COASTAL DEVELOPMENT IN THE MEDITERRANEAN AND THE STRIPE-NECKED TERRAPIN *(MAUREMYS CASPICA)*

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One positive outcome of the massive tourist development of the Mediterranean over the last 30 years or so has been that this region with its wealth of wildlife interest has become readily accessible to northern herpetologists (and other forms of naturalist), who may be starved of such variety in their home country and therefore thoroughly enjoy a brief sojourn in the sun with a diverse array of lizards, frogs etc. to whet their appetite. Non-herpetologist tourists sometimes get hooked during a Mediterranean holiday – they cannot help but notice e.g. the hosts of lizards scampering over walls or ruins and may continue their new-found interest upon returning home, and on balance this must be a good thing. However, it is all too easy to draw up a long list of the environmental damage that has occurred as a result of mass tourist development, many aspects of which continue to give cause for concern even in an age of increasing awareness of such issues and the strenuous efforts at all levels to reduce long-term despoliation and/or destruction.

To raise just one herpetological example of the effects of coastal development, I have come across two instances in the last three years of small, isolated and ageing populations of the Stripe-Necked Terrapin (*Mauremys caspica*) marooned in tiny water bodies in the centre of expanding villages/towns and with no further likelihood of reproduction. One of these examples is in the village of Nidri on the Ionian Greek island of Lefkas which I visited in August 1994, the other in Turunc, a coastal village in the south-western corner of Turkey, visited in August 1996. I suspect the pattern of development of these villages has been broadly similar, and probably typical of the majority of such situations all around the Mediterranean, occurring in the following manner. A coastal settlement developed in a bay, with a variable area of flat land behind drained by seasonal streams and inhabited amongst others by terrapins. The terrapins had access to exposed sand banks in which to lay their eggs, and co-existed well enough as the adjacent land was given over to agriculture. Remnants of this system can be seen behind Nidri where there are still irrigation ditches although now mostly abandoned and heavily choked with reed and unsuitable for terrapins. Turunc is still far less developed than Nidri and on a smaller scale, but without any extensive areas of wetland adjacent to the single drainage channel. As the village/town grew, so did the necessity to prevent winter flooding, or to provide suitable building land right up to the channel, and the channel was canalised with vertical concrete sides to contain the water, while the agricultural hinterland immediately inland was increasingly sold off for development. A typical situation seems to be that water ceases to flow in these small streams early in the summer but a short stretch of water remains behind a sand or gravel bar that separates the mouth of the stream from the sea, the water apparently brackish since I have seen marine fish and prawns along with the terrapins (Turunc) and, surprisingly, Green Frogs (Nidri).

The sketch map in figure 1 shows the situation in Nidri, with a remnant pool in a dip in the stream channel bed as it leads under the main road in the centre of the town. In this pool could be seen two very large female and one large male *Mauremys* only (August, 1994). They often attracted the attention of passing tourists who thronged the bridge during the evening, and it seemed to me that they were highly vulnerable to undesirable attention although I only ever witnessed healthy interest on the part of anyone who had noticed them. Plate 1 shows the seaward end of the channel, in which I did not see any terrapins, although Green Frogs were plentiful in the rank vegetation just upstream from the brackish pool as well as in the pool itself, and Grass Snakes (*Natrix natrix*) occurred. However, now that the stream sides are canalised the terrapins probably have no access to suitable egg laying sites and as far as I could tell the population no longer reproduces. The size of the three adults suggested they were of some age and it is possible that no reproduction has occurred for several years, a population indeed on the point of collapse.

Plate 1. The channel at Nidri, looking upstream from the saltwater pool at the seaward end. The base of the channel is concrete-lined, covered in places with well-vegetated coarse gravels presumably deposited by winter flow. Green Frogs and Grass Snakes could be found here, but no terrapins.

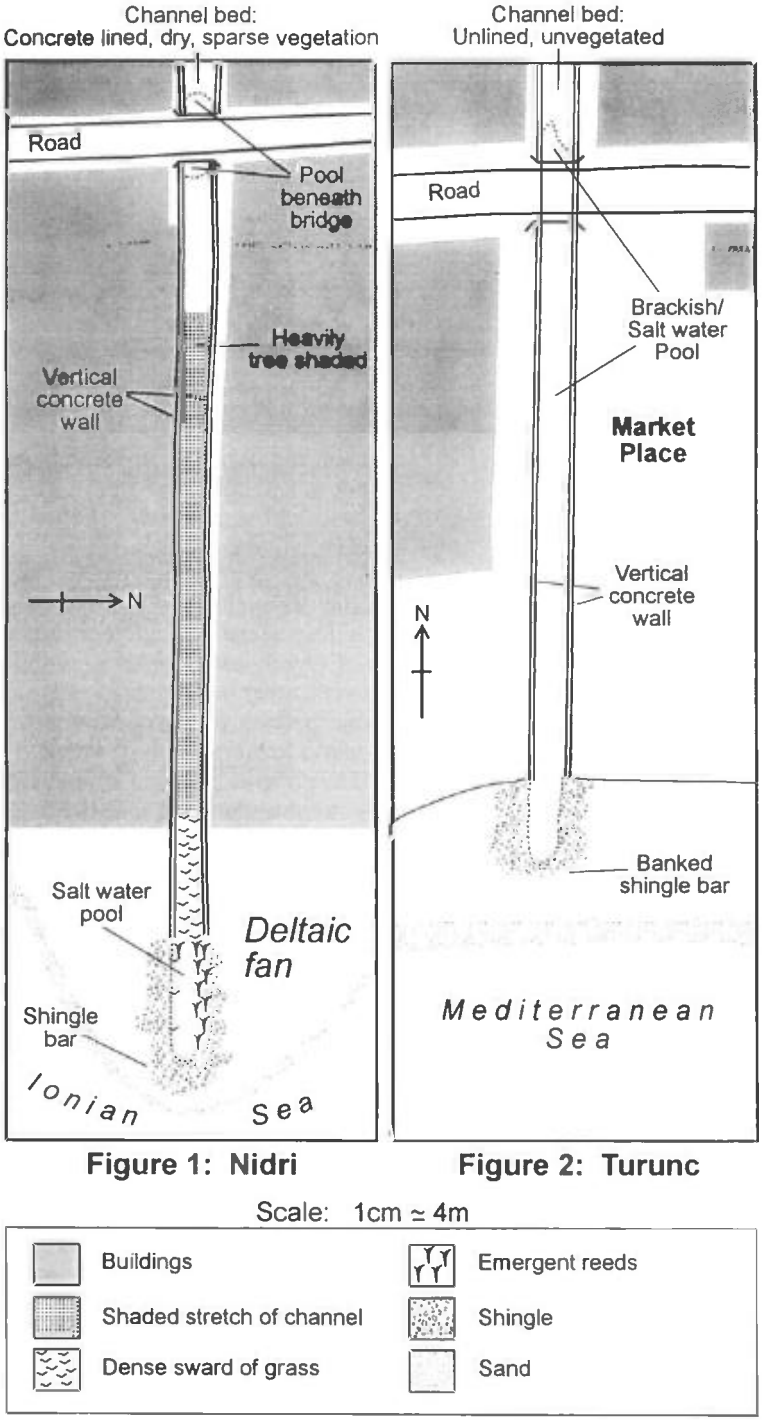

Figure 1: Nidri **Figure 2: Turunc**

Figure 1. Sketch map of drainage channel through Nidri (Lefkas, Greece)

Figure 2. Sketch map of drainage channel through Turunc (Mirmaris, Turkey)

The *Mauremys* population in the stream mouth at Turunc was larger (August, 1996). Although I was unable to make an accurate estimate the population certainly numbered over 10 individuals and may have been substantially higher, but the situation is essentially the same as at Nidri in that there is no obvious place where successful nesting may take place, except possibly the stream bed itself immediately upstream of the permanent water (figure 2). I only saw adult terrapins in this population.

The Mediterranean coastline has hundreds if not thousands of villages or towns that began in similar circumstances. No doubt any terrapin populations have long since vanished from the older and/or larger resorts, but is the situation described here repeated elsewhere where terrapins have managed to survive particular developments of their habitat but locked into a sterile, non-reproductive existence? I see no reason to suppose otherwise. Publicity about aquatic chelonian conservation in this region has centred on the marine turtles, all of which have suffered extensively and are threatened, whereas the freshwater terrapins are not, at least not to the extent of regional extinction of species. However, I suspect that at a local population level extinction is happening, partly due to the reasons described. Corbett (1989) dealt extensively with the marine turtles particularly in the eastern Mediterranean but not specifically with freshwater Chelonia, although he noted that Greece and Turkey both had urgent and pressing problems concerning the conservation of their herpetofaunas.

Mediterranean terrestrial habitats tend to decline through a well known sequence as coastal development proceeds, firstly suffering fragmentation and degradation, finally succumbing to total obliteration in the centres of towns, but any naturalist visiting such locations is quick to notice a range of plants, insects, other invertebrates and birds as well as certain lizard species that appear to maintain healthy populations in derelict sites, ruins, overgrown gardens etc. In contrast, aquatic habitats become either drained or canalised as described. If they survive at all it is to serve as drainage channels, for which some provision clearly must be made, and they are thus confined to a far greater extent even than they were pre-development. Within such unpromising boundaries it seems that even terrapins can survive, but I strongly suspect that the long term prospects for such remnant populations in these circumstances are bleak, without conservation measures being taken that would first ascertain the breeding status of any given population and then if appropriate provide suitable sites within or next to such channels for successful egg-laying and incubation.

REFERENCE

Corbett, Keith (ed.) (1989). *The Conservation of European Reptiles and Amphibians*, Christopher Helm, London.