

Abridged Threatened Species Nomination Form

For nominations under the Common Assessment Method (CAM) where supporting information is available, but not in a format suitable for demonstrating compliance with the CAM, and assessment against the IUCN Red List threat status.

Cover Page *(Office use only)*

Species name (scientific and common name):	<i>Bertmainius colonus</i> (Eastern Stirling Range pygmy trapdoor spider)
Nomination for (addition, deletion, change):	Addition
Nominated conservation category and criteria:	Vulnerable B1ab(iii)+B2ab(iii)

Scientific committee assessment of eligibility against the criteria:		
This assessment is consistent with the standards set out in Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding.		Yes <input type="checkbox"/> No <input type="checkbox"/>
A.	Population size reduction	•
B.	Geographic range	•
C.	Small population size and decline	•
D.	Very small or restricted population	•
E.	Quantitative analysis	•

Outcome:			
Scientific committee meeting date:			
Scientific committee comments:			
Recommendation:			
Ministerial approval:		Date of Gazettal/ Legislative effect:	

Nomination summary *(to be completed by nominator)*

Current conservation status				
Scientific name:	<i>Bertmainius colonus</i>			
Common name:	Eastern Stirling Range pygmy trapdoor spider			
Family name:	Migidae	Fauna <input checked="" type="checkbox"/>	Flora <input type="checkbox"/>	
Nomination for:	Listing <input checked="" type="checkbox"/>	Change of status <input type="checkbox"/>	Delisting <input type="checkbox"/>	
1. Is the species currently on any conservation list, either in a State or Territory, Australia or Internationally? 2. Is it present in an Australian jurisdiction, but not listed?		Provide details of the occurrence and listing status for each jurisdiction in the following table		
Jurisdiction	State / Territory in which the species occurs	Date listed or assessed (or N/A)	Listing category i.e. critically endangered or 'none'	Listing criteria i.e. B1ab(iii)+2ab(iii)
International (IUCN Red List)				
National (EPBC Act)				
State / Territory	1. WA	8/4/1994	Endangered (as <i>Moggridgea</i> sp. (BY Main 1990/24.25))	C1+2a
	2.	Reassessed 22/06/2016 by WA TSSC	Vulnerable	B1ab(iii)+B2ab(iii)
	3.			
Consistent with Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding, it is confirmed that:				
<ul style="list-style-type: none"> this assessment meets the standard of evidence required by the Common Assessment Method to document the eligibility of the species under the IUCN criteria; 			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:				
<ul style="list-style-type: none"> surveys of the species were adequate to inform the assessment; 			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:	This species, and others of the same genus, have been the subject of considerable survey effort by many people over the past 20 years. Staff from the WA Museum and DPAW have actively searched for species of <i>Bertmainius</i> at numerous locations across southwest WA, using standard search techniques and pitfall traps.			
<ul style="list-style-type: none"> the conclusion of the assessment remains current and that any further information that may have become available since the assessment was completed supports or is consistent with the conclusion of the assessment. 			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:	Harvey <i>et. al.</i> (2015) conducted a taxonomic revision of the genus <i>Moggridgea</i> which has led to the split of <i>Moggridgea</i> sp. (BY Main 1992/24.25) into three species under the genus <i>Bertmainius</i> : <i>B.</i>			

<p><i>monachus</i>, <i>B. pandus</i> and <i>B. colonus</i>. The specimen (BY Main 1990/24.25) used for the original species listing has been attributed to <i>B. colonus</i>. <i>Moggridgea</i> sp. (BY Main 1992/24.25) was listed in WA in 1994 as Endangered C1+2a,, but following the taxonomic revision, the species was reassessed in June 2016 by the WA TSSC as Vulnerable B1ab(iii)+B2ab(iii).</p>		
<p>Nominated national conservation status: category and criteria</p>		
<p>Presumed extinct (EX) <input type="checkbox"/> Critically endangered (CR) <input type="checkbox"/> Endangered (EN) <input type="checkbox"/> Vulnerable (VU) <input checked="" type="checkbox"/></p>		
<p>None (least concern) <input type="checkbox"/> Data Deficient <input type="checkbox"/> Conservation Dependent <input type="checkbox"/></p>		
<p>What are the IUCN Red List criteria that support the recommended conservation status category?</p>	<p>B1ab(iii)+B2ab(iii)</p>	
<p>Eligibility against the IUCN Red List criteria (A, B, C, D and E)</p>		
<p><i>Provide justification for the nominated conservation status; is the species eligible or ineligible for listing against the five criteria. For delisting, provide details for why the species no longer meets the requirements of the current conservation status.</i></p>		
A.	Population size reduction (evidence of decline)	<ul style="list-style-type: none"> (A3) It is projected that the species may undergo drastic population decline in the future if impacted by fire events and/or a drying climate. However, there is no information on population size or potential rates of reduction. No information to assess.
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	<ul style="list-style-type: none"> (B1) The current EOO is < 100 km² (36 km²) which meets criteria Critically Endangered. (B2) The AOO is < 500 km² (36 km²) which meets criteria for Endangered. (a) The species is known from less than 10 locations (collected on 7 separate peaks), all on the eastern massif of the Stirling Range. This falls under the criteria for Vulnerable. (b) It is projected that the species will experience a decline in (iii) area, extent and/or quality of habitat in response to fire events, a drying climate, and habitat degradation from <i>Phytophthora</i>. Meets criteria for Vulnerable B1ab(iii)+B2ab(iii)
C.	Small population size and decline (population size, distribution and evidence of decline)	<ul style="list-style-type: none"> It is known from less than 10 locations, with some populations consisting of dozens of individuals. However, there is no information on total population size or potential rates of reduction. No information to assess
D.	Very small or restricted population (population size)	<ul style="list-style-type: none"> It is known from less than 10 locations, with some populations consisting of dozens of individuals. However, there is no information on total population size. No information to assess/Does not meet criteria.
E.	Quantitative analysis (statistical probability of extinction)	<ul style="list-style-type: none"> No information to assess.

Summary of assessment information					
EOO	EOO using MCP 23 km ² . IUCN guidelines state that AOO cannot exceed EOO and therefore EOO is considered to be 36 km ² .	AOO	36 km ² (2kmx2km grid) [25 km ² (Harvey <i>et. al.</i> 2015)]	Generation length	≥ 4 years
No. locations	< 10 Collected from 7 separate peaks	Severely fragmented		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>	
No. subpopulations	< 10 Collected at 7 sites	No. mature individuals		Unknown	
Percentage global population within Australia				100%	
Percentage population decline over 10 years or 3 generations				N/A	
Threats (detail how the species is being impacted)					
Threat (describe the threat and how it impacts on the species. Specify if the threat is past, current or potential)		Extent (give details of impact on whole species or specific subpopulations)		Impact (what is the level of threat to the conservation of the species)	
Habitat degradation due to <i>Phytophthora</i> dieback <i>Phytophthora</i> selectively reduces the floral assemblages which may lead to degraded habitat. <i>Present and future</i>		Entire		Medium	
Extreme fire events and inappropriate fire regimes Other <i>Bertmainius</i> species have been subject to fire, which caused the death of many individuals. Therefore there is evidence that fire events can severely reduce the population size. <i>Past, present and future</i>		Entire		High	
Climate change – drying climate and increased fire risk Climate change is leading to a drying climate and increasing the frequency and intensity of extreme weather events like fire. <i>Future</i>		Entire		High	
Management and Recovery					
Is there a Recovery Plan (RP) or Conservation Management Plan operational for the species?				Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
List all relevant recovery or management plans (including draft, in-preparation, out-of-date, national and State/Territory recovery plans, recovery plans for other species or ecological communities, or other management plans that may benefit or be relevant to the nominated species).					

- Department of Environment and Conservation. (DRAFT). *Stirling Range Rhytidid Snail (Undescribed Rhytidid species (WAM 2295-69)) and Stirling Range Trapdoor Spider (Moggridgea sp. S (BY Main 1990/24.25)) Recovery Plan 2010-2019*.
- Barret, S. (2005). *Montane Mallee Thicket of the Stirling Range Interim Recovery Plan (Mallee-heath and mallee-thicket community on mid to upper slopes of Stirling Range mountains and hills) 2004-2009 (Interim Recovery Plan No. 195)*. Albany, WA: Department of Conservation and Land Management.
- Barret, S. (2000). *Montane Heath and Thicket of the South West Botanical Province, above approximately 900m above sea level (Eastern Stirling Range Montane Heath and Thicket Community) Interim Recovery Plan 1999-2002 (Interim Recovery Plan No. 52)*. Wanneroo, WA: Department of Conservation and Land Management.
- Department of Conservation and Land Management (1999). *Stirling Range and Porongurup National Parks Management Plan 1999-2009 (Management Plan No. 42)*. Perth, WA: Prepared by the Department of Conservation and Land Management for the National Parks and Nature Conservation Authority.

List current management or research actions, if any, that are being undertaken that benefit the conservation of the species.

- Phosphite spraying of Declared Rare Flora and Threatened Ecological Communities within the Stirling Range NP to control the spread of *Phytophthora cinnamomi* dieback since 1997.
- *Phytophthora cinnamomi* hygiene practices are in place and information on hygiene practices is available for visitors to the SRNP.
- The current Stirling Range National Park fire management strategy highlight areas where known threatened invertebrates occur to identify where protection from fire is necessary. Fire suppressants and retardants are employed for the control of fires within the SRNP.
- Several invertebrate research projects involving searches for invertebrates within SRNP and surrounds have been conducted by Parks & Wildlife and WA Museum staff.

List further recommended management or research actions, if any, that would benefit the conservation of the species.

- Continue *Phytophthora cinnamomi* control activities, hygiene practices and education.
- Investigate effect of phosphite spray on the species.
- Continue to implement fire exclusion practices.
- Implement monitoring program and undertake research to further understand the biology and ecology, particularly in relation to fire and climate change.
- Improve public awareness and understanding of Stirling Range invertebrates.

Nomination prepared by:

Contact details:

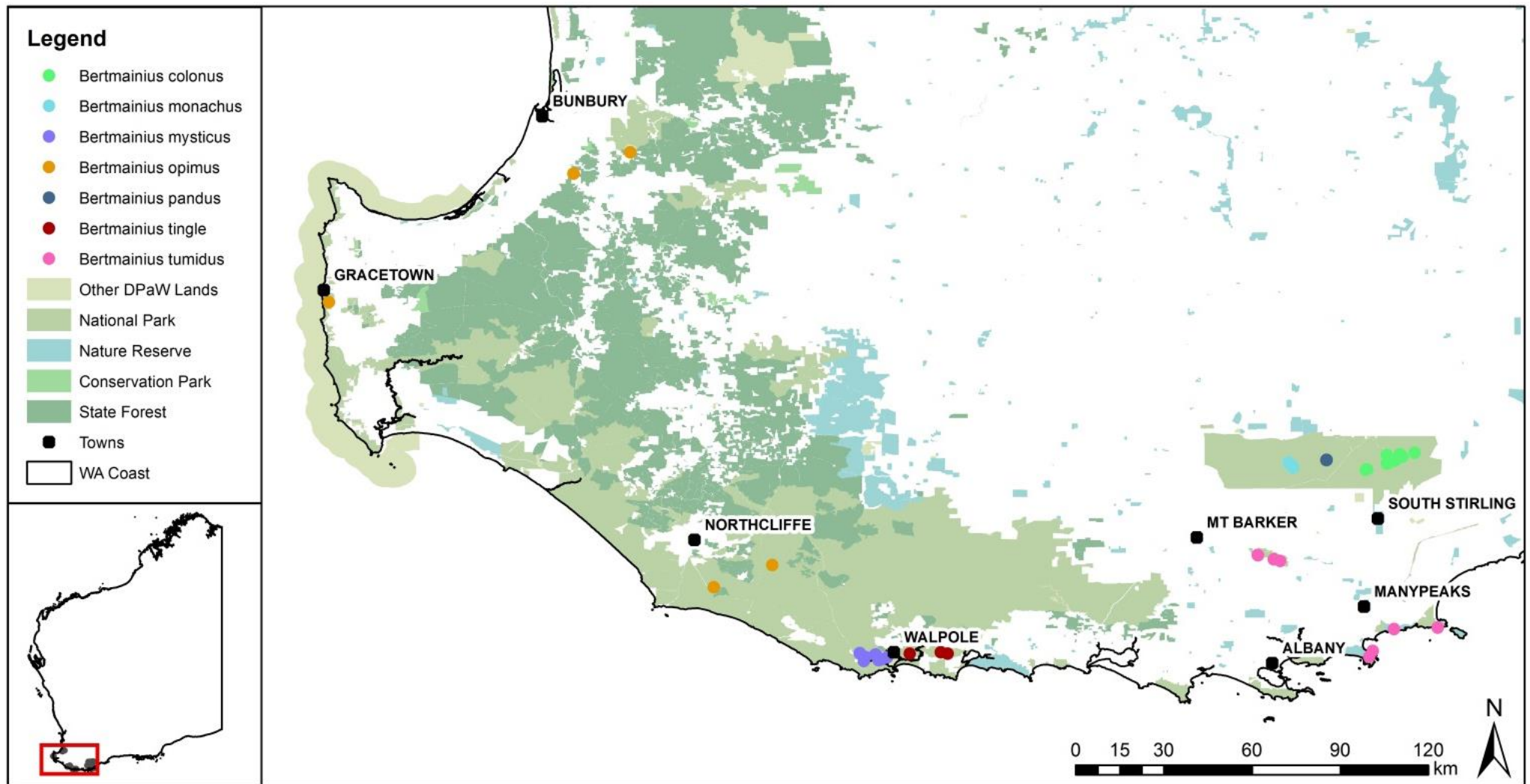
Date submitted:

If the nomination has been refereed or reviewed by experts, please provide their names and contact details:

Mark Harvey – WA Museum

Summary of subpopulation information (detailed information to be provided in the relevant sections of the form)						
Location (include coordinates)	Land tenure	Survey information: Date of survey and No. mature individuals	AOO	Site / habitat Condition	Threats (note if past, present or future)	Specific management actions
Stirling Range NP, Eastern Massif, S of Pyungorup Peak -34.3692, 118.3278	National Park	2005 – 3 specimens		Good	Habitat degradation due to <i>Phytophthora</i> dieback: <i>present and future</i> Extreme fire events and inappropriate fire regimes: <i>past, present and future</i> Climate change – drying climate and increased fire risk: <i>future</i>	<i>Phytophthora cinnamomi</i> control activities, hygiene practices and education. Fire management strategy including fire exclusion. Monitor and research the species, particularly the effects of fire and climate change Raise public awareness and understanding
Stirling Range NP, Eastern Massif, N. end of South Isongerup Track -34.3744, 118.2828	National Park	2005 - 12 specimens		Good	As above	As above
Stirling Range NP, Eastern Massif, Ellen Creek -34.3817, 118.2897	National Park	2005 -11 specimens		Good	As above	As above
Stirling Range NP, Eastern Massif, SE of Coyanarup Peak -34.3919, 118.2678	National Park	2004/2005 - 15 specimens		Good	As above	As above
Stirling Range NP, Eastern Massif, Bluff	National	2004 – 2 specimens		Good	As above	As above

Knoll -34.3756, 118.2425	Park					
Stirling Range NP, Eastern Massif, Coyanarup Peak -34.4028, 118.2444	National Park	2004/2005 – 15 specimens		Good	As above	As above
Stirling Range NP, Eastern Massif, Wedge Hill -34.4203, 118.1828	National Park	1996 – 2 specimens 2004 – 3 specimens		Good	As above	As above
Stirling Range NP, Eastern Massif, S of Pyungorup Peak -34.3692, 118.3278	National Park	2005 – 3 specimens		Good	As above	As above



A map of south-west WA with locations of WA Museum *Bertmainius* specimens (DPaW, 2016).

Threatened species nomination

For nominations to the WA Threatened Species Scientific Committee (and the Minister for Environment) to amend threatened species listings under the WA *Wildlife Conservation Act 1950* or their IUCN Red List threat status.

Cover Page (Office use only)

Species name (scientific and common name):	<i>Bertmainius colonus</i> (Eastern Stirling Range pygmy trapdoor spider)
Nomination for (addition, deletion, change):	Change
Nominated conservation category and criteria:	Vulnerable B1+2ab(i,ii,iii,iv,v)c(iv)

TSSC assessment of eligibility against the criteria:		
A.	Population size reduction	<ul style="list-style-type: none"> No information to assess
B.	Geographic range	<ul style="list-style-type: none"> Harvey <i>et. al.</i> (2015) conducted a taxonomic revision of the genus <i>Moggridgea</i> which has led to the split of <i>Moggridgea</i> sp. (BY Main 1992/24,25) into three species under the genus <i>Bertmainius</i>: <i>B. monachus</i>, <i>B. pandus</i> and <i>B. colonus</i>. The specimen (BY Main 1990/24.25) used for the original species listing has been attributed to <i>B. colonus</i>. Therefore the nomenclature will be updated accordingly. The current EOO is < 100 km² and the AOO is < 25 km² and the species is known from less than 10 locations, all on the eastern massif of the Stirling Range. It is projected that the species will experience declines in area, extent and/or quality of habitat, in response to fire events, a drying climate, and habitat degradation from <i>Phytophthora</i>. Meets criteria for Vulnerable B1ab(iii)+B2ab(iii)
C.	Small population size and decline	<ul style="list-style-type: none"> No information to assess
D.	Very small or restricted population	<ul style="list-style-type: none"> No information to assess/does not meet criteria
E.	Quantitative analysis	<ul style="list-style-type: none"> No information to assess

Outcome:	
TSSC Meeting date:	22 nd June, 2016

<i>TSSC comments:</i>	TSSC discussed whether the species was experiencing continuing decline, and decided that there was only ongoing decline in the (iii) area, extent and/or quality of habitat.		
<i>Recommendation:</i>	Vulnerable B1ab(iii)+B2ab(iii)		
<i>Ministerial approval:</i>		<i>Government Gazette:</i>	

Nomination summary *(to be completed by nominator)*

Current conservation status					
Scientific name:	<i>Moggridgea</i> sp. (BY Main 1990/24.25)				
Common name:	Stirling Range trapdoor spider				
Family name:	Migidae	Fauna <input checked="" type="checkbox"/>		Flora <input type="checkbox"/>	
Nomination for:	Listing <input type="checkbox"/>	Change of status <input checked="" type="checkbox"/>		Delisting <input type="checkbox"/>	
Is the species currently on any conservation list, either in WA, Australia or Internationally?		Yes <input checked="" type="checkbox"/> If Yes; complete the following table		No <input type="checkbox"/> If No; go to the next question	
Jurisdiction	List or Act name	Date listed or assessed	Listing category i.e. critically endangered	Listing criteria i.e. B1ab(iii)+2ab(iii)	
International	IUCN Red List				
National	EPBC Act				
State of WA	WC Act	8/4/1994	Endangered (as <i>Moggridgea</i> sp. (BY Main 1990/24.25))	C1+2a	
	DPaW Priority list	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>
Other States or Territories					
Nominated conservation status: category and criteria (including recommended categories for deleted species)					
Presumed extinct (EX) <input type="checkbox"/> Critically endangered (CR) <input type="checkbox"/> Endangered (EN) <input type="checkbox"/> Vulnerable (VU) <input checked="" type="checkbox"/>					
None <input type="checkbox"/> Priority 1 <input type="checkbox"/> Priority 2 <input type="checkbox"/> Priority 3 <input type="checkbox"/> Priority 4 <input type="checkbox"/> Other Specially Protected (Conservation Dependent) <input type="checkbox"/>					
What criteria support the conservation status category above? <i>Refer to Appendix A table 'Summary of the five criteria (A-E)' and the check version that can be completed to indicate all criteria options</i>			B1+2ab(i)(ii)(iii)(iv)(v)c(iv) Harvey et. al. (2015)		
Eligibility against the criteria					
Provide justification for the nominated conservation status; is the species eligible or ineligible for listing against the five criteria. For delisting , provide details for why the species no longer meets the requirements of the current conservation status.					
A.	Population size reduction	<ul style="list-style-type: none"> (A3) It is projected that the species may undergo drastic population decline in the future if impacted by fire events and/or a drying climate. However, there is no information on population size or potential rates of reduction. No information to assess. 			
B.	Geographic range	<ul style="list-style-type: none"> (B1) The current EOO is < 100 km² which meets criteria Critically 			

		<p>Endangered.</p> <ul style="list-style-type: none"> • (B2) The AOO is < 25 km² which meets criteria for Endangered. • (a) The species is known from less than 10 locations, all on the eastern massif of the Stirling Range. This falls under the criteria for Vulnerable. • (b) It is projected that the species will experience a decline in (i) extent of occurrence, (ii) area of occupancy, (iii) area, extent and/or quality of habitat, (iv) number of locations and (v) number of mature individuals in response to fire events, a drying climate, and habitat degradation from <i>Phytophthora</i>. • (c) Harvey <i>et. al.</i> (2015) recommends that this species may experience extreme fluctuation in the (iv) number of mature individuals due to the impact of fire, as demonstrated by other <i>Bertmainius</i> species. • Meets criteria for Vulnerable B1+2ab(i)(ii)(iii)(iv)(v)c(iv)
C.	Small population size and decline	<ul style="list-style-type: none"> • It is known from less than 10 locations, with some populations consisting of dozens of individuals. However, there is no information on total population size or potential rates of reduction. • No information to assess
D.	Very small or restricted population	<ul style="list-style-type: none"> • It is known from less than 10 locations, with some populations consisting of dozens of individuals. However, there is no information on total population size. • No information to assess/Does not meet criteria.
E.	Quantitative analysis	<ul style="list-style-type: none"> • No information to assess.
Reasons for change of status		
Genuine change <input type="checkbox"/> New knowledge <input checked="" type="checkbox"/> Taxonomic change <input checked="" type="checkbox"/> Previous mistake <input type="checkbox"/> Other <input type="checkbox"/>		
Harvey <i>et. al.</i> (2015) have conducted a taxonomic revision of the genus <i>Moggridgea</i> which has led to the split of <i>Moggridgea</i> sp. (BY Main 1992/24.25) into three species under the genus <i>Bertmainius</i> : <i>B. monachus</i> , <i>B. pandus</i> and <i>B. colonus</i> . The WAM specimen used for the listing has been attributed to <i>B. colonus</i> .		
Summary of assessment information (detailed information to be provided in the relevant sections of the form)		
EOO	< 100 km ²	AOO 25 km ² Generation length ≥ 4 years
No. locations	< 10	Severely fragmented Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
No. subpopulations	< 10	No. mature individuals Unknown
Percentage global population within WA		100%
Percentage global population within Australia		100%
Percentage population decline over 10 years or 3 generations		N/A

Summary of subpopulation information (detailed information to be provided in the relevant sections of the form)						
Location (include coordinates)	Land tenure	Survey information: Date of survey and No. mature individuals	AOO	Site / habitat Condition	Threats (note if past, present or future)	Specific management actions
Stirling Range NP, Eastern Massif, S of Pyungorup Peak -34.3692, 118.3278	National Park	2005 – 3 specimens		Good	Fire (past, present & future) Phytophthora (present & future) Climate change – drying of habitat and increased fire risk (future)	Mitigation of large, hot fires Ongoing assessment of impacts of Phytophthora
Stirling Range NP, Eastern Massif, N. end of South Isongerup Track -34.3744, 118.2828	National Park	2005 - 12 specimens		Good	Fire (past, present & future) Phytophthora (present & future) Climate change – drying of habitat and increased fire risk (future)	Mitigation of large, hot fires Ongoing assessment of impacts of Phytophthora
Stirling Range NP, Eastern Massif, Ellen Creek -34.3817, 118.2897	National Park	2005 -11 specimens		Good	Fire (past, present & future) Phytophthora (present & future) Climate change – drying of habitat and increased fire risk (future)	Mitigation of large, hot fires Ongoing assessment of impacts of Phytophthora
Stirling Range NP, Eastern Massif, SE of Coyanarup Peak -34.3919, 118.2678	National Park	2004/2005 - 15 specimens		Good	Fire (past, present & future) Phytophthora (present & future) Climate change – drying of habitat and increased fire risk (future)	Mitigation of large, hot fires Ongoing assessment of impacts of Phytophthora
Stirling Range NP, Eastern Massif, Bluff Knoll	National Park	2004 – 2 specimens		Good	Fire (past, present & future) Phytophthora (present & future) Climate change – drying of	Mitigation of large, hot fires Ongoing assessment of impacts of Phytophthora

-34.3756, 118.2425					habitat and increased fire risk (future)	
Stirling Range NP, Eastern Massif, Coyanarup Peak -34.4028, 118.2444	National Park	2004/2005 – 15 specimens		Good	Fire (past, present & future) Phytophthora (present & future) Climate change – drying of habitat and increased fire risk (future)	Mitigation of large, hot fires Ongoing assessment of impacts of Phytophthora
Stirling Range NP, Eastern Massif, Wedge Hill -34.4203, 118.1828	National Park	1996 – 2 specimens 2004 – 3 specimens		Good	Fire (past, present & future) Phytophthora (present & future) Climate change – drying of habitat and increased fire risk (future)	Mitigation of large, hot fires Ongoing assessment of impacts of Phytophthora

Nomination detail

Please refer to the Departments guidelines on nominating species for amendment of the Western Australian threatened species lists at http://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Threatened_Species_Nomination_Guidelines_2014.pdf

For technical information on terminology used in this form, and the intent of information requirements, as they relate to an assessment of this nomination against the IUCN Red List criteria, refer to the 2001 *IUCN Red List Categories and Criteria. Version 3.1*

http://www.iucnredlist.org/documents/redlist_cats_crit_en.pdf

and *Guidelines for Using the IUCN Red List Categories and Criteria Version 11* (February 2014)

<http://cmsdocs.s3.amazonaws.com/RedListGuidelines.pdf>

Section 1: Taxonomy

1.1 Current taxonomy	
Species name and Author:	<i>Bertmainius colonus</i> Harvey, Main, Rix & Cooper 2015
Subspecies name(s) and Author:	N/A
Is the species/subspecies conventionally accepted?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Is there any controversy about the taxonomy?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If not conventionally accepted and/or if there is any controversy; provide details:	N/A
Has the species/subspecies been formally named?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Has the species/subspecies been recently described?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
If the species has not been formally named or described; is it in the process of being described? Is there an anticipated date for the publication of the description? Has a type specimen been deposited? And if so provide the registration number and where deposited.	N/A
If there are any closely related taxa provide details and include key distinguishing features:	<p>Excerpts from Harvey <i>et. al.</i> (2015):</p> <p>Males of <i>B. colonus</i> differ from those of <i>B. tingle</i>, <i>B. mysticus</i> and <i>B. opimus</i> by the presence of a ventral spine on tibia I (Fig. 63), from <i>B. pandus</i> by the less sinuate metatarsus I (Fig. 64), from <i>B. monachus</i> by the smaller PME (Fig. 52), and from <i>B. tumidus</i> by the less robust tibia I (Fig. 62). In addition, <i>B. colonus</i> can be distinguished by the following two unique nucleotide substitutions for nuclear ITS1/ITS2 (see Supplementary File S1) (n = 15): A(41), T(474).</p> <p>The male of <i>Bertmainius colonus</i> is extremely similar to males of the other two species from the Stirling Range, but males cannot be effectively distinguished from <i>B. monachus</i> using morphological criteria alone. However, the sequence data show significant divergences for both COI and ITS (Figs 10, 11); these data are consistent with genetic isolation of the two species' highly disjunct populations over millions of years (Cooper et al. 2011), thus confirming their status as distinct species.</p>

1.2 Taxonomic history			
Are there recent synonyms for the species?		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
If Yes; provide details of synonyms:	Currently listed as <i>Moggridgea</i> sp. (BY Main 1990/24.25) Stirling Range trapdoor spider		
Have there been recent changes in the taxonomy or nomenclature?		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
If Yes; provide details of changes:	Harvey <i>et. al.</i> (2015) have conducted a taxonomic revision of the genus <i>Moggridgea</i> which has led to the split of <i>Moggridgea</i> sp. (BY Main 1992/24.25) into three species under the genus <i>Bertmainius</i> : <i>B. monachus</i> , <i>B. pandus</i> and <i>B. colonus</i> . The WAM specimen used for the listing has been attributed to <i>B. colonus</i> .		
1.3 Hybridisation			
Is there any known hybridism with other species in the wild?		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
If Yes; Where does this occur and how frequently?	N/A		

Section 2: Species information

2.1 Morphology / physical description	
Insert photograph(s) of species or provide as an attachment: See Figs 50-76 in Harvey <i>et. al.</i> (2015).	
Species description:	Adult <i>Bertmainius</i> are small trapdoor spiders, with a total body length of 6.10mm (male) to 10.38mm (female). They are dark grey-brown coloured in life, but yellow-brown when preserved in ethanol. Females have a strongly spinose pedipalp and legs I and II. See Harvey <i>et. al.</i> (2015) for a full species-specific description.
2.2 Biology (provide details)	
<p>The spiders construct shallow burrows on the banks of shallow gullies. The burrows are capped with a thin lid that serves to retain moisture and keep out predators such as ants. The lids are sealed with silk when the spiders moult, or when eggs or juveniles are in the burrow with the female. The spiders seem to prefer moist, shaded areas.</p> <p>Burrows are often clustered in appropriate microhabitats. Life history information is limited, and the age structure of the populations is unknown. However, most mygalomorph spiders are relatively long lived (>5 years).</p>	
2.3 Ecology (provide details)	
<p>The spiders remain in their burrows for virtually their entire lives, with adult males permanently leaving their burrows after maturity to wander in search of adult females. Little is known of the reproductive ecology of <i>Bertmainius</i> species. Once they have emerged, adult males are unlikely to be able to walk very far, and might only venture over a few square metres in their life. It is likely that the males of this species mature and wander in search of females during autumn and winter. The only recorded male of <i>B. colonus</i> was found alone in its nest in March 2005, suggesting that it had recently moulted and was waiting for favourable conditions to emerge and seek females for mating. Like other trapdoor spiders, it is assumed that males approach the burrow of a mature female, and rely</p>	

on pheromones to assess her reproductive status. If receptive, the male will enter the burrow and mate with the female. After gestation, the female lays a single egg sac with ca. 15-40 eggs. After hatching the juveniles stay with their mother for at least a few days before emerging to construct their own burrow. After mating with one or more females, the adult male dies.

The spiders feed on other small invertebrates, including ants, as evidenced by insect remains being found in the burrows of some individuals. The spiders wait at night for prey, at the entrance of their burrow with the lid slightly open. When a suitable prey item walks past the burrow, they lunge out and drag the prey into the burrow. It is then bitten to inject venom, and consumed. The sedentary, burrow-restricted lifestyle of these spiders makes them highly susceptible to threatening processes in the surrounding habitat.

Section 3: Habitat

3.1 Habitat (provide details in response to the question below)	
Described the habitat suitable for the species (biological and non-biological). Include descriptions of specific purpose habitat (e.g. foraging, breeding, roosting, seasonal migration, different life stages).	<i>Bertmainius colonus</i> construct shallow burrows in shaded gullies and creek lines on the eastern massif of the Stirling Range. This area experiences high rainfall.
If the species occurs in a variety of habitats, is there a preferred habitat?	N/A
Does the species use refugia? (include what is it and when is it used)	Moist gullies and creek lines.
Is the habitat restricted in extent or number of locations?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>
If Yes, provide details:	Restricted to shaded gullies and creek lines on the eastern massif of the Stirling Range
Is this species reliant on a threatened or priority species or ecological community?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>
If Yes, provide details:	The species has only been found within the ecological community <i>Proteaceae Dominated Kwongan Shrublands of the Southeast Coastal Floristic Province of Western Australia</i> (Endangered TEC under the EPBC Act, WA Priority 3(iii)).
Are there any other species (sympatric species) that may affect the conservation status of the nominated species?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
If Yes, provide details:	N/A
What is the area, extent, abundance of habitat?	
What is the quality of habitat?	Good
Is there a decline in habitat area, extent or quality?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>
If there is a decline, is the decline continuing?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>
Provide details:	It is projected that the species will experience a decline in area, extent and/or quality of habitat in response to fire events, a drying climate, and habitat degradation from

	<i>Phytophthora.</i>
What is the critical habitat or habitat important for the survival of the species?	Shaded gullies and creek lines on the eastern massif of the Stirling Range.

Section 4: Survey

4.1 Survey methods (Provide details)				
What survey methods are applicable to the species?	Manual searches for burrows are the most reliable way of surveying this species. The burrows are relatively easy to locate, especially on the banks of gullies, where they can be observed by careful inspection. They are characteristically small in size with neatly fitting trapdoors that usually bear a ventral hinge.			
Are there preferred or recommended survey methods that yield better results for the species?	No			
Are there special requirements, techniques, expertise or other considerations that are necessary when surveying for this species?	Yes. Familiarity with the morphology of the small and cryptic burrows is necessary to survey for this species.			
Are there reasons why the species may not be detected during surveys?	The burrow lids are well camouflaged and not easy to detect by inexperienced searchers.			
Can the species be identified in the field?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>		
Provide details:	As there is only a single species of <i>Bertmainius</i> at each site in WA (see Harvey et al. 2015), the identification of populations which have been previously identified is unequivocal. New populations, however, will require detailed examination by an expert taxonomist and/or molecular analysis.			
Can the species be easily confused within similar species in the field?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/> Unknown <input type="checkbox"/>		
Provide details:	See above.			
List any published survey guidelines, guidance statements, protocols, standard operating procedures or other documents that are relevant to conducting surveys for this species.				
N/A				
4.2 Survey effort				
Has the species been well surveyed?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
Have targeted surveys been conducted for the species?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
Provide details of the successful and unsuccessful surveys undertaken for the species:	This species, and others of the same genus, have been the subject of considerable survey effort by many people over the past 20 years. Staff from the WA Museum and DPAW have actively searched for species of <i>Bertmainius</i> at numerous locations across SW WA and the Stirling Range, using standard search techniques and pitfall traps.			

4.3 Research (Provide details)

Has the species been well researched?

Yes ☒

No ☐

Partially ☐

Unknown ☐

What research has been or is being conducted?

The recent publication by Harvey *et al.* (2015) includes a full taxonomic description and comprehensive molecular sequence data (the latter an extension of Cooper *et al.* (2011)). Field surveys have been conducted on Western Australia *Bertmainius* for 25 years

What are the knowledge gaps for the species?

It is unknown how this genus recovers from fires.
Little is known of the reproductive ecology of *Bertmainius* species.

Research recommendations:

Reproductive ecology.
Response to fire and drying climate.

4.4 Monitoring (Provide details)

Is the species being monitored, either directly (targeted) or indirectly (general monitoring)?

No.

What methods are used for monitoring?

See above.

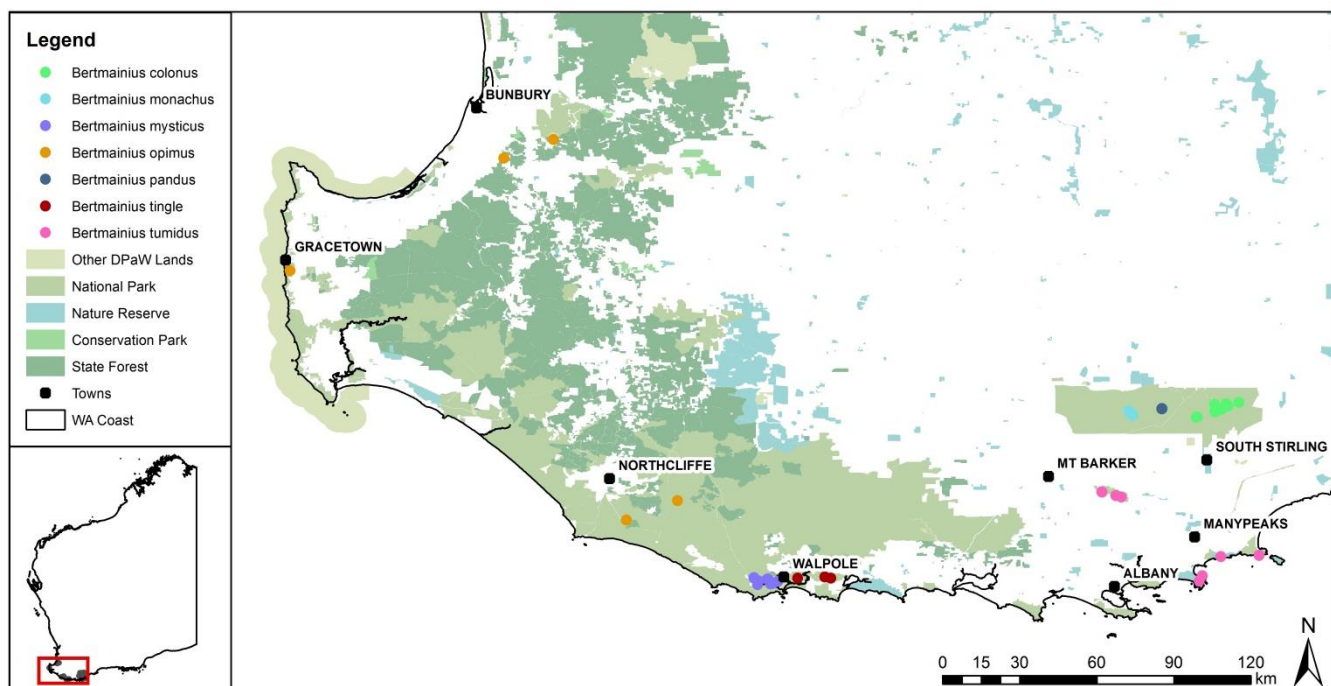
Monitoring recommendations:

Pre and post fire population monitoring.

Section 5: Geographic range

5.1 Distribution

Insert map(s) of the species distribution, or provide as an attachment:



A map of south-west WA with locations of WA Museum *Bertmainius* specimens (DPaW, 2016).

What is the current distribution of the

Bertmainius colonus has been found in less than 10 locations on the

species within Western Australia?	eastern massif of the Stirling Range NP.		
What percentage of the species distribution is within WA?	100%		
What is the current distribution of the species within the other Australian States and Territories?	0%		
Does the species occur outside of Australia?		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
If Yes, what percentage of the species distribution is within Australia, or what is the significance of the occurrence in Australia?	N/A		
What is the current international trend for the species? (if known)	N/A		
5.2 Migration (fauna only)			
Is the species migratory?		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Is the migration within WA or within Australia or international?	N/A		
5.3 Extent of Occurrence (EOO) within Australia			
What is the current EOO?	< 100km ²		
How has this been calculated?	Minimum convex hull as per IUCN red list criteria		
What is the historical EOO?	Unknown by presumably < 100km ²		
What is the current EOO trend?	Decreasing <input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>		
Provide details on the current trend – quantify if possible	There is no information available, but presumably there the species is naturally rare. It is projected that the species will experience a decline in extent of occurrence in response to fire events, a drying climate, and habitat degradation from <i>Phytophthora</i> .		
If there has been a change in EOO when did this change occur?	N/A		
Was the change observed, estimated, inferred or projected?	N/A		
If the EOO is decreasing / declining, is it continuing?		Yes <input type="checkbox"/>	No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>
Is the continuing decline observed, estimated, inferred or projected?	Projected – the EOO could drastically decline in the future in response to a large fire event and/or a drying climate.		
Is there extreme fluctuation in EOO?		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
If Yes, provide details:	N/A		
5.4 Area of Occupancy (AOO) within Australia			
What is the current AOO?	25 km ²		

How has this been calculated?	Based on collection records and the distribution of suitable surrounding habitats		
What is the historical AOO?	Unknown		
What is the current AOO trend?	Decreasing <input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>		
<i>Provide details on the current trend – quantify if possible</i>	It is projected that the species will experience a decline in area of occupancy in response to fire events, a drying climate, and habitat degradation from <i>Phytophthora</i> .		
If there has been a change in AOO when did this change occur?	Unknown		
Was the change observed, estimated, inferred or projected? Give details.	<p>Projected – the AOO could drastically decline in the future in response to a large fire event and/or a drying climate.</p> <p>The sedentary, burrow-restricted lifestyle of these spiders makes them highly susceptible to threatening processes in the surrounding habitat.</p>		
If the AOO is decreasing / declining, is it continuing?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unknown <input checked="" type="checkbox"/>
Is the continuing decline observed, estimated, inferred or projected? Give details.	It is projected that the species will experience a decline in area of occupancy in response to fire events, a drying climate, and habitat degradation from <i>Phytophthora</i> .		
Is there extreme fluctuation in AOO?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Unknown <input type="checkbox"/>
<i>If Yes, provide details:</i>	N/A		
5.5 Number of Locations			
<p>‘Locations’ are defined as a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat. (IUCN 2001).</p>			
At how many locations does the species occur?	Regarded as < 10 locations - found on 7 separate peaks on the eastern massif of the Stirling Range.		
Has there been a change in the number of locations?	Decrease <input type="checkbox"/>	Increase <input type="checkbox"/>	No change <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>
If there has been a change, when did this change occur?	Unknown		
Was the change observed, estimated, inferred or projected? Give details.	Unknown		
If the number of locations is decreasing / declining, is it continuing?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unknown <input checked="" type="checkbox"/>
Is the continuing decline observed, estimated, inferred or projected? Give details.	<p>Projected – The number of locations could drastically decline in response to a large fire event and/or a drying climate.</p> <p>The sedentary, burrow-restricted lifestyle of these spiders makes them highly susceptible to threatening processes in the surrounding habitat.</p>		
Is there extreme fluctuation in the number of locations?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Unknown <input type="checkbox"/>

<i>If Yes, provide details:</i>	N/A			
Does this species occur on any off-shore islands?				Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<i>If Yes, provide details:</i>	N/A			
5.6 Fragmentation				
Is the distribution fragmented?				Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
The phrase ' severely fragmented ' refers to the situation in which increased extinction risks to the taxon results from the fact that most of its individuals are found in small and relatively isolated subpopulations (in certain circumstances this may be inferred from habitat information). These small subpopulations may go extinct, with a reduced probability of recolonization.				
Is the distribution severely fragmented?				Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
<i>If Yes, provide details:</i>	N/A			
5.7 Land tenure				
Is the species known to occur on lands managed primarily for nature conservation? i.e. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation				Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<i>If Yes; provide details:</i>	All locations are within Stirling Range National Park			
Is the species known to occur on lands that are under threat? i.e. mining tenement, zoned for development				Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<i>If Yes; provide details:</i>	N/A			
Provide details of other land tenures where the species occurs as this relates to the species conservation status	N/A			

Section 6: Population

<p>'Population' is used in a specific sense in the Red List Criteria that is different to its common biological usage. Population is here defined as the total number of mature individuals of the taxon. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used. (IUCN 2001)</p>				
<p>'Subpopulations' are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less).</p>				
6.1 Subpopulations				
Location (include coordinates)	Land tenure	Survey information: Date of survey and No. mature individuals	AOO	Site / habitat Condition
Stirling Range NP, Eastern Massif,	National Park	2005 – 3 specimens		Good

S of Pyungorup Peak -34.3692, 118.3278				
Stirling Range NP, Eastern Massif, N. end of South Isongerup Track -34.3744, 118.2828	National Park	2005 - 12 specimens		Good
Stirling Range NP, Eastern Massif, Ellen Creek -34.3817, 118.2897	National Park	2005 -11 specimens		Good
Stirling Range NP, Eastern Massif, SE of Coyanarup Peak -34.3919, 118.2678	National Park	2004/2005 - 15 specimens		Good
Stirling Range NP, Eastern Massif, Bluff Knoll -34.3756, 118.2425	National Park	2004 – 2 specimens		Good
Stirling Range NP, Eastern Massif, Coyanarup Peak -34.4028, 118.2444	National Park	2004/2005 – 15 specimens		Good
Stirling Range NP, Eastern Massif, Wedge Hill -34.4203, 118.1828	National Park	1996 – 2 specimens 2004 – 3 specimens		Good
Stirling Range NP, Eastern Massif, S of Pyungorup Peak -34.3692, 118.3278	National Park	2005 – 3 specimens		Good

6.2 Population size (Australian context) *(include how numbers were determined/calculated)*

What is the total population size?	Unknown. Some populations consist of dozens of individuals (Harvey <i>et. al.</i> 2015)
What is the number of subpopulations?	< 10
What percentage of the population is within WA?	100%
What percentage of the population is within Australia?	100%

6.3 Population dynamics (Australian context) *(include how numbers were determined/calculated)*

What is the number of mature individuals?	Unknown.
What is the number of immature individuals?	Unknown.
What is the number of senescing/past reproductive individuals?	Unknown.

What is the maximum number of mature individuals per subpopulation?	Unknown.		
What is the percentage of mature individuals in the largest subpopulation?	Unknown.		
What percentage of mature individuals is within WA?	100%		
What percentage of global mature individuals is within Australia?	100%		
What is the age of sexual maturity?	Not certain, but most likely > 4 years		
What is the life expectancy?	Not certain, but most likely > 8 years		
What is the generation length?	Unknown		
What is the reproductive capacity? (i.e. litter size or number of seeds)	Females lay egg cases with 15-35 eggs.		
What is the reproductive success?	Unknown		
6.4 Population trend			
What is the current population trend (mature individuals)?	Decreasing <input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>		
What is the percentage of the population change and over what time period?	Unknown		
How has this been calculated?	N/A		
If the trend is decreasing; are the causes of the reduction understood?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>		
Have the causes of the reduction ceased?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>		
Are the causes of the reduction reversible?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>		
Is the reduction continuing (continuing decline)?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>		
Has the change been observed, estimated, inferred or is it suspected (direct observation, index of abundance appropriate to the species)?	<p>It is suspected that the species will decline in the future in response to fire events and a drying climate. The sedentary, burrow-restricted lifestyle of these spiders makes them highly susceptible to threatening processes in the surrounding habitat.</p> <p>Other <i>Bertmainius</i> species have been subject to fire, which caused the death of many individuals. Therefore there is evidence that fire events can severely reduce the population size.</p>		
When was the reduction or is it anticipated to occur?	Past <input type="checkbox"/> Present <input type="checkbox"/> Future <input checked="" type="checkbox"/>		
What is the period of time for the reduction (in years and generations)?	A wild fire may impact the species at any time. A drying climate due to climate change is currently occurring, but it is unknown when it will begin to impact on the species. Either of these threats may cause a reduction at any time in the future. It is unknown if a reduction has occurred in the past.		

Has there been a reduction in the number of subpopulations?		Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>
If Yes, provide details:	N/A	
Are there extreme fluctuations in population size?		Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>
If Yes, provide details:	N/A	
6.5 Translocations and captive/enclosed subpopulations		
Have there been translocations (introduction or re-introduction)?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
Are there proposed translocations (introduction or re-introduction)?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
Are there captive/enclosed/cultivated subpopulations?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
Are there proposed captive/enclosed/cultivated subpopulations?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
Are there self-sustaining translocated subpopulations?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
If Yes, provide details:	N/A	
Are there translocated subpopulations that are not self-sustaining?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
If Yes, provide details:	N/A	
Are there self-sustaining captive/enclosed subpopulations?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
If Yes, provide details:	N/A	
Are there captive/enclosed subpopulations that are not self-sustaining?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
If Yes, provide details:	N/A	
Other information on translocations and captive/enclosed subpopulations for the species (including failures):	There are no plans for captive populations or translocations.	
6.6 Important subpopulations		
<p><i>Identify any subpopulations that are important or necessary for the long-term survival of the species and provide details for why they are considered as such (i.e. key breeding, edge or range, maintenance of genetic diversity):</i></p> <p>The species is known from less than 10 locations, all of which are within the eastern massif of the Stirling Range. It is likely that if a fire event or a drying climate were to impact on the species on the future, it would impact on all the locations due to their proximity to each other. Therefore, all subpopulation are considered necessary for the long-term survival.</p>		

Section 7: Threats

7.1 Threats (detail how the species is being impacted, i.e. how severe, the extent, evidence of the impact)

Threat (describe how the threat impacts on the species. Include abiotic and biotic causes, human related e.g. exploitation, and biological characteristics of the species e.g. low genetic diversity)	Extent (give details of impact on whole species or specific subpopulations)	Impact (what is the level of threat to the conservation of the species)	Evidence	Time period (past, present, future)
Habitat degradation due to <i>Phytophthora</i> dieback	Entire	Medium	<i>Phytophthora</i> selectively reduces the floral assemblages which may lead to degraded habitat.	Present and future
Extreme fire events and inappropriate fire regimes	Entire	High	Other <i>Bertmainius</i> species have been subject to fire, which caused the death of many individuals. Therefore there is evidence that fire events can severely reduce the population size.	Past, present and future
Climate change – drying climate and increased fire risk	Entire	High	Climate change is leading to a drying climate and increasing the frequency and intensity of extreme weather events like fire.	Future

Section 8: Management

8.1 Current management	
Is the species managed?	Yes, directly <input type="checkbox"/> Yes, indirectly <input checked="" type="checkbox"/> No <input type="checkbox"/>
If Yes; provide details of current or past management actions:	The species' habitat is managed as part of the National Park.
Does the species benefit from the management of another species or ecological community?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>
If Yes; provide details:	There are Interim Recovery Plans for the Montane Mallee Thicket TEC and Montane Heath and Thicket TEC in the Stirling Range NP. The species is known to occur near these, and the management actions implemented for these TECs (including fire management and <i>Phytophthora</i> control) may impact on the species.
8.2 Recovery planning	
Is there an approved Recovery Plan (RP) or Interim Recovery Plan (IRP) for the species?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<p>List all relevant recovery plans or interim recovery plans (including draft, in-preparation, out-of-date, national and other State/Territory plans, and plans for other species or ecological communities that may benefit or be relevant to the nominated species)</p> <p>Department of Environment and Conservation. (DRAFT). <i>Stirling Range Rhytidid Snail (Undescribed Rhytidid species (WAM 2295-69)) and Stirling Range Trapdoor Spider (Moggridgea sp. S (BY Main 1990/24.25)) Recovery Plan 2010-2019.</i></p> <p>Barret, S. (2005). <i>Interim Recovery Plan No. 195: Montane Mallee Thicket of the Stirling Range Interim Recovery Plan (Mallee-heath and mallee-thicket community on mid to upper slopes of Stirling Range mountains and hills) 2004-2009.</i> Albany, WA: Department of Conservation and Land Management.</p> <p>Barret, S. (2000). <i>Interim Recovery Plan No. 52: Montane Heath and Thicket of the South West Botanical Province, above approximately 900m above sea level (Eastern Stirling Range Montane Heath and Thicket Community) Interim Recovery Plan 1999-2002.</i> Wanneroo, WA: Department of Conservation and Land Management.</p> <p>List other documents that may be relevant to the management of the species or the lands on which it occurs (i.e. area management plans, conservation advices, referral guidelines)</p> <p>Department of Conservation and Land Management (1999). <i>Management Plan No. 42: Stirling Range and Porongurup National Parks Management Plan 1999-2009.</i> Perth, WA: Prepared by the Department of Conservation and Land Management for the National Parks and Nature Conservation Authority.</p>	
8.3 Management recommendations	
Ongoing fire management and <i>Phytophthora</i> control.	

Section 9: Nominator details

Nominator name(s):	
Contact details:	
Date submitted:	

If the nomination has been refereed or reviewed by experts, please provide their names and contact details:

Mark Harvey – WA Museum

Section 10: References

9.1 References

- Cooper, S., Harvey, M., Saint, K. & Main, B. (2011). Deep phylogeographic structuring of populations of the trapdoor spider *Moggridgea tingle* (Migidae) from southwestern Australia: evidence for long-term refugia within refugia. *Molecular Ecology* 20(15): 3219-3236
- Harvey, M., Main, B., Rix, M. & Cooper, S. (2015). Refugia within refugia: *in situ* speciation and conservation of threatened *Bertmainius* (Araneae: Migidae), a new genus of relictual trapdoor spiders endemic to the mesic zone of south-western Australia. *Invertebrate Systematics* 29: 511-533.
- Harvey, M. & Main, B. (1997). *The status of the trapdoor spider genus Moggridgea in the Stirling and Porongurup Ranges*. Report to the Department of Conservation and Land Management.
- Main, B. & Gaull, K. (1992). *Response of trapdoor spiders to fire in the Stirling Range*. Report to the Department of Conservation and Land Management.

SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN AN IUCN RED LIST THREATENED CATEGORY (CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE).¹

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%
<p>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.</p> <p>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.</p> <p>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].</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><i>based on any of the following:</i></p> <p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.</p>			
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			
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			
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
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

¹ Use of this summary sheet requires full understanding of the *IUCN Red List Categories and Criteria* and *Guidelines for Using the IUCN Red List Categories and Criteria*. Please refer to both documents for explanations of terms and concepts used here.

FORM VERSION OF IUCN RED LIST SUMMARY OF THE FIVE CRITERIA (A-E) to assist with determining eligible criteria					
Check boxes in one or more of the following fields to support your nomination; refer to summary table above for explanations					
A. Population size reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4					
A1 <input type="checkbox"/>	and one of the following	≥ 90% <input type="checkbox"/>	≥ 70% <input type="checkbox"/>	≥ 50% <input type="checkbox"/>	
	and any of the following	(a) <input type="checkbox"/>	(b) <input type="checkbox"/>	(c) <input type="checkbox"/>	(d) <input type="checkbox"/> (e) <input type="checkbox"/>
A2 <input type="checkbox"/>	and one of the following	≥ 80% <input type="checkbox"/>	≥ 50% <input type="checkbox"/>	≥ 30% <input type="checkbox"/>	
	and any of the following	(a) <input type="checkbox"/>	(b) <input type="checkbox"/>	(c) <input type="checkbox"/>	(d) <input type="checkbox"/> (e) <input type="checkbox"/>
A3 <input type="checkbox"/>	and one of the following	≥ 80% <input type="checkbox"/>	≥ 50% <input type="checkbox"/>	≥ 30% <input type="checkbox"/>	
	and any of the following	(b) <input type="checkbox"/>	(c) <input type="checkbox"/>	(d) <input type="checkbox"/>	(e) <input type="checkbox"/>
A4 <input type="checkbox"/>	and one of the following	≥ 80% <input type="checkbox"/>	≥ 50% <input type="checkbox"/>	≥ 30% <input type="checkbox"/>	
	and any of the following	(a) <input type="checkbox"/>	(b) <input type="checkbox"/>	(c) <input type="checkbox"/>	(d) <input type="checkbox"/> (e) <input type="checkbox"/>
B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy)					
B1 <input type="checkbox"/>	and one of the following	< 100 km ² <input type="checkbox"/>	< 5,000 km ² <input type="checkbox"/>	< 20,000 km ² <input type="checkbox"/>	
	and at least two of the following three conditions [(a), (b), (c)]	(a) <input type="checkbox"/>	and one of the following	1 <input type="checkbox"/>	≤ 5 <input type="checkbox"/> ≤ 10 <input type="checkbox"/>
		(b) <input type="checkbox"/>	and any of the following	(i) <input type="checkbox"/>	(ii) <input type="checkbox"/> (iii) <input type="checkbox"/> (iv) <input type="checkbox"/> (v) <input type="checkbox"/>
		(c) <input type="checkbox"/>	and any of the following	(i) <input type="checkbox"/>	(ii) <input type="checkbox"/> (iii) <input type="checkbox"/> (iv) <input type="checkbox"/>
B2 <input type="checkbox"/>	and one of the following	< 10 km ² <input type="checkbox"/>	< 500 km ² <input type="checkbox"/>	< 2,000 km ² <input type="checkbox"/>	
	and at least two of the following three conditions [(a), (b), (c)]	(a) <input type="checkbox"/>	and one of the following	1 <input type="checkbox"/>	≤ 5 <input type="checkbox"/> ≤ 10 <input type="checkbox"/>
		(b) <input type="checkbox"/>	and any of the following	(i) <input type="checkbox"/>	(ii) <input type="checkbox"/> (iii) <input type="checkbox"/> (iv) <input type="checkbox"/> (v) <input type="checkbox"/>
		(c) <input type="checkbox"/>	and any of the following	(i) <input type="checkbox"/>	(ii) <input type="checkbox"/> (iii) <input type="checkbox"/> (iv) <input type="checkbox"/>
C. Small population size and decline					
C1 <input type="checkbox"/>	and one of the following	< 250 <input type="checkbox"/>	< 2,500 <input type="checkbox"/>	< 10,000 <input type="checkbox"/>	
	and one of the following	25 % <input type="checkbox"/>	20 % <input type="checkbox"/>	10 % <input type="checkbox"/>	
C2 <input type="checkbox"/>	and one of the following	< 250 <input type="checkbox"/>	< 2,500 <input type="checkbox"/>	< 10,000 <input type="checkbox"/>	
	and at least two of the following three conditions [(a)(i), (a)(ii), (b)] plus applicable size and/or percentage	(a)(i) <input type="checkbox"/>	≤ 50 <input type="checkbox"/>	≤ 250 <input type="checkbox"/>	< 1,000 <input type="checkbox"/>
		(a)(ii) <input type="checkbox"/>	90 - 100 % <input type="checkbox"/>	95 - 100 % <input type="checkbox"/>	100 % <input type="checkbox"/>
		(b) <input type="checkbox"/>			
D. Very small or restricted population					
D <input type="checkbox"/>	and one of the following	< 50 <input type="checkbox"/>	< 250 <input type="checkbox"/>	D1 (< 1,000) <input type="checkbox"/>	
D2 <input type="checkbox"/>	and one of the following	< 20 km ² <input type="checkbox"/>	≤ 5 <input type="checkbox"/>		
E. Quantitative analysis					
E <input type="checkbox"/>	and one of the following	≥ 50 <input type="checkbox"/>	≥ 20 % <input type="checkbox"/>	≥ 10 % <input type="checkbox"/>	

The following table is to assist with determining eligibility under criteria B, C & D

What is the total number of mature individuals?						
Global	< 50 <input type="checkbox"/>	< 250 <input type="checkbox"/>	< 1,000 <input type="checkbox"/>	< 2,500 <input type="checkbox"/>	< 10,000 <input type="checkbox"/>	Unknown <input type="checkbox"/>
National	< 50 <input type="checkbox"/>	< 250 <input type="checkbox"/>	< 1,000 <input type="checkbox"/>	< 2,500 <input type="checkbox"/>	< 10,000 <input type="checkbox"/>	Unknown <input type="checkbox"/>
WA	< 50 <input type="checkbox"/>	< 250 <input type="checkbox"/>	< 1,000 <input type="checkbox"/>	< 2,500 <input type="checkbox"/>	< 10,000 <input type="checkbox"/>	Unknown <input type="checkbox"/>
How has this number been determined or calculated? suspected						
Reliability of total number of individuals (other than for 'unknown' above)						
Global	Known <input type="checkbox"/>	Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>		
National	Known <input type="checkbox"/>	Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>		
WA	Known <input type="checkbox"/>	Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>		
If from expert opinion, provide name of expert: Authors and reviewers						
How many subpopulations/locations?						
Global	1 <input type="checkbox"/>	≤ 5 <input type="checkbox"/>	≤ 10 <input type="checkbox"/>	Unknown <input type="checkbox"/>		
National	1 <input type="checkbox"/>	≤ 5 <input type="checkbox"/>	≤ 10 <input type="checkbox"/>	Unknown <input type="checkbox"/>		
WA	1 <input type="checkbox"/>	≤ 5 <input type="checkbox"/>	≤ 10 <input type="checkbox"/>	Unknown <input type="checkbox"/>		
How has this number been determined or calculated?						
Reliability of number of populations/locations (other than for unknown above)						
Global	Known <input type="checkbox"/>	Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>		
National	Known <input type="checkbox"/>	Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>		
WA	Known <input type="checkbox"/>	Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>		
If from expert opinion, provide name of expert:						
What is the total number and percentage of mature individuals in each subpopulation/location? (include all known subpopulations/ locations; add subpop./ location name or reference below and add additional rows as required)						
Subpop./ location 1	1 <input type="checkbox"/>	≤ 5 <input type="checkbox"/>	≤ 10 <input type="checkbox"/>	Unknown <input type="checkbox"/>		
	90 - 100 % <input type="checkbox"/>	95 – 100 % <input type="checkbox"/>	100 % <input type="checkbox"/>	Unknown <input type="checkbox"/>		
Subpop./ location 2	1 <input type="checkbox"/>	≤ 5 <input type="checkbox"/>	≤ 10 <input type="checkbox"/>	Unknown <input type="checkbox"/>		
	90 - 100 % <input type="checkbox"/>	95 – 100 % <input type="checkbox"/>	100 % <input type="checkbox"/>	Unknown <input type="checkbox"/>		
How has this number been determined or calculated?						
Reliability of the total number of mature individuals in each subpopulation/location? (other than for unknown above)						
	Known <input type="checkbox"/>	Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>		
If from expert opinion, provide name of expert:						