes for fun and profit.

Three important aspects of the turtles' environment can be altered: food, crowding, and water exchange.

Food Supply Fish

The biggest problem facing this project is that of food supply. Hawkbills are carnivorous throughout their life cycle, and in all probability will need to be fed fresh protein. The first protein to come to mind is fish, but, unfortunately, fish protein is very valuable in Western Samoa. It is possible that this problem may be solved by trapping small reef fish, which have little economic value. This could be done by placing wire fish traps in different areas outside of the reef where they would not be readily subject to poaching by fishermen.

Molluscs, drabs

Also available for food the razor clam, called fo'i in Samoan. Other molluscs, such as faisua (Tridacna) are also available, as well as crabs. Turtle grass, the primary source of food for the Green sea turtle in Samoa, is abundant.

Coconuts

Another food which the turtles readily eat and is probably for them is fresh coconut. Experiments already performed have shown that mature coconut meat put through a meat grinder is readily eaten by hawksbill which are several months old. For the young turtles, however, the pieces appear to be too large and hard to eat when using mature nuts, but they don't appear to have a problem with younger nuts, just past the "spooning" stage. As coconuts are rich in protein, it could very well be that turtles would thrive on a diet of only coconuts. One additional factor to consider here, however is that unless the coconuts can be taken from Government land somewhere, in Western Samoa, they will have to be purchased.

To sum up the food problem, there is food available for the project. It remains to be seen, however, whether or not this food can be procured cheaply enough to make the project financially sound.

Crowding

The question of crowding the young turtles is not a pressing concern at this point, although it should be investigated. Dr. Hendrickson stated that the more crowded the turtles are the more they nip each other, and this obviously would be undesirable if they are to be sold for their good looks. At present it would probably be easiest to assume the optimum condition is one where all turtles have room to sleep on the surface at the same time. A newly hatched turtle takes up about 6 square inches; one 6 months old about 30 square inches, a five fold increase. In order to hold 100 baby turtle we would need a tank

with 600 square inches of surface area, i.e., a tank approximately 1 foot by 5 feet. At 6 months we would need 5 such tanks, and presumably at 1 year 10 such tanks - assuming that this is the optimum condition.

Water Exchange - x2/day

The third major environmental factor is water exchange. Turtles are quite dirty creatures, and their water has to be changed often. At present their water is changed once daily, but that is not often enough. The best system would be to set up large water holding tanks, using concrete cess pool tanks, fill them using a gasoline engine pump, and then have them distribute water to the holding tanks by a gravity feed system. A daily turn over of twice the volume of the tank is probably optimum.

Tanks-44 gallon drums

As for the tanks, at present there are several 44 gallon drums available which could be cut in half along the long axis, thus providing two twenty gallon tanks. The total surface area of one of these tanks would be 748 square inches. Thus it could hold a total of 123 young turtles. According to Dr. Hendrickson, a layer of cement could be applied to the inside of a metal container such as this is thus protecting the metal surface from oxidation by the sea water. Drains could be installed in the bottom of the tank to drain off any sediment, and also provide for a constant circulation.

Cement tanks

Cement tanks could also be used, for an attempt should be made to find which type of tank or container would be most suitable for a villager to use.

Stands

If the Half-44 gallon drums are used, it would be best to make stands for them, and this would probably require the purchase of some lumber.

10% hatching release

As mentioned earlier, approximately 10 percent of the hatchlings should be released in order to insure the survival of the wild stock. It is the recommendation of Dr. Hendrickson that these turtles be raised to an age where they can find for themselves in the ocean. Judging from the hawksbill which are presently being raised at Aleipata, the best age for release would probably be somewhere from 3 to 6 months of age. These turtles, according to Dr. Hendrickson, should not receive treatment which will make them entirely accustomed to living in a tank. Efforts should be taken to see that their diet is constantly varied, that they don't become used to feeding only at specific times, and that they don't always associate human presence with feeding time. Perhaps even a sea-pen could be established where they could be allowed to spend some of their time - but not all, due to the difficulty of stopping poachers.

Shade or Sun

In setting up these turtle tanks, an effort should

be made to find in the turtles are affected by living in shade as opposed to living in sun light. That is to say some of the tanks should be set up outside of the Banana shed, where they are all kept at the moment. This means also that a fence will have to be build around the tanks in order to protect them.

Data

The data to be kept should include diet, weekly measurements of growth in length and weight, daily temperature readings, and any behavioral observations made.

Marketing

As for the marketing end of the project, an effort should be made to contact a buyer in the Ryukus, and to get an estimate of the price per head for turtles supplied, as well as conditions under which they would be wanted (i.e. size, condition of specimen, wanted dead or alive, etc.) Dr. Hendrickson recommended that instead of selling all of the turtles out right a condition of the contract should be that we received back a certain percentage of the specimens after they have been stuffed, and these should be then sold on the tourist market in Hawai'i, when a much better price could be obtained, as well as providing publicity about Western Samoa. A contact on the Hawai'ian market should also be sought.

III. Conclusion

Due to the size of the natural turtle population in Western Samoa, a hawksbill turtle ranching industry will never provide more than an interesting sidelight to the national economy. However, if it does prove feasible - and there is every indication that it should - it could provide an export product which will help to build the economy in its own small way. Also, and perhaps this is even more important, it will provide Western Samoa with a product that is definitely going to add to the tourist appeal of the country.

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ACB:lv



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
Western Pacific Program Office
P. O. Box 3830
Honolulu, Hawaii 96812

November 21, 1985 F/SWR1:RTBI

Mr. George Balazs
Honolulu Laboratory
National Marine Fisheries Service
P.O. Box 3830
Honolulu, Hawaii 96812

Dear George:

This letter is to report to you the recapture of a tagged sea turtle (species undetermined) bearing two University of Hawaii tags near Mulifauna Wharf, Upolu Island, Western Samoa (see enclosed map).

The information was given to me on November 10, 1985 while I was in Apia, Western Samoa by the brother in law of the fisherman who captured the turtle. The person furnishing the information was Mr. Lavatai Mailagi, Samoa Scenic Tours, c/o Aggie Grey's Hotel, P.O. Box 669, Apia, Western Samoa. The name of the fisherman is Maoluma Salina.

Details of the recapture are as follows:

Approximate date of recapture: Mid September, 1985
Place : Near Mulifauna Wharf Channel
Method : Speared at night
Species : Unknown
Size of turtle : About 30-36 in. long (shell)
Tag details:

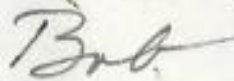
1. Double tagged. One tag attached to flesh of each front flipper.
2. Tag material - aluminum.
3. Tag legend - one side "University of Hawaii 555"
- other side "Hawaii + telephone numbers"
4. Tag size - about 2 in. x 1 in.

Other: : Turtle shell green with algae.

Mr. Mailagi said the event was reported at the fish market to an employee of the Fisheries Division, Department of Agriculture, Forests, and Fisheries, Western Samoa, but it was felt the official did not report it to his office.

I would appreciate any information you may have on this tagged turtle so that I can write Mr. Mailagi with the results.

Sincerely yours,



Robert T.B. Iversen
Special Programs Officer

Enclosure

cc: Mr. L. Mailagi
Mr. Ueta Faasili,
Acting Chief Fisheries Officer



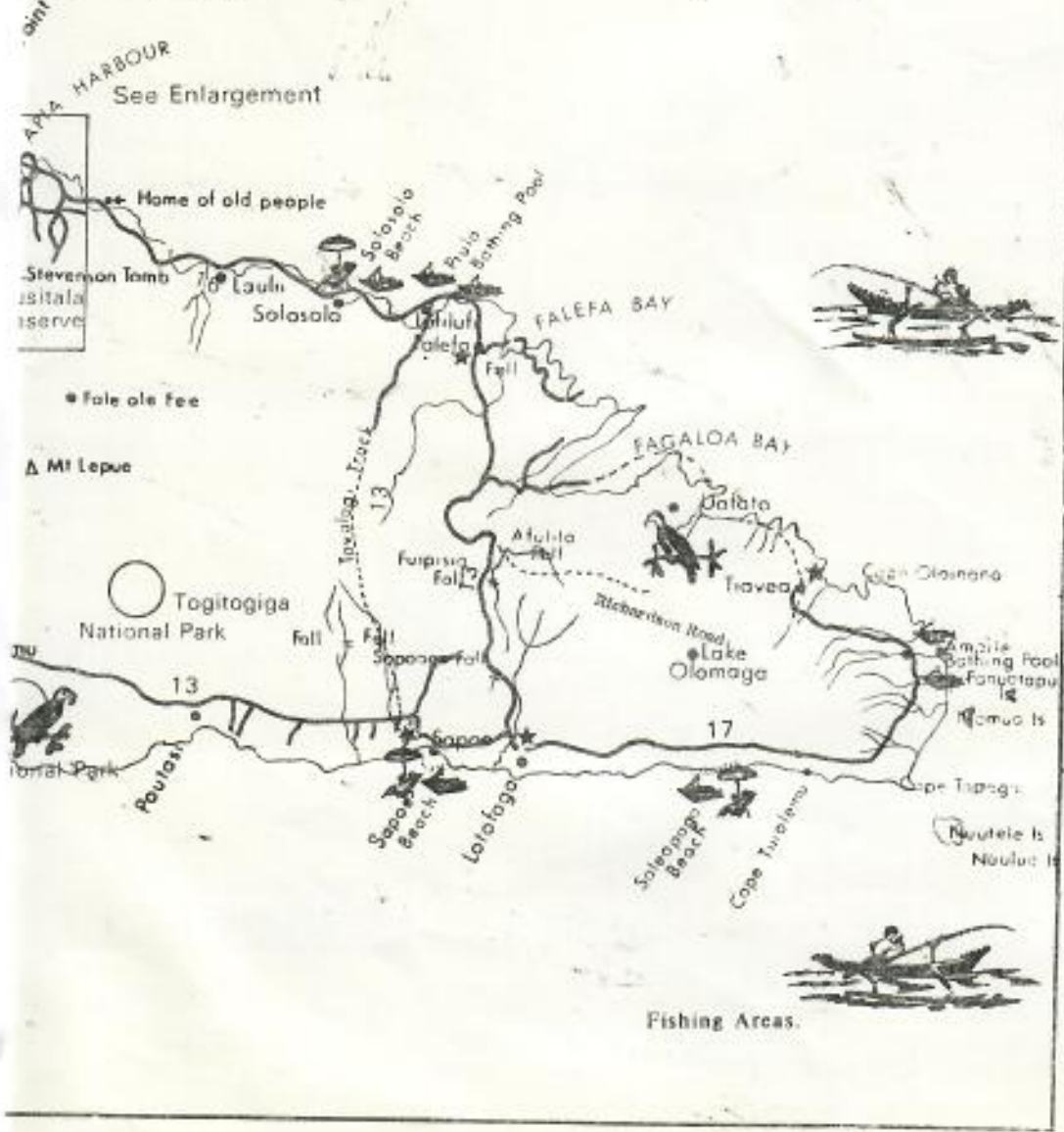
Scale

0 2 4 6 8 10 Miles

LEGEND

Distances in miles	★ 10 ★
Roads	—
Tracks	- - -
National Park	○ ○ ○
Beaches	☀
Air Strips	✈
Rivers	—
Lava Field	—

LU ISLAND

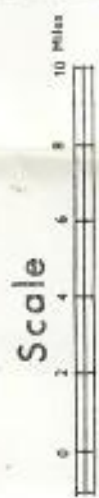
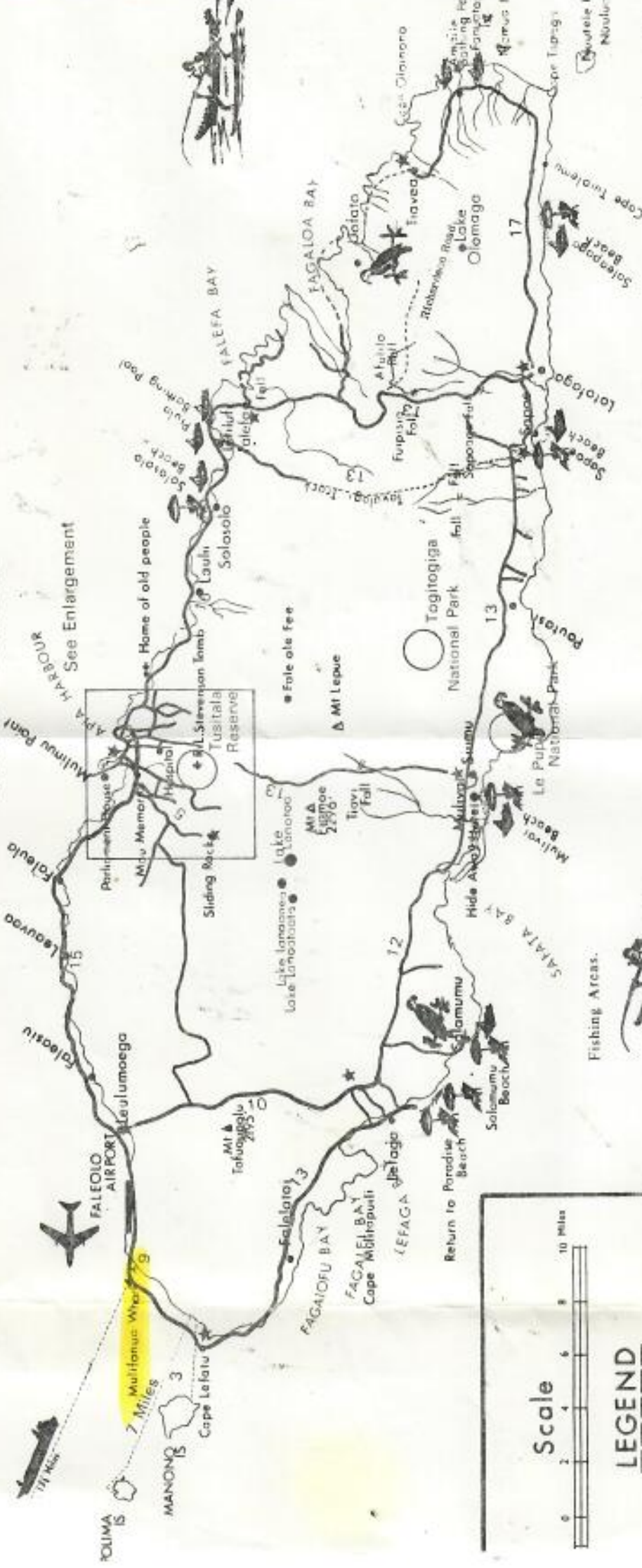


Telephone • Telephone



Fishing Areas.

UPOLU ISLAND



LEGEND

- fences in miles
- roads
- national park
- beaches
- Strips
- Field
- ★ 10



Fishing Areas.



Fishing Areas.

9/12/83
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asia & the pacific

Khmers attack Viet base

BANGKOK — Khmer Rouge rebels staged a hit-and-run attack yesterday on a Vietnamese base near the Thai-Cambodian border in an offensive reaching to the outskirts of the capital of Phnom Penh, rebel sources said.

About 30 Khmer Rouge guerrillas opened fire on an major base at Nihom Mahk Houen shortly before dawn, scattering the 400-strong garrison, Khmer Rouge officers at the border said.

One guerrilla was killed and three seriously wounded before the attackers fled into the jungle, they said.

Western Samoa asks help

APIA, Western Samoa — Western Samoa is asking the rest of the world for help in fighting a brushfire that has raged out of control for a week, causing millions of dollars in damage.

"With our meager resources the fire could burn for months," Prime Minister Tofilua Eti Alesana said yesterday, "unless we receive immediate help."

The fire, whipped by 30 mph winds, has jumped firebreaks and spread across the seaward side of drought-stricken Savai'i, one of the two main islands in Western Samoa.

SPC/Nelson Polytechnic Fisheries Training Course Concludes

The SPC's 18 week Pacific Fisheries Officer Training Course, held annually at Nelson Polytechnic in New Zealand, ended early in June, with most students returning directly home to resume their duties. The course tutors commented that this years intake of 15 participants from 12 countries was the best to date. Individual students showed a very definite awareness of their own training requirements, and many commented on the value of the practical instruction offered by the course. Subjects of study ranged from welding to net-mending, and trainees left the college with a basic knowledge of the many practical skills essential to an all-round fisheries worker.

NEWS FROM AROUND THE REGIONThird International Artificial Reef Conference Announced

The Third International Artificial Reef Conference, to be held in Southern California from November 2nd-4th, 1983, has recently been announced in a circular leaflet from the conference organisers at Occidental College, Los Angeles. The meeting aims to bring together fisheries officers, engineers and biologists to discuss recent developments relating to artificial reefs, fish aggregation devices and other fish attraction systems. The titles of conference sessions already planned include: Siting Criteria; Design and Function; Recruitment and Successional Development; Aggregation Production; Artificial vs. Natural Reefs; Surface and Mid-water Aggregators; and Fishery Management Considerations. In addition to enabling these topics to be examined simultaneously from the viewpoints of planners, designers and scientists, the conference hopes to promote personal contacts in the field and encourage more coordination between fish aggregation projects.

For further information, contact: Dr J.S. Stephens, Occidental College, Department of Biology, 1600 Campus Road, Los Angeles, CA. 90041.

Trochus Hatchery Feasibility Study For Vanuatu

Pending approval by the Government of Palau, Mr Gerald Heslinga, of the Micronesian Mariculture Demonstration Centre, is to be engaged later this year by SPC as a consultant to assist the Vanuatu government in determining the feasibility of establishing a hatchery for Trochus niloticus, the top shell. T. niloticus support a small but important commercial fishery in Vanuatu, shells being bought by a local company for the manufacture of mother-of-pearl button blanks. If feasible, the hatchery will be used to breed and grow on Trochus juveniles to a size suitable for seeding local reefs, and therefore supplementing recruitment to the natural population. Tagging studies on trochus conducted jointly by ORSTOM (Office de Recherche Scientifique et Technique Outre-Mer) and Fisheries Department research workers have enabled legal minimum size limits to be established by the Vanuatu government as a means of ensuring maximum production. However, the Fisheries Department feels that yields can be raised above natural levels by seeding reefs and enhancing natural recruitment.

Gill Netting Trials Carried Out On FADs In Samoa

The Fisheries Division of the Western Samoan Government's Department of Agriculture has conducted gill netting trials around fish aggregation devices, with encouraging initial results. Chief Fisheries Officer Mr Alphonso Phillip, who planned and conducted the trials with his staff, used 6-inch mesh 210/30

white nylon multifilament netting, 1,700 meshes long and 120 deep. The net was hung on a 10mm polypropylene head rope, with 5.5" x 3" net floats at 10 foot intervals and a 30 lb float at each end. 14 lb sinkers on the end ropes completed the arrangement. No foot rope or sinkers were used along the length of the net, the bottom edge being left completely free. This arrangement ensures that the net enfolds fish which run into it, rather than acting as a springy barrier from which they can escape.

Due to the frequency of trolling operations around most Samoan FADs, there were few opportunities for the net to be set without interfering with the activities of professional fishermen, or risk of damage. Therefore, only three sets were made between January and June 1983. Of these the first two gave catches of 198 skipjack of 4-5 lb each, and 980 yellowfin and skipjack, of 2-3 lb each respectively. The second set, which yielded the higher catch, was accompanied by the use of live mollies, which stay close to the head rope and lure the tuna into the net. Although a few tuna were caught, the third set was disrupted by huge fish, possibly marlin or sharks, which tore the net near the middle. Some shark damage also occurred near the end of the net on the second set, and this emphasised the importance of timing the sets correctly and keeping the net in the water for as short a time as possible. The ideal setting time appears to be about 1 hour before sun-up, with live-bait seeding commencing when the tuna rise, about 15 minutes before sun-up.

Although the results obtained are by no means conclusive, it appears from these trials that FAD-associated gill netting is a productive technique worthy of further attention.

Forum Fisheries Committee Meeting Held

The 8th meeting of the Forum Fisheries Committee, the controlling body of the South Pacific Forum Fisheries Agency, was held in Apia, Western Samoa from 2nd to 5th May, with representation from senior officers of many of the region's governments, as well as FAO, SPC, and other international organizations. Apart from discussing the Agency's 1983/84 budget and administrative matters, the Committee reviewed progress on the implementation of the Regional Research and Development Programme on fisheries (RRDP). Within the RRDP the SPC's Tuna and Billfish Assessment Programme and its Deep Sea Fisheries Development Project are listed as priority items, and the governments represented in the Committee expressed satisfaction at the progress made in these activities.

The Committee recognised the urgent need to ensure that members receive reasonable returns and equitable distribution of benefits from highly migratory fish species taken from their waters and wished the Agency to consider this as its primary objective. The Committee also recognised the value of the SPC's Tuna and Billfish Assessment Programme, currently scheduled to terminate in September 1984, and strongly supported the continuation of such research activities as high priority in the RRDP.

CABLE ADDRESS :

" SOUTHPACOM " NOUMEA
TELEPHONE : 26.20.00
TELEX : SOPACOM 139 NM

ADRESSE TELEGRAPHIQUE :

" SOUTHPACOM " NOUMEA
TELEPHONE : 26.20.00
TELEX : SOPACOM 139 NM

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NEW CALEDONIA



COMMISSION DU PACIFIQUE SUD

BOITE POSTALE D5
NOUMEA CEDEX
NOUVELLE-CALÉDONIE

In reply, please quote CONF 2/9/9/1, PRO 7/3/21

PLEASE ADDRESS REPLY TO
THE SECRETARY-GENERAL

11 June 1979

Mr Alf Philipps
Chief Fisheries Officer
Department of Economic Development
P.O. Box 206
APIA
Western Samoa.

Dear Alf,

... I refer to my circular letter dated 14 May a copy of which is
... attached. Please find also a copy of a letter from Dr G. Balazs, an expert
... in marine turtles, who will chair the workshop on turtles.

No doubt that you will appreciate how important it is that Western Samoa produces a paper reviewing subsequent recapture results.

As stated in the circular letter, this document should be forwarded to SPC before mid-September.

I thank you in advance for your co-operation in this matter.

Yours sincerely,

R. Grandperrin
Fisheries Adviser

Encls.

cc : Dr G. Balazs
University of Hawaii at Manoa
Hawaii Institute of Marine Biology
P.O. Box 1346
Coconut Island
KANEHE, Hawaii 96744.


RG/wp

June 2, 1980

New West



Simply Samoa

 Savai'i, Western Samoa (Polynesia) "The joy of welcome is like birds greeting the dawn," goes a Savai'i proverb, and should you honor the Savai'ians with a visit, you will likely be toasted by a chief in a kava ceremony (in which case it is imperative that a small amount of the beverage be poured onto the ground in front of one before drinking). There are no bars and no hotels, but plenty of *fa'a Samoa*, the "Samoa way of life," which is cherished here as it has not been on the more westernized islands of neighboring American Samoa. Accommodations are limited to communal guest houses; those run by the village chief of Lalomalava are the nicest. The island, which legend identifies as the cradle of the Polynesian race, is big (700 square miles) and awesomely beautiful, a lush tropical garden spined by towering volcanic peaks such as 3,503-foot Mount Mauga Sili. Beaches are everywhere, and some only ten minutes from the guest houses are absolutely magnificent. Skin diving and snorkeling are marvelous, but you must bring all gear.

Savai'i is reached through Pago Pago in American Samoa, via Honolulu (Continental). Approximate time required under ideal conditions is fourteen hours, including connecting time and the flights from Pago Pago to Apia (Polynesian Airlines, South Pacific Island Airways) and from Apia to Savai'i (Air Samoa). December through March is the hotter, rainier season, while June through September is the cooler, drier time.

1/23 ASAV - AVALA
on Savai'i

- Small green in
pond

+ Adult green at Apia market

FANTASY ISLANDS

(or, five reasonable facsimiles of paradise you can get to in a day)



By Roger Jay Miller



THE OLD SOUTH PACIFIC hand let go a long, truthful sigh: "When you get down to it, there are too many piles of beer cans under the palm trees."

Well, okay, it's been a long time since Gauguin painted friendly native girls on uncluttered, vanilla beaches, and our fantasies have not necessarily kept pace with modern developments. But, face it, there are trade-offs. The perfect Pacific island paradise cannot be unspoiled and litter-free at the same time its accommodations lack icemaking machinery in the hall. The pristine and unaffectedly friendly island will not always have well-chilled beer, perfectly grilled lobster or big, bouncy, king-size beds. That beach in front of your hotel may not remind you immediately of the one you saw in the travel book, and the snorkel gear may have mysteriously disappeared three years earlier.

There are also the very real trade-offs of flying time, expense and accessibility. If you have a week (or even two), you hardly need to spend the better part of four days simply getting to and from even the most ideal island. Some of the very best islands can only be reached by boat after long voyages. (The petite

Lindblad Explorer regularly discovers these often uninhabited gems for its passengers.) But if you have ten days off from the bank and 10,000 miles to go, you obviously need to think jet.

We have scoured the Pacific in search of islands that still fit the popular image of paradise, that are, at the same time, reasonably easy to get to, and where you don't need an Outward Bound course to survive. In making our final selection, we had to omit several splendid places such as Bora Bora (after Dino, no longer "undiscovered") and Manihi (terrific, but we thought Huahine more interesting).

Not every island we've picked has everything, of course. You'll find few discos but quite a lot of peace. Perhaps *too* much serenity for some tightly wound mainlanders who prefer lots of activities and little introspection. It takes a while to adjust, to slow down, to fall into step with your dream—figure two or three days' unwinding time. It isn't easy, you know, dealing with a personal vision of paradise. Never has been. But one magical day—if you are fit for your own fantasy—you will forget to put on shoes; you will stop counting falling coconuts. You will be part of the poster.

This paper does not appear to be commensurate with the scholarly journal standards of PACIFIC SCIENCE. The broad title is not justified by the contents, and most of the data contained are tenuous. The entire manuscript could easily be reduced to a concise scientific note. I recommend that such a rewrite be undertaken as a prerequisite for publication in PACIFIC SCIENCE.

In addition to the notes entered into the text, the following comments are offered for consideration.

Only two papers are cited (both by W. N. Witzell) when in fact a number of relevant publications on the hawksbill turtle have appeared in recent years.

Data presented on incubation are confined to transplanted nests and therefore are not representative of natural conditions. Artificial hatchery work and naturally occurring events have been unjustifiably merged on several occasions in the manuscript.

No interpretation of "track counts" is provided. How many turtles do these tracts represent?

With the exception of Figure 3, the figures and tables do not contribute substantially to the paper. The information could be summarized and incorporated into the text.

Figures 1A and 1B display a male hawksbill, but no mention of males appears in the text. Was this turtle tagged in addition to the seven nesting females?

It should be noted that this manuscript appeared in essentially the same form as Working Paper 3 of the South Pacific Commission's Fifth Technical Meeting on Fisheries (August 1972).



University of Guam

MARINE LABORATORY
P. O. BOX EK AGANA, GUAM 96910

September 20, 1977

Dr. George Balasz
Hawaii Institute of Marine Biology
P.O. Box 1346
Coconut Island
Kaneohe, Hawaii 96744

Dear Dr. Balasz:

This enclosed article on the hawksbill turtle has been submitted to *Micronesica* for publication. The presentation of data in the figures is in great need of clarification; we need a better account of how the lines were calculated and the confidence limits of the data. Other than that, though, I would appreciate your advice on whether the information presented is new and is of enough value to be published in *Micronesica*.

Any advice you could give me on this matter and on how the ms should be modified would be greatly appreciated.

Sincerely yours,

Charles Birkeland
General Editor, *Micronesica*

CB:gda

October 25, 1977

CONFIDENTIAL

Dr. Charles Birkeland
General Editor, MICRONESICA
University of Guam
Marine Laboratory
P. O. Box EK
Agana, Guam 96910

Dear Dr. Birkeland:

I apologize for taking several weeks to respond to your request to review the W. N. Witzell manuscript. It arrived as I was preparing to leave for field studies and I have only now had the opportunity to carefully read it through. My comments, which are brief and mostly negative for its present form, are contained on the attached sheet. I would not mind spending time editing and improving a manuscript in which it is apparent that the author already devoted considerable time and thought in the preparation. I have done this on several occasions for the journal AQUACULTURE and once for HEPETOLOGICA. However, in the present case it is clear to me that the author only pieced together portions of old reports and set it off to you apparently hoping for publication. A complete rewrite is necessary in order to present the information in a meaningful, concise and scientifically sound fashion commensurate with accepted journal standards. I hope that the author will undertake such a rewrite.

Sincerely,

GEORGE H. BALAZS
Jr. Marine Biologist

GHB:ec

Enclosure

Author's Copy

Review of W. N. Witzell Manuscript for MICRONESICA

This paper is deficient in several areas and unacceptable for publication in a scientific journal in its present form. However, if the author is willing to undertake an extensive revision, eventual publication of some of the information could be recommended. The following suggestions should be considered.

1. The title is far too broad and does not tell the reader what specific subject matter will be discussed. The introduction further misleads the reader, in that no tagging or other research of nesting turtles (excepting track counts) was conducted. In this context, the description "population dynamics" is meaningless. The body of the paper moves so rapidly and superficially from one subject to another that the reader is again left wondering what actually comprises the central theme.
2. The three figures should either be deleted or significantly improved with qualifying data. If the latter course is chosen, the author should also discuss and interpret the material in the text. It is not sufficient to just present figures to the reader with little or no explanation.
3. All information presented should have supporting data as a basis. A number of the statements made are unduly speculative.
4. Any direct criticism of government agencies (i.e. "Samoa government refuses...") should be deleted. This can serve no useful purpose and certainly has no place in a scientific journal.
5. The literature referenced is confined to only two papers, both of which are by the author. This is inadequate. I suggest that the author consult at least the following four references for background information on what other researchers have learned about *Eretmochelys*.

Bustard, H. R. (1972) Sea turtles. Natural History and Conservation. Taplinger Pub. Co., N.Y. 220p.

Carr, A. and S. Stancyk (1975) Observations on the ecology and survival outlook of the hawksbill turtle. *Biological Conservation* 8:161-172.

Carr, A., Hirth, H. and L. Ogren (1966) The ecology and migrations of sea turtles. 6. The hawksbill turtle in the Carribean Sea. *Am. Mus. Novit.*, 2248, 29p.

Hughes, G. R. (1973) The survival situation of the hawksbill sea turtle in Madagascar. *Biological Conservation*, 5:114-118.



University of Guam

MARINE LABORATORY
P. O. BOX EK AGANA, GUAM 96910

November 17, 1977

Dr. George H. Balazs, Jr.
Hawaii Institute of Marine Biology
P.O. Box 1348
Coconut Island
Kaneohe, Hawaii 96744

Dear Dr. Balazs:

Thank you very much for your thorough review of the ms by Witzell on the hawksbill turtle. I realized a complete rewrite was in order before I sent you the ms for review, but I sent the ms for you anyway for two reasons. First, I wanted to be sure the material was new and important enough to justify my requesting a rewrite. I meant to make it clear that this was all I was asking for. I do appreciate your editorial suggestions. Second, I've been advised that you were an authority on turtles that should be consulted and who should be informed of such manuscripts on turtles.

I apologize for sending a ms that I knew was not publishable in its present form. I do appreciate the time you put into it. Of course you will be anonymous, but appreciated.

Sincerely yours,

CHARLES BIRKELAND
General Editor, MICRONESICA

CB/tcb

MARCH 1980



Two days in American Samoa were great! I stayed with Fr. Simon Burke, 68 years old, in Samoa about 40 years...a walking history book...and he loves to talk! You know how I talk too much...but I pale before him.

This morning I left for Western Samoa with Cardinal Pio. He gave me a choice of three places to stay. I'm with the Maryknoll Brothers. I took about 30 pictures in American Samoa, but lost my camera over there. What a dummy! Today we had a mild storm - terrific rain. A hurricane with

100 mph winds was due here in a few hours, but it turned out to sea. These people are great! Very simple, intelligent, fun loving, and of deep faith. What a place for a natural high! Slow talking, slow moving (even the traffic) and genuine. The Mass is an experience. What participation! Everyone is doing something. All bellow whether or not they can sing. There is a real sense of identity with and responsibility for the Church. If one sees a scrap of paper in Church it is picked up right away. It seems everyone knows where the broom closet is located. On the way home from school kids will remove some fallen palm branches from the Church lawn.

The image of the Samoan in Hawaii is far different than that of the Samoan here. I suppose he is far out of his element in Hawaii. Here his culture, the authority structure etc. supports him.

In less than an hour I'll leave with two neighbors, a father and son to go to Savai'i island, the westernmost in Western Samoa. Upolu is about 100 years behind Honolulu, but Savai'i is even more so. Sio, the night witchman here at the Maryknoll Brothers place is returning to his home village after a ten year absence. His son and one of the Cardinal's workers will go with us. It's only a weekend stay but it should be thrilling.

We leave Upolu and put our car on a ferry for a 13 mile ride to Savai'i. We land at the eastern tip and drive four hours almost to the western tip. The best speed on those roads is about 15 mph. Very crude roads.

Some startling facts of life here: School teachers and policemen get about \$30.00 per week, yet prices are all higher than in Honolulu. Everyone is attached to the land, so chickens, pigs, taro, breadfruit and papaya are abundant. A stranger coming in alone would have to be a highly skilled expert to survive on a salary alone. Automobiles are comparatively rare. I'll bet that Upolu does not have one car for every 100 people. Duty on importing a car is 155%. Wow! Duty on a pickup is only 50% - hence, more pickups than cars. About one half of the people know some English, so the dumb palangi (haole) can get by easily.

You're all in my daily prayers. Keep me in yours. Love, Father C.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Fisheries Center
75 Virginia Beach Drive
Miami, Florida 33149

January 9, 1980 F/SECx5/WNW/paw

Mr. George Balazs
University of Hawaii at Manoa
Hawaii Institute of Marine Biology
P. O. Box 1346, Coconut Island
Kaneohe, Hawaii 96744

Dear George:

Thank you for sending me a copy of Mr. Travis' Samoan hawksbill paper, it was very interesting.

Much of the paper was paraphrased from my 1973 unpublished manuscript (which you have), with additional comments from Travis sprinkled throughout, and I am somewhat perturbed that my manuscript was not accurately quoted in its entirety or properly cited.

I am only familiar with the data and observations which were taken from my 1973 manuscript, however, I do agree with the basic conclusion that the hatchery project is responsible for increased numbers of juvenile and subadult turtles around Western Samoa. I base this on three weeks of interviews with fishermen, simultaneous market surveillance, and personal observations conducted by me during November 1977. I do not know if any of the hatchery turtles are ready to nest yet, although they can start nesting at a fairly small size (60cm). In any event, it is probable that 90-95% of the eggs laid in Western Samoa would be eaten by fishermen if the turtle project personnel didn't beat them to the eggs. Therefore, I strongly believe that the hatchery must continue operation.

As I told you in Washington, D.C. last month, the 1973 manuscript was hastily written before conclusion of the study and is, therefore, a preliminary report on my findings at that time. The manuscript is fairly accurate, considering the adverse conditions in which it was written and typed. I have cleaned up the manuscript, adding new data recorded during the remainder of the study, deleting inaccurate and unimportant data, and have submitted it for publication. Hopefully, it will clear any ambiguities pertaining to the Western Samoa turtle project which might cast doubt on the scientific validity of my recorded findings.

Two other manuscripts have been completed pertaining to Western Samoa turtles and will be submitted for publication soon:

1. "Growth of captive hawksbill turtles, Eretmochelys imbricata, in Western Samoa"
2. "Observations on the green turtle, Chelonia mydas, in Western Samoa"



Page 2, 1/9/80

A third manuscript has been started entitled "The marine turtles in Tonga", which reports my findings of a two year turtle survey (1975-77) in the Ha'apai Island Group, Tonga.

Sincerely yours,

Wayne →

Wayne N. Witzell
Fishery Biologist

THE HAWKSBILL TURTLE (*ERETMOCHELYS IMBRICATA*)
IN WESTERN SAMOA

W. N. Witzell and Alan C. Banner

ABSTRACT

A small population of hawksbill turtles (*Eretmochelys imbricata*) nest on three small islands off the eastern coast of Upolu Island, Western Samoa. The nesting season extends from September to July. Each nest averaged 149.5 eggs, of which 71.1% hatched. The average incubation period was 62 days, the incubating nest temperatures averaged a rise of 3.6°C over sand at equal depth. No natural predation on nests was seen, and only one instance of natural predation on neonate turtles was seen. Human predation upon eggs and nesting females was extensive; the predation pressure being directly proportional to beach accessibility, and the major factor leading to the decline of the Samoa turtle population. Market surveys indicate a year-round occurrence of hawksbills. In lieu of protective legislation, the Fisheries Division of Western Samoa initiated a turtle conservation project to reduce the incidence of human predation on eggs.

There are no detailed published accounts on the biology and ecology of marine turtles in the central South Pacific. The Fisheries Division of the Government of Western Samoa sponsored a marine turtle research program (October 1970-May 1973) in an effort to study the life histories of the cheloniid species occurring in Samoan waters. The following is an account of the hawksbill turtle, *Eretmochelys imbricata*.

Turtles have always played an important part in Samoan culture and were once widely used for food. Evidence from folklore, songs, and interviews with fishermen indicate that the Samoan turtle resource was once a sizable and an important food source for the small, isolated villages. However, the nesting turtles on Samoan beaches have almost been exterminated because of human population explosion. Turtle meat is presently eaten predominantly by village chiefs only on celebrated occasions.

MATERIALS AND METHODS

Fieldwork during the turtle survey was carried out using a 5-m boat powered by a 20-hp outboard motor with a 3-m inflatable boat and 6-hp motor as a reserve.

Supporting a resident study team on any of the beaches was logistically impractical due to rough sea conditions, unpredictable squalls, and mechanical failures of the outboard motors. We attempted to visit the nesting islands every day; however, we made 19 overnight trips during calm weather in February 1972.

We anchored the boat outside the beach reefs and swam to the beaches carrying a watertight insulated container for removing eggs. We followed this procedure throughout the nesting season. Inspection of all turtle tracks found on the beaches was carried out and noted before searching for the nests. Sharp sticks were probed into the sand to locate a clutch. The depths to the top and bottom of the egg mass were recorded in addition to the position of the nest on the beach. Fresh eggs were removed from the beaches for further observations at the mainland hatchery, the oldest eggs being 2-days old. All older nests were concealed and their positions on the beach recorded for future observations. Attempts were made to avoid rotating or jarring the eggs during the collecting and transplanting process. The eggs were reburied in the hatchery, as soon as possible, to avoid unnecessary embryonic deaths.

The hatchery, a small section of mainland beach, was fenced off to keep out dogs, pigs, and people. The eggs were recounted and a sample (10%) measured as they were reburied. A wire enclosure, with a clutch identification number, was then placed over the clutch to insure capture of the emerging hatchlings.

Nest temperatures were measured on a sample of transplanted nests using mercury indoor/outdoor thermometers with remote reading scales. These nest temperatures were recorded daily during incubation, simultaneously with the sand temperature at equal depths, air temperature, and general weather conditions.

Adult turtles were tagged midway along the posterior edge of the right front flipper with monel cow-ear tags.

All turtle measurements are straight line measurements in centimeters and weights are in grams.

SPECIES CHARACTERISTICS

The hawksbill turtle (*Eretmochelys imbricata* Linnaeus, 1766), is readily distinguished from other turtles occurring in Western Samoa by the following combination of characteristics: four pairs of costal shields, anterior pair not touching the nuchal shield; four inframarginal shields, without pores; two pairs of prefrontal scales on the head; two claws on each flipper; narrow beak. The costal shields are juxtaposed in hatchlings, imbricated in juveniles and adults, and juxtaposed again in extremely large turtles. The marginal shields are serrated in juveniles, becoming smooth in adults.

General color patterns of adult, juvenile, and neonate Samoan hawksbill turtles are presently described due to the ambiguities in the literature (Hughes, 1974) regarding the taxonomic status of the proposed Atlantic and Pacific hawksbill subspecies which are based, in part, on coloration.

The carapace in adult turtles is dark brown with faint yellow streaks and blotches (Fig. 1). The scales on the dorsal side of the flippers and head are dark brown to black with yellow margins. The ventral side of the flippers and the plastron are pale yellow, with scattered dark scales on the flippers (Figs. 1 and 2).

Juvenile coloration (Fig. 3 left) is often variable, particularly the carapace, which ranges from light brown to black with varying amounts of distinct yellow streaks and blotches. The head and dorsal flipper scalation is black with whitish margins and the plastron is whitish with many brown blotches; the ventral side of the flippers have scattered black scales.

Neonate coloration (Fig. 3 right) is uniform, variations are generally noticed when the turtles are about 5 months old. The carapace and the top of the head and neck are tan; the side and bottom of the head and neck, including the beak, are dark grey; the dorsal and ventral sides of the fore flippers are gray with a whitish fringe around the posterior edge; the dorsal and ventral sides of the hind flippers and plastron are dark gray with two whitish ridges posteriorly on the plastron.

RESULTS

Nesting Islands and Beaches

The hawksbill turtle was the only species of marine turtle found nesting in Western Samoa. The nesting beaches are located off the eastern end of Upolu Island on three small offshore islands: Namu'a, Nu'utele, and Nu'ulua (Fig. 4).

Namu'a is approximately 800 m long, 300 m wide, and 76 m above sea level. A nesting beach 175 m long is situated on the eastern side of the island. From the low water mark to the beach vegetation there is a steep 7 m slope, with another 9 m moderate uphill slope to the jungle. The approach to the beach is clear of obstacles; a few scattered rocks in the water at the center of the beach should not hinder a nesting turtle or emerging hatchlings. The reef begins immediately in front of the beach and extends seaward for 30 m before dropping off into deep water. The entire length of the beach has a layer of beach rock 2 m wide at the low water mark; this rock is low in profile and does not obstruct nesting turtles

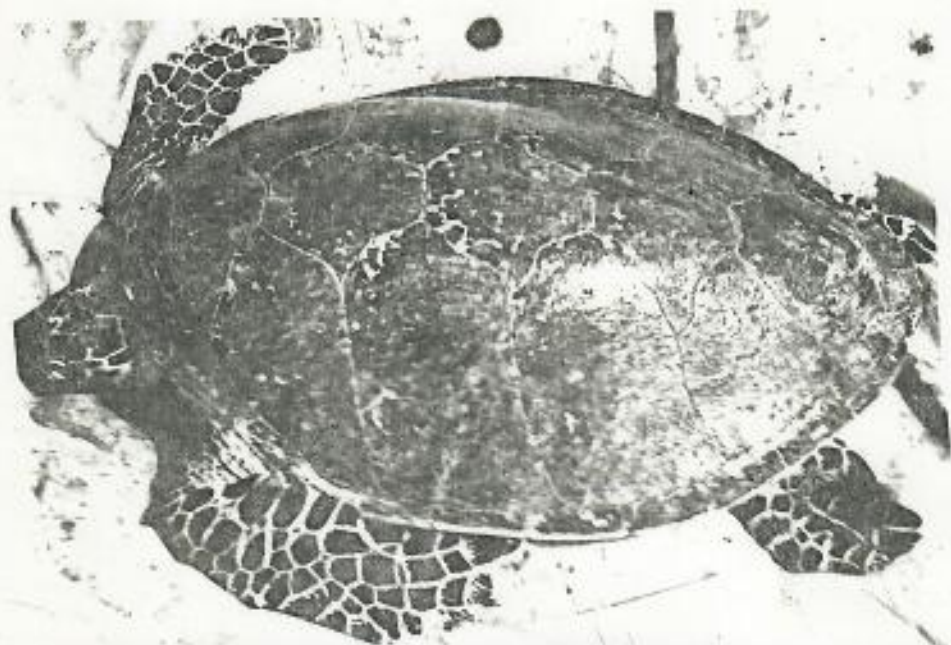


Figure 1. Adult male hawkshell illustrating pigmentation, squamation, and morphology of dorsal (upper) and ventral (lower) surfaces.

or emerging hatchlings. The sand is medium coarse broken shells and corals, extending inland as far as the jungle where it blends into packed soil and root masses. Most nests were 1-2 m inside the beach vegetation at the north end of the beach.



Figure 2. Adult male hawksbill head illustrating pigmentation, squamation, and morphology of lateral (upper) and dorsal (lower) surfaces.

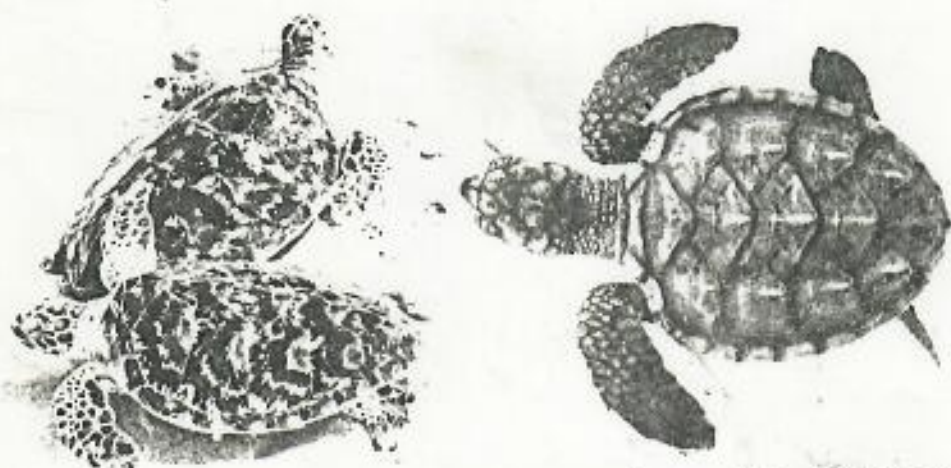


Figure 3. Juvenile (left) and hatchling (right) hawkshills illustrating pigmentation, squamation, and morphology of the dorsal surfaces.

The largest nesting island is Nu'utele, approximately 1,650 m long, 850 m wide, and 200 m above sea level. There are two nesting beaches, Nu'utele and Vini. Nu'utele beach, located on the eastern side of the island, is 350 m long and 12 m wide from the low water mark to the vegetation. The beach slopes uphill gently to the edge of the vegetation where there is a steep 0.75 m high sand bank that hinders access to the vegetation. The reef extends from the beach to 40 m offshore before dropping off into deep water. There is no beach rock and the sand is medium coarse broken shells and corals. Most nests were 2-3 m inside the beach vegetation, and no section of the beach was preferably nested upon. Vini beach, on the northeastern side of Nu'utele Island, is 600 m long, with an excellent passage through the reef and has no obstructions or beach rock. Privately owned property inhibited the collecting of detailed turtle information during the nesting season.

Nu'ulua Island is approximately 700 m long on each side and 108 m above sea level. The nesting beach on the eastern side is 350 m long with 50 m sections of rock rubble at both ends. There is a uniformly steep 6 m slope from the low water mark to the vegetation line and 20 m of level vegetation to the jungle. The approaches to the beach are blocked, in sections, by large rocks and by the shallow 30 m wide reef. The entire length of the beach has a 2-3 m wide layer of beach rock at the low water mark and forms an obstacle to the nesting turtles and a formidable barrier to hatchlings. The beach is composed of coarse broken shells, corals, and rocks. Most turtles nested 2-4 m inside the vegetation on a 20 m section in the middle of the beach.

Nesting Season

The nesting season extends from September to July, with January and February being the peak months. Figure 5 depicts the estimated total number of turtle tracks found on the four beaches during the 1971-72 nesting season. The beaches had large differences in numbers of nesting turtles as well as different nesting season periods. The smaller the total number of nests on a beach, the shorter was

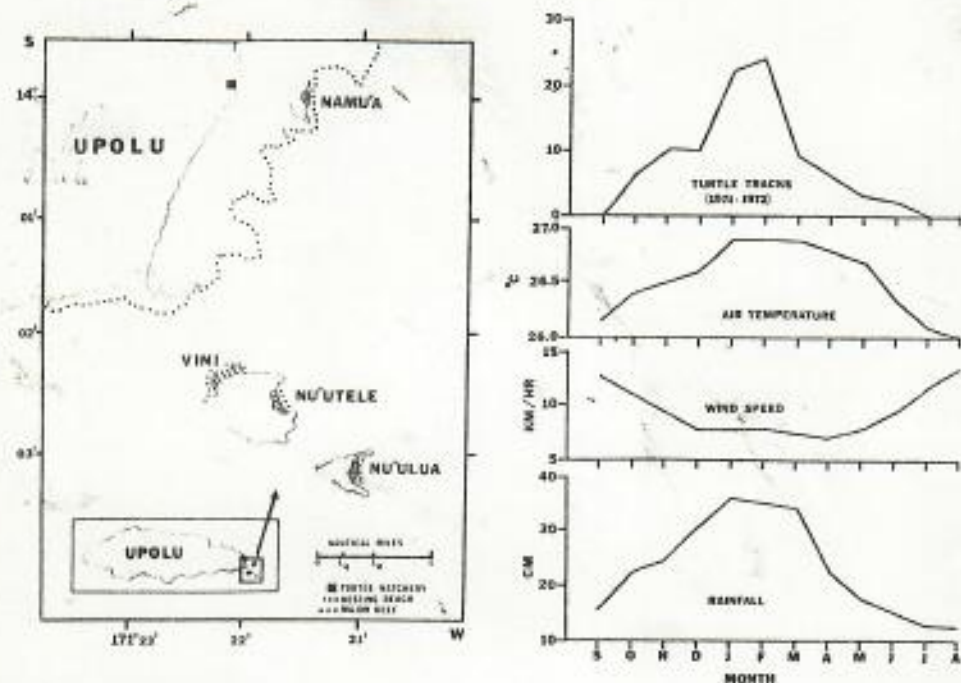


Figure 4. The hawkbill nesting islands and beaches of Western Samoa.

Figure 5. The number of hawkbill tracks found on the beaches during the 1971-72 nesting season and the prevailing weather conditions during the nesting season.

the nesting season. These differences resulted from varying amounts of human predation pressure upon nesting females and eggs, predation being proportional to the ease of beach accessibility. Beach accessibility is defined in terms of distance from the mainland reef and ease of passage through the beach reef. The beaches were ranked from the smallest to the largest (percentage of total nests, shortest nesting season, and easiest beach access): Namu'a (4%, January-February), Vini (7%, December-March), Nu'utele (11%, November-April), Nu'ulua (78%, September-July).

Climatological data (Fig. 5) from the Apia Weather Observatory is summarized for 1953-73, showing increasing air temperature and rainfall and decreasing wind speed during the nesting season.

Eggs and Incubation

A sample of eggs from 23 transplanted nests from the 1971-72 nesting season was analyzed from laying through hatching (Tables 1-3). For parameters involving excessively large numbers of measurements per nest, a sample of 10% of the eggs was used.

Nest characteristics (Table 1), with the exceptions of egg diameter and weight, are highly variable. This variability was seen through the nesting season and could be attributed to the wide size range of nesting turtles. Although we were only able to tag and measure the carapace length of seven comparatively small nesting turtles, larger turtles were seen captured by the Samoan fisherman. Also,

Table 1. Samoan hawksbill nest characteristics

	\bar{x}	SD	Range	N
Depth to top of nest (cm)	26.96	6.44	11.0-36.5	23
Depth to bottom of nest (cm)	46.22	4.81	34.5-54.0*	23
Weight of eggs (g)	24.40	1.06	23.0-25.9	3*
Diameter of eggs (cm)	3.47	0.06	3.4-3.6	23*
Number of eggs	149.57	41.66	60.0-219.0	23

* 10% of these nests were measured.

large size differences of tracks found on the beaches were noted. The mean, standard deviation, and range of the seven measured nesting turtles is 68.6 cm, 4.76 cm, and 60.0-73.5 cm.

The eggs are spherical and white. Although abnormal shaped eggs were rarely seen, three clutches contained 1-3 yokeless lumps, all spherical and averaging 1.5 cm in diameter.

Incubation and hatching parameters for the 23 clutches are also highly variable (Table 2). The mean number of transplanted eggs is smaller than the mean number of eggs per nest (from Table 1) because several eggs per clutch were broken when locating the nest with sharp sticks. The day after emergence each clutch was excavated and all unhatched eggs opened to determine the percentage of undeveloped eggs and percentage of dead embryos. These incubation and hatching figures correspond closely with those nests left undisturbed on the nesting beaches.

Most hatchlings (77.27%) emerged in the late afternoon when sand temperatures fell below 29°C. The shadow caused by the high rock cliffs on the western side of each nesting beach accounted for this daylight hatching (full darkness begins around 2000 h).

Nest temperatures were measured at the center of the egg mass and averaged a maximum increase of 3.6° (range 2.7°-5.0°C) over the sand temperature at equal depth. Nest temperatures were affected by clutch size and the prevailing weather conditions; the larger the clutch, the higher the rise in temperature, and the less fluctuation from adverse weather. Periods of heavy rain lowered the nest temperatures 0.55°-2.2°C and lengthened the incubation period 4-6 days over clutches of equal size free from rain.

Neonate hawksbills were very uniform in size (Table 3). They were healthy and no abnormal hatchlings were seen; very few died after emergence during the first weeks of captivity before release.

Table 2. Incubation and hatching of transplanted Samoan hawksbills

	\bar{x}	SD	Range	N
Number of transplanted eggs	145.70	41.06	59.0-213.0	23
Percent eggs hatched	71.12	21.71	35.4-91.8	23
Percent eggs undeveloped	22.95	22.17	3.6-79.5	23
Percent dead embryos	6.40	5.65	0.0-26.0	23
Number of incubation days	62.00	2.58	59.0-70.0	23
Time of day hatched*	1820	0145	1500-1930	17

* For daylight hatches only; 77.27% of the clutches hatched in daylight.

Table 3. Measurements of neonate Samoan hawksbill turtles

	\bar{x}	SD	Range	N*
Carapace length (cm)	3.96	0.08	3.8-4.1	23
Carapace width (cm)	3.08	0.08	3.0-3.2	23
Plastron length (cm)	3.29	0.09	3.2-3.4	23
Head width (cm)	1.38	0.04	1.3-1.4	23
Eye width (cm)	0.46	0.05	0.4-0.5	20
Weight (g)	12.73	0.51	12.1-13.2	3

* 10% of these nests were measured.

Predation on Eggs and Hatchlings

The nesting islands and surrounding waters abound with potential predators of eggs and hatchlings. Polynesian rats (*Rattus exulans*) are the only mammals found in abundance upon the nesting beaches, though traces of wild pigs were found on Nu'utele and Vini beaches. The ghost crab (*Ocypode* sp.) exists in great numbers on all of the beaches near the high water mark. The hatchlings, which must traverse the open beach upon emergence, are surrounded with potential predators. The belt of ghost crab holes must first be passed, then the section of beach rock. The rock itself is a formidable barrier, and upon this rock lives a large population of grapsoid crabs averaging 6-10 cm carapace width.

The nesting islands support large populations of sea birds throughout the year. They consist of different species of boobies, terns, tropicbirds, frigatebirds, petrels, and shearwaters.

Potential reef predators are numerous in both numbers and species: needlefish, barracudas, jacks, groupers, and sharks. Pelagic predators include: bonito, skip-jacks, tunas, dolphins, and sharks. The pelagic predators, with the exception of sharks, are often seen in schools within 0.5 km of the beaches.

Natural predation upon Samoan hawksbill eggs and emerging hatchlings seems to be a relatively unimportant factor contributing to the apparent decline of the turtle population. All of the species of rats, birds, and crabs have been termed "potential" since we did not see any evidence of egg or hatchling predation during our observations on the beaches, though the mortality rate from tunas, dolphins, and sharks is undoubtedly high. We witnessed one instance of a 1.5 m black-tipped reef shark (*Carcharhinus spallanzani*) attacking a group of freshly released turtles 1.5 km east of the nesting islands. Daylight hatching may relieve some predation pressure because the turtles swim across the reef before nocturnal feeders—such as groupers and sharks—become active; the hatchlings reach deep water in darkness when bonitos, skipjack, and tuna cease surface feeding. Human predation on hawksbill eggs and nesting turtles, however, is severe; almost all nests not removed or concealed by the Fisheries Division are collected by Samoan fishermen.

CONCLUSIONS

Hawksbill Ecology and Status in Western Samoa

A segment of the hatchling and juvenile hawksbill population stays near Samoan reefs year-round. We observed that small hawksbills (4-40 cm) frequently foraged the Samoan reefs; a 2-year fish-market survey in the capital city of Apia also supported these observations. We notched the eighth left marginal shield on 1,720 hatchlings before releasing them; we had seven returns, all within 12

months. The notch remained perceptible for 14 months on turtles reared in captivity. Possibly the most important factors explaining the low return rate (0.4%) are poor identification by the local fishermen, high mortality by pelagic fishes, and passive migration away from Samoa by oceanic currents.

Mature hawksbill turtles were also sighted by us throughout the year, but they were seen in abundance only during the nesting season. Samoan fishermen are not equipped to capture large turtles from the ocean, thereby explaining the absence of mature turtles in the marketplace. It is not known whether most of the adult hawksbill population migrates and, if so, how far or in what direction. Recaptured turtles marked with Western Samoa tags have not been reported.

The Western Samoa hawksbill turtle resource is a small remnant of the former nesting population. Extensive human predation upon eggs and nesting females has exterminated all turtles reported to have once nested on the excellent mainland beaches. The three small islands off the eastern coast of Upolu Island now support only sporadic nesting activities, and only one beach, Nu'ulua, holds any promise of continued nesting. Relative inaccessibility to this beach is undoubtedly the principal reason for the survival of this lingering nesting population.

The Western Samoan Government has not passed protective legislation or set aside the nesting islands as wildlife refuges. There is little chance of either of these protective measures becoming law in the near future. The Fisheries Division, however, followed up the turtle survey with a conservation program of its own, in which 50-75% of all clutches found are collected, hatched on the mainland, raised in captivity for 3-4 weeks, and then released at sea near the nesting beaches. Uncollected nests are concealed and observed (Witzell 1972; 1974).

There is no indication of an increase in the nesting population at this time, though there is an increase of juveniles reported in the market, and the imminent extinction of the Samoan hawksbill is likely to occur if the hatchery program fails to substantially increase the numbers of nesting turtles and if the eggs and nesting females continue to be taken by Samoan fishermen.

ACKNOWLEDGMENTS

I thank W. Travis, V. Matagi, P. Muller, M. Muench, and the Western Samoa Fisheries Division staff for their invaluable help during the turtle survey. I also thank S. Collard and S. Fofonoff for reviewing various versions of this manuscript.

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Witzell, W. N. 1972. To live or not to live. Int. Turtle Tortoise Soc. J. 6: 32-35.
———. 1974. The conservation of the hawksbill turtle in Western Samoa. South Pac. Bull. 24: 33-36.

DATE ACCEPTED: April 2, 1980.

ADDRESSES: (W.N.W.) Fisheries Division, Western Samoa. PRESENT ADDRESS: National Marine Fisheries Service, Southeast Fisheries Center, 75 Virginia Beach Drive, Miami, FL 33149; (A.C.B.) Late of the Fisheries Division, Western Samoa. Died at Nu'ulua Island during the turtle survey.

- Hirth

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Mr. G. H. Balazs,
Jr. Marine Biologist,
Hawaii Inst. of Marine Biology,
P.O. Box 1346,
Kaneohe,
Hawaii 96744

19th June, 1975

Dear Mr. Balazs,

In response to your letter published in the March 1975 issue of Pacific Islands Monthly, I would inform you that there exists in Western Samoa a turtle ranching operation which collects the eggs of Green Sea Turtles and Hawksbill Turtles from the nesting beaches at the western end of the island of Upolu and subsequently releases hatchlings back to the sea.

Hatchlings from each nest are identified by shell nicking and the Fisheries Officer to whom I spoke told me he had not received any reports from other parts of the Pacific of marked turtles being caught. In his opinion the Western Samoan turtles were non-migratory.

It may be however, that some of his turtles have migrated to French Frigate Shoals which are nearly due North of the Samoan beaches located at 14°S - 171°20'W.

For further information I suggest you write to Mr. W. Travis,
Chief Operations Officer,
Ministry of Fisheries,
Western Samoa

Yours sincerely,

A.F. MacGillivray

A.F. MacGillivray

AFM/Ped

FORM CD-45
(REV. 3-76)

U. S. DEPARTMENT OF COMMERCE

2. CHECK APPROPRIATE BLOCK

SUPPLY, EQUIPMENT OR SERVICE ORDER

 PROCUREMENT OTHER (Specify)

Bill

FOR: **National Marine Fisheries Service**

1. THE NUMBER SHOWN IN BLOCK 5 MUST APPEAR ON ALL SHIPMENTS AND/OR DOCUMENTS RELATING TO THIS ORDER ↓

3. REQUISITIONER DOCUMENT NO.

4. BUREAU CONTROL NO.

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9. QUOTATION REF. OR CONTRACT NO.

open market

10. DISCOUNT TERMS

11. DELIVERY
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shipping point

12. GOVT. B/L NO.

** ship PREPAID & ADD

13. DELIVERY DATE

14. FUNDS AVAILABLE (Budget Office)

14a. STATION

15. LINE NO.	16. DO NOT USE	17. DESCRIPTION	18. QUAN- TITY	19. UNIT	20. ESTIMATED TOTAL CGST	21. ACTUAL	
						UNIT PRICE	TOTAL COST
1.		Tags, self-piercing monel metal, style #4-1005, size 1 consecutively numbered 1 thru 2000 stamped with lettering 'VSAH'	2000	ea			
2.		Pliers, applicator for above tags	2	ea			
<p>** Please ship PREPAID AIR & ADD shipping charge as separate item on your invoice.</p>							

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23. SIGNATURE APPROVING OFFICER

DATE

TITLE

TITLE

24. ACCOUNTABLE
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25. NOT AVAILABLE-
 BUREAU STOCK/
EXCESS

INITIALS

26. SIGNATURE-BUREAU CONTROL OFFICER

27. NOT AVAILABLE-
 DEPARTMENT
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INITIALS

28. APPROVAL

DATE

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DATE

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E. nakamura

3/16/81

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 TRADE-IN RECEIVING REPORT33. SEND INVOICES
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TO: →

Southwest Fisheries Center
Honolulu Laboratory
2570 Dole Street
Honolulu, HI 96822-2396

May 15, 1986 P/SWC2:GHB

Mr. Lui A. J. Bell
Fisheries Marine Biologist
Fisheries Division
P. O. Box 206
Apia, Western Samoa

Dear Lui,

Many thanks for your letter of April 29th concerning my earlier correspondence asking about a tagged sea turtle reportedly found in Western Samoa. I appreciate the efforts you have made to resolve this important mystery.

If the man who bought the turtle from Mr. Maoluma mailed the tag to the inscribed address (University of Hawaii), it has either been lost or has not yet been delivered here in Hawaii. Turtle tags with the University inscription and postal zip code have had an excellent record of being delivered properly and made available to me here at the National Marine Fisheries Service. Tags with that address were used during the nine years that I worked for the University of Hawaii. It is therefore very likely that I tagged the turtle in question. Unfortunately, the three 5's you mentioned as being part of the number are not sufficient to pinpoint the original tagging data. No tags were used that had a 500 number series.

It was my understanding that the turtle captured may have had two tags on it--one on each front flipper. If this was indeed the case, perhaps the man who bought the turtle kept one tag and mailed the other. You might want to inquire about this possibility when you locate and speak to the man in person.

I have enclosed one of our tags (No. 6981) so you can see first-hand its size, style, and inscription. Perhaps it would be worthwhile to show it to the man and ask if it is like the one he saw.

Again, thank you for your assistance. I hope that we are successful. Best regards.

Sincerely,

George H. Balazs
Zoologist

cc: Balazs
HL

P.O. Box 206,
Apia,
Western Samoa.



Government of Western Samoa

Your Ref:

Our Ref:

Telephone 20-369

DEPARTMENT OF AGRICULTURE, FORESTS, AND FISHERIES
FISHERIES DIVISION

29 April 1986

Dr. George H. Balazs
U.S. Department of Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Centre
Honolulu Laboratory
PO Box 3830
HONOLULU, Hawaii 96812.

Dear Dr. Balazs,

Your letter of 10 February 1986, to the Chief Fisheries Officer here, concerning the Tagged Turtle caught off Mulifanua in Western Samoa, was referred to me.

Well, after numerous attempts to contact Mr. Lavatai Mailagi at Aggie Grey's Hotel, I finally succeeded today. He told me where Mr. Maoluma Salima lived. I visited him (Mr. Maoluma) this morning and was able to obtain the following informations:

- the turtle was caught off Mulifanua village (near Western Samoa's International Airport).
- it was brought to the Apia Fish Market and was bought by a shop owner in town with the tag intact.
- Mr. Maoluma wrote, on a piece of paper, informations on the tag but has lost it. He could only recall that the University of Hawaii was on it and three 5s (555).
- Mr. Maoluma went back to the man who bought the turtle and asked for the tag but the man told him that he had already sent it to the address on the tag.

Mr. Maoluma was in a hurry to go somewhere so he didn't have time to show me the man who bought the turtle. I will try to get hold of the man through Mr. Maoluma for more informations of the tag's whereabouts. But it might be worth checking with the Department concerned in the University of Hawaii whether the tag ever came.

Yours sincerely

L. A. J. Bell

Lui A J Bell

FISHERIES MARINE BIOLOGIST

W. Samoan economy continues down

APIA (AFP) - The value of Western Samoan exports continued a free fall in the wake of a devastating blight on the main export crop, the Central Bank's quarterly report said on Friday.

The value of exports in the first quarter of this year were 57 per cent lower than on the same quarter last year.

The country's gross reserves were also falling as a result.

Taro, Samoa's main export crop and also the backbone of

subsistence farming, was hit 18 months ago by a fungus, closely related to the pathogen which caused the Irish potato famine in the 1840s.

It has already destroyed 90 per cent of the crop.

In the first quarter of 1993, taro exports earned 2.6 million tala (SA1,222,650) but in the first quarter of this year, raised just 56,000 tala.

The bank report said Western Samoan beer exports were down 22 per cent and cigarette imports down 10 per

cent.

It said the country's gross reserves at the end of March were enough to buy 4.3 months worth of imported goods and services. In March 1993, the figure was 6.8 months.

Imports have fallen 21 per cent.

However, the first quarter deficit this year was 15 million tala, double the figure recorded for the same period last year.

The Daily Post - Fiji

8/2/94

A22 Sunday, July 31, 1994 The Honolulu Advertiser

Pacific island leaders meet

By Geoff Spencer

Associated Press

SYDNEY, Australia - Soaring populations, disappearing rainforests and polluted waters are just part of the grim agenda for leaders of small South Pacific island states meeting this week in Brisbane.

Heads of government from the 15-nation South Pacific Fo-

rum start their annual conference tomorrow and plan to tackle an alarming array of social, economic and environmental problems threatening the future of many islands.

"Whatever policies we've been following in the South Pacific... are demonstratively not working," Australian Pacific Island Affairs Minister Gordon Bilney said recently.

Rainforests are fast disappearing and fish stocks are being exploited at an alarming rate by foreign companies, which provide little cash benefit to indigenous populations.

Coral reefs are dying off from pollution and sewage.

Some islands are regularly hit by disasters, such as hurricanes and earthquakes. Others, according to the worst case

over a paradise almost lost

scenarios of greenhouse effect advocates, could disappear under rising seas levels triggered by global warming from the industrialized world's pollution.

The islands are distant from markets. Apart from Papua New Guinea, which is rich in minerals and oil, most islands have few natural resources or can produce little in the way of manufactured exports.

These cash-strapped economies have small hope of meeting raised consumer expectations among young islanders inspired by satellite television and better education.

Urban slums and poverty are becoming commonplace as traditional village-lifestyles break down.

The forum groups Australia and New Zealand with Papua

New Guinea, Fiji, Vanuatu, Western Samoa, Tonga, Niue, Cook Islands, Solomon Islands, Tuvalu, Kiribati, Federated States of Micronesia, Marshall Islands and Nauru.

When it began in 1971, forum gatherings were humble international meetings. Heads of government literally sat together on woven mats and quietly discussed common issues.

GHB

The Conservation of Sea Turtles: Practices and Problems¹

PETER CHARLES HOWARD PRITCHARD

Florida Audubon Society, Post Office Drawer 7, Maitland, Florida 32751

SYNOPSIS. The various techniques in common use for conservation and restoration of depleted sea turtle populations are reviewed, namely: banning international commerce; operating artificial hatcheries, both in the natural beach environment and in styrofoam and other types of incubators; "head-starting" of hatchlings in captivity; protection of nesting females by means of beach patrols; and translocation of eggs or hatchlings to distant areas from which turtles have been extirpated or to which it is desired to introduce new colonies. The difficulties of monitoring the results of all of these techniques are discussed, and potential dangers or disadvantages of each approach are reviewed. It is concluded that, until unequivocal data become available, turtle conservationists should continue to pursue common sense or logically sound restoration programs, but should constantly re-evaluate their actions in the light of the latest available knowledge and modify or desist from current approaches as necessary.

Nearly all sea turtle biologists, sooner or later, become turtle conservationists, at least by sympathy, and frequently as a major part of their professional activities. The reasons for this metamorphosis are clear enough; those who work in the field with sea turtles are inevitably distressed as the animals they study are slaughtered, often while actually on the nesting beach. The eggs too are all too frequently raided, either by man himself or by predators that in many cases have been introduced to the system by man or allowed to form unnaturally high population densities as a result of man's tinkering with ecological balances. Moreover, while there are still places being discovered where large sea turtle populations still exist, the evidence is reasonably clear that most populations are on the retreat. The hordes of green turtles whose annual migrations to the Cayman Islands once actually assisted navigators in getting a directional fix on Grand Cayman are now not even a memory, having disappeared over a hundred years ago. The Kemp's ridley population, confined to a single nesting beach in Mexico where 40,000 individuals were seen nesting on one day in 1947, is now on the brink of extinction, with only a few

hundred breeding females left. The olive ridley population in Surinam—the only population of this species in the West Atlantic—is similarly slipping out of existence before our very eyes; and sea turtles have long since ceased nesting on practically every island in the Pacific Ocean inhabited by man.

Conscientious observers of sea turtles have thus initiated many courses of action during the last two decades designed to slow the slaughter and reverse the trends towards extinction of sea turtle populations. Virtually all of these stratagems have been well-conceived, and, having personally been involved with sea turtle conservation for fifteen years, I am convinced that they are good. But sea turtle conservation remains without a theoretical framework, and almost all techniques that have been used remain unproven and riddled with paradox. Turtle conservationists are still unsure whether it is wiser to permit exploitation of turtles themselves and to protect their eggs, or to allow a controlled egg harvest and to protect the turtles themselves—though their instincts incline most of them, including myself, to the latter. One of the main problems is that sea turtle populations appear to respond slowly and unpredictably to both stress and to conservation measures, and monitoring of a population, at the present state of the art, can only be done by counting the number of females appearing on nesting beaches. Moreover, this technique has se-

¹ From the Symposium on *Behavioral and Reproductive Biology of Sea Turtles* presented at the Annual Meeting of the American Society of Zoologists, 27-30 December 1979, at Tampa, Florida.

rious shortcomings. The maturation time of sea turtles under wild conditions is still not known; it appears to be very variable, and the populations of the green turtle, at least, that have been studied do not appear to even approach the known potential growth and maturation rates observed in well-fed captive individuals. Consequently, the results of increased recruitment as manifested by increased numbers of adults arriving to nest will not be visible for an unknown but considerable number of years. Even then, the response to protection may be masked by other factors. In the case of the green turtle especially, the number of females observed to nest in a given season, even in the case of an abundant, unexploited, and presumably stable population, shows astonishing variation. Examples on record are those of Carr *et al.* (1978), who showed that an estimated 15,426 green turtles nested at Tortuguero, Costa Rica in 1978, only 5,723 in 1974, and 23,142 in 1976; even more dramatically, Limpus (1978) showed that green turtle nesting failed almost completely in Australia in 1975-76, when only 19 turtles nested at Heron Island, whereas 1,100 had nested there the season before. It will be clear from these examples that a multi-year average will need to be taken for an index of the status of the overall population to be obtained. Things are not quite so bad with the other species, however, and populations of loggerheads and ridleys, for example, appear to show relatively steady year-to-year trends, though again inexplicable "good" and "bad" years are not unknown.

In recent years a few turtle biologists have attempted some preliminary population modeling with various sea turtle populations. It is much harder to produce these models than to criticise them, and the attempts are entirely laudable. But no model yet has predictive capability and some have been based on seriously defective biological information bases, or simplistic assumptions in such parameters as maturation time that render the models more of the nature of academic exercises than interpretations of reality. Bustard (1979) provides a good, though already

dated, review of the problems one encounters in attempting to derive an accurate picture of the population dynamics of any sea turtle species; such essential parameters as the sex ratio at hatching—or at maturity or the average number of nesting seasons that a given adult female will survive, remain unknown. In several publications, René Márquez of Mexico and his co-workers have attempted to derive population models for the Mexican Pacific populations of *Chelonia* and *Lepidochelys* (e.g., Márquez and Doi, 1973; Márquez *et al.*, 1976, 1979). These are probably the most sophisticated models that have yet been produced for sea turtle populations; but they still rely on an extremely deficient data base, the age of maturity being derived from observations on a small number of captive individuals. Moreover, assumptions on levels of human predation are derived from tag returns, whereas spontaneous shedding of tags is known to be extensive for many sea turtle populations. It should also be recognized that in many areas tags are not returned by fishermen, either because the turtles were caught illegally, or because the tags are retained as trinkets or souvenirs.

The population of loggerhead turtles nesting on Little Cumberland Island, Georgia, U.S.A., has been extensively modeled by James Richardson and his associates; but again, conclusions are confusing. Richardson *et al.* (1978) reported on their studies of this population between 1965 and 1976, and concluded from the linear regression line of the percentage of untagged individuals found nesting each year that recruitment to the population was zero; but after only three more years of observations, these authors concluded that the same population showed a complete turn-over of breeding females over a cycle of between 5 and 6 yr!

Similar paradoxes abound in the writings of other sea turtle population experts. For example, Bjorndal (1979) plotted survivorship curves for nesting cohorts of green turtles at Tortuguero, Costa Rica from 1955 onwards, and concluded that the population was headed inexorably for extinction, with progressively decreasing

survival prospects for each cohort as the years went by. Yet the same population showed no overall decreasing trend during the years of observation, and indeed the 1976 and 1978 nesting cohorts were the two highest on record. However, these two seemingly incompatible observations may be explicable: the upturn in the population may have been a recent phenomenon resulting from the closure of the commercial exploitation of the population on the Nicaraguan feeding grounds, while the cohort survivorship curves could not be drawn for years subsequent to the early 1970s because a turtle was only deemed to have failed to survive if it was not recorded back on the nesting beach within 4 or 5 yr. Known tag shedding (leaving a detectable scar) is also a complicating factor, as is tag shedding of which no evidence is detectable (*i.e.*, complete healing of the tag wound). Turtles returning to nest outside the 5-mile area of intensive patrolling also would be unlikely to be detected, and might well be dismissed as having failed to survive. Also, the population in recent years may not be in as good shape as it might seem since the very good years of 1976 and 1978 were adjacent to poor years.

We thus see that we cannot expect to see results quickly when we attempt to protect or conserve a sea turtle population, and we are often forced into stratagems that simply seem to be commonsensical or logically bound to be good for the species rather than procedures that are "tried and true" in the strict sense. I have been party to all of these approaches, believing strongly that the absence of certainty as to the best approach is no justification for failure to act. But lest we get completely carried away by the conviction that our efforts are indeed saving sea turtles, and fail to maintain a constant critical appraisal of our efforts, it is worth reviewing the different things people try and do to save sea turtles, to judge whether these techniques are indeed as purely beneficial as we might think. I apologize in advance to anyone who is offended by this procedure; my own ox will get gored at least as severely as anyone else's.

Sea turtle conservation efforts usually fall into one of the following categories:

1) The passage of laws to prevent sea turtles from featuring in international commerce.

2) The protection of nesting female turtles from poaching by the establishment of beach patrols.

3) The movement of eggs to beach hatcheries or to artificial incubators such as styrofoam boxes, with release of hatchlings as they emerge.

4) Maintaining hatchling turtles in captivity for a period of time until they have grown sufficiently to be deemed safe from the majority of hatchling predators ("head-starting").

5) The distribution of hatchling turtles (or eggs) from a healthy breeding population to areas where the turtles have disappeared due to over-exploitation.

Scenario 1: An international ban on the use of sea turtles and their products in trade

This is an approach to which most turtle conservationists, including myself, have subscribed, the rationale being that if a turtle product is harder to sell because markets have been closed, prices will be lower and pressure on populations will drop. Through this argument, conservationists have been successful in getting sea turtles placed on Appendix I of the CITES Convention, listed as endangered or threatened under the US Endangered Species Act, and so on. However, a different interpretation of the potential or actual effect of such an approach has been described to me by Sr. Antonio Suarez, the world's largest industrial user of sea turtles, which we should consider carefully. I am not yet ready to espouse it, but we certainly need to face it.

Suarez agrees that, in the developed and wealthier countries, where poaching is controllable and where the income that could be generated from turtle exploitation can be denied without causing problems, total protection of sea turtles is perfectly workable. However, he warns that in countries where significant numbers of people are hungry, and where

governmental resources, especially in law enforcement, are inevitably directed strongly towards commercial areas, a flat ban may be simply a comfortable illusion that the situation is under control. Suarez regards exploitation of sea turtles as inevitable in such places—of which Mexico is his prime example—and the real question is not whether to do it but how to do it. He feels that there are definite benefits from having the highest possible price for turtle products—benefits not just for the industry, but also for the turtle populations themselves. His rationale is this: if a turtle industry is potentially highly profitable, large-scale entrepreneurs (such as himself) will move in, and, working with government (which will also now show serious interest because of the money involved), will devise a plan that will institute some rational controls on the exploitation, and which will subsidize such measures as protection of nesting beaches by such means as a tax levy on each turtle caught or sold. Suarez argues that, without worthwhile profits, the turtles will be killed wastefully and no money will be available to be turned back into management and conservation of the species.

As an extension of this argument, Suarez observes that, while it may be true that in a pure uncontrolled market situation, the more valuable we allow the species to become, the more people will devote themselves to hunting it, in Mexico the reverse may in fact be the case. A fisherman needs a certain target income in order to meet the payments on his boat, feed his family, and so on. A turtle quota that is too low to allow him to meet this target income will meet with his opposition, and he is likely to go outside the law if such a quota is insisted upon. However, Suarez argues, a fisherman may be willing to accept, say, a 50% reduction in turtle quotas if each turtle can be made twice as valuable; and, with access to high-paying international markets, it may indeed become possible to offer him the higher prices that will make a lower quota acceptable. After all, a lower quota means less work, and fishermen are not against conservation on principle; it is

just that they often feel they cannot afford it, and in such places as the Pacific coast of Mexico, there may be few economic alternatives available to them apart perhaps from marijuana cultivation.

Suarez' final blow to me was his affirmation that, when the United States banned the importation of olive ridley products, the annual take of this species in Ecuador doubled promptly, as fishermen struggled to meet their target income with a reduced value for each turtle.

I do not want you to accept this argument without first attacking it as vigorously and as thoughtfully as you can. But I feel it is dangerous for us to ignore it. I personally would base my reply to Suarez on questioning the inevitability of turtle exploitation in Third World countries. Such nations as Surinam, Costa Rica, and others have demonstrated that not only wealthy countries can afford turtle protection; other nations have demonstrated strong protective policies in certain areas of their jurisdiction, and predatory policies in others—for example, Mexico protects ridleys on the Gulf Coast, and Ecuador protects all sea turtles in the Galapagos Islands, but the same nations practice rapacious exploitation of ridleys on their Pacific coasts.

These examples show that Third World countries *can* protect sea turtles, both by law and in reality; and where it seems difficult we simply have more work to do in locating economic alternatives.

Last week I was exposed to somewhat parallel arguments on the economic necessity of exploiting sea turtles while attending a South Pacific Commission meeting on sea turtle resources held in New Caledonia. Representatives from several South Pacific archipelagic nations argued vigorously that the Japanese market for hawksbill products was a fact of life, like it or not; and they definitely did like the inflated prices now being offered. They felt that the hawksbill was not demonstrably depleted in their territories (though the time span of their observations was, in one case, only one week, and in other cases not much longer), that fishermen were going to go on catching them, and they consid-

ered a ban on trade in the species an example of purist elitism that failed to recognize the economic imperatives of Third World.

We argued about this for some time, without getting anywhere, when an interesting compromise was proposed. This was that an Organization of Hawksbill Exporting Countries should be formed—OHEC, if you like—that could set up controls on exploitation, only admit to its membership those nations that had adequate and properly managed hawksbill populations, and that could in general establish controls over what was at present a totally unmanaged species. Japan has recently started making a few noises too about making some concessions toward hawksbill management, ranging from size limits on imported specimens, a ban on the import of stuffed souvenirs, and the establishment of hawksbill farms—possibly, according to present plans, in the United States Trust Territory. As the discussion developed, it was suggested that both exporting and importing countries should form an entirely closed cartel, denying market access to those countries that were not doing right for their hawksbills.

I see great potential dangers in our changing our hawksbill policy in mid-stream, but, as with the arguments of Antonio Suarez, we should consider everything. The OHEC proposal at least does not recommend that we open any new markets, but just try and bring existing markets under control.

One final point should be mentioned as to why a simple ban on taking or trading may not be the sole salvation of sea turtles. As we all know, one of the major pressures on the essentially non-commercial Kemp's ridley, loggerhead, and possibly also flat-back turtles is the incidental capture of the animals in trawls. The ban on taking the Kemp's ridley, under any circumstances, is certainly utterly necessary in view of the critical status of the species; but, by placing a shrimp trawler in violation even if he catches a Kemp's ridley quite innocently and releases it as soon as he brings it on board, we are cutting ourselves off from a source of information that is vitally nec-

essary to the declaration of critical marine habitat for the species. Clearly we need to establish controls or no-trawling zones in those areas where incidental capture of ridleys is most probable and demonstrable; but we have outlawed those who may provide the very data we need, on where trawlers most often catch ridleys.

Scenario 2: Protection of nesting female turtles from exploitation by means of beach patrols

Clearly this is one of the keys to any turtle conservation program. The nesting phase is the most vulnerable one of all, and a couple of poachers with cutlasses can, by working a nesting beach, kill every nesting female turtle in half an ocean, in the extreme case. A turtle killed on the beach early in a nesting season may have gone on to lay many hundreds of eggs, and no decent country permits the exploitation of turtles under such circumstances.

Yet again, there is something we should consider. There is no arguing that a breeding female turtle early in the nesting season is a critically important member of the species. But how important is a female at the end of the nesting season?

In the case of the green turtle—though the picture appears to be similar for other species—the great majority of tagged female turtles are never seen back on the nesting beach in subsequent years; and, having the strongest philopatry of all sea turtle species, there is no evidence that they go to other beaches. Hughes (1979) has summarized the remigration percentage for green turtles in five different populations. The highest return rate was from Surinam, where the patrol crews are likely to see every turtle nesting. Twenty-four percent of tagged female turtles were found nesting again in subsequent years. Only 11.8% remigrants were found at Tortuguero,² 1.8% at Ascension Island, 0.9% in Sarawak, and, on the tiny, easily and thoroughly patrolled nesting beach at Heron Island, Great Barrier Reef, only 1.0% of turtles were ever seen nesting again, even though the population is protected and not exploited.

² But this rate has increased in the last two seasons.

Is my conclusion that we should allow female turtles to be exploited when they have finished nesting for the season? My answer is no, but only because I do not believe the data. I am personally of the belief that a significant—usually large—proportion of Monel tags will drop off tagged turtles in the interval between nesting seasons. While some tags will stay on for a decade or two, and others that are shed will leave a permanent and detectable scar or tear at the tagged site, others, I am convinced, are shed and the scar heals over virtually undetectably, or at least is undetectable to a harried beach patroller tagging sand-covered, uncooperative turtles under cover of darkness. Some of the low return rates too are attributable to far-from-complete beach coverage by patrol personnel, as at Ascension Island, for example.

Incidentally, some nations have established turtle laws that protect the younger turtles and allow exploitation of the adults. This is the same kind of size-limit that one would apply to lobsters or oysters, and I do not know for sure whether it is good or bad. I suspect bad, because if you allow anyone to take big turtles, they are going to be tempted to take them off nesting beaches. The reverse type of size limit—protection of breeders and exploitation of immatures, such as some South Pacific nations have established following Harry Hirth's consultancy recommendations—may be much better. Young turtles are fast and circumspect and are able, to a certain degree, to look after themselves. Moreover, even turtles well past post-hatchling life are still highly susceptible to predation by such beasts as tiger sharks, and, as we have also learned in recent years, a half-grown turtle may still require several decades to reach maturity.

So I am still convinced that those individuals that have survived the vicissitudes of their long pre-maturity period, namely the breeders, are the most important ones to protect. I simply find it hard to accept that a creature that takes fifty years to mature will have one breeding season and then, in the vast majority of cases, die before it breeds again, though I suppose

there are parallels to such a population model among salmon, or among hapaxanthic palm trees. But these are imperfect comparisons, because in those species we know reproduction to be a programmed one-time culmination of life, whereas with sea turtles we know that some individuals can survive for three, four, or five nesting seasons.

Scenario 3: *Establishment of hatcheries or artificial incubation of eggs in styrofoam boxes*

There is no question that, when turtle eggs are subject to total or near total predation, either by man or by feral or wild animals, something should be done. Probably the best thing to do is to control or intercept those predators in some way, so that the eggs will be left to hatch *in situ*. Other cases exist where a substantial proportion—possibly even nearly all—eggs are being lost by beach erosion, and although this may be natural, in some areas beach erosion is an unnatural artifact of the Corps of Engineers and their foreign equivalents attempting to manipulate or stabilize shorelines that would really be better off without such controls. In such cases, it may be deemed desirable to enhance the turtles' chances of reproductive success by moving the eggs to a safer place.

Hatcheries are important and in some cases vital. But the temptation should be resisted to move eggs on principle. The public relations value of a neat hatchery with rows of wire circles, each perhaps marked with small colored flags, in which the total productivity of a certain turtle beach is housed, does not outweigh the fact that in almost all cases, movement of eggs, by the techniques usually used, reduces hatching percentage from perhaps 90% to 50–70%, and if only, say, 25% of eggs were doomed to destruction by natural predators, erosion, etc., the hatchery may actually constitute a net drain on the population. Moreover, we still do not know the means by which a turtle relocates the beach of its birth when the time comes for it to nest; and until we have such knowledge we must accord particular importance to the early minutes and hours of a turtle's life, at which stage "imprinting"

may take place. Any deviation from natural procedures at this stage may cause a turtle to fail to re-migrate to the right place when it matures and needs to nest; and the artificial confinement of hatchlings within wire mesh cages until the sun is up, or the placement of turtles straight into the sea without letting them run down the beach, may short-circuit vital imprinting mechanisms. I doubt if this is the case; I doubt if turtles, that have survived so long, are that delicate; but the possibility exists.

Perhaps a more realistic possibility is that hatchery-produced turtles will not enter the sea at the optimal stage of their infantile activity frenzy, and will be subject to excessive nearshore predation; or that, by releasing hatchery turtles at a particular time and place every morning, predators may become familiar with the routine and gather accordingly. So, run a hatchery if that is the only option for getting any reasonable hatchling productivity on a given beach; but try and make the location of the hatchery one that duplicates that of a natural nest as closely as possible; and duplicate nature as closely as possible during the potentially critical early hours, from emergence at the sand surface to entering the sea. And bear in mind that a hatchery is very much a case of all of one's eggs in one basket. A hatchery, like the biblical city on a hill, cannot be hid, and will be a standing temptation to all of the usual egg predators, including man, unless it is well guarded. Localized erosion too could sweep one's entire hatchery into the sea; and nests placed close to each other in endless rows in a large hatchery may well generate sufficient metabolic heat to raise the overall temperature a few degrees above that which is natural, which, as we now know, may have profound influences upon the sex ratio of the hatchlings. Another danger is that, if a hatchery is established year after year in the same place, the residues of the eggs from seasons past may well introduce bacteria or toxic decomposition products into the new nests.

Many workers have found that hatching eggs in styrofoam boxes promotes control and protection of nests from environmental inclemencies and predators of all kinds,

from ants to man. In fact, some very impressive hatching percentages have been achieved by workers using such incubators. However, as we have learned at this conference, the danger exists of severe distortion of sex ratios. Our information on this subject is still fragmentary, and we still do not know the natural hatching sex ratio for any sea turtle species; but experiments under constant-temperature conditions (and styrofoam boxes are good enough insulators for the temperature within to be nearly constant) show that only a few degrees deviation from the optimal temperature can produce an almost or completely monosexual brood.

One of the problems too with running a hatchery is that it is very difficult to monitor survivorship of the young turtles produced. Various means have been proposed or actually utilized from time to time to mark hatchlings in ways that will allow them to be identified in later life; but the difficulties of marking a 30-g animal in a way that will still be obvious when it weighs 150 kg are massive. One potential method is the insertion of permanent needle-like magnets in the body cavity, but these could only be detected in the adult by means of a large and bulky magnetometer. There is potential for biological tagging of some kind, using the animals' own immune responses to provide a permanent testable reaction; but this again will have the disadvantage of requiring elaborate mechanisms to detect. Another difficulty results simply from the enormous number of hatchlings that must be tagged in order to have a reasonable likelihood of a few being found when they grow up and nest; most authorities assume that only two or three out of a thousand hatchling sea turtles are likely to survive to maturity, so many thousands must be tagged to make an experiment worthwhile.

One technique that may be more successful than others is that of excision of a certain marginal scute, together with the underlying bone, from large series of hatchlings. If a different scute is excised each year, the year-class of the animal will be evident thereafter. This method has been used in Australia, in South Africa, and in

Florida, and there is no question that in subsequent years turtles have been caught that seemingly had been treated in this way. The problem is that one can never be sure that the injury was not inflicted by some natural cause or accident, especially when the wound heals in such a way as to blur the angular edges of the initial incision. Just last week I saw a carapace of a beautiful two-thirds grown green turtle in the Loyalty Islands. This shell had the posterior marginal on the left side missing, and it may well have been a specimen marked as a hatchling by Bustard or Limpus in Australia; but it is impossible to be sure.

Scenario 4: *Head-starting*

Because of the massive post-hatching mortality in any sea turtle population, it is natural to attempt to circumvent this loss by raising at least some of the hatchlings produced for a year or so in captivity, until they are too big to be swallowed by avian and most marine predators. It is generally recognized, though, that the technique is unproven, and the danger of short-circuiting imprinting mechanisms is even more severe than in the operation of a hatchery. There are other problems too; captive-raised turtles are likely to become "tame," and to associate the appearance of man with feeding time; when released, they may ill-advisedly swim over to boats which may be occupied by people less benign than, say, Jim McVey.

A policy question that must be addressed for any head-starting operation is that of where to release the turtles; should they be treated as "big hatchlings," and released on their natal beach, to crawl into sea and enter the same currents that they would have entered as hatchlings? Or should they be released in places where similar-sized wild individuals of the species already occur? In the absence of any good knowledge, one might guess that the first technique might favor imprinting, but the second favor survival. There are a lot of things that could go wrong, and at this stage the most sensible precaution is to submit only a small percent of the hatch-

lings from a given beach to the head-starting process.

I might add that, for those who are looking for support for head-starting programs, a recent paper by Travis (1979) may be of interest. Travis reported on 81 hawksbills in Samoa that were raised for just four weeks in captivity, marked with shell notches, and released. The rationale for such a short period of head-starting was not that the turtles would outgrow their predators, but that they would lose their infantile buoyancy, and, being able to dive freely, they could escape birds, start feeding straight away, and so on. Anyway, these turtles were released, 4-wk old, on 3 March 1970. On 8 June 1971, fifteen months later, no fewer than 57 of the original 81 were recaptured about 17 mi west of the point of release; the turtles were reported to be still somewhat aggregated. Eight years after the release, in May 1978, Travis reports that adult turtles were once again being caught and were being offered for sale in the Apia Market; and that 11 of 17 adult turtles examined in the market showed traces of the shell-notches that had been placed on the 1-mo old turtles! Fishermen too reported that notched turtles had been caught while mating and had been seen nesting (Ross Witham, take heart!).

Does this mean that we should invest major resources in head-starting every hatchling turtle we can lay our hands on? My answer again is no, because I do not believe the data.

Scenario 5: *Release of hatchling turtles at points a long distance from the nesting beach where the eggs were laid*

This was the procedure followed by Archie Carr during the celebrated "Operation Green Turtle," in which hatchling green turtles from Tortuguero were released at a number of sites around the Caribbean at which green turtles had once been common. Carr feels that the experiment was a failure, though this conclusion may be premature—we are only now learning how slowly green turtles may grow, and the released turtles may not yet be old enough to show up on nesting

beaches. Moreover, in some of the places that the turtles were released, such as Antigua and Colombia, green turtles are once again being reported.

We are presently involved with a plan to start a breeding colony of Kemp's ridley at Padre Island, Texas, by transplanting eggs from Rancho Nuevo, three hundred miles down the coast, hatching them in Texas sand in boxes that are flown to Padre Island, and allowing the young turtles to imprint on the Padre Island seashore by being allowed to run into the sea there. The US Fish and Wildlife Service is also involved in a similar plan with the loggerhead at the Chincoteague Wildlife Refuge, in an attempt to establish a thriving colony of this species at the northern limit of its breeding range.

A question that should be asked for programs of this kind is: Even if successful, is the result desirable? If turtles are not already to be found nesting in the new locations, this may be because the habitat is unsuitable; or if the turtles were formerly there but have been exterminated by man, this same exploitation pressure may eliminate the incipient new colony. My feeling is that this type of program represents a legitimate experiment, and if the proportion of eggs or hatchlings utilized for translocation is kept low, the only objection may be that this should be a low priority for expenditure of scarce conservation funds.

CONCLUSIONS

While little that we do is proven, even less is disproved. Taking no action to save the disappearing sea turtles is indefensible; we should continue to do what informed common sense suggests; and the greater the risk of a given conservation procedure, the fewer eggs or turtles should be subjected to such manipulation. Keep open minds; no single way will work,

but between us, with our combined intelligence, knowledge, and insights, I believe we can save sea turtles from extinction.

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Tinilau's Turtles

ONCE LONG AGO, there lived a man named Tinilau. He was very handsome. People say that everyone loved him because he was always happy and was always kind to people. Everyone knew where Tinilau was by the laughter and by the perfume of his *ulafala*¹, which seemed to follow him everywhere.

Tinilau's *fale* was very close to the sea. The music of the waves and the boom of the rollers lulled him to sleep day and night. In this sleepy and peaceful house he kept a rooster to wake him in the mornings. All the villagers knew the early call of the rooster, and, like Tinilau, they too waited for its 'cock-a-doodle-doo' to call them to their daily work.

The rooster was not the only pet Tinilau had. Besides other animals, he had three turtles which he kept in the sea close to his *fale*. These turtles had become so very widely known that people from all over the island used to come to see them. They were so big and so strong that Tinilau used them to carry himself and any luggage he might have on his trips between the islands.

When he went on a journey, he would pack all his clothes and gifts, and then tie them to the back of the first turtle. The second turtle would carry the food and green coconuts, whilst the third turtle, which was the strongest and the gentlest of them all, would carry Tinilau. This last one was his favourite.

One day, a stranger from Fiji came to Tinilau's island, and because he had nowhere to live, Tinilau asked him to come and stay in his house.

The stranger's name was Ae. Ae lived happily in Tinilau's house for nearly three years. He was given the best that his host could find.

¹ *Ulafala*, a necklace made from the pandanus fruit.

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Tinilau's Turtles

Stories of Old Samoa
by Fanoaofi
M'ia'h
1960

As the whole village loved Tinilau, everyone went out of his way to make Ae comfortable and happy. Every day the guest would follow his host around when Tinilau went to feed his pet animals. Of all the animals his host had, Ae liked the turtles best of all. In spite of Tinilau's kindness, Ae envied him for having such wonderful pets. He was so jealous of Tinilau, that he decided to try to destroy them before he returned to his own country.

One evening Ae and Tinilau sat down to eat. A gentle sea breeze cooled the house, and also fanned the sea, making millions and millions of wavelets on the usually calm lagoon. When the moon began to climb in the sky, Tinilau said goodnight to his guest; but before he went to bed, Ae told him that he would like to return to Fiji as soon as possible, as he had been away from home longer than he had expected. Tinilau assured him that he would prepare everything for his journey back to Fiji on the next day.

Ae did not go to sleep that night. He was kept awake by the bad and ungrateful thoughts he had against his kind host. When the rooster called out that morning had arrived, Ae cursed it, for he had just fallen asleep.

The news of Ae's departure soon spread from house to house, and everyone came to Tinilau's house bringing gifts of *tapas*², mats and fine-mats and food for Ae. Towards the afternoon, everything was ready for the journey. There was food enough for a month's journey, *tapas* and mats for a whole village.

When the sun was half way on its journey to the west, Tinilau called his three pet turtles. Before the crowds who had come to see the visitor off, Tinilau told his turtles what they were to do.

² *Tapas*, cloth made from the bark of a tree.

Willing hands tied the huge bundles of mats and clothing on the first turtle, and food and green coconuts on the second, while the third was told specially by its master to take great care of his passenger.

Timilau touched his visitor on both cheeks and then begged him to look after his pet turtles. He asked Ae to send them back as soon as they reached Fiji. To all this, Ae gave his word of honour that he would see that no harm came to the turtles.

The journey then began. Timilau stood on the shore and watched until the far horizon swallowed the three specks that were his pet turtles. He returned to his house and waited for their return.

Perhaps you would like to know how Ae treated the turtles? As soon as he knew he was out of Timilau's sight, he called out to the turtle which was carrying the food and green coconuts, to come closer. Ae took one green coconut, and instead of cracking it with his stone knife, he cracked it against the head of the poor gentle turtle on which he was riding. That was the beginning of the ill-treatment of the turtles.

The animals, however, were as faithful to their master as Ae was unfaithful to his word. So although they were ill-treated they continued on the long journey just as their master had told them to do. At long last the first scattered islands of the Fiji group were sighted. If the turtles could have spoken they would have shouted with joy and relief, for the long, long trip had come to an end.

Alas for the poor turtles, more trouble was still to come. When they finally arrived, the turtles which carried the food and gifts dropped their bundles on the beach and then fled. Over the reef they waited for their brother. They waited throughout the night. They waited all the next day. Still

there was no sign of their brother. Then the two turtles decided to go over the reef and into the lagoon to find out what had happened. What they saw made them very, very sad. The waters of the lagoon were a light shade of pink with the blood of the third turtle, for cruel Ae ordered his people to kill it.

Back in Samoa Timilau waited and waited. He began to feel worried because his turtles were three days overdue. On the next morning two of his pets arrived. He could see by the sad and tired way the turtles jumped the reef that all was not well. He counted them. One two he wondered where the third was. He wondered, for he could not believe that anyone could be so unkind as to kill his favourite turtle. However, what he suspected must be true. The stunned look in the eyes of his two turtles could mean only one thing—his kindness to Ae had been repaid by an unkindness.

Timilau, the happy and kind man, was changed to an angry one. He hated unkindness to people and above all to animals. When the sun sank down in the west, when the darkness of the tropical night suddenly covered the land, Timilau walked to where the land met the sea. Above the roar of the breakers, Timilau called to the spirits of those who had passed on to the west. He called them to help. He called them to bring back Ae to his home without delay.

Late that evening Ae slept in Timilau's house once again, for the spirits had heard Timilau's call. Ae slept on, lulled by the continuous murmur of the sea, fanned by the gentle breeze which never seemed to leave Timilau's house. Towards morning, Ae turned over in his bed of mats and fine-mats and said to himself. 'This bed reminds me of the one I slept in when I stayed with stupid Timilau'. He immediately

Tinilau's Turtles

turned over and went to sleep again, thinking all the while how good it was to be home in Fiji again after all those years in Samoa.

When it was nearly morning the call of Tinilau's rooster rang out in the clear morning air. Ae heard the call and again he said to himself, 'My word, how musical! That rooster reminds me of the one which sat on my miserable host's housetop'.

The first rays of the morning sun brought Tinilau to Ae's bedside. Imagine Ae's surprise at seeing his host before him. He rubbed his eyes, but the vision was still there. He thought to himself, 'Surely this is only a bad dream'. He looked around him. Everything he saw made him realise that this was no dream. He could not explain to himself how he came to be in Tinilau's house when a few hours before he had fallen asleep in his own house in Fiji.

Realising that he was at the mercy of Tinilau he said in a very humble voice, 'Tinilau, I sit here, but behold I am only Ae'.

Perhaps you would not understand the full meaning of this saying, because the English words cannot give the sense of the Samoan language. '*Ou te nofo atu sua o a'u o Ae*', means that one is extremely sorry; it can mean that one is so small, so evil and so ungrateful that all that is left worthy to be considered by the other person is the name—'Ae'.

Ae then asked Tinilau for mercy. He asked that his life might be spared. Tinilau, being a kind person, punished him but spared his life.

Ever since then, the Samoans when they wish to ask forgiveness for some very serious offence, always begin their pleadings by saying, 'As I sit here, behold I am only Ae'.



Above the roar of the breakers Tinilau called to the spirits for help