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LETTERS

Kemp's Ridley Sea Turtles

Gary Taubes' article about Kemp's ridley sea turtle conservation (Research News, 1 May, p. 614) addresses a controversial issue which exemplifies scientific and political problems associated with endangered species conservation. Unfortunately, the article seems to emphasize criticisms of the Kemp's ridley project and to downplay defending arguments.

The article indicates that a primary problem with the headstart project is the lack of a control group. However, the natural population is the control group. The number of natural hatchlings entering the water from the nesting beach and the number of hatchlings in the headstart project are known for each year. All "headstarted" turtles currently receive flipper tags and a permanent "passive integrated transponder" or "pit" tag which is inserted under the skin. Headstarted turtles can thus be differentiated from wild ridleys on the nesting beach, and their reproductive output can be compared to that of wild ridleys.

The article suggests that after their release into the wild, headstarted turtles do not act like natural turtles. To substantiate this, the article indicates that "many" headstarted turtles are captured by hand after they "meekly" approach swimmers. Of the total number of headstarted recaptures, the actual percentage of ridleys that are captured or observed while swimming is 6%. Further, most of these recaptures occur from the same methods by which wild ridleys are captured (shrimp trawls and hook and line) and from similar locations, suggesting that the majority of headstarted turtles are behaving like wild turtles.

The article presents several anecdotes that negatively characterize the performance of the headstart project. However, these anecdotes are inaccurate second-hand accounts of isolated incidents in the early to mid-1980s which, if anything, have enhanced the current performance of the project.

While the article attempts to identify many problems associated with the headstart project, it omits or poorly addresses the primary obstacles it faces. Initially, only flipper tags were used to mark turtles, and tag return data indicated that there was a high probability that the tags might fall off before adulthood. Thus, if headstarted turtles nested, they could not be identified. During the mid-1980s the project began experimenting with a variety of permanent tags, and every headstarted yearling now receives a permanent pit tag in addition to a flipper tag. The initial lack of permanent tags has also prevented an accurate assessment of age to sexual maturity, so it is at present impossible to estimate how many (if any) headstarted turtles have reached adulthood. The use of permanent tags will now provide the first conclusive data on age to sexual maturity in the wild.

In addition to tagging problems, there has been a wide variety of logistical problems involved with rearing and releasing 1000 to 2000 sea turtles per year (as would be expected in an experimental research program of this magnitude). However, these problems have for the most part been overcome, and the project has become unparalleled in its ability to efficiently rear sea turtles for an 11-month period. The major problem facing the project (and the recovery of Kemp's ridley species in general) became clear by the mid- to late 1980s. Mortality of Kemp's ridleys in the wild (both headstarted and wild turtles) was extremely high, so high that it was likely that few if any headstarted turtles were surviving to adulthood. But this was also the case in the natural population. During the 1980s the nesting population hovered at approximately 500 or fewer females per season (even though turtles on the nesting beach have been protected since the 1960s and 20,000 to 50,000 hatchlings enter the water at the nesting beach each year). Fortunately, the mortality of ridleys in the wild should significantly decrease during the 1990s because turtle excluder devices have become mandatory on shrimping vessels in U.S. waters and are now being implemented in Mexican waters.

The headstart project is now efficiently producing yearling turtles complete with permanent tags, and mortality in the wild is decreasing. From a scientific viewpoint it is ironic that political pressure may terminate the project just as it begins to generate data that would answer the question, Is headstarting a viable conservation tool?

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Taubes' article "A dubious battle to save the Kemp's ridley sea turtle" contains some statements regarding National Park Service activities that are ambiguous, misleading, or incorrect. The distinctions between imprinting and headstarting activities and the agencies conducting these two separate programs were unclear in the article. A portion of the multiagency project to help save the critically endangered Kemp's ridley sea turtle from ex-

tinction was an experimental attempt to establish a secondary breeding colony of this species at Padre Island National Seashore (PAIS), a unit of the National Park Service (NPS). Each year, from 1978 through 1988, approximately 2000 eggs were collected in Rancho Nuevo, Mexico, for this program. The NPS was responsible for "imprinting" activities, which included incubation of the eggs at PAIS and exposure of the hatchlings to the local beach and surf. The National Marine Fisheries Service (NMFS) conducted the "headstarting" portion of the project, which involved rearing the imprinted turtles for 10 to 12 months at their laboratory in Galveston, Texas.

The article states that the "yearly budget for imprinting and headstarting at Galveston would be between $250,000 to $500,000." However, funding requirements for the two activities should be considered separately. NPS expenditures for imprinting (approximately $15,000 a year) were significantly smaller than headstarting (NMFS) costs. Additionally, transfer of eggs to PAIS for incubation and imprinting ceased after 1988, whereas headstarting activities continue. Hatchlings are now transported directly from Rancho Nuevo, Mexico, to Galveston, Texas, for headstarting.

It was stated in the article that "the Park Service on Padre Island calculated that 31 degrees Celsius was the pivotal temperature." However, the NPS estimate of the pivotal temperature was 30.2 degrees Celsius (*1*, *2*). Although this may seem a trivial point, this slight difference has profound implications on sex ratio.

Regarding the gender of hatchlings born before 1985, although no hatchlings could be killed to determine gender, a number of methods were used to determine the sex of dead embryos, dead hatchlings, and captive turtles (gonadal histology, laparoscopy, serum testosterone assay, and necropsy). It was found that some females were produced during the early project years (*2*, *3*). Estimates of the overall percentage of females within the 1978 to 1984 year-classes range from 33 to 48%, depending on the method of calculation used. About three-fourths of these clutches had either entered or completed their middle third of development, thought to be the critical sex-determining period, before shipment to PAIS.

The statement that "[a] 1983 shipment of 2000 eggs to Padre Island . . . was left in an air-conditioned room; only one in eight hatched" should also be clarified. No incubating sea turtle eggs were placed in an air-conditioned room at PAIS. Although only 12% of the eggs within the 1983 year-class hatched, most embryos ceased development before their arrival at PAIS, and fungal infection or excessive sand moisture, or both, contributed to their death (*1*, *4*). Despite the high embryonic mortality in the 1983 year-class, the overall hatching rate for the 22,507 eggs incubated at PAIS from 1978 through 1988 was 77.1%.

Undoubtedly, public awareness about the plight of sea turtles has increased as a result of NPS efforts. Some of the biological information collected by the NPS was the first of its kind for the species and has been used to assist with efforts in Rancho Nuevo, Mexico. Although none of the headstarted turtles have been observed returning to nest at any beach, several factors may have influenced their return or detection: (i) mortality at sea; (ii) predominance of males in some early project years; (iii) tag loss; and (iv) limited efforts to detect returning females. At least 11 to 12 years may be required for females of this species to attain the minimum nesting size (*5*).

The NPS is now focusing conservation efforts for this species on attempts to locate and protect nesting females (wild and headstarted) and stranded hatchlings. Staff at PAIS are conducting extensive beach patrol and public education efforts, both of which have been given high priority in the recently completed Kemp's Ridley Sea Turtle Recovery Plan. As directed by the recovery plan, NPS mandates, and the Endangered Species Act, these efforts will continue for the foreseeable future.

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Response: Wibbels makes several debatable points. That 6% of the turtles are captured by hand (45 out of 716 tag recaptures) does not

sound like "many," except when compared with the number of wild Kemp's ridleys found meekly approaching swimmers, which is effectively none. One must also add that of the 716 tags recaptured, according to Charles Caillouet, a chief scientist for the headstarting program at Galveston, 313 (43%) were from turtles found stranded on the beach; and in 103 cases no method of recovery was reported.

As for Wibbels' criticism of the anecdotes used to illustrate the problems encountered by the laboratory, the primary source for the numbers used in these accounts was Caillouet, who should know. It is true that these were isolated incidents from the early to mid-1980s. However, my article did not mention a 1987 incident, in which the Galveston laboratory aborted "research" plans to place 48 freshwater turtles near underwater explosions to determine the "lethal range" of the blasts and then to place 50 legally threatened loggerhead sea turtles outside the lethal range to establish the level of injuries that would be suffered. The decision to abort the project was made by Ed Klima, director of the laboratory, only after the lay press reported the research plans and sparked a vehement public outcry. As Klima told me, "I must have had 1000 letters addressed to me saying, 'Why didn't they put me in the water and blow me up?' It was unbelievable. We had the money [to do the research] and we returned it. Even though we were not going to intentionally kill any sea turtles, we were going to use a surrogate species. Dumb on my part? Yes." My article also omitted a 1991 incident in which 100 adult ridleys were trucked in midsummer to Panama City, Florida, for Turtle Exclusion Device (TED) testing, resulting in the death of 30 of these turtles. Thus it is still questionable whether the current performance of the project has been "enhanced."

As for the key question of continuing the headstart experiment, Wibbels told me in a 31 January phone interview that his blue-ribbon panel was specifically directed to evaluate only the headstart program and that they were not told to consider sea turtle conservation as a whole. "If I was in the position where I was in control of all conservation sea turtle money in the United States," Wibbels said, "it would be a really tough decision whether I would put it in the nesting beach or put it in the Galveston project." Wibbels also admitted that headstarting is an experiment and not a conservation tool. Considering, as he says, that the full implementation of TEDs in the Gulf of Mexico also means "the mortality of ridley's in the wild should significantly decrease," it makes the relative importance of another decade of headstart experimentation in a world of limited funding highly questionable.—*Gary Taubes*