

THE SURVIVAL STATUS OF SEA TURTLES

Are they endangered, threatened, or what?

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By Peter C. H. Pritchard, Subcommittee Chairman.

The latest edition of the IUCN Red Data Book (Groombridge, 1982) lists five species of sea turtle (i.e. Chelonia mydas (including C. agassizi), Lepidochelys kempfi, L. olivacea, Eretmochelys imbricata, and Dermochelys coriacea) as "endangered;" and one species (Caretta caretta) as "vulnerable." The seventh species, Chelonia depressa, listed in former IUCN publications as "rare," was dropped from the 1982 Red Data Book because it was not considered to fulfil the criteria for inclusion in any of the carefully defined categories of threatened species. (The term "threatened" was here used generically to include all categories of concern, rather than being a specific category just below "endangered," as in previous usages).

Nevertheless, the compiler realized that this was a provisional arrangement only, "pending a planned discussion of the criteria defining each present category, and related aspects of sea turtle biology and conservation," including the assumption that "each turtle population must be treated as a discrete entity for the purposes of conservation."

The influential Endangered Species listings of the United States Department of the Interior list sea turtles as "endangered" or as "threatened." D. coriacea, L. kempfi, and E. imbricata were early inclusions on the "Endangered" list. Subsequently, the populations of Chelonia mydas in Florida and the Mexican Pacific, and of L. olivacea in the Mexican Pacific, were listed as "Endangered"

also, with other populations of these species plus all populations of Caretta caretta listed as "Threatened." Once again, C. depressa -- the one sea turtle species so localized that few herpetologists had even seen it -- was not included in the lists.

The CITES listings include all species of marine turtle (Dermochelyidae and Cheloniidae) in Appendix I, i.e. prohibited from international trade between signatory countries, and to be exported or imported only by permit and for demonstrable purposes of conservation or public education. Initially, C. depressa was excluded on the grounds that this species was effectively protected in the only country in which it nested (i.e. Australia), but following certain false claims that certain shipments of sea turtle products in commerce were derived from this species, it too was included in Appendix I.

IUCN defines "Endangered" as "Taxa in danger of extinction, and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction. Also included are taxa that are possibly already extinct but have definitely been seen in the wild in the last 50 years."

Although sea turtle conservationists were active in promoting the listing of sea turtles as "endangered" by USDI and IUCN, and as Appendix I species by CITES, they nevertheless retain some residual unease about the accuracy of some of these categorical allocations. Carr (1972) differed somewhat from the priorities demonstrated by the official listings by considering L. kempi and E. imbricata to be jointly the most endangered, followed (in this order) by C. mydas, L. olivacea, C. agassizi (in which were included certain island stocks of the eastern and central Pacific and the Indian Ocean as well as the

mainland American Pacific stocks), Caretta caretta, Chelonia depressa, and (the least endangered) D. coriacea. Information revealed during the subsequent 15 years does little to change this order, except that the usual definition of C. agassizi is much more restrictive geographically, so that this form (confined to the American Pacific mainland shores and possibly the Galapagos Islands) may be more endangered than either C. mydas or L. olivacea. Indeed, there is some informal evidence that populations of Carr's "least endangered" species, D. coriacea, may be increasing, even in some places (such as Guyana or Trinidad) where beach slaughter of nesting females has been heavy.

Mrosovsky (1983) took issue with the allocation of "endangered" status to any of the sea turtle species except L. kempfi. He concluded, after a review of the wide distribution of most of the species, and the existence of at least some major and currently unthreatened populations of each, that none of the species (except L. kempfi) met the IUCN definition of "endangered." However, he added a reflection that, with the uncontrolled spread of human beings and man-caused pollution and habitat destruction, "some conservationists may still wish to use the endangered label as they do a preventive medicine or a self-negating prophesy. If you call a species endangered, then it can be saved. If you do not call it endangered, then it will be. But there should also be room for a scientific approach, for starting not with fear but with facts."

Groombridge and Luxmoore (1987) gave a particularly useful discussion of marine turtle biology, management, exploitation, international trade, systematics, and conservation status, with emphasis upon C. mydas and E. imbricata. They discussed the difficulties of providing accurate censuses of sea turtle populations, and gave a careful review of the arguments in favor of, and against, the commonly held belief that sea turtle nesting aggregations or colonies were genetically

discrete and so must be assessed individually and in isolation. They found sufficient evidence of shift of nesting animals from one beach to another to conclude that nesting populations were less genetically isolated than often thought. This argument was further supported by the lack of direct evidence that sea turtles return to their natal beach, as adults, to nest; by the possibility of males mating with females of other than their maternal population; and by the ability of sea turtles of several species to establish nesting colonies on geologically new beaches (even on the island of Krakatoa) within a relatively short time.

In their discussion of conservation status, these authors concluded that, if a category had to be allocated to the species C. mydas as a whole, "endangered" could not apply, since several large populations could be considered "safe" for the foreseeable future, and they opted instead for the category "vulnerable." On the other hand, if individual populations were to be categorized, those of Queensland, South Yemen, Europa, Tromelin, and elsewhere appear to be neither depleted nor threatened, whilst on the other hand populations in Pacific Mexico, Sabah, Sarawak, Burma, many parts of the West Atlantic region, and elsewhere, must be ranked as "endangered." A large number of populations fell between these two extremes, and information was inadequate to assess many others.

These same authors concluded that the world status of E. imbricata could, at present, only be listed as "Indeterminate" (i.e. "Taxa known to be endangered, vulnerable, or rare, but where there is not enough information to say which of the three categories is appropriate.") Evaluation of the status of the hawksbill was complicated by the fact that, being a carnivore, it would not be expected to be as plentiful as the green turtle*, nor was there any evidence that it ever had been; that its dispersed nesting habits simultaneously made

*Although Lepidochelys olivacea in the eastern Pacific is not only more abundant than any green turtle population, but is also apparently carnivorous.

it difficult to exploit, to protect, or to count, efficiently; and that, although the millenia of exploitation to which this still-extant species had been subjected indicated that it could certainly tolerate some level of exploitation, nevertheless the harvest of enormous numbers in recent decades in response to the demand for shell was almost certainly not sustainable.

It thus seems legitimate to re-open the question of the appropriate status category for each of the various species of sea turtle. This should not be done naively, or in a political vacuum, and it would be easy for an honest revision of status to be misinterpreted as a "go ahead" to those parties waiting for the species to recover sufficiently for legal international trade to resume. Indeed, whilst it may be true that the wide distribution and the numbers of most sea turtle species clearly place them in a different category of endangerment from, say, an island species restricted to a few dozen individuals in a simple but disturbed ecosystem, nevertheless revision of the categories should perhaps only be made if the turtles themselves stand to gain from it.

Although how such a gain might be made by a "downlisting" of status is not immediately obvious, the following possibilities exist:

- i) Insistence upon "endangered" status for species that, in the mind of the general public, are not endangered, and which dozens of nations regard as a manageable and exploitable resource rather than a life-form in danger of extinction, can lead to credibility problems.
- ii) Sea turtles may be diverting scarce conservation funds or energy away from, say, certain freshwater turtles or tortoises whose situation may in fact be far more critical.
- iii) Even within a species of sea turtle, a blanket category of "endangered" gives no recommendations as to which populations are in especial need of active

conservation, and which ones are sufficiently abundant or locally protected by national or governmental conservation programs as to be lesser priority candidates for international conservation concern and investment.

iv) Some argue that, in the long run, sea turtle conservation must pay for itself, and that other approaches to their conservation will of necessity be only short-term. This "paying for itself" could be accomplished, for example, by permitting ranching or farming of sea turtles for international markets to take place, part of all of the profits resulting therefrom being re-invested in the conservation of the wild turtle resource. This connection could be maintained best in the case of ranching, since the ranch operators would have a permanent self-interest in protecting the source of the eggs or hatchlings from which the ranch stock was derived. On the other hand, under current international legal constraints (especially CITES), such international markets may only be supplied legally if a downlisting (in the case of CITES, to Appendix II) of the parent wild stock could be obtained.

Counter-arguments, to maintain all species on the "endangered" or "Appendix I" list, may be summarized as follows:

i) Even though some populations are numerous, so was the passenger pigeon. Numbers alone do not guarantee long-term survival, and sea turtles, being large, edible animals laying large numbers of edible eggs in accessible, terrestrial locations, will always be vulnerable, at the least.

ii) The downlisting of certain populations may concentrate a recrudescence of commercial interest on those same populations, which could then lead to excessive commercial pressure and a rapid return to truly "endangered" status.

iii) Any downlisting, however carefully considered or qualified, would probably be oversimplified by parties ranging from law enforcement officials to turtle

exploiters (potential or actual), with a conclusion that "turtles are no longer endangered. They are legal in international trade again." This could lead not only to non-enforcement of laws restricting trade in still-endangered populations, but might lead to difficulties in such seemingly unrelated areas as persuading shrimp trawl operators to accept regulations mandating the use of turtle excluder devices -- a campaign that may be the most vital current issue in sea turtle conservation. Shrimpers are already baulking at the requirement to use the TED, and are presenting poorly-researched arguments to the effect that it is unfair to mandate TED use when turtles continue to be exploited commercially when in foreign waters.

iv) Many have doubts about the potential for turtle ranching or farming to contribute to turtle conservation. They express suspicion that the release of head-started turtles by the operators of farms or ranches may not be helpful, and fear that the opening of turtle markets (such as that of the US) that may have been closed for a decade or more could result in confusion and complication, and a probable reluctance on the part of law enforcement officials to challenge imports falsely claimed to be from farmed or ranched stock.

v) While conceding the desirability of turtle conservation "paying for itself," many see tourism as a safer alternative to consumptive use. In some cases, tourism and consumptive use (at least of eggs) may co-exist, as on the Malaysian leatherback nesting beach, but tourism and beach-slaughter or removal of nesting females are unlikely to be compatible. Tourists often relate to nesting turtles in a very sympathetic fashion, and are disturbed to see egg collectors (legal or illegal) at work, and are likely to be angered by exploitation of the turtles themselves. Also, while perhaps a trite observation, it remains true that a turtle can only be eaten once, but can be enjoyed by many tourists -- and still survive.

Some countries too may be a little over-optimistic in their anticipation of the role that legal export of turtle products might play in domestic turtle conservation programs. Thus, for several years Surinam apparently pinned its hopes for ongoing domestic turtle conservation on the financial success of a green turtle ranching operation, that was repeatedly denied access to foreign markets at successive meetings of the parties to CITES. Yet this ranching operation was a small one in a very remote area, and relied upon imported feed for which hard currency was in very short supply. In reality, it might have been many years before this operation generated sufficient foreign revenue even to meet its costs (let alone of the international lobbying effort to open the foreign markets). It would surely have been more appropriate for Surinam to have approached international funding bodies, drawing attention to its important turtle stocks and its excellent past record of stewardship, and requesting external grants to maintain these conservation efforts. The approach adopted in recent years, of selling a quota of eggs of the green turtle on domestic markets and utilizing the revenues for the turtle conservation program, while not without some risks, may be an acceptable substitute for the above, with the additional advantage of identifying a permanent rather than an interim source of funds for the conservation effort.

Such an undertaking would have advantages over ranching for export, quite apart from the question of stimulating foreign markets for turtle products. It requires little capital, generates immediate revenues, keeps the protein harvested in the country housing the resource, and requires no international action or change in classification of stocks to be legal.

We would conclude by recommending that a preamble be affixed to any recommendation for the downlisting of any sea turtle population, emphasizing that the purpose of the new lists is to allow conservation authorities, such as WWF and IUCN, to concentrate new sea turtle conservation funds and efforts in those places where the populations are truly endangered. It should be mentioned that the Marine Turtle Specialist Group considers that the ultimate market impacts (good or bad) of turtle ranching or farming are still undemonstrated, and that there is considerable potential for a project that initially seemed "good" (or at least harmless) to evolve into something very different as economic or other forces re-shape it as the years go by. On the other hand, "goodwill gestures" on the part of a commercial turtle operation, such as the Kemp's ridley captive breeding effort at Cayman Turtle Farm, may do a great deal of good if expertly guided and conducted. Nevertheless, the Group should stand by its policy statement on turtle ranching and farming -- a statement that, in general, fails to endorse either concept, but agrees to tolerate such efforts if certain listed safeguards are followed. Open endorsement of a project involving international trade in an "endangered" or "vulnerable" species is very risky, and such endorsement might lead to a subsequent inhibition of any critical comments on an operation even if it failed to meet its conservation or mitigation obligations as the years went by.

In its preamble, the Group should also emphasize that any country that elects to offer complete protection of its sea turtle resources, for aesthetic, scientific, philosophical, or tourism reasons, should be fully encouraged to do so. While such populations may theoretically be exploitable, this does not mean that they have to be exploited. And new evidence can always surface indicating that even populations assumed to be protected and "safe" may not be so. Examples of this would include the massive losses (10,000+ individuals annually) of the nationally "protected" loggerhead turtle, as a result of incidental

catch by trawlers, in the southeastern United States; or the revelation that the "safe" Queensland populations of the green turtle are undergoing a loss of tens of thousands of individuals annually at the hands of turtle hunters in eastern Indonesia, New Guinea, Torres Strait, Northern Territory, Eastern Queensland, the Solomon Islands, Vanuatu, and New Caledonia (Limpus and Parmenter, 1985).

It can bear with repetition, too, that most or all of the sea turtle populations that are not currently "endangered" enjoy their current status largely or entirely because they have been protected, at least on their nesting grounds, as a matter of either national policy or of inaccessibility for decades. To remove such populations from international endangered lists may represent scientific accuracy, but it also returns the entire burden of their good management or protection to local or national authorities that, in some cases, may misinterpret the change in formal status as approval of "rational" exploitation. Yet the latter is always based on assumptions rather than scientifically valid data on population dynamics, and the population could return rapidly to truly "endangered" status.

In those areas where resources may be insufficient, or demand too strong, to permit the easy establishment of complete protection for sea turtles, it is necessary to analyze the local sociology to determine the most appropriate conservation strategy. In such areas as Papua New Guinea, for example, it may be unrealistic to ban all take of turtles, since not only are governmental mechanisms unavailable to establish such a ban, but turtles are sufficiently involved in local cultural habits (especially in the purchase of brides in coastal areas) for a ban (even if it were feasible) to have far-reaching and not necessarily positive social consequences.

As a general rule, the Group urges that, where some degree of exploitation

of sea turtles is deemed necessary or unavoidable, local use (ideally subsistence, although true subsistence is a rarity nowadays) should take precedence over commercial export. This philosophy recognizes that a turtle is just as dead whether it was killed for local use or for international markets, and we are aware of the arguments that suggest that, by maximizing the cash value of each turtle (i.e. by allowing it to be sold on international markets), local fishermen can meet their "target" income by catching far fewer turtles. Nevertheless, normal economic theory predicts that higher prices will result in increased, not reduced, hunting pressure, and on a global scale human beings are now so much more numerous than their nominal prey species (the sea turtles) that the vast majority of humans can never expect to partake of the products of even a single sea turtle. Thus, if any preference is to be given, local coastal people in the tropics can present a more persuasive argument that they "need" the turtles more; that they, being so much fewer than the masses of humanity living far from sea turtle resources, are less likely to constitute an insatiable demand; and that, by living alongside the resource they utilize, they can detect quickly if it is being overexploited and, for reasons of self-interest, could play a part in its conservation. Even if the take for international markets were to be lower than the subsistence or local take, it remains true that the former would rarely displace the latter, and both together would be more of a stress than either separately.

With these preambular comments emphasized, we should address the subject of how to re-categorize the status of sea turtle populations.

In most cases, some kind of recognition of populations below the species level will be essential. Subspecies remain ill-defined, at best, for all species, so a "population" approach seems necessary. On the other hand, to identify every nesting beach individually would not only be a monumental task, it presupposes a degree of philopatry and isolation counterindicated by the arguments of Groombridge and Luxmoore (1987). Moreover, available data are inadequate to assess the long-term

population trends of sea turtles on the vast majority of individual nesting beaches around the world; and nesting beach surveys yield only an index to, not an actual measure of, overall population status, and the relationship between nesting numbers and total population remains completely obscure. Thus, a broad regional approach (as a compromise between the panspecific approach on the one hand, and the national or the individual nesting beach approach on the other) is indicated.

It may be well to use non-standard status categories for these non-standard creatures. The following are proposed:

Category I. Extinct or extirpated.

Category II. Endangered (i.e. much rarer than in former times) and continuing to decline; causes of stress or decline identifiable.

Category III. Endangered, becoming progressively rarer, although reasons for decline unclear and/or conservation or protection measures already in place.

Category IV. Vulnerable. Still reasonably abundant and no clear-cut downward trend, but stresses identified and monitoring and/or reversal of stresses necessary.

Category V. Apparently safe if present circumstances do not change. Still abundant and not known to be depleted. Adequately protected (or managed) by permanent domestic laws, regulations, and/or conservation programs. Monitoring still desirable; this should include tagging programs to see if distant exploitation is occurring.

Category VI. Depleted or rare, but recovering under protection.

Category VII. Indeterminate. Reason for concern, but existing data inadequate to evaluate trends or precise status.

A further category of "marginal in this area" (i.e. rare for ecological reasons rather than man-induced population reduction) could be used also. But this category may not be necessary if we do not subdivide populations too finely, or try and evaluate the status of all species everywhere, whether or not they ever had significant populations in all such areas.

These categories draw attention to some of the ultimate enigmas of sea turtle management. It remains without satisfactory explanation, for example, why all of the arribadas of Lepidochelys in Mexico known to exist between the 1940's and the 60's have disappeared, with the conspicuous exception of the one that has been and still is exploited at an industrial level (i.e. the population of L. olivacea nesting at Playa Escobilla, Oaxaca). The arribada of L. kempi in Tamaulipas has dwindled to almost nothing despite over two decades of vigorous beach protection, and the arribadas of L. olivacea in Jalisco and Guerrero have also disappeared even though they were exploited only casually as opposed to industrially. Similarly, D. coriacea appears to be surviving and even increasing on certain South Atlantic beaches (in Guyana and Trinidad) despite a dismal history of beach slaughter of the females; and L. olivacea continues to nest on the Pacific coast of Honduras even though egg collection in this area appears to have been virtually 100% for many decades.

Part of the answer to these difficult questions lies in the possibility of imperfect philopatry; leatherbacks nesting in Trinidad or Guyana, for example, or olive ridleys nesting in Honduras, may have been derived from other nesting grounds -- Surinam or French Guiana in the first case; Nicaragua or Costa Rica in the second -- where recruitment may be much better or protection of nesting adults or their eggs more thorough.

This would still not explain the continued reduction of the nesting population of L. kempi since no other nesting populations are known. Very recent information does suggest that the arribadas of L. olivacea that appeared on Eilanti Beach, Surinam, in the 1960's (since reduced to very low numbers) may have shifted to a new nesting ground near Kourou, French Guiana, and it is certainly possible that a new arribada of L. kempi is building up somewhere, but it certainly hasn't been found. Blame for the demise of L. kempi has been put on incidental catch

by Mexican or US trawlers, and indeed it is difficult to think of any other stress, operating up to the present, that could be responsible for the continuing annual decline of this species.

Since, under USDI and IUCN guidelines, higher taxa (i.e. monotypic families or genera) qualify for higher priority protection or recovery funding than species or subspecies, the question has sometimes arisen as to whether it is appropriate for the survival status of a taxon to be considered when judgmental taxonomic allocations are made. In the extreme case, it has been argued that "we can save this form if we elevate it to full species (or generic) status." Arguments somewhat along these lines were presented by Carr (1975), and discussed further by Mrosovsky (1983). No definitive judgement on the question can be passed, but the following points may be worth making:

- i) An attempt to elevate an endangered population to a clearly inappropriate level of taxonomic distinctness will not only be rejected promptly, but any attempt to elevate such populations will undermine conservationists' credibility.
- ii) Those who are concerned about the survival prospects of a given population should be encouraged to seek statistically valid criteria to justify its classification as a distinct subspecies (or, if appropriate, higher taxon).
- iii) Isolated populations do qualify for conservation action by IUCN or USDI even if they are not identified as separate species or even subspecies.
- iv) To make an entirely hypothetical observation, few would have trouble forgiving an 18th-century conservationist if he had succeeded, say, in saving the now extinct Mascarene tortoises (which may or may not have constituted a separate full genus) from extinction by exaggerating the level at which they were taxonomically distinct. Taxonomic errors can be corrected later; indifference or abuse resulting in extinction cannot.

The broad categories given below must be interpreted as suggestions only; they can be refined after input has been received from all members of the Marine Turtle Specialist Group. They do not address all areas or countries in which a species may occur, but they do address the major ones. It should be remembered too that it is often impossible to decide on the breeding population to which a turtle caught at-sea belongs. For example, an immature green turtle caught in Bahamian waters may have come from a Bahamian nesting beach, or a Florida one, or one in Cuba, Costa Rica, Quintana Roo, or Isla Aves.

CHELONIA MYDAS

Florida: VI
Costa Rica: IV
Ascension Island: IV
Guyana: II
Surinam: V
Aves Island: II
Cayman Islands: I
Brazilian islands: II/IV
Eastern Atlantic: VII
Other Atlantic and Caribbean: II/IV
Northwestern Indian Ocean (Pakistan to Somalia): V
Europa/Tromelin: V
Aldabra: VI
Sabah, Sarawak: II
Burma: II
Philippines: II
Australia (Western): V/VII
Queensland: IV
Papua New Guinea: II
Indonesia: II/IV
New Caledonia: V
Hawaii: V
Other Pacific islands: II/VII
Mediterranean: II.
Other populations: II/VII

CHELONIA AGASSIZI

Galapagos Islands: V
Mexico: II
Central America to Peru: IV

CHELONIA DEPRESSA

All populations: V

CARETTA CARETTA

US Atlantic: IV
Mediterranean: II
American tropics (Cuba to Venezuela): II/IV
Southern Brazil: VII
Eastern Atlantic: VII
Tongaland (Natal): VI
Mocambique/Madagascar: II/IV
Australia (Western and Queensland): V
New Caledonia: IV.
Japan: IV

ERETMOCHELYS IMBRICATA

All populations: II/VII
(The full Group should be able to refine this oversimplification)

LEPIDOCHELYS KEMPI

All populations: III

LEPIDOCHELYS OLIVACEA

South Atlantic populations: II
Eastern Atlantic populations: VII
Indian Ocean populations: IV
Mexican Pacific populations: II
Costa Rica Pacific populations: V
Central American Pacific (except Costa Rica): IV

DERMOCHELYS CORIACEA

Caribbean and South American mainland populations, from Central America to Guyana, including Trinidad: IV
Surinam and French Guiana: V
Caribbean islands: IV
Eastern Atlantic: VII
Tongaland: VI
Sri Lanka: III
Malaysia: IV
Irian Jaya: IV
Pacific Mexico: IV
Pacific Costa Rica: V
Other populations: VII

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