

# International Trade in the Blue Tree Monitor Lizard *Varanus macraei*

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**Abstract - Using Convention on International Trade in Endangered Species (CITES) trade statistics derived from the CITES Trade Database (UNEP World Conservation Monitoring Centre, Cambridge, UK), published literature and anecdotal information from the internet, the wildlife trade in *Varanus macraei* is described. The lizard is a high value pet commodity and although it is traded in relatively small numbers, virtually all trade appears to be of animals harvested directly from the wild population on Batanta Island, Indonesia. Export data suggests an extraction rate of over 6.6 individuals per km<sup>2</sup> over a decade, with a total value of between US \$1-2 million. Trade to some countries including Russia, Taiwan and Ukraine is underestimated or omitted by import data. Overall trade in the species is increasing and prices have remained high despite captive breeding events in Europe and the United States, with captive bred animals representing less than 1% of worldwide trade.**

## Introduction

*Varanus macraei* is a very attractive tree monitor species closely related to *V. prasinus*. It was formally described in 2001 from animals in the wildlife trade and named after a reptile dealer (Böhme & Jacobs, 2001). Trade in the species was first reported by the Convention on International Trade in Endangered Species (CITES) in 2003. The species appears to occur only on the Indonesian island of Batanta and some offshore islets, with a total area of less than 430 km<sup>2</sup>, but no data on the wild population of *V. macraei* exists. Two searches for the species over 2-4 days both caught single animals (Del Canto, 2013; Reisinger, 2014). Del Canto (2013) was told by a local guide that *V. macraei* had been extirpated from an (unidentified) offshore islet as a result of pet trade collection.

Previous analysis of the trade in *V. macraei* estimated 631 animals traded between 2003 and 2005, but relied exclusively on import reports from CITES comparative tabulations, on the basis that export data overestimates trade because it includes permits which were issued but may not have been used (Pernetta,

2009). However, discussions at the inaugural meeting of the IUCN Monitor Lizard Specialist Group in 2015 suggested that *V. macraei* was present in the wildlife trade of some countries for which no import data existed. The aim of this work is to summarize data on trade in the species up to 2012/2013 using CITES data and additional information available online.

## Methods

CITES comparative tabulations (downloaded 1 December 2015) were used for analyses, which include data from Indonesia up to 2012 and some other countries up to 2013. Annual numbers of transactions in *V. macraei* were calculated from CITES comparative tabulations, using each row as a single transaction. Matched transactions were rows that included figures from both exporting and importing countries. For data analysis, averages are expressed as mean + s.d.

To look at trends in retail prices of *V. macraei*, prices were taken from 32 for sale advertisements

from the USA posted on faunaclassifieds.com between 2003 and 2014 (A, Appendix 1). Four advertisements posted online from Europe between 28 November and 4 December 2015 were used to estimate current values (B-E, Appendix 1).

“Cursory internet searches” were performed using the Google search engine accessed from the United Kingdom, with data filtered according to date where appropriate. To look for evidence of the presence of *V. macraei* in countries that have not recorded imports, cursory searches on Google were performed using the terms “*Varanus macraei*” or “blue tree monitor” together with names of countries. Internet searches were conducted for a total of 100 minutes.

## Results

Seven countries have reported exports and 25 countries have reported imports of *V. macraei*. All transactions were of live animals, except a presumably erroneous entry recording export of two *V. macraei* leather products from Argentina to the United States (excluded from subsequent analyses). Of 165 records for *V. macraei*, three were declared as animals sourced from the wild (CITES code W), 49 as captive bred animals (code C) and 111 as farmed (code F). Two seized shipments (code I) were reported; a single animal exported from New Zealand to Indonesia (excluded from analysis) and five animals exported from Indonesia to the United States.

### *Trade from Indonesia*

Indonesia is the largest exporter of *V. macraei*. Between 2003 and 2012, Indonesia reported exports of 2,847 *V. macraei* to 22 countries. Between 2003 and 2013, 12 countries reported imports of 1,562 *V. macraei* from Indonesia (Figs. 1 & 2; Table 1). One country (South Africa) not included in Indonesian export records reported import of the species from Indonesia.

The number of countries reporting imports from Indonesia remained stable between 2006 and 2013 with a mean of  $6.5 \pm 1.07$  countries per year. The number of countries reported as importers by Indonesia increased between 2006 and 2012 with a mean of  $13.5 \pm 7.43$  per year.

The number of recorded transactions in *V. macraei* from Indonesia shows an upward trend from all sources (Fig. 3). An average of  $7.6 \pm 3.01$  transactions per year were recorded from 2003-2013 by importing countries and an average of  $10.8 \pm 5.16$  transactions per year by

Indonesia. The number of matched transactions showed no overall trend (Fig. 4), with an average of  $42.4 \pm 19.5$  % matched transactions per year.

Ten of 16 countries with recorded trade in less than 50 *V. macraei* did not report any imports of the species (Table 1). Indonesia reported export of 218 lizards to those countries up to 2012. South Africa reported import of six *V. macraei* from Indonesia in 2009, although Indonesia did not report any exports of the species to South Africa.

### *Exports of Varanus macraei from countries other than Indonesia*

Exports from countries other than Indonesia accounted for 34 animals in import reports and 61 animals in export reports (Table 2). Seventeen imported and 21 exported animals were not declared as being of Indonesian origin, representing 0.9% and 0.7% of total international trade.

### *Value of trade in V. macraei*

The average price per individual of animals offered for sale between 2003 and 2014 was US \$736  $\pm$  234 (range \$475-1500) (Fig. 14). Animals described as “juvenile” or “young” tended to be more expensive than animals described as adult. The dataset is too small to show clear trends but suggests that the price of the animals has remained more-or-less constant.

Advertisements posted online between 28 November and 4 December 2015 indicate a current average price of *V. macraei* in Europe of €930  $\pm$  128.8 (range €800-1,000), equivalent to approximately US \$1,087  $\pm$  141.3 (range \$878-1207).

### *Evidence of trade in V. macraei not recorded in import reports*

Records of *V. macraei* in countries that have not declared imports of the species are restricted to Taiwan (Shiau, 2006), Russia (Andreeva *et al.*, 2008) and the Philippines (Sy, 2015). Cursory internet searches found evidence of captive *V. macraei* in three additional countries (Denmark, Sweden and the Netherlands) that have not reported imports of the species (F-J Appendix). There is also evidence that *V. macraei* had been imported into the United Kingdom prior to 2009 and that by 2012 more than three specimens had been kept in the country (K, L Appendix 1). A zoo inventory suggests *V. macraei* is/has been maintained at 33 zoos in 12 countries

Table 1. Summary of trade in *Varanus macraei*.

Country	Importing Country						Indonesia						
	No. Transactions	Period	No. Animals	Average No. Animals per Transaction	No. Transactions	Period	No. Animals	Average No. Animals per Transaction	No. Transactions	Period	No. Animals	Average No. Animals per Transaction	Figure
United States	21	2003-2013	737	35 ± 27.7 (4-115)	12	2003-2012	1462	122 ± 59.0 (38-245)					5
Japan	13	2003-2013	183	14 ± 10.7 (1-37)	13	2003-2012	388	30 ± 19 (3-62)					6
Germany	11	2003-2014	102	9.3 ± 8.0 (1-27)	8	2005-2012	102	12.8 ± 8.3 (5-29)					7
France	10	2003-2013	305	30.5 ± 27.1 (2-82)	8	2003-2012	326	40.8 ± 18.9 (2-64)					8
Czech Republic	14	2003-2014	160	11.4 ± 8.1 (2-32)	7	2003-2012	119	17 ± 15.1 (4-45)					9
Taiwan	-	-	-	-	10	2003-2012	103	10.3 ± 5.9 (3-22)					10
Russia	0	2003-2012	0	-	8	2003-2012	43	5.4 ± 3.5 (2-13)					11
South Korea	5	2003-2013	41	8.2 ± 7.3 (1-20)	5	2003-2012	25	5 ± 3.7 (1-10)					12
Great Britain	1	2003-2013	3	-	5	2003-2012	27	5.4 ± 2.7 (3-10)					13
Switzerland	2	2003-2013	13	6.5 ± 0.7 (6-7)	1	2003-2012	6	-					-
Spain	3	2003-2013	12	4 ± 0.0 (4-4)	6	2003-2012	28	4.6 ± 2.7 (2-10)					-
Malaysia	3	2003-2014	7	2.3 ± 1.2 (1-3)	3	2003-2012	14	4.6 ± 1.5 (3-6)					-
United Arab Emirates	0	2003-2013	0	-	3	2003-2012	47	15.6 ± 12.5 (7-30)					14
Ukraine	0	2003-2010	0	-	2	2003-2012	40	20 ± 14.1 (10-30)					15
Austria	0	2003-2014	0	-	3	2003-2012	17	5.6 ± 2.9 (4-9)					-
Bahrain	-	-	-	-	1	2003-2012	10	-					-
Canada	0	2003-2011	0	-	4	2003-2012	17	4.3 ± 6.1 (1-7)					-
Georgia	0	2003-2014	0	-	1	2003-2012	3	-					-
Oman	0	2008-2012	0	-	1	2003-2012	10	-					-
Pakistan	0	2003-2014	0	-	2	2003-2012	16	8 ± 2.8 (6-10)					-
Slovakia	0	2003-2014	0	-	1	2003-2012	15	-					-
South Africa	1	2003-2012	6	-	0	2003-2012	0	-					-

Table 2. Trade data for *V. macraei* exported from countries other than Indonesia

Exporting Country	Import Quantity	Export Quantity	Importer Transactions	Exporter Transactions
Switzerland	8	16	2	2
Czech Republic	2	2	1	1
Germany	17	26	6	9
Sweden	0	2	0	1
United States	6	15	2	4

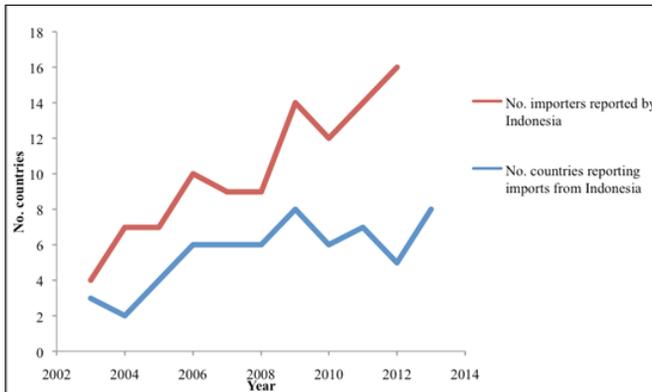


Fig. 1. Number of countries importing *Varanus macraei*.

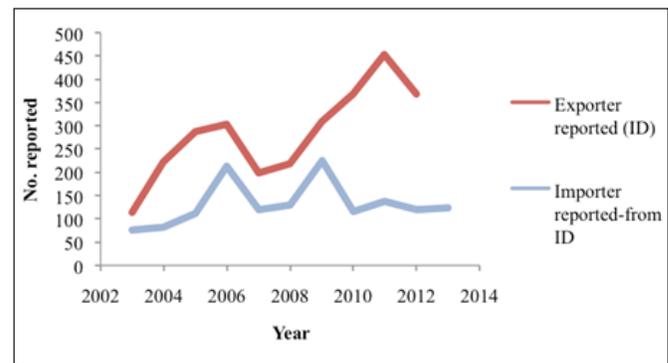


Fig. 2. Trade in *V. macraei* from Indonesia.

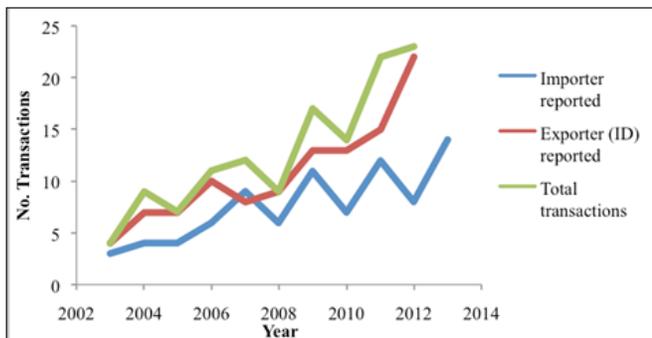


Fig. 3. Number of transactions in *V. macraei* from Indonesia.

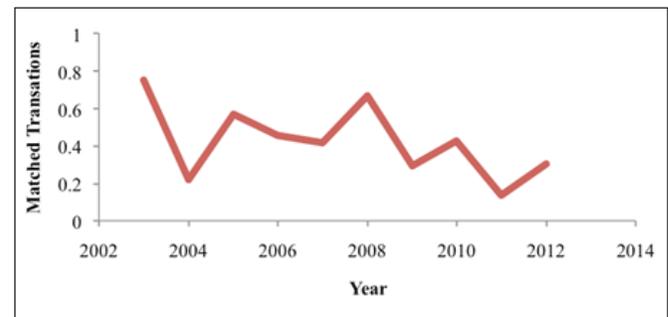


Fig. 4. Proportion of matched transactions in *V. macraei* from Indonesia.

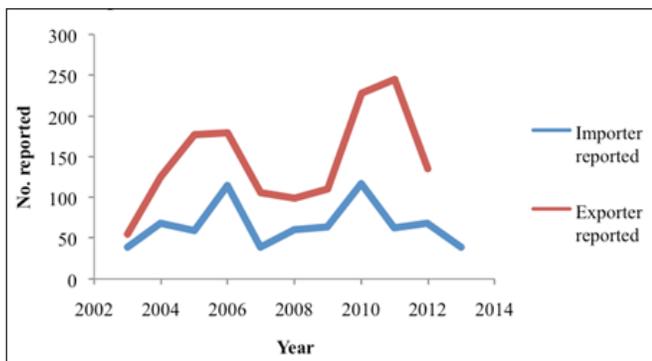


Fig. 5. Exports of *V. macraei* from Indonesia to the United States.

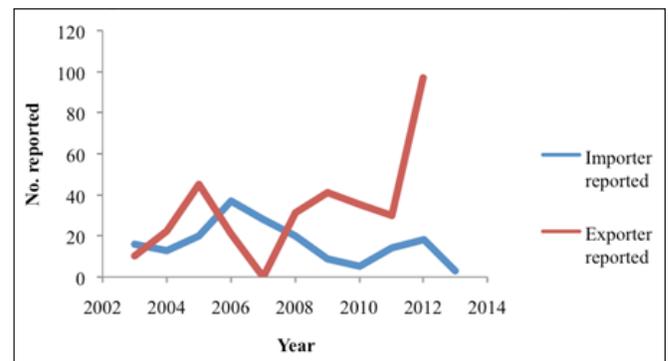


Fig. 6. Exports of *V. macraei* from Indonesia to Japan.

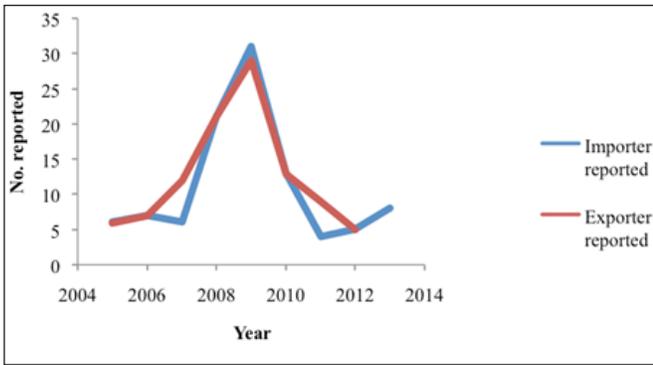


Fig. 7. Exports of *V. macraei* from Indonesia to Germany.

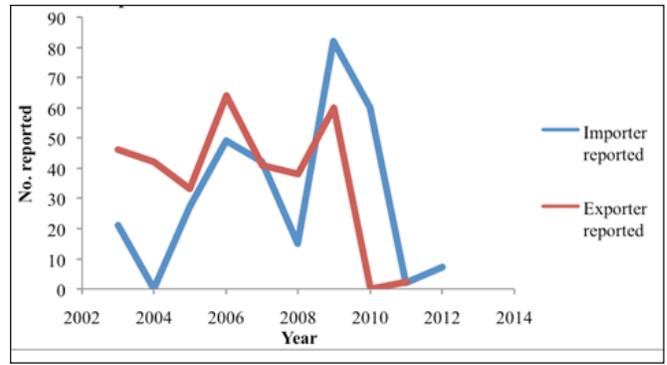


Fig. 8. Exports of *V. macraei* from Indonesia to France.

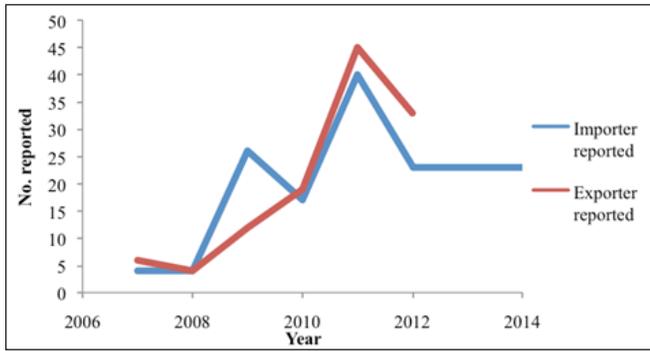


Fig. 9. Exports of *V. macraei* to the Czech Republic.

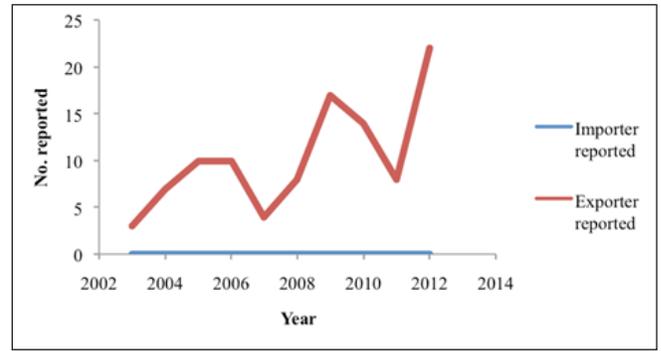


Fig. 10. Exports of *V. macraei* from Indonesia to Taiwan.

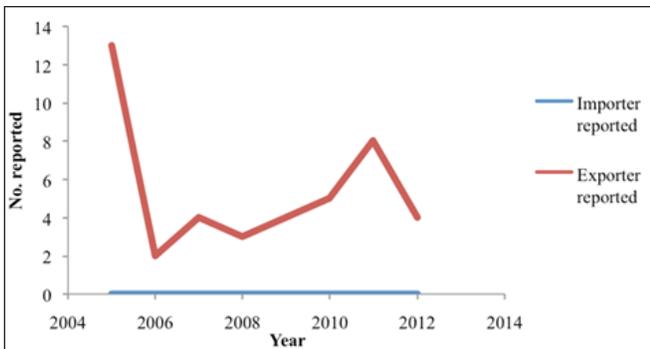


Fig. 11. Exports of *V. macraei* from Indonesia to Russia.

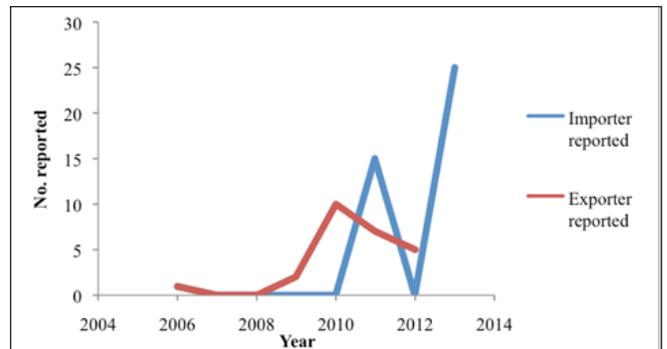


Fig. 12. Exports of *V. macraei* from Indonesia to Korea.

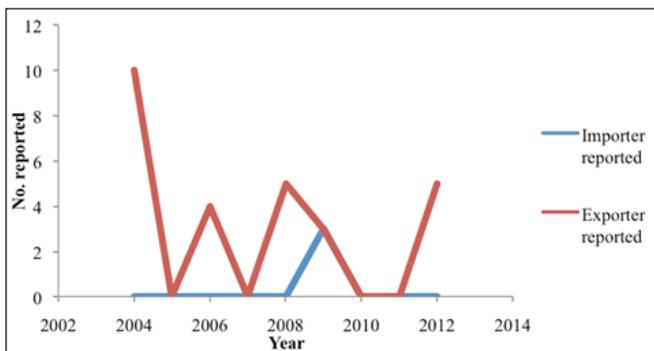


Fig. 13. Exports of *V. macraei* from Indonesia to the United Kindgom.

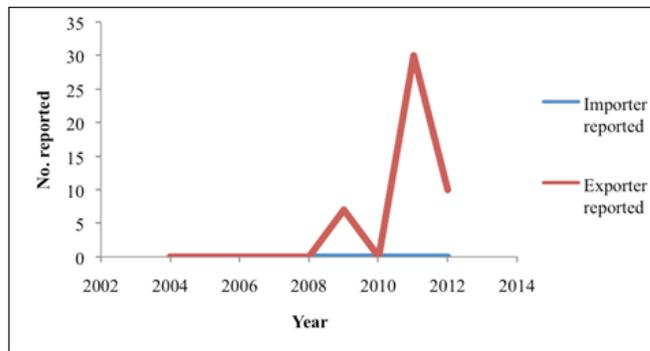


Fig. 14. Exports of *V. macraei* from Indonesia to the United Arab Emirates.

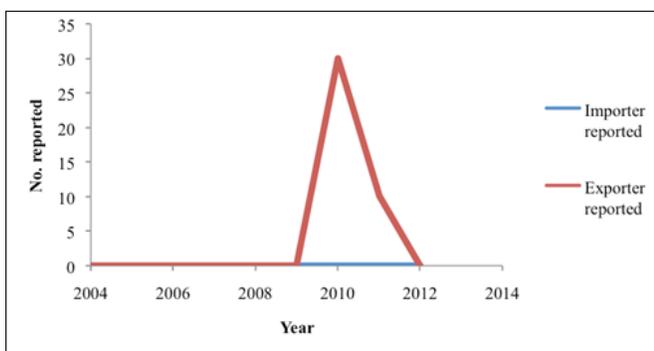


Fig. 15. Exports of *V. macraei* from Indonesia to the Ukraine.

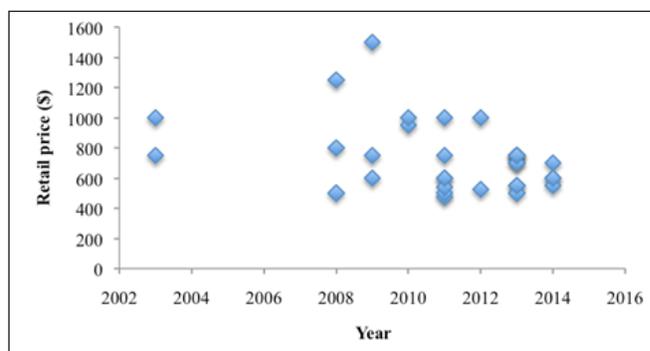


Fig. 16. Price of *V. macraei* in the United States.

including Denmark, Norway, Poland, Russia, Slovakia, Sweden and Ukraine (M). Evidence from social media also suggests a substantial domestic market for live *V. macraei* within Indonesia (N-P).

*Evidence of illegal trade in V. macraei*

There appears to be no systematic recording of seized animals not accompanied by CITES certification. Ziegler *et al.* (2009) reported on the confiscation of a sub-adult pair of *V. macraei* in the Czech Republic (2004) and another pair in Germany (2007). Hroudova (2004) reported a 2004 attempt to illegally import 112 specimens of reptiles including *V. macraei* into the Czech Republic. A cursory internet search revealed a 2011 seizure of *V. macraei* in Indonesia as part of a shipment in boxes belonging to a Russian national (Q).

**Discussion**

Trade in *V. macraei* between 2003 and 2005 was described by Pernetta (2009) based on import permits

alone. However, there is evidence of the occurrence of *V. macraei* in countries for which export reports exist but import reports do not. Thus export reports may identify countries where *V. macraei* are traded more accurately than import reports, and in at least some cases may provide more realistic estimates of trade volumes.

All countries for which export reports exist but import reports do not are signatories to CITES except Taiwan. Bahrain did not become a signatory until 2012. Although the Russian Federation has been a member since the country’s formation, no imports of live *Varanus* or products derived from of any varanid species have been reported, despite reported exports of 3,145 live animals and over 58,000 skins and leather products to the country since 2002. The lack of border controls between countries of the European Union means that all *Varanus* species listed under CITES Appendix 2 (“Annex B”) can be traded between EU states without CITES documentation, with the exception of suspensions in some populations including wild caught *V. beccarii* and *V. salvadorii* from Indonesia (European Union, 2015). The lack of a monitoring system within the EU means

that consumer countries cannot be identified.

Both importer- and exporter-reported figures suggest an increasing number of consumer countries and some increase in the overall volume of trade in *V. macraei*. Whilst importer-reported trade suggests minor increases in overall trade volumes since 2005, exporter reports suggest a more substantial increase. The increase is at least partly due to an increase in consumer countries in Asia, some of which fail to record imports of the animals.

There is substantial literature on the captive reproduction of *V. macraei* (e.g., Dedlmar, 2007; Jacobs, 2002; Mendyk, 2007; Moldovan, 2008; Zeigler *et al.*, 2009), and anecdotal online information indicates that the species is bred in captivity with F1 offspring traded internationally. Although it is possible that a small captive bred population of this species has been established, the available evidence suggests that captive reproduction in the species is mainly sporadic and claims of F2 and subsequent generations are rare (Rauhaus *et al.*, 2014). Perhaps most significantly, evidence of captive breeding exists only for animals maintained in Europe and North America, and reports of captive-bred, ranched or “farmed” animals from Indonesia remain unsubstantiated. Because of a lack of evidence of sustainable harvesting methods or captive breeding within Indonesia (Auliya, 2009; Lyons & Natusch, 2011; Natusch & Lyons, 2012; Nijman & Shepherd, 2010), it is likely that all animals originating from Indonesia are harvested from the wild and declared sources (codes C and F) are inaccurate. The importance (or otherwise) of the collection of gravid females in the trade cannot be estimated. The importance of pre-export mortality on overall levels of exploitation cannot be estimated, but is likely to be significant because monitor lizards of the *V. prasinus* group dehydrate easily, are considered more difficult to maintain in captivity than other species, and require specialized care (Mendyk, 2015; Zeigler *et al.*, 2009). Therefore, considerable mortality might be expected between capture and export.

Despite captive breeding efforts, the value of *V. macraei* in the wildlife trade has remained high (at least in Europe and the USA) and levels of trade in the species are demonstrably higher than are indicated by importer reports for some countries. Unless a method of distinguishing animals of captive-bred origin from stock harvested from the wild is introduced, the relative importance of captive bred animals in overall trade will remain difficult to assess.

*Varanus macraei* is a high value animal traded in relatively small quantities. The very small area

of occupancy of *V. macraei* (< 430 km<sup>2</sup>) indicates a harvesting rate of 3.6-6.6 individuals per km<sup>2</sup> through the species' range over about a decade. Using importer and exporter reports, and an average retail price of US \$736 per animal, the total value of declared international trade in *Varanus macraei* from Indonesia is estimated at US \$1.15-2.01 million, or US \$104,000-190,000 per year. In comparison, the total value of trade in *V. exanthematicus* since 2003 is estimated at over US \$10 million (assuming an average price of \$30 per animal, based on 342,654 declared imports).

In the absence of data on population size, and considerable uncertainty and concern over levels of exploitation, the status of *V. macraei* should be considered a very high priority subject for future research, and captive breeding of the species should be encouraged, documented and coordinated.

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#### Appendix: Internet URLs Cited in the Text

- A <http://www.faunaclassifieds.com/forums/archive/index.php/f-52.html>
- B [http://www.terrarium.com/tb/list\\_classifieds.php?split=20&ftsearch=varanus](http://www.terrarium.com/tb/list_classifieds.php?split=20&ftsearch=varanus)
- C [http://www.mendl.ji.cz/index.php?id\\_category=50&controller=category](http://www.mendl.ji.cz/index.php?id_category=50&controller=category)
- D <https://drive.google.com/file/d/0B0kJYCKDL1yAbTITNnBldTJHQW8/view>
- E [http://www.pythons-boas.de/main.php?sprache=english&id=3&link=Abzugeben&waran\\_id=87](http://www.pythons-boas.de/main.php?sprache=english&id=3&link=Abzugeben&waran_id=87)
- F <http://www.captivebredreptileforums.co.uk/monitors-big-small/11659-few-pics-my-monitors-here-denmark.html>
- G [http://www.terrarium.com/tb/list\\_classifieds.php?split=280&category\\_selection=2&type\\_selection=1](http://www.terrarium.com/tb/list_classifieds.php?split=280&category_selection=2&type_selection=1)
- H <http://repticzone.com/forums/Monitors/messages/648775.html>
- I <https://www.flickr.com/photos/72616463@N00/4225431145>
- J <http://www.reptileforums.co.uk/forums/lizards/788899-green-blue-yellow-tree-monitors.html>
- K <http://www.captivebredreptileforums.co.uk/monitors-big-small/15047-blue-tree-monitors.html>
- L <http://www.reptileforums.co.uk/forums/tags/varanus%20macraei.html>
- M <http://zooinstitutes.com/zoosrating/animal.asp?name=574>
- N <https://www.facebook.com/groups/varanuslovers/>
- O <https://www.facebook.com/groups/AbiezzartGroups/>
- P <https://www.facebook.com/groups/390352824366203/>
- Q [http://www.asean-wen.org/phocadownload/reports\\_publications/Action\\_Update\\_q4\\_2011.pdf](http://www.asean-wen.org/phocadownload/reports_publications/Action_Update_q4_2011.pdf)