

# Tortoise Search Methods

## BP Tortoise and Turtle Conservation Project, 2004-2005

### Study Area

Timed searches for tortoises will be conducted in and around the Central Cardamoms Protected Forest throughout the wet season, from August-October 2004, and the dry season, from November 2004 to early (February-May) 2005.

Areas to be surveyed will be chosen based on habitat, logistics, life history of target species, historic records of tortoises, and on information gathered from interviews with local villagers. These areas will encompass a wide range of distinct habitats and different altitudes.

### Target Species

The target species are elongated tortoises (*Indotestudo elongata*) and impressed tortoises (*Manouria impressa*). The elongated tortoise is classified as endangered (IUCN, 2002) and is found in low to mid-altitude dry deciduous and evergreen forest. The impressed tortoise is currently classified as vulnerable (IUCN, 2002) and occurs in hill evergreen forest at altitudes over 800m. This species has only recently been confirmed to occur in Cambodia, though no individuals have been found in the wild. In addition to these tortoises, semi-aquatic turtles such as the Asian giant turtle (*Heosemys grandis*) may also be encountered on land during the wet season and in close proximity to water during the dry season.

### Tortoise searches

Rather than clearing formal transects through evergreen forest, the surveys will consist of timed searches for tortoises. During these searches the team will walk in a fixed direction along roughly parallel routes looking for tortoises, turtles, tracks, and faeces. Every search will be timed using a stopwatch, and searches will be conducted during the morning and in the afternoon. Each team-member will walk approximately 5-10m apart from the next, depending on the density of the vegetation. The key is to ensure that in dense forest, where visibility is low, transects are close enough together to ensure that the area is thoroughly searched and no tortoises are missed. The number of participants can vary but should be at least 4 people, and should include trained team members and local guides. To minimize observer variation, the three core BP team members should be used for all surveys. In addition, at least one local hunting dog will be used. The dogs will be allowed to roam between and around the participants, and will be used to find concealed animals. This is predicted to considerably increase the effectiveness of the searches, as was proven to be the case by Platt *et al.*, 2003, wherein dogs were shown to be almost five times more efficient at finding tortoises than people.

The search effort (and hence relative abundance) for each tortoise and turtle species will be calculated as the number of man- and dog-hours required to locate one tortoise.

## **Measurements taken**

When a tortoise or turtle is found, the date, time, time taken to find it (i.e. time on stopwatch), locality (determined with Garmin-12 GPS), habitat, microhabitat, altitude, weather, and air temperature will be recorded. The tortoise or turtle will be identified to species using field guides (Cox *et al.*, 1998, and Stuart *et al.*, 2001) and its behaviour will be recorded (i.e. resting head in, resting head out, walking, feeding, combat (male-male), mating (male-female), or nesting). In addition, its age will be estimated by counting the number of growth rings on the scutes, and its sex will be determined based on differences in shell morphology (shape) and tail size. The straight-line carapace length will be recorded using calipers or measuring tape, and a unique mark will be given to each individual by notching the marginal scutes of the carapace, thereby ensuring that recaptures are recognized and recorded.

Every tortoise and turtle will be photographed above and below to provide confirmatory evidence of species identifications. Empty shells will also be photographed and measured, and will be collected and retained whenever possible. At least one DNA sample (shell fragment or blood sample) will be taken for each tortoise and turtle species, in case there are doubts as to the validity of species identifications.

## **Datasheets**

A data sheet has been produced to ensure that information is recorded systematically in the field. All information will be entered onto the computer at the end of each field trip.

## **References**

Cox, M.J., van Dijk, P.P., Nabhitabhata, J. and Thirakhupt, K., 1998. A photographic Guide to Snakes and other Reptiles of Thailand and southeast Asia.

IUCN Red List of Threatened Species, 2002.

Platt, S.G., Ko, W.K., Khaing, L.L., Myo, K.M., Swe, T., Lwin, T., and Bridgewater, T.R., 2003. Population status and conservation of the Critically Endangered Burmese Star Tortoise *Geochelone platynota* in central Myanmar. *Oryx* Vol **37** No. 3, 464-471.

Stuart, B., van Dijk, P.P., and Hendrie, D., 2001. Photographic Guide to the Turtles of Thailand, Laos, Vietnam and Cambodia.