



Consultation on Species Listing Eligibility and Conservation Actions

Litoria subglandulosa (glandular frog)

You are invited to provide your views and supporting reasons related to:

- 1) the eligibility of *Litoria subglandulosa* (glandular frog) for inclusion on the EPBC Act threatened species list in the Endangered category; and
- 2) the necessary conservation actions for the above species.

The purpose of this consultation document is to elicit additional information to better understand the status of the species and help inform on conservation actions and further planning. As such, the below draft assessment should be considered to be **tentative** as it may change following responses to this consultation process.

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

The Threatened Species Scientific Committee (the Committee) undertakes the assessment of species to determine eligibility for inclusion in the list of threatened species and provides its recommendation to the Australian Government Minister for the Environment.

Responses are to be provided in writing by email to:
ExpertAssessmentPlans@environment.gov.au

Please include species scientific name in Subject field.

or by mail to:

The Director
Threatened Species and Communities Governance Section
Department of Climate Change, Energy, the Environment and Water
John Gorton Building, King Edward Terrace
GPO Box 858
Canberra ACT 2601

Responses are required to be submitted by Friday 23 December 2022.

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General background information about listing threatened species

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the department's website at: <https://www.dcceew.gov.au/environment/biodiversity/threatened>

In order to determine if a species is eligible for listing as threatened under the EPBC Act, the Threatened Species Scientific Committee (the Committee) undertakes a rigorous scientific assessment of its status to determine if the species is eligible for listing against a set of criteria. These criteria are available on the Department's website at: <https://www.dcceew.gov.au/sites/default/files/env/pages/d72dfd1a-f0d8-4699-8d43-5d95bbb02428/files/tssc-guidelines-assessing-species-2021.pdf>

As part of the assessment process, the Committee consults with the public and stakeholders to obtain specific details about the species, as well as advice on what conservation actions might be appropriate. Information provided through the consultation process is considered by the Committee in its assessment. The Committee provides its advice on the assessment (together with comments received) to the Minister regarding the eligibility of the species for listing under a particular category and what conservation actions might be appropriate. The Minister decides to add, or not to add, the species to the list of threatened species under the EPBC Act. More detailed information about the listing process is at: <https://www.dcceew.gov.au/environment/biodiversity/threatened/nominations>

The devastating bushfires that burnt more than 10 million hectares across southern and eastern Australia in 2019-20 severely impacted native wildlife and habitat. This created an urgent need for hundreds of species and ecological communities (ECs) to be assessed against EPBC Act criteria for threatened listing status, so that the recovery and future resilience of fire-affected species and ECs could be supported by statutory protection commensurate with their post-fire status, and to ensure EPBC Act lists are as current and accurate as possible, helping improve environmental resilience and preparedness for future fire events. As part of the Australian Government's bushfire response the Department engaged scientific experts to deliver a number of Species Expert Assessment Plans (SEAPs) for groups of species and ECs that were affected by the 2019-20 fires, or could be affected by similar fire events in the future, to enable hundreds of species and ECs to be assessed against EPBC Act criteria for threatened listing status and improve the currency of EPBC Act lists in a timely manner. Information about the SEAPs project is available at: <https://www.dcceew.gov.au/environment/biodiversity/threatened/seap>

This assessment follows evaluation of the conservation status of the species through the SEAPs project.

To promote the recovery of listed threatened species and ecological communities, Conservation Advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the department's website at: <https://www.dcceew.gov.au/environment/biodiversity/threatened/recovery-plans>

Privacy notice

The Department will collect, use, store and disclose the personal information you provide in a manner consistent with the Department's obligations under the Privacy Act 1988 (Cth) and the Department's Privacy Policy.

Any personal information that you provide within, or in addition to, your comments in the threatened species assessment process may be used by the Department for the purposes of its functions relating to threatened species assessments, including contacting you if we have any questions about your comments in the future.

Further, the Commonwealth, State and Territory governments have agreed to share threatened species assessment documentation (including comments) to ensure that all States and Territories have access to the same documentation when making a decision on the status of a potentially threatened species. This is also known as the '[Common Assessment Method](#)' (CAM). As a result, any personal information that you have provided in connection with your comments may be shared between Commonwealth, State or Territory government entities to assist with their assessment processes.

The Department's Privacy Policy contains details about how respondents may access and make corrections to personal information that the Department holds about the respondent, how respondents may make a complaint about a breach of an Australian Privacy Principle, and how the Department will deal with that complaint. A copy of the Department's Privacy Policy is available at: <https://www.dcceew.gov.au/about/commitment/privacy>

Information about this consultation process

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.

Consultation questions for *Litoria subglandulosa* (glandular frog)

PART 1 – INFORMATION TO ASSIST LISTING ASSESSMENT

1. Do you have any additional information in the **ecology or biology** of the species?
2. Can you provide any additional information or estimates on **longevity, average life span or generation length** for the species?
3. Do you have additional information to support an **estimate of the current population size** of mature adults of the species (national extent)?
4. Do you have additional information on **population trends** over 3 generations, or an historic population size for the species (national extent)?
5. Do you have additional information on **current range** (national extent) or **location of populations** for the species?
6. Can you provide additional information on any **change in range or location of populations**, or an **historic range** (national extent)?

PART 2 – INFORMATION FOR CONSERVATION ADVICE ON THREATS AND CONSERVATION ACTIONS

7. Do you have further information on the historic, current or potential **threats** facing the species?
8. Do you have further information on current or potential **management actions** to support protection and recovery of the species?
9. Do you have further information on current or potential **monitoring or research activities** for the species?
10. Are you aware of **other knowledge** (e.g., traditional ecological knowledge) that may help better understand the threats and management actions to aid recovery of the species?
11. Are you aware of any **cultural importance or use** that the species has?
12. What **individuals or organisations** are currently, or potentially could be, involved in management and recovery of the species?

PART 3 – ANY OTHER INFORMATION

13. Do you have comments on **any other matters** relevant to the assessment of this species?



DRAFT - Conservation Advice for *Litoria subglandulosa* (glandular frog)

This draft document is being released for consultation on the species listing eligibility and conservation actions

The purpose of this consultation document is to elicit additional information to better understand the eligibility of the species for listing and inform conservation actions, further planning and the potential need for a Recovery Plan.

The draft assessment below should therefore be considered **tentative** at this stage, as it may change as a result of responses to this consultation process.

Note: Specific consultation questions relating to the below draft assessment and preliminary determination have been included in the consultation cover paper for your consideration.

This document combines the approved Conservation Advice and Listing Assessment for the species. It provides a foundation for conservation action and further planning.



Litoria subglandulosa (glandular frog) © Copyright, Geoff Heard

Conservation status

Litoria subglandulosa (glandular frog) is proposed to be listed in the Vulnerable category of the threatened species list under the *Environment Protection and Biodiversity Conservation Act 1999*.

Litoria subglandulosa was assessed by the Threatened Species Scientific Committee to be eligible for listing under criterion 2. The Committee's assessment is at Attachment A. The Committee's assessment of the species' eligibility against each of the listing criteria is:

- Criterion 1: Not eligible
- Criterion 2: B1ab(i,ii,iii,v) +2ab(i,ii,iii,v): Vulnerable
- Criterion 3: Insufficient data
- Criterion 4: Insufficient data
- Criterion 5: Insufficient data

The main factors that make the species proposed for listing in the Vulnerable category are its restricted distribution occurring at <10 locations, suspected ongoing population decline, caused by habitat clearing and climate change, and the extent of the overlap of its distribution with burnt areas from the 2019-20 bushfires.

Species can also be listed as threatened under state and territory legislation. For information on the current listing status of this species under relevant state or territory legislation, see the [Species Profile and Threat Database](#).

Species information

Taxonomy

Conventionally accepted as *Litoria subglandulosa* Tyler & Anstis (1983).

Litoria subglandulosa sensu lato (*s.l.*) previously included *L. daviesae* (Davies' tree frog) before it was redescribed by Mahony et al. (2001). *Litoria subglandulosa sensu stricto* (*s.s.*) is now recognised to be restricted to localities north of Cunnawarra National Park, New South Wales (NSW).

Description

The glandular frog is a medium-sized frog from the family Pelodryadidae ("tree frogs"). The glandular frog is similar to Davies' tree frog, both in appearance (adult and tadpole) and the male breeding call. The two species are primarily distinguished by their distribution, with glandular frog occurring north of Walcha, northern NSW and Davies' tree frog to the south (Mahony et al. 2001).

The following description of adult glandular frogs is drawn from Cogger (2014) and Anstis (2017). Females are larger than males, having a snout-to-vent length (SVL) to 50 mm, while males reach 40 mm SVL. The smooth dorsal surface is typically olive to bright green with light brown flecks and blotches. During winter dormancy, the dorsum darkens to almost black. The sides and limbs are green and the ventrum is coarsely granular and white. The groin, arm-pits, and surfaces under the hindlimbs are light yellow. A dark brown lateral stripe, with a pale gold stripe above it, extends from the snout through the eye and along the ear, breaking into golden patches along the abdomen. A narrow white stripe along the green upper lip extends to the glandular area above the arm. The broad head has an indistinct tympanum located under a thick glandular ridge. The prominent eyes are golden, with a lighter upper half. The long fingers and toes have large discs. Fingers are unwebbed while toes are half webbed.

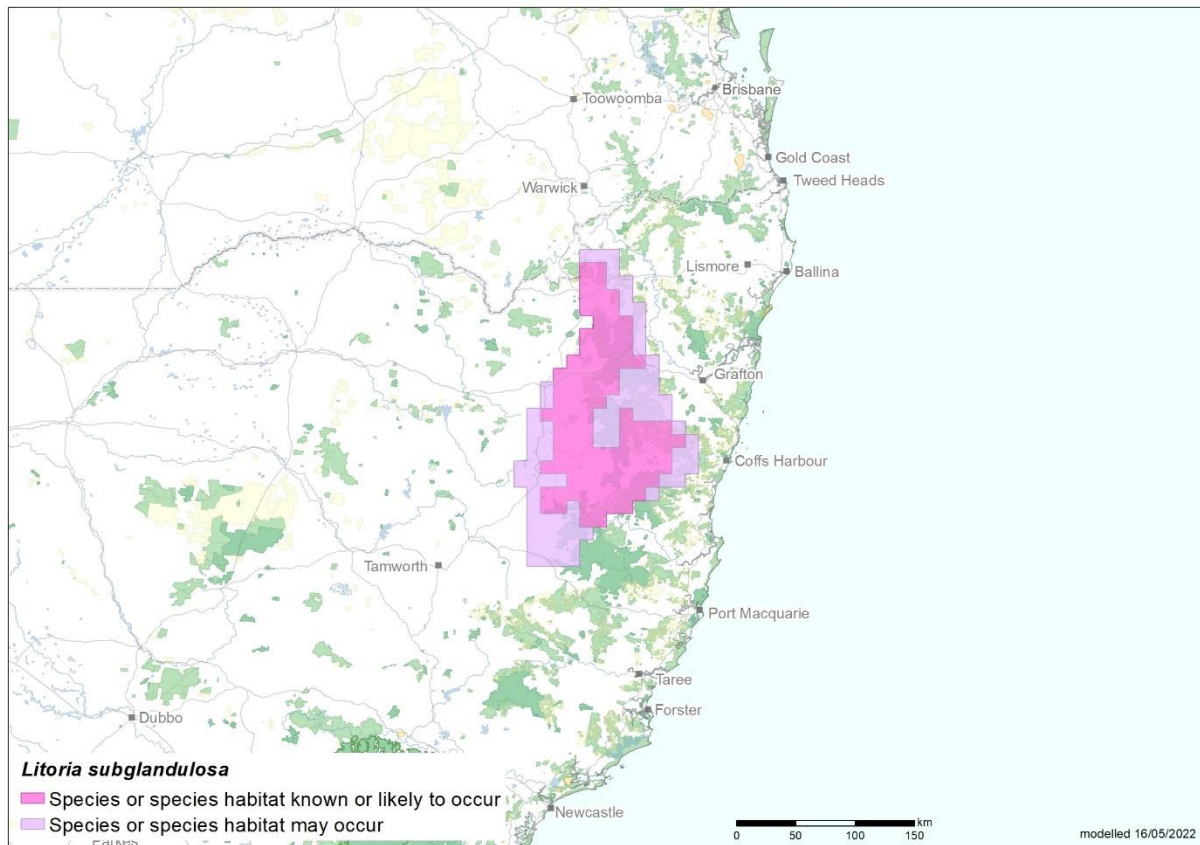
Male breeding calls usually comprise a sequence of five–seven repeated ‘or-äk’ notes (Tyler & Anstis 1975), and when heard together, it creates a polyphonic chorus (Cogger 2014; Anstis 2017).

Females lay up to about 300 eggs in a single, adhesive clump, and average ovum and capsule diameters are 1.6 mm and 3.6 mm, respectively (Anstis 2017). Newly hatched tadpoles have two well-developed pairs of external gills. Tadpoles can grow to a length (including tail) of 37 mm, with a body length of 14 mm. The streamlined body is wider than it is deep. The snout is rounded. The eyes are dorsolaterally positioned with a gold ring surrounding the pupil. The dorsum colour ranges from golden-brown to dark brown. There are short streaks of pale gold along the sides of the body and there is a visible, pigmented lateral line system. Tail fins are shallow and translucent with dark flecks (Anstis 2017). The oral disc lacks teeth, forming a funnel, a rare feature among Australian tree frogs (Anstis & Littlejohn 1996; Anstis 2017).

Distribution

Following taxonomic revision and the description of Davies’ tree frog by Mahony et al. (2001), the glandular frog is now restricted to a 250 km stretch from Walcha, in northern NSW, to Girraween National Park, on the Qld/NSW border, at elevations above 600 m. The type locality is Barwick River, Point Lookout, NSW (Mahony et al. 2001). The southern part of the glandular frog’s range marks the geographic delineation between it and Davies’ tree frog. Glandular frog populations are generally disjunct and occur in stream habitats along the eastern escarpment of the Great Dividing Range. At sites in northern NSW (e.g., New England National Park and the headwaters of the Oban and Henry Rivers), the once common glandular frog underwent decline and was not recorded from these areas from the 1970s (Mahony et al. 2001).

Map 1 Modelled distribution of glandular frog



Source: Base map Geoscience Australia; species distribution data [Species of National Environmental Significance](#) database.

Caveat: The information presented in this map has been provided by a range of groups and agencies. While every effort has been made to ensure accuracy and completeness, no guarantee is given, nor responsibility taken by the Commonwealth for errors or omissions, and the Commonwealth does not accept responsibility in respect of any information or advice given in relation to, or as a consequence of, anything containing herein.

Species distribution mapping: The species distribution mapping categories are indicative only and aim to capture (a) the habitat or geographic feature that represents to recent observed locations of the species (known to occur) or habitat occurring in close proximity to these locations (likely to occur); and (b) the broad environmental envelope or geographic region that encompasses all areas that could provide habitat for the species (may occur). These presence categories are created using an extensive database of species observations records, national and regional-scale environmental data, environmental modelling techniques and documented scientific research.

Cultural and community significance

The cultural, customary and spiritual significance of species and the ecological communities they form are diverse and varied for Indigenous Australians and their stewardship of Country. This section describes some examples of this significance but is not intended to be comprehensive or applicable to, or speak for, Indigenous Australians. Such knowledge may be held by Indigenous Australians who are the custodians of this knowledge and have the rights to decide how this knowledge is shared and used.

Frogs are known to have cultural and spiritual significance to many Indigenous people through their prominent role in traditional knowledge stories. Frogs feature in ceremony, lore, mythology, totems, art, kinship, as well as being utilised as bait, food and water resources, indicators of ecological change and the overall health of Country. The most well-known creation story with a frog as the protagonist is “Tiddalik/Jiddelek, the Thirsty Frog that Drinks Up All the Water.” This flood cycle story is thought to have originated from the Kurnai people (Curr 1887; Howitt 1888), known today as, Gunai-Kurnai, the Traditional Owners of the southeast Gippsland area.

Frogs are well known to herald changes in barometric conditions such as rain and flood, as noted in the anecdote, “When the Frogs Sing” (McMahon 1937), told from Boorowa River area, traditionally owned and occupied by the Wiradjuri people. Roth (1897) produced a detailed study of Aboriginal groups from the North-West-Central areas of Queensland and reported that frogs, except for “true green frogs”, were “eaten everywhere, and partaken of, roasted”. Water stored in the bladder of aestivating burrowing frogs was squeezed directly into the mouth and the body was then eaten (Bayly 1999). Knowing where and how to locate and track frogs beneath the desert claypan meant the difference between life and death.

Often represented as teachers, frogs were used as symbols in lessons to humans about fear, morals and kinship. An example of which is “Why Manparrie (frogs) Jump into the Water”, shared by David Unaipon (1930) or similarly, “The Timid Frogs” (Reed 1978), and “Frog in Throat”, a newspaper article which tells of men preparing for initiation corroborees by eating frogs to gain “a voice that was clear and strong.” (Kennedy 1932).

Frogs have many names across all the traditional language areas where they exist. Some Language names for ‘frog’ in areas where glandular frogs occur are: ‘Jahrany/Jarahyn’ in Bundjalung; ‘Jaraan’ in Gumbaynggirr; ‘Impatanga/Tuk’ in Nganyaywana; ‘Yatanggan’ in Dhanggati. These names are often onomatopoeic, illustrating the calls of species found within specific geographical areas.

Significance specific to the glandular frog

The Banbai rangers identify tuk (frog) as an ecological indicator in their “Banbai Fire and Seasons Calendar for Wattleridge Indigenous Protected Area” (Banbai Nation 2021). When the tuk (frog) begins its cycle of calling and breeding in October and November it is indicative of a seasonal change in wind, temperature and humidity. During this change there are increasing fire risks as warmer winds bring drier and hotter conditions, that along with lightning, has the potential to bring bushfires. (McKemey and Banbai Nation 2020; McKemey et al. 2021). The glandular frog is identified by the Banbai Rangers as a “significant and unique” species, which is part of a suite of fauna that is “extremely important to us” (Banbai Nation 2021).

The identified geographic range of the glandular frog encompasses lands traditionally maintained by many Indigenous groups and encompasses many areas that have local Cultural Knowledge custodians and land rights holders. The Cultural groups, rightsholders, stakeholders and organisations identified for engagement include, but are not necessarily limited to the following:

Traditional Language groups (source: AIATSIS, spellings may vary)

Anaiwan/Nganyaywana, Banbai/Baanbay, Bundjalung, Burrigati/Dainggatti/Dunghutti/Thunggutti, Gambalamam/Gumbaynggir, Marbal/Ngarabal, Widjupal/Wiyabal and Wehlubal

NSW Local Aboriginal Land Councils

Baryulgil, Glen Innes, Moombahlene, Grafton-Ngerrie, Jubullum, Guyra, Armidale, Jana Ngalee, Muli Muli, Nambucca, Bowraville, Coffs Harbour, Thunggutti and Dorrigo Plateau

Registered Native Title Determinations and Prescribed Body Corporates

Western Bundjalung People and Ngullingah Jugun (Our Country) Aboriginal Corporation

Certified Indigenous Land Use Agreements with Native Title Claimants

Western Bundjalung Amended Settlement ILUA

Indigenous Protected Areas

Dorodong Indigenous Protected Areas and Wattleridge Indigenous Protected Areas

Local Indigenous Rangers, cultural and land management organisations

Banbai Rangers, Banbai Enterprise Development Aboriginal Corporation, Darrunda Wajaarr Rangers and Muurrbay Aboriginal Language & Cultural Co-operative

Relevant biology and ecology

The biology and ecology of the glandular frog is not fully understood and some information pre-dates the taxonomic split of Davies' tree frog from *L. subglandulosa s.l.* (see taxonomy section). Information prior to 2001 was only included when it specifically referred to localities or frogs at those localities within the current range of the glandular frog, or if it applied to both species.

Habitat

Glandular frogs can be found in natural and highly disturbed environments. They typically occur in areas with permanent streams and rivers in well-vegetated woodland, wet sclerophyll forest, and rainforest (Mahony et al. 2001; Cogger 2014; Anstis 2017). A third of the current distribution is within protected areas (CAPAD 2020). Glandular frogs can persist in modified areas, providing there is fringing riparian vegetation (Lemckert 2022 pers. comm. 14 February).

Reproductive biology

Glandular frogs breed in spring and early summer. Small groups of calling males are generally observed above the water, perched on low vegetation (e.g., *Juncus* spp.) or logs, and breeding occurs in permanent or semi-permanent pools (Cogger 2014; Anstis 2017). Higher calling intensity is associated with light rain and warmer temperatures. Calling primarily occurs at night but sporadic diurnal calling is not uncommon (Anstis & Littlejohn 1996).

After mating, eggs masses are typically attached to submerged rocks on the side of stream pools, 1-7 cm below the surface (Tyler & Anstis 1975). Eggs hatch after eight-ten days. Tadpoles live along the bottom of slow flowing streams among rocks, leaf litter, and plant roots, where they blend in among the silt and leaf litter (Anstis 2017). They are well camouflaged, and use their suctioning mouthparts to pull themselves over rocky substrates. This behaviour has only been observed in glandular frogs, Davies' tree frogs, and other torrent stream-adapted tadpoles (Anstis 2017). The tadpole stage lasts for three–four months and metamorphosis occurs

between December and February. Green dorsal colouration starts to appear a few weeks after metamorphosis, replacing golden-brown pigmentation (Anstis 2017).

General ecology and behaviour

Little is known about non-breeding behaviour in adult frogs. They are presumed to eat invertebrates and have a semi-arboreal lifestyle (Hero et al. 2002). Glandular frogs have been observed in ground vegetation (Lemckert 2022 pers. comm. 14 February). Adults are often found under rocks or in rock crevices. The presence of trout has not been shown to impact glandular frogs (Clulow et al. 2009).

Habitat critical to the survival

Glandular frogs typically occur near permanent streams and rivers in well-vegetated woodland, wet sclerophyll forest, and rainforest above 600 m. They have been observed in understorey vegetation and likely shelter under rocks or in rock crevices. They can be found in natural and highly disturbed environments.

Breeding occurs in permanent or semi-permanent pools. Eggs are laid on submerged rocks in these pools 10–70 mm below the surface. After hatching, tadpoles live along the bottom of slow-flowing streams among rocks, leaf litter, and plant roots.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Important populations

At the time of preparing the Conservation Advice, sufficient information to enable description of important populations was not available.

Threats

Historical and continuing declines of glandular frogs are thought to be driven by habitat loss caused by primary industries and climate change. Habitat clearing is inferred to have caused population declines in the 1970s to the 1990s (NPWS 1994; Anstis 1997). Climate change is expected to increase the frequency/severity of droughts and bushfires, which temporarily reduce the amount of suitable habitat for glandular frogs. Their habitat may not fully recover between drought/fire events. This species is inferred to be particularly susceptible to chytridiomycosis, an infectious disease caused by the amphibian chytrid fungus, *Batrachochytrium dendrobatidis* (*Bd*), due to its restriction to upland riparian habitat (Rowley & Alford 2007; Murray et al. 2010) and *Bd* has been inferred as a cause of past declines (Anstis 1997).

Table 1 Threats impacting the glandular frog

Threat	Status ^a	Evidence
Habitat loss and habitat degradation		
Vegetation clearance	Timing: past/current/future Confidence: inferred Likelihood: almost certain Consequence: major Trend: unknown Extent: across part of the range	Vegetation clearance for agricultural purposes, including cattle grazing, is thought to have caused past population declines, particularly at the type locality site near Ebor, NSW (Anstis 1997; Mahony et al 2001). Male glandular frogs call from fringing riparian vegetation during the breeding season (Anstis 2017; Cogger et al. 2014), suggesting a reliance on this type of vegetation.
Pollution (agricultural)	Timing: past/current/future Confidence: inferred Likelihood: almost certain Consequence: moderate Trend: unknown Extent: across part of the range	A decline in the glandular frog population in the New England Tablelands coincided with an increase in pollution from urban and agricultural by-products (Anstis 1997, Mahony et al. 2001), and it is inferred that pollution has reduced the range of this species. Water pollution and increased sediment loads from run-off from primary industries and urban development are known to negatively impact egg and tadpole development (deMaynadier & Hunter 1995; Welsh & Ollivier 1998).
Altered hydrology	Timing: current/future Confidence: inferred Likelihood: likely Consequence: moderate Trend: unknown Extent: across part of the range	Some glandular frog habitat is surrounded by cleared agricultural land and subject to altered hydrology (Mahony et al. 2001). Since glandular frogs are restricted to areas with permanent streams and rivers (Anstis 2017; Cogger 2014), alterations to flow regimes that eliminate or significantly reduce water flow would render habitat unsuitable for breeding, causing local population declines or extinctions.
Fire regimes that cause declines in biodiversity ^b		
Increased fire extent, severity, and frequency	Timing: current/future Confidence: inferred Likelihood: likely Consequence: major Trend: increasing Extent: across entire range	Bushfires can adversely affect pond and stream breeding habitat, increasing water temperature, altering water chemistry (Lyon & O'Connor 2008), and creating sediment/ash runoff 'slugs' that can form in waterways following rainfall (Lyon & O'Connor 2008; Alexandra & Finlayson 2020). These slugs can fill in crevices in pond and stream substrates, reducing the availability of refugia for tadpoles (Welsh & Ollivier 1998), and promote toxic algal blooms (Alexandra & Finlayson 2020) that can deoxygenate the water and cause egg and tadpole death. Sediment slugs can persist for a significant period of time and reach aquatic ecosystems up to 80 km downstream of burnt areas, greatly increasing the impact on species outside of the immediate burnt area (Lyon &

		<p>O'Connor 2008; Alexandra & Finlayson 2020).</p> <p>The possible scale of future bushfire events was demonstrated by the 2019-20 bushfires, where more than 10 million hectares were burnt across southern and eastern Australia. Although 67 % of glandular frog habitat was burnt during these fires (Legge et al. 2021), the streams likely helped to buffer the effects of bushfires on glandular frogs. It is estimated that there was a 23 % population decline immediately following the fires (Legge et al. 2021). Within the fire affected areas only, it is estimated that there was a 50% decline (Mahony 2021. pers comm 10 September). Although expert elicitation in Legge et al. (2021) suggest that recovery is plausible, the best estimate indicated a 14 % decline ten years post-fire, with the 80 % confidence interval ranging from 53 % decline to 20 % increase.</p> <p>Threat interactions:</p> <p>Anthropogenic fragmentation of ecosystems, alteration to ignition patterns, and climate change are causing major alterations to frequency and severity of fires. Current climate projections predict an increase in the scale, frequency, and intensity of bushfires (CSIRO & Bureau of Meteorology 2020). More frequent, severe fires may lead to greater, non-reversible declines (Lemckert 2022 pers. comm 14 February).</p>
Climate change and severe weather		
Increase in drought frequency/severity	<p>Timing: current/future Confidence: inferred Likelihood: likely Consequence: major Trend: increasing Extent: across the entire range</p>	<p>Climate projections for south-eastern Australia include reduced rainfall, increased average temperatures, and more frequent droughts (CSIRO & Bureau of Meteorology 2020). Climate change is expected to cause a pronounced increase in extinction risk for a number of frog species over the coming century (Hagger et al. 2013; Pearson et al. 2014). Droughts that result in temporary or permanent loss of previously permanent streams and rivers will result in decreased recruitment and potentially local extinction of the glandular frog.</p>
Exotic invasive species, problematic native species, pathogens and disease		
Disease – animal pathogens (Chytridiomycosis caused by chytrid fungus)	<p>Timing: current/future Confidence: suspected Likelihood: almost certain Consequence: major Trend: unknown Extent: across the entire range</p>	<p>Chytridiomycosis is an infectious disease caused by the amphibian chytrid fungus <i>Batrachochytrium dendrobatidis</i> (<i>Bd</i>). Frog species exhibit diverse susceptibility to <i>Bd</i>; some do not show any apparent symptoms while others are extremely susceptible, resulting in very high mortality and population decline (DOEE 2016). Mortality associated with <i>Bd</i> erodes the capacity of the population</p>

		<p>to sustain loss of recruitment associated with drought and reduces resilience to climate change (Scheele et al. 2016).</p> <p><i>Bd</i> has been attributed as a cause of past declines of glandular frogs (Anstis 1997). This frog species is inferred to be susceptible to <i>Bd</i> due to its restriction to upland, riparian habitat (Rowley & Alford 2007; Murray et al. 2010). The current rate of decline due to <i>Bd</i> is unknown.</p>
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^aTiming—identifies the temporal nature of the threat

Confidence—identifies the nature of the evidence about the impact of the threat on the species

Likelihood—identifies the likelihood of the threat impacting on the whole population or extent of the species

Consequence—identifies the severity of the threat

Trend—identifies the extent to which it will continue to operate on the species

Extent—identifies its spatial context in terms of the range of the species

^bFire regimes that cause declines in biodiversity include the full range of fire-related ecological processes that directly or indirectly cause persistent declines in the distribution, abundance, genetic diversity or function of a species or ecological community. ‘Fire regime’ refers to the frequency, intensity or severity, season, and types (aerial/subterranean) of successive fire events at a point in the landscape

Categories for likelihood are defined as follows:

Almost certain – expected to occur every year

Likely – expected to occur at least once every five years

Possible – might occur at some time

Unlikely –known to have occurred only a few times

Unknown – currently unknown how often the threat will occur

Categories for consequences are defined as follows:

Not significant – no long-term effect on individuals or populations

Minor – individuals are adversely affected but no effect at population level

Moderate – population recovery stable or declining

Major – population decline is ongoing

Catastrophic – population trajectory close to extinction

Each threat has been described in Table 1 in terms of the extent that it is operating on the species. The risk matrix (Table 2) provides a visual depiction of the level of risk being imposed by a threat and supports the prioritisation of subsequent management and conservation actions. In preparing a risk matrix, several factors have been taken into consideration, they are: the life stage affected; the duration of the impact; and the efficacy of current management regimes, assuming that management will continue to be applied appropriately. The risk matrix and ranking of threats has been developed in consultation with experts and in-house expertise using available literature.

Table 2 Glandular frog risk matrix

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
Almost certain			Pollution	Vegetation clearance Disease (chytridiomycosis)	
Likely			Altered hydrology	Increase in fire frequency/severity Increase in drought frequency/severity	
Possible					
Unlikely					
Unknown					

Risk Matrix legend/Risk rating:

Low Risk	Moderate Risk	High Risk	Very High Risk
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Priority actions have then been developed to manage threats, particularly where the risk was deemed to be 'very high' or 'high'. For those threats with an unknown outcome, we identify the need for further research.

Conservation and recovery actions

Primary conservation objective

The glandular frog will have a secure, viable population, and its existing habitat is protected and maintained.

Conservation and management priorities

Habitat loss and habitat degradation

- Minimise disturbance of the glandular frog and its habitat. Designate protection zones around all known subpopulations to ensure habitat is not further fragmented by roads, timber harvesting, or clearing on freehold land. Activities permitted in protection zones should be dictated by further monitoring and research into the effects of disturbance on the species.
- Maintain appropriate water quality and flows by minimising water diversion and extraction and preventing pollution.
- Undertake surveys to determine the current distribution and spatial, temporal, and demographic characteristics of the suspected decline of the species.
- Identify the species' breeding and non-breeding habitat requirements and evaluate factors influencing the quality and availability of suitable habitat across the species' distribution.

- Identify key sites and protect and maintain sufficient high-quality habitat to ensure the species' viability.
- Identify and conserve landscape characteristics that facilitate movement of individuals between subpopulations.
- Remove weeds and restore habitat at localised sites. Care should be taken to use appropriate weed removal methods (e.g., cutting and pasting/painting methods), as herbicide formulations can be toxic to frogs and tadpoles, particularly if they contain glyphosate and surfactants (Mann et al. 2003).
- Encourage landholders to enter land management agreements, particularly in-perpetuity covenants, that promote the protection of habitat.

Fire regimes that cause declines in biodiversity

- Monitor populations impacted by the 2019-2020 bushfires, in particular:
 - Conduct on-ground surveys during optimal survey conditions to establish the extent of population responses to the 2019-2020 bushfires and to provide a baseline for ongoing monitoring.
 - Assess the effects of fire on survival and reproduction, including:
 - The impact of altered environmental attributes, such as sediment loads, stream hydrological regimes, and riparian vegetation structure and composition.
 - The species' long-term response to major fire events or altered fire regimes, through identifying those parts of its range that are most vulnerable, or conversely, where there are opportunities to enhance refuges from fire.
- In the aftermath of the bushfires, protect unburnt areas in order to provide refuge sites.
- Control introduced herbivores to support the regeneration of forest habitat at some localised sites.
- Develop and implement fire management strategies that improve habitat condition and minimise the risk of moderate to high severity bushfires.

Climate change and severe weather

- Investigate options for enhancing the resilience of the species' habitat to extreme interannual variation in rainfall, especially drought.

Exotic invasive species, problematic native species, pathogens and disease

- Minimise the spread of *Bd*, in particular:
 - Implement suitable hygiene protocols (Murray et al. 2011) to protect priority populations as described in the threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis (DoEE 2016).
 - Provide disease identification and prevention protocols and training (methods of handling, diagnostic keys, etc.) to researchers and land managers for use in the field.

Stakeholder engagement/community engagement

- Engage custodians of Indigenous Cultural Knowledge and Traditional Owners in conservation actions, including the implementation of fire management and other survey, monitoring and management actions. Enable the sharing of knowledge, while ensuring the processes and protocols to record, store, and share any knowledge are agreed and appropriately resourced. Information on the application of cultural burning and integrated Caring for Country practices to protect and enhance habitat is of critical importance.
- Educate landowners and managers of the importance of maintaining riparian and lentic habitat and the integration of habitat protection into land management regulations.
- Ensure information on glandular frogs and their habitat is shared between state forest managers and environment staff. New population data and research should be made available to all stakeholders to continue to implement best-practice land management that minimises the impacts of potential threats on the species.
- Provide input into the various impact assessment and planning processes on measures to protect glandular frogs and their habitat. These include water resource plans, park management plans, and environmental impact assessments.
- If potential habitat for the species is identified on private land, liaise with landholders to provide information on the species and its habitat requirements, and encourage reporting of any sightings.
- Provide advice to private landholders and community groups on how to protect and restore habitat.
- Engage interested nature conservation, land management, and landholder groups in conservation management activities and citizen science projects, such as non-invasive monitoring through the FrogID project (Rowley et al. 2019). Activities need to be carefully managed to prevent disturbance to frogs and participants should be made aware of the need to follow correct field practices and hygiene protocols to mitigate the risks of trampling and disease transmission. If necessary, use workshops to aid stakeholders in developing the skills and knowledge required to manage threats to this species while undertaking these activities.

Survey and monitoring priorities

- Monitor glandular frog subpopulations to detect any change in their sizes and to understand how different subpopulations are responding in different environmental and management settings and in response to various threats, particularly bushfires.
- Assess the population size, distribution, and ecological requirements (breeding and nonbreeding habitat requirements) of the glandular frog, including:
 - Survey sites within the known distribution range of the species where the environment is likely to be suitable for the species to identify whether historic populations still exist and to identify populations that were previously unknown.

Information and research priorities

- Work with Traditional Owners to gather, use and record any traditional knowledge associated with the species ensuring the practices to record, store and disseminate this knowledge are mutually supported.
- Assess the effects of fire on survival and reproduction, as identified in the 2019-20 bushfire response section.
- Establish the impact of fire retardants used to fight bushfires on frog populations.
- Conduct population and distribution modelling to predict the impact of climate change on the species' survival under different climate scenarios, including:
 - Identify the impact of more frequent droughts and bushfires on populations.
 - Identify which regions within the species distribution are most/least vulnerable to climate change.
- Improve understanding of the extent and impact of infection by *Bd* on glandular frogs to better inform how to apply existing or new management actions relevant to the species' recovery.
- Investigate the availability of *Bd* refuge sites, either within or outside the natural range of the species.

Links to relevant implementation documents

DAWE (Department of Agriculture, Water and the Environment) (2020a). [Wildlife and threatened species bushfire recovery research and resources](#).

DAWE (Department of Agriculture, Water and the Environment) (2020b). [AUS GEEBAM Fire Severity NIAFED20200224](#).

DoEE (Commonwealth Department of the Environment & Energy) (2016). [Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis](#).

OEH (NSW Office of Environment and Heritage) (2019). [Glandular frog – profile](#).

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THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Threatened Species Scientific Committee finalised this assessment on DD Month Year.

Attachment A: Listing Assessment for *Litoria subglandulosa*

Reason for assessment

The devastating bushfires that burnt more than 10 million hectares across southern and eastern Australia in 2019-20 severely impacted native wildlife and habitat. This created an urgent need for hundreds of species and ecological communities (ECs) to be assessed against EPBC Act criteria for threatened listing status, so that the recovery and future resilience of fire-affected species and ECs could be supported by statutory protection commensurate with their post-fire status, and to ensure EPBC Act lists are as current and accurate as possible, helping improve environmental resilience and preparedness for future fire events.

As part of the Australian Government's bushfire response the Department engaged scientific experts to deliver a number of Species Expert Assessment Plans (SEAPs) for groups of fire-affected and non-fire affected species and ECs, to enable hundreds of species and ECs to be assessed against EPBC Act criteria for threatened listing status and improve the currency of EPBC Act lists in a timely manner.

This assessment follows evaluation of the conservation status of the glandular frog through the SEAP project.

Assessment of eligibility for listing

This assessment uses the criteria set out in the [EPBC Regulations](#). The thresholds used correspond with those in the [IUCN Red List criteria](#) except where noted in criterion 4, sub-criterion D2. The IUCN criteria are used by Australian jurisdictions to achieve consistent listing assessments through the Common Assessment Method (CAM).

Key assessment parameters

Table 3 includes the key assessment parameters used in the assessment of eligibility for listing against the criteria.

Table 3 Key assessment parameters

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Number of mature individuals	No estimate used	-	-	Insufficient data. Locality records generally produced by ad hoc surveys and incidental observations. While records sometimes include the number of adults, this information is inconsistent and typically only includes calling males.
Trend	Contracting			The population is suspected to be declining due to ongoing threats (see Table 1). The population is predicted to decline by 14 % by 2030, partly due to the impacts of the 2019-20 bushfires (Legge et al. 2021).

Litoria subglandulosa (glandular frog) Conservation Advice

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Generation time (years)	4	-	-	The generation time of the glandular frog is unknown. It is inferred to be 4 years based on <i>Litoria lesueuri</i> (Lesueur's Frog), a similar-sized tree frog (Morrison et al. 2004).
Extent of occurrence (EOO) (km ²)	13,589	13,589	113,589	<p>The extent of occurrence (EOO) estimate is based on the mapping of confirmed point records, obtained from state governments, museums, and citizen science projects, including FrogID (Rowley et al. 2019; Rowley & Callaghan 2020). Only records considered to represent the current distribution of the species were used for this assessment. The EOO was calculated using a minimum convex hull based on the IUCN Red List Guidelines (2022).</p> <p>Since the glandular frog and Davies' tree frog were synonymised until 2001 (Mahony et al. 2001), records prior to 2001 were only included if they were outside the distribution of Davies' tree frog (i.e., north of Walcha, NSW). All records were then vetted by experts and those thought to represent the current distribution of the species were used to calculate EOO.</p>
Trend	Contracting			The EOO is suspected to be contracting due to threats including the 2019-20 bushfires (Legge et al. 2021) and ongoing removal of streamside vegetation (Mahony et al. 2001).

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Area of occupancy (AOO) (km²)	624	416	832	<p>The area of occupancy (AOO) estimates are based on the mapping of confirmed point records, obtained from state governments, museums, and citizen science projects, including FrogID (Rowley et al. 2019; Rowley & Callaghan 2020). Only records considered to represent the current distribution of the species were used for this assessment. The AOO was calculated using a 2x2 km grid cell method, based on the IUCN Red List Guidelines (2022).</p> <p>While the AOO was calculated to be 416 km² based on existing records, it is likely an underestimate due to lack of sampling within the EOO. It is unlikely that the true AOO exceeds twice the calculated AOO, so the maximum plausible value is considered to be 832 km². The estimate used in this assessment is 624 km², which is halfway between the minimum and maximum plausible values.</p>
Trend	Contracting			<p>The AOO is suspected to be contracting due to threats including the 2019-20 bushfires (Legge et al. 2021) and ongoing removal of streamside vegetation (Mahony et al. 2001).</p>
Number of subpopulations	Insufficient data	-	-	Insufficient data. Data on population genetics are needed to determine population connectivity.
Trend	Insufficient data			
Basis of assessment of subpopulation number	NA			
No. locations	2	1	4	<p>Based on current records, the distribution of the glandular frog can be grouped geographically into two regions (north and south of Guy Fawkes River NP) or four regions (Girraween NP, Timbarra NP, Gibraltar Range and surrounds, New England NP and surrounds).</p> <p>As the 2019-20 bushfires burnt 67% of the glandular frog's habitat, it is plausible that one large bushfire could impact most of the species' range within one generation.</p>
Trend	Stable			<p>The number of locations is projected to remain stable.</p>

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Basis of assessment of location number	Different threatening process impact populations at different scales. Streamside vegetation removal for one infrastructure development project may affect 0.05 km ² of glandular frog habitat whereas one bushfire can burn over 5,000 km ² (Boer et al. 2020; Filkov et al. 2020). During the 2019-20 bushfire season, more than 10.3 million hectares of land was burnt (DAWE 2020b). Therefore, the threat with the largest potential impact (bushfires) was used to determine the number of locations. Two locations implies that there are likely to be unburnt and burnt habitats following a fire similar to the 2019-20 bushfires.			
Fragmentation	While some of the glandular frog's habitat is fragmented, it does not meet the IUCN definition of 'severely fragmented', which requires more than 50% of individuals be found in small, isolated subpopulations of low viability (IUCN Standards and Petitions Committee 2022).			
Fluctuations	Glandular frogs are not subject to extreme fluctuations in EOO, AOO, number of subpopulations, locations or mature individuals. No parameter was changed by an order of magnitude by the 2019-20 bushfires.			

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Criterion 1 Population size reduction

Reduction in total numbers (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered Very severe reduction	Endangered Severe reduction	Vulnerable Substantial reduction
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]</p> <p>A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p>		<p>Based on any of the following</p> <ul style="list-style-type: none"> (a) direct observation [except A3] (b) an index of abundance appropriate to the taxon (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat (d) actual or potential levels of exploitation (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites 	

Criterion 1 evidence

Not eligible

Although the generation length of the glandular frog is unknown, it is estimated to be 4 years based on the similar-sized Lesueur’s Frog (Morrison et al. 2004). Therefore, population reductions were assessed over a 12-year period.

Substantial declines have occurred from the mid-1970s to the mid-1990s, particularly in the New England Tablelands, where land around streams was largely cleared for agriculture purpose and subject to agricultural pollution (Mahony et al. 2001). Systematic surveys in the early 1990s by NSW National Parks and Wildlife Service (NPWS) only detected glandular frogs (including what is now considered to be Davies’ tree frog) at 8 of 573 potential breeding sites (NSW NPWS 1994). Although declines more than 12 years prior to this assessment (i.e., 2010) do not factor into the listing status of this species, they highlight the impact of past and ongoing threats.

Major ongoing threats include agricultural activities, increased frequency and intensity of drought, and increased frequency and severity of bushfires (see Table 1). After the 2019-20 fires, it is estimated that there was a 50 percent population decline in fire-affected areas (Mahony 2021. pers comm 10 September). The ecology of glandular frogs, specifically its association with riparian habitat, likely protected frogs from higher mortality (Mahony 2021. pers comm 10 September). An analysis by a team from the National Environmental Science Program's Threatened Species Recovery Hub estimated that 67 percent of the range of the glandular frog was affected by these fires: 21 percent was burnt in high to very high severity fire, and 46 percent was burnt in low to moderate severity fire. A structured expert elicitation process was used to estimate the proportional population change for this species from pre-fire levels to immediately after the fire and then out to three generations after the fire, when exposed to fires of varying severity. These results, combined with the spatial analyses of fire overlap, suggest that one year after the fire, the species has experienced an overall decline of 21 percent from pre-fire levels, but that the decline could be as large as 55 percent (upper bound of 80 percent confidence interval). After three generations, the estimate for the overall population decline relative to the pre-fire population was predicted to be 14 percent, but potentially as high as 53 percent (upper bound of 80 percent confidence interval). Thus, while severe population reduction due to the bushfires is possible, glandular frogs will most likely show a decline < 30 percent over a three-generation period (12 years). However, field surveys are needed to verify these estimates.

The Committee has concluded that the glandular frog is not eligible for listing in any category under this criterion, because past, current or future population declines are unlikely to exceed 30 percent in any three-generation period.

The purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 2 Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy

	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

Criterion 2 evidence

Eligible under Criterion 2 B1ab(i,ii,iii,v) +2ab(i,ii,iii,v) for listing as Vulnerable

The extent of occurrence (EOO) of the glandular frog is calculated at 13,589 km² and the area of occupancy (AOO) is calculated at 624 km² (see Table 3), which meet thresholds for listing as Vulnerable under sub-criteria B1 and B2, respectively.

Fire is considered to be the most serious, plausible threat for this species, specifically increased fire frequency and severity caused by climate change. Based on the extent of the 2019-20 bushfires, it is estimated that between 2–4 bushfire events could affect the entire population within a single generation. Hence, the number of locations is estimated to be two (Table 3), thereby meeting subcriterion (a).

Continuing declines in number of mature individuals, EOO, AOO, and extent and/or quality of habitat are inferred based on ongoing threats to glandular frogs, particularly bushfires, vegetation removal, pollution (see Criterion 1), thereby meeting subcriterion (b)(i,ii,iii,v).

The Committee considers that the species' EOO and AOO are limited, the number of locations is limited, and continuing decline is inferred in number of mature individuals, EOO, AOO, and area, extent and quality of habitat. Therefore, the species has met the relevant elements of Criterion 2 to make it eligible for listing as **Vulnerable**.

The purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 3 Population size and decline

	Critically Endangered Very low	Endangered Low	Vulnerable Limited
Estimated number of mature individuals	< 250	< 2,500	< 10,000
AND either (C1) or (C2) is true			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	Very high rate 25% in 3 years or 1 generation (whichever is longer)	High rate 20% in 5 years or 2 generation (whichever is longer)	Substantial rate 10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(a) (ii) % of mature individuals in one subpopulation =	90 - 100%	95 - 100%	100%
(b) Extreme fluctuations in the number of mature individuals			

Criterion 3 evidence

Insufficient data to determine eligibility

There is no estimate for the number of mature individuals, but the population size is not suspected to be small enough to warrant listing under this criterion.

The Committee considers that there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

The purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 4 Number of mature individuals

	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
D. Number of mature individuals	< 50	< 250	< 1,000
D2.¹ Only applies to the Vulnerable category Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time			D2. Typically: area of occupancy < 20 km ² or number of locations ≤ 5

¹ The IUCN Red List Criterion D allows for species to be listed as Vulnerable under Criterion D2. The corresponding Criterion 4 in the EPBC Regulations does not currently include the provision for listing a species under D2. As such, a species cannot currently be listed under the EPBC Act under Criterion D2 only. However, assessments may include information relevant to D2. This information will not be considered by the Committee in making its recommendation of the species' eligibility for listing under the EPBC Act, but may assist other jurisdictions to adopt the assessment outcome under the [common assessment method](#).

Criterion 4 evidence

Insufficient data to determine eligibility

The number of mature individuals is unknown (see Criterion 3).

The Committee considers that there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

The purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 5 Quantitative analysis

	Critically Endangered Immediate future	Endangered Near future	Vulnerable Medium-term future
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

Criterion 5 evidence

Insufficient data to determine eligibility

Quantitative analysis has not been undertaken. Therefore, there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

The purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Adequacy of survey

The survey effort has been considered adequate and there is sufficient scientific evidence to support the assessment.

Public consultation

Notice of the proposed amendment and a consultation document is made available for public comment for a minimum of 30 business days. Any comments received relevant to the survival of the species/subspecies are considered by the Committee as part of the assessment process.

Listing and Recovery Plan Recommendations

A decision about whether there should be a Recovery Plan for this species has not yet been determined. The purpose of this consultation document is to elicit additional information to help inform the decision.

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