CHRONOLOGY OF TRIPS TO ROSE ATOLL SUBSEQUENT TO THE WRECK OF THE *JIN SHIANG FA* ON 14 OCTOBER 1993.

Date	Participants (science staff excluding ship based NOAA divers)	Purpose
16-18 October 1993	E. Flint, J. Hale, G. Grant, and F. Tuilagi	preliminary damage damage assessment
2 - 6 November 1993	E. Flint, M. Molina, J. Naughton, G. Balazs, K. Harbison, ? P. Craig, F. Tuilagi, G. Grant, P. Trail, J. McConnaughey, J. Russo, A. Kindig	damage assessment turtle tagging, terrestrial monitoring
28 Nov - 9 Dec 1993	S. Barclay,	removal of wreck from reef, damage assessment, *Cenchrus* control
23-31 March 1994	K. McDermond, G. Grant, H. Demerest J. Hale, M. Molina, J. Maragos, G. Mauseth	physical damage assessment, deploy rodenticide, terrestrial monitoring
24-29 October 1994	P. Craig, A. Green, H. Freifeld, F. Tuilagi, G. Balazs, J. Craig, M. Rice	fish and clam survey satellite telemetry on turtles, terrestrial monitoring, ground-truth aerial photos
8 - 11 April 1995	E. Flint, P. Craig, C. Newton, E. Henry, A. Tualaulelei	algae survey, terrestrial monitoring
6- 15 August 1995	M. Molina, S. Miller, J. Burgett, S. Stubbs, R. Helm, P. Colla, R. Ricker, P. Gabrielson, A. Green, F. Tuilagi, E. Henry	damage assessment
21 - 26 October 1995	H. Freifeld, G. Balazs, D. Woodside, M. Butzen, A. Tualaulelei	satellite tracking turtles
2 - 5 April 1996	N. Palaia, C. Solek, H. Freifeld	terrestrial monitoring

25 Jul - 2 Aug 1996	D. Palawski, M. Molina, J. Burgett, D. Woodside, C. Solek, E. Henry, F. Tuilagi, P. Gabrielson, B. Prewett	damage assessment terrestrial monitoring
10 August 1996	N. Palaia	U.S. Army Corps of Eng. survey for military debris
24 Jan - 1 Feb 1997	R. Poetter, E. Flint, C. Solek, J. Burgett S. Vink	terrestrial monitoring iron and aluminum conc. in water check algae transplants, dye flow exp.
2 -6 Feb 1998	D. Williamson, C. Willis, D. Woodside, T. Webb, J. Seamon	terrestrial monitoring
19 - 21 April 2000	E. Flint, G. Phocas, P. O=Connor	terrestrial monitoring
22-25 February 2002	E Flint, J. Maragos, J. Seamons, , J. Burgett, S. Fa'aumu	terrestrial monitoring algal surveys, reef assessments
5-6 May 2004	E. Flint, L.A. Woodward, J. Maragos J. Burgett, G. Smith, P. Eves	Reef monitoring, Pisonia treatment, terrestrial monitoring
July - August 2004	S. Barclay, J. Maragos, G. Smith J. Burgett, P. Gabrielson,	Reef metal removal, Algae ecology
14-22 January 2005	J. Maragos, K. Schletz, E. Tardy	Reef metal removal turtle survey Pisonia monitoring

TRIP REPORT

Rose Atoll National Wildlife Refuge
January 14th-January 22nd, 2005

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Purpose of Trip: Survey Rose Island for the presence of nesting sea turtles in addition to assessing the status of wildlife and prospects for future wildlife work in remote islands for SWG-CWCS planning.

Background:

Sea turtle activity in Rose Atoll National Wildlife Refuge (American Samoa) has been reported as early as 1873 (Tuato'o-Bartley, 1993). Sporadic flipper tagging occurring on Rose Island since the 1970's has resulted in the tagging of 46 nesting green turtles as of 1993 (Balazs, 1996). It is estimated that 24-36 green turtles were nesting there in the early 1990's (Tuato'o-Bartley, 1993). Turtle surveys on Rose Island since 1993 have included daytime surveys (i.e., looking for crawls and/or presence of turtles) that were conducted by DMWR biologists in 1997 & 2002 in conjunction with other wildlife work.

Although Rose Atoll NWR is protected by strict laws and its isolated location, nesting green turtles are still at risk because they migrate to areas outside of US territorial waters (e.g., Fiji) (Craig et al., 2004). Continued monitoring at the NWR is necessary to assess any trends in population numbers and mitigate threats at both local and regional levels.

Methods:

NIGHTLY SURVEYS

1. Beginning shortly before dusk (~1830) and ending shortly after sunrise (~0530), hourly walk around the perimeter of the island looking for fresh crawls. Rely only upon ambient light so as not to frighten away potential nesting turtles.

2. Upon discovery of a fresh crawl, follow it to locate the nesting turtle. Approach the turtle from behind in order to remain undetected. Observe the turtle using ambient light and record the following:
    a. Time of emergence/discovery, tide at emergence, duration of nest digging/egg laying, time of return to sea
    b. Number of body pits/egg chambers dug prior to the actual nest
    c. Number of eggs laid, if any
    d. GPS location of nest
    e. After eggs have been laid and covered, use a headlamp (soft, red light) to do the following:
        i. Confirm species
        ii. Measure CCL and CCW in cm
        iii. Determine presence of flipper tags and record any tag numbers
        iv. Note distinguishing marks or features and overall condition of the turtle

3. Upon discovery of a hatchling, look for other hatchlings and locate the nest, if possible. Count number of hatchlings and GPS nest location (GPS site of entry into the sea if nest is not found). Confirm species. Note incidence of predation or other factors affecting hatchling survival.

Results:

The MV Tokelau departed Pago Pago Harbor around 1500 on January 14th and arrived in Rose Atoll NWR at approximately 0500 on January 15th for a total travel time of about 14hrs. For the purpose of this report, January 14th is Day 1 of the trip.

I conducted daytime surveys (i.e., counts and GPS of existing sea turtle nests) on Days 2, 7, and 8 totaling approximately twelve hours. Nighttime surveys were conducted on Days 2, 3, 4, 5, and 7. Rather than camping on the island, I slept on the MV Tokelau during the day, returned to the island around 1800, and departed the next morning around 0700 on most days. The survey on Day 6 was cancelled due to inclement weather and rough seas making it unsafe to enter the channel into the lagoon.

Between Days 2 and 8, six new nests were counted. Of these, two were confirmed by visual observation during egg laying and four were discovered within a few hours of the nesting event. Nests were identified primarily by the existence of a noticeable escarpment formed at the end of a nesting event when a turtle throws sand using its front flippers to mask the nest. Four additional "possible" nests were identified as such due to ambiguous features and/or an inability to determine the day on which they were made (possibly prior to Day 1). A total of three false crawls were identified between Days 2 and 8. One false crawl was discovered on Day 2; the other two occurred on Days 6 and 8 and were made by the same turtle (visual confirmation). Nests occurring during the trip were distributed evenly around the island. None of the three turtles seen had flipper tags.

Six separate hatches were observed during the trip. Two of these hatches were significant with 30+ hatchlings counted. They both occurred around dusk on opposite sides of the island (SW and E). The other "hatches" each involved one to four hatchlings around dusk, with one hatchling discovered at 2430. These small numbers likely represent the last few stragglers from a larger hatch on a previous night. Additional hatches probably occurred during the week, but were not detected. During the week, five dead hatchlings were found; one was found at the entrance of a crab hole, two had severed heads (possibly inflicted by birds), and one was found inland, body in tact. Several black-tipped reef sharks were observed near shore in the lagoon throughout the night on all nights. These sharks were observed eating hatchlings and appeared to be enjoying a "feeding frenzy" during one of the larger hatches. The greatest concentration of black-tipped reef sharks was regularly observed on the western (lagoon) side of the island.

Although I did not personally visit Sand Islet, a member from the Moana Divers crew (contracted to clean up a shipwreck on the reef) reported on Day 2 that he had counted eight "nests" under the existing shrubs on the islet. Although these "nests" may have been false crawls, it is evident that turtles nevertheless attempt to nest on the islet. Nests on Sand Islet are at risk of inundation during high tides and storms.

In addition to turtle activity, I was able to observe seabirds (at all hours and locations) and some invertebrates. The birds seem to be thriving. Brown noddies seemed to be most abundant on the island preferring the sand flat on the northern side. Common fairy terns, red-footed boobies, brown boobies, and sooty terns were also common. Other species identified were great frigatebirds, lesser frigatebirds, sandpipers, 1 whimbrel (possibly a bristle-thighed curlew?), and red-tailed tropicbirds. (This list is not complete; formal surveys were not

conducted.) Spiders, ants, and several types of land crabs were also abundant throughout the island.

I looked briefly at a few of the remaining *Pisonia* trees and noted that the scale insect is still present. Although some leaves and entire branches showed no evidence of the insect, other leaves on the same tree exhibited concentrations of the insect at the leaf stem. A small pool was discovered on the north side of the island just inland of the sand flat. The pool is home to four fish, representing three species. Some turtle egg shells were found near the pool. A turtle nest may have been inundated at this site.

Summary:

Green turtles have been nesting throughout Rose Island this breeding season since at least November (based on expected egg incubation duration). The data gained from this trip is insufficient to determine the number of females nesting on the island, although it seems reasonable that the number is close to that suggested by Tuato'o-Bartley (1993), 22-36. Nests are distributed throughout the island, with no side obviously preferred. Threats to hatchlings are natural predators (i.e., birds, crabs, and reef sharks) with reef sharks seeming to take the largest percentage of hatchlings upon entry into the sea.

Future research needs include continued monitoring, flipper tagging, and tissue sampling. Tissue sample data should be stored in a regional database to be compared to samples obtained in other areas of the Pacific. This data would help in determining the home range of the nesting green turtles on Rose Island. The fact that these turtles have been shown to migrate west to countries such as Fiji makes it imperative to create and support regional cooperatives/regulations to protect these turtles in both their nesting and feeding grounds.

Literature Cited

Balazs, G., 1996. Historical summary of sea turtle observations at Rose Atoll, American Samoa, 1839-1993. NMFS, Honolulu Laboratory, Hawaii (Unpublished report).

Craig, P., D. Parker, R. Brainard, M. Rice, and G. Balazs. 2004. Migrations of green turtles in the central South Pacific. Biological Conservation 116, 433-438.

Tuato'o-Bartley, T.E. Morrell, and P. Craig. 1993. Status of sea turtles in American Samoa in 1991. Pacific Science 47(3): 215-221.