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## AN OVERVIEW AND CHECKLIST OF THE NATIVE AND ALIEN HERPETOFAUNA OF THE UNITED ARAB EMIRATES

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**Abstract.**—This paper provides an updated checklist of the United Arab Emirates (UAE) native and alien herpetofauna. The UAE, while largely a desert country with a hyper-arid climate, also has a range of more mesic habitats such as islands, mountains, and wadis. As such it has a diverse native herpetofauna of at least 72 species as follows: two amphibian species (Bufonidae), five marine turtle species (Cheloniidae [four] and Dermochelyidae [one]), 42 lizard species (Agamidae [six], Gekkonidae [19], Lacertidae [10], Scincidae [six], and Varanidae [one]), a single amphisbaenian, and 22 snake species (Leptotyphlopidae [one], Boidae [one], Colubridae [seven], Hydrophiidae [nine], and Viperidae [four]). Additionally, we recorded at least eight alien species, although only the Brahminy Blind Snake (*Ramphotylops braminus*) appears to have become naturalized. We also list legislation and international conventions pertinent to the herpetofauna.

**Key Words.**—amphibians; checklist; invasive; reptiles; United Arab Emirates

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### INTRODUCTION

The United Arab Emirates (UAE) is a federation of seven emirates (Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain, Ras Al Khaimah, and Fujairah), which cover an area of approximately 89,000 km<sup>2</sup>, including the offshore islands. The country is in the eastern part of the Arabian Peninsula, and is bordered to the west and south by Saudi Arabia, Oman to the east and the Arabian Gulf to the north. Much of the UAE is classified as having a hyper-arid climate (Middleton and Thomas 1997; Bottomlay and Al Mualla 2008). However, the country also has a range of more mesic habitats such as islands, mountains, and wadis. As such, it has a diverse native herpetofauna.

There have been various attempts at listing the reptile and amphibian species of the UAE. Hornby (1996) developed a checklist with 67 species of reptiles and amphibians, covering both terrestrial and marine species. Thirty-three terrestrial reptile species were recorded in Abu Dhabi Emirate during a 1991–1992 survey (Baha El Din 1996). Gardner (2005, 2008) listed 54 terrestrial reptiles in the UAE. Baldwin and Gardner (2005) also list four marine turtle species (including one possible vagrant) and nine sea-snake species. Cunningham and Feulner (2001) also list two amphibian species. In this paper, we list 72 terrestrial and marine species. Additionally, eight alien species have been recorded, but which fortunately have not yet established viable populations.

We derived this checklist from a literature review, survey reports held in the archives of the Environment Agency-ABU DHABI, and data collected by the authors. While this paper is not intended to be a comprehensive review of the literature on the herpetofauna of the UAE, we consulted the major works covering Arabian reptiles and amphibians

(Arnold 1984, 1986; Balletto et al. 1985; Gasperetti 1988; Leviton et al. 1992; Gasperetti et al. 1993; Egan 2007). More comprehensive reviews of the herpetological literature specific to the UAE were provided by Gardner (2005, 2008).

### LEGISLATION AND INTERNATIONAL CONVENTIONS

We present the following main national legislation, species global status, and international conventions pertinent to the UAE herpetofauna and list the species under each convention in Table 1.

**National.**—The UAE has a Federal Law 11 (2006) that superseded Federal Law 24 (1999), which prevents the capture, hunting, and taking from the wild animals covered in its three main appendices.

**IUCN Red List.**—The 2010 IUCN Red List of Threatened Species covers some UAE species in the Least Concern, Endangered, and Critically Endangered categories.

**CITES & CMS.**—The UAE is a signatory to the CITES Convention (1990) and has some agreements on the Convention on Migratory Species.

### AMPHIBIANS AND REPTILES OF THE UAE

**Amphibians.**—There are only two species of amphibians found in the UAE and both are toad species. These species are the Arabian Toad (*Duttaphrynus arabicus* [formerly in *Bufo* see Van Bocxlaer et al. 2009]) and Dhofar Toad (*Duttaphrynus dhufarensis* [formerly in *Bufo* see Van Bocxlaer et al. 2009]; Fig. 1). The distribution of these species is mainly limited to the northern emirates of the UAE,

TABLE 1. The species of amphibians and reptiles in the United Arab Emirates, which are covered by national legislation and/or international conventions.

Species	Legislation & Conventions			
	UAE Federal	IUCN Red List <sup>1</sup>	CITES <sup>2</sup>	CMS <sup>3</sup>
Arabian Toad ( <i>Duttaphrynus arabicus</i> )	-	Least Concern	-	-
Dhofar Toad ( <i>Duttaphrynus dhufarensis</i> )	-	Least Concern	-	-
Green Turtle ( <i>Chelonia mydas</i> )	App. I	Endangered	App. I	I/II
Hawksbill ( <i>Eretmochelys imbricata</i> )	App. I	Critically Endangered	App. I	-
Loggerhead ( <i>Caretta caretta</i> )	App. I	-	App. I	I/II
Olive Ridley ( <i>Lepidochelys olivacea</i> )	-	-	-	I/II
Leatherback Turtle ( <i>Dermochelys coriacea</i> )	App. I	-	App. I	-
Spiny-tailed Lizards ( <i>Uromastix aegyptia</i> : subspecies <i>microlepis</i> and <i>leptieni</i> )	App. II	-	App. II	-
Rock Semaphore Gecko ( <i>Pristurus rupestris</i> )	App. III	-	-	-
Slevin's Sand Gecko ( <i>Stenodactylus slevini</i> )	App. III	-	-	-
Desert Monitor ( <i>Varanus griseus</i> )	App. II	-	App. I	-
Jayakar's Sand Boa ( <i>Eryx jayakari</i> )	-	-	App. II	-

<sup>1</sup> 2010 IUCN Red List

<sup>2</sup> Convention on International Trade in Endangered Species of Wild Fauna and Flora

<sup>3</sup> Convention on Migratory Species

which have water available in the wadis. These species are also found in neighboring Oman, Saudi Arabia and Yemen. Both these species are listed as Least Concern in the IUCN Red List (IUCN 2010).

**Marine turtles.**—There are five species of marine turtles that are known to occur within UAE territorial

waters (Baldwin and Gardner 2005; Das 2007). The only species known to breed in the UAE is the Hawksbill (*Eretmochelys imbricata*). Large numbers of Green Turtles (*Chelonia mydas*) forage on sea grass meadows off western Abu Dhabi. The other three species, the Olive Ridley Turtle (*Lepidochelys olivacea*), Loggerhead Turtle (*Caretta caretta*), and

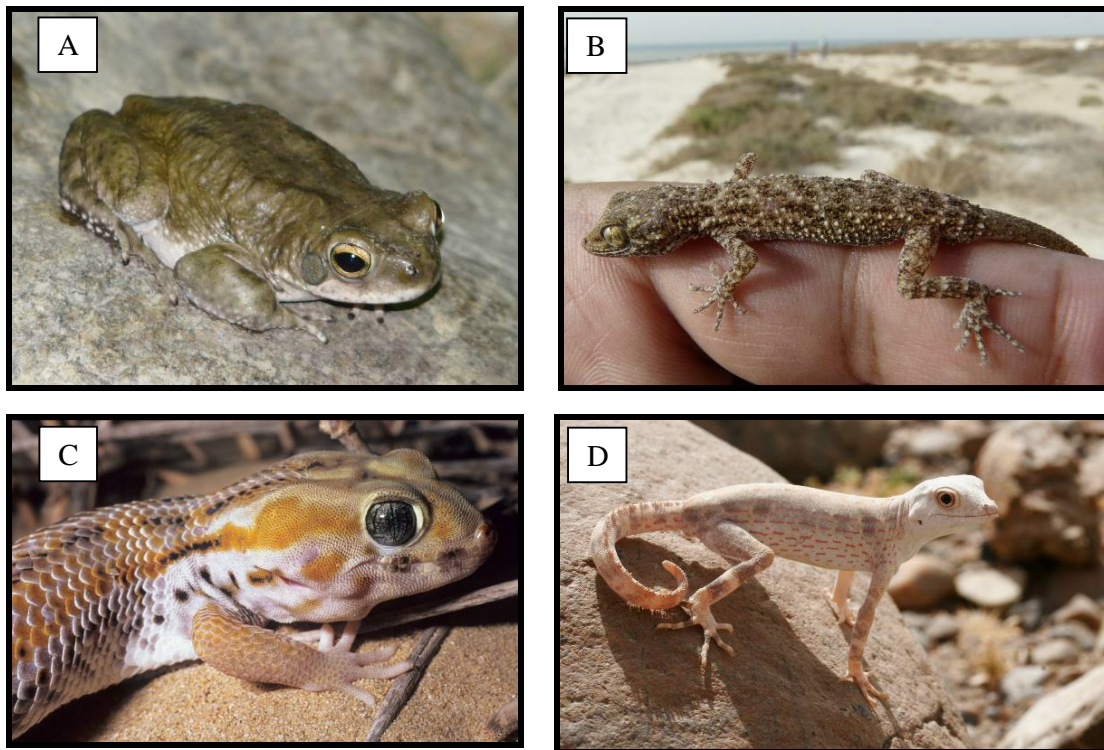


FIGURE 1. A) Dhofar Toad, *Duttaphrynus dhufarensis* (Photographed by Pritpal Soorae). B) Arabian Ground Gecko, *Bunopus tuberculatus* (Photographed by Pritpal Soorae). C) Desert Skink Gecko, *Teratoscincus keyserlingii* (Photographed by Andrew Gardner). D) Carter's Semaphore Gecko, *Pristurus carteri* (Photographed by Andrew Gardner).

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Leatherback (*Dermochelys coriacea*) are occasional sightings.

**Lizards.**—Forty-two species of lizards belonging to five families are found in the UAE. The families are the Agamidae, Gekkonidae, Lacertidae, Scincidae, and Varanidae. The Agamidae are represented by six small to large sized species, which are sand, rock, and sabkha habitat specialists with the largest species, the spiny-tailed lizards known as “*dhub*” in Arabic. These large, mainly herbivorous lizards live in deep burrows in aeolianite and other firm substrates. A new species, *Uromastix leptieni*, was described in 2000 from northern areas of Oman and the UAE; however, more recent studies have relegated it to the sub-specific level within *Uromastix aegyptia* (Wilms and Böhme 2000; Wilms and Böhme 2007; Wilms et al. 2009). Other agamids include two species of toad-headed agamas (genus *Phrynocephalus*), the Sinai Agama (*Pseudotrapelus sinaitus*), and Yellow-spotted Agama (*Trapelus flavimaculatus*).

There are 19 species of geckos recorded within the UAE belonging to eight genera: *Asaccus* (two species), *Bunopus* (two species; Fig. 1), *Cyrtopodion* (one species), *Hemidactylus* (three species), *Pristurus* (four species), *Ptyodactylus* (one species), *Stenodactylus* (five species), and *Teratoscincus* (one species). One of the most notable gecko species is the Desert Skink Gecko or Wonder Gecko (*Teratoscincus keyserlingii*), which is distributed in Iran and along some of the Arabian Gulf coastal sandy habitats of the northern UAE (Fig. 1). This species is under threat as much of its restricted habitat range within the UAE is threatened by infrastructure developments, such as new cities and industrial areas. Carter’s Semaphore Gecko (*Pristurus carteri*; Fig. 1) has recently been found in a very restricted area in the extreme east of the Abu Dhabi Emirate, UAE (Gardner 2009).

There are 10 species of lacertids recorded in the UAE. Of these six are fringe-toed lizards of the genus *Acanthodactylus*, with species variously adapted to soft sand, harder substrates, and gravel and coastal plains. Two species of the regionally endemic Oman lizards (Genus *Omanosaura*) occur in the Hajar Mountains, and two species of sand lizards of the genus *Mesalina* occur in the UAE.

There are six species of skinks recorded within the UAE, including a small population of the Golden Grass Skink (*Trachylepis septemtaeniata*), first discovered in 2004 on Jernain Island (Soorae and Al Hameiri 2005). Three species of skink, the Asian Snake-eyed Skink (*Ablepharus pannonicus*), Tesselated Mabuya (*Mabuya tessallata*), and the Ocellated Skink (*Chalcides ocellatus ocellatus*) inhabit more vegetated and moist environments. The other two species are the Sand Skink (*Scincus mitranus*) typical of sand dune habitats and the Iranian Sand Skink (*Scincus scincus conirostris*) in more restricted sandy/gravelly habitats. A single species of monitor, the Grey or Desert Monitor, *Varanus griseus*,

is widespread in desert habitats. This is the largest lizard species in the country.

**Amphisbaenians.**—A single amphisbaenian species, Zarudny’s Worm Lizard (*Diplometopon zarudnyi*) is found in the UAE (Fig. 2). These are common in all areas of aeolian sand. They are frequently found under logs and other debris during the day, but move on the surface at night, as shown by their distinctive tracks.

**Snakes.**—Twenty-two native species of snakes have been recorded within the UAE, belonging to five families (Leptotyphlopidae, Boidae, Colubridae, Hydrophiidae and Viperidae). Additionally, one alien species from the family Typhlopidae may be established. A single thread snake species, the Hook-nosed Thread Snake, *Leptotyphlops macrorhynchus*, is widely distributed, though rarely seen due to its fossorial habits. A single boid species, Jayakar’s Sand Boa, *Eryx jayakari*, is widely distributed in sandy habitats.

Seven species of colubrids (six genera) occur in the UAE. There are two species of racers in the genus *Platyceps*: *P. rhodorachis* in the northern mountains and wadis, and *P. ventromaculatus*, which occurs on the offshore islands of Sir Bani Yas and Delma (Aspinall and Gardner 2007). There are single species each in the genera *Telescopus*, *Spalerosophis*, *Psammophis*, *Malpolon*, and *Lytorhynchus*. The Arabian Cat Snake, *Telescopus dhara*, has only recently been officially recorded within UAE territory, although it has long been predicted to occur (Gardner et al. 2009).

Nine sea snake species in the family Hydrophiidae are known to occur in the waters of the Arabian Gulf and the Gulf of Oman (Baldwin and Gardner 2005; Al Abdessalaam 2007). In Abu Dhabi Emirate, an opportunistic survey conducted between 2002 and 2006 recorded three main species; the Arabian Gulf Sea Snake (*Hydrophis lapemoides*), the Short Sea Snake (*Lapemis curtus*), and the Yellow-bellied Sea Snake (*Pelamis platurus*; Soorae et al. 2006).



FIGURE 2. Zarudny's Worm Lizard, *Diplometopon zarudnyi* showing a close-up of the head. (Photographed by Pritpal Soorae)

TABLE 2. Alien species of reptiles and amphibians recorded in the United Arab Emirates.

Species	Native Range	Source
Green Toad ( <i>Pseudepidalea viridis</i> [previously in <i>Bufo</i> ])	Mediterranean region	Pet trade
Common Iguana ( <i>Iguana iguana</i> )	Central America	Pet trade
Black-lined Plated Lizard ( <i>Gerrhosaurus nigrolineatus</i> )	East Africa	Pet trade
Nile Crocodile ( <i>Crocodylus niloticus</i> )	Sub-Saharan Africa	Pet trade
Red-eared Slider ( <i>Trachemys scripta elegans</i> )	North America	Pet trade
Caspian Terrapin ( <i>Mauremys caspica</i> )	Eastern Mediterranean to parts of the Middle East	Pet trade
African Spurred Tortoise ( <i>Geochelone sulcata</i> )	Sahelo-Saharan Africa	Pet trade
Brahminy Blind Snake ( <i>Ramphotyphlops braminus</i> )	Africa, Asia	Imported soil

Four species of venomous vipers are found in the UAE. One species, the Persian Horned Viper (*Pseudocerastes persicus*) is restricted to mountain tops above 1000 m (Cunningham 2002). Two species of saw-scaled vipers occupy rather different habitats, with the Sind Saw-scaled Viper (*Echis carinatus sochureki*) found in the northern part of the country in sand and sandy gravel habitats, while the Oman Saw-scaled Viper (*Echis omanensis*) occurs in the mountain wadis and hillsides. The Arabian Horned Viper (*Cerastes gasperettii*) is widely distributed in windblown sand deserts.

The Environment Agency-Abu Dhabi assessed alien species (terrestrial and freshwater) of the UAE. Records and sightings of the following species are shown in Table 2. None of these species appears to have established sustainable breeding populations in natural habitats. As such, these alien species are not considered invasive or pests, although it is important to maintain vigilance against potential invasive species.

The Brahminy Blind Snake, *Ramphotyphlops braminus* (Family Typhlopidae), also known as the Flowerpot Snake, has been found in urban gardens in Dubai (Gardner 2008). It is a notorious colonist because of its adaptability, ease of transport in soil, and its parthenogenetic reproductive mode. It is possible that it is self-sustaining in these non-natural habitats. Its natural range includes large areas of Africa and most of Asia, but introduced populations occur in the Americas, Australia, and many islands (Gasperetti 1988). Given its requirement of moist soil, its occurrence in Dubai gardens is likely to represent a successful introduction and colonization.

A list of amphibian and reptile species occurring in the UAE is presented in the Appendix with its presence in one of the five main habitat types, namely inland desert, coastal desert, mountains and wadis, islands, and the marine realm. A further habitat type, the coastal and inland sabkhas or salt flats, is not included in the table as it is inhospitable to almost all reptiles. Two species that live on sabkha margins are the Gulf Sand Gecko (*Stenodactylus khobarensis*) and Spotted Toad-headed Agama (*Phrynocephalus maculatus*; Loughland and Cunningham 2002).

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APPENDIX. A list of herpetofauna occurring in the United Arab Emirates. The five main habitats are defined at the end of the table and “x” denotes presence in this main habitat type.

	Inland Desert <sup>1</sup>	Coastal Desert <sup>2</sup>	Habitats Mountains & Wadis <sup>3</sup>	Islands <sup>4</sup>	Marine <sup>5</sup>
<b>Amphibians</b>					
<b>Bufonidae (Toads)</b>					
Arabian Toad ( <i>Duttaphrynus arabicus</i> )	-	-	x	-	-
Dhofar Toad ( <i>Duttaphrynus dhufarensis</i> )	-	-	x	-	-
<b>Marine Turtles</b>					
Green Turtle ( <i>Chelonia mydas</i> )	-	-	-	-	x
Hawksbill Turtle ( <i>Eretmochelys imbricata</i> )	-	-	-	-	x
Loggerhead Turtle ( <i>Caretta caretta</i> )	-	-	-	-	x
Olive Ridley Turtle ( <i>Lepidochelys olivacea</i> )	-	-	-	-	x
Leatherback Turtle ( <i>Dermochelys coriacea</i> )	-	-	-	-	x
<b>Agamidae (Agamid Lizards)</b>					
Yellow-spotted Agama ( <i>Trapelus flavimaculatus</i> )	x	x	-	-	-
Sinai Agama ( <i>Pseudotrapelus sinaitus</i> )	-	-	x	-	-
Arabian Toad-headed Agama ( <i>Phrynocephalus arabicus</i> )	x	x	-	-	-
Spotted Toad-headed Agama ( <i>Phrynocephalus maculatus</i> )	x	x	-	-	-
Leptien's Spiny-tailed Lizard ( <i>Uromastyx aegyptia leptieni</i> )	x	x	-	-	-
Egyptian Spiny-tailed Lizard ( <i>Uromastyx aegyptia microlepis</i> )	x	x	-	x <sup>6</sup>	-
<b>Gekkonidae (Geckos)</b>					
Gallagher's Leaf-toed Gecko ( <i>Asaccus gallagheri</i> )	-	-	x	-	-
Musandam Leaf-toed Gecko ( <i>Asaccus caudivolvulus</i> )	-	-	x	-	-
Banded Rock Gecko ( <i>Bunopus spatulurus hajarensis</i> )	-	-	x	-	-
Arabian Ground Gecko ( <i>Bunopus tuberculatus</i> )	x	x	-	x	-
Rough-tailed Bowfoot Gecko ( <i>Cyrtopodion scabrum</i> )	x	x	-	x	-
Yellow-bellied House Gecko ( <i>Hemidactylus flaviviridis</i> )	x	x	-	x	-
Persian Gecko ( <i>Hemidactylus persicus</i> )	-	-	x	x	-
Red Sea Gecko ( <i>Hemidactylus robustus</i> )	x	x	x	x	-
Carter's Semaphore Gecko ( <i>Pristurus carteri</i> )	-	-	x	-	-
Bar-tailed Semaphore Gecko ( <i>Pristurus celerrimus</i> )	-	-	x	-	-
Least Semaphore Gecko ( <i>Pristurus minimus</i> )	x	x	-	-	-
Rock Semaphore Gecko ( <i>Pristurus rupestris</i> )	x	x	x	x	-
Fan-footed Gecko ( <i>Ptyodactylus hasselquistii</i> )	-	-	x	-	-
Arabian Sand Gecko ( <i>Stenodactylus arabicus</i> )	x	x	-	-	-
Dune Sand Gecko ( <i>Stenodactylus doriae</i> )	x	x	-	-	-
Gulf Sand Gecko ( <i>Stenodactylus khobarensis</i> )	x	x	-	x	-
Eastern Sand Gecko ( <i>Stenodactylus leptocosymbotes</i> )	x	x	x	-	-
Slevin's Sand Gecko ( <i>Stenodactylus slevini</i> )	x	x	-	x	-
Desert Skink Gecko ( <i>Teratoscincus keyserlingii</i> )	x	x	-	-	-
<b>Lacertidae (Lacertid lizards)</b>					
Bosk's Fringe-toed Sand Lizard ( <i>Acanthodactylus boskianus</i> )	x	-	x	-	-
Saudi Fringe-toed Sand Lizard ( <i>Acanthodactylus gongrorhynchatus</i> )	x	x	-	-	-
Haas's Spiny-footed Lizard ( <i>Acanthodactylus haasi</i> )	x	x	-	-	-
Snake-tailed Fringe-toed Lizard ( <i>Acanthodactylus ophiodurus</i> )	-	x	x	-	-
Schmidt's Fringe-toed Lizard ( <i>Acanthodactylus schmidtii</i> )	x	x	-	-	-
Blanford's Fringe-toed Lizard ( <i>Acanthodactylus blanfordii</i> )	-	x	-	-	-

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Blue-tailed Oman Lizard ( <i>Omanosaura cyanura</i> )	-	-	x	-	-
Jayakar's Oman Lizard ( <i>Omanosaura jayakari</i> )	-	-	x	-	-
Hadramaut Sand Lizard ( <i>Mesalina adramitana</i> )	x	x	-	-	-
Short-nosed Sand Lizard ( <i>Mesalina brevirostris</i> )	x	-	-	x	-
<b>Scincidae (Skinks)</b>					
Asian Snake-eyed Skink ( <i>Ablepharus pannonicus</i> )	-	-	x	-	-
Ocellated Skink ( <i>Chalcides ocellatus ocellatus</i> )	x	x	x	x	-
Tessellated Mabuya ( <i>Mabuya tessellata</i> )	-	-	x	-	-
Sand Skink ( <i>Scincus mitranus</i> )	x	x	-	-	-
Iranian Sand Skink ( <i>Scincus scincus conirostris</i> )	x	x	-	-	-
Golden Grass Mabuya ( <i>Trachylepis septemtaeniata</i> )	-	-	-	x	-
<b>Varanidae (Monitor lizards)</b>					
Desert Monitor ( <i>Varanus griseus</i> )	x	x	-	-	-
<b>Amphisbaenidae (Amphisbaenians)</b>					
Zarudny's Worm Lizard ( <i>Diplometon zarudnyi</i> )	x	x	-	-	-
<b>Serpentes (Snakes)</b>					
<b>Leptotyphlopidae (Thread snakes)</b>					
Hook-nosed Thread Snake ( <i>Leptotyphlops macrorhynchus macrorhynchus</i> )	x	x	-	-	-
<b>Boidae (Boas)</b>					
Jayakar's Sand Boa ( <i>Eryx jayakari</i> )	x	x	-	x <sup>7</sup>	-
<b>Colubridae (Colubrids)</b>					
Gray's Racer Snake ( <i>Platyceps ventromaculatus</i> )	-	-	-	x	-
Wadi Racer ( <i>Platyceps rhodorachis</i> )	x	x	x	-	-
Crowned Leaf-nosed Snake ( <i>Lytorhynchus diadema</i> )	x	x	-	-	-
Hooded Malpolon ( <i>Malpolon moilensis</i> )	x	x	x	-	-
Schokari Sand Racer ( <i>Psammophis schokari</i> )	x	x	x	x	-
Clifford's Diadem Snake ( <i>Spalerosophis diadema cliffordi</i> )	x	x	-	-	-
Arabian Cat Snake ( <i>Telescopus dhara</i> )	-	-	x	-	-
<b>Hydrophidae (Sea snakes)</b>					
Ornate Sea Snake ( <i>Hydrophis ornatus</i> )	-	-	-	-	x
Annulated Sea Snake ( <i>Hydrophis cyanocinctus</i> )	-	-	-	-	x
Arabian Gulf Sea Snake ( <i>Hydrophis lapemoides</i> )	-	-	-	-	x
Small-headed Sea Snake ( <i>Hydrophis gracilis</i> )	-	-	-	-	x
Yellow Sea Snake ( <i>Hydrophis spiralis spiralis</i> )	-	-	-	-	x
Yellow-bellied Sea Snake ( <i>Pelamis platurus</i> )	-	-	-	-	x
Short Sea Snake ( <i>Lapemis curtus</i> )	-	-	-	-	x
Beaked Sea Snake ( <i>Enhydrina schistosa</i> )	-	-	-	-	x
Viperine Sea Snake ( <i>Praescutata viperina</i> )	-	-	-	-	x
<b>Viperidae (Vipers)</b>					
Arabian Horned Viper ( <i>Cerastes gasperettii</i> )	x	x	-	-	-
Persian Horned Viper ( <i>Pseudocerastes persicus persicus</i> )	-	-	x	-	-
Sindh Saw-scaled Viper ( <i>Echis carinatus sochureki</i> )	x	x	-	-	-
Oman Saw-scaled Viper ( <i>Echis omanensis</i> )	-	-	x	-	-

<sup>1</sup> **Inland Desert** (which comprises of Inland Dune Habitats (Mega Dunes), Inland Sabkha (Salt Flats), and Interdunal gravel plains).

<sup>2</sup> **Coastal Desert** (which comprises of typical beach habitats (sandy or rocky), Coastal Sabkha (salt flats), and Coastal sands (small undulating sand dunes lying behind the coastal beaches).

<sup>3</sup> **Mountains & Wadis** (which comprises of rocky mountains and wadis (freshwater streams in mountainous regions predominately in the north of the UAE).

<sup>4</sup> **Islands** (which comprises of low lying sandy islands and rocky islands with low hills).

<sup>5</sup> **Marine** (which comprises of all territorial waters of the UAE in the Arabian Gulf and Gulf of Oman).

<sup>6</sup> Spiny-tailed lizards have also been recorded on Marawah Island (N24.2998°, E53.285°), Abu Dhabi Emirate.

<sup>7</sup> Jayakar's Sand Boa have been recorded on Sir Bani Yas and on Al Aryam Island (N24.2709°, E54.1562°), Abu Dhabi Emirate. It is possible that these could represent introductions via sand transported from the mainland.



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