

Student explorations aid science

HPA has a mission unique in the high school world: to aid National Marine Fisheries Service scientists in their search for information about the green sea turtle, which could increase the population of this threatened species.

In October fifteen Upper School students, led by science teacher Dave Gulko and NMFS turtle expert George Balazs, set up camp at a "hot spot" along the Kona Coast for the first of three field studies that would



Over the lava in slippered feet, students take an inner tube to the water's edge to await their first sea turtle.

test their research skills and tax their endurance. During the two night, three day field study, the student investigators assisted Dr. Balazs as he gathered information about turtle growth rates, feeding behavior, and parasite infestation.

First, dive teams stretch a special, large-mesh net across the lagoon to snag turtles that move in and out of the area as the tides change. (The flat-bottomed pond and five-acre lagoon in this area are important feeding and sleeping sites for the green sea turtle, which migrate here and to other major islands in the chain from their breeding grounds in French Frigate Shoals in the Northwestern Hawaiian Islands.)

The students work day and night in well-defined jobs. Most night work is done by students designated as water researchers. The turtle tenders, or research assistants, help with on-shore work, which includes tagging, recording data, and care of the captured turtles through the night. Data is also collected on how turtles utilize algae and on their feeding and sleeping habits. Other students serve as camp facilitators, cooks, and photographers (both above and underwater).

Taking four hour turns through the night, the student-scientists watch the

capture area and scan the net floats for signs of the elusive reptile. Once a turtle is snagged in the net, the dive team on duty swings into action to remove it before it is injured or drowns. The turtle is carefully removed from the net, carried to shore in a large inner tube, and laid on its back to await measurement and tagging. In the morning, each turtle is carefully measured and tagged on a fore-flipper with a corrosion resistant ID tag. Stomach samples and fecal samples are taken, external parasites are noted and, in some cases, removed.

After all the necessary scientific data has been gathered, the students carry the turtle back to the ocean's edge and release it. The turtle rides an ocean surge to deeper water then swims away in a burst of speed, none the worse for the experience.

Six turtles were captured during the October expedition, one of which had been originally tagged in the same area three years before. According to Dr. Balazs, the growth of that turtle was considered slow, averaging about one-half inch per year in shell length. At that rate, it will take many years to reach a large enough size (about 32 inches) to be sexually mature. One of the other turtles captured had a non-functional hind flipper, the result of an injury that Dr. Balazs suspects almost amputated the flipper. Such injuries are most often caused by entanglement in a gill net or in monofilament fishing line.

Two more trips are scheduled for the spring semester, according to Mr. Gulko. "To learn about the biology of an endangered species up-close is a unique opportunity for our students. Most people have never seen a green sea turtle, but our students are gaining the hands-on experience of assisting a real scientist in real field conditions. Few get this chance, even at the undergraduate level in college.



Chris Reynolds, Jay Warkentin, and Neil Ozaki remove the turtle from the inner tube in preparation for its return to the ocean.

What do you know about greens turtles?

Test your knowledge against these facts from a study prepared for the World Conference on Sea Turtle Conservation by David Ehrenfeld, Professor of Biology at Rutgers U.

- * The green sea turtle gets its name because of the color of its fat. They average 200 to 500 pounds, but 800 pounders have been caught.
- * They grow very slowly, taking 15 or more years to mature.
- * As vegetarians, they live in shallow waters that support good growth of underwater grasses and seaweeds. (For the first six to twelve months of their lives, they are carnivorous.)
- * Their vision is good underwater, poor on land. They can see ultraviolet

light, but their sensitivity to red light is poor.

- * Although they have no external ears, their sensitivity to low frequency sounds allows them to hear well in their environment.
- * Their sense of smell underwater is excellent.
- * The greens are great travelers. During their nesting journeys every two to four years, they may travel distances up to a thousand miles.
- * In labs, they've been taught to press underwater keys when they detect specific light and chemical signals. Their performance is as good as that of rats or pigeons. However, their learning curve drops if they are given physical punishment for failure.

How are sea turtles protected?

According to Professor Ehrenfeld, species of sea turtle can be considered entirely safe. Each species is threatened to some extent for various reasons, including oil spills at nesting beaches, habitat destruction from beach development and pollution, subsistence hunting by native populations, "incidental take," in which turtles are accidentally captured and drowned in fishing nets, poaching (particularly for eggs, which are in demand as an alleged aphrodisiac), and commercial use.

The green sea turtle is considered the most economically valuable reptile, so its population has declined dramatically. Its eggs are considered a gourmet delicacy, the skin of its flippers are used for shoes and handbags, and its shell is used for jewelry (although the shell of greens raised in captivity are considered inferior). The turtle oil used in cosmetics and the cartilage used in clear turtle soup come primarily from greens. Miscellaneous uses include eating the hatchlings. Immature greens are frequently stuffed, varnished, and sold as wall decorations or preserved whole in plastic paperweights.

Federal and state wildlife laws protect all sea turtles from harassment or harm. Regulations prohibit the commercial sale of any product from any turtle species in this country, without exception, including farm raised products. Civil penalties include up to six months in prison and \$10,000 fine, and criminal penalty limits are one year and

A brief history

The National Marine Fisheries Service study of Hawaiian green turtles spans twelve years, and HPA's participation marks the first time high school students have been included. Our involvement in researching and monitoring the sea turtles is an outgrowth of a field study that Ian McKelvey, Pat Doyle, and Mr. Gulko assisted with last March. They helped Dr. Balazs and University of Hawaii-Hilo students collect data at Punaluu on growth rates extending over a three year period. Seven green turtles were tagged, two of which had been originally tagged in 1984. Mr. Gulko's background and expertise and the interest and competence shown by Ian and Pat impressed Dr. Balazs and led to the present, ongoing project at a "hot spot" along

\$20,000. But poaching still occurs. Recently, three Maui men were convicted of catching a green sea turtle, fined \$500 piece and ordered to perform 100 hours of community service.



A tag is placed on the flipper, where it is easily seen.