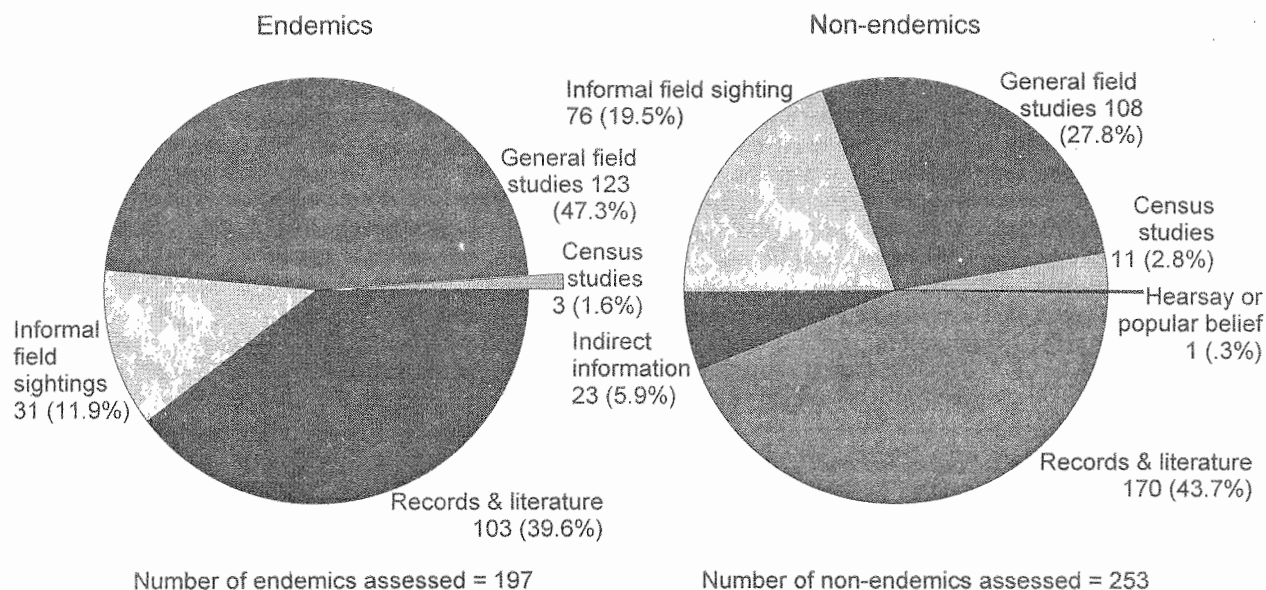


Data quality



There is a tendency among scientists to be very conservative in their approach unless a very systematic study has been done and the results published. Initially, it was feared that it would not be possible to assess many of the Indian reptiles as a result. It was felt that not much was known on Indian reptiles because of lack of extensive monitoring or field studies. However, most of the assessments could be based primarily on the habitat structure and enough information was available. This was due to studies conducted in those areas either for reptiles or for other taxa. Therefore, participants based 47% of assessments for endemics and 27.5 % for non-endemics on General field studies. Informal field sightings contributed to the assessments in 12% of the endemics and 19.5% of the non-endemics. In almost all of the remaining assessments for reptiles, particularly where no records of the species were available after its first description or was last sighted many years back, information was obtained only from records and literature.

The IUCN guidelines for assessment clearly suggest a "conservative" approach in favour of the taxa, e.g. "... the absence of high quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasized to be acceptable throughout. Inference and projection may be based on extrapolation of current or potential threats into the future (including dependence on other taxa), so factors related to population abundance or distribution (including dependence on other taxa), so long as these

can reasonably be supported. Suspected or inferred patterns in either the recent past, present or near future can be based on any of a series of related factors, and these factors should be specified. Taxa at risk from threats posed by future events of low probability but with severe consequences (catastrophes) should be identified by the criteria (e.g. small distribution, few locations). Some threats need to be identified particularly early, and appropriate actions taken, because their effects may be irreversible, or nearly so (pathogens, invasive organisms, hybridization)."

An exercise to determine the status of any taxon, particularly in the first instant, should not be hindered by lack of hard information. Thorough, all-encompassing hard data is almost impossible to gather for even a single taxon. The time required to gather such detailed information could in fact delay conservation measures for threatened taxa. For many groups of organisms there is not even a complete checklist, so any effort to put together what is known by ALL people studying these groups is a valid starting point from which other, more complete and accurate, exercises can be planned.

The combination of elements which make up a CAMP workshop such as group effort of researchers and associated specialists, a neutral environment, objective facilitation, good faith and good intentions can provide informed advice for conservation action planning. The results of this workshop are the outcomes of such an exercise.

Table 5. Research recommendations as suggested for the assessed taxa

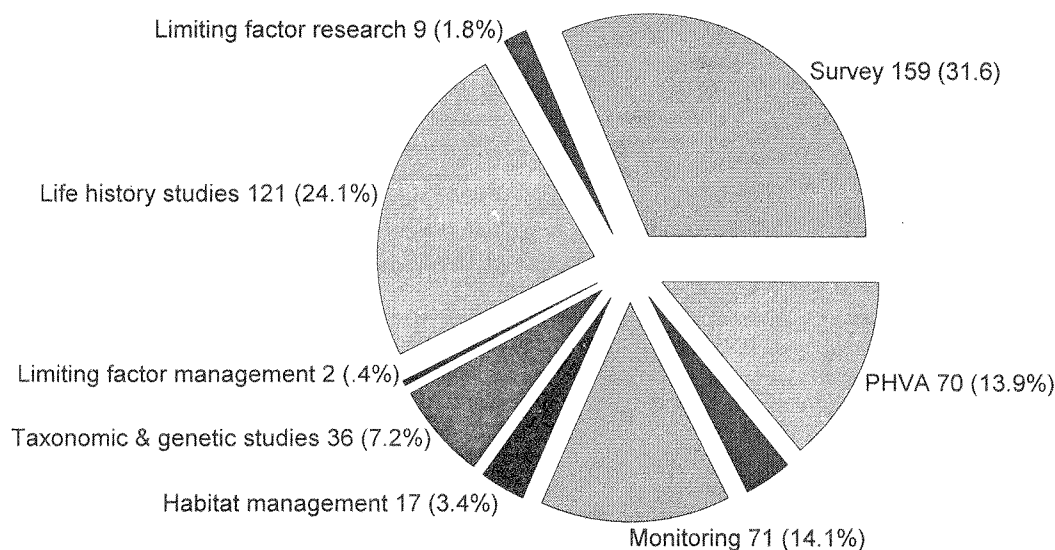
		T	S	M	G	H	Hm	Lm	Lr	Lh	P	O
ENDEMIC	CR	6	15	4	-	4	2	-	1	15	7	-
	EN	5	28	14	-	4	6	-	3	20	10	-
	VU	14	50	20	-	4	6	-	3	49	15	-
	LR-nt	4	22	25	-	5	2	-	2	20	13	-
	LR-lc	-	3	6	-	-	-	-	-	5	2	-
	DD	7	41	2	-	-	1	-	-	12	23	-
NON-ENDEMIC	CR	1	14	9	-	3	-	-	1	9	12	-
	EN	1	16	11	-	1	1	-	-	7	12	-
	VU	5	40	30	-	3	5	-	3	31	24	1
	LR-nt	11	38	47	-	-	2	1	2	29	18	2
	LR-lc	3	21	20	-	-	-	-	-	20	6	-
	DD	4	55	20	-	-	-	-	1	38	8	-

Conservation action and recommendation

The previous section dealt with the different values for assessing the IUCN categories for the taxa. This section concerns conservation action to insure the survival of the taxa in the long term, and their habitat. Conservation action can take many forms, of which keeping the habitat inviolate may be the best way of insuring survival of taxa. However, for some species habitat protection alone may not be sufficient. Constant pressure on habitat and individual taxa has forced many taxa into small, isolated or fragmented populations, which can result in a steady decline in numbers, genetic viability and general fitness, or what is called an "extinction vortex". To overcome these complications and avoid extinction, corrective actions need to be taken up intensively and aggressively. Table 5 summarises the various conservation actions recommended for the taxa. Since knowledge of species distribution is not nearly adequate, participants recommended

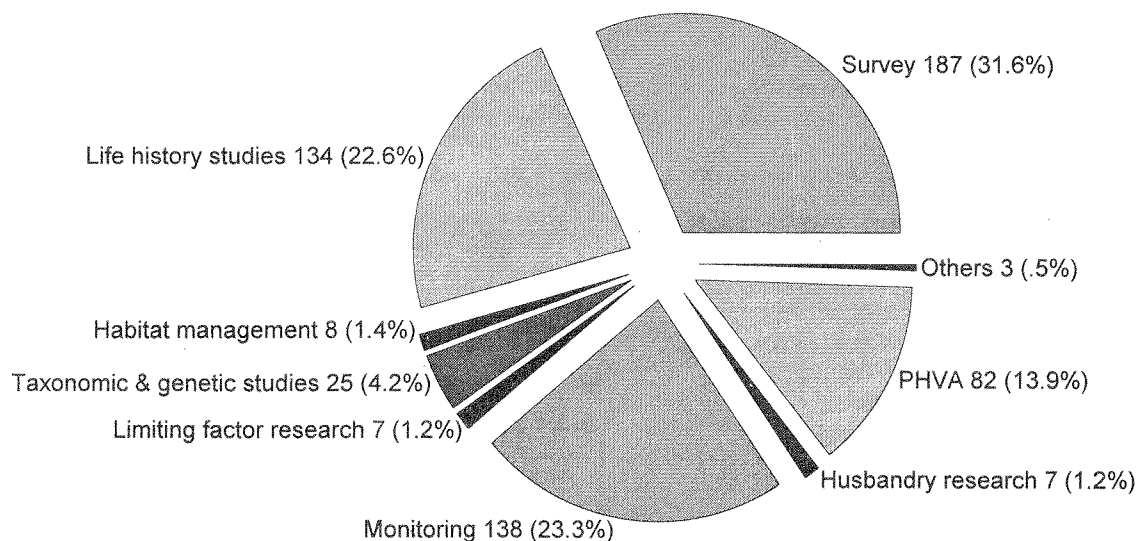
Survey more than any other action, for more than 60% of the reptiles assessed. For taxa whose extent of occurrence far exceeded the area of occupancy, the recommendation was for more surveys within the range as to identify other areas of distribution. Since population studies are lacking and trends in amphibian populations need detailed studies, Monitoring also was recommended for many taxa. Taxonomic and genetic studies were recommended for many taxa because of the confusion in taxonomy and identification and the inconsistency prevailing amongst biologists. Further, many taxa have not been recorded after their initial discovery several years (which can be decades or even a century or more) before, whereby there are no proper types available for comparative studies. Other conservation actions recommended were habitat management, limited factor research, life history studies, genetic management and population and habitat viability assessment studies.

Research recommendations for endemic reptiles



Number of endemics assessed = 197

Research recommendations for non-endemic reptiles



Number of non-endemics assessed = 253

Captive breeding and the level of difficulty

Captive breeding recommendations are at 4 levels, Level 1, 2, 3 and 4 (see definition end of this report). Level 1 is for taxa to be interactively managed *in situ* and *ex situ* so as to retain 90% genetic diversity for 100 years. Level 2 is for *ex situ* populations to be infused with fresh genetic material from the wild so as to retain sufficient diversity. Level 3 is not for conservation but only for education, husbandry and research. Level 4 is for commercial and sustainable utilisation.

Of the threatened taxa, only 23 endemic taxa and 19 non-endemic taxa were recommended for captive breeding. Within the recommendations, however, captive breeding for education, research and husbandry were encouraged more than for conservation in the case of non-endemics, while for endemics the recommendations for captive breeding were more for conservation. Not a single taxon was recommended for sustainable harvest including the species that were previously in the skin trade.

One of the reasons for not recommending captive breeding for conservation could be the fact that breeding techniques are not known for all taxa. Participants could identify only 32 (4 endemic and 28 non-endemic) out of 448 taxa for which captive breeding technology was well known. Many zoos in India maintain reptiles in captivity,

although only a few have been able to breed some of the more commonly kept reptiles such as the crocodiles, gharial and turtles successfully. A few specialised reptile facilities such as Madras Croc Bank and other snake parks have had better success with lesser-known reptiles. The total number of reptiles in India is so vast that this knowledge is still in its infancy, even though maintaining the smaller reptiles is more feasible. Scattered efforts have been made in the past mostly in laboratories where common species have been kept or bred. As a first phase of its construction, the Coimbatore Zoological Park and Conservation Centre will be exhibiting some of the lesser-known reptiles in captivity as a speciality, along with amphibians and invertebrates.

It is unfortunate that captive breeding is so poorly known and misunderstood. Most reptiles are small and harmless to man. They are relatively easy to maintain and breed in captivity and are not expensive. They are a group of organisms for which reintroduction could be a real possibility without any of the problems which confront large vertebrates. Considering the rapidity and scope of reptile decline and the percentage of threatened reptiles, captive breeding could provide a degree of security with minimal cost and danger, either to animal or man

Table 6. Captive breeding recommendations for reptiles

	Level 1	Level 2	Level 3	Level 4	Pending	No
INDIAN ENDEMICS						
CR	3	-	1	-	4	8
EN	5	-	3	-	8	16
VU	2	-	3	-	10	47
LR-nt	3	-	3	-	6	22
LR-lc	-	-	-	-	2	7
DD	-	-	-	-	21	20
NON-ENDEMICS						
CR	2	-	2	-	8	4
EN	1	1	1	-	3	15
VU	4	1	1	-	12	35
LR-nt	-	-	2	-	12	56
LR-lc	-	-	-	-	2	36
DD	-	-	4	-	5	48

Table 7. Level of difficulty in breeding reptiles in captivity

	Level 1	Level 2	Level 3	Unknown
INDIAN ENDEMICS				
CR	-	1	3	12
EN	1	2	9	20
VU	3	2	9	48
LR-nt	-	-	1	17
LR-lc	-	-	-	7
DD	-	-	-	24
NON-ENDEMICS				
CR	1	2	3	10
EN	2	1	-	17
VU	6	7	7	32
LR-nt	15	8	7	40
LR-lc	4	1	-	33
DD	-	6	2	49

Conclusion

The BCPP Conservation Assessment and Management Plan Workshop for all Indian reptiles was a pioneering effort in several ways. For the first time in India, and perhaps anywhere, a systematic conservation workshop was held for reptiles, which are neither particularly attractive

nor exciting to the great majority of people. This exercise demonstrated that reptiles are also threatened in India with more than one-third of the described taxa under threat.

The workshop was also a good exercise in the application of the IUCN Categories, which are meant for all living organisms except microorganisms. Problems participants had using the categories were communicated to the Review Working Group of the Species Survival Commission, which benefited by our testing the categories on amphibians. Perhaps more important with regard to the IUCN categories, the workshop participants reported that they learned a great deal about conservation biology and population dynamics which would subjects such as taxonomy, field methodology and conservation breeding.

Perhaps the most useful achievement of the workshop was that it provided a forum and occasion for many reptilian field biologists and taxonomists to get together and discuss status of reptilian taxa in India; some of the researchers being referred for their knowledge for the first time.

Since the CAMP workshop for Indian reptiles, a request for a CAMP workshop for reptiles of Sri Lanka has been received. The results of the reptile CAMP for India will be included as part of the Reptile and

be reflected in the kinds and quality of information they aspired to collect in future field studies.

Several problems of reptile systematics, research methodology and captive breeding were discussed during the assessments. These discussions proved very useful in bringing together and lending focus to the participants to discuss the difficulties in

Amphibian Action Plan for south Asia being prepared by the South Asian Reptile and Amphibian Specialist Group. This could very well pave the way for similar assessments in other countries for making conservation action plans for reptiles and other taxonomic groups.

The BCPP Conservation Assessment workshop for Indian reptiles has helped in understanding the urgent need to protect threatened taxa from extinction and manage them in the near future. Some of these taxa may not survive if timely action is not taken, that is if they are not man-managed. Many of them, because of their small population size and restricted distribution, require intensive care and habitat management and may survive only with human support.

TAXON DATA SHEETS

This Report is incomplete without the Taxon Data Sheets and the Summary Data Table. A Taxon Data Sheet is one where in information regarding the species is included as given by the participants at the workshop. Information includes (as given in the example below) details about species distribution, threats to the habitat, threats to the population, population trends, numbers of individuals, and other important information that is required to derive the threat category. For every species, data quality index is also provided to distinguish the kind of information gathered at the workshop, be it through scientific field studies, records, indirect information or popular belief. Finally, the Taxon Data Sheet also includes recommendations for research and management action for every species as suggested by participants, which is the outcome of the CAMP process. A Taxon Data Sheet is filled for every one of the 450 taxa assessed at the workshop, making it a treasure-trove of information on all reptiles in India, in a single source.

We are unable to publish the two due to their length as they are too long for ZOOS' PRINT. Persons interested in a complete report may write to Z.O.O./ CBSG India and order it for Rs. 275.00 plus postage (Indians and equivalent for other Asian countries) and \$35.00 plus postage for people from developed countries.

1. *Ablepharus grayanus* (Stoliczka, 1872) — DD/N — (Dwarf earless skink). Family: Scincidae. Taxonomic status: Species. Habit: Diurnal, terrestrial. Habitat: Arid country. Global Distribution: Iraq, Pakistan, India. Current Regional Distribution: Gujarat. - Elevation: Sea level -20 m. -Range (sq. km): > 20,000. -Area Occupied (Sq. km): > 2,000. -Number of locations: 1 (Kutchch). Population Trends: -% Decline: Not known. -Time / Rate (Yrs or gens): Not known. -No. of Mature Individuals: Not known. Global Population: Not known. Regional Population: Not known. Data Quality: Records (M. A. Smith, 1935). Recent Field Studies: Nil. Threats: Not known. Trade: No. Other Comments: —. Status: IUCN: DATA DEFICIENT (Nationally). DATA DEFICIENT (Globally). -Criteria based on: —. -CITES: No. -IWPA (1972; 91): No. -RDB, National (1994): No. -RDB, International (1996): No. Recommendations: -Research management: Survey; Life-history studies. -PHVA: No. Captive Program Recommendations: -Captive Breeding: No. -Level of difficulty: Not known. Existing Captive Programs: None. -Names of facilities: —. Sources: 256. Compilers: J.C. Daniel, N.M. Ishwar, B.A. Daniel, S. Bhupathy, P. Kannan.

305. *Oligodon travancoricum*, Beddome, 1877 — EN (B1, 2a, 2b, 2c) — (Travancore kukri snake) Family: Colubridae. Taxonomic status: Species. Habit: Terrestrial. Habitat: Scrub jungle, moist deciduous. Global Distribution: ENDEMIC to Western Ghats. Current Regional Distribution: Kerala. -Elevation: 200-1200 m. -Range (sq. km): < 5,000. -Area Occupied (Sq. km): < 500. -Number of locations: 2 (Kalakkad; Olavakode); Fragmented. Population Trends: -% Decline: Not known. -Time / Rate (Yrs or gens): Not known. -No. of Mature Individuals: Not known. Global Population: Restricted distribution and threatened.unknown. Data Quality: General field studies (Smith, 1943 in South of Palghat Gap) Informal field sightings. Recent Field Studies: N.M. Ishwar, 1996 in Kalakkad; G. Martin, 1996 in Olavakode Near Palghat. Threats: Loss of habitat; Human interference. Trade: No. Other Comments: Sparsely studied, information deficient. Status: - IUCN: ENDANGERED. -Criteria based on: B1, 2a, 2b, 2c (Restricted distribution, limited location, severely fragmented, continuing decline observed in extent of occurrence, area of occupancy and/or quality of habitat). -CITES: No. -IWPA (1972; 91): Schedule IV. -RDB, National (1994): No. -RDB, International (1996): No. Recommendations: -Research management: Survey; Monitoring; Husbandry research; Life-history studies. -PHVA: Pending. Captive Program Recommendations: -Captive Breeding: Level 1. -Level of difficulty: Moderately difficult. Existing Captive Programs: None. -Names of facilities: —. Sources: 258. Compilers: V.P. Ajit, K.G.M. Pillai, V. Kalaiarasan, P.O. Nqmeer. B. Rathinasabapathy, G. Martin.