

# Vava'u Turtle Monitoring Program

## Nesting Survey Report November 2012- January 2013



Supported By:



## **1. Background**

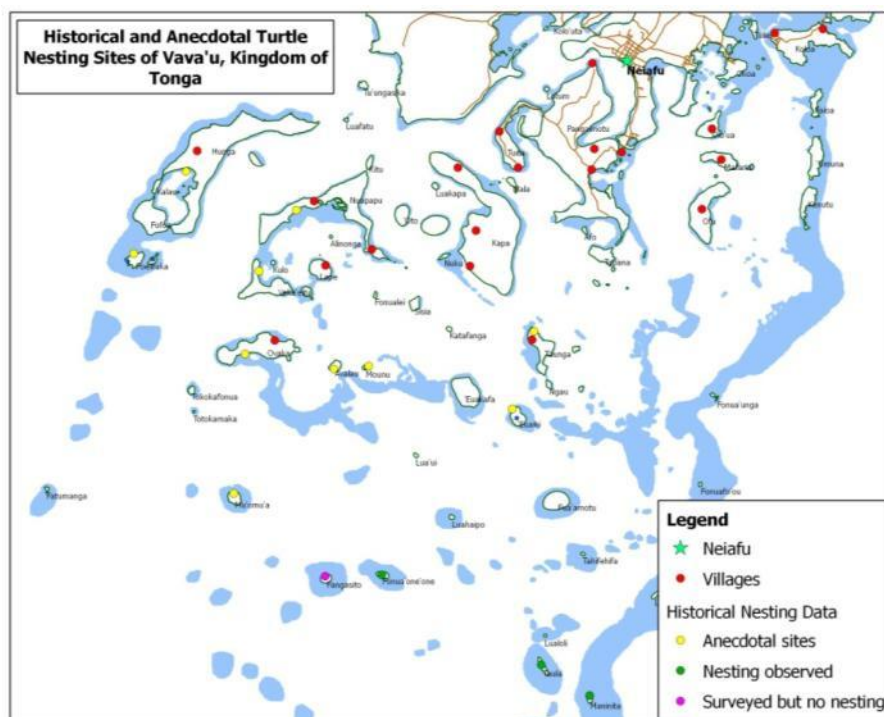
One of the main objectives for the Vava'u Turtle Monitoring Program was to establish the abundance and distribution of turtle nests within the Vava'u island group and to determine species nesting. The nesting season in the pacific region is from November to February with peak activity during December and January, which is when nesting survey efforts were concentrated.

### **1.1 Previous studies**

Prior to the establishment of this project, there had only been one nesting survey conducted in Vava'u in 1973. This survey was an add-on to a more intensive survey of the Ha'apai island group where it is thought that the majority of nesting occurs. The 1974 survey visited four of Vava'u's outer islands over the course of several days to look for evidence of nesting. The islands surveyed were Maninita, Taula, Fonua'one'one and Fangasito (figure 1). Of these islands, nesting activity was found on three, with Fangasito being the only island without observed nesting activity. In total, 5 nests were identified on Maninita, 2 on Taula and 2 nests on Fonua'one'one, all of varying ages with 6 of these nests showing signs of egg poaching. This brief survey indicated that there is limited turtle nesting in Vava'u and the nests that do occur are subject to poaching. The results of the 1974 survey indicated that nest poaching in Vava'u is a worrying trend and the interim years between this and the 1974 study could mean that there have been at least 28 years of unchecked egg collection. The long-lived nature of turtles means that we may only now be seeing the effect of this type of long term exploitation. New, ongoing nesting surveys are needed to establish the population status and trend of Vava'u's turtles.

### **1.2 Anecdotal nesting locations**

As part of the background research into Vava'u nesting turtle population, the VTMP project leader spoke to a number of different stakeholders from across the island group to try and establish an historical baseline for nesting locations. Stakeholders consulted included fisheries officers, fishermen, town officers, district officers, long term residents and tourism operators. Many people were happy to contribute their stories and these areas identified have been marked in figure 1. The yellow sites marked on the map indicate the anecdotal nesting sites that have been reported to the project over the past 6 months, one interesting factor to note is the correlation between locations of historical nesting sites and local villages.



**Figure 1:** Map to show the documented nesting sites of the 1974 survey (green), the surveyed sites where no nesting was found (pink) and the anecdotal nesting sites collected through stakeholder discussions (yellow). Also shown are the locations of the villages of Vava'u (red)

## 2. Methods

The 2012/13 field survey was conducted by project leader Kate Walker with logistical assistance from Joe Caesar, Ben Newton and Karen Stone. As no comprehensive survey of the nesting potential of Vava'u's beaches had ever been conducted, it was decided to survey as many of the groups beaches as possible during the nesting season. The surveys would be looking for evidence of nesting, suitability of beach for nesting, level of human activity on the beach and suitability of beach for inclusion in future surveys or works. The beaches throughout the group can either be accessed by road or boat, depending on their location and in-kind contributions were secured for the use of boats and cars to enable the surveys to be conducted during the November – January period, although the December-January period was the most intensive. All surveys were conducted during the day in the mid-low-mid tide cycle to ensure access. Permission was sought from land owners where necessary.

### 2.1 Road Access Surveys

Several of the beaches on the main island of Vava'u are accessible by car and these were surveyed at least once during the nesting season. Beaches that were deemed suitable for turtle nesting were surveyed a second time. The numbers of beaches on the main island represent a small proportion of the total number of available beaches due to the sheer cliffs that form most of the islands coastline.

## 2.2 Boat Access Surveys

Two methodologies were adopted for the boat based surveys:

**Shore based** – several of the beaches were on islands easily accessible from the main island by small boat. A 10 foot long fibreglass open boat was loaned to the project for these shore based surveys (figure 2). The near shore islands of the group were divided into several sectors (figure 4) depending on locations to leave the boat overnight and routes were designed to maximise the number of beaches surveyed in the most fuel efficient way. After the first survey of each beach, its suitability for nesting was determined based on substrate type, beach size at high tide and back-of-beach vegetation structure. Beaches that were deemed unsuitable for nesting were eliminated from future surveys and the routes were adjusted according. Notes were taken on each beach for future surveying efforts.



*Figure 2: A small dingy was used to access the beaches of islands close to the main harbour of Neiafu*

**Off-shore** – The outer islands were not accessible by day trips in the dingy, therefore a sailing yacht was made available for a 2 week intensive survey of the outer islands (figure 3) in the third quarter of the peak nesting season. The yacht was anchored in the safest southern anchorage ('Euakafa) and the 10 outer islands to be surveyed were divided into 2 routes (figure 4). Each route was visited on alternate days over a ten day period to ensure that a full nesting cycle was observed.



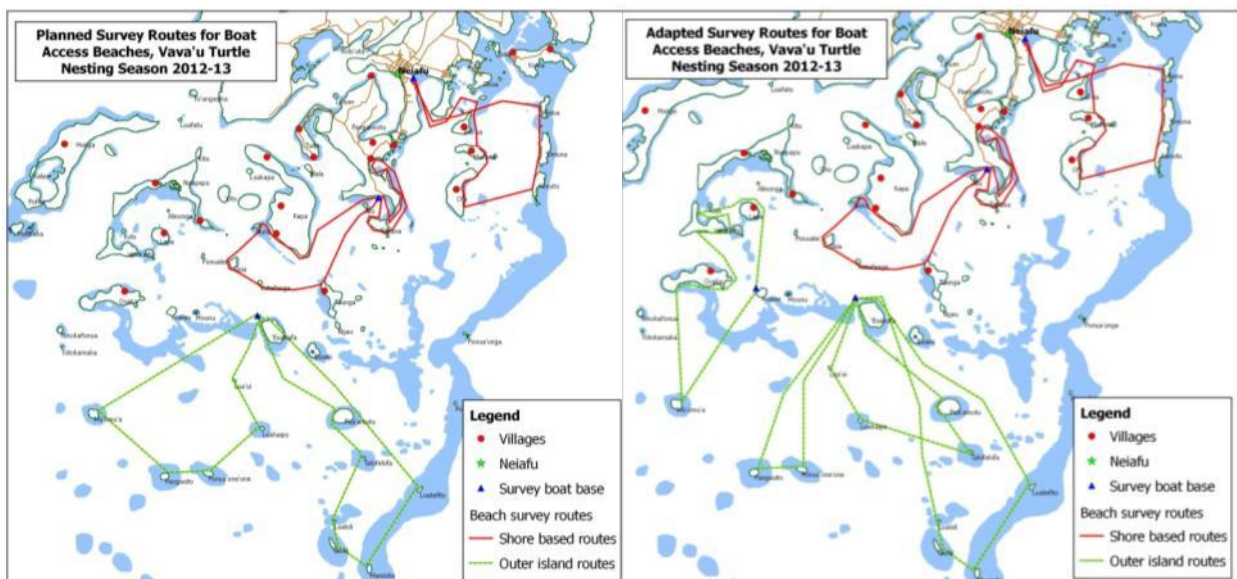
*Figure 3: Distances between island groups in the outer island was considerable and took many hours to visit*



### 2.3 Changes in the field

Once in the field it became apparent that the survey designs needed adapting and this was done in situ. The main change was the routing for the outer islands. Many of these islands were only accessible during the mid-high-mid tide range due to the shallow surrounding reefs. The two planned routes were too long to fall only within this tidal range, therefore the routes were adapted to group them according to tidal accessibility (figure 4).

The 10 day survey was interrupted by a tropical storm that passed through the island group and forced a 5 day break in the middle of the outer island survey.



**Figure 4:** Maps depicting the planned (left) and actual (right) survey routes for the boat based surveys. The red lines show the routes taken for the shore based surveys; the green lines are the routes from the anchorage bases. There were two planned routes for the outer island which were adapted to four routes and included additional beaches.

## 3. Results

### 3.1 Beach Summaries

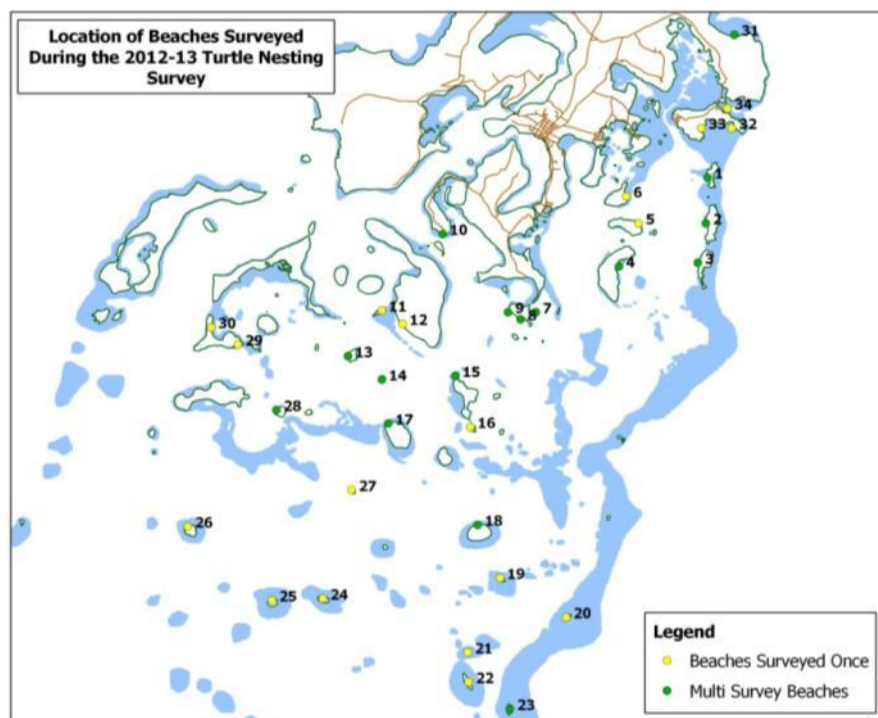
In total 34 individual beaches were surveyed from November 2012 to January 2013 (figure 6). For beaches on the outer islands, there was mostly one beach per island. Where multiple beaches were available for surveying, they have been numbered separately in the results table. Of these beaches, 18 were surveyed only once either due to nesting activity being found, unsuitability of habitat or unfavourable weather leading to lack of beach access (figure 6).

Figure 5 shows the typical habitat for good nesting potential and is indicative of the types of beaches which will be visited repeatedly as surveying efforts continue.

Table 1 provides a list of each of the visited beaches, along with their map reference number, a brief description of their characteristics and a level of human impact.



**Figure 5:** The typical habitat type for nesting hawksbill turtles. A sloped beach above the mean high tide mark and vegetation at the back line.



**Figure 6:** Map showing all beaches surveyed and approximate number of surveys showing single visit (yellow) or multiple visits (green).

Table 1: Descriptions of beaches visited during survey with associated human impact level (HIL) on a scale of to 5

Island/Beach Name	Map Ref #	Accessibility	Notes	HIL
Paloa	1	Easy access by dingy, limited beach at high tide	Not much nesting habitat at high tide	3
Umuna	2	Easy access by dingy, limited beach at high tide	Not much nesting habitat at high tide	3
Kenutu	3	Easy access by dingy, good high tide beach for the length of the island	Whole west shore of island is good nesting habitat but beach shows heavy use by humans for Umu. Popular island with fishermen. Very large seagrass bed on west shore with no records of turtles being seen there. Worth continued surveying to determine nesting. No tracks seen in 2012-13 surveys	4
Ofu	4	Difficult access at low tide with shallow reefs in-front of several bays. Good high tide beach on north section	Several beaches on east coast of island, northernmost is a great potential nesting site. There is a village on this island on the NW shore. Access to beach is difficult from sea but unknown from land for the villagers. This beach is worth continued surveys to determine nesting.	4
Mafana	5	Access at high and low tide, not much high tide beach	No stand out beaches here from a nesting potential point of view. There is one beach with a small resort on it with limited potential but it near villages so low chance of nesters.	3
'Olo'ua	6	Access at high and low tide, not much high tide beach	There is a village on this island and no impressive beaches from a nesting potential point of view. Close to mangrove system so sand tends towards mud.	4
Tapana 1	7	Easy dingy access. Small beach at high tide	Largest of the Tapana beaches with good potential habitat although limited sand available at high tide	3
Tapana 2	8	Easy dingy access. Small beach at high tide	Low chance of nesting habitat but small beaches and high tides do not justify a great survey effort here.	3
Tapana 3	9	Easy dingy access. Small beach at high tide	Low chance of nesting habitat but small beaches and high tides do not justify a great survey effort here.	3
Talihau	10	Road access, big beach at high tide	Reported that turtles have nested here and good suitable habitat but its a village beach with pressure from humans, dogs and pigs.	5
Nuku	11	Easy dingy access, big beach at high tide	Good high tide beach but back of beach is rock rather than vegetation so not very likely for hawksbills or greens	3
Kapa	12	Shallow reef access, can be navigated at low tide, big beach at high tide	Good potential beach with typical hawksbill characteristics but village is very close so its likely that all nester have previously been eaten. Signs of pig digging at the back of the beach.	5
Sisia	13	No dingy access at low tide, good high tide beach	Good potential site but small beach so surveying effort should be limited	2
Katafanga	14	No dingy access at low tide, good high tide beach	Good potential site but small beach so surveying effort should be limited	2
Taunga	15	Dingy access at low tide	Documented false crawl on northern shore.	4

		long beach at high tide	Village are known to catch turtles so needs further monitoring. Good potential beach for nesting apart from human pressure.	
Ngau	16	Good dingy access at low tide, small beach at high tide	Not very suitable habitat. Beach very small at high tide with dense trees at the back of beach	2
'Euakafa	17	Good dingy access at low tide, small but long beach at high tide	Some good potential sites on this long beach but no signs during surveys in 2013	3
Fua'amotu	18	Good dingy access at low tide through one channel on north. Can walk round most of island, probably all at low tide.	Good potential nesting habitat on northern shore – good high tide beach. Beach on southern shore is smaller at high tide and less suitable with much being underwater at high tide.	1
Tahifehifa	19	No dingy access high or low tide except on flat calm days – swim only. Good high tide beach	Small island with difficult access but good nesting potential . Has been reported as nesting beach in the past but not verified. As with other small islands, good chance of occasional nesters but small size and difficulty of access will limit survey efforts here.	0
Luatefito	20	Easy dingy access high and low tide, may need to anchor and swim in swells. Great beach all around at high tide. Can walk around at high tide.	Documented nesting beach (2013). Lots of good potential nesting habitat. Several tracks seen in 2013 survey – no confirmation of nests.	0
Lualoli	21	Difficult access at all tides. Can be swum on a clam day only. Good high tide beach	Small island and beach so but good potential habitat. Size of island and difficulty of access will minimise survey effort	0
Taula	22	Access by dingy only at high tide in one channel. Anchor and swim on days with swell. Great high tide beach. Can walk round whole island	Documented nesting beach (1974) still great potential habitat. Important bird nesting islands. No tracks observed but storms are likely to have destroyed any tracks during survey period. Signs of targeting island for harvesting chicks. No other reason to go there due to difficult access	3
Maninita	23	Good dingy access at all tides. Great high tide beach. Can walk round whole island.	Documented current nesting beach (2013). Seems to be most important nesting beach. Signs of human use as overnight camp with turtle BBQ evident	3
Fonua'one'one	24	Good lagoon entrance at low tide. Good high tide beach. Can walk around whole island	Documented current nesting beach (2013)	2
Fangasito	25	Access at high tide only due to shallow fringing reef. Anchor and swim in swell. Can't walk around island, steep beach. Good high tide beach	Very steep beach so good for nesting habitat. No tracks observed this time round but has good potential	0
Mu'omu'a	26	No dingy access to shore, swim in only on calmer days. Great high tide beach. Can't walk around island	Historical nesting reported here. No tracks observed this survey but have been recorded in recent years by expat. Worth studying but beach access makes intensive survey difficult.	0



Lua'ui	27	No access at low tide due to shallow surrounding reef. Good high tide beach, anchor and swim on days with swell at high tide.	Good nesting potential. Small beach so not worth extensive monitoring effort. No tracks observed.	0
Avalau	28	Great beach access high or low tide, good high tide beach. Can't walk around island.	Good nesting habitat. No tracks observed during survey period.	3
Vaka'eitu 1	29	Dingy access over reef at high tide. Need to anchor and swim in swell. Small high tide beach	Historical nesting reported here. Heavily used by local villages so likely hood of surviving nesters is low	3
Vaka'eitu 2	30	Dingy access at all tides, good beach at high tide	Not much high tide beach and lots of trees at back of beach. Not great nesting potential	4
Ketahi	31	Road access. Long beach with good sand beach at high tide on northern (left) side from track.	Lots of suitable nesting habitat on northern shore but heavily used for Tongan feasts on Sundays so limited likelihood of surviving nesters here	5
Koloa 1	32	Road access from village. Thin high tide beach	Lots of trees at back of beach. Lots of roots, not great potential for nesting	5
Koloa 2	33	Road access via new resort track. Small high tide beaches	Limited nesting potential. Close to village and sand slightly gravel.	3
Koloa 3	34	Footpath access from Koloa 2	Not suitable for nesting – small beach and gravel sand	3

### 3.2 Nesting surveys

In total, 14 surveys days were spent covering the 34 islands or beaches travelling approximately 250km by boat and car. The planned level of surveying was reduced due to an unusually high tropical disturbance frequency during the November to February cyclone season. The high storm surges of this unseasonal weather period further impacted the surveys by reducing the chances of observing nesting tracks on beaches.

The 1974 survey identified 3 nesting beaches with 9 nests (unconfirmed) in total. The VTMP 2012/13 nesting beach survey identified 9 individual turtle activities (figure 7), including potentially 4 nests, on the beaches of 5 islands (table 2). Of the 5 islands, only 2 had possible nests found during this survey season but the probability is high that the other 3 islands also host nesting females. These figures could be higher, however a tropical storm in the middle of the survey period washed the beaches of several islands with good nesting potential beyond the high tide mark, eliminating any tracks. I would anticipate that regular nesting still occurs on Taula and has the potential to also occur on Fangasito and Mu'oum'a.

The smaller outer islands of Lua'li, Luahaipo, Tahifehifa, and Lualoli have suitable beaches for turtle nestings, however the small beach area would indicate a less reliable nesting frequency and

therefore would not be as important to monitor as Maninita, Taula, Fonua'one'one, Luatafito and Mu'omu'a .

There were two outer islands that it was not possible to survey during this season – Fonuafo'ou and Fonua'unga. These will be included in the 2013/14 nesting survey.

None of the islands easily accessible to villages (north of the reef) showed any evidence of nesting turtles. Anecdotal evidence shows nesting did occur in these places, however it is possible that hunting pressure has wiped these nesters out or moved them away from these nesting grounds. VTMP will continue to monitor the historical nesting beaches close to villages over the period of 4 years to observe a full nesting cycle to confirm.

*Table 2 details the nesting activities observed from the beaches listed in table 1.*

Island	Map Ref #	Date	Activities	Notes
Maninita	23	9/1/13	1-5 day old nest, track width 23.5 inch	Probably hawksbill
			1 very old hawksbill track, track width 23in	No down track but this is possible obscured by newer track adjacent to it. Possible lay.
			1 old hawksbill track, potential false crawl or egg poaching. Track width 27 inches.	Holes dug at this nesting site but cannot confirm human activity relating to this – minimal disturbance in area. Poor nesting site with lots of roots so possible false crawl.
Fonua'one'one	24	10/1/13	1 new nest, hawksbill. Track width 29.5 inches	Probable nest as track were broken by camouflage area.
			1 very old track	No ID or measurements possible. No downward track observed. No signs of human on beach. Possible lay.
Taunga	15	11/1/13	False crawl with body pit	Very weather worn track but body pit and section of track was visible
Luatafito	20	18/1/13	1 false crawl	2 Body pits but probably no nest
			1 possible false crawl	Very old so no tracks but evidence of body pits
Mu'omu'a	26	19/1/13	Potential false crawls	Some potential body pits observed. After tropical storm so no tracks present



**Figure 7:** Top left clockwise – 2-5 day old track on Maninita, nest on Maninita in the vegetation at the back of the beach, project leader measuring track new track width, hawksbill track on outer island.

#### 4. Limitations of Study

The distance required to travel between the outer islands is the main limiting factor in surveying the Vava'u turtle population. During this initial survey, our efforts were widespread to encompass as many of the beaches as possible. The weather was the main determining factor in our success with long periods of good calm weather needed to access these difficult islands. The main outer islands survey was cut short and divided into two separate efforts due to a tropical storm system and meant that we could not attain the minimum recognised standard of a 10 day period of daily surveying. Our survey at this stage in the project was limited to presence/absence of turtle activity.

#### 5. Recommendations for 2013-14 Nesting Season

Moving forward with future nesting surveys, the number of beaches needing to be accessed by sea has now be reduced to 14 regular and 7 occasional based on this seasons presence/absence data and can therefore be better targeted and timed.

During the 2013-14 nesting season, it is recommended that a base camp be established on Maninita for a 10 day period for nightly surveys and also allowing for day surveys to the nearby outer islands. This will remove the necessity of a yacht being based in exposed anchorages for extended periods

and will therefore reduce the impact of the sea conditions on our surveys. Resorts on outer islands will also be approached for camping possibilities to enable access to a different range of outer islands and to provide a prolonged stay in the outer island regions between camping surveys. With targeted night surveys on Maninita, tagging of the nesting turtles should also be possible.