NDF WORKSHOP CASE STUDIES
WG 7 – Reptiles and Amphibians
CASE STUDY 5
Uromastyx
Country – **ISRAEL**
Original language – English

UROMASTYX LIZARDS IN ISRAEL

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Uromastyx ornata
Photo by Shahar Alterman

Uromastyx aegyptia
Photo by Gili Eliyahu

I. Background information on the taxa

Two species of *Uromastyx* lizards occur in Israel. The Egyptian mastigure (*U. aegyptia*), and the Ornate mastigure (*U. ornata*)[1]. In the early 2000's some Israeli entrepreneurs approached the Israeli government agency responsible for wildlife management and enforcement, the Israel Nature and Parks Authority (INPA), requesting permits for collection and/or breeding of *Uromastyx* lizards in Israel for commercial purposes, i.e. to export live individuals for the international pet trade.

The INPA conducted a study to see if an NDF could be made for either or both of the species of *Uromastyx*. The final result was a rejection of the proposals for both species because the scale of collection requested would have been detrimental to these species; in other words a finding of non-detriment could not be made.

This case study will cover how the determination was made for each of the two species separately, but first some general information on the genus *Uromastyx*.

The taxonomy of the genus has been somewhat confused over the years, with subspecies being promoted and new species or subspecies being described (Knapp, 2004). In this paper I use the scientific names as they appear in the CITES standard reference for this genus: Wilms (2001), which was designated for the first time in 2002 at CoP 12 [see: CoP12 Doc. 10.3 (Rev.)]. According to this standard reference, there are 16 species in this genus, including *U. ornata* as a separate species. Most authors consider *ornata* as a subspecies of *U. ocellata*, so usually specimens of *ornata* were apparently traded as *U. ocellata*. Therefore, there are almost no data in the UNEP-WCMC trade database for trade in *U. ornata*.

Due to the confusion about the species' names before a standard nomenclature reference for the genus was established in 2002, there was (and still is) some confusion about whether a particular species occurs in a particular range state or not. For example, Egypt is not listed as a range state for *U. acanthinura*, however the country has reported exports for this species, and in October 1991 the Egyptian government declared an export ban on *U. acanthinura, U. aegyptia, U. ocellata and U. ornata* from its country (CITES Notification No. 662, dated 16 January 1992).

[1] Alternative common names in English for *Uromastyx* lizards are: Dabb or Dhabb lizards or Spiny-tailed lizards. In the literature, one can also find alternative spellings of the scientific specific names, such as *aegyptius* or *ornatus*. Here I follow the scientific names in the CITES standard reference for the genus *Uromastyx* (Wilms, 2001).

Little is known about this genus in the wild and there are far more publications concerning husbandry and captive breeding of *Uromastyx* than concerning their ecology and behavior in the wild (Highfield & Slimani, 1998). *Uromastyx* are generalist herbivores, they are diurnal and usually live in groups of several individuals occupying very extensive territories (Zug, 1993). Typical populations range from about 1 to 10 animals per ha (Highfield & Slimani, 1998) depending on the species and habitat. *Uromastyx* are generally very colorful lizards whose size varies with species and can reach up to about 75 cm (including the tail) in the largest individuals. They can live over 20 years in the wild (Bouskila & Amitai, 2001), reach sexual maturity around four years old, and lay between 10 and 40 eggs per year, depending on the individual's size and species.

In most places, the habitats of *Uromastyx* are not directly threatened, as they mainly comprise desert which is usually of no commercial value (but this is not the case in Israel, see below). *Uromastyx* lizards have been in international trade for several decades and collecting is considered the major threat to many of the populations in the wild (Highfield & Slimani, 1998; Knapp, 2004). The scale of exploitation, including domestic utilization for food and traditional medicine (e.g., Walls, 1996) can lead to local depletions.

Concern about the sustainability of trade in these species led to the inclusion of all Uromastyx species in Appendix II of CITES in 1977. In addition, a number of trade restrictions specific to certain species or countries, have been applied to *Uromastyx* since then.

The Animals Committee has discussed concerns about the trade in *Uromastyx* a number of times, especially as part of the Significant Trade Review process, most recently at AC 15 in 1999 and AC 22 in 2006.

IUCN's Red List (IUCN 2007) currently contains only one Uromastyx species (i.e., the newly described species *U. alfredschmidti*, which is listed as Near Threatened), however a new IUCN Global Reptile Assessment will apparently be released in the next year or two.

1. BIOLOGICAL DATA

1.1 Scientific and common names

Scientific name: *Uromastyx aegyptia*; English common names: Egyptian mastigure, Egyptian dabb-lizard, Egyptian spiny tailed lizard. In Hebrew: *Chardon-zav mazui*.

1.2. Distribution

The global distribution of *U. aegyptia* includes Sudan, Egypt (including the Sinai Peninsula), Saudi Arabia, Jordan, Israel and Iraq. The species'

range in Israel (see map on page 4) includes: the eastern Judean Desert (Nahal Hever alluvial fan), the Arava Valley, and the central and southern Negev Desert (Bouskila & Amitai, 2001). An isolated population, in the western Negev Desert, is separated from all other populations in Israel by the unsuitable area of the Negev highlands. This small population is thus connected only to other conspecific populations across the border in the Sinai Peninsula of Egypt. The total area of the species' habitat in Israel is approx. 4,000 km^2, but much of this is marginal habitat with few individuals.

1.3 Biological characteristics

1.3.1 *General biological and life history characteristics of the species*

U. aegyptia is the largest species in the genus with adults weighing up to 2 kg and reaching up to 75 cm in total length. They live in deep burrows (up to 10 m in length, and 1.8 m in depth) that are in use for many years. These burrows require heavy investments for their construction, and the survival of the lizards depends on them as shelter from predators and from the extreme conditions in the desert (Bouskila, 1983, 1986). They hibernate in these burrows during December and January (Mendelssohn & Bouskila, 1989).

Juveniles and adults are predominantly herbivorous, feeding mainly on leaves, buds, fruits, seeds and flowers of plants. Annuals are eaten during the spring, if winter rains were enough to support germination. During dry years and during the summer (when no rain occurs), the lizards depend on perennial plants; in the wadis in the Arava Valley, Acacia trees comprise the main summer food source (Bouskila, 1984; Bouskila, 1987; Foley *et al.*, 1992; Mendelssohn & Bouskila, 1989). In other areas that lack *Acacia* trees, they feed on perennial shrubs. They tend to use burrows that are close to summer sources of food, apparently because foraging far from their burrow exposes them to predation (Bouskila & Molco, 2002). They are mostly solitary and spend most of their time during the day near the burrow.

Robinson (1995) found population densities of *U. aegyptia* of 4.4-6.3 individuals per ha in an arid but productive environment in Kuwait. Bouskila (1984) reported an average of 3.4 adult individuals per ha in the northern part of the Arava Valley of Israel. Bouskila & Molco (2002) reported 10 individuals per ha near Eilat in the southern part of the Arava Valley. Gottleib & Vidan (2007) found an average density of 18.5 *U. aegyptia* burrows per ha in the central part of the Arava Valley, with an average of 51% of them in active use.

U. aegyptia reaches sexual maturity at the age of 4-6 years (Mendelssohn & Bouskila, 1989). Longevity in nature is more than 20

years (Bouskila & Amitai, 2001). Bouskila (1984) observed mating during May; the females lay one clutch of eggs (clutch size: 17- 41 eggs) in May or June in deep burrows (up to 3 m long) that they dug; the eggs hatch at the end of August. Females did not lay eggs every year (Bouskila, 1984).

Juveniles are very susceptible to predation, and many of them are killed during their first year by birds (e.g., shrikes), by varanid lizards and by snakes. The predators of adults are mainly raptors, but also wolves, dogs and humans (Bouskila, 1984).

1.3.2 *Habitat types*

U. aegyptia is a large herbivorous lizard active all year round, especially during the summer, which in Israel is the dry season, and they are thus limited in their distribution to those areas that provide some green vegetation during the summer (Arbel, 1984; Bouskila, 1984; Bouskila & Amitai, 2001; Mendelssohn & Bouskila, 1989). The typical habitat for this species is alluvial fans, gravel plains, and wide wadis in desert areas. Most of their habitat has < 80 mm mean annual rainfall, and they are always found in areas with < 150 mm mean annual rainfall.

1.3.3 *Role of the species in its ecosystem*

U. aegyptia has a central role in the desert plains as a physical ecosystem engineer in that the lizard modifies in a substantial way the physical characteristics of its habitat, and the modification has important implications on other organisms in the ecological system (Bouskila & Molco, 2002). The large burrows of *U. aegyptia* provide shelter for many organisms that would not be able to dig through the hard desert crust to escape the harsh conditions in the desert. These include snakes, geckos, spiders and many arthropods. In addition, the accumulation of soil from deep layers near the entrance of the burrow provides an ameliorated substrate for plants that normally may suffer from the high concentration of salt near the ground surface. In addition to the role as an ecosystem engineer, *U. aegyptia* serves as prey to variety of predators and acts as an herbivore in the ecosystem (Bouskila, 1984, 1986). The species was the principal prey of the golden eagle (*Aquila chrysaetos*) when three pairs of this endangered raptor established breeding territories in the Arava Valley in the 1970's (B. Shalmon, pers. comm.).

1.4 Population

1.4.1 *Global Population size*

There are no reliable estimates of global population size, and population densities apparently differ greatly among the different range states.

Israel contains less than 20% of the world population of this species (Dolev & Perevelotsky, 2004), but there is no reliable population estimate for the whole country. As stated above, the species range in Israel covers up to about 4,000 kmÇ, but their density is rather low in most of this area which is apparently only marginal habitat. By extrapolating and estimating densities the country's population of this species may be as low as a few thousand adults.

1.4.2 *Current global population trends*

___increasing _X_decreasing ____ stable ____unknown

The world population is apparently decreasing due to unsustainable collection from the wild (IUCN, in prep.). There are currently no export quotas for this species (CITES, 2008).

1.5 Conservation status

1.5.1 *Global conservation status (according to IUCN Red List)*

___Critically endangered ___Near Threatened
___Endangered ___Least concern
___Vulnerable ___Data deficient

The species is not listed in the IUCN Red List 2008 (as of October 2008), but a new assessment by IUCN of many reptile groups is expected to be released next year.

1.5.2 *National conservation status for the case study country*

The Red Book of Vertebrates in Israel (Dolev & Perevelotsky, 2004) lists the Regional Threat Category of U. aegyptia as Near Threatened.

1.5.3 *Main threats within the case study country*

___ No Threats
_X_ Habitat Loss/Degradation (human induced)
___ Invasive alien species (directly affecting the species)
_X_ Harvesting [hunting/gathering]
_X_ Accidental mortality (e.g. Bycatch)
___ Persecution (e.g. Pest control)
___ Pollution (affecting habitat and/or species)
___ Other_____
___ Unknown

Threat and Disturbance factors

a. Habitat destruction: in particular by the expansion of low-water use agriculture and of military training in desert areas (Bouskila & Amitai, 2001; Bouskila & Molco, 2002). In addition to reducing the habitat available for the species, these factors cause fragmentation of the existing populations.
b. Poaching: They are illegally trapped and eaten in the Arava Valley by foreign agricultural laborers, mostly those from Thailand (Hawlena, 2000; Bouskila & Molco, 2002; Yom-Tov, 2003; Nemtzov, 2007; Leader & Boldo, 2008) (see photo on page 9).

c. They are illegally trapped and eaten by local Bedouins, who traditionally used the skin as water canteens (Arbel, 1984; Bouskila & Amitai, 2001).
d. All-terrain vehicles and off-road vehicles used by agriculture workers and also for recreation, damage the burrows and their surroundings, and can cause diversion of flood waters into some of the burrows.
e. They are killed by cars on roads, particularly males during the mating season (Bouskila & Amitai, 2001).

In Israel, *U. aegyptia* habitat has been greatly reduced by the spread of modern agriculture into desert regions, relying on innovative low-water-use agricultural techniques. Large regions of arid areas and *U. aegyptia* habitat in the Arava Valley have now been converted to agriculture, with much of the land being covered with plastic hothouses (Hawlena, 2000) (see photo on page 9). Plans are progressing also to convert *U. aegyptia* habitat in the western Negev Desert to agricultural land.

Until the mid 1990's *U. aegyptia* were sometimes reported as an agricultural pest causing damage to crops in the Arava Valley (Moran & Keidar, 1993), but such damage no longer occurs (Nemtzov, 2002) since the population in that area has been greatly reduced and most of the crops there are no longer grown outdoors.

Two studies of *U. aegyptia* in the northern (Hawlena, 2000) and the central Arava Valley (Gottleib & Vidam, 2007) have shown marked reductions in the sub-populations of this species in Israel as a function of distance to agricultural regions. This is due mainly to negative impact of poaching by agricultural workers, and by loss of habitat from construction of structures for low-water use agriculture in closed hothouses.

2. SPECIES MANAGEMENT WITHIN THE COUNTRY FOR WHICH CASE STUDY IS BEING PRESENTED

2.1 Management measures

2.1.1 *Management history*

Until the early 1990's there were reports of agricultural damage by *U. aegyptia* in the Arava Valley. Problem animals were sometimes trapped and translocated further away from the agricultural areas. The species has never been "managed" but rather its habitat is protected as a way to encourage its survival in the wild.

2.1.2 *Purpose of the management plan in place*
The current efforts on behalf of this species are directed at preventing poaching and further loss of habitat.

2.1.3 *General elements of the management plan*
The current "management" program related to conservation of this species is to try to prevent further loss of habitat, as well as education and enforcement against poaching by Thai agricultural workers.

2.1.4 *Restoration or alleviation measures*
N/A

2.2 Monitoring system

2.2.1 *Methods used to monitor harvest*
There is no legal harvest, so no monitoring of harvest is done.

2.2.2 *Confidence in the use of monitoring*

2.3 Legal framework and law enforcement: Provide details of national and international legislation relating to the conservation of the species

The species is fully protected in Israel under a variety of laws and regulations. The species is listed as "protected wildlife" under the Wildlife Protection Law of 1955 (and its regulations of 1994) and as a "protected natural asset" under the National Parks, Nature Reserves and National Monuments Law of 1998 (and its regulations of 2002 and 2005). Specimens (including live individuals as well as all parts and derivatives) may not be disturbed, harmed, captured, held, bred in captivity, moved, or traded without a written permit from the Israel Nature and Parks Authority. In addition, much of the habitat of this species in Israel is in protected areas (nature reserves) where no fauna or flora may be disturbed or collected.

Internationally, all *Uromastyx* species have been listed in Appendix II of the CITES Convention since 1977.

3. UTILIZATION AND TRADE FOR RANGE STATE FOR WHICH CASE STUDY IS BEING PRESENTED

3.1 Type of use (origin) and destinations (purposes) (e.g. commercial, medicinal, subsistence hunting, sport hunting, trophies, pet, food). Specify the types and extent of all known uses of

the species. Indicate the extent to which utilization is from captive-bred, artificially propagated, or wild specimens

Outside of Israel, the species has been trapped and sold for the international pet trade, and is also grown in captivity. There are records in the past of domestic use of the species for traditional medicine and for food and leather by local Bedouins before the establishment of the State of Israel in 1948 and the enactment of Israel's Wildlife Protection Law in 1955. There has never been any legal trapping or collecting allowed in Israel. There are many records of illegal poaching for food in recent years by farm workers from Thailand.

3.2. Harvest

3.2.1 *Harvesting regime (extractive versus non extractive harvesting, demographic segment harvested, harvesting effort, harvesting method, harvest season)*

The species is not legally harvested.

3.2.2 *Harvest management/ control (quotas, seasons, permits, etc.)*

N/A

3.3 Legal and illegal trade levels: To the extent possible, quantify the level of legal and illegal use nationally and export and describe its nature.

Although *U. aegyptia* are fully protected by Israeli law and may not be captured or harmed without a permit, there is apparently much illegal poaching, mainly by snare traps set by agricultural workers from Thailand (photo, right) who are employed in the Arava Valley (Harel Ben Shahar, pers. comm.; Yom-Tov, 2003; Nemtzov, 2007; Leader & Boldo, 2008). Close to agricultural areas their population has been locally decimated, but the extent of the poaching has not been quantified.

During the years when there was an export quota from Egypt for this species, there may have been small amounts of smuggling of wild caught specimens out of Israel and into Egypt. If this occurred it was apparently not on a large commercial scale.

Photo: Agricultural workers from Thailand building a new hothouse in the desert habitat near Hazeva in the northern Arava Valley. The photo shows the two major threats to *U. aegyptia* in Israel: loss of habitat and poaching by foreign agricultural workers. Photo by Roni Ostreicher

II. Non-detriment finding procedure (NDFs)

1. IS THE METHODOLOGY USED BASED ON THE IUCN CHECKLIST FOR NDFs?

____ yes _X_√ no

2. CRITERIA, PARAMETERS AND/OR INDICATORS USED

Field observations of the species in the northern Arava Valley (Bouskila, 1984; Hawlena, 2000) were conducted by counts of active burrows and repeat observations of activity levels in specific transects. Comparisons of the surveys in 2000 of the same area studied in 1984, using aerial photographs and ground-truthing, showed the population to be clearly in decline due mainly to loss of habitat and high levels of poaching, especially in the vicinity of settlements and agricultural areas.

Because there were no reliable demographic data available to conduct a detailed MSY study, the evaluation was based on a determination of the general state of the country's population of this species. The life history characteristics of this species show that it relies on long adult longevity coupled with low juvenile survivorship (*r* strategy). Collecting adults from the wild from a species employing such a strategy is not generally conducive to sustainable harvest (Schlaepfer *et al*., 2005).

Because the policy of the INPA is to employ an extremely low level of tolerance to risk of extinction, the agency uses a precautionary approach in all areas of evaluation of the exploitation of wildlife (see: Milner-Gulland & Akcakaya, 2001).

Based on this precautionary approach the agency could not set a minimum number of animals that could be collected from the wild with no detrimental effect on the population. There was therefore no justification in allowing any collecting, since sustainable harvest can only be done on a population at steady-state or one that is increasing but not on one in decline.

3. MAIN SOURCES OF DATA, INCLUDING FIELD EVALUATION OR SAMPLING METHODOLOGIES AND ANALYSIS USED

Multiyear comparison of field observations and surveys were conducted in transects.

4. EVALUATION OF DATA QUANTITY AND QUALITY FOR THE ASSESSMENT

The quality of the data was determined to be reliable as it was collected only by authorized and experiences scientists and rangers.

5. MAIN PROBLEMS, CHALLENGES OR DIFFICULTIES FOUND ON THE ELABORATION OF NDF

There were no demographic data available on birth or death rates, or on immigration that would have allowed us to use even a simple population model to determine population trends. All results were based on comparison of survey data.

6. RECOMMENDATIONS

There does not appear to be any level of collection of individuals from the wild that could be deemed sustainable, as the wild population is in decline and their *r* strategy makes them poor candidates for exploitation. This determination was not made on the basis of a sound scientific analysis of the population's demographics or on any kind of arithmetic algorithm. But even a simple algorithm, such as Robinson and Roberts (1991), which is based on only four parameters, to estimate of

the possibility of sustainable harvest, has many problems (Milner-Gulland & Akcakaya, 2001).

If the INPA were to wish to determine whether the decision not to issue an NDF was correct, they should conduct a more comprehensive survey of the species including collection of demographic data and use an appropriate model, such as suggested by Milner-Gulland & Akcakaya (2001). Also, repeat surveys every three to five years of the same area will allow multi-year comparisons of the population's status.

I. Background information on the taxa

1. BIOLOGICAL DATA

1.1 Scientific and common names: *Uromastyx ornata* In English: Ornate Mastigure. In Hebrew: *Chardon-zav hadur*

1.2 Distribution (Specify the currently known range of the species. If possible, provide information to indicate whether or not the distribution of the species is continuous, or to what degree it is fragmented. If possible, include a map)

The species *U. ornata* is endemic to the Arabo-Sinaian region: southern Israel, the Sinai Peninsula (Egypt), and north-west Saudi-Arabia (Bouskila & Amitai, 2001). Its range in Israel includes the Eilat Mountains and Mt. Timna. The total area of the species' habitat in Israel is approx. 270 km^2.

1.3 Biological characteristics

1.3.1 *Provide a summary of general biological and life history characteristics of the species (e.g. reproduction, recruitment, survival rate, migration, sex ratio, regeneration or reproductive strategies, tolerance toward humans)*

Very little has been published about the ecology and behavior of *U. ornata* in the wild, and most of what is known is from unpublished surveys and internal reports of the Israel Nature and Parks Authority.

This species is much smaller than *U. aegyptia* with adults reaching up to 40 cm and weighing up to 300g (Mendelssohn & Bouskila, 1989). *U. ornata* lives in very dry areas (with < 20 mm mean annual rainfall) in rocky habitats rich in holes and crevices. They are active all year-round, but most activity is in the hottest part of the day during the

hottest months. Most activity is on the rocky slopes of the wadis, with descents to the floor of the wadi only for chasing invaders for feeding or for reproduction (including courtship and nesting), and also for an unusual and unexplained behaviour wherein the male flips the female onto her back (Molco & Ben-David, 2000).

U. ornata may be solitary or live in small groups, but never with more than one adult male (Mendelssohn & Bouskila, 1989). Dominant males attack and chase other males from their home range, but they do not maintain exclusive territories. Often a dominant male occupies a segment of the slope in a wadi, where several females, and even a subordinate male, may use the same area. From spring to the beginning of winter, the dominant male often approaches a female, turns her over on her back, and walks in circles on its belly. The meaning of this unique behavior is not clear yet, but it is likely to be related to the bond between the dominant male and the females in his home range (Bouskila & Molco, pers. comm.; Molco & Ben-David, 2000). The female digs a burrow in the floor of the wadi, where she lays on e clutch of 7-17 eggs in June. The eggs hatch after about 60 days in the beginning of August. Juveniles disperse within 4 days after hatching. Juveniles reach sexual maturity at the age of 2 years (Mendelssohn & Bouskila 1989).

The food of *U. ornata* is mainly composed of flowers, fruits and leaves of *Ochradenus baccatus* and other bushes; they shelter in rock crevices on steep slopes of wadis, but they descend the slopes for feeding in the wadi (Bouskila & Amitai 2001; Molco & Ben-David, 2000; Bouskila & Molco, pers. comm.).

1.3.2 *Habitat types: Specify the types of habitats occupied by the species and, when relevant, the degree of habitat specificity*

The species is specific to extreme desert (<20 mm mean annual rainfall), in steep, rocky, hot wadis that hold Acacia trees and *O. baccatus* bushes (Mendelssohn & Bouskila, 1989; Bouskila & Amitai 2001, Molco & Ben-David 2000).

1.3.3 *Role of the species in its ecosystem*

The role of this species in its ecosystem has not been studied directly, but it is reasonable to view it as similar to that of other *Uromastyx* species (above); it is probably less of an ecosystem engineer in that does not create burrows in the hard desert floor, but it does dig nesting burrows for laying eggs and it clears burrows in rocky crevices that are apparently exploited by many other species.

1.4 Population

1.4.1 *Global Population size: (Population size may be estimated by reference to population density, having due regard to habitat type and other methodological considerations, or simply inferred from anecdotic data)*
Unknown

1.4.2 *Current global population trends*
___increasing ____decreasing ____stable _X_unknown

During four field trips in the eastern Sinai Peninsula of Egypt during 1998-1999 by experienced investigators during the activity season in appropriate habitats, only very few individuals were observed, far lower than in the nearby Eilat Mountains Nature Reserve on the Israeli side of the border (Molco & Ben-David, 2000).

The low density may have been caused by over-collection subsequent to Israel turning this area over to Egypt in 1983 (as part of the 1979 peace treaty between these countries). In addition, all wadis that contained the appropriate habitats and plants were heavily grazed by livestock. The impact of such heavy grazing has not been evaluated yet, but it is likely that it contributed to reduction in the population.

1.5 Conservation status

1.5.1 *Global conservation status (according to IUCN Red List)*

___Critically endangered ___Near Threatened
___Endangered ___Least concern
___Vulnerable ___ Data deficient

The species is not listed in the IUCN Red List 2008 (as of October 2008), but a new assessment by IUCN of many reptile groups is expected to be released next year.

1.5.2 *National conservation status for the case study country*
The Red Book of Vertebrates in Israel (Dolev & Perevelotsky, 2004) lists the regional threat status for *U. ornata* as endangered EN (B, C2a). This classification code means the area of the species' habitat in Israel is <5,000 km^2 and the population is estimated to be less than 2,500 mature individuals, and a continued decline is projected in the form of severely fragmented populations, and no subpopulation has more than 250 mature individuals in it.

1.5.3 *Main threats within the case study country*

___No Threats
_X Habitat Loss/Degradation (human induced)
___Invasive alien species (directly affecting the species)
___Harvesting [hunting/gathering]
___Accidental mortality (e.g. Bycatch)
___Persecution (e.g. Pest control)
___Pollution (affecting habitat and/or species)
___Other_____
___Unknown

Threat and Disturbance factors

a. Potential trade impact: Despite protection in Israel and in Egypt, *U. ornata* has a great demand in the international pet trade and they may be collected by illegal traders and reptile collectors (Bouskila & Molco, 2002). No illegal collection in Israel has been recorded, but the potential is certainly there.
b. Habitat loss: The global population is apparently small, and sub-populations can be easily fragmented by mountain ranges which are not used by the species or by utilization of their habitat by humans for recreational or other activities (Bouskila & Molco, 2002). This is not a severe threat in Israel, as most of their habitat is protected and is also unsuitable for most uses by people (e.g. agriculture or real estate).
c. All-terrain vehicles and off-road vehicles that are driven in the wadis in Southern Israel disturb the animals and cause damage to bushes and trees which are their main food sources. This is a localized threat and likely to increase, but it is not severe as most of the habitat is protected and such activities are concentrated in a few designated 4X4 routes.

2. SPECIES MANAGEMENT WITHIN THE COUNTRY FOR WHICH CASE STUDY IS BEING PRESENTED

2.1 Management measures

2.1.1 *Management history*

A survey of the species in the Eilat Mountains in the late 1970's showed apparently very low population numbers. Subsequently, 162 individuals were translocated during 1980 and 1981 from the southern Sinai Peninsula to the Eilat Mountains to augment the population

there[2]. More recent studies suggest that the survey may have produced erroneous low numbers due to inappropriate survey methods, and the Eilat Mountains population was probably not as depleted as was thought. There have been no subsequent translocations.

2.1.2 *Purpose of the management plan in place*
Current management measures for this species in Israel involve protection of the habitat in which the species occurs. The habitat is part of the Eilat Mountains Nature Reserve, a fully protected area.

2.1.3 *General elements of the management plan*
In order to reduce the impact of hikers and off-road vehicles on the *U. ornata* habitat and on the entire nature reserve, specific walking trails and 4X4 routes were marked in parts of the nature reserve, since totally closing the reserve to people was deemed as not feasible. Although these are almost all in the wadis (which form part of the habitat of *U. ornata*), there only a few such trails, in an attempt to reduce human impact on all the fauna and flora in this fragile desert habitat.

2.1.4 *Restoration or alleviation measures*
Besides the translocations during 1980 and 1981 (see section 2.1.1., above) no other restoration or alleviation measures have been enacted.

2.2 Monitoring system

2.2.1 *Methods used to monitor harvest*
The species is not legally harvested, so no harvest monitoring occurs. The species is monitored in the wild annually by an experienced ranger along preset transects to establish multi-year comparisons and to establish population trends.

2.2.2 *Confidence in the use of monitoring*
There is no monitoring of harvest, but there is a high level of confidence in the population monitoring in the wild which is considered reliable and accurate.

[2] The Sinai Peninsula was turned over from Israel to Egypt in the early 1980's (after the *Uromastyx* translocation project) as part of the peace treaty between these countries.

2.3 Legal framework and law enforcement: Provide details of national and international legislation relating to the conservation of the species.

The species is fully protected in Israel under a variety of laws and regulations. The species is listed as "protected wildlife" under the Wildlife Protection Law of 1955 (and its regulations of 1994) and as a "protected natural asset" under the National Parks, Nature Reserves and National Monuments Law of 1998 (and its regulations of 2002 and 2005).

Specimens (including live individuals as well as all parts and derivatives) may not be disturbed, harmed, captured, held, bred in captivity, moved, nor bought or sold, nor offered for sale (without a written permit from the Israel Nature and Parks Authority). In addition, all the habitat of this species in Israel is in protected areas (nature reserves) where all fauna and flora are fully protected and may not be disturbed or collected.

Internationally, all *Uromastyx* species are listed in Appendix II of the CITES Convention since 1977.

3. UTILIZATION AND TRADE FOR RANGE STATE FOR WHICH CASE STUDY IS BEING PRESENTED

There is no legal use of *U. ornata* individuals or parts and derivatives in Israel. No specimens may be taken from the wild, and there is no legal captive breeding or trade (domestic or international).

Because the species' natural habitat is small and away from agricultural areas, and because the animals are relatively rare, there is apparently no poaching by farm workers, and there is apparently no illegal trade. As stated above, *U. ornata* has a great demand in the international pet trade so the potential for illegal collection and smuggling exists. There have been few if any cases of poachers or reptile collectors taking *U. ornata* in Israel.

3.1 Type of use (origin) and destinations (purposes) (e.g. commercial, medicinal, subsistence hunting, sport hunting, trophies, pet, food). Specify the types and extent of all known uses of the species. Indicate the extent to which utilization is from captive-bred, artificially propagated, or wild specimens

A very limited number of permits have been issued in the past for a very few individuals to be held in Israel in mini-zoos in non-commercial educational institutions.

3.2 Harvest

The species is not legally harvested in Israel.

3.2.1 *Harvesting regime (extractive versus non extractive harvesting, demographic segment harvested, harvesting effort, harvesting method, harvest season)*
N/A

3.2.2 *Harvest management/ control (quotas, seasons, permits, etc.)*
N/A

3.3 Legal and illegal trade levels: To the extent possible, quantify the level of legal and illegal use nationally and export and describe its nature
There is no legal trade, domestic or international. There is apparently very little illegal trade if at all, as poachers of this species have never been caught and the population is apparently mostly stable.

II. Non-detriment finding procedure (NDFs)

1. IS THE METHODOLOGY USED BASED ON THE IUCN CHECKLIST FOR NDFs?

__yes _X_no

2. CRITERIA, PARAMETERS AND/OR INDICATORS USED
The status of the population as determined by a field study conducted in the species habitat over a number of years, based on repeated counts along transects and visual observations (Bouskila & Molco, 2002).

Individually recognized territorial adults were photographed to determine population size.

The limited world distribution, the low numbers found in the survey in Egypt's eastern Sinai, and the small range in Israel suggest that there is a severe risk of decline if they are exploited for trade.

The overall status of this species in Israel shows a population that is apparently small (a few hundred individuals) but apparently stable. Some sub-populations might have declined drastically, as was observed in a survey of Mt. Timna by Nature & Parks Authority in 1998, in which no *U. ornata* were seen in areas where they have been observed several years earlier (Bouskila & Molco, 2002). Moreover, in that 1998 survey, no fresh feces were found in the surveyed region, although old feces (apparently several years old) were quite abundant. This survey indicated a local decline, but its reason has not been determined yet. No recent follow-up surveys have been conducted.

3. MAIN SOURCES OF DATA, INCLUDING FIELD EVALUATION OR SAMPLING METHODOLOGIES AND ANALYSIS USED

Transect surveys were used to look for live individuals and for spoor (feces) and by spot observations of identified individuals at fixed sites in *U. ornata* habitats in the Eilat Mountains and Mt. Timna Nature Reserves in southern Israel. These were evaluated to determine the relative status of the population in multiyear comparisons.

Table: Summary of observations of *U. ornata* from the Nahal Shlomo Valley (translated by the author from Molco & Ben-David, 2000).

Year	Transects		Direct observations		No of individually recognized individuals
	Hours	Days	Hours	Days	
1996	170	106	65	75	90
1997	250	140	240	135	150
1998	160	126	160	126	160
1999	110	100	110	100	170
Total	**690**	**462**	**575**	**436**	**170**

4. EVALUATION OF DATA QUANTITY AND QUALITY FOR THE ASSESSMENT

The quality of the data was deemed excellent as the observer was very experienced.

5. MAIN PROBLEMS, CHALLENGES OR DIFFICULTIES FOUND ON THE ELABORATION OF NDF

As was the case with *U. aegyptia*, there were no reliable demographic data available, so determination of the population's state had to be made using other parameters.

Because the population in Israel is connected with the population in eastern Sinai, the decline in the eastern Sinai population that was observed there, may affect the population in the nearby Eilat Mountains.

6. RECOMMENDATIONS

A NDF could not be made, and no collection has been authorized.

The INPA needs to publish the survey data. In addition, survey methods need to be improved so that better population assessment can be made in other regions. Repeat surveys of the population need to be done every few years for making multi-year comparisons on population trends.

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