

Report of Activities Carried Out Under the Authority of Special Use Permit 12521-04005, as amended and issued on September 14, 2004 by the Pacific Remote Islands National Wildlife Refuge Complex, Fish and Wildlife Service, USDO, Honolulu, Hawaii

Report prepared by

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Project Title: Remote interactive imaging to monitor green turtles, *Chelonia mydas*, and their marine and terrestrial habitats at East Island, French Frigate Shoals in the Northwestern Hawaiian Islands: Phase II. An experimental demonstration project to transmit live video to the main Hawaiian Islands using a satellite-dish link on Tern Island.

Trip Objective: To install and make operational a 2.4 meter satellite dish on Tern Island that will transmit live video to Honolulu from interactive robotic cameras placed on East Island in May 2003 (Phase I) that send video to Tern Island by microwave relay.

Trip Outcome: Fully successful.

Project Rationale: Monitoring the seasonal abundance of migrant green turtles nesting at East Island, French Frigate Shoals was initiated in 1973 and has continued annually for 32 years. The purpose of this project is to track long term trends as a reliable measure of the conservation status of the Hawaiian green turtle population (see Balazs and Chaloupka, Biological Conservation 117 (2004):491-498). For a portion of each nesting season personnel conduct systematic nightly patrols to count turtles coming ashore to lay eggs. During daylight hours counts are made of turtles basking along the shoreline. The continuation of monitoring at East Island is of great importance in view of the considerable value of long term sea turtle data sets for understanding the dynamics, hence proper management, of a population. The experimental use of remotely controlled video cameras mounted on the existing 65-ft pole at East Island offers potential to augment and perhaps partially replace on-site monitoring by field personnel. The use of new imaging technologies may also allow for improved quantitative monitoring of changes in habitat and the abundance of other wildlife (sea birds, monk seals), as well as Refuge security and educational outreach.

Abstract: A remotely controlled camera viewing system with fully interactive pan, tilt and zoom capabilities was successfully installed on East Island at French Frigate Shoals, the most important migrant breeding site for the Hawaiian green turtle (*Chelonia mydas*) population. The "SeaTurtle Cam" sends live video by microwave transmissions from East Island to Tern Island where they are relayed by a satellite uplink to Honolulu and Homer, Alaska. The East Island to

Tern video component was accomplished in May 2003. The satellite component (Phase II) was completed in September 2004 with the installation of a 2.4 meter dish on Tern Island. The camera system was envisioned, funded and carried out by the Marine Turtle Research Program, NOAA Pacific Islands Fisheries Science Center in cooperation with the Fish and Wildlife Service. The system was designed and installed, and is being maintained, by SeeMore Wildlife Systems of Homer, Alaska. The system is an experimental demonstration project to remotely monitor and study nesting, mating, basking, hatchling emergence, survival and other activities and behaviors of green turtles and their marine and terrestrial habitats at East Island.

Schedule of Personnel Movements September 21-27, 2004 Involving the French Frigate Shoals
National Wildlife Refuge, Northwestern Hawaiian Islands, under SUP 12521-04405

<u>Affiliation/Name</u>	<u>Tern Island Arrival</u>	<u>Tern Island Departure</u>
NOAA/NMFS PSD Marine Turtle Research Program, Pacific Islands Fisheries Science Center, Honolulu, Hawaii		
George H. Balazs	9/21/04	9/27/04
Shawn K. K. Murakawa	9/21/04	9/27/04
Seemore Wildlife Systems Homer, Alaska		
Konrad Schaad	9/21/04	9/27/04
Daniel Zatz	9/23/04	9/27/04
Hawaii Preparatory Academy Waimea, Hawaii		
Marc Rice	9/22/04	9/27/04
	<u>Daytime trips to East Island</u>	
Balazs, Schaad, and Rice	9/24, 9/25, 9/26/04	
Zatz	9/24, 9/25/04	

Summary of Daily Work Activities at the French Frigate Shoals National Wildlife Refuge,
Northwestern Hawaiian Islands, September 21-27, 2004 under SUP 12521-0445

<u>Date</u>	<u>Activities</u>	<u>Personnel</u>
9/21/04 Tuesday	Unpacked, inventoried and examined all gear comprising the 2.4 meter satellite dish and base mounts previously shipped to Tern Island via NOAA vessel. Conferred with Refuge personnel about suitable locations for installation of the dish. Authorization received for placement on top of heavy steel storage container unlikely ever to be moved situated at west end of main building. Transferred base mounts of dish to top of container.	GB, SM, KS
2200h	Patrolled perimeter of Tern Island and "pipeline" barrier along runway to rescue disoriented hatchling turtles and collect dead ones from ghost crab predation.	GB, SM, KS
9/22/04 Wednesday	Attached the four base mounts of satellite dish using bolts and reinforcement through ceiling of steel storage container. Sealed all areas for superior waterproofing. Installed, aligned and bolted together the two panels of the satellite dish.	GB, KS, MR
2200h	Patrolled perimeter of Tern Island and "pipeline" barrier along runway to rescue disoriented hatchlings and collect dead ones from ghost crab predation.	GB, KS, MR
9/23/04 Thursday	Installed electronics in Computer Room and aligned dish to achieve precise communication with satellite. Installed cable from dish to Computer Room across roof top with guidance and authorization by Refuge personnel. Established video signal from existing camera on East Island via satellite dish to SeeMore Wildlife Systems office in Homer, Alaska.	GB, KS, MR, DZ
2200h	Patrolled perimeter of Tern Island and "pipeline" barrier along runway to rescue disoriented hatchlings and collect dead ones from ghost crab predation. At Crab Beach encountered basking juvenile green turtle PIT tag 442F0A7E79 previously tagged by Refuge personnel at Tern Island. Also encountered untagged adult male basking green turtle at Crab Beach.	Refuge personnel, GB, MR, DZ

* George H. Balazs = GB
Shawn K. K. Murakawa = SM
Konrad Schaad = KS
Marc Rice = MR
Daniel Zatz = DZ

Summary of Daily Work Activities (Continued)

<u>Date</u>	<u>Activities</u>	<u>Personnel</u>
9/24/04 Friday	Worked on East Island 1130-1600h and replaced upper camera on pole, refilled water reservoirs for camera lens wash-and-wipe mechanism, and cleaned and inspected electronics housed at base of pole. Located and excavated small nesting beach temperature recorders deployed by turtle technicians in June 2004.	GB, MR, KS, DZ
2200h	Patrolled perimeter of Tern Island and "pipeline" barrier along runway to rescue disoriented hatchlings and collect dead ones from ghost crab predation. At Crab Beach encountered basking adult male green turtle PIT tags 4136094F27 and 4136030C79 previously tagged while basking at Tern Island in May 1999.	GB, MR
9/25/04 Saturday	Worked on East Island 1100-1600h to replace the upper camera on pole for a second time due to persistent electronic problems. Initiated removal of wooden flotsam lodged along shoreline believed to be accelerating soil erosion. Rescued and released 104 hatchlings obstructed from normal emergence. Collected dead hatchlings that was unable to emerge from their nests. Collected two vials of seawater for PCR alphaherpes viral analysis.	GB, MR, KS, DZ
2200h	Patrolled perimeter of Tern Island and "pipeline" barrier along runway to rescue disoriented hatchlings and collect dead ones from ghost crab predation. Rescued and released 47 hatchlings obstructed from normal emergence. Noted same adult male green turtle basking at Crab Beach as seen 9/24/04 evening.	GB, MR
9/26/04 Sunday	Worked on East Island 1230-1630h to make final adjustments to upper and lower cameras. Continued removal of wooden flotsam achieving approximately 50% of task. Remaining 50% will need to be addressed on future trip involving KS or person with similar technical expertise.	GB, MR, KS
1730-2000h	Washed, cleaned and stored boat and outboard motors. Packed gear in preparation for 9/27/04 departure.	GB, MR, KS
2200h	Patrolled perimeter of Tern Island and "pipeline" barrier along runway to rescue disoriented hatchlings and collect dead ones from ghost crab predation.	GB, MR

Summary of Daily Work Activities (Continued)

<u>Date</u>	<u>Activities</u>	<u>Personnel</u>
9/27/04 Monday	Conducted final modification for improvement of electronic and computer components on Tern Island. Completed testing of all elements of camera system to verify reliable, clear, and interactive video stream from East Island to Tern Island and, via satellite dish to satellite onward to SeeMore Wildlife office in Homer, Alaska. Provided briefing to Refuge personnel on the installation and operation of the system, including free availability of internet access, email, and world wide web during night time hours. Finished packing gear and departed for Honolulu on chartered aircraft at 1500h.	GB, KS, MR, DZ

List of Specimens and Samples Collected at French Frigate Shoals September 21-27, 2004

<u>Item</u>	<u>Quantity</u>
Frozen green turtle hatchlings (<i>Chelonia mydas</i>) for histological research to determine sex ratios resulting from natural nests incubating at French Frigate Shoals. The death of the hatchlings resulted from natural ghost crab predation where the entire body of the hatchling was eaten by the crabs.	40
Seawater collected from the near shore waters of East Island for PCR alpha herpes viral analysis.	(2) 45cc vials