GUEST EDITORIAL: Messages in Bottles

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Sea turtle tagging projects have existed for nearly 40 years. With developments in population modelling, genetic analysis, telemetry, and established recovery plans, the original research goals of many of these programs, especially in the U.S.A., have changed considerably over the years. Combining these factors with inflated expenses and uncertain funding, maybe it is time to re-examine the direction of many tagging programs and develop strong, cost-effective programs that reflect these technological and recovery developments and that address actual scientific research necessary for the recovery of the species.

Monel cattle ear tags were first used extensively in the 1950's in Sarawak to mark green sea turtles (Hendrickson 1958). Upon the discovery of cattle tags as effective tools for marking turtles, the difficult task of tracking individual sea turtles became possible. Applying a tag was easy, it did not require expensive or complex equipment, and could be done in a matter of minutes with apparently little harm to the turtle. Due to the popularity of this method the number of tagging organisations increased dramatically, and what followed was a tagging frenzy that continues to persist to this day as hundreds of thousands of tags are broadcast throughout the world.

To tag or not to tag: what was the original question?

It has become apparent that many nesting beach taggers are suffering from what Mrosovsky (1983) called the "tagging reflex"; that is, the desire to tag turtles simply because they are there. This is sometimes best demonstrated by many nesting beach tagging programs which appear to think that the act of tagging is, in itself, valid scientific research or conservation. Additionally, it has been suggested that improperly cleaned/sterilised and applied tags could lead to flipper infections and possibly death (C. W. Caillouet, NMFS pers. comm.), and could lend a new twist to the much publicised tag loss problem. If a turtle is not measured and tagged correctly, why tag it at all?

Mrosovsky stated that "all too often some of those concerned with the conservation and biology of turtles devote little attention to evaluation of what they are doing ... and more has been relearned by tagging than any other method." Crouse (1985) basically reached the same conclusion regarding tagging nesting loggerheads in the U. S.A.. Recent advances in sea turtle population genetics (Bowen & Witzell 1997) and telemetry (Stoneburner 1982; Hays 1992; Renaud 1995; Renaud & Carpenter 1994; Renaud *et al*. 1995, 1996; Eckert & Sarti 1997) are answering many of the questions originally addressed by tagging, thereby precluding the need for much of the tagging effort (particularly on the nesting beach) that has continued for years. If tagging is failing to answer the questions we originally asked, has tagging just become a mindless habit?

When used in conjunction with a sound research plan and legitimate research goals, we have learned much from tagging. Tagging has, in fact, taught us most of what we know about sea turtle nesting biology, and we have progressed considerably since the early tagging extravaganzas of the 1970's and 1980's. However, long-term nesting studies may just be telling us something we already knew, and after twenty years of intense tagging there appears to be an embarrassingly low tag return rate. This meagre return information from tagged nesting beach turtles is negligible and is expected, considering that most of the tags may fall off fairly quickly (Mrosovsky & Shettleworth 1982; Limpus 1992; Bjorndal *et al*. 1996). Also, considering the magnitude of the nesting beach tagging effort, the lack of published new information is astonishing. Consequently, I think we should re-evaluate the need to continue many of these tagging efforts, because I frankly feel that many projects may not be based on sound research protocols, adequate record keeping, or even have legitimate research goals.

Perhaps all taggers should ask themselves Mrosovsky's original questions before applying another tag:

1. What are the questions they are trying to answer?
2. Are there alternatives to tagging for addressing these questions?
3. Why is tagging the method of choice?

4. What kind of program and which method of tagging is the most appropriate?
5. What provisions will be taken to collect and collate the data?
6. In what ways would the answer to the questions posed be likely to have an impact on conservation policies?

Current tagging justifications sometimes appear different, less scientific in purpose:

1. To see where they go.
2. To legitimise summer camp/intern programs.
3. Because the tags are often free for the asking.
4. They have a permit, so it must be scientific.

Unfortunately, the Manual of Sea Turtle Research and Conservation Techniques (Pritchard *et al.* 1983) tells *how* to tag turtles, but not *why* to tag. The U.S. national sea turtle recovery plans all state that "sea turtle researchers commonly tag turtles encountered," but no specific prioritised research tasks require tagging. The lack of valid scientific justifications in these documents appears to give indiscriminate tagging scientific legitimacy, and recent advances in telemetry and population genetics has negated much of the original justification for mass tagging. I feel that future tagging efforts should be based on *bona fide* scientific research principles as defined below:

- Part 216.3 of the 1993 Proposed Rule to Revise Regulations for Scientific Research under the U.S. Endangered Species Act, defines *bona fide* scientific research as "Research on or otherwise benefiting protected species, the results of which would likely be accepted for publication in a peer-reviewed scientific journal; or are likely to contribute to understanding the basic biology or ecology of the species or stock; or to identifying, evaluating, or resolving possible conservation problems; or are necessary to fulfil a critically important research need." Part 216.35 states that proposed research must also, "Address a research need/objective identified in a species recovery or conservation plan...". Unfortunately, as stated earlier, there are no prioritised tagging projects in the recovery plans.

The progress made through genetics work in uncovering nesting beach origins has eliminated the need for costly and lengthy nesting beach projects, especially for loggerheads (Bowen & Witzell 1997). The Revised Regulations for the issuance of a permit [in the U.S.] state that studies must "... not involve unnecessary duplication of research. If similar research has been done in the past or has been authorised, the proposed research must either (i) be necessary to verify (i.e., replicate) the results of this previous or authorised research...; or (ii) be likely to contribute significant data to the scientific literature or provide new insight."

In conclusion, it appears that some tagging projects may be "feel good" projects, particularly for the nesting beach and the miscellaneous part-time taggers, and may not have the scientific legitimacy necessary to justify their existence. Some tagging could be considered harassment and in clear violation of the Endangered Species Act, and could even jeopardise the health and safety of these endangered turtles for questionable purposes. Recent evidence suggests that tagging may increase the chance of bycatch in fishing nets (Nichols & Seminoff 1998). In addition, death and/or disfigurement from infections introduced at the tagging site may occur. Consequently, in addition to each researcher re-evaluating his or her research goals and directions, maybe Federal and state permitting agencies should look closely at permit applications to ensure that there is valid scientific justification for tagging before issuing permits or making tagging mandatory under a Section 7 Consultation [under the authority of the U.S. Endangered Species Act].

BJORNDAL, K.A., A.B. BOLTEN, C.J. LAGUEUX, & A. CHAVES. 1996. Probability of tag loss in green turtles nesting at Tortuguero, Costa Rica. Journal of Herpetology 30:567-571.

BOWEN, B. & W. WITZELL (Eds). 1997. Proceedings of the International Symposium on Sea Turtle Genetics. NOAA Tech. Memo. NMFS-SEFSC-396. U. S. Dept. Commerce. 173 pp.

CROUSE, D. 1985. The Biology and Conservation of Sea Turtles in North Carolina. Ph.D. Dissertation. University of Wisconsin at Madison. 216 pp.

ECKERT, S.A. & L. SARTI M. 1997. Distant fisheries implicated in the loss of the world's largest leatherback nesting population. Marine Turtle Newsletter 78:2-7.

HAYS, G.C. 1992. Assessing the nesting beach fidelity and clutch frequency of sea turtles by satellite tracking. In: I. Priede and S. Swift (Eds.), Wildlife Telemetry: Remote Monitoring and Tracking Animals. Ellis Horwood, Chichester, England. pp. 203-213.

HENDRICKSON, J. 1958. The green sea turtle, *Chelonia mydas* (Linn.), in Malaya and Sarawak. Proceedings of the Zoological Society of London 130:455-535.

LIMPUS, C.J. 1992. Estimation of tag loss in marine turtle research. Wildlife Research 19:457-469.

MROSOVSKY, N. 1983. Conserving Sea Turtles. British Herpetological Society, London. 177 pp.

MROSOVSKY, N. & S.J. SHETTLEWORTH. 1982. What double tagging can tell us. Marine Turtle Newsletter 22:11-15.

NICHOLS, W.J. & J.A. SEMINOFF. (1998). Plastic "Rototags" may be linked to sea turtle bycatch. Marine Turtle Newsletter 79:20-21.

PRITCHARD, P., P. BACON, F. BERRY, A. CARR, J. FLETEMEYER, R. GALLAGHER, S. HOPKINS, R. LANKFORD, R. MÁRQUEZ M, L. OGREN, W. PRINGLE JR., H. REICHART, & R. WITHAM. 1983. In: K.A. Bjorndal & G.H. Balazs, (Eds.). Manual of Sea Turtle Research and Conservation Techniques. Second Edition. Centre for Environmental Education, Washington D.C. 126 pp.

RENAUD, M.L. 1995. Movements and submergence patterns of Kemp's ridley sea turtles (*Lepidochelys kempii*). Journal of Herpetology 29:302-306.

RENAUD, M.L. & J. CARPENTER. 1994. Movements and submergence patterns of loggerhead turtles (*Caretta caretta*) in the Gulf of Mexico determined through satellite telemetry. Bulletin of Marine Science 55:1-15.

RENAUD, M.L., J.A. CARPENTER, J.A. WILLIAMS, & A.M. LANDRY. 1966. Kemp's ridley sea turtle (*Lepidochelys kempii*) tracked by satellite telemetry from Louisiana to nesting beach at Rancho Nuevo, Tamaulipas, Mexico. Chelonian Conservation and Biology 21:108-109.

RENAUD, M.L., J. CARPENTER, J. WILLIAMS. & S. MANZELLA-TIRPAK. 1995. Activities of juvenile green sea turtles (*Chelonia mydas*) at a jettied pass in south Texas. Fisheries Bulletin 93:586-593.

STONEBURNER, D.L. 1982. Satellite telemetry of loggerhead sea turtle movement in the Georgia Bight U.S.A. Copeia 1982:400-408.