LANIAKEA

COMPOSITION BOOK
28 FEBRUARY 2014
100 Sheets, 200 Pages
9.75 inch x 7.50 inch
Wide Ruled with margin

GEORGE BALAZS

NEED RIDE LANIAKEA (BOOKS & DAILY LOGS)

Friday night 2/28/14 - 71921 ID
AUDREY 5' - MALES ADULT
Saturday 3/1/14 - 50144 ID

3-1-2014

JACK Lutey - MATSON Capt.
808 222-4344

Capt. DAVE Thompson - 1st Capt
808 479-9872

Cheyenne S Larvey
808-636-4270
CheyenneSolar@gmail.com

#20 pickup 3/1/2014
Truck
moved wooden container
DONNES TO AUDREY 5'
Friend - JESSICA

1/21/14 TO Audrey's ~5pm arrived
TUESDAY Talked to "RON" MNaH volunteer
Left Right carapace Keep out caution tape up.
Basker Oatley L6 - doesn't look
for 8 months - This today is first time
in 8 months. Talked to JOCK & SANFORD
Audrey 93 2/11/14 Talked to Audrey on porch chairs
"for 45 min ? years ago memory very sharp
85 or 25.?"
Surf to be 40-50 ft tomorrow Wednesday
12-13 baskers before dark. 2 up very high.

9:45pm at Lanikea - Alone/dark. 1 large
juvenile ~60cm BASKING LH pit only =

45256 C C C 49

2 PALM TREES. $60,000 1960
in her yard.

9:20 AM - Audrey's Cove (JOCKOS)
21 14 Tuesday night at

12 baskets seen and examined;
① highest-headed impact to Left carapace subadult no pits

② Large Juvenile #12 Regressing TMR dorsal R FF
existing LH 470A1B2B52 none RH
③ & ④ no pits - juvenile
⑤ subadult

11 her
BIRTHDA
NEED CARD

LH 41360E7B3F RH ending F3B

(6) Juvenile LH 4A352B590F.

(7) Adult Male tail - no pits

(8) Adult female Large no pits. could have put SAT tag on

(9) Juvenile no pits

(10) Juvenile no pits

(11) SubAdult LH 470D095238

(12) Subadult no pits

N=12 (4 dd pits, 8 none)

(N=1 w/Regressing TMR RFF dorsal)

1/22/14 Wednesday

photos

up 7:15 AM Departed ~930AM

Loggerhead turtles and type sub mesoscale features of the KURoshio EXTension 99

SEMINAR

Friday
2/28/2014 AUDREY'S COVE 1
430 pm BASK
① LHF 4A5C032470 CCL-
RH 4A3C385E73 87.5
short TAIL

② NONE

3olb test cut off
③ NONE RFF
CCW 62
CCW 60.5

LH 4C3B39137C
RH 4C3C625779

④ NONE Subsdvll short tail
CCL-77.0
LH 4C3C635F2B
RH 4C3B475F7F

LHF 4C3B4A6E6E
→ 88.5 CCL
short TAIL
Quick BACK TO The Sea

2/28/14 AUDREY S - RICE & BALAZS ON 6/24 off
Friday 6/24 ID 71921
TELONICS 635215
8PM BATTERY 10-2011
2-part uw EPOXY + MK9 6 SEC Temp & Dept 60 sec light 60 sec wet dry
TOR-0490255
* LHF 4B1A4E3F63
RHF 4B1921614
SCL-98 Healed piece out of LHF. Post centrals injured and healed
Attached with 2-Part 5 MIN EPOXY Quick fix.

3/1/14 1135 Am Black Spray + photos

8

~~9~~ 5 pm More epoxy
Then Turtle went back
into the water

3/1/2014 up ~ 8 AM
Saturday 11 Am Sat. Tag
male crawling out
to bask at Aubreys

Prolapsed Cloaca ~~2013~~
LH 470A055F53
RH 467C63495?
1150 Am basking CCL 89.5 cm

With another

3/1/14 Basking Lanaihea @ 1247
L28 CCL 87.0

105 pm 1 1" strip of cloth/resin
UV Activated.

Big ♂ 110 pm
LH 470A105B3D
RH 470A051D1E

Tags:
470A1B5745, PIT, LHF, 5/23/08
46287B5179, PIT, RHF, 5/23/08

TURTLE ID	DATE	EVENT TYPE	ISLAN
470A1B5745	23-May-08	Basking Capture	OAHU
470A1B5745	12-Aug-08	Basking	OAH
470A1B5745	3-Oct-08	Basking	OAI
470A1B5745	15-Oct-08	Basking	OA

E7B3F RH ending F3B
352B590F.
Pits
10 Pits. COULD HAVE PUT SAT TAG ON

0095238

MAJAR

Marine Turtle Research
NOAA Fisheries
Pacific Islands Fisheries Science Center
2570 Dole Street
Honolulu, Hawaii 96822-2396

Tags:
470A1B5745, PIT, LHF, 5/23/08
46287B5179, PIT, RHF, 5/23/08

TURTLE ID	DATE	EVENT TYPE	ISLAND	SITE	LOCATION	SPECIES	SEX	METHOD	SCL (cm)	CCL (cm)	TUMOR RANK	DESCRIPTION
470A1B5745	23-May-08	Basking Capture	OAHU	HALEIWA	Jocko's Cove - Basking	CM	M	Hand/Basking	90.6	-	0	-
470A1B5745	12-Aug-08	Basking	OAHU	HALEIWA	Audrey's Cove - Basking	CM	M	Basking	-	-	0	Reported by Joanne Pettigrew.
470A1B5745	3-Oct-08	Basking	OAHU	HALEIWA	Jocko's Cove - Basking	CM	M	Basking	-	-	0	Reported by Joanne Pettigrew.
470A1B5745	15-Oct-08	Basking	OAHU	HALEIWA	Jocko's Cove - Basking	CM	M	Basking	-	-	0	Reported by Joanne Pettigrew.

♂ 240 pm Boxed

95.5 cm CCL

3/1/2014

9/2012

ID = 50144

Telonics 663463

TDR 0290200

Telonics -
1st Coat on at 1503

6/24

505 pm reconfirmed

* LH 470A1B57
45

505pm

* RH 46207B5
reconfirmed 9

TDR - ~~3rd Lateral left~~ 3rd central
1st Coat 1514 h.

337 pm PA# attach

TDR - 3rd central/
TAM2639 2nd Central
posterior

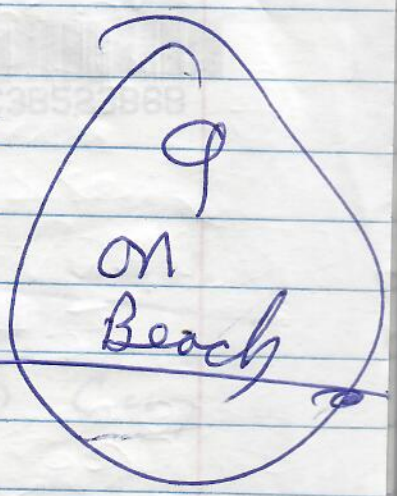
3/1/14 CCL 7.0cm

Basket 340pm Audrey Cook

LHF 41362B276B

RHF 413570093A

Short TAIL



LHF 4A394F2A30

Short TAIL

80.0 CCL

~~3~~ NO TAG

~~1~~ NO TAG

1 NO TAG

1 NO TAG

PAJ

3/1/2014 Audrey Cove / 350 pm

New Tagging shorttail

CCL 97 cm

M. Rice LHF

M. Rice

CCL 78.5 cm

LHF

78.0 short Tail

CCL

LHF

70.5 CCL,

Short TAIL LHF

3/1/2014

Short tail

98.0 CCL

Audrey Bask

LHF

RFL

EXISTING 4C3B523B6B

97-CCL

female short tail

3/1/2014 Saturday out Basking 505pm

LH 470C6F623C

RH —

Audrey

91.0 CCL

*Big Swf

CHOOSE THE RIGHT EPOXY FOR THE JOB

	DESCRIPTION	COLOR	USES	BENEFITS
Amazing GOOP® SuperMend® Epoxy Paste 	versatile all purpose high density	off-white ❶	kitchen appliances shelves & cabinets plastic toys, furniture sports equipment porcelain & china	drill & tap no shrinkage non-sag waterproof
Amazing GOOP® Marine Epoxy Paste 	extra fast bonding high density	light beige ❶	keels & skegs hulls & decks pools & spas boat blister pox seal leaks	cures in temperatures to 34 °F/1 °C non-sag sands like real wood

APPLY TO	SET/WORKING TIME	CURE TIME	STRENGTH		HEAT RESISTANC
fiberglass, PVC, metal, fiberglass, most plastics, wood, Styrofoam™, aluminum ❷	15 minutes @ 70 °F/21 °C	4 hours @ 70 °F/21 °C ❸	compress tensile shear bond	36,000 psi 7,450 psi 2,700 psi 1,750 psi	140 - 150 °F 60 - 66 °C ❹
fiberglass, wood, steel, ABS, PVC, CPVC, copper, most plastics ❷	5 minutes @ 70 °F/21 °C	20 minutes @ 70 °F/21 °C ❸	compress tensile shear bond	36,000 psi 7,450 psi 2,700 psi 1,700 psi	190 °F 88 °C ❹

A NOVEL USE OF AN ANCIENT HAWAIIAN FISHPON[illegible] BY GREEN TURTLES (Chelonia mydas)

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INTRODUCTION

Kiholo Bay located on the west coast of the Big Island of Hawaii, [illegible] wide facing to the west. The southern portion of the bay has a relatively deep basin (~30m) along to an extended shallow reef area as one moves to the north (Figure1). The northeast portion of the bay is bounded by an 1859 lava flow from the Mauna Loa volcano (Figure 1). In this area there are two semi-enclosed bodies of water, Wainanali'i lagoon and a 3.1 acre Hawaiian fish pond (Pond) (19.855°N, 155.920°W) (Figure 2) (Kay et al., 1977). The Pond is composed to two sections (designated sections 1 and 2) connected by a 75 m long, 3-4 meter wide channel effectively making them one large pond (Figure 2). The entire north end of Kiholo bay has numerous freshwater springs from which groundwater flows creating, especially in the Wainanali'i lagoon and the Pond, a significant freshwater lens on the surface and a strong halocline and associated thermocline approximately 0.5m thick.

Figure 1. Kiholo Bay showing our study area (Pond) in the lower right hand side of the image.

Figure 2. The northern side of Kiholo Bay showing the auwai, fish pond sections 1 and 2 which are joined together by a 75 m long channel making them contiguous. (Photo: Google Earth)

The shallow reef area of Kiholo Bay is an important forage ground for juvenile and subadult green turtles and has been a study site since 1980 (Balazs et al., 2000). Since the protection of the green turtle by both the Hawaii State and the U.S. Federal Governments in 1978, the population of Hawaiian green turtles has increased significantly (Balazs and Chaloupka, 2004b) (Chaloupka & Balazs, 2007). In the early days of protection, many of the green turtles that foraged in the shallow reef area of the bay spent their nocturnal time resting in Wainanali'i pond (Laber and Waller, 1994). Over time, it was noted that a few green turtles were utilizing the Pond as a rest area, moving in and out via a 50 meter long, 2 to 3.5 m wide channel called an "auwai" which connects the Pond to the open ocean (Figure 3). A study conducted in 2000 (Harrington, et.al, 2001) showed that the Pond was being used by green turtles as a resting area with more than 50 entering and leaving the pond in a 24 hour period. Recently, the land surrounding the Pond and the Pond itself have come under the ownership of The Nature Conservancy (TNC). TNC has initiated a program to restore the Pond to its original form as a Hawaiian fish pond. Given that these areas have become important habitats for green turtles at Kiholo Bay, we felt it was important to see how the subpopulation of green turtles using the fish pond has changed over the intervening 13 years since the last study. The purpose of this study was to determine how many green turtles move in and out of the pond daily, how much time individuals spend in the Pond and what their behaviors are in the Pond relative to resting and foraging.

Figure 3. This image shows the fifty meter long channel called an "auwai" which connects Kiholo Bay and the fish pond. Two green turtles are making their way up the auwai into the pond.

MATERIALS AND METHODS

Visual monitoring of the migrations of green turtles in and out of the fish pond was conducted for a period of 20 days using an [illegible] waterproof [illegible] bullet camera with a Sony CCD installed on the stone wall of the auwai. The camera was connected to a Lorex Time Lapse VHS recorder that allowed us to record 72 hours of turtle migrations on a single tape. It is noted that we believe the counts of turtles leaving and entering the pond at night are probably low because the IR lights on the camera were of insufficient strength to see through the surface during rough or turbid periods. The system was powered by two 200W solar panels and two 12V car batteries. The tapes were changed every 48 to 72 hours, were digitized and turtles moving into and out of the Pond were counted manually and summarized into one-hour bins.

To gather data on the movement of individual turtles, we used a radio frequency identification (RFID) system. Juvenile and subadult green turtles (C. mydas) were harmlessly captured in or near the auwai using a scoop net. The RFID tags (13 mm HDX RFID tags) were attached to the left third lateral scute using UV sensitive polyester resin and fiberglass cloth (Figure 4) following a technique similar to that in Balazs, et al., 1996. Tags were applied to 15 turtles on April 29, 2013, 14 turtles on June 14, 2013, and 4 turtles on June 20, 2013 for a total of 33. An Oregon RFID HDX multi-antenna reader with antenna multiplexer and dual antennas recorded the presence of tagged turtles entering and leaving the pond with a date/time stamp (Figure 5). The entire system was installed and working on June 4, 2013. All data was downloaded using ZTerm™ command line interface, opened in an excel file and analyzed. The system was powered by two 12V car batteries and had sufficient power for 7 days of recording. Batteries were changed out with recharged batteries every 7 days. The total time the turtles were monitored depended on the date of tagging and ranged from 51 to 67 days.

Figure 4. RFID tags attached to the third left lateral scute with UV sensitive polyester resin and fiberglass cloth.

Figure 5. Dual antennas installed across the upper end of the auwai recorded the presence of tagged turtles. Antenna 1 is on the right and antenna 2 is on the left. Note the green turtle just about to pass through antenna 2.

In order to determine the distribution and behavior of turtles in the Pond, we conducted three swimming transects on 1/28/13, 2/28/13 and 9/29/13. Divers swam the length of the fish pond (sections 1 & 2 and the connecting channel) while in visual contact with each other and recorded sightings of green turtles and their behavior on water proof plastic slates being careful not to record the same turtles more than once. The data from each diver was then combined to produce a complete picture of the number of turtles and their behaviors. Turtle behaviors were classified as swimming (S-actively swimming above the bottom), resting (R-laying quietly on the bottom) and feeding (F-could be seen scraping algae off of the bottom).

Salinity and Temperature in the pond were taken using a Hach digital salinometer and a YSI 4600 Precision Thermometer. The locations of the samples are shown in Figure 6. At each location samples were taken at the surface, at the halocline/ thermocline and at the bottom where the bottom (1 to 2 meters depth) was below the halocline. A total of 6 sites were sampled on April 1, 2013 when the tide was low at .15 m.

Figure 6. Water sample sites in Pond sections 1 and 2. Samples were taken on 4/1/13 at 1000 h during a low tide (.15 m).

RESULTS

The video monitoring showed that the movement of green turtles (Chelonia mydas) into and out of the Pond was non-random. The majority of the turtles moved out of the Pond to the ocean in the early morning (0500 h to 1000 h) with a peak at 0700 h and moved up the auwai from the ocean into the Pond from early to late evening (1300 to 2400 h) with peaks at 1400 h and 1900 h (Figure 7).

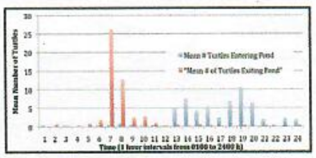

Figure 7. Mean number of green turtles moving into and out of the pond in one-hour bins over a period of 8 days.

Tidal flow can create strong currents in the auwai and, to some extent, does control when turtles can enter and leave the pond. Figures 8a and 8b show how tidal flow appears to be correlated to migratory movement of the turtles. The immigration of turtles is shifted forward some 5 hours correlating with the rising tide. The maximum number of turtles observed entering the Pond during a 24-hour period was 74 and the maximum number of turtles going out of the Pond was 67.

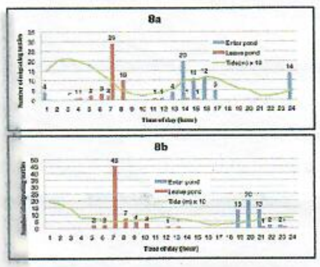

Figure 8a & 8b. Graphical representation of the migratory behavior of green turtles relative to rising and falling tides. 8a occurred on 2/23/13 and 8b occurred on 3/5/13 and demonstrates how the time of in-migration of the turtles may be shifted by tidal flow.

Of the 33 juvenile and subadult green turtles (C. mydas) fitted with RFID tags, 32 provided data. Turtle number 477 was never recorded subsequent to its capture and release. Turtle 477 was captured foraging outside of the Pond and may never have been a Pond resident/visitor. The maximum percent of time spent in the Pond by a turtle was 99.9% and the maximum time spent out of the Pond in the ocean was 83%. Eleven of the 32 turtles spent more that 80% of their time in the Pond, 7 of the 3 spent more than 90% of their time in the Pond and 6 of those spent more than 95% of their time in the Pond. Figure 9 shows the percent of time spent in and out of the Pond by each of the 32 turtles.

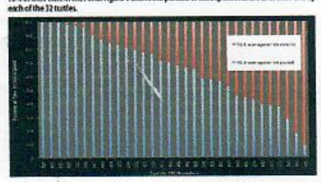

Figure 9. Percent of time spent in the pond and in the ocean by 32 RFID tagged green turtles over a period of 51 to 67 days.

Transects run during the daylight hours (table 1) show that both section 1 and section 2 are utilized for feeding and resting by green turtles. The average number of turtles in section 1 was 7 and the average number of turtles in Section 2 was 12. Thirty three percent of the turtles observed in section 1 and 31% observed in section 2 were feeding. Basking was observed only in section one. Feeding behavior occurs primarily in areas where there is hard substrate on which algae can grow. There is some feeding that occurs in the soft bottom areas where turtles have been observed taking in sediment and exhibiting gular pumping/filtering prior to swallowing.

Salinity and Temperature were measured at 6 locations in the ponds. The range of water temperatures in the ponds was 21.40 to 23.17 °C at the surface, 22.78 to 23.17 °C at the halocline and 23.89 to 24.56 °C at the bottom. Salinity measurements were taken at the same time and locations. In location 1 to 4, salinity measures ranged from 2.40‰ to 4.31‰ at the surface, 3.40‰ to 4.04‰ at the halocline, and 10.80‰ to 17.50‰ at the botton. In location 5 and 6, salinity measures ranged from 3.41‰ to 5.77‰ at the surface, 3.53‰ at halocline, and 24.7‰ at the bottom.

Behavior	# turtles observed transect 1/28/13		# turtles observed transect 2/?/13		# turtles observed transect ?/?/13		Average percent Observed (%)	
	Section 1	Section 2	Section 1	Section 2	Section 1	Section 2	Section 1	Section 2
Swimming	1	2	0	11	5	3	29	40
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	24
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	31

Table 1. [illegible] and times.

DISCUSSION

The Pond at Kiholo does not appear to have changed significantly since the last study in 2000 (Harrington, et.al, 2002). The northern section of the pond (section 2) is the furthest away from the auwai and shows the greatest influence from the influx of fresh groundwater. The freshwater surface lens is well established and the oceanic water nearer the bottom of the pond is of lower salinity (17‰) than offshore ocean water. The same is true for the southern section (section 1) except that the auwai is contiguous with the section 1 and allows for a significant influx of warmer, higher salinity ocean water (24.7‰, 26°C for bottom water in section 1).

Video monitoring of the movement of turtles into and out of the pond showed a strong out peak time (Figure 7) with a few individuals moving out of the pond at other times during the night. This 0700 h peak migration out of the Pond appears to be relatively unaffected by the tides when compared with the times of peak migration into the Pond (Figure 7). Tidal flow can create strong currents in the auwai and, to some extent, does control when turtles can enter and leave the pond. Figures 8a and b show how tidal flow appears to be correlated with migratory movement of the turtles. High tidal flow appears to be correlated with a shift in "peak" times a few hours one way or the other. A strong falling tide had greater influence on migration into the Ponds than a strong rising tide did on migration out of the Pond as flow velocities in the auwai were greater during falling tides.

The subpopulation of Hawaiian green turtles (C. mydas) found in the Pond at Kiholo is made up of a minimum of 74 juvenile and subadults that spend from 17% to 99.9% of their time in the pond. Because the entire population does not migrate on a daily basis, our counts are not indicative of the total population that might be in the pond at any one time and we believe that there may be over 100 individual green turtles that utilize the pond habitat occasionally or continuously. Turtles 504 through 507 were captured while feeding in section 2 of the Pond and had significant algal growth on their heads and carapaces. This kind of epiphytic growth is indicative of turtles that live in calm waters and leads us to believe that these turtles spent most of their time in the Pond. RFID data showed that these 4 animals spent an average of 80% of their time in the Pond. In addition, a total of 6 of the RFID tagged turtles spent 95% or more of their time in the pond. It was found that turtles using Wainanali'i lagoon as a resting site spent from 35 to 80% of their day-time feeding in the bay (Laber and Waller, 1994). Extrapolating from that data, we would expect a "Pond" turtle to spend at least 17.5% to 40% of its time each day in the bay feeding if it was only utilizing the Pond for resting purposes. It seems relatively safe to say that the 8 RFID tagged turtles that spent 85% or more of their time in the Pond are getting the majority if not all of their food within the Pond. The RFID migration data showed a positive correlation between SCL and percent of time spent in the pond (Pearson Correlation Coefficient = 0.4248, P=0.017).

Diurnal swimming transects indicate that Resting and feeding are the two primary behaviors occurring in the pond. Feeding takes place during the daylight hours and is generally restricted to the areas in the pond where there is algal growth on hard substrate. The hard substrate is primarily covered with a green algae *Cladophora laetevirens* with trace amounts of *Rhizoclonium* *calogossoides*, *Schizothrix calcicola* and *Chroococcus* sp. In 2000, *Cladophora hemispherica* was the predominant algae observed (Harrington, et al. 2002)

Resting behavior involves laying quietly along the sides of the pond or settling onto the soft bottom and laying quiescent, even settling down into the sediment. Some turtles will crawl out of the water and bask, a behavior that is common and rather unique in Hawaii (Rice et al, 2002).

The Pond represents an important habitat for juvenile and subadult Hawaiian greenturtles (C. mydas). The total population of turtles that utilized the habitat probably varies over time and we estimate that between 75-100 green turtles commonly enter the pond and utilize it for resting and foraging. RFID monitoring of individual turtles showed that 25% (n=8) of the tagged turtles spend over 85% of their time in the Pond indicating that the Pond is their primary forage habitat.

Restoration of the Pond to its historical form through the removal of invasive vegetation along the periphery of the pond, as planned, would not seem to pose any threat to the well being of the Pond turtles. In fact, it may increase incident solar radiation and enhance algal growth providing additional forage. It has been suggested that the pond was partially filled up with sediment by the 2011 Japan tsunami and that sediment should be pumped out of the pond. Such an operation would possibly be detrimental to the well being of the turtles, depending on how it was accomplished. Another big question about the restoration is, will the TNC try and make the pond into a productive fish pond for in order to do so would require that the auwai be blocked off and would prevent the movement of turtles into and out of the Pond effectively removing access to an important green turtle habitat.

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A SOCIOLOGICAL STUDY: HUMAN INTERACTIONS WITH SEA TURTLES AT LANIAKEA, ON THE ISLAND OF OAHU, HAWAII

By
Cody Beth Hooven

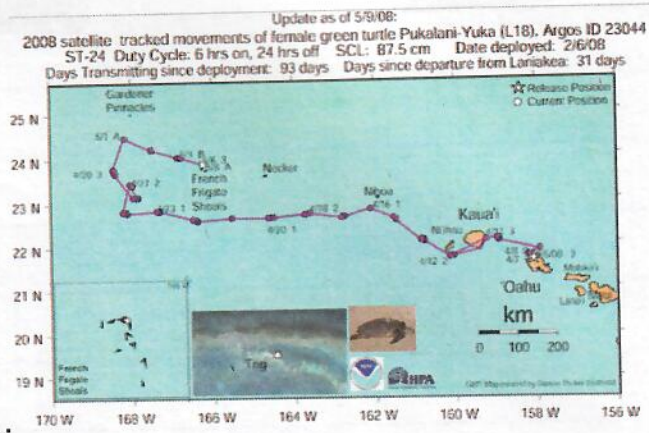
Marine Option Program
University of Hawaii at Manoa

Submitted to: Marine Option Program
May 13, 2004

Advisors:

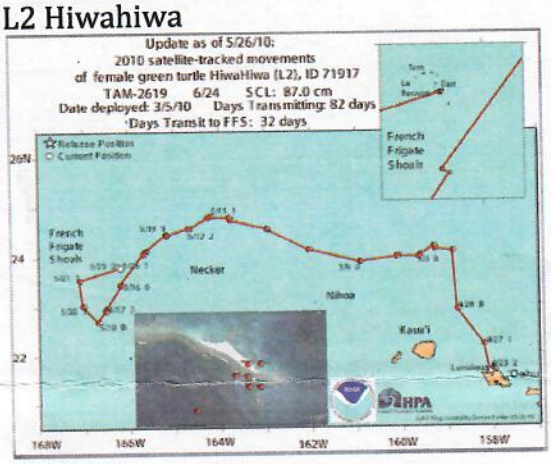
George H. Balazs — Leader, Marine Turtle Research Program of the National Marine Fisheries Service (NOAA)

Dr. Sherwood Maynard — Director of the Marine Option Program and the Marine Biology Program, University of Hawaii at Manoa

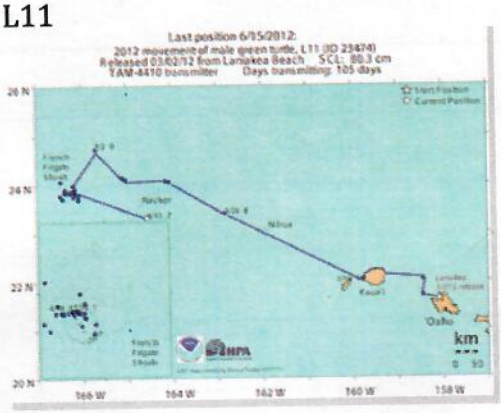


L18 Pukalani

L2 Hiwahiwa



L11



HSA 8/7/2015

Laniakea barriers will remain for now

By Marcel Honoré
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The barriers that have blocked vehicles from parking at Laniakea for the past year and a half won't be coming down Friday, the deadline originally slated under a state court order.

Instead, the Save Laniakea Coalition, the group that is suing the state Department of Transportation to remove the barriers, will hold a settlement meeting with state and city officials in about two weeks and try to reach a deal that would allow vehicles to park at the popular North Shore surf and sea turtle-gazing destination. It might also keep many of the barriers in place to help ensure safety and better traffic flow on Kamehameha Highway.

The DOT installed the barriers in December 2013 as traffic congestio steadily grew worse on the North Shore. Much of the problem stemmed from the traffic chaos, the onslaught of turtle-seeking tour buses, and potential safety hazards at Laniakea.

The state's move followed years of study, community discussion and $1.7 million in state funding but little action. Critics argue that the North Shore community and its visitors deserve a better solution that doesn't restrict public beach access.

Save Laniakea's suit further contends that the DOT needed to get special state permits for coastal areas to put up those barriers. In a June 5 hearing, Circuit Judge Gary Chang generally agreed with the group, saying the barriers would need to be removed until the state got those permits or the proper permission from the city, which owns the undeveloped parkland there.

Friday marked the final day to remove the barriers or find a way to provide public access, but Judge Karen Nakasone granted an extension and all the parties will meet next on Aug. 18.

On Thursday, Save Laniakea lawyer Bill Saunders said he's hopeful the parties can finally agree at that meeting to allow Waimea-bound cars to enter the nearly 1,000-foot stretch of land mauka of the highway that's blocked by the barriers. They could then exit in the Waimea direction, while keeping up a wall of barriers in between to prevent cars and pedestrians from haphazardly crossing into the road, he said.

If they're able to agree to a plan, it would likely go into effect sometime around October, he said.

"That is one possible option," DOT spokesman Tim Sakahara said of the plan to let Waimea-bound cars enter and exit while leaving most barriers in place.

"That's the potential. That all has to be worked out. A lot of things have to happen," Sakahara said. "It would still have to be safe, it would still have to be practical, feasible. … We don't want to cause that congestion again."

The city recently gave the state permission to leave the barriers in place, according to a letter from Saunders to Honolulu Managing Director Roy Amemiya. On Thursday, Saunders said members of Save Laniakea planned to sue the city in the coming days over that permission. They argue that the city would also need the proper permits first, same as the state, in order to give that nod, Saunders said.

If all the parties reach a deal later this month, then they could drop the city suit, he added.

Subject: FW: RE: List of priority research activities for HonuLani

(6)

Sand movements of shoreline; correlations of surf, rain and tide with basking;

Highly visible and easily accessible site used by the public. Long know as a world famouos surfing site.

Research techniques and tools utilitzed:

-Measuring caliper and electronic scale

-PLacement of PIT tags in the turtles PIT="Passive Integrated Transponde tags known as "chips" by veterinarians for permanent individual indentification of dogs and cats).

-TDR's (=Time-Depth Recorders) small computerized equipment temporarily glued on the turtles that records and stores ocean depth, temperature

>- See and draw from Objectives sheets developed for Kona and other study >sites

>- Get copy of Lena report

>See Gregg Ambrose and other surfing books that list Laniakea

>- Number of turtles and their size classes, ages, and sexes regularly basking on the beach and feeding in near shore waters.

Weights and body measurements of the turtles

Photographic records of individual turtles and their behaviors (including facial patterns)

Heath status of turtles, including but not limited to tumors, immune >status, parasites, and bacterial infections.

>- Thermal ecology of basking- physiological impacts.
>
>- Food sources being utilized.
>
>- Daytime and nighttme activities- time budgets for basking, feeding, and
>resting underwater.
>
>- Reproductive status of the turtles. ⊘ LINKS by migration to FFS.
>
>Genetic makeup of the turtles.
>
>Reasons why the turtles favor Laniakea for basking and are tame to
>humans.
>
>Fishery interactions with the turtles, inlcuding lines, hooks and nets
>
>Positive and negativce aspects of people viewing and interacting with
>the turtles.
>
>- Habitat characteristics of the beach and adjacent ocean waters used by
>the turtles.

- Beach clean up
- EDUCATION Outreach

- DYNAMICS of seasonal use/seasonal habitat change.


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