Assessment of the Impacts of the Emerald Tree Monitor (*Varanus prasinus*) on the Environment

Consideration of an application under the Environment Protection and Biodiversity Conservation Act 1999 to amend the List of Specimens Taken to be Suitable for Live Import

August 2022

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Cataloguing data

This publication (and any material sourced from it) should be attributed as: DCCEEW 2022, *Assessment of the Impacts of Varanus prasinus (Emerald Tree Monitor) on the Environment*, Department of Climate Change, Energy, the Environment and Water, Canberra.

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Acknowledgement of Country

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.

Contents

Tables iv
Figures iv
Acronyms and abbreviations iv
Executive summary v
1. Introduction 6
1.1 Purpose of the proposed import 6
1.2 Background on the Act 6
2. Biology and Ecology 7
2.1 Taxonomy 7
2.2 Description 8
2.3 Geographic range 9
2.4 Diet 11
2.5 Reproductive biology 11
2.6 Environmental tolerances 12
2.7 Hybridisation 12
3. Species status and conservation 13
3.1 National status 13
3.2 Related Live Import List listings 13
3.3 Related threat category listings 13
3.4 Conservation status 13
4. Risk Assessment 16
4.1 Previous risk assessments(s) 16
4.2 Bomford Risk Assessment Model 16
4.3 Results 18
4.4 Consequences for the environment 19
4.5 Risk summary 22
5. Discussion 25
6. Conclusion 26
Appendix A: Summary of comments received on the proposal to include *Varanus prasinus* on the Live Import List 27
References 31

Tables

Table 1 Bomford Model results for V. prasinus 18
Table 2 Type and likelihood of impacts from the potential establishment of V. prasinus and the possible consequences 20
Table 3 Summary of risks and risk mitigation measures for V. prasinus 23
Table 4 Comments received during public consultation and response from applicant 27
Table 5 Comments received during consultation with from state, territory and Commonwealth government agencies 29

Figures

Figure 1 Geographical distribution of V. prasinus complex in New Guinea and Australia 7
Figure 2 From left to right; V. beccarii, V. reisingeri, V. prasinus and V. macraei 8
Figure 3 An adult emerald tree monitor (above) and juvenile (below) 9
Figure 4 Geographical distribution of V. prasinus in New Guinea and Australia 10
Figure 5 Distribution of V. prasinus in the Torres Strait Islands 10
Figure 6 Confirmed and unconfirmed occurrences of V. prasinus on the Torres Strait Islands and mainland Australia (Cape York Peninsula, Queensland) 11
Figure 7 Climate matching for V. prasinus 17
Figure 8 Proliferative stomatitis in a V. prasinus 19

Acronyms and abbreviations

asl – Above sea level
CABI – Centre of Agriculture and Biosciences International
CBD – Convention on Biological Diversity
CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora
DAF – Queensland Department of Agriculture and Fisheries
DCCEEW – Department of Climate Change, Energy, the Environment and Water
DES – Queensland Department of Environment and Science
EAA – Exhibited Animals Act 2015 (Queensland)
EIC – Environment and Invasives Committee
EICAT – Environmental Impact Classification for Alien Taxa
EPBC – Environment Protection and Biodiversity Conservation Act 1999
GISD – Global Invasive Species Database
ISC – Invasive Species Compendium
ISSG – Invasive Species Specialist Group
IUCN – International Union for Conservation of Nature
MAF – New Zealand Ministry of Agriculture and Fisheries, Biosecurity
NCA – Nature Conservation Act 1992 (Queensland)
SSC – Species Survival Commission
SVL – Snout to vent length
TL – Total [body] length
TSRA – Torres Strait Regional Authority
ZAA – Zoo and Aquarium Association of Australasia

Executive summary

An application was submitted to the Department of Agriculture, Water and the Environment (the department) to amend the Live Import List to include *Varanus prasinus* (emerald tree monitor). A report was prepared in accordance with s 303EE of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to evaluate the likelihood of establishment in Australia and the potential impacts and consequences on the Australian environment. Several factors were considered during the assessment, including, but not limited to, available scientific evidence, biological and ecological traits of the species, environmental conditions for establishment (current and potential distribution of the species), conservation status, and potential impacts in the event of establishment.

V. prasinus is a medium-sized, arboreal monitor lizard native to New Guinea and several islands in the Torres Strait. As such, *V. prasinus* is listed as a native species in Queensland, Australia (because it is endemic to the Torres Strait islands). Sightings of *V. prasinus* on the Australian mainland remain unverified or inconclusive.

V. prasinus is not established outside its geographic range and is not considered an invasive pest. It is listed on Appendix II of CITES and assessed as Least Concern on the IUCN Red List of Threatened Species. Queensland's *Nature Conservation (Animals) Regulation 2020* lists it as a protected species and classifies it as 'Near Threatened'.

In Queensland, it is legal to keep and breed *V. prasinus*. Currently, 5 licenced zoos or exhibitors have facilities approved for up to 104 specimens in addition to approximately 40 licenced private keepers.

Results from the Bomford model indicate that *V. prasinus* has a low likelihood of establishment and a low to medium risk rating if it were to become established on mainland Australia. Mitigation measures were devised and are expected to minimise the level of risk to low.

During consultation, 4 submissions were received from the public and 8 submissions were received from state governments and territories. Several concerns were raised, including

- whether *V. prasinus* is native and present in Queensland and is permitted to be kept and bred in captivity,
- the risk of imported *V. prasinus* specimens that may harbour disease(s) currently absent in Australia, such as varanid herpesvirus 1, that may negatively impact native varanids,
- the impact of importing *V. prasinus* specimens that may be illegally sourced from the wild (in Indonesia) and laundered through captive-breeding facilities with falsified documentation claiming their origin, and
- the possibility that listing may encourage illegal trade of this species into and within Australia.

Despite these concerns, the risk of *V. prasinus* establishing a viable wild population on the Australian mainland is low and the potential environmental impacts and consequences of this risk is also low. Other concerns may be mitigated with general procedures and protocols, i.e., quarantine, permitting, and licencing. Based on all available evidence and information, the department recommends listing *V. prasinus* on Part 2 of the *List of Specimens taken to be suitable for live import* (Live Import List).

1. Introduction

1.1 Purpose of the proposed import

The Dragon Training Mobile Zoo submitted an application to amend the Live Import List to include the emerald tree monitor (*Varanus prasinus*). The applicant wishes to import specimens for educational display and breeding purposes.

1.2 Background on the Act

Under s 303EC of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the responsible Minister may amend the List of Specimens Taken to be Suitable for Live Import (Live Import List) by, relevantly, including a specimen on the list. Section 303EB of the EPBC Act dictates two parts to the Live Import List:

Part 1 comprises specimens that can be imported without a permit under the EPBC Act. Part 1 must not include any organism listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and

Part 2 comprises specimens that require a permit under the EPBC Act to be imported. For each specimen included in Part 2 of the list there is to be a notation regarding whether the inclusion is subject to restrictions or conditions. Restrictions or conditions may relate to a quantitative limit, the circumstances of import, the source of the specimen or the circumstances in which it was taken. Additional conditions may also be applied when the permit for import is issued.

Before amending the Live Import List, the Minister must consult with appropriate state, territory and Commonwealth ministers and other persons, and consider a report assessing the potential environmental impacts of the proposed amendment (s 303EC of the EPBC Act). When submitting an application to the department to amend the Live Import List, all applicants are required to provide an accompanying draft assessment report that addresses specific terms of reference published on the department website.

The department undertakes an assessment of the potential environmental impacts of the proposed amendment using the information in the applicant's draft report and any other sources of relevant information. The department also considers comments and information received through the public consultation process (including states and territories). The application and accompanying draft report for the proposed import of the Emerald Tree Monitor (*Varanus prasinus*) was released for public comment between 4 November and 7 December 2020. This assessment report on the potential environmental impacts of listing the species was prepared in accordance with s 303EE of the EPBC Act. Under ss 303EC(5)(a) the Minister must consider this report before amending the list.

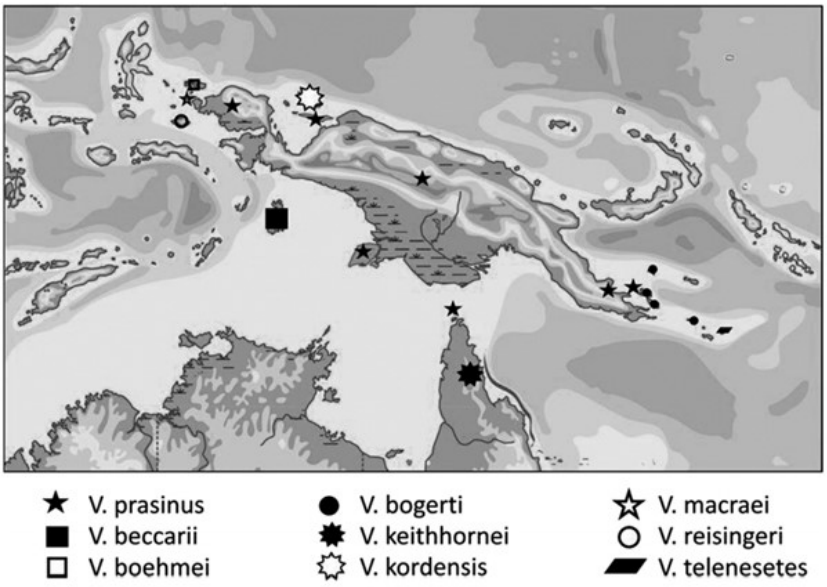
2. Biology and Ecology

2.1 Taxonomy

Varanus prasinus is a member of the *V. prasinus* complex; a group of closely related arboreal Indo-Australian monitors that are easily distinguishable by their distinctly elongated and prehensile tails (Zeigler et al. 2007; Eidenmüller et al. 2017). The complex includes *V. prasinus, V. beccarii, V. boehmei, V. bogerti, V. keithhornei, V. kordensis, V. macraei, V. reisingeri* and *V. telenesetes* (Jacobs 2003; Zeigler et al. 2007). Only *V. keithhornei* is found on the Australian mainland. *V. prasinus* is found widely on the island of New Guinea and some islands whilst the other members of the complex are only found in one or two locations on the islands surrounding the island of New Guinea (Figure 1). The other members are distinguishable by their starkly differing skin colours and patterns (Figure 2).

Kingdom:	Animalia
Phylum:	Chordata
Class:	Reptilia
Order:	Squamata
Family:	Varanidae
Genus:	Varanus
Subgenus:	Euprepiosaufus
Species:	*V. prasinus*
Scientific name:	*Varanus prasinus* (Schlegel, 1839)
Common name:	Emerald Tree Monitor, Emerald Monitor, Green Tree Monitor
Synonym:	*Varanus (Hapturosaurus) prasinus* (Bucklitsch et al. 2016)

Figure 1 Geographic distribution of V. prasinus complex in New Guinea and Australia



Source: Eidenmüller et al. 2017

Figure 2 From left to right: V. beccarii, V. reisingeri, V. prasinus and V. macraei



Source: Jessica Lyons

2.2 Description

V. prasinus is a brilliant green arboreal monitor lizard. Adults grow to approximately 30 cm snout to vent length (SVL) and have a long prehensile tail (Greene 1986; Greene 2004). They are a brilliant green colour with an average adult weight of 280 g (Figure 3). *V. prasinus* belongs to the *V. prasinus* species complex, a group of nine morphologically similar species which all exhibit similar arboreal habits (Koch et al. 2010). *V. prasinus* is an obligate rainforest species native to the island of New Guinea and several surrounding islands, and the Torres Strait islands. They are highly sought after for the pet trade (Janssen 2018). It is thought that the colouration provides camouflage in the rainforest canopy (Koch & Eidenmüller 2019). The species is difficult to find in the wild as it prefers thick vegetation and can be shy. Adults have been recorded to live an average of 14.4 years in captivity, with the oldest living 25 years (Mendyk 2014).

Little is known about the ecology and behaviour of *V. prasinus* in the wild, however, they are solitary (Pianka et al. 2004), and it is assumed they only congregate to mate (Greene 2004). Irwin (2004) reports on the behaviour and ecology of *V. prasinus* from the closely related *V. keithhornei* from north Queensland, Australia, and other members of the *V. prasinus* complex. The applicant states that *V. prasinus* are social reptiles living in small groups with a ratio of 1 male to several females, however, Mendyk (2011) recommends housing them in pairs with a ratio of 1 male to 1 female for successful keeping and breeding.

Figure 3 An adult V. prasinus (above) and juvenile (below)



Source: Gunther Schmida in Koch and Eidenmüller 2018 (above), Davies 2014 (below)

2.3 Geographic distribution

V. prasinus is distributed throughout mainland New Guinea and surrounding islands (Sorong, Manokwari, Fakfak, Yapen-Waropen, Mimika, Jayapura, Merauke), and the Torres Strait Islands, including Kirriri (Hammond), Muralag (Prince of Wales); Dauan (Cornwallis), Mabuiag (Mabuyag/Jervis), Mer (Murray), Moa (Mua/Banks), Boigu (Talbot), Badu (Mulgrave), and Saibai (Günther 1879; Loveridge 1934; Whittier & Moeller 1993; Wilson 1996; Philip & Philip 2004; Clarke 2004; Borsboom 2007; Ingram 2008; Schaffer 2010; TSRA 2013; Cogger 2018; Koch & Eidenmüller 2019; Shea et al. 2018; ALA 2022; Figures 5, 6). Lavery et al. (2012) questions the presence of this species on Mer. Koch & Eidenmüller (2019) discuss unconfirmed reports about sightings of large green lizards in rainforests in Cape York Peninsula, Australia, and the likelihood of *V. prasinus* existing on mainland Australia concluding that the evidence for this claim is inconclusive. The Torres Strait Regional Authority Land and Sea Management Unit (2013) stated that *V. prasinus* might also occur on Ugar (Stephens) Island, although verified reports were not yet available.

Figure 4 Geographic distribution of V. prasinus in New Guinea and Australia



Source: Shea et al. 2018

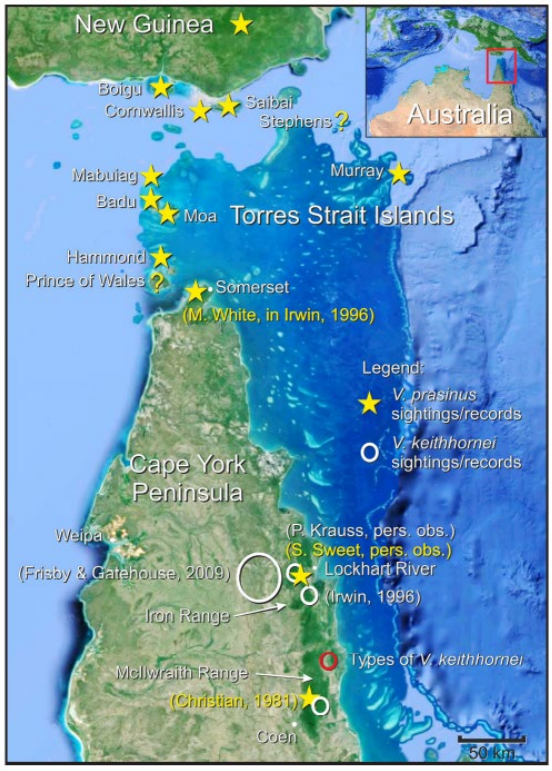
V. prasinus is arboreal and inhabits a variety of habitats including subtropical and tropical rainforest, mangrove swamps, bodies of water (swamps, rivers, lagoons), and modified habitats, such as cocoa plantations; preferring high humidity (an average of 70%) and dense vegetation up to 830 m asl (Greene 2004; Pattiselanno et al. 2007; Philip & Philip 2007; Shea et al. 2018). They exhibit a range of highly specialised behaviours related to foraging and prey capture (Hartdegen et al. 1999, 2000).

Figure 5 Distribution of V. prasinus in the Torres Strait Islands



Source: Modified from Stirling 2008

Figure 6 Confirmed and unconfirmed occurrences of V. prasinus on the Torres Strait Islands and mainland Australia (Cape York Peninsula, Queensland)



Source: Koch & Eidenmüller 2008

2.4 Diet

Studies examining stomach contents of *V. prasinus* have shown that this species is insectivorous (prey items include katydids, stick insects, cockroaches, beetles, spiders) and carnivorous (prey items include frogs, geckos, crabs, mammals *Melomys* spp., birds), and has been observed scavenging (Greene 1986; Pattiselanno et al. 2007; Philipp & Philipp 2007; Struck 2002; Shuter 2014). Captive specimens occasionally consume vegetable and fruit, but as they are unable to digest cellulose, these items are not thought to be part of their normal diet (Greene 1986; Losos & Greene 1988).

2.5 Reproductive biology

V. prasinus is oviparous and reach sexual maturity at approximately two years of age (Baldwin 2006; Mendyk 2012; Lemm 2014). Mating usually occurs in the wetter months of the year, from November to April (Pianka et al. 2004). In the wild, clutches are thought to be deposited in tree hollows and burrows in termite mounds that have been dug by females; it is hypothesised that these environments provide constant temperature (approximately 29^0C) and humidity (70% or higher) in addition to protection from predators (Greene 1986; Andrews et al. 2017). Several other varanid species are also known to nest in termite mounds, and at least two, *V. panoptes* and *V. gouldii*, excavate deep (3 m or more in depth) complex warrens with helical tunnels that are used for nesting by several females (Doody et al. 2014; 2015). Clutches are laid 4 to 8 weeks after mating, with up to 4 clutches produced a year (Nijman & Shepherd, 2009; Mendyk 2011). In captivity, *V. prasinus* lay clutches of up to 7 eggs that hatch within 166 to 205 days (Jacobs 2004; Nijman & Shepherd 2009). Mendyk (2011) reports the shortest interval between successive clutches is 68 days. Compared to other squamates, varanids have a prolonged incubation length primarily as an adaptation to

maximize hatchling fitness (Andrews et al. 2017). *V. prasinus* is thought to be capable of parthenogenesis (Grabbe & Koch 2014).

2.6 Environmental tolerances

V. prasinus are found within a small climatic range but have been successfully bred in zoos and by private keepers in the USA and Europe. In the wild they are found in tropical monsoon forests, mangrove swamps, lagoons, cocoa plantations, rainforests and palm stands (Shea et al. 2018). Although not recorded, it is thought that *V. prasinus* is predated by larger birds, dasyurids (carnivorous marsupials such as quolls), rodents, snakes, larger lizards, cats, dingos and dogs.

2.7 Hybridisation

Hybridisation occurs when two individuals from separate species reproduce to form offspring (hybrids). Members of the *V. prasinus* complex are considered allopatric and no successful interbreeding has been recorded between different members of the complex (Greene 2004).

3. Species status and conservation

3.1 National status

V. prasinus is not on the Live import list and is only permitted to be kept in Queensland. The Queensland Department of Environment and Science (DES) and the Queensland Department of Agriculture and Fisheries (DAF) regulate the keeping and trade of captive native species through the *Nature Conservation Act 1992* (NCA) and the *Exhibited Animals Act 2015* (EAA).

V. prasinus is well established in captivity in Queensland. Currently, there are:

- 5 Licensed zoos/exhibits under the EAA; zoos or exhibitors that have breeding provisions and are approved to hold up to 104 individuals (5 - 42/facility, *maximum permitted quantities).
- Approximately 40 licenced private keepers of a Class 2 animal under the NCA (recreational licensees).

Provided an authority holder is authorised to hold the species there are no limitations for transfer or trade of the species to another authority or licensing scheme (e.g., from exhibition licence holder to another licence holder under the NCA or movement into or out of state). *V. prasinus* is on a 'watch list' in Queensland for specific monitoring of breeding success and trade to reduce any potential for illegal trafficking and laundering of wild specimens.

3.2 Related Live Import List listings

Approximately 276 native species of varanid are currently held in Australian zoos for breeding purposes (ZAA 2022). Two similar species are listed on Part 2 of the Live Import List: the peach throat monitor (*V. jobiensis*) and Komodo dragon (*V. komodoensis*). Import conditions for these species are for 'eligible non-commercial purposes only, excluding household pets.' The Global Invasive Species Database (GISD 2022) does not record these species forming feral populations or having any detrimental environmental impacts anywhere in the world.

V. prasinus is not considered a pest in its natural range (Shea et al. 2018). *V. prasinus* is not included in the Australian List of Threat Categories of Non-indigenous Vertebrates (EIC 2021), however, two other species of varanid are on this list: the savannah monitor (also known as Bosc's monitor, *V. exanthematicus*) and *V. komodoensis*. Both have been listed in the Extreme (P) threat category (EIC 2021). This threat category specifies that *'… animals should not be allowed to enter, nor be kept in any State or Territory unless sufficient risk management measures exist to reduce the potential risks to an acceptable level… If a species has not been assessed or if there is too little information to be able to properly adopt a risk analysis approach, the precautionary approach will be adopted*'.

3.3 Related threat category listings

V. prasinus is not considered invasive or a pest.

3.4 Conservation status

3.4.1 IUCN Red List of Threatened Species

V. prasinus was assessed in 2017 as Least Concern by Shea et al. (2018). This listing assessment was justified due to its broad distribution on the island of New Guinea, its presence in a wide variety of habitats, and not being affected by any significant threats (Shea et al. 2018).

3.4.2 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

V. prasinus is listed on Appendix II of CITES (CITES 2022). International trade in specimens of Appendix-II species may be authorised by the granting of an export permit or re-export certificate. Australia implements stricter import measure than CITES and requires an import permit prior to specimens being imported. As *V. prasinus* is CITES-listed, it can only be included in Part 2 of the Live Import List (ss 303EB(5) of the EPBC Act).

3.4.3 Conservation of Migratory Species of Wild Animals (CMS)

V. prasinus is not listed on the CMS.

3.4.4 Queensland's Nature Conservation Act 1992 (NCA) and Nature Conservation (Animals) Regulation 2020

DES administers the NCA and subordinate legislation*, (Nature Conservation (Animals) Regulation 2020)*, that lists *V. prasinus* as a protected species and classifies it as 'Near Threatened'. Any species classified as 'Near Threatened' is deemed a component of Queensland's biodiversity and a vital feature of the ecosystem in which the animal lives. This species is considered of inherent value and potential importance for the maintenance of ecosystem processes and a source of genetic information integral to understanding the evolution of Australian biota. Management intent for this species in Queensland (in the Torres Strait Islands) includes monitoring and reviewing the conservation status of the animal and its habitat and to put into effect strategies to address any threats.

3.4.5 Threat(s) and other considerations

V. prasinus is traded internationally for the live pet trade. Indonesia is major exporter, as it is native to the island of New Guinea. It is suspected that a large portion of captive-bred specimens are sourced from the wild (Nijman & Shepherd 2009; Lyons & Natusch 2011; Crook et al. 2016).

If the Live Import List were amended to allow the import of *V. prasinus*, adherence to import restrictions and conditions is required, in addition to obtaining all relevant permits and licences to keep this species. Imports would also be subject to approval by the department under the *Biosecurity Act 2015*. It should be noted that imported specimen(s) may be potentially sourced illegally from the wild (in Indonesia) and laundered through captive-breeding facilities with falsified documentation claiming their origin as captive-bred (see the growing body of literature that suggests wild specimens are likely to be laundered to circumvent trade restrictions (such as only captive-bred specimens may be exported, etc.); Lyons & Natusch 2011; Koch et al. 2013; Bennett 2015; Janssen 2018; Janssen & Chng 2018; Jimenez-Bustamante & Rentería 2018). It is assumed that only a small number of specimens are being removed from the wild population and that this level of trade would not be detrimental the wild population.

3.4.6 Confiscation(s) and seizure(s)

Illegal trade and smuggling have been recorded for this species:

- IUCN (2005) report 50 *V. prasinus* were seized by Customs at Zagreb Airport, Croatia.
- Derraik & Phillips (2010) report the seizure of 2 *V. prasinus* that were illegally smuggled into New Zealand.
- TRAFFIC (2011) report 7 *V. prasinus* seized in Jakarta, Indonesia; between 1989 and 2018.

- In 2016 and 2017, attempts were made to illegally import similar species of varanids, including the blue tailed monitor (*V. doreanus*), the mangrove monitor (*V. indicus*), and the black tree monitor (*V. beccarii*) from Indonesia.
- In 2018, an Australian man was found guilty of importing *V. prasinus* and several other reptiles (including varanids) from Indonesia (DAWE 2022). He was sentenced to 23 months of imprisonment, suspended immediately on a condition imposed by the court for him to remain on good behaviour for the period of the sentence.
- Sy & Lorenzo II (2020) report 41 confiscated or seized *V. prasinus* from the Philippines.

4. Risk Assessment

4.1 Previous risk assessments(s)

There are no known previous risk assessment(s) undertaken for *V. prasinus*.

4.2 Bomford Risk Assessment Model

The likelihood of *V. prasinus* establishing in mainland Australia was assessed using the Bomford (2008) Risk Model in accordance with the 4 key factors of establishment success:

- Number of releases and propagule pressure: the release of large numbers of animals at different times and places enhances the chance of successful establishment,
- Climate match: introduction to an area with a climate that closely matches that of the species' original range,
- History of establishment of exotic populations elsewhere: previous successful establishment, and
- Taxonomic group: belonging to a family or genus which has a high establishment success rate.

All available information related to the above factors were incorporated for *V. prasinus* to estimate the potential impacts of the establishment of feral population(s) on mainland Australia. The specific risks for estimating the probability of establishment for propagule pressure, climate matching, and likelihood and impacts of potential releases are discussed below.

4.2.1 Number of releases and propagule pressure

All varanids are considered capable of facultative parthenogenesis (Grabbe & Koch 2014). *V. prasinus* can lay up to 4 clutches annually of approximately 5-7 eggs (Mendyk 2012). Husbandry techniques for *V. prasinus* have improved considerably and lead to greater captive breeding success, with many captive-bred specimens produced globally (Mendyk 2012). Even within Australia, captive breeding of *V. prasinus* is not difficult if the appropriate environmental and other conditions are available.

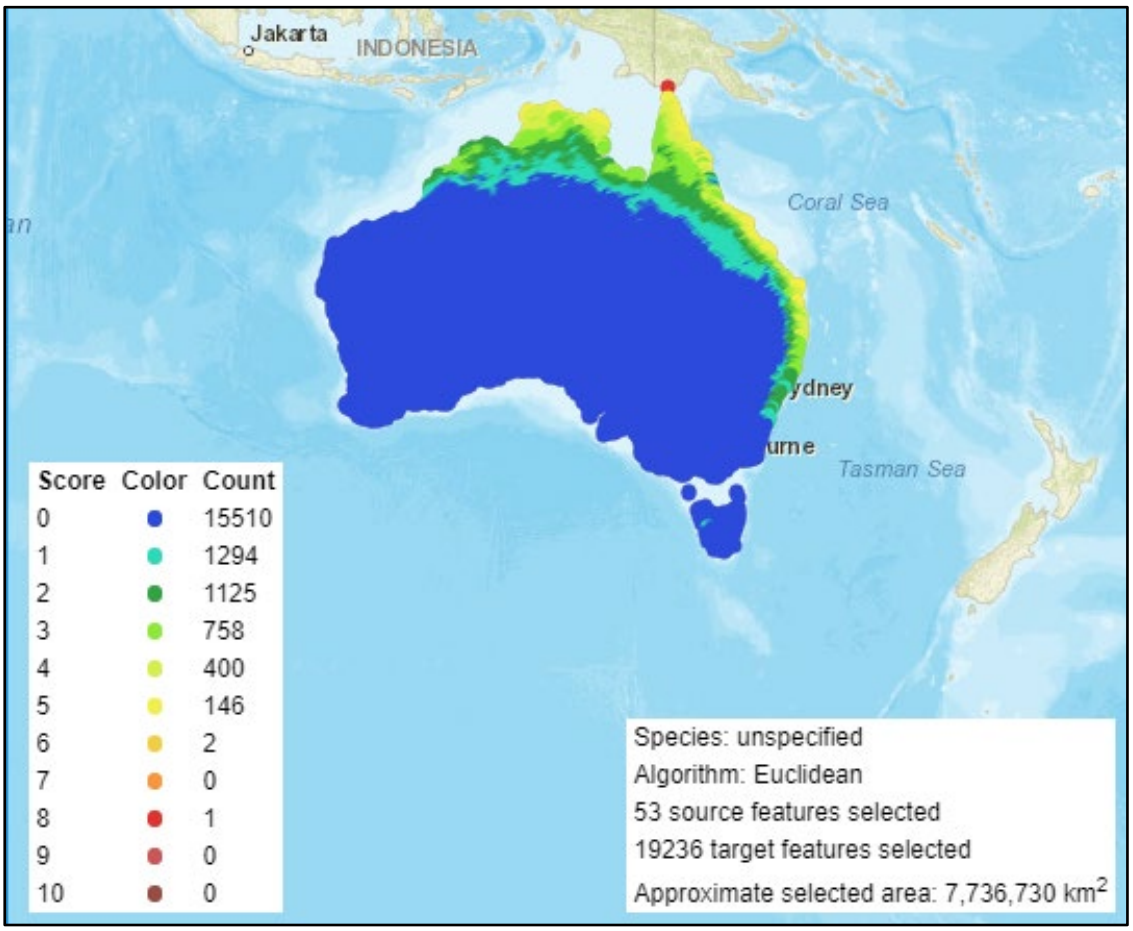
V. prasinus is a CITES-listed Appendix II species, and therefore would be restricted to Part 2 of the Live Import List. This means it could only be imported into appropriately licenced zoos, wildlife parks, and research facilities. There is a low probability of specimens escaping, being stolen, or released into the wild to establish a viable breeding population due to the small numbers likely to be imported. *V. prasinus* have been kept for several years by private keepers under special licence in Queensland with no reports of specimens becoming established, or sighted, in the wild. The establishment of a viable wild population of *V. prasinus* on mainland Australia is unlikely.

4.2.2 Climate match

Climatch v2.0 (ABARES 2021) implements the CLIMATE algorithm to predict a species' distribution using climatic variables from the species' current distribution (source) to other regions in Australia (target; see ABARES 2021). This generates a map of the area with a climate that closely matches the range of *V. prasinus*. Predictions are presented in Figure 7. The higher the score (e.g., 10), the closer the match of climates between the source and target. The values for the six highest match classes (i.e., the scores for match levels 10, 9, 8, 7) are summed to = 'Value X' Value X is converted to a climate match score (1–8) provided by Bomford (2008).

Distribution data from IUCN (2022) and Koch & Eidenmüller (2019) was used to generate a Climatch map for V. prasinus. *V. prasinus* inhabits a relatively narrow climate range. It is found in tropical monsoon forests, mangrove swamps, lagoons, cocoa plantations, rainforests and palms in areas that have an average of 70% humidity and up to 830 m asl (Shea et al. 2018). Results indicate a very low climate match for the majority of mainland Australia (Figure 7). Only the Torres Strait Islands and parts of Cape York Peninsula in far north Queensland may provide suitable habitat for *V. prasinus*. On the mainland, the Kutini-Payamu (Iron) and Kulla (McIlwraith) ranges near Coen and a mangrove inlet near Bowen are considered suitable habitat. Kutini-Payamu and Kulla ranges are the locations where the only mainland Australian member of the *V. prasinus* complex, *V. keithhornei*, is found. Mangrove swamps exist along the Queensland east coast and may provide small pockets of potentially suitable habitat. In captivity, *V. prasinus* does not usually reproduce in environments where humidity falls below 70% or the temperature below 24°C.

Figure 7 Climate map for V. prasinus



Source: Climatch

4.2.3 History of establishment elsewhere

V. prasinus has not been recorded as successfully establishing outside its natural geographic range despite being kept and bred in zoos and by private individuals in the USA, and other countries. A exotic risk rank score of 0 (never introduced) is given where there are no recorded introductions, although a precautionary approach may warrant a higher risk score (Bomford 2008).

4.2.4 Taxonomic group and history of invasiveness

GISD lists 2 species of the Varanidae family as being invasive; the mangrove monitor (*V. indicus*) and the Nile monitor (*V. niloticus*; GISD 2022). Neither of these species is on the Live Import List**.**

V. indicus is a small (~1.2 m TL) arboreal monitor found in mangroves, forests, swamps and rainforests (Cogger 2018). It is an opportunistic carnivore that feeds on eggs (mainly from reptiles and birds but also turtles), molluscs, rodents, insects, crabs, smaller lizards, fish, and carrion. It is native to Palau Islands; however, it is also present in Northern Australia, Solomon Islands, New Ireland, Guam and Micronesia (CABI 2022). It was introduced to Micronesia as a biological control for ants (on Kosrae) and rats (on Pohpnpei; Schreiner 1989). It is considered a serious pest with little potential for successful control (King & Green 1999; GISD 2022).

V. niloticus is a large (~2.4 m TL) semi-aquatic monitor native to sub-Saharan Africa that has established 3 invasive breeding populations in Florida, USA (Luxmore et al. 1988; Wood et al. 2016). Wood et al. (2016) hypothesised that specimens were intentionally released from captivity (either by reptile breeders and keepers or zoos) once they grew too large or became aggressive, or escaped, potentially during extreme weather events (i.e., hurricanes, flooding). *V. niloticus* is a threat to local biodiversity as it is highly mobile, capable of reaching sexual maturity at 2 years of age, has clutches of up to 60 eggs, and achieves high densities (de Buffrénil 1992; de Buffrénil & Rimblot-Baly 1999).

V. niloticus and *V. indicus* have the biological and ecological characteristics to be of concern and establish as invasive species, given ideal conditions. *V. prasinus*, however, does not exhibit these same characteristics, occurring in specific and limited distribution and producing small clutch sizes and numbers of offspring.

4.3 Results

Results from the Bomford Model (2008) concludes a low establishment risk for *V. prasinus* despite some other varanid species having established exotic populations (Table 1; Bomford 2008). This is largely due to *V. prasinus* not having similar biological and ecological traits, in addition to being kept and bred in captivity in Australia for more than 10 years without having established any known exotic population(s). This risk assessment and its results should be evaluated with additional information and data when it becomes available.

Table 1 Bomford Model results for V. prasinus

Score	Value	Explanation
Climate match risk	1	Climatic matching from native and introduced range using temperature and rainfall from 19,236 sites. Matches to Australian sites are categorised into 10 classes. Only 1 site was found in classes 7-10.
Exotic elsewhere risk	0	*V. prasinus* does not have established exotic population(s).
Taxonomic family risk	15	Varanidae, high risk. Please note this score is based on raw frequencies. It does not account for other variables, or interactions with them, that are likely to affect the risk of establishment.
Establishment risk	16	Low

4.4 Consequences for the environment

The magnitude and type of impacts by alien taxa vary greatly among ecosystems, and many of these impacts only become obvious or influential after the onset of invasion (IUCN 2020). Moreover, many impacts remain or are difficult to redress even if the alien taxa of concern are removed or controlled (IUCN 2020).

There are several factors that indicate if a species is likely to impact the Australian environment. These include, but are not limited to, its potential impact(s) as a predator, competition with native species, and impact(s) as a disease vector. These and additional impact considerations are detailed in Table 2.

V. prasinus is a slender monitor that weighs approximately 280 g when fully grown. In the wild, it consumes insects and small mammals and birds. It would more than likely locate similar viable food sources in Australia if it were to establish on the mainland. *V. prasinus* could potentially compete for food and other resources, such as habitat niches (tree hollows, etc) with other lizards, snakes, small mammals and birds.

V. prasinus are not considered a threat to humans, however, they do have sharp claws and teeth that are capable of superficial damage to the skin by scratching and biting. With the propensity to keep reptiles as pets globally, zoonotic disease transfer to humans continues to pose a potential risk to the public and environment. Novel parasites, such as ticks (González-Acunã et al. 2005), any zoonoses they may be carrying (Pernetta 2009), and pathogens such as *Salmonella* species, Crimean-Congo haemorrhagic fever virus, eastern equine encephalitis virus and western equine encephalitis virus have been recorded in other imported reptile species (van Roon et al. 2019; Masila et al. 2020). Wellehan et al. (2005) first reported a herpesvirus associated disease in varanids; presence of a proliferative stomatitis in captive *V. prasinus* (Figure 8). There is insufficient evidence to evaluate if *V. prasinus* may harbour parasites, or are a vector for other pathogens of environmental, zoonotic, or veterinary importance.

Biosecurity requirements for animals imported into Australia and quarantine protocols are intended to minimise this potential risk. The current Australian biosecurity import conditions for reptiles (excluding crocodilians) for zoological purposes include certification requirements, health assessments, treatments, pre-export and post-arrival quarantine periods, and disease freedoms in the premises of origin and export (BICON 2022).

Figure 8 Proliferative stomatitis in a V. prasinus



Source: Wellehan et al. 2005

The New Zealand Ministry of Agriculture and Fisheries (MAF) Biosecurity import risk analysis (2008) for specified members of the order Squamata from government approved zoological collections in Australia states that "… *Although classification of herpesviruses from lizards (and, more broadly, reptiles) is not complete, all authors have suggested that they fall within the Alphaherpesvirinae. Taxonomic studies have identified those viruses evaluated (Gerrhosaurid HV1, 2, and 3, Iguanid HV2, and Varanid HV1) as within an evolutionary branch separate from those of avian and mammalian alphaherpesviruses and suggest that they may have evolved with their hosts over 200 – 400 million years. This is consistent with the apparent close host-virus relationship of most herpesviruses with their hosts that contributes to pathogenicity being expressed only rarely*." Based on this information, risks associated with efficacy of available quarantine and diagnostic capability for reptiles must be considered when importing, regardless of their origin.

Australia has an interim policy in place to manage the import of live reptiles (for exhibition purposes); this includes the import condition that 'the exporting government must certify, that … no disease due to herpesvirus has been diagnosed in reptiles of the same family as the reptiles being exported, at the premises of origin, during the 12 months prior to certification.' The import conditions also require 90-day pre-export quarantine and 90-day post-arrival quarantine, with reptiles only being eligible for import from a registered/licensed zoo/aquarium into a zoo/wildlife park approved under state or territory legislation to hold the species being imported. From the interim policy, information on herpesvirus indicates other variants have been reported in snakes and lizards as primary pathogens but diseases due to these agents have not been reported in Australian reptiles.

Reptile breeders and keepers may be at risk when feeding *V. prasinus*, as scratches and bites may become infected by septicaemia, induced by group B streptococci of serotype V (Hetzel et al. 2003). Wellehan et al. (2005) detected the first report of a herpesvirus in varanids; with the presence of a proliferative stomatitis in captive *V. prasinus* (Figure 8). However, Okoh et al. (2021) provides further information on the current published knowledge of the taxonomy, pathogenesis, pathology, and epidemiology of reptilian herpesviruses.

Derraik & Phillips (2010) report two illegally smuggled *V. prasinus* into New Zealand were infected with a protozoan (*Hepatozoon* sp.) and that this parasite could pose a threat to other reptile species.

It is not within the remit of this report to assess disease risk; that assessment will be conducted under the *Biosecurity Act 2015* as part of the biosecurity application process, if the species is listed.

Table 2 Type and likelihood of impacts from the potential establishment of V. prasinus and the possible consequences

Type of impact	Sub-categories	Significance	Assessment	Rating
Competition for resources - direct (interference competition) or indirect (depletion of shared resources)	• Chemical or other inhibition • Higher fecundity • More rapid development than similar species • Direct competition for food, shelter, thermoregulating and resting places	Potential to be highly detrimental.	*V. prasinus* would compete for food and other small animal resources such as tree hollows with other lizards, snakes, small mammals, and birds.	High, with unknown consequences.
Predation	• Direct predation of other species • Direct attacks	Potential to be highly detrimental.	Predation of invertebrates, small	High, with unknown consequences.

Type of impact	Sub-categories	Significance	Assessment	Rating
			vertebrates as this is their diet.	
Habitat and ecological community impacts	• Community impacts of predation. e.g., links between consumption of canopy arthropods and herbivore damage of new leaves. • Provide prey for exotic predators • Provide prey for native predators. e.g., snakes • Habitat alterations • Indirectly facilitate survival of other exotic species • Changes to community dynamics. e.g., invertebrate composition may change through consumption.	Potential to have detrimental effects on recipient ecosystems.	Rainforest canopy consumption of invertebrates could change community dynamics	Moderate, with unknown consequences.
Potential to cause injuries to other species	• Venomous or toxic bite • Poisonous skin glands • Organs and/or body size capable of causing physical injury (e.g., biting, crushing)	Variable. Reptiles and amphibians that cause poisoning and/or physical injuries elsewhere in their range may be expected to have similar effects.	Does not have a venomous or toxic bite. Injury to other species most likely during predation.	Insignificant / Minor.
Role as disease carriers and reservoirs	• Pathogens • Parasites	Species that harbour or transmit diseases or parasites elsewhere may transmit the same or similar diseases or parasites if these are present.	Varanids can carry ticks and host pathogens. Import requirements will minimise the overseas pathogens and parasite introduction risk. Could spread local pathogens and parasites obtained from the environment.	Likely to move local pathogens and parasites. Minor consequence. Unlikely / Remote likelihood of introducing an exotic pathogen or parasite. Consequence could be minor to major.
Hybridisation with native species and other genetic changes		Hybridisation may occur and corrupt the gene pool.	A similar species, *V. keithornei* is part of the species complex and is present on Cape York.	Unlikely / Remote.
History of impact overseas		Descriptive information on the impacts of previous invasions may provide a basis for useful predictions, although	No overseas impact known.	Insignificant / Minor.

Type of impact	Sub-categories	Significance	Assessment	Rating
		with a high degree of uncertainty.		
Rate of spread in new environments		Rapid spread following their release into new environments overseas should be considered to pose a high risk.	No overseas impact known.	Insignificant / Minor.
Social impacts	Impacts to people through direct interaction, pets, homes, community facilities	Difficult to forecast.	Kept in the pet trade with no known adverse impacts.	Insignificant / Minor.
Economic impacts	Impacts to trade, livestock or crops, aquaculture.	Introduced reptiles and amphibians may bring economic benefits or cause economic harm. Forecasting significance is difficult.	No overseas impact known.	Insignificant / Minor.

4.5 Risk summary

4.5.1 Risk Rating

Environmental consequences may be predominantly from competition for resources, predation, habitat, and ecological community impacts. The ratings are estimates as the consequences are mostly unknown, but the lack of dominance of *V. prasinus* in its home range, and lack of impacts overseas suggests a moderate to high-risk rating for the environmental consequences is appropriate.

The likelihood of establishing is the chance or probability that establishment will occur. Based on current available information and results from the Bomford Model, the likelihood of *V. prasinus* establishing is unlikely/remote (Table 3). Consequence is the significance of the impact if establishment were to occur. Based on current available information and the impacts considered in Table 3, the consequence rating of *V. prasinus* establishing is low to medium.

4.5.2 Concerns raised during consultation

The department undertook consultation with the public from 3 November to 7 December 2020 and with state governments and territories from 16 June to 19 July 2021. In total, 4 responses were received from the public and 8 from state governments and territories (see Appendix A). Most of the concern related to encouraging illegal trade of the species and biosecurity risk, especially for disease. Concerns raised, including:

- **Animal welfare of specimens for zoo display purposes.** These concerns would be considered as part of the assessment process for any permit(s) and/or licence(s) under national legislation for exhibitions.
- **Potential for specimens to be sourced from wild populations illegally.** *V. prasinus* is CITES-listed Appendix II and therefore requires an export permit. Australia takes a stricter measure than CITES and requires an import permit in addition to the export permit.

- **Potential for specimens to harbour pathogens and/or parasites.** Under the *Biosecurity Act 2015*, the Australian biosecurity import conditions for reptiles (excluding crocodilians) for zoological purposes includes certification, health assessments and treatments, pre-export and post-arrival quarantine, and disease free in the premises of origin. These import conditions aim to minimise the risk to a low level.
- ***V. prasinus* is already held by numerous private and zoo licenced keepers in Queensland.** The department has noted this information and liaised with the Queensland Government, who provided comments on the application.

4.5.3 Risk Mitigation

The Bomford Model indicates that *V. prasinus* has a low to medium risk rating if it were to become established in mainland Australia. In response to the comments received during the consultation rounds, the applicant provided additional information on potential risks and risk mitigation measures for *V. prasinus*, as detailed in Table 4.

Table 3 Summary of risks and risk mitigation measures for V. prasinus

Risk	Applicant's response	Likelihood of risk occurring	Potential impact	Proposed mitigation	Overall risk if mitigation implemented
Release or escape of adult specimens	Animals will be held at a zoological facility, never for wild release. They are already a native species of Australia (in the Torres Strait Islands, not mainland Australia). Environmental factors restrict its range to far North Queensland. Should it somehow survive further south of its range it would be unable to successfully propagate (as the temperature and humidity do not suit this species). All Lizards will be microchipped. When at shows a harness equipped with a GPS tracker will be attached to the lizard to ensure a speedy and accurate recovery in the unlikely event of escape.	Low	Low	Restrict imports to Part 2 of the List with the condition 'zoological exhibitions only'. Static zoological facilities tend to be low risk for escapes. Exhibitions that travel and remove species from enclosures pose a higher, but manageable risk.	Low
Release or escape of immature specimens	These animals will be held at zoological facilities, never for wild release. They are also already a native species of the Torres Strait Islands (Queensland) and a natural occurring part of our biological integrity.	Low	Low	Restrict imports to Part 2 of the List with the condition 'zoological exhibitions only'. Static zoological facilities tend to be low risk for escapes. Exhibitions that travel and remove species from enclosures pose a higher, but manageable risk.	Low
Excess progeny entering illegal	Surplus animals would be avoided by not incubating any eggs. Any reproduced animals would only be shared with (?)	Moderate	Low	Mitigation proposed is not enforceable.	Low, if only traded to other licenced zoos.

Risk	Applicant's response	Likelihood of risk occurring	Potential impact	Proposed mitigation	Overall risk if mitigation implemented
herpetofauna trade	appropriately licensed and qualified organisations. Any individuals bred by us will be traded to other zoological institutes in Australia (or gifted). Trades may include work experience or other animals to help expand our educational programs. Any hatchlings will not be 'sold'.				
Theft	The species should be considered for listing under Part 2 of the Live Import List and applying the condition of eligible non-commercial purpose only, excluding household pets. Zoos have many security measures in place to prevent theft.	Moderate. Travelling zoos pose a higher risk of theft.	Low	Imports restricted to zoological exhibitions only, as it will be listed in Part 2 of the Live Import List.	Low
Vector for pathogens	Prior to export/import, individuals will require comprehensive health assessments to ensure they are pest and disease free. A secondary health assessment and quarantine will be carried out on arrival.	Very low	Moderate	Import condition for reptiles, as stated under the *Biosecurity Act 2015*.	Very low

5. Discussion

V. prasinus is geographically distributed across New Guinea and the Torres Strait Islands (Indonesia, Papua New Guinea, and QLD, Australia). Results from CLIMATCH predict that if this species were to establish a viable wild population in Australia in the future, it would only inhabit pockets of suitable tropical rainforest in Cape York Peninsula, QLD. Little is known of the habits of *V. prasinus* in the wild, but based on available information, its diet would consist of insects and small mammals.

Members of the *V. prasinus* complex are allopatric and therefore considered unable to produce fertile offspring with other members of the complex (Greene 2004). If *V. prasinus* were to establish a viable wild population in northern Australia, it would be unlikely to successfully breed with the only endemic member of the *V. prasinus* complex, the canopy goanna (*V. keithornei*).

V. prasinus are susceptible to disease and have been recorded with Varanid Herpesvirus 1 (VH1) and protozoan (*Hepatozoon* sp.). It is important to note that any imported specimens will be subject to quarantine procedures for reptiles under the *Biosecurity Act 2015*. These procedures can be found on BICON (2022), but specifically, there is an interim policy in place to manage the import of live reptiles for zoological purposes. This includes the import condition that the exporting government must certify that '*no disease due to herpesvirus has been diagnosed in reptiles of the same family as the reptiles being exported, at the premises of origin, during the 12 months prior to certification*'. The import conditions also require 90-day pre-export quarantine and 90-day post-arrival quarantine.

Sourcing imported specimens presents concerns for potential illegal trade of wild specimens. As *V. prasinus* is listed in Appendix II CITES, it would require a CITES export permit. Australia has stricter domestic measure for CITES-listed species and requires a CITES import permit for Appendix II CITES specimens. State and territory government agencies manage permitting and licensing. Currently, 5 Australian zoos and exhibitors and approximately 40 private keepers are permitted to keep and breed *V. prasinus* in Queensland, Australia.

Results from the Bomford Model show that *V. prasinus* has a Low to Medium risk rating to the Australian environment. Risk mitigation measures have been detailed that are expected to minimise this level of risk to Low.

Several concerns were raised by Commonwealth, state and territory agencies, the public and other experts during extensive consultation on this application. These concerns mainly included:

- Animal welfare considerations for imported *V. prasinus,*
- Status of *V. prasinus* on the Australian mainland,
- Risk of *V. prasinus* importing novel disease(s) into Australia,
- Current licencing required to keep and breed *V. prasinus* in Queensland, and
- That listing may encourage illegal trade of *V. prasinus* into and within Australia.

These concerns were shared by the department and extensively considered during the assessment. Additional consultation was sought to inform these concerns and assess the final department response for this application, and this species.

6. Conclusion

The department has reviewed the application to amend the Live Import List to include *V. prasinus* and undertaken a risk assessment. During this process, the department independently reviewed all available information on *V. prasinus* and sought consultation from Commonwealth, state and territory agencies, the public and other experts, as is required under the *Environment Protection and Biodiversity Conservation Act 1999.*

Based on all available information and the results from application of the Bomford Model and CLIMATCH, *V. prasinus* poses a low to medium risk to the Australian environment. This risk can be further reduced with conditions placed on import and purpose, and the general quarantine procedure for import into Australia. Risks can also be mitigated with licences and permits for this species.

The department, however, did have some concerns that were also shared by those that provided comments during consultation (see section 4.7 and Appendix A). These concerns were considered at length and additional consultation was sought from the Department of Agriculture and Fisheries, Queensland, and the department's Animals and Biological Imports Branch (Zoo, Aquatic, Laboratory and Companion Animals).

After critically examining and reviewing all available evidence and information, the department recommends listing *Varanus prasinus* on the Part 2 of the Live Import List, with the following conditions and restrictions:

- For eligible non-commercial purpose only, excluding household pets.

Appendix A: Summary of comments received on the proposal to include *Varanus prasinus* on the Live Import List

The applicant's draft assessment report on *Varanus prasinus* was posted on the Department of Climate Change, Energy, the Environment and Water's (formally the Department of Agriculture, Water and the Environment) website for the first round of consultation from 3 November to 7 December 2020. A summary of the comments received are presented in Table 4. Four submissions were received: all objected to the proposal to amend the Live Import List to include *V. prasinus*.

The second round of consultation round seeking comment from the from state, territory and Commonwealth government agencies was released between 16 June 2021 to 19 July 2021. Eight submissions were received: 3 objected to the proposal to amend the Live Import List to include *V. prasinus*, and 5 were neutral.

These comments are not endorsed by, or reflect the position of, the department.

Table 4 Comments received during public consultation and response from applicant

Respondent	Major comments
The Humane Society Born Free Foundation The International Fund for Animal Welfare (IFAW)	In a joint submission, the three organisations object to the listing of this species based mainly on animal welfare concerns, including: • Excessive handling of animals in mobile zoo situations cause undue stress to the animals. • This species is not required to be bred for any conservation benefit. • Questioning whether there is an expectation that the proponent would be profiting from the sale of any offspring.? This would potentially encourage illegal trade in this species. • The largest trade in this species is from Indonesia where it is impossible to determine if they are wild caught or captive bred animals. The species can't be exported so it shouldn't be imported.
Federation University	Requested additional information on: • The source from which the applicant intends to obtain the species. This is vital, as it should only be obtained from a captive breeding population. If there is one in Australia, this must be the preferred option. • The applicant insists that no commercial activities will be involved but also states that they will attempt to breed the species and offer individuals to others, but this could well result in a commercial transaction.

Respondent	Major comments
	• The applicant insists that the species is already in Australia, but this is by no means certain and depends on unauthenticated anecdotal observations. No specimen has been captured and the evidence that it occurs in Cape York should not, on current information, be accepted. • The biological information on the species is limited. An important fact that is missing is that the species in loosely social and lives in the wild in multi-age small groups. This should be replicated in captivity. • There are numerous incorrect and dangerous statements made in the application such as "as the tree monitor…. Is native to Australia in far north Queensland, there is no risk of a feral population establishing". This simply not only incorrect but also is a distortion of biology. • The applicant states the animals will be checked to ensure that it is pest and disease free before and after arrival. This would just not be possible as it is likely, that the species carries viruses that are unknown and so undetectable. It is also possible that they could be transmitted to humans.
Department of Agriculture, Water and the Environment	We recommend that the report include reference to the Australian biosecurity import conditions. The specific import conditions for 'Reptiles (excluding crocodilians) for zoological purposes' can be found on Australian biosecurity import conditions webpage (BICON). These conditions provide information on certification requirements for the import of reptiles to Australia, including health assessments, treatments, pre-export and post-arrival quarantine periods and requirements and disease freedoms in the premises of origin. The report also mentions potential trade and transportation of the species within Australia. Much of the information in the report references the standards and legislation of NSW. As we understand, the scope of the report is for importation of Emerald Tree Monitors into any zoo within Australia. Other state and territory legislation will therefore apply and should be referred to since the jurisdictional requirements may vary. It's also important to note that the importation of reptiles into Australia occurs under specific transportation conditions, including caging and bedding requirements, which would be worth expanding on in the report. This information can also be found on BICON, and we recommend highlighting the differences in transportation requirements into and within Australia.
A member of the public	Raised concerns about the movement of animals from one land to another and to ask that we no longer interfere with, or unbalance, our biological integrity. Asks '*How were you going to provide the Emerald green lizard with what he needs and not what you want*?' The species is known to be collected from the wild, captive-bred and traded internationally both legally and illegally. Concerns for Australian biosecurity and biodiversity due to factors including the potential for the introduction of animals with unknown provenance and/or genetic incompatibility which could lead to changes in the genetic integrity of the Australian population of Emerald monitor if domestic breeding programs were to promote interbreeding of endemic and introduced animals. Increased disease risk as reptiles is known to carry latent diseases. International Union for the Conservation of Nature as of 'Least Concern' for conservation so minimal justification for importing the species to support international conservation efforts. Currently kept in several licensed Queensland zoos which suggests it is unnecessary to import the species from overseas sources for the purpose of exhibition in Australia.

Table 5 Comments received during consultation with from state, territory and Commonwealth government agencies

Respondent	Major comments
VIC Department of Agriculture	Seeks further clarification that the species is considered an Australian native as this has implications for its declaration status as a pest animal in Victoria. Under the Victorian Catchment and Land Protection Act 1994 all species of family Varanidae that did not occur naturally in the wild in Australia before European settlement (except animals listed in schedule 2) are prohibited pest animals. A permit to bring into Victoria, sell or keep prohibited pest animals in Victoria would only be considered in highly exceptional circumstances. Suggest an analysis of the risk of establishment and spread under various climate trajectories to comprise the Climate Matching Score.
WA Department of Primary Industries and Regional Development	Does not support listing the species and commented that: • It is in agreement with comments you received from the NSW Department of Primary Industries, and the questions raised by the Federation University. • Of considerable concern is the likely consequence of wild-caught emerald tree monitors, labelled as captive-bred specimens, being imported. This is recognised as already occurring in other countries and it is unlikely that it could be prevented from occurring in Australia, the destination country. • Of concern is risk of the species being bred and supplied to many low security Australian zoos or wildlife parks. The species is reported as being a highly sought-after specimen for the illegal reptile trade in Australia. • As the species is kept in several licensed Queensland zoos WA commented that it is unnecessary to import the species from overseas sources for the purpose of exhibition in Australia. It could be assumed that these captive species are the progeny of illegal imports of emerald tree monitors into Australia in the past.
QLD Department of Agriculture and Fisheries	DAF submits the following concerns (summarised): • the species' status as native to Queensland appears uncertain • live import appears counterproductive with efforts to protect wild populations of the species from commercial trade • there appears to be consensus among wildlife disease experts in Queensland that import poses an unacceptable disease risk
NSW Department of Primary Industries	*Varinus prasinus* is closely related to several other arboreal monitor species; when combined, these are often referred to as the *V. prasinus* species group or species complex. In addition to *V. prasinus*, this species group, whose members are all allopatric, includes *V. beccarii* (Aru Islands), *V. boehmei* (Waigeo Island), *V. bogerti* (D'Entrecasteaux Archipelago), *V. keithhornei* (Cape York Peninsula), *V. kordensis* (Biak Island), *V. macraei* (Batanta Island), *V. reisingeri* (Misool Island) and *V. telenesetes* (Rossel Island). In addition to the occurrence of geographic speciation, the Emerald monitor is known to be collected from the wild, captive-bred and traded internationally both legally and illegally. The importation of Emerald monitor from sources outside Australia has the potential to negatively impact on Australian biosecurity and biodiversity due to factors including the potential for the introduction of animals with unknown provenance and/or genetic incompatibility (including animals specifically bred for selective morphological traits). The importation of such animals could lead to changes in the genetic integrity of the Australian population of Emerald monitor if domestic breeding programs were to promote interbreeding of endemic and introduced animals. Additionally, reptiles can carry a range of bacteria, viruses, and parasites and can harbor disease agents long-term, with few to no clinical signs. The importation of reptiles into Australia brings an increased risk of introducing exotic disease agents and the potential for transmission of such diseases once imported. It is noted that Emerald monitor is listed by the International Union for the Conservation of Nature as of 'Least Concern' for conservation. Therefore, there appears to be minimal justification for importing the species to support international conservation efforts. Furthermore, our inquiries indicate that Emerald monitor is currently kept in several licensed Queensland zoos which suggests it is unnecessary to import the species from overseas sources for the purpose of exhibition in Australia.

Respondent	Major comments
ACT Department of Environment, Heritage and Water	No comments on the updated draft risk assessment document and no concerns with DAWE listing *Varanus prasinus* (Emerald Tree Monitor) on Part 2 of the Live Import List with the condition, as per section 3030FB(c): Import for the purposes of exhibition only.
NT Department of Environment, Parks and Water Security	No comment(s) or concerns.
TAS Department of Natural Resources and Environment	DPIPWE has three primary concerns relating to the potential import and subsequent movement of the Emerald Tree Monitor (*Varanus prasinus*): • The risk of disease importation, and transmission (to both native and captive reptiles). The current state of knowledge of diseases in monitor species is poor, and it is not clear what risks are posed, and therefore what mitigations can be put in place. As an example, the novelty of some reptile diseases and their long lead time between infection and expression makes detection difficult and complicates the identification of appropriate quarantine requirements – including duration. • The status of the species as an Australian native is not clearly established. The presence of the species in collections in Queensland is not – by itself – evidence of its status as a native species, especially as it is a species that is known to have been illegally traded in Australia (see (c)). • Tasmania has experience of the illegal trade in this species. In 2014 three specimens were seized in Tasmania (the private possession of any non-native reptile species is not permitted in Tasmania; exotic reptile species may be kept under license for display/educational purposes. The three specimens were sent alive to Eumundi in Queensland. It is therefore possible that this seized wildlife has contributed to the presence of the species in collections in that state. We are therefore concerned that inclusion of this species on the live import list could contribute to the illegal take and trade in this species. We understand that this concern is outside the specific scope of the current request but felt it important to communicate our specific experience in this issue.
SA Department of Environment, Heritage & Sustainability	No comment(s) or concerns.

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