RED LIST ASSESSMENT

Questionnaire

(please complete one questionnaire per taxon, extra sheets may be used)

1. SCIENTIFIC AND COMMON NAMES

The IUCN Red List generally focuses at the species level. Subspecies, plant varieties, and subpopulations (as defined in the IUCN Red List Categories and Criteria. Version 3.1) may also be assessed and will be considered for inclusion in the IUCN Red List only if the species-level assessment is also available. Hybrids will not be considered for inclusion in the IUCN Red List. For currently undescribed species, please refer to the rules outlined in section 2.1 of current version of the *Guidelines for Using the IUCN Red List Categories and Criteria*.

1a. Scientific name (including authority details):

Cnemaspis psychedelica Grismer, Ngo & Grismer, 2010

1b. Synonym/s (if there has been a taxonomic change in the last 5 years or if widely used):

None

1c. English Common Name (if known):

Psychedelic Rock Gecko

1d. Other Common Names (if known and state language):

Vietnamese: Tắc kè đuôi vàng

2. HIGHER TAXONOMY

Note that the IUCN Red List does not record sub-families, sub-orders, etc. Only the taxonomic levels requested below should be provided. A taxonomic notes field is also provided to allow further details about taxonomy to be recorded – see section 4a.

2a. Kingdom	2b. Phylum	2c. Class
Animalia	Chordata	Reptilia

2c. Order	2b. Family
Squamata	Gekkonidae

3. COUNTRY, SUBCOUNTRY AND MARINE AREA OCCURRENCES

Provide a list of the **countries** and **subcountry units** (e.g., states, provinces, etc.) in which this taxon occurs. For marine taxa, also record names of FAO fisheries areas and (optional) Large Marine Ecosystems (LME).

   Presence: For each country, subcountry or marine area, please record whether this taxon is extant, extinct, possibly extinct, or presence uncertain.

   Origin: For each country, subcountry or marine area, please record whether this taxon is native, reintroduced, introduced, vagrant, or origin uncertain.

Note: A distribution map showing the extent of occurrence **MUST** also be attached.

See the current version of the *Guidelines for Using the IUCN Red List Categories and Criteria* for the IUCN definition of "extent of occurrence".

3a. Countries			3b. Subcountry units (if known)		
Country name	Presence	Origin	Subcountry unit name	Presence	Origin
Vietnam	extant	native	Ca Mau Province	extant	native

3c. Marine Areas		
FAO area name or LME	Presence	Origin
None		

4. TEXT DOCUMENTATION

Provide a short narrative for each of the topics below to support the information used for the Red List assessment in section 5 and to complement and provide more detail for the Classification Scheme codes for habitats, threats, stresses and conservation actions recorded in Annex 1 (use additional sheets if required).

Please avoid using one-word answers in this section; the Red List assessment should be treated in the same way as a scientific paper, where the information is presented as clearly as possible for the reader, and all references used as cited within the text.

4a. Taxonomic Notes

Record any recent taxonomic changes or current taxonomic doubts or debates about the validity or identity of the taxon.

None

4b. Distribution

Provide a summary of the current information available about the taxon's geographic range. Include a mention of important sites for this taxon.

This species is currently known only from Hon Khoai Island and Hon Tuong Isle, Ca Mau Province, southern Vietnam. Hon Khoai island, which is only about 8 km² in size, is one of the biggest of in total 92 islands in Rach Gia Bay. Hon Tuong is a small offshore isle of Hon Khoai (Ngo et al. submitted).

4c. Population

Provide a summary of the information available for size and trend of the global population. Information about sizes and trends of subpopulations or trends in particular regions of the taxon's range can also be included in this section. If no quantitative information on population sizes or trends is available, please record whether the species is common, abundant, rare, etc. If there really is no information at all about the population, please note this.

The recent study by Ngo et al. (submitted) investigating the population size of *Cnemaspis psychedelica* revealed the presence of animals along seven transects on Hon Khoai Island as well as for the first time on the small offshore isle, Hon Tuong. A total of 267 animals were captured during the wet season, whereof 196 were adults, and 526 individuals (378 adults) were observed during the dry season. Based on four investigated sites, population size estimates revealed about 365 animals during the wet season. With respect to the same transects a total of 576 individuals were estimated during the dry season (Ngo et al. submitted). Including two further sites (viz. 6 sites) a total population size of 732 individuals was estimated during the dry season on Hon Khoai Island. The effective population size (considering only mature individuals) was estimated to comprise approximately 507 animals during the dry season. With regard to seasonal variations, the mean density of *C. psychedelica* along suitable habitat sites was estimated to be around 120 individuals per km / transect during the wet and 192 individuals per km / transect during the dry season (Ngo et al. submitted).

Current population trend (tick (✓) one box only)	Increasing	
	Decreasing	
	Stable	✓
	Unknown	

4d. Habitats and Ecology

Provide a summary of the habitats occupied by the taxon, highlighting essential habitats and ecological requirements. It is not necessary to know the details of behavioural traits, etc. unless these are relevant to the taxon's Red List status (e.g., it has a particular life cycle, growth pattern or behaviour that makes it vulnerable to specific threats).

The species is a microhabitat specialist preferring large, granite boulders in the shade of the forest canopy (Grismer et al. 2010). On Hon Khoai Island, small to large boulder outcrops provide this microhabitat type, which are surrounded by dense vegetation mainly consisting of small trees, with a leaf-covered forest floor (Grismer et al. 2014, Nguyen et al. 2015). Individuals retreat into cracks in the rocks, between rocks or beneath ledges when threatened (Grismer et al. 2010). According to field observations by Grismer et al. (2010), individuals bask in filtered sunlight during the daytime. At night most *C. psychedelica* were found below overhanging granite boulders, sleeping on leaves or deeply retreated into crevices. They were furthermore frequently observed to occur aggregated in groups composed of different age and sex classes (Truong Nguyen pers. obs).
Grismer et al. (2010) and Ngo et al. (submitted) observed gravid females carrying two eggs. Eggs were deposited on the undersides of overhanging boulders, sometimes in aggregations.

Elevation in m above sea level	**Upper limit:**	300	**Depth** in m below sea level	**Upper limit:**	
	Lower limit:	3		**Lower limit:**	

4e. Use and Trade

Provide a summary of any utilization of and/or trade in the taxon (at local, national and international levels). Please remember that the taxon may be utilized or be the focus of local, national or international trade, but if these activities are carried out sustainably they may not actually be a threat to the species; it is therefore useful to record whether this utilization/trade is a likely threat to the global population; this information helps to identify species that are important for human livelihoods, but which may be under threat from factors other than utilization or trade.

If unknown or there is no trade in the taxon, please state this.

Live individuals of the species have been offered for sale in Europe and the Russian Federation, while the international trade in C. *psychedelica* currently mainly occurs on internet platforms, where it is hardly to control (Ngo et al. submitted). Grismer et al. (2014) reported that reptile dealers were selling illegally collected individuals of *C. psychedelica* online in the Russian Federation for 3500 EUR/pair in December 2013. In June 2014, nine pairs of *C. psychedelica* were reported to be sold at the reptile trade fair "Terraristika" in Hamm, Germany, and further specimens were observed for 2000 EUR/ pair in November 2014 (own obs.). The online market price for live pairs was reported to reach up to 2500-3500 EUR (Altherr 2014). International online pet shops from Spain, Czech Republic and Germany are known to have offered *C. psychedelica* (Ziegler et al. 2015). From 2013 to 2015, a total of 21 different offers of *C. psychedelica* were noted. Ten of the online adverts (between 2 and 16 specimens) derived from Russia, three from Germany, three from Spain, one (10 specimens) from Czech Republic, and one (4 specimens) from the USA (Auliya et al. 2016). Nguyen et al. (2015) reported that there were insufficient data available to assess the sustainability of harvest on the species, but assumed that the species reproduction rate would limit its capacity to recover from harvesting. As the population is restricted in range, the species is considered "especially prone to extinction" and poaching is assumed to have a large impact on the ability of the species to survive (Nguyen et al. 2015, Auliya et al. 2016).

4f. Threats

Provide a summary of the major threats affecting, or likely to affect, the taxon. Try to indicate whether these threats are historic threats that caused past population declines, or current threats affecting the population now, and whether they are likely to affect the population in future.

Please record as much detail about the threats as possible, including the main cause of the threat (the driver), the threat itself, the scale of the threat (e.g., is most of the global population affected, or is the threat affecting only small parts of the population), and the stress this threat places on the taxon (e.g., habitat degradation, loss of breeding sites, loss of prey base, direct mortality, etc.).

Nguyen et al. (2015) reported that the illegal collection for the commercial trade is a major threat to the species because it has a low capacity to recover from over harvesting due to the small estimated population size and a low reproductive rate. The introduction of Long-tailed Macaques (*Macaca fascicularis*) to Hon Khoai island poses another putative threat to *C. psychedelica* as macaques were observed to feed on geckos and their eggs (Grismer et al. 2010, Ngo et al. submitted). In addition, road construction caused habitat destruction, erosions within adjacent forest and landscape fragmentation on Hon Khoai Island. Numerous granite formations, representing important habitat sites for *C. psychedelica* on Hon Khoai Island are blasted by dynamite in order to flatten several areas for further construction of roads or artificial ponds. The density of the species was lower at disturbed sites compared to the density in undisturbed forest, giving evidence for the negative impact of habitat degradation on *C. psychedelica*. The current habitat destruction in concert with the planned development of sites for ecotourism will prospectively interfere with the natural occurrence of *C. psychedelica*, which was found to flee hastily in response to the presence of humans (Ngo et al. submitted).

4g. Conservation Actions

Provide a summary of the conservation actions currently in place, and **realistic** actions needed to mitigate the major threats to the taxon (if any). This section should not be used to record a full "wish list" of conservation actions for the species; please try to restrict recommendations to those actions that could realistically be implemented and have a good chance of improving the status of the taxon.

To further enhance the protection status and control the international trade in the species, the inclusion of *C. psychedelica* in the Appendices of CITES and in additional national regulations are strongly recommended, since the species already gained high international demand rising the pressure on wild populations.

The forest on Hon Khoai is currently under the management of the Hon Khoai Forest Ranger Station. However, the establishment of a species conservation area on Hon Khoai Island will also be crucial to facilitate long-term habitat and species protection.

Ziegler and Nguyen (2015) reported about the buildup of a conservation breeding programme for *C. psychedelica* in southern Vietnam. First egg depositions already took place in the breeding facility and first succesful reproduction in captivity was recently reported by Ziegler et al. (2016).

5. DATA FOR RED LIST CRITERIA

Record the available data for population sizes, trends, decline rates, ranges, etc. to compare against the IUCN Red List Criteria thresholds.

For full IUCN definitions of "population size", "subpopulation", "mature individuals", "generation length", "reduction", "continuing decline", "extreme fluctuation", "severely fragmented", "extent of occurrence", "area of occupancy", "location", and "quantitative analysis", please refer to the current version of the *Guidelines for Using the IUCN Red List Categories and Criteria*.

5a. Data for criterion A: rate of population reduction

Generation length
(please state the unit used).

Unknown (age at maturity 3 years)

Time period used for criterion A (tick (✓) one box only)

10 years ☐

3 generations ☐   Time period ☐

Criteria A1 and A2:

% population size reduction over the last 10 yrs or 3 generations:

☐

Data quality:

Observed ☐
Estimated ☐
Inferred ☐
Suspected ☐

Are the causes of this reduction understood? (tick (✓) one box only)

Yes ☐
No ☐
Unknown ☐

Have the causes of the reduction now ceased? (tick (✓) one box only)

Yes ☐
No ☐
Unknown ☐

Is the reduction reversible? i.e., is the population now showing signs of recovery? (tick (✓) one box only)

Yes ☐
No ☐
Unknown ☐

Past population reduction rate based on (select any combination):

Direct observation ☐
Index of abundance ☐
Decline in area of occupancy, extent of occurrence, and/or habitat quality ☐
Actual or potential levels of exploitation ☐
Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites ☐

Criterion A3:

% population size reduction over the next 10 yrs or 3 generations (max. 100 years in future):

☐

Data quality:

Projected ☐
Suspected ☐

Future population reduction rate based on (select any combination):

Index of abundance ☐
Decline in area of occupancy, extent of occurrence, and/or habitat quality ☐
Actual or potential levels of exploitation ☐
Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites ☐

Criterion A4:

% population size reduction over the longer time period of 10 yrs or 3 generations, where some time falls in the past and some is projected in to the future (max. 100 yrs in future):

☐

Data quality:

Observed ☐
Estimated ☐
Inferred ☐
Projected ☐
Suspected ☐

Population reduction rate based on (select any combination):

Direct observation ☐
Index of abundance ☐
Decline in area of occupancy, extent of occurrence, and/or habitat quality ☐
Actual or potential levels of exploitation ☐
Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites ☐

5b. Data for criterion B: restricted range

Criterion B1: Extent of occurrence (EOO) in km²:	8	Criterion B2: Area of occupancy (AOO) in km²:	

Is the population severely fragmented? (tick (✓) one box only)	Yes	✓	If yes, justify this statement in the population text box (refer to habitat fragmentation AND the dispersal abilities of the taxon).	Number of locations:	2
	No				
	Unknown				

Extent of occurrence	Continuing decline	✓	Observed	✓
			Inferred	
			Projected	
	Extreme fluctuation			

Area of occupancy	Continuing decline		Observed	
			Inferred	
			Projected	
	Extreme fluctuation			

Area, extent and/or quality of habitat	Continuing decline	✓	Observed	✓
			Inferred	
			Projected	

Number of locations or subpopulations	Continuing decline		Observed	
			Inferred	
			Projected	
	Extreme fluctuation			

Number of mature individuals	Continuing decline		Observed	
			Inferred	
			Projected	
	Extreme fluctuation			

5c. Data for criterion C: small population size and continuing decline

Population size Number of mature individuals in the global population:	

Is there continuing decline in the population? (tick one box only)	Yes No Unknown ✓	**Rate of continuing decline known?** (tick one box only)	Yes No Unknown ✓

Estimated continuing decline % within 3 years or 1 generation (whichever is the longer time period; max. 100 years in future)**:**	
Estimated continuing decline % within 5 years or 2 generation (whichever is the longer time period; max. 100 years in future)**:**	
Estimated continuing decline % within 10 years or 3 generation (whichever is the longer time period; max. 100 years in future)**:**	

Number of mature individuals in largest subpopulation:		**% of mature individuals in largest subpopulation**	

Extreme fluctuations in number of mature individuals:	Yes	
	No	
	Unknown	✓

5d. Data for criterion D: small population size or restricted range

Population size Number of mature individuals in the global population:	507

Area of occupancy (AOO) in km²:	8	**Number of locations**:	2	**Is there a plausible threat that could rapidly push the taxon towards extinction?**	Yes ✓ No Unknown

5e. Data for criterion E: quantitative analysis

Has a quantitative analysis predicting probability of extinction been carried out? (e.g. Population Viability Analysis)	Yes	
	No	x
	Unknown	

Probability (%) of extinction within the next 10 years or 3 generations (use the longer time period; max. 100 years in future)

Probability (%) of extinction within the next 20 years or 5 generations (use the longer time period; max. 100 years in future)

Probability (%) of extinction within the next 100 years

6. RED LIST ASSESSMENT

Assess the taxon using the information and data recorded in section 4 and 5, and following the *IUCN Red List Categories and Criteria: version 3.1.* and current version of the *Guidelines for Using the IUCN Red List Categories and Criteria* for guidance on applying the IUCN criteria.

6a. Red List Category & Criteria

Tick (✔) one of the following Red List categories, For taxa qualifying for a threatened category (CR, EN or VU), record all criteria and subcriteria met. For the NT category, record all criteria and subcriteria nearly met:

☐	**Extinct (EX)**	Date last seen in wild (day/month/year)	
☐	**Extinct in the Wild (EW)**	Date last seen in wild (day/month/year)	
☐	**Critically Endangered (CR)**	Criteria met for CR	
X	**Endangered (EN)**	Criteria met for EN	B1a;bi,iii
☐	**Vulnerable (VU)**	Criteria met for VU	
☐	**Near Threatened (NT)**	Criteria nearly met for NT	
☐	**Least Concern (LC)**		
☐	**Data Deficient (DD)**		
☐	**Not Evaluated (NE)**		

Is this taxon Possibly Extinct? (applies to CR taxa only)

Yes	
No	x
Unknown	

6b. Rationale for the assessment

Provide a summary of the reasons why the taxon qualifies for the category and criteria recorded in section 6a. Include any population or range information used, inferences, assumptions, etc. For NT specify what criteria were nearly met and for DD state what little information is known. Please refer to the *IUCN Red List Categories and Criteria: version 3.1.* and the current version of the *Guidelines for Using the IUCN Red List Categories and Criteria* for guidance on definitions of terms and applying the IUCN criteria).

Listed as Endangered under Criterion B on the basis that this species occurs at severely fragmented locations on only two offshore islands in the Rach Gia Bay, Vietnam which certainly represents an extent of occurrence (excluding unsuitable habitat) below 5,000 km^2 and it is subject to a continuing decline in the extent and quality of its habitat due to various forms of habitat loss. In addition, the wild population of the species is also under threat due to the illegal pet trade, while the species gained increasing international interest among hobbyists.

Assessment Date:

DD	MM	YYYY
15	06	2016

Assessors' Names:

Given Name(s)	Family Name	Email Address	Institution
Truong Quang	Nguyen	nqt2@yahoo.com	Institute of Ecology and Biological Resources
Hai Ngoc	Ngo	ngohai2709@gmail.com	Vietnam National Museum for Nature
Thomas	Ziegler	ziegler@koelnerzoo.de	Cologne Zoo, University of Cologne
Mona	van Schingen	mschinge@smail.uni-koeln.de	University of Cologne, Cologne Zoo

6c. Changes in Red List status

Check the IUCN Red List web site (www.iucnredlist.org) to find out whether the taxon has previously been assessed.

Has this taxon been assessed for a previous IUCN Red List?

Yes

No — x

Unknown

If yes, what was the previous assessment?

If yes, has the taxon changed category since its last assessment?

Yes

No

If no, have the criteria changed?

Yes

No

Reason for change in category:

Genuine change

Recent change

Change since first assessment

Non-genuine change

New/better information available

Taxonomic change

Incorrect application of criteria previously

Criteria thresholds changed since previous assessment

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7. LITERATURE REFERENCES

Provide a list of all published and unpublished reference sources used for the information recorded above. Please provide full references, and try to avoid abbreviations (e.g., write *Conservation Biology* rather than *Cons. Biol.*).

Altherr S. (2014). Stolen Wildlife - Why the EU needs to tackle smuggling of nationally protected species. *Report by Pro Wildlife, Munich, Germany* 29: pp.

Auliya M., Altherr S., Ariano-Sanchez D., Baard E. H., Brown C., Cantu J-C., Gentile G., Gildenhuys P., Henningheim E., Hintzmann J., Kanari K., Krvavac M., Lttink M., Lippert J., Luiselli L., Nilson G., Nguyen T.Q., Nijman V., Parham J., Pasachnik S.A., Pedrono M., Rauhaus A., Rueda D., Sachnez M-E., Schepp U., van Schingen M., Scheeweiss N., Segniagbeto G.H., Shepherd C., Stoner S., Somaweera R., Sy E., Türkosan O., Vinke S., Vinke T., Vya R., Williamson S., Ziegler T. (2016). Trade in live reptiles and its impact on reptile diversity: the European pet market as a case study. *Biological Conservation*, accepted.

Grismer L.L., Ngo, T.V., Grismer, J.L. (2010). A colorful new species of insular rock gecko (*Cnemaspis* Strauch 1887) from southern Vietnam. *Zootaxa*, 58: 46–58.

Grismer L.L., Wood P.L., Anuar S., Riyanto A., Ahmad N., Muin M.A., Sumontha M., Grismer J.L., Onn C.K., Quah E.S.H. *et al.* (2014). Systematics and natural history of Southeast Asian Rock Geckos (genus *Cnemaspis* Strauch, 1887) with descriptions of eight new species from Malaysia, Thailand, and Indonesia. *Zootaxa*, 3880(1): 1–147.

Ngo H.N., Nguyen T.Q., Nguyen T. V., van Schingen M. and Ziegler T. (submitted). First assessment of the existing status of the Psychedelic Rock Gecko (*Cnemaspis psychedelica*). *Amphibian and Reptile Conservation.*

Nguyen T.Q., Ngo H.N., Pham C.T., van Schingen M., Nguyen K.V., Rauhaus A., Ziegler T. (2015). Population assessment, natural history and threat evaluation of the Psychedelic Rock Gecko (*Cnemaspis psychedelica*). Part I: trade analysis, literature survey, own data; October 2015. Unpublished report for the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Division Species Protection, Bonn, Germany and for the Species Programme, UNEP World Conservation Monitoring Centre, Cambridge, UK, 1–18.

Ziegler, T., Nguyen, T. Q. (2016): Aktuelle Projekte zur Erhaltung des Psychedelischen Felsengeckos (*Cnemaspis psychedelica*). ZGAP Mitteilungen, in press.

Ziegler T., Rauhaus A., Nguyen T.Q., Nguyen K.V. (2015). Aufbau einer Erhaltungszuchtanlage für Echsen in der Hon Me Station von Wildlife at Risk in Südvietnam. ZGAP Mitteilungen 31(1): 30-33.Ziegler T., Rauhaus A., Nguyen K.V., Nguyen T.Q. (2016). Building of a conservation breeding facility for the Psychedelic Rock Gecko (*Cnemaspis psychedelica*) in southern Vietnam. Der Zoologische Garten, doi:10.1016/j.zoolgart.2016.05.002

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Figure 1. Distribution map of *Cnemaspis psychedelica* in the Rach Gia Bay, southern Vietnam
(Need an EOO map of IUCN)