

## Literature Cited

## Farming Endangered Turtles to Extinction in China

Turtles are facing a global extinction crisis that is particularly acute in Asia because of China's insatiable demand for their meat for soup and shells for traditional Chinese medicine (van Dijk et al. 2000; Turtle Conservation Fund 2002). International conservation efforts, still grappling with the scope of the crisis, are also faced with the revelation that large commercial turtle farms are operating in China. Our investigations reveal that the scale of these operations, especially that pertaining to endangered species, vastly exceeds all predictions (van Dijk et al. 2000; Shi & Parham 2001; Shi et al. 2004) and that there are over 1000 farms in China worth over a billion U.S. dollars (Shi & Provincial Forestry Bureau for Endangered Species Import and Export Management Office of China, unpublished data). We submit that these lucrative farming operations are a major threat to the survival of China's diverse turtle fauna.

Turtle farms are a problem mainly because they are the primary purchasers of wild-caught turtles. Apart from increasing their total stock of adult animals, farmers are always seeking wild breeders because suc-

cessive generations of farm-raised turtles show a marked decrease in reproductive capability. This reliance on wild-collected individuals indicates that turtle farming is not a sustainable practice. As the wild populations decline, it will become increasingly difficult to supplement farm stock from the wild. Nevertheless, established turtle farmers with enough capital are continuing to purchase turtles whenever possible, opting to earn profits while they can, apparently with little regard for the future. In the short term there may be some benefits in terms of deflecting pressure from imported species (in conjunction with stricter import regulations, e.g., Meng et al. 2000), but these gains can only be considered temporary, with a permanent cost to wild Chinese turtles. In the long term turtle farms serve no function beyond generating profit for a few entrepreneurs.

The existence of an enormous, largely unregulated, turtle-farming industry creates additional and serious challenges for turtle conservation. Wildlife collecting and trading stations can now launder illegally collected turtles as captive-produced fare. This kind of shell game is particularly obvious for species such as the big-headed turtle (*Platysternon megacephalum*), which does not breed readily in captivity. Another issue is that as Chinese turtles have become more scarce, some turtle farmers have started switching to North American species such as snappers (*Chelydra*, *Macrochelys*) and sliders (*Trachemys*), which are much easier to breed, but of course have no conservation value for China because they are non-natives.

Whether any part of the turtle-farming industry can ever be co-opted into conservation strategies remains to be seen, but at the present time the two efforts are heading in opposite directions. Even assuming that the farming of endangered, native turtles could be made sustainable, there is a cultural demand for wild-caught game. This is especially

true in China, where the nutritional properties of wild animals are promulgated by the practitioners of traditional medicine and deeply ingrained in the national psyche. Consequently, wild-caught turtles fetch significantly higher prices than farm-raised turtles, and no amount of captive breeding will decrease the desire for wild turtles. Therefore, after the inevitable crash in the farming of native turtles, the depleted wild populations will still face intense harvesting pressures.

China is developing rapidly, and the escalation of turtle farming has followed the path of other capitalist ventures following the economic reforms of the 1980s. The fusion of China's growth with China's utilitarian attitude toward nature emphasizes quick profit over sustaining biodiversity. Despite the fact that industrialization of the wildlife trade is often proffered as a salve for dwindling species, there is mounting evidence to suggest it can have a strong deleterious effect. In the case of Chinese turtles, the farms are wayward arks, gathering together the last vestiges of wild populations and then processing them for the soup pot. Only a massive effort by the Chinese government could curb or alter legal Chinese turtle-farming practices, and it is unlikely that the black market turtle farms could ever be controlled. The bleak future of Chinese turtles is mirrored in other commonly farmed wildlife such as crocodiles, snakes, and bears (Wan & Fan 1998; Thorbjarnarson 1999; Li 2004; Zhou & Jiang 2004). We predict that the gathering of these species into breeding facilities is an ephemeral phenomenon that will be replaced eventually by a permanent one: the extinction of wild populations.

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