Experts Gather to Talk Turtle

Despite endangered species pact, sea turtles are threatened by world trade in meat, skins, and shells

The spotlight was on the sea turtle at a 5-day international conference held at the State Department at the end of November. Participants from 40 nations were there to hammer out a conservation strategy for the earth's seven species of sea turtle, six which are endangered.

Sea turtles embody all the major challenges faced by efforts to conserve endangered species. Like whales, they are distributed internationally and they travel a lot—some regularly migrate thousands of miles—so nothing less than a global strategy is required. Also, they are extraordinarily valuable commercially because of the variety of products they yield, including eggs, skin, meat, calipee (cartilage used for soup), shells, oil, and trophies. In some areas, sea turtle meat is an important food for indigenous populations, which poses the same type of conflict that has occurred over the bowhead whale in Alaska. Finally, sea turtles are difficult to protect because they are easy to catch, slow to mature, and vulnerable at many stages. Their habitats are being threatened, their eggs are poached, and adults are being lost in large numbers to shrimp fishing operations, where they are caught in shrimping nets and drown.

The species are as follows: the green (which are the most numerous and the ones that make the best eating), hawksbill (suppliers of tortoiseshell), the loggerhead, the leatherback, the olive (Pacific) ridley, the Kemp's (Atlantic) ridley, and the flatback. All are now listed on Appendix 1, the list of the Convention on International Trade in Endangered Species (CITES); however, Japan, a major consumer of turtle products, has not ratified the treaty, and two other big consumers, France and Italy, have taken reservations on sea turtles.

Anyone who attended all the sessions of the conference should be dreaming about sea turtles for many weeks to come. There were sea turtle movies, and long, detailed presentations about sea turtle reproduction, migration, nutrition, trade, "incidental catch," subsistence hunting, history, laws, tagging, nesting, hibernation, "headstarting," managing, and farming. But despite all that is known about sea turtles, much is not known about their populations, lifespans (they can live 30 to 40 years in captivity, but life-span in the wild is unknown), and how a turtle finds its way back to nest on the beach where it hatched.

One certainty is that turtle populations have drastically diminished in the past few decades. They were once so plentiful in the Caribbean that Spanish galleons could navigate in the fog to Grand Cayman Island by following the sounds of migrating herds. As recently as 1947, 40,000 Atlantic ridleys were seen nesting together on a beach in Mexico. Now At-

NEI Votes to Protect Cold-Blooded Animals

The National Advisory Eye Council, which must review and approve research grants made by the National Eye Institute (NEI), is asking all investigators not to inflict needless pain on the cold-blooded lower vertebrates (such as frogs and turtles) used extensively in vision research. Some investigators are said to assume that cold-blooded animals do not experience pain when in fact they probably do, some scientists believe.

At its October meeting, the council approved a statement of policy calling on all researchers supported by NEI to adopt "effective and uniform procedures . . . to minimize pain in these animals." Henceforth, researchers will be expected to note in their grant applications what they are doing to ensure that this policy is followed. The council indicates that, in most cases, the policy can be met—and is often already being met—without compromising the advantages of working with cold-blooded vertebrates.

Council member Kenneth T. Brown, a professor of neurophysiology at the University of California School of Medicine at San Francisco, first raised the issue at a council meeting last January. In a memorandum to his colleagues on the council, he said that, while it may be impossible to prove that cold-blooded vertebrates experience pain, the argument sometimes advanced by researchers that they do not is "so strained that one wonders whether it would be advanced at all except in self-justification."

Brown then observed, "Since pain is an important adaptive survival mechanism, it is probably a primitive mechanism that appeared early in evolution. This is indicated, for example, by the fact that the withdrawal reflex is organized at a spinal level. . . . Since it is demonstrably reasonable to assume similarity among vertebrates for many of the research problems that interest investigators, it would be unreasonable to assume at the same time that cold-blooded animals do not feel pain."

Brown said certain investigators do not consider or take seriously the pain that may be inflicted on these animals. "For example," he said, "I have heard a first-hand account from a well-known investigator who systematically practiced removal of one eye from a live fish, which was then replaced into the tank, awaiting an experimental need for the second eye. . . . The investigator even joked about this in a group of experimenters in a social situation, which seems to indicate the generality with which such practices are accepted."

The upshot of his initiative was that the council, in considering the matter again in May, concluded that the National Institutes of Health's general policy on "Responsibility for Care and Use of Animals" is not specific enough clearly to protect cold-blooded vertebrates from needless suffering. Accordingly, the council asked Brown to draft the statement of policy which it has now adopted.—LUTHER J. CARTER

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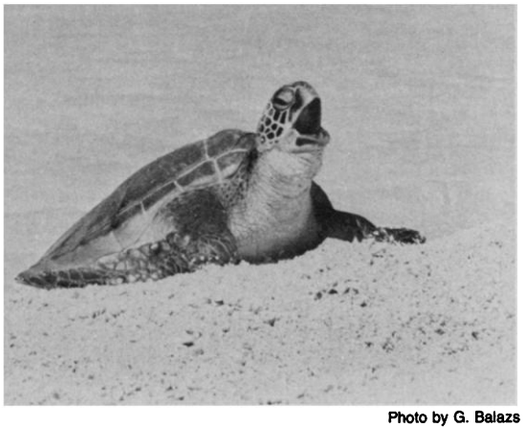

Photo by G. Balazs

Green turtle basking and yawning on Hawaii beach.

lantic ridleys are the most endangered of the lot, and it is believed that there are no more than 500 to 1000 nesting females left. The Atlantic ridleys have thus become the object of some extraordinary efforts to preserve them. Last spring, when their only nesting beach, Rancho Nuevo in Mexico, was threatened by the oil spill in the Gulf of Mexico, Mexicans and Americans collaborated in airlifting newly hatched turtles from the beach with the aid of a Pemex helicopter and dropping them in parts of the gulf that were free from oil.

In Galveston, the National Marine Fisheries Service is conducting an experimental head-start program in which hatchlings are kept in a laboratory during their vulnerable first year of life. Officials are trying to establish a second rookery for the ridleys at Padre Island National Seashore in Texas. They go to Rancho Nuevo and collect eggs as they are being laid by the mother turtle, before they hit Mexican sand. The eggs are packed in Padre Island sand and then flown to hatch at Padre Island. When they hatch, the little turtles are allowed to run down the beach for the all-important "imprinting" that will enable them to return to the beach as adults to nest. They are then collected and held in individual basins at the Galveston lab until they are big enough to be released safely into the gulf. At present, says Peter Pritchard of the Florida Audubon Society, "we don't know if this is just an expensive way of killing turtles." All are tagged, however, and so far it appears they are surviving well, although it is too soon to know whether the females, who take about 8 years to reach sexual maturity, will be returning to Padre Island.

Although everyone at the conference wanted to save sea turtles, there was one issue on which they were sharply divided: the virtue, or lack thereof, of turtle farming. There is only one turtle farm, the Grand Cayman Turtle Farm on Grand Cayman Island, which raises green turtles for meat and other products. The farm was established in 1968, went bankrupt, and in 1974 was purchased by a German-British consortium. It is extremely expensive to run, what with its artificial beach, aquatic system, and special high-protein pelletized turtle chow, and has still not made a profit. However, it now has a breeding stock of 1200 turtles, which this year produced 45,000 eggs. It plans to slaughter 12,000 turtles a year, and according to a report by the wildlife trade-monitoring group TRAFFIC (USA), "it is probably the largest exporter of green turtle meat in the world."

The turtle farm people did not seem to be very popular at the conference because most conservationists believe that commercial mariculture will only stimulate the market for turtle products. They also make enforcement of trade restrictions more difficult because illegal traffickers in turtle meat may represent their product as coming from the farm. In recognition of this, the United States recently added farmed turtle products to the forbidden list in CITES. Judith Mittag of Düsseldorf, one of the farm's proprietors (and also, incidentally, the gynecologist who invented the tampon) argues that the farm's product only displaces the demand for turtle meat from illicit to licit channels. She added: "There are only two alternatives: either a resource is exploited sustainably or it's exploited nonsustainably." She said research on the farm could help Third World countries learn how to manage their turtle stocks, and held out the possibility that farm turtles could be used for restocking the wild. This argument does not carry weight with most turtle experts, who point out that all commercial turtle products are luxury items and it would be better to avoid developing a taste for them.

The convention, which was presided over by World Wildlife Fund president Russell Train, closed after presentation of a "sea turtle conservation strategy" that contained specific recommendations on everything from basic biological research to a global survey of laws relating to sea turtle conservation. While acknowledging that we still want the turtles for human use, the strategy says that "as long as sea turtles remain endangered, the ending of commercial exploitation of all sea turtle products" is the ultimate, or at least ideal, goal.

A standing committee is being formed to monitor progress on the plan; it will meet in 1981 in association with the third CITES conference.

—CONSTANCE HOLDEN

Energy R & D Fueled by Few Countries

Despite the widespread belief that most economically advanced countries redoubled their efforts to research and develop new means of obtaining energy after the 1973 Arab oil embargo, the facts show that many of them did not. A few actually cut back, according to *Science Indicators 1978*, recently released by the National Science Foundation (NSF).

The significant exception was the United States, which increased its energy R & D some 435 percent since the oil cutoff. Total U.S. expenditures for energy R & D now stand at $2.8 billion—more than 10 percent of all federal R & D funds. Of the 24 member nations in the Organization for Economic Cooperation and Development (OECD), the only other exception was Italy, which by 1976 had pushed energy R & D up to 22 percent of its total public funding.

In Denmark, Finland, Germany, and France, on the other hand, expenditures remained steady. In Belgium, Switzerland, and Canada, public funding of energy R & D declined in the years following 1973. In the Netherlands, only a third as much public money was spent on energy R & D in 1976 as in 1971.

The NSF *Indicators*, the fourth edition of a biennial report to the President on the state of U.S. science and technology, also noted that the overall U.S. commitment to science and technology is building up at an "encouraging rate." Many science policy-makers have been concerned that U.S. research expenditures were falling in relation to the nation's total economic output, but the NSF report says the decline is ending. In recent years, it notes, the United States "spent more on research and development than the United Kingdom, France, West Germany, and Japan combined." Other highlights from the report:

- Women and blacks continue to be underrepresented in scientific careers. The number of women, however, has increased at almost twice the rate of men during the 1970's, and the number of blacks who received doctoral degrees grew by 35 percent, compared to 26 percent for whites and 70 percent for Asian-Americans.

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