

NSW Threatened Species Scientific Committee

Conservation Assessment of *Grevillea parviflora* subsp. *supplicans* Makinson (Proteaceae)

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Grevillea parviflora subsp. *supplicans* Makinson (Proteaceae)

Distribution: Endemic to NSW

Current EPBC Act Status: Not listed

Current NSW BC Act Status: Endangered

Proposed listing on NSW BC Act and EPBC Act: Endangered

This conservation assessment report has found that there is no change to the threatened status of *Grevillea parviflora* subsp. *supplicans* in NSW, and no changes to the schedules of the BC Act are therefore required.

Summary of Conservation Assessment

Grevillea parviflora subsp. *supplicans* was found to be eligible for listing as Endangered under Criterion B1ab(iii,v)+2ab(iii,v).

The main reasons for this species being eligible are: 1) the extent of occurrence is estimated to be 230 km² and the area of occupancy is estimated to be 136 km²; 2) it is known from 2–6 threat-defined locations; and 3) continuing decline in the area, extent and quality of habitat and the number of mature individuals is inferred due to adverse fire regimes, competition and habitat degradation from exotic grasses, road maintenance and track use, and land clearing including under-scrubbing for fire mitigation.



Grevillea parviflora subsp. *supplicans* flowering in Marramarra National Park. Photo: Gavin Phillips.

Description and Taxonomy

Grevillea parviflora subsp. *supplicans* is an accepted taxon (CHAH 2024; PlantNet 2025) that lies in *Grevillea* group *Linearifolia* subgroup *Linearifolia* (Makinson 2000). *Grevillea parviflora*, which contains two subspecies, is described at the species level by Makinson (2000) as having “Leaves linear to broadly so or very slightly oblanceolate, straight, pliable, 1.5–3.5 (–5) cm long, 0.8–1.0 (–1.3) mm wide; upper surface smooth to punctate, with midvein and intramarginal veins prominent and smooth to faintly granular; margins once or twice (vertically) refracted about intramarginal veins; lower surface exposed and subsericeous or sometimes enclosed except for midvein and then 2-grooved. Conflorescence terminal, erect, sessile to subsessile, mostly exceeded by adjacent leaves, broadly secund or subsecund (sometimes obscurely so), 4–14-flowered. Flowers acroscopic. Perianth subsericeous outside, bearded inside. Pistil 4.5–6.5 (–7.5) mm long; style incurved, usually hooked in apical 2 mm, with minute hairs and papillae in apical 0.5 mm; pollen-presenter oblique. Follicle narrowly ellipsoidal, 8–10 mm long, faintly warty.”

Grevillea parviflora subsp. *supplicans* is further described by Makinson (2000) as a “Low shrub 0.3–0.6(–1.0) m tall. Major branches spreading; branchlets usually strongly secund with leaves held skywards. Leaves 0.6–2(–3) mm wide. Flower colour: perianth white with rusty brown hairs on limb; style white, sometimes becoming red with age. Stipe of ovary 0.5–0.6 mm long.” It is distinguished from *G. parviflora* subsp. *parviflora* by the spreading and strongly secund branches, and a shorter stipe on the ovary (Makinson 2000).

Grevillea parviflora subsp. *supplicans* was previously considered a form (*G. linearifolia* form ‘d’ narrower-leaved Sydney form) within a broader concept of *G. linearifolia* (McGillivray and Makinson 1993). Many of these forms were subsequently recognised as distinct taxa in Makinson (2000), with *G. parviflora* subsp. *supplicans* forming an alliance with closely related taxa ranging from southern Queensland to the Shoalhaven area in NSW, with all having strongly to weakly secund conflorescences. *Grevillea parviflora* subsp. *supplicans* can be distinguished from these closely allied taxa by the combination of narrow and pliable leaves, the inner surface of the perianth profusely bearded, the short ovary stipe, and the strongly secund branches (Makinson 2000).

Distribution and Abundance

Grevillea parviflora subsp. *supplicans* is endemic to northwest Sydney in an area bound by Arcadia to the south, Maraylya in the west, the Hawkesbury River in the north and Berowra Creek in the east. This area lies across the Yengo, Pittwater and Cumberland subregions of the Sydney Basin Bioregion (Commonwealth of Australia 2012) and is on the traditional lands of the Dharug people (Horton 1996).

Originally thought to be highly restricted and known only from a few sites (NSW Scientific Committee 2000), the number of plants and sites known across northwest Sydney has substantially expanded with survey effort in recent years (Clarke 2024; BioNet 2025). *Grevillea parviflora* subsp. *supplicans* is currently known from a number of sites across Marramarra National Park (NP) and large tracts of bushland to the south that are a mixture of freehold properties, crown land, aboriginal land, and council managed areas. Several of the southernmost and westernmost sites occur in the urban or semi-urban fringe of the Sydney metropolitan area.

NSW Threatened Species Scientific Committee

There are estimated to be at least 2,972 mature individuals in the population of *Grevillea parviflora* subsp. *supplicans* spread across 11 subpopulations following the IUCN (2024) definition (Table 1). Subpopulations are defined where sites are geographically separated by 1 km or less, as greater distances are likely to be a barrier to gene flow. This is due to the typical foraging ranges of the primary pollinators of *G. parviflora* subsp. *supplicans* and the limited seed dispersal range typical of the genus (see Ecology section below). The largest subpopulation occurs between South Maroota and Canoelands, where an estimated 1,282 mature plants (43% of mature individuals of the total population) have been recorded across 10 discrete survey sites.

Table 1. Population breakdown for *Grevillea parviflora* subsp. *supplicans*.

Subpopulation	Tenure	Estimated number of mature individuals in subpopulation	Survey Site ¹	Survey year ¹	Surveyed abundance ¹
Weavers Ridge Trail	National Park	50	Weavers Ridge Trail	2017	50
Roberts Rd	National Park	150	Roberts Rd	1999	50
				2002	150
South Maroota-Canoelands	National Park, Aboriginal land, crown land and freehold	1,282	Paulls Rd E	2015	80
			Paulls Rd W	1998	25
				2003	5
				2012	400+
			Days Rd E	2009	300
			Days Rd W	2006	72
			Hearses Rd	2001	unknown
			Maroota FT	2021	4
			Hitchcock Rd	2004	unknown
			South of Maroota	2024	59
Glenorie	Aboriginal land and freehold	437	Little Cattai Creek	2009	405
			Yoothamurra Trail	2001	32
				2020	unknown
Cattai Creek	Freehold	unknown	Cattai Ridge Rd	2009	unknown
Smugglers Ridge	National Park	306	Smugglers Ridge Trail	2024	251
			Marramarra Ridge Trail	2024	55
Fagans Ridge	Aboriginal land and freehold	105	Fagans Ridge	2016	105
				2018	unknown

NSW Threatened Species Scientific Committee

Arcadia Park	Freehold	5	Arcadia Park	1999	5
Arcadia	Aboriginal land, crown land and freehold	300	Calabash Rd	2004	200
				2008	unknown
			Dust Hole Ridge Trail	1998	20
				2000	20
				2005	unknown
				2011	unknown
			Bay Rd	2000	30
				2007	unknown
				2013	unknown
			End of Bay Rd	2006	50
Halls Creek	Freehold	24	Bay Rd above Halls Creek	2002	24
Coba Ridge	National Park	313	Coba Ridge Trail	2024	313
TOTAL MATURE INDIVIDUALS		2,972			

¹Survey data are drawn from James (2012), Clarke (2024) and BioNet (2025).

The most recent surveys of *Grevillea parviflora* subsp. *supplicans* indicate that many sites recorded as far back as 1998 still contained numerous plants in 2024, with most being very healthy and displaying flowers and/or fruit (Clarke 2024). However, for sites that have not been resurveyed in recent years, abundance estimates remain uncertain, as numbers recorded up to 25 years ago may not accurately reflect current numbers, especially those outside of Marramarra NP that have not experienced fire since the time of last survey (NSW NPWS 2024). However, the total population estimate of 2,972 mature individuals is considered a plausible minimum population figure given many occurrences that have been re-surveyed since 2000 have increased in number, several sites and subpopulations that are likely extant have unknown abundances and are not included in the population estimate, and new stands/subpopulations are still being found (Clarke 2024). While the population appears to be stable based on surveys in Marramarra NP (Clarke 2024), the trajectory of the remainder of the population on other land tenures is currently unknown but is suspected to be declining, especially in areas with less frequent fire regimes than seen in the NP. in areas with less frequent fire regimes than seen in the NP.

Extent of Occurrence and Area of Occupancy

The Extent of Occurrence (EOO) is estimated to be 230 km² and is based on a minimum convex polygon enclosing a cleaned dataset of known occurrences of the subspecies, the method of assessment recommended by IUCN (2024). The Area of Occupancy (AOO) of *Grevillea parviflora* subsp. *supplicans* is estimated to be 136 km² using 2 x 2 km grid cells, the scale recommended by IUCN (2024). Both EOO and AOO were calculated using ArcGIS (Esri 2021). Based on these estimates, the subspecies has a highly restricted AOO and EOO.

The cleaned spatial dataset used to inform the AOO and EOO estimates contains 582 unique records sourced from BioNet (NSW Wildlife Atlas), the Atlas of Living Australia and targeted surveys undertaken by Clarke (2024). An outlying record of questionable accuracy that occurs just west of Cattai Creek currently forms the south-western limit

NSW Threatened Species Scientific Committee

of the known distribution of *Grevillea parviflora* subsp. *supplicans* and has a disjunction of 5–10 km from the next nearest records and was excluded from the cleaned dataset. The exclusion of this record would reduce the EOO to 193 km² and AOO to 132 km². In either event, the subspecies distribution is highly restricted.

Cultural Significance

This assessment is not intended to be comprehensive of the Traditional Ecological Knowledge that exists for *Grevillea parviflora* subsp. *supplicans* or to speak for Aboriginal people. Aboriginal people have a long history of biocultural knowledge, which comes from observing and being on Country, and evolves as it is tested, validated, and passed through generations (Woodward *et al.* 2020). Aboriginal Peoples have cared for Country for tens of thousands of years (Bowler *et al.* 2003; Clarkson *et al.* 2017). Although no specific information could be collected on *G. parviflora* subsp. *supplicans*, it is acknowledged that there is traditional ecological knowledge for all plants, animals and fungi connected within the kinship system (Woodward *et al.* 2020). Traditional ecological knowledge referenced in this assessment belongs to the relevant knowledge custodian and has been referenced in line with the principals of the NSW Indigenous Cultural and Intellectual Property protocol (ICIP) (Janke and Company 2023).

Other species of *Grevillea* are culturally significant plants for Indigenous Australians (Royal Botanic Gardens Victoria 2014).

Ecology

Habitat

Grevillea parviflora subsp. *supplicans* grows in heathy woodland on sandy soils over Hawkesbury Sandstone (Makinson 2000). The subspecies tends to grow in low nutrient soils and sites with full sun (Benson and McDougall 2000), and is now known to occupy a range of soil depths and textures (Clarke 2024). *Grevillea parviflora* subsp. *supplicans* prefers open woodlands and boundary areas between shrubby vegetation and open/bare sandstone platforms, and is often found in disturbed areas such as track edges and powerline easements, with such areas often holding the largest and healthiest stands (Clarke 2024; T. Burton pers. comm. February 2025). Observations in more recently burnt and long-unburnt stands show that plants become sparse and less fecund following inter-fire periods longer than 18–20 years, when a denser mid-storey develops and shades out lower shrubs such as *G. parviflora* subsp. *supplicans* (T. Burton pers. comm. February 2025).

Commonly associated species include *Corymbia eximia*, *C. gummifera*, *Eucalyptus globoidea*, *E. sparsifolia*, *E. squamosa*, *E. haemostoma*, *E. racemosa*, *E. punctata*, *Angophora hispida*, *A. bakeri*, *Gaudium trinervium*, *Banksia ericifolia*, *B. serrata*, *B. oblongifolia*, *Grevillea buxifolia*, *Petrophile pulchella*, *Kunzea capitata*, *Micromyrtus ciliata*, *Calytrix tetragona* and *Lepidosperma viscidium* (Benson and McDougall 2000; Clarke 2024). Several other species listed as threatened on the *Biodiversity Conservation Act 2016* also co-occur with *G. parviflora* subsp. *supplicans* at certain sites, including *Acacia bynoeana*, *Micromyrtus blakelyi*, *Leucopogon fletcheri* subsp. *fletcheri*, *Darwinia biflora*, *Tetratheca glandulosa*, *Hibbertia superans*, *Kunzea rupestris* and *Pimelea curviflora* var. *curviflora* (James 2012; Clarke 2024).

NSW Threatened Species Scientific Committee

Life history

Grevillea parviflora subsp. *supplicans* is an obligate seeder that is killed by fire and regenerates from a soil-stored seed bank (Falster *et al.* 2021; Ferrer-Parris and Keith 2022; T. Burton pers. comm. February 2025). While the subspecies does produce rhizomes from which it can vegetatively regenerate, it has not been observed to resprout following fire (Ferrer-Parris and Keith 2022) and records of the subspecies made in the wake of various fires have noted the lack of apparent resprouts and typically abundant seedlings (BioNet 2025).

The primary juvenile period of the subspecies is approximately two years following monitoring of the post-fire response of *Grevillea parviflora* subsp. *supplicans* in Marramarra NP (T. Burton pers. comm. February 2025). Estimates of lifespan for the subspecies and sister subspecies range from 25 to 60 years (Falster *et al.* 2021). Based on these estimates, a coarse estimate of generation length can be estimated using the age of first reproduction + $z \times$ length of reproductive period, where z is a constant between 0 and 1 calculated using survivorship and the relationship between fecundity and age (IUCN 2024). Using the above lifespan estimate of 25–60 years, a primary juvenile estimate of two years, and a value for z of 0.21–0.33 as calculated for other woody shrub species (Fung and Waples 2017), the generation length of *G. parviflora* subsp. *supplicans* is estimated to be 7–21 years.

Reproductive Ecology

Flowers of *Grevillea parviflora* subsp. *supplicans* are produced in spring (Aug–Nov), with peak flowering in October (McGillivray and Makinson 1993; Makinson 2000). Pollination is likely similar to most *Grevillea* species and performed by nectivorous birds and bees (White *et al.* 2020). While longer pollen transfer distances can and do occur, in species with such pollination syndromes, the majority is thought to occur across distances of less than 1 km (Krauss *et al.* 2021). Pollinated flowers produce one to two seeds per capsule which are released thereafter (Benson and McDougall 2000). *Grevillea parviflora* subsp. *supplicans* produces dormant seeds, likely possessing physiological dormancy as in *G. parviflora* subsp. *parviflora* and many other *Grevillea* species (Falster *et al.* 2021). The seeds are primarily dispersed via gravity with secondary dispersal by ants before forming a soil-stored seedbank (Benson and McDougall 2000).

Threats

The threats facing *Grevillea parviflora* subsp. *supplicans* are adverse fire regimes, competition and habitat degradation by exotic grasses, and habitat damage from road maintenance and track use. Land clearing and urbanisation also poses a potential threat to the taxon.

Adverse fire regimes

The fire history varies across the range of *Grevillea parviflora* subsp. *supplicans*. The southernmost subpopulations occurring in smaller patches amongst rural housing have no recorded fires, while other sites/subpopulations outside of Marramarra NP have mostly only been burned once or twice in the last 60 years (NSW NPWS 2024). Inside the NP fire frequency is typically higher, with sites having been burned up to five times in the last 60 years (NSW NPWS 2024). Fire-related threats therefore vary

NSW Threatened Species Scientific Committee

across the subspecies' range. While some sites in Marramarra NP may be threatened by too-frequent fire, those elsewhere may be at risk of senescence without fire stimulated mass recruitment.

Observations indicate that too infrequent fire is the primary threatening mechanism through which adverse fire regimes negatively affect *Grevillea parviflora* subsp. *supplicans*. Regular disturbance including after fire has been observed to result in large flushes of seedlings (James 2012; Clarke 2024; BioNet 2025; T. Burton pers. comm. February 2025), with long-unburnt stands noted as senescing over time, often as the result of suppression through overshading by over-topping shrubs (Clarke 2024; T. Burton pers. comm. February 2025). Without fire and soil disturbance to open the understory to maintain open vegetation communities and to allow seedlings to grow and mature, *G. parviflora* subsp. *supplicans* may not persist in the continued absence of fire. Where *G. parviflora* subsp. *supplicans* sites are on private land or in reserves surrounded by urban development, hazard reduction burning is logistically difficult and seldom conducted. While localised arson incidents can be common in these areas, wildfire risk is relatively low compared to larger natural areas in national parks, and remnants fragmented by urbanisation can be managed for fire suppression (Gill and Williams 1996; Tresize *et al.* 2020). The Arcadia Park subpopulation which is adjacent to urban infrastructure was described as having semi-senescent individuals in overmature vegetation in 1999 (BioNet 2025).

Comparison of sites in Marramarra NP also supports a need for regular fire to maintain *Grevillea parviflora* subsp. *supplicans* stands, with unburnt stands senescing. The Roberts Road subpopulation burnt in the 2002 wildfire, and a prescribed burn was next conducted at the site in 2009, seven years post-wildfire (NSW NPWS 2024). This prescribed burn was only applied to one side of the fire trail, and on this side the fire killed the mature plants on the site and resulted in a mass recruitment event (T. Burton pers. comm. February 2025). The plants on the other side of the trail were noted in subsequent years to senesce, with the side burnt in 2009 remaining healthy (T. Burton pers. comm. February 2025). Another site that burnt in the 2002 wildfire in the Smugglers Ridge subpopulation was also observed to be senescent some 18–20 years later (T. Burton pers. comm. February 2025), supporting the notion that periodic fire is necessary to maintain stands of *G. parviflora* subsp. *supplicans*, and that stands where fire is excluded may be at risk of decline in numbers of mature individuals and habitat quality.

Conversely, high fire frequency may burn *Grevillea parviflora* subsp. *supplicans* before they can mature and replenish the soil-stored seed bank. Fire intervals across subpopulations in Marramarra NP have generally been sufficiently long to avoid this, but records in the Roberts Road subpopulation appear to have possibly experienced a fire interval as short as one year, with records mapped within wildfire extents in both 1993 and 1994 (NSW NPWS 2024). Subsequent observations from this subpopulation indicate that the subspecies was abundant in places and/or regenerated following the next wildfire in 2002 (T. Burton pers. comm. February 2025). This may indicate that either one or both fires did not severely reduce the number of individuals in the subpopulation or that the subpopulation was able to regenerate (potentially from a residual soil seed bank) following an inter-fire interval of only one year. Given the frequency of fire weather days are projected to increase in the region particularly in spring and summer up to 2099 (AdaptNSW 2025), it is possible that consecutive fire episodes involving higher severity fires may occur in the future. Furthermore, rainfall

NSW Threatened Species Scientific Committee

across the subspecies' range is projected to decrease by 7–10% annually and mean temperatures throughout the year are expected to increase by 1–2°C by 2099 (AdaptNSW 2025), and the time spent in drought is projected to increase on the East Coast through the 21st century (CSIRO 2023), further increasing the chance of repeat and higher severity fires triggering decline in the future.

'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' and 'Anthropogenic climate change' are listed as Key Threatening Processes under the NSW *Biodiversity Conservation Act 2016*. 'Fire regimes that cause declines in biodiversity' and 'Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases' are listed as Key Threatening Processes under the *Environment Protection and Biodiversity Conservation Act 1999*.

Competition and habitat degradation from exotic grasses

Exotic grasses, including African lovegrass (*Eragrostis curvula*) and whiskey grass (*Andropogon virginicus*) have been identified as a threat to several subpopulations of *Grevillea parviflora* subsp. *supplicans* (James 2012; Clarke 2024; T. Burton pers. comm. February 2025; M. Hall pers. comm. February 2025). African lovegrass and whiskey grass are known to quickly colonise disturbed areas (Bradley 2016; Graham and Taylor 2018), interacting with other threats such as road maintenance and track use, land clearing, and adverse fire regimes to directly compete with *G. parviflora* subsp. *supplicans* which also prefers open, disturbed areas. Both of these exotic grasses are also known to form dense swards which can exclude other plant species and prevent recruitment, and also modify fire regimes by acting as a quick accumulating fuel (Cronk and Fuller 2001; NSW Scientific Committee 2003; Graham and Taylor 2018). Whiskey grass is also known to be allelopathic (Rice 1972) and is therefore able to suppress the growth of native plants.

Both African lovegrass and whiskey grass are considered problem weeds in core areas of *Grevillea parviflora* subsp. *supplicans* habitat, with these grasses being present in Marramarra NP, and whiskey grass being present at all *G. parviflora* subsp. *supplicans* sites surveyed in 2024 and some previously surveyed roadside sites outside of the NP (James 2012; Clarke 2024; T. Burton pers. comm. February 2025; M. Hall pers. comm. February 2025). Furthermore, highly invasive Coolatai grass (*Hyparrhenia hirta*) is also now spreading into northwest Sydney, and is considered a high risk for *G. parviflora* subsp. *supplicans* sites as unregulated vehicle movement could easily spread Coolatai grass into Marramarra NP (M. Hall pers. comm. February 2025). This means that continuing decline in the habitat quality of *G. parviflora* subsp. *supplicans* is inferred due to these exotic grasses, and this decline is likely to increase into the future.

'Invasion of native plant communities by exotic perennial grasses' is listed as a Key Threatening Process under the *Biodiversity Conservation Act 2016*.

Road maintenance and track use

Records of *Grevillea parviflora* subsp. *supplicans* note adverse effects from a range of human activities including roadside maintenance, and track use by mountain bikes and motorbikes (BioNet 2025). Adverse effects of human activity are likely greater in subpopulations that are closer to rural and semi-urban areas or along roads, tracks

NSW Threatened Species Scientific Committee

and trails. A number of subpopulations recorded along fire trails and roads may be negatively affected during roadwork activities or utilities installation and maintenance. While some disturbance may promote recruitment as seen in some roadside sites in the past (James 2012), it can also make vegetation more sensitive to other disturbances such as fire and facilitate the invasion of exotic grasses.

This threat also extends into Marramarra NP where unregulated vehicle access has resulted in trackside stands of *Grevillea parviflora* subsp. *supplicans* being disturbed and destroyed. Illegal access to trails in Marramarra NP by four-wheel drive vehicles has resulted in tracks being pushed directly through patches of *G. parviflora* subsp. *supplicans* in some areas of the Smuggler Ridge subpopulation, and one large site of the species in the NP was partially cleared at one time for an illegal rave party event (T. Burton pers. comm. February 2025). Several sites in the NP are also regularly accessed by utilities contractors, though this access is currently actively managed to ensure contractors do not spread weeds or damage sensitive vegetation (T. Burton pers. comm. February 2025; M. Hall pers. comm. February 2025). Without active management by the NSW National Parks and Wildlife Service, including the maintenance of gates and closure of trails to deter illegal access, the degradation of habitat and destruction of individuals of *G. parviflora* subsp. *supplicans* would likely increase from current levels. This threat therefore continues to be a substantial current and future risk to the subspecies.

Land clearing and urbanisation

It is likely that historical land clearing for agriculture has adversely affected *Grevillea parviflora* subsp. *supplicans* across the south of its range. At present, over half of the known subpopulations occur on the periphery of rural lands on or near private property or in unreserved lands, and it is possible these may be adversely affected by land use and clearing by private landowners. The practice of under-scrubbing (*i.e.* the removal of the shrub layer) as a fire prevention measure is the most likely clearing mechanism that adversely affects subpopulations on private properties in peri-urban areas. Several subpopulations of *G. parviflora* subsp. *supplicans* occur in zones that allow clearing of understorey vegetation within 50 m of a dwelling without a permit for fire mitigation (NSW Rural Fire Service 2025), and this unregulated clearing may result in significant loss of mature individuals and habitat on parcels of private land where the subspecies occurs.

‘Clearing of Native Vegetation’ is listed as a Key Threatening Process under the *Biodiversity Conservation Act 2016*. ‘Land Clearance’ is listed as a Key Threatening Process under the *Environment Protection and Biodiversity Conservation Act 1999*.

Number of Locations

When considering adverse fire regimes, *Grevillea parviflora* subsp. *supplicans* occurs across 2–6 threat-defined locations, as per the IUCN definition (IUCN 2024). This is due to increased frequency and severity of wildfires and their interaction with increased drought being the most serious plausible threat that results in the lowest number of locations for the taxon.

The number of threat-defined locations could be four, as a single large fire could affect all but the three southernmost subpopulations (Cattai Creek, Arcadia Park and Halls Creek) as happened in 2002 (NSW NPWS 2024), given their peri-urban settings and

NSW Threatened Species Scientific Committee

long-unburnt status. However, as fires can spread through peri-urban landscapes (as seen in fires in Como-Jannali (1994), Canberra (2003), Winmalee (2002), Wingello (2020)), the actual number of threat-defined locations may be as few as two or three. The maximum number of six threat-defined locations accounts for spatial patchiness across a large fireground due to potential fire breaks such as rivers and roads, and the presence of disjunct subpopulations, while noting that Marramarra NP has a history of large-scale fires that often span multiple subpopulations (NSW NPWS 2024).

Assessment against IUCN Red List criteria

For this assessment it is considered that the survey of *Grevillea parviflora* subsp. *supplicans* has been adequate and there is sufficient scientific evidence to support the listing outcome.

Criterion A Population size reduction

A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%
A1 Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased. A2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible. A3 Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]. 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. based on any of the following: (a) direct observation [except A3] (b) an index of abundance appropriate to the taxon (c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality (d) actual or potential levels of exploitation (e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.			

Outcome

Grevillea parviflora subsp. *supplicans* is considered Data Deficient under Criterion A.

Population reductions

While it is likely that the subspecies has undergone a population reduction historically due to clearing for urban development, there are insufficient data to quantify any reductions over a three-generation timespan of 21–63 years.

Criterion B Geographic range

B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
	Critically Endangered	Endangered	Vulnerable
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			

NSW Threatened Species Scientific Committee

Outcome

Grevillea parviflora subsp. *supplicans* is eligible for listing as Endangered under Criterion B1ab(iii,v)+2ab(iii,v).

EOO and AOO

The extent of occurrence (EOO) is estimated to be 230 km² and area of occupancy (AOO) has been estimated to be 136 km².

Number of threat-defined locations

Grevillea parviflora subsp. *supplicans* is found at 2–6 threat-defined locations when considering the most serious plausible threat that results in the minimum number of locations is adverse fire regimes. Given the history of large-scale fires in Marramarra NP that can also affect adjacent bushland areas, and that sites in these areas appear to have similar trends in wildfire occurrence and fire management (NSW NPWS 2024) resulting in a similar risk of adverse fire regimes affecting multiple sites, it is considered that the best estimate of the number of threat-defined locations is three to five.

Severely fragmented

Grevillea parviflora subsp. *supplicans* is not considered severely fragmented as most known individuals are found in relatively large, non-isolated subpopulations.

Continuing decline

Continuing decline in the area, extent and quality of habitat and number of mature individuals of *Grevillea parviflora* subsp. *supplicans* is inferred based on observations concerning a number of ongoing threats to the subspecies. Too infrequent fire negatively affects *Grevillea parviflora* subsp. *supplicans*, with observations supporting a need for regular fire to maintain stands through stimulation of the soil seedbank, and that long-unburnt stands senesce. Comparison of both regularly and long-unburnt sites in Marramarra NP has shown that stands burnt approximately 7 years apart remain healthy, with others senescing 18–20 years after wildfire (T. Burton pers. comm. February 2025). Additionally, some occurrences in the peri-urban environment, such as the Arcadia Park subpopulation which is adjacent to urban infrastructure, have been noted as having semi-senescent individuals in long-unburnt vegetation as far back as 1999 (BioNet 2025), and so it is possible that this subpopulation and others that have not recently burnt have further senesced and may contain no or limited mature individuals at present. Numbers of mature individuals have also declined due to unauthorised development of four-wheel drive tracks and clearing for other illegal activities in some large stands of *G. parviflora* subsp. *supplicans* in Marramarra NP, and unregulated clearing of the shrub layer (under-scrubbing) for fire mitigation on private land is also inferred to result in loss of mature plants.

Invasive exotic grasses such as African lovegrass and whiskey grass are commonly found in *Grevillea parviflora* subsp. *supplicans* sites (James 2012; Clarke 2024; T. Burton pers. comm. February 2025; M. Hall pers. comm. February 2025). These grasses degrade the habitat available for the subspecies by outcompeting seedlings, altering fire regimes, and allelopathic effects (Rice 1972; Cronk and Fuller 2001; Bradley 2016; Graham and Taylor 2018). They are also easily spread by unregulated vehicle access to sites, and can benefit from disturbance during track maintenance activities, further contributing to continuing decline.

NSW Threatened Species Scientific Committee

Extreme fluctuations

It is unknown whether *Grevillea parviflora* subsp. *supplicans* undergoes extreme fluctuations.

Conclusion

Grevillea parviflora subsp. *supplicans* is eligible to be listed as Endangered under Criterion B because the EOO and AOO meet the Endangered thresholds, and the best estimate of the number of threat-defined locations (3–5) also meets the Endangered threshold. Additionally, continuing decline in the area, extent and quality of habitat and the number of mature individuals is inferred due to adverse fire regimes, competition and habitat degradation from exotic grasses, road maintenance and track use, and land clearing including under-scrubbing for fire mitigation.

Criterion C Small population size and decline

C. Small population size and decline			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals	< 250	< 2,500	< 10,000
AND at least one of C1 or C2			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(ii) % of mature individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals			

Outcome

Grevillea parviflora subsp. *supplicans* is data deficient under Criterion C1 and Criterion C2.

Number of mature individuals

The minimum estimated population size of *Grevillea parviflora* subsp. *supplicans* is 2,972 mature individuals.

Continuing decline

Continuing decline in the number of mature individuals of *Grevillea parviflora* subsp. *supplicans* is inferred due to adverse fire regimes (particularly too infrequent fire), unauthorised track creation and clearing for other illegal activities in Marramarra NP and unregulated clearing of the shrub layer (under-scrubbing) for fire mitigation on private land.

However, the magnitude of this decline is unable to be estimated to allow assessment under Criterion C1.

Mature individuals in each subpopulation

The largest subpopulation of *Grevillea parviflora* subsp. *supplicans* between South Maroota and Canoelands is currently estimated to consist of 1,282 mature individuals.

NSW Threatened Species Scientific Committee

% of mature individuals in a single subpopulation.

Current knowledge suggests that the largest subpopulation of *Grevillea parviflora* subsp. *supplicans* between South Maroota and Canoelands contains approximately 43% of the total population.

Extreme fluctuations

It is unknown whether *Grevillea parviflora* subsp. *supplicans* undergoes extreme fluctuations.

Conclusion

Regarding Criterion C1, the overall number of mature individuals of *Grevillea parviflora* subsp. *supplicans* is below the Vulnerable threshold. However, there are not enough data to determine the magnitude of continuing decline in the number of mature individuals.

Regarding Criterion C2, while the overall number of mature individuals of *Grevillea parviflora* subsp. *supplicans* is below the Vulnerable threshold and continuing decline in the number of mature individuals is inferred, the number of mature individuals in each subpopulation and the % of mature individuals in the largest subpopulation exceed the Vulnerable thresholds. As it is uncertain whether the subspecies undergoes extreme fluctuations, there is insufficient information to determine whether it is eligible for listing under Criterion C2.

Criterion D Very small or restricted population

D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
D. Number of mature individuals	< 50	< 250	D1. < 1,000
D2. Only applies to the VU category Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.	-	-	D2. typically: AOO < 20 km ² or number of locations ≤ 5

Outcome

Grevillea parviflora subsp. *supplicans* is not eligible for listing under Criterion D.

Number of mature individuals

The minimum estimated population size of *Grevillea parviflora* subsp. *supplicans* is 2,972 mature individuals.

Risk of future extinction in a very short amount of time (D2)

Grevillea parviflora subsp. *supplicans* occurs at 2–6 threat-defined locations, and has an estimated AOO of 136 km². However, no plausible threat is apparent that may rapidly drive the subspecies to Critically Endangered or Extinct in a very short time.

Criterion E Quantitative Analysis

E. Quantitative Analysis			
	Critically Endangered	Endangered	Vulnerable
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

NSW Threatened Species Scientific Committee

Outcome

Grevillea parviflora subsp. *supplicans* is considered data deficient under Criterion E.

Probability of extinction

Currently there is not enough data to undertake a quantitative analysis to determine the extinction probability of *Grevillea parviflora* subsp. *supplicans*.

Conservation and Management Actions

Grevillea parviflora subsp. *supplicans* is currently listed on the NSW *Biodiversity Conservation Act 2016*, and a conservation strategy has been developed by the NSW Department of Climate Change, Energy, the Environment and Water under the Saving our Species (SoS) program. The conservation strategy identifies priority locations, critical threats and required management actions to ensure the subspecies is extant in the wild in 100 years. *Grevillea parviflora* subsp. *supplicans* sits within the Site-managed species stream of the SoS program, and the conservation project can be viewed [here](#).

NSW Threatened Species Scientific Committee

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NSW Threatened Species Scientific Committee

APPENDIX 1

Assessment against *Biodiversity Conservation Regulation 2017* criteria

The Clauses used for assessment are listed below for reference.

Overall Assessment Outcome:

Grevillea parviflora subsp. *supplicans* was found to be Endangered under Clause 4.3(b)(d)(e i,iii).

Clause 4.2 – Reduction in population size of species

(Equivalent to IUCN criterion A)

Assessment Outcome: Data Deficient

(1) - The species has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of the taxon:			
	(a)	for critically endangered species	a very large reduction in population size, or
	(b)	for endangered species	a large reduction in population size, or
	(c)	for vulnerable species	a moderate reduction in population size.
(2) - The determination of that criteria is to be based on any of the following:			
	(a)	direct observation,	
	(b)	an index of abundance appropriate to the taxon,	
	(c)	a decline in the geographic distribution or habitat quality,	
	(d)	the actual or potential levels of exploitation of the species,	
	(e)	the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.	

Clause 4.3 - Restricted geographic distribution of species and other conditions (Equivalent to IUCN criterion B)

Assessment Outcome: Endangered under Clause 4.3(b)(d)(e i,iii)

The geographic distribution of the species is:			
	(a)	for critically endangered species	very highly restricted, or
	(b)	for endangered species	highly restricted, or
	(c)	for vulnerable species	moderately restricted,
and at least 2 of the following 3 conditions apply:			
	(d)	the population or habitat of the species is severely fragmented or nearly all the mature individuals of the species occur within a small number of locations,	
	(e)	there is a projected or continuing decline in any of the following:	
		(i)	an index of abundance appropriate to the taxon,

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	(ii)	the geographic distribution of the species,
	(iii)	habitat area, extent or quality,
	(iv)	the number of locations in which the species occurs or of populations of the species,
	(f)	extreme fluctuations occur in any of the following:
	(i)	an index of abundance appropriate to the taxon,
	(ii)	the geographic distribution of the species,
	(iii)	the number of locations in which the species occur or of populations of the species.

Clause 4.4 - Low numbers of mature individuals of species and other conditions

(Equivalent to IUCN criterion C)

Assessment Outcome: Data Deficient

The estimated total number of mature individuals of the species is:			
	(a)	for critically endangered species	very low, or
	(b)	for endangered species	low, or
	(c)	for vulnerable species	moderately low,
and either of the following 2 conditions apply:			
	(d)	a continuing decline in the number of mature individuals that is (according to an index of abundance appropriate to the species):	
	(i)	for critically endangered species	very large, or
	(ii)	for endangered species	large, or
	(iii)	for vulnerable species	moderate,
	(e)	both of the following apply:	
	(i)	a continuing decline in the number of mature individuals (according to an index of abundance appropriate to the species), and	
	(ii)	at least one of the following applies:	
		(A)	the number of individuals in each population of the species is:
		(I)	for critically endangered species extremely low, or
		(II)	for endangered species very low, or
		(III)	for vulnerable species low,
		(B)	all or nearly all mature individuals of the species occur within one population,
		(C)	extreme fluctuations occur in an index of abundance appropriate to the species.

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Clause 4.5 - Low total numbers of mature individuals of species

(Equivalent to IUCN criterion D)

Assessment Outcome: Not met

The total number of mature individuals of the species is:			
	(a)	for critically endangered species	extremely low, or
	(b)	for endangered species	very low, or
	(c)	for vulnerable species	low.

Clause 4.6 - Quantitative analysis of extinction probability

(Equivalent to IUCN criterion E)

Assessment Outcome: Data Deficient

The probability of extinction of the species is estimated to be:			
	(a)	for critically endangered species	extremely high, or
	(b)	for endangered species	very high, or
	(c)	for vulnerable species	high.

Clause 4.7 - Very highly restricted geographic distribution of species–vulnerable species

(Equivalent to IUCN criterion D2)

Assessment Outcome: Not met

For vulnerable species,	the geographic distribution of the species or the number of locations of the species is very highly restricted such that the species is prone to the effects of human activities or stochastic events within a very short time period.
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