

Remigration and Residency of Hawaiian Green Turtles in Coastal Waters of Honokowai, West Maui, Hawaii

PETER BENNETT¹, URSULA KEUPER-BENNETT¹, AND GEORGE H. BALAZS²

¹*Turtle Trax, 24 Reid Drive, Unit 3, Mississauga, Ontario, Canada L5M 3A6, www.turtles.org (howzit@turtles.org)*

²*National Marine Fisheries Service, Southwest Fisheries Science Center, Honolulu Laboratory, 2570 Dole Street, Honolulu, Hawaii 96822, USA*

During the period 1989-1999, five adult females (U521, F765, U359, 122C, and A240) have made nesting migrations to French Frigate Shoals (FFS) and returned to Honokowai. Three of these females (U521, F765, and U359) have made two or more migrations during this period. This involves a round-trip swimming voyage of at least 2000 km. Tutu (U521), first identified by photograph in 1990, completed her fourth documented migration during this time.

Three of the five females (F765, U359 and 122C) were sub-adults (65-85 cm carapace length) when first sighted, and subsequently matured at Honokowai. They migrated to FFS where they were issued their first set of flipper tags. Observations at Honokowai, captured on photographs and videotape, provided a historical record of these turtles before they were tagged, an unusual circumstance. The combined National Marine Fisheries Service (NMFS) and Honokowai records are shown in Tables 1-5.

The reproductive behaviour of the three honu suggests that young females on their first migration return to the place where they spent their late developmental years. For example, we recorded Tiamat for six consecutive years at Honokowai before she made her first documented FFS nesting migration in 1997, when she was issued tag 122C. In 1998 and again in 1999 she was regularly present at Honokowai.

Two turtles already had tags when first sighted. If these two turtles are like the three younger females, it is highly probable that Tutu (U521) and Shredder (A240) lived at Honokowai when they migrated/nested for the first time. Considering the powerful site fidelity of female honu to their resting/foraging grounds, it is possible that all five of these females have spent all their post-pelagic years in this small area of West Maui (approximately 25 hectares). As a result, there exists the romantic possibility that some honu spend their entire lives within the same reef system.

IMPLICATIONS OF FIXITY IN HONU

This fixity makes honu vulnerable to persistent pollution sources and other anthropogenic assaults. It therefore follows that it is imperative that humans do all they can to keep sea turtle habitat, and the ocean in general, clean.

Of the five females, three have had fibropapilloma (FP) tumours and regressed. In 1999, we documented tumours

for the first time in a fourth, Shredder (A240).

Honu fixity and tameness offers unique opportunities for researchers to study the etiology of FP in free-ranging turtles living in the same habitat over many years. With such impressive long-term residency, no other sea turtles in the world have offered such a "window" into their private lives, a window that might well remain open for decades!

EXAMPLE OF FIXITY FOR A HONOKOWAI FEMALE

In June 1998, Mendelbrot was sighted on East Island laying her eggs. She is U359 and the good people monitoring turtles there took a picture of her. This makes Mendelbrot the first Honokowai turtle for which we have a photographic history in both nesting and foraging habitat.

This is one of those rare occasions where a turtle seems more beautiful on land than in water. This is also the first time in FFS history that a turtle at East Island has been matched to her foraging grounds by her facial markings. In addition, she is the first honu with a documented history prior to having received tags.

CONCLUSION

Hawaiian green turtles nest at the French Frigate Shoals every two to three years, a fact based on twenty-nine years of annual monitoring at FFS by NMFS. The Honokowai females follow this cycle. When egg-laying is complete, all five have reliably returned to the same home foraging grounds until their next urge to reproduce.

These records significantly contribute to continuing research in Hawaii suggesting that at least some green turtles demonstrate the same high degree of fidelity to certain coastal waters as they do to their distant nesting beaches.

LITERATURE CITED

Work, T.W., and G.H. Balazs. 1999. Relating tumor score to hematology in green turtles with fibropapillomatosis in Hawaii. *Journal of Wildlife Diseases* 35(4):804-807.

Table 1. Annual records for Tutu, U521. All evaluations of tumour severity and overall turtle condition conducted according to Work and Balazs (1999).

Year	Comments
1990	First sighted at the Turtle House. Tagged female. Tumors on both eyes and one tumor near tag on right front flipper. Overall Tumor Score Light
1991	Nesting, French Frigate Shoals. 6/1/91, 6/2/91, 6/16/91, 6/18/91, 7/1/91, 7/3/91, 7/4/91, 7/15/91, 7/16/91, 7/29/91, 8/12/91, 8/13/91
1992	Resighted at the Turtle House. All tumors improved. Fist Honokowai regression case.
1993	Resighted at the Turtle House. Read one tag for the first time. Regression continues.
1994	Nesting, French Frigate Shoals. 6/25/94. Nesting, but resighted at Honokowai on August 25 th . Eye tumors completely gone. Tumor on right front flipper barely noticeable. Regression continues.
1995	Resighted on second dive. Accepted our presence easily. Regression complete, no visible tumors. New tags read July 15. She is turtle U521 (left rear tag).
1996	Nesting, French Frigate Shoals. 6/15/96, 7/1/96, 7/2/96
1997	Resighted quickly as fourth turtle of the summer. Regression holds.
1998	Resighted July 3 rd dive. Several white blemishes on neck and shoulders. Fear of FP relapse!
1999	Nesting, French Frigate Shoals. 6/8/99, 6/21/99, 6/23/99

Table 3. Annual records for McTaggart, F765. All evaluations of tumour severity and overall turtle condition conducted according to Work and Balazs (1999).

Year	Comments
1990	---
1991	---
1992	Nothing more than a left profile in a poor photo, but enough for identification.
1993	First time. Nesting, French Frigate Shoals. 6/3/93.
1994	Regular visitor to the Turtle House. Named McTaggart in honor of new tags - F765. Tolerant of approach. No visible tumors.
1995	Resighted at the Turtle House. Infrequent visitor this year.
1996	Not sighted at Honokowai, not reported at French Frigate Shoals. Only female ever to go AWOL!
1997	Resighted on afternoon dive of July 3 rd . Increasing in girth and regular visitor this summer. No visible tumors.
1998	Resighted July 9 th at the Rock. Only seen twice. No visible tumors.
1999	Nesting, French Frigate Shoals. 6/21/99

Table 5. Annual records for Shredder, A240. All evaluations of tumour severity and overall turtle condition conducted according to Work and Balazs (1999).

Year	Comments
1990	---
1991	Nesting, French Frigate Shoals. 5/26/91, 5/27/91, 5/28/91, 6/11/91, 6/24/91, 7/6/91, 7/7/91, 7/20/91, 8/1/91
1992	---
1993	Nesting, French Frigate Shoals. 6/15/93, 6/16/93, 6/17/93, 6/29/93
1994	---
1995	Extremely shy turtle, easily identified by mangled hind flippers. Finally let us get close enough to record her facial markings, our only way for a positive identification.
1996	Nesting, French Frigate Shoals. 6/9/96, 6/21/96, 6/22/96, 7/3/96, 7/4/96
1997	Still shy, but allows us to read tags: A240 and A241
1998	Nesting, French Frigate Shoals. 6/7/98, 6/8/98, 6/9/98, 6/21/98
1999	Resighted August 26 th dive near North House. Only one resighting. Small tumor growing in posterior of each eye.

Table 2. Annual records for Tiamat, 122C. All evaluations of tumour severity and overall turtle condition conducted according to Work and Balazs (1999).

Year	Comments
1990	---
1991	Retrospective analysis of videotape shows Tiamat resting at the Turtle House.
1992	A photograph shows Tiamat swimming in the distance.
1993	Resighted at the Turtle House several times this summer. Acclimated somewhat. Small tumor beginning in right eye. Overall Tumor Score Light.
1994	Resighted at the Turtle House and Reef 2. Tumors growing on neck, shoulders, and in both eyes and mouth. Overall Tumor Score Moderate.
1995	Resighted at the Turtle House. Eye tumors shrunken, mouth tumors nearly gone. Becoming fully acclimated. Possible regression. Overall Tumor Score Light.
1996	Resighted at Resting Site and accepted us immediately. All tumors gone. Regression confirmed. To celebrate we named her Tiamat.
1997	First time. Nesting, French Frigate Shoals. 5/30/97, 6/13/97, 6/15/97, 6/16/97
1998	Resighted on our first dive. June 29 th . New tags - 122C, and "V 40" is engraved in the right hind portion of her carapace. NMFS notified. Regression holding.
1999	Resighted Tiamat during first week's diving. Judging by her girth, things are going well. Regression holding.

Table 4. Annual records for Mendelbrot, U359. All evaluations of tumour severity and overall turtle condition conducted according to Work and Balazs (1999).

Year	Comments
1990	---
1991	---
1992	---
1993	First sighting: July 18 th . Rest Site. Early FP in both eyes, several neck/shoulder tumors, cantaloupe-sized under right front flipper. Named Mendelbrot.
1994	First Time. Nesting, French Frigate Shoals. 6/12/94, 6/13/94, 6/25/94, 7/7/94
1995	Resighted at Rest Site with shiny new tags. Regression confirmed. Eyes tumor-free, large tumor under her right front flipper is shrunken and gray. Did not read tags.
1996	Nesting, French Frigate Shoals. 6/11/96, 6/12/96, 6/22/96, 6/23/96, 6/25/96, 6/26/96
1997	Resighted July 27 th . "Armpit" tumor had shrunken further. Regression continues. Read tag U359. NMFS records show Mendelbrot nested in June '94, June '96.
1998	Nesting, French Frigate Shoals. 6/5/98, 6/6/98, 6/18/98, 6/19/98. June 29 th . NMFS confirms Mendelbrot nested at French Frigate Shoals. August 16 th , sighted at Reef 2. D62 painted on right rear carapace. Still regressing.
1999	Resighted July 22 nd at her preferred spot on Reef 2. Seen later at the Turtle House. Tumor under right front flipper continues to shrink. Still regressing.



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Compilers:

Andrea Mosier
Allen Foley
Beth Brost

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National Marine Fisheries Service
Miami Laboratory
Sea Turtle Program
75 Virginia Beach Drive
Miami, FL 33149, U.S.A.

or

National Technical Information Service
5258 Port Royal Road
Springfield, VA 22161
(800) 553-6847 or (703) 605-6000
<http://www.ntis.gov>