

The difficult task of ameliorating these problems will now be the responsibility of the Directorate of SPA in Ankara. As a newly formed government agency the Directorate does not yet have its own field workers. Moreover, there is not as yet an established network for co-operation between the SPA and the various governmental departments responsible for the environment (e.g., the Ministry of Agriculture, Forestry and Rural Service, and the Undersecretariat for Environment). The small staff of the Directorate of SPAs must be increased before the preservation of the SPAs can be assured. However, their designation means that there is now a legal requirement that all construction within the new SPA areas must be halted and all physical planning revised as from 3 March 1990.

Akyatan, another sea turtle nesting area identified in the 1988 survey, is currently being proposed for protection. The Ministry of Forestry (OGM) is proposing to extend the area of the current Strict Nature Reserve (SNR) at Akyatan to include the nesting beach and nearby feeding areas at Yumurtalik Dalyan. The remaining undesignated 11 nesting areas are still under threat from development and often from large scale sand mining. In the Official Gazette of the State Planning department of the Turkish Government (Reg. No. 0327, 1989), a commitment was stated to a long term programme to protect all of the 17 areas. This was followed on 17 April 1990 by a new Littoral Law banning all sand mining and imposing a fine of up to US\$ 20,000 on offenders. This Law has yet to be enforced and sand mining is currently continuing.

The designation of the new SPAs is an excellent step toward successful preservation of sea turtles in the Mediterranean and a pioneering accomplishment for wildlife conservation in Turkey. This act by the Turkish Government deserves acknowledgement from the international conservation community, and encouragement for continued efforts.

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**GUEST EDITORIAL:
IS 'HEADSTARTING' A REASONABLE CONSERVATION MEASURE?
"ON THE SURFACE, YES; IN REALITY, NO"**

As part of the USA/Mexico cooperative program to conserve the Kemp's ridley sea turtle (*Lepidochelys kempi*), "headstarting" was employed as an experimental technique. Hatched turtles were immediately taken into captivity and maintained for a period of time, in this case about nine months, and then released into the sea at a size which is believed to discourage many of the young animal's natural predators. The theoretical idea is to increase survival and ultimately return greater numbers of animals into the breeding population than

would occur naturally. To date, there is no indication that 12 years of such headstarting has contributed a single animal to the breeding population of the Kemp's ridley.

When the U. S. [Fish and Wildlife Service, National Marine Fisheries Service, National Park Service] and Mexico cooperative program started in 1978, it had an additional experimental objective, and that was to try to establish a second nesting colony of the Kemp's ridley in the United States. The thinking was that if a second nesting population could be established, besides the historical one in Mexico, this would provide further insurance against any natural or human caused disaster that might hit the single major nesting beach at Rancho Nuevo in Tamaulipas, Mexico.

The U. S. Fish and Wildlife Service (FWS), in cooperation with Mexico, moved approximately 2,000 Kemp's ridley eggs each year from Rancho Nuevo, Mexico, to the National Park Service's Padre Island National Seashore, during the 1978-1988 time frame, a period of 11 years. The eggs were turned over to the National Park Service (NPS), where personnel completed incubation, hatching, and hatchling imprinting attempts on the Padre Island shore and adjacent waters. After this was accomplished, the hatchlings were transferred to National Marine Fisheries Service (NMFS) facilities at Galveston, Texas, where the animals were "headstarted" for a period of months and then released into the Gulf of Mexico. In most cases these releases took place in the waters offshore of Padre Island.

The original agreement for this project was among Mexico's Secretary of Fisheries, FWS, NPS, NMFS, and Texas Parks and Wildlife Department. FWS served as the overall coordinator for this working group which involved far more than the headstarting experiment in our attempts to prevent the biological extinction of this species in the wild. The original agreement between all the parties involved was to do the Padre experiment for 10 years; it was extended to 11 years and was terminated after the 1988 transfer of 1,000 eggs to NPS, Padre Island. Two thousand Kemp's hatchlings are now being moved annually from Rancho Nuevo to the NMFS Galveston lab for continuation of experimental headstarting. FWS provides minimal cooperation in this effort, but we are not an advocate of this project.

The obvious question is why would anyone object to what would appear, on the surface, to be a reasonable and sound conservation measure. Doesn't it make sense to maintain these turtles in captivity until they grow to a size more likely to reduce early life stage predation? On the surface, yes; in reality, no.

Headstarting sea turtles is not new. It has been attempted in many areas around the world for decades, with one of the largest and longest programs carried out by the State of Florida for over a 30-year period. The State of Florida stopped their program [MTN 46:1-2] on the basis that there had been no evidence that their long term efforts, nor any other headstarting efforts, had resulted in a single headstarted animal surviving and entering a breeding population, and this is the single and only objective of such a program -- to increase the breeding stock over and above what occurs naturally.

We recognize the public appeal of "turtle hatcheries". It sounds great: if you need more turtles, then raise them -- just like trout, quail, pheasants, or elephants. What this fails to address are the problems which brought the trout, turtles, or elephants to their present sad state. Something is terribly wrong in the animal's environment, and until these problems are recognized and corrected all the turtle farms in the world will do little more than eat up taxpayer's money and put a turtle in every trawl that doesn't have a Turtle Excluder Device (TED) installed. In essence, we would be doing little more than supporting a put and take turtle fishery. Hatcheries and headstarting won't cut it for our sea turtles and will only serve as an expensive facade to cover up the real problems of habitat loss and degradation, and

incidental or directed killing by humans. Unfortunately, there are no quick "fixes" for sea turtles (or any other species) on the brink of extinction, and until this is recognized and accepted, we can keep kissing sea turtles (or any other species) goodbye.

My personal opinion, after working with sea turtles in a number of countries and the U. S., is that even though we know relatively little of the sea turtles' life history and ecology, we don't have to spend tons of money over many years for intricate and long term research to find recovery answers. A comparable example would be the American alligator, one species that has been recovered and, under strict State oversight, is now actually being commercialized in certain areas. What the alligator needed to come back is the same as the sea turtle -- and that is to give the animals strict levels of protection from human killing and protect the nesting sites. If this is really done, I firmly believe that Kemp's ridley and the other sea turtles will begin returning to safer population levels. If this protection isn't achieved, then the Kemp's ridley and the other sea turtles that have been around for more than 100 million years may be lost to the world in one short human lifetime.

Again, I stress the point that turtle hatcheries or expanded headstarting efforts will not solve the existing problem for the turtles or the people, they would only be a costly hoax. At this time, with the data available, the United States Fish and Wildlife Service does not endorse headstarting for raising and releasing sea turtles into the wild as a recovery action or an attempt to maintain present numbers of reproducing marine turtles in the wild.

No headstarted turtle has ever been recorded as nesting in the wild, and there is no proof that they will even reproduce in the wild. Headstarted animals are supposedly, and I use the term loosely, "imprinted" to their natal beach, where, if everything worked as it does on paper, they would return to nest when they reached maturity. However, no one yet knows what cues it takes or for how long (and when) a sea turtle must be imprinted in order to return to that site many years later. The extreme example of what this human meddling might do is cause these animals to scatter and disperse to such a point that they will never get together in time and space to reproduce their kind. A far less extreme, but likely situation, would be that individuals, not knowing what we want them to do, will choose totally inappropriate nesting sites, such as Miami Beach, where there is no realistic way to assure their survival.

Animals kept in buckets or troughs and fed Purina food pellets for the first 9-12 months of their life have been forced by us to bypass what may be a critical aspect of their early life cycle -- we don't know. However, it doesn't take a genius to figure out that life in a bucket or raceway with a kind person dumping in prepared food pellets once a day, is not what the real world is all about. What happens to an animal's muscle tone and stamina, to say nothing of what is taking place behaviorally and physiologically to these animals, from this abnormal captive life? It's a tough world out there and the natural selection that starts at birth to give back in future years the best of the survivors to continue the species has been bypassed in our well-intentioned efforts. I've worked with enough species, not only with sea turtles but a diverse number of other species in my 31 years of professional wildlife work to know that captive raised individuals don't cut it -- be they trout, turtles, pheasant, wild turkey or elk -- unless they are intended for immediate human harvest by the gun or hook and line. These animals are not suitable for survival in the wild, they can't compete. This is not to say that 100% die; in some cases a few make it, but this is the exception and certainly not a rational use of the animal or our scarce resource dollars.

The sea turtle has spent millions of years developing survival mechanisms, which were an outstanding success until humans entered the picture. They cannot adapt to high human predation, but they constantly demonstrate they will at least meet us halfway. We

just can't keep killing them. They have adapted to a changing environment and appear to tolerate insults to their ocean and beach environments, far more than many species. In fact, they are so tough that I would not recommend sea turtles as environmental indicators of the health and well-being of our oceans -- for they may hang on long after many of their ocean neighbors have given up and disappeared. Until we understand far more of what it is that provides the necessary cues that cause turtles to return to a particular beach to nest, what imprinting consists of and how long it may take, or what the real behavioral and physiological ramifications are of captive culture, we would be unusually wise to stay far away from headstarting and hatcheries and to concentrate our efforts on saving the turtles we have left in their natural environment. With this in mind, I make the following recommendations:

1. Maintain maximum protection of nesting beaches for all species,
2. Expand and enforce TED regulations to include all waters, all times, and all trawlers of 25 feet or greater,
3. In cooperation with State, county, and local governments of Florida, acquire the nesting beach habitat to establish the Archie Carr National Wildlife Refuge,
4. Significantly increase the law enforcement capability of NMFS by expanding the number of Special Agents, especially in the Gulf of Mexico region. As an example, in Texas there is but one Agent to monitor literally thousands of trawlers, as well as many other federal and international fisheries concerns. This increase should be coupled with a closer working relationship between FWS and NMFS enforcement to take advantage of available resources in both agencies for the common goal,
5. Use every means possible to convince the Japanese government that commercial importation of sea turtle parts, from anywhere in the world, is not acceptable, and
6. Begin negotiations to develop an international accord for sea turtles in the Western hemisphere which recognizes the international sharing of these species, their economic, scientific, and educational value, and establishes the policy and framework for real international management of these resources in our hemisphere.

Editors' note: The text of this Editorial was excerpted from the testimony of Jack B. Woody, Associate Regional Director/National Sea Turtle Coordinator for the U. S. Fish and Wildlife Service, Department of Interior, before the Subcommittee on Fisheries and Wildlife Conservation and the Environment, U. S. House of Representatives, regarding endangered and threatened sea turtles; 1 May 1990, Washington D. C.

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**SEA TURTLE CONSERVATION REQUIRES MANDATORY USE OF TEDs:
NATIONAL ACADEMY OF SCIENCES/RESEARCH COUNCIL REPORT AVAILABLE**

WASHINGTON D. C. -- Turtle excluder devices (TEDs) should be required for all shrimp trawls at most places and most times of the year from Cape Hatteras, North Carolina, to the Texas-Mexico border to protect sea turtle species now covered by the Endangered Species Act, a committee of experts has concluded. Shrimp trawls, which

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KEMP'S RIDLEYS ARE RARER THAN WE THOUGHT

In 1989, 835 nests of the Kemp's ridley (*Lepidochelys kempji*) were recorded by the bi-national beach monitoring crew at Rancho Nuevo, Tamaulipas, Mexico (Márquez, personal communication). Despite intensive patrols, it was not possible to encounter all of the nesting turtles; the turtles spent a short time on land (about 45 minutes), showed unusually broad dispersal north of the camp headquarters at Barra Coma, and also a new tendency toward very early morning nesting during the 1989 season. Nevertheless, 201 turtles were tagged with Monel metal tags in 1989, and 74 turtles tagged in previous seasons were encountered. Of the 201, 116 were recorded nesting once, 72 twice, and 13 three times. Of the 74, 47 were seen once, 23 twice, and 4 three times. These data allow the calculation of an estimate of the average number of nests per female per season as follows.

Out of the 835 total nesting events, the turtle was seen (and tagged, or the tag number noted) on 404 occasions. Thus, based on the assumption that beach coverage was consistent throughout the season, there was $404/835 = 0.484$ chance of witnessing a given nesting event and consequently a $(0.484)^3$ probability of witnessing a three-time nester on all three occasions. So, if three-time nesters were observed on $13 + 4 = 17$ occasions, the actual season's total of three-time nesters can be estimated at $17/(0.484)^3 = 150$. Similarly, to estimate the actual total of two-time nesters, I note that the observed total of $72 + 23 = 95$ includes a subset of three-time nesters that were actually observed only twice. The chance of seeing a three-time nester on exactly two of its three nestings (i.e., on nestings 1 and 2, 1 and 3, or 2 and 3) may be estimated as $3 \times (0.484)^2 (1 - 0.484) = 0.363$. Thus, $150 \times 0.363 = 54.5$ of the three-time nesters would have been seen just twice, leaving $95 - 54.4 = 40.6$ actual double nesters observed both times. This corresponds to a true total (observed + unobserved) of $40.6/(0.484)^2 = 173.3$ double-nesters.

The triple and double nesters together thus produced $(150 \times 3) + (173.3 \times 2) = 796.6$ nests for the season, leaving just 38.4 nests ($835 - 796.6$) made by single nesters. So 835 nests were made by $(150 + 173.3 + 38.4) = 361.7$ turtles, giving an average of 2.31 nestings per turtle. This figure is much higher than accepted literature values; for example, Márquez et al. (1982) calculated a value of 1.326. Later this figure was revised upwards to 1.47 (1.45 for neophytes, 1.55 for remigrants); but it is clear in the latter calculation (Márquez et al., 1989) that no correction was made for the diminishing probability of observing a multiple nester on