

Honu heroes on a mission, turtle by turtle

HPA student assistants take assignment seriously

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It is a glorious day at Kiholo Bay, Eight Hawaii Preparatory School students — five Upper Schoolers and three Middle Schoolers — are busy attending to various tasks at this study site on the Big Island's leeward coast, just 25 minutes away from the school.

About half of the students are watching a narrow channel in a pristine lagoon for turtles, while the other students work under a large canopy assisting with weighing, measuring, and collecting data on captured turtles under the supervision of George Balazs, leader of the Marine Turtle Research Program within the Protected Species Division of the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service, Pacific Islands Fisheries Science Center, and Marc Rice, director of HPA's Sea Turtle Research Program.

On this particular day, the students will capture and study 36 turtles — 12 new and 24 "recaptures."

As he works with the students, Balazs explains very carefully the dos and don'ts of working with the turtles.

The charismatic and renowned scientist, who has been described as the "honu's best friend," frequently jokes with the students and exchanges friendly banter with Rice. While the mood is light, there is important work to be done and everyone stays on task.

About 1,500 students have participated in the Collaborative Sea Turtle Research Program at HPA since it began in October 1987. At its helm, are Rice and Balazs, two men who are passionate about their work, the honu, and the opportunities the program provides for students to gain real-life field experience as they learn about the threatened animal and share their knowledge with others.

Balazs saw his first sea turtle in 1964 while exploring a lagoon in Bora Bora. In 1969, he watched commercial turtle hunters on Maui land their catch for nearby restaurants catering to Hawaii tourists. He wanted to do something to ensure growing turtles to sustain the growing trade in turtle steak.

He started working with turtles, doing captive rearing research in 1971 after earning his master's degree in animal science from the University of Hawaii at Manoa. In 1973, his research interests turned to the conservation biology of wild sea turtles in Hawaii and throughout the Pacific region.

For the past 35 years — 25 with NOAA — he has pursued an array of projects in understanding and restoring depleted stocks of sea turtles.

The charming and soft-spoken Rice joined HPA's science department in 1972 and has held numerous teaching and administrative positions at the school. He holds a master's degree in marine invertebrate zoology from the University of Hawaii at Manoa and throughout his tenure at HPA, he has shared his love of the ocean with students.

He is an excellent photographer and also holds a United States Coast Guard ocean operator's license. Balazs and Rice obviously "click." After 20 years, their collaboration has resulted in voluminous work relative to the Hawaiian green turtle (*Chelonia mydas*). The two honu heroes clearly share mutual respect and admiration for what the other brings to the program. But Balazs is quick to point out that "without the

students, there's no robustness to what we've done."

"The students are budding field technicians; junior scientists who work side-by-side with us and they make it possible for us to do all those things that Marc and I couldn't possibly do with one other person from my staff. Three of us could do 'x' percent in one day. With five, 10 students, we're able to do 10 times 'x' in a day."

"Students under Marc's direction are the foundation of the program and the magnitude of what we've been able to accomplish can be attributed to these well-mannered and thoughtful students."

Details about how the collaboration came to be vary ever so slightly, depending on whom you ask. For the record, the school's Sea Turtle Research Program began as an outgrowth of a 1986 field study that included David Gulko, Upper School marine science teacher, Rice (then director of studies), and students Ian McKelvey and Pat Doyle of the class of 1987.

The four accompanied students from the University of Hawaii at Hilo Marine Options Program and assisted on a tagging trip to Punaluu, which was supervised by Balazs, who had been working with the college since the early 1980s. When Rice and Gulko approached Balazs about working with high school students in a similar program, Balazs thought Kiholo Bay might be "an excellent place to duplicate what we were doing at Punaluu."

HPA already had a close relationship with the Hino family, who owned property at Kiholo. Robbie Hind Jr. initially donated \$2,000 to the school for turtle work there and he and his wife, Florence, continued to support the program as they passed away. The program also has been supported by Dr. Earl Bakken and the Bakken Foundation.

The first turtle tagging trip to Kiholo in October 1987 consisted of 15 students who worked all night, three day and field study with Gulko, Rice, and Balazs. The group captured six turtles during that expedition.

Rice recalls the early days of the program (1987-1990), when all three students were overnights and the group used kayaks to transport equipment. Students took a 300-foot net with floats and stretched it across the lagoon at night. While the work might not seem applied to the field of heart, the experience has been the highlight of many taggers who have been there and done that.

Rice gets animated as he describes the night work. "If there was a male in the water, there'd be splashing and the floats would go down and the capture team, five or six designated students, along with an adult, would get [the] tube, swim out, get the turtle out of the net, and bring it back. We would keep the turtles safely in a pen and work on them at first light."

"Students rotated duty watching the net throughout the night," recalls Rice. "Going into that lagoon at night with its cold, dark water and you can't see anything in the water because it's kind of murky — and there are these stickfish that come towards lights and they've got real sharp teeth — we're kids would come back and say, 'Oh, that's not unusual and fun thing I ever did was snorkel at night at Kiholo Bay.'"

When Gulko left in 1989, biology teacher Monica Traub took over the program. Traub left in 1991 and Rice, who continued to be involved with the program since the beginning, naturally stepped in to direct the program.

"We had no base population of tagged animals, so the first part was just to tag as many turtles as possible," explains Rice. A large population of tagged animals would allow researchers to determine growth rates, changes in health status, and migratory behavior, for example, do the animals

move up and down the coast or do they stay in the same place. "There were very, very few animals when we started," says Rice. "We would spend three full days and get seven to 10 animals."

Since those early expeditions in 1987, the program — has expanded to include much of the island of Hawaii's leeward coast, from Kawaihae to Honaunau. Today, the turtle tagging excursions are primarily day trips, but Rice has increased the number of student trips, from one to three to up to 10 to 20 per year. Students have traveled with Rice to the Neighbor Islands, Midway Atoll, and Nagoya, Japan to assist Balazs with his work.

HPA students also have been the only high school present at the prestigious annual International Symposium of Sea Turtle Biology and Conservation, which attracts about 1,000 of the world's top researchers and conservationists to such varied event sites as Texas, Florida, Pennsylvania, and Greece.

In addition to accompanying students on all tagging trips, Rice has traveled with Balazs to French Polynesia, the Shoaals, American Samoa, Singapore, and Australia to assist with research work. The program also has become more involved with public outreach, doing presentations at various events such as the Kaloiko-Honokahua Cultural Day, Waimea Festival, Coral Reef Awareness Day, and Turtle Independence Day.

In 1997, Rice expanded the program to include Middle School students. In 2001, he added a group of high school students formed a volunteer sea turtle rescue team for west and north Hawaii, in partnership with Balazs' Marine Turtle Research Program.

Rice still heads the school's rescue team — one of four in the state of Hawaii, and the only team of high school students. The team responds to reports from the general public of stranded sea turtles in the area, from Honolulu Harbor to Pololu Valley. The school's turtle hotline (881-4200) is open from sunrise to sunset; after-hour emergency calls are taken at 987-6903.

As the program has grown, the students' exposure to researchers and scientists working in partnership with Balazs from around the world has grown.

"Now, our students also are involved in actual student research projects," states Rice. "So that they can do much more of a focus on our side."

Student projects include the remote video camera at Kiholo and the recent installation of a remote video camera at Puako. The cameras can be operated by students selected to study basking behavior of green turtles, eliminating the need to wait for periodic visits to the study sites.

Middle School student Meimei Nakahara also is involved in a study of gender-dependent growth rates of Sea Life Park captive-bred juvenile green turtles at the Mauna Lani Bay Hotel.

Another aspect of the work that has changed is the use of technology. "In the beginning, it was simply a tape measure, calipers, and a scale," says Rice with a laugh. "We'd measure them and weigh them and that was all we could do, basically."

Since the mid-1990s, the program has incorporated the use of technology in unique ways. Apart from computers and remote cameras, the program uses telemetry equipment, such as archival time-depth recorders, which are attached to selected turtles to learn about the animals' diel (daily, day and night) behavior — their movements, sleeping, and eating habits.

The units record the time, depth, temperature, and date of a particular turtle's movements. Each unit costs about \$1,300 and must be retrieved to read the data, which makes it prohibitive to outfit large numbers of animals.



Honu heroes George Balazs (left) and Marc Rice, director of the Marine Turtle Research Program, NOAA, National Marine Fisheries Service, Pacific Islands Fisheries Science Center, and Marc Rice, director of the Hawaii Preparatory Academy Sea Turtle Research Program, pause during a mission at Kiholo Bay. Courtesy photo

turtles since the first release in 2003, transmit data to a satellite and turtle movements can be tracked over long periods of time from a few months to up to two years, or more. One hundred sixty-seven juvenile loggerhead turtles have been satellite-tagged and released since 2003 and 13 turtles from the 2005 release list are transmitting after 908 days. HPA students Kathy Treacy and Alejandro Horowitz traveled to Nagoya with Rice to assist with the most recent release of 25 turtles in September.

"We're doing things with technology that very few other folks do," states Rice. In fact, the Sea Turtle Research Program continues to be the only program of its kind for middle and upper school students.

The collaborative work has yielded major findings about the Hawaiian green turtles. "The most significant finding is that the population is well down the road to recovery," states Balazs. "Our concern used to be, 'Can these turtles in Hawaii survive; can they recover to some level of former abundance?'"

"By all means of evaluation right now, they have not only done so, they have done so to the extreme, where a legitimate scientific concern is the foraging areas — Kiholo, the other sites — is the level of food that can be produced by the habitat keeping up with the needs of the turtles?"

Obviously, this is great news for the turtles.

"We are deficient as scientists if we don't fairly and accurately report the good news that goes along with studying a threatened species listed under the Endangered Species Act," states Balazs. "Over the past several years, we've had a lot of good news for Hawaiian green turtles."

That "good news" translates to status changes for about 61,000 Hawaiian green turtles, according to a ScienceDirect article Balazs co-authored with Milani Chaloupka (University of Queensland School of Economics), which appeared online on March 3, 2007. While no formal population count has been taken, this figure is based on a computer model that provides the best estimates at this time.

Balazs sees the population growth firsthand every time he visits Kiholo Bay. "We caught six turtles over three days in 1987. Today, we go there for four or five hours and we're at 25, 35 turtles and we need to stop because there are so many turtles there that we will overwhelm ourselves with how many we can catch and then adequately, properly handle and collect the data on them."

According to Balazs, the Hawaiian green turtle population, genetically diverse, will come in from the Pacific and around the world, is one of, if not the best, studied green turtle population in the world. "One of the things to learn is, if our data and impressions are correct, this species in Hawaii has recovered so very

well, almost to the apparent possible detriment of themselves," he says. "That's a wonderful model to study, to figure out what's happened. The population has really built up far sooner than we expected, meaning 30 years or so, and now, they're potentially overabundant in some areas. What is the effect of that on the habitat and how might this be brought into balance? These are intriguing scientific questions."

Another finding, possibly related to the growth in population, is that the turtles' growth rates have declined in many areas compared to what that were back in 1987.

"[The turtles] grow very, very slowly now," states Balazs. "They didn't grow very slowly in the 1980s."

"So when you have less food to go around, it adds fuel to the belief by some of us that now, the population has built up really well. That's good, that's great. But it's really built up, maybe, so that it's exceeding the ability of the habitat to support them and that's not quite so good. That's an aspect that needs to be investigated a bit more."

Balazs, who played a major role in getting the honu officially listed as "threatened" under the Endangered Species Act in September 1978, believes that in his lifetime, "it is entirely possible that the special protections of the U.S. Endangered Species Act will be recognized as no longer needed for the genetically-discreet stock of the Hawaiian green turtle."

Should the honu be taken off the U.S. Endangered Species list, Balazs said a different management regime, administered by the state of Hawaii, rather than a federal agency, will come in and "prudently manage the Hawaiian stock of green turtle so the over harvesting and decline, which occurred in the late 1960s and 1970s, will never again be repeated."

In the meantime, current projects include continuing to sample study sites along the leeward coast. At the time of this interview, Balazs was preparing to travel to Honaunau with Rice. "Each year that we add to our database is one year longer in what already are long-term data sets that are rare in the world of sea turtles for sea turtle foraging sites," he said.

Another ongoing study is the basking behavior of turtles, which first appeared in large numbers along the Big Island's leeward coast in the mid-1990s. "We're still struggling with the issues of why they do this," said Balazs.

From a student perspective, Rice would like to continue getting students involved in conservation issues, not just with green turtles but the marine environment in general. "Perhaps expanding our scope, continuing to reach out to the community and focusing on some of the environmental aspects and human interactions with turtles because we're going to run into more and more of those issues."

As for the future, Balazs emphatically stated, "People make programs. You need to have the right people stepping forward because they will determine what happens in the future. By example, and by history, in some framework, the program will continue."

"Marc is definitely top of the line. It was clear we had common interests, we got along, and we each saw in one another opportunities that we were eager to pursue that would be impossible to pursue, or near impossible, without a partnership. What a match. We needed one another and we enjoyed working together. We marvel and brag about the synergism because the two of us together is more than 1+1=2."

"But, I had no imagination whatsoever that this work would endure and reach the successful levels, scientifically, and from the standpoint of giving students field experience."

Added Rice, "George has been phenomenal in including us in everything. He's extremely sharing; he's always been very good about explaining things and sharing the science side with us. It's not easy for him as a research scientist to have to work with an educator and high school students."

"It's been a wonderful opportunity for HPA and for me, personally, to be able to work with George over the years because he has been a mentor not only to our students but to me as well."

For more information about the Sea Turtle Research Program at HPA, visit: <http://castaff.hpa.edu/~mrice/htth/anniversary>.