

Appendix 6: Herpetofauna Sub-group Report

Status, Trends, and Recommendations on Hong Kong Herpetofauna

A. Reptiles

Overview of status and trends

Reptiles are a very diverse group with some 10,000 named species. In Hong Kong, five species of native freshwater turtles, five species of sea turtles, 21 species of lizards and over 50 species of snakes (including 6 sea snake species) have been recorded. The number of native snake species is not certain because two species, *Dendrelaphis hollinrakei* and *Ahaetulla prasina medioxima* reported by Lazell (2002) are based on old specimens without any collecting information and recent searches on the island where the specimens originated failed to find more record. Hence, their status in Hong Kong is not clear. Also one young snake found on Keung Shan, Lantau is so special that it cannot even be identified to the genus (Lazell, pers comm.). There are other species of uncertain status, either from old literature records or from specimens that might have been originated from trade and released locally.

With over 80 native species, the reptile fauna in HK is exceptionally rich and includes about 25% of the species in China. Reptiles especially snakes are difficult to survey. Although reptiles have been studied for more than 60 years by naturalists and more recently by researchers and the Agriculture, Fisheries and Conservation Department (AFCD), our knowledge on many rare species is poor. There are still a number of little-known species with only a handful of local records.

Species assessment of the local status could not be carried out due to time and manpower constraint and the AFCD extensive database was not available during the BSAP process. Hence we have to rely on the literature and the knowledge of the experts participating in the herpetofauna sub-group for a general overview and the recommended actions. An earlier assessment by Fellowes *et al.* (2002) analysing the restrictedness in the distribution have identified seven reptile species of Global Concern, six species of Regional Concern and 20 species of Local Concern.

All turtles are protected in Hong Kong but all five species of freshwater turtles are subject to a medium to high level of illegal trapping/collecting. Golden Coin Turtle (*Cuora trifasciata*) is the most threatened because of its high commercial value and the population in the wild has declined drastically since widespread trapping started

in late 1990's. In an AFCD-sponsored study carried out by Kadoorie Farm and Botanic Garden in 2001-2002 comparing seriously trapped population with that under low trapping pressure, the number of *C. trifasciata* found in the heavily trapped site is less than half of that under low trapping pressure. This indicates illegal trapping can deplete the turtle population quickly. Big-headed Terrapin (*Platysternon megacephalum*) has also been impacted by trapping (Sung *et al.*, 2013). The last stream turtle, Beale's Terrapin (*Sacalia bealei*), is a rare species sympatric with the Golden Coin Turtle and is also under threat from illegal trapping. The extensive exploitation for trade remains the most serious threat to Asian Turtles (Horne *et al.*, 2012). Turtles have a life history strategy of slow maturing, long life span and producing a small number of eggs each year. Once depleted by over-exploitation, it is very difficult for the population to recover. In China, they are also under intense collecting pressure (Lau & Shi, 2000). Hence, many of the Asian turtles are threatened according to the IUCN Red List (IUCN, 2014) and the China Species Red List (Wang and Xie, 2004) and the global/regional status of the above three species are either Critically Endangered or Endangered.

Species	Global Status (IUCN, 2014)	China Status (Wang & Xie, 2004)
<i>Cuora trifasciata</i>	CR	CR
<i>Platysternon megacephalum</i>	EN	EN
<i>Sacalia bealei</i>	EN	EN

CR – Critically Endangered; EN - Endangered

Among sea turtles, only the Green Turtle (*Chelonia mydas*) breeds locally (Chan, 2002) while the other species turn up in Hong Kong waters occasionally. The Green Turtle used to breed in a number of remote beaches but now only regularly nest in one beach on Lamma Island. Loss of suitable beaches without human disturbance and harvesting of the eggs in the past, as well as being deliberately and incidentally caught outside HK would seem to be the major factors causing the decline. The number of breeding females is believed to be very small in the past several decades and there are some years without any nests recorded (Ng, 2014). The future of the Hong Kong population is uncertain.

Of the lizards in Hong Kong, Bogadek's Legless Lizard (*Dibamus bogadeki*) is endemic to Hong Kong and can only be found on three small remote islands. Vietnamese Blue-tailed Skink (*Plestiodon tamdaoensis*) is rare locally and can only be found in a few sites on Sai Kung peninsula and Vietnam. Individuals of the Water Monitor (*Varanus salvator*) can still be seen but it is possible that these odd individuals are escaped animals and it is not known whether a breeding population exists. The rest of the lizard species in Hong Kong probably have a more or less stable population except the Chinese Skink (*Plestiodon chinensis*) that is usually associated with agricultural fields.

The snakes in Hong Kong are very diverse and occupy all habitat types. There are a few rare species that used to be only found in high altitude but which have been recorded in mid-altitude forests in recent years. These snakes probably have spread to the lower forests when these became mature and offered suitable habitats. There are two little-known snakes that so far have only been found in forests at low altitude, mostly outside country parks: the endemic Lazell's Blind Snake (*Typhlops lazelli*) (Wallach & Pauwels, 2004) and the rare White-headed Blind Snake (*Ramphotyphlops albiceps*).

Buff-striped Keelback (*Amphiesma stolatum*), a common rice paddy snake, has become rare in Hong Kong probably due to the abandonment of rice cultivation in Hong Kong. Similarly, Chinese Water Snake (*Enhydris chinensis*), Plumbeous Water Snake (*Enhydris plumbea*) have declined in numbers due to the destruction and degradation of their lowland habitats.

The status of sea snakes is a concern. Banded Sea Snake (*Hydrophis cyanocinctus*) was common in the 1940's and 1950's (Karsen *et al.*, 1998) and was often caught and sold by local fishermen by the seashore in 1970's and early 1980's. However, there are far fewer recent records and it is extremely rare for one to be seen by divers in Hong Kong if at all. This probably reflects over-harvesting and a decline in the marine environment.

Major threats identified

The major threat to the freshwater turtles in Hong Kong is illegal trapping and/or collecting. Although all turtles are protected by law and many of the stream habitats fall within country parks, illegal collecting targeting Golden Coin Turtle still occurs despite joint enforcement actions by AFCD and Kadoorie Farm & Botanic Garden. Recently many turtle traps have also been found in lowland sites and there is one

known case of poaching for Big-headed Turtles.

Poaching does not seem have spread to snakes and Hong Kong has healthy wild populations of commercially-traded snake species such as Burmese Python (*Python bivittatus*), Chinese Cobra (*Naja atra*), King Cobra (*Ophiophagus hannah*) and Many-banded Krait (*Bungarus multicinctus*). The situation in the rest of South China is very different and these snakes are seldom encountered in the wild.

Habitat destruction and degradation from development pose a threat to the lowland species, with the aquatic and semi-aquatic species seeming to be more affected.

Major Knowledge Gaps to be Filled

The status of many rare, restricted and/or endemic species is still not clear. Therefore, future research should be targeted towards the following:

- The status of *Dendrelaphis hollinrakei* and *Ahaetulla prasina medioxima* need to be clarified by carrying out more surveys in Shek Kwu Chau and working closely with the organization managing the island.
- More field survey is needed in the Keung Shan area on Lantau in order to find more specimens of the unidentified snake, coupled with taxonomic and ecological work, so that it can be identified and its conservation needs understood.
- More targeted field surveys for little-known and highly restricted species such as *Dibamus bogadeki*, *Plestiodon tamdaoensis*, *Typhlops lazelli* and *Ramphotyphlops albiceps* to find out their distribution, habitat use and ecology so that appropriate conservation actions can be designed and implemented.
- More surveys on seldom-covered areas that may support rare species such as lowland forests on Hong Kong Island, Lantau Island and small remote offshore islands.
- The taxonomy of the tree gecko *Hemiphyllodactylus* sp. needs to be sorted out.

Priority species and recommended actions

The priority reptiles identified are the three threatened stream turtles: *Cuora trifasciata*, *Platysternon megacephalum* and *Sacalia bealei*. The populations in Hong Kong are probably the healthiest in the world due to intensive collecting in the rest of their range. Even in Hong Kong where they are protected by law, many of their habitats are within country parks and patrolling has stepped up, illegal collecting still happens and even captive collections are affected by criminal activity. The wild population has declined drastically in *Cuora trifasciata*. Hence a species action plan with clear conservation objectives and targets, including committed and

coherent legal enforcement, are urgently needed for the group of stream turtles in order to address the threat and reverse the decline. An expert group should be formed to formulate this action plan, oversee its implementation and review the results regularly.

A species action plan on *Cuora trifasciata* is being formulated jointly by the AFCD, KFBCG and WWF-HK. Already a *Cuora trifasciata* conservation breeding programme has been established jointly by Kadoorie Farm and Botanic Garden and AFCD and has successfully produced young turtles every year. The next step is to come up with effective measures to address the illegal collecting, trade and demand. Also a pilot release of the captive-bred young turtles in a safe, suitable site without any trapping should be attempted and regularly monitored/studied.

Known sites supporting the rare endemic reptiles should be protected by incorporating them into country parks, special areas or covered by SSSIs or Conservation Areas.

Sham Wan, the nesting beach of the Green Turtle has been designated as a Restricted Area. However, the coastal water next to the beach have no protection where the adult turtles gathering around to mate (Obst, 1986; Ernst & Barbour, 1989). They are then vulnerable to disturbance from yachts, people etc. Hence, the coastal waters around Sham Wan should be established as a Marine Park to provide comprehensive protection to this very small remaining population. Regional and international collaborative efforts are also needed to conserve this migratory species.

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B. Amphibians

Overview of status and trends

The amphibians is a diverse group and the number of recognized species has grown enormously in recent years due to more surveys in previously remote areas and the use of molecular genetics in their taxonomy (Stuart *et al.*, 2008). Their biphasic life cycle (i.e. adult and larval stages), permeable skin and unshelled eggs also make them particularly vulnerable to environmental changes. The Class Amphibia is the most threatened among the vertebrates with about 30% classified as threatened or extinct according to the IUCN Red List (IUCN, 2014). The South China ecoregions are exceptionally rich in species, in endemic species and in threatened species (FEOW, 2008; Hoekstra *et al.* 2010; Das & van Dijk 2013). In Hong Kong 24 native species are known including one newt and 23 frogs and toads (Chan *et al.*, 2005). This is about 6% of the Chinese amphibian fauna.

The Hong Kong amphibians can be separated into three groups based on their habitat use (Lau, 1998). There are eight species that breed in hill stream and most of these tend to have a restricted global distribution with some species only recorded in Hong Kong and neighbouring coastal South China. Since most of the upland streams are protected in Country Parks, these species are not under immediate threat. Two species, Giant Spiny Frog (*Quasipaa spinosa*) and South China Cascade Frog (*Amolops ricketti*), are assessed as Vulnerable in Hong Kong because of their very restricted distribution and small population size in Hong Kong.

There are three forest species that breeds in shaded, slow-flowing or still water bodies, including the endemic Romer's Tree Frog (*Liuixalus romeri*). Romer's Tree Frog was assessed as globally Endangered in 2004 according to the IUCN Red List but this needs updating as the current population is stable. Since this is endemic to Hong Kong, the local assessment has to follow the Global IUCN category but when it is re-assessed, it is likely to be Least Concern.

The remaining 13 species are mostly associated with open habitats and usually breed in pools, ponds, fields and/or marshes. Although most of these lowland species are widespread and common, one of them, Rough-skinned Floating Frog (*Occidozyga lima*), has disappeared from Hong Kong because of the disappearance of rice paddies and other suitable freshwater habitats.

Local assessment using the IUCN Red List criteria and the guidelines for its application in regional and national levels was carried out by the Herpetofaunal

Sub-group of the Status and Trend and Red List Focus Group during the BSAP process.

Amphibian Species in HK	Threatened Globally (IUCN, 2014)	Threatened in China (Wang & Xie, 2004)	Threatened in Hong Kong
24	3 EN (<i>Xenophrys brachykolos</i> , <i>Amolops hongkongensis</i> , <i>Liuixalus romeri</i> , need updating) 2 VU (<i>Quasipaa exilispinosa</i> , <i>Q. spinosa</i>)	2 EN (<i>X. brachykolos</i> , <i>A. hongkongensis</i> , need updating) 4 VU (<i>Hoplobatrachus chinensis</i> , <i>Q. exilispinosa</i> , <i>Q. spinosa</i> , <i>L. romeri</i> , need updating)	1 RE (<i>Occidozyga lima</i>) 1 EN (<i>L. romeri</i> , need updating) 2 VU (<i>Amolops ricketti</i> , <i>Q. spinosa</i>)

RE – Regionally Extinct, EN – Endangered, VU - Vulnerable

Major Threats Identified and Recommendations

The major threat to the amphibian fauna in Hong Kong is habitat destruction and degradation from development ranging from large-scale urbanization to small house development in the lowland areas. Flat, agricultural land (both active and abandoned) is particularly at risk. Freshwater marshes formed from the abandonment of rice paddies are under-represented in the country parks. The two freshwater marsh species, Three-striped Grass Frog (*Hylarana macrodactyla*) and Two-striped Grass Frog (*Hylarana taipeihensis*), have shown a decline in distribution and are assessed as locally Near Threatened.

Degradation of Country Park enclaves in the New Territories has also impacted the two forest species: Brown Wood Frog (*Hylarana latouchii*) and Fujian Big-headed Frog (*Limnonectes fujianensis*), both assessed as locally Near Threatened.

Unlike the situation in neighbouring South China, collecting of large-bodied frogs for consumption or newts for the pet trade is not currently an issue in Hong Kong. The absence of this threat has resulted in good local populations and Hong Kong is a stronghold for these species.

One potential threat that can have serious implications is the chytrid fungus disease.

This disease has caused many amphibian extinctions even in pristine habitats in other parts of the world (Rachowicz *et al.*, 2006). American Bull Frog and African Clawed Frog are known vectors of this disease (Whittaker & Vredenburg, 2011) and alarmingly, they are in the live animal trade and for sale in Hong Kong, a situation that should be addressed. Past study showed chytrid infection was apparently absent in Hong Kong (Rowley *et al.*, 2007). AFCD has a monitoring programme on this disease and it should be continued to cover both wild and market amphibians.

Major Knowledge Gaps to be Filled

Amphibians have been relatively well studied in Hong Kong by naturalists, researchers in universities and AFCD. The latter has been undertaking territory-wide surveys since 2002. The major knowledge gaps that are relevant to their status and conservation are listed below.

- Many amphibians are poor dispersers over physical barriers or unsuitable habitats and a study of Romer's Tree Frog showed that there is genetic differentiation among the island populations (Lau, 1998). Freshwater marshes are increasingly confined to small, isolated pockets and it is important to study the population genetics of the fragmented populations of Three-striped Grass Frog and Two-striped Grass Frog to explore the need for active population and/or habitat management.
- In view of the large amount of existing data available, ongoing and future monitoring/surveys should be targeted towards answering specific questions that can help guide conservation, with regular analysis and dissemination of findings built into such a programme. Some examples are (1) targeted surveys to find out the distribution of South China Cascade Frog, which is recorded from only two sites locally of which the exact location of one is not known; (2) the impact of mosquito control measures such as oiling, removal of boulders to straighten the stream course and the removal of trees on stream banks in hill streams on amphibians and their habitats,
- The exotic Green House Frog (*Eleutherodactylus planirostris*) has established in Hong Kong and is spreading. Impacts on native amphibian fauna by this exotic frog should be studied.

Priority Species and Recommended Actions

The priority amphibian identified is the Rough-skinned Floating Frog which disappeared from Hong Kong in the 1990's. It is recommended that good-sized rice paddy should be established in country parks and a reintroduction programme for this species be formulated and implemented according to the IUCN guidelines on

reintroduction. The establishment of rice paddy will benefit not only this species but also a suite of invertebrates (e.g. rice paddy damselflies of the genus *Ischnura*), herpetofauna (e.g. Buff-striped Keelback *Amphiesma stolatum*) and freshwater fish (such as *Oryzias curvinotus*) that might also have disappeared or become scarce. At the same time it will revive a millennia-old sustainable land use that has nourished and shaped human culture and the biodiversity of the region. This will also contribute towards Aichi Target 7, Areas under Sustainable Management.

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