

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>Trioza barrettae</i> (<i>Banksia brownii</i> plant-louse)
Nomination for (addition, deletion, change):	Change
Nominated conservation category and criteria:	Endangered A2ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)

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>Trioza barrettae</i>			
Common name:	<i>Banksia brownii</i> plant-louse			
Family name:	Trioziidae	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"/>	
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)		14/10/2014	Critically Endangered	A2ce, B2ab(i,ii,iii,iv)
National (EPBC Act)				
State / Territory	1. WA (WC Act 1950)	06/11/2012	Critically Endangered	B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,i v,v)
		Assessed 5/4/2017	Endangered	A2ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)
	2.			
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:	Invertebrate surveys in late spring and summer were conducted in and around the Stirling Range National Park and other areas of the Albany district in 2000, 2001, 2007, 2008, 2011 2012 and 2014/2015. A total of 21 species of <i>Banksia</i> , 16 other species of Proteaceae and 69 other plant species have been sampled. The plant-louse was discovered in 2007, following its collection from <i>Banksia brownii</i> plants. <i>B. brownii</i> sister taxa, as well other <i>Banksia</i> species occurring naturally within 100m of the <i>B. brownii</i> individuals were also sampled.			
<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:	Further monitoring of <i>Banksia brownii</i> subpopulations have been conducted since the 2012 assessment. The discovery of three additional subpopulations now exceeds the EOO threshold for Critically Endangered (as reflected in the IUCN Red List assessment) and now meets Endangered			

		based on the historic level of decline in the host species. The area of occupancy is still highly restricted due to the dependency on the host plant, but using the IUCN 2 km x 2 km grid method for calculating the AOO, the AOO is 20 km ² which meets the criterion for Endangered. The re-assessment meets Endangered A2ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v).
Nominated national conservation status: category and criteria		
Presumed extinct (EX) <input type="checkbox"/> Critically endangered (CR) <input type="checkbox"/> Endangered (EN) <input checked="" type="checkbox"/> Vulnerable (VU) <input type="checkbox"/>		
None (least concern) <input type="checkbox"/> Data Deficient <input type="checkbox"/> Conservation Dependent <input type="checkbox"/>		
What are the IUCN Red List criteria that support the recommended conservation status category?		A2ce; B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)
Eligibility against the IUCN Red List criteria (A, B, C, D and E)		
Provide justification for the nominated conservation status; is the species eligible or ineligible for listing against the five criteria. For <u>delisting</u> , provide details for why the species no longer meets the requirements of the current conservation status.		
A.	Population size reduction (evidence of decline)	<ul style="list-style-type: none"> (A4) Based on the plant-louse's direct dependence on the host species, <i>Banksia brownii</i>, the decline can be inferred based on <i>Banksia brownii</i> population monitoring results. The probability of extinction is considered to be high with only 17 out of the 27 Threatened and Priority Flora Database (TPFL) subpopulations of <i>B. brownii</i> remaining. The number of <i>B. brownii</i> plants in the remaining subpopulations is continuing to decline, with frequent deaths observed due to plant disease (<i>Phytophthora</i>), drought and senescence. In Moir & Leng's 2014 assessment for <i>The IUCN Red List of Threatened Species</i>, the species population size was inferred to have been reduced by 88% in the past 10 years (i.e. Critically Endangered), assuming the plant-louse once occurred on all subpopulations of <i>B. brownii</i> but was now found on only 2 out of the 17 remaining subpopulations. The plant-louse has since been found at three other subpopulations. Using the same logic, the population size reduction would therefore be 71% (i.e. Endangered). The decline is inferred based on (c) a decline in AOO, EOO and quality of the habitat (i.e. the host plant species) due to the ongoing (e) effects of <i>Phytophthora cinnamomi</i> dieback and other plant diseases, and wildfire and inappropriate fire regimes, drought and climate change. It is noted that the decline is based on the loss of the host species which has a longer generation time than the plant-louse. The generation time of the plant-louse is one year, and three generations is thus 3 years. However, the IUCN Red List criteria provides for a minimum assessment time of 10 years, which is applicable to the rate of decline of the host which is appropriate in this situation as it is the critical matter for this species. Meets criteria for Endangered A2ce
B.	Geographic range (EOO and AOO, number of locations and evidence of	<ul style="list-style-type: none"> The (B1) EOO is estimated to be 1,996 km², and (B2) AOO is estimated to be 20 km² using the 2 km x 2 km grid method. It is noted, however, that the plant-louse is a short-range endemic that can only disperse short distances and is only found on some of the

	decline)	<p>remaining and widely separated subpopulations of <i>Banksia brownii</i>. For this reason, the AOO calculated using standard IUCN techniques are considered to include a large area of unsuitable habitat and therefore are large over-estimates.</p> <ul style="list-style-type: none">• (a) The species is considered to be severely fragmented as it is only found at five widely separate subpopulations at four locations. The plant-louse is a short range endemic, and the host plant subpopulations are now too far apart to allow for exchange and recolonisation.• (b) Based on the plant-louse’s direct dependence on the host species, <i>Banksia brownii</i>, the decline can be inferred based on <i>Banksia brownii</i> population monitoring results. The probability of extinction is considered to be high with only 17 out of 27 host plant TPFL subpopulations remaining. The number of <i>B. brownii</i> plants in the remaining subpopulations is continuing to decline, with frequent deaths observed due to plant disease, drought and senescence.• It is suspected that this decline will continue to occur due to ongoing impacts of <i>Phytophthora cinnamomi</i> dieback and other plant diseases, wildfire and inappropriate fire regimes, drought and climate change. Therefore, there is an observed and projected decline in the host plant and therefore the plant-louse (i) EOO, (ii) AOO, (iii) area, extent and quality of habitat, (iv) number of locations/subpopulations and (v) number of mature individuals.• Meets criteria for Endangered B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)			
C.	Small population size and decline (population size, distribution and evidence of decline)	<ul style="list-style-type: none">• No population counts of the plant-louse have been conducted.• Insufficient information to assess			
D.	Very small or restricted population (population size)	<ul style="list-style-type: none">• No population counts of the plant-louse have been conducted.• AOO is estimated to be 20 km² using standard IUCN 2 km x 2 km grid.• Subpopulations occur in 4 locations.• The plausible threats are considered to have the potential to drive the species to be critically endangered if locations are lost.• Meets criteria for Vulnerable D2			
E.	Quantitative analysis (statistical probability of extinction)	<ul style="list-style-type: none">• Insufficient information to assess			
Summary of assessment information					
EOO	Calculated as 1,996 km ² (using Minimum Convex Polygon and α-hull)	AOO	Estimated AOO: 20 km ² (2 km x 2 km grid) Area mapped subpopulations: < 4 km ² (Moir & Leng, 2013)	Generation length	1 year
No. locations	4	Severely fragmented	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>		
No. subpopulations	5	No. mature individuals	Unknown		

Percentage global population within Australia	100%
Percentage population decline over 10 years or 3 generations	71%

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)
Note: The following are threats to <i>Banksia brownii</i> , the host plant, and therefore are considered to be threats to the plant-louse, due to their dependency on the host species		
<p><i>Phytophthora cinnamomi</i> dieback & other plant diseases (aerial canker and <i>Armillaria</i> sp. fungus).</p> <p>Infection leading to the death of the host species will reduce the number of host plants available to the plant-louse.</p> <p>Unhealthy, dying and dead host plants due to <i>P. cinnamomi</i> infection and other plant diseases have been recorded at all sites where the plant-louse is found and at the failed translocation site at Kamballup.</p> <p><i>Past, present and future</i></p>	Entire	Severe
<p>Wildfire and inappropriate fire regimes</p> <p>As demonstrated at the Vancouver Peninsula subpopulation, <i>Banksia brownii</i> plants require fire to regenerate. If isolated subpopulations are not burnt at appropriate times, the subpopulation will begin to senesce and would lead to the local extinction of the plant-louse if no hosts can be located.</p> <p>Conversely, fire will extinguish available host plant structures and therefore cause the local extinction of the plant-louse if no hosts can be located immediately.</p> <p><i>Past, present and future</i></p>	Entire	Severe
<p>Drought</p> <p>Drought can lead to degraded habitat and unhealthy or dying host plants, and therefore could cause the local extinction of the plant-louse if no hosts can be located.</p> <p><i>Banksia brownii</i> deaths due to drought have been recorded in parts of the Stirling Ranges and the failed translocation site at Kamballup.</p> <p><i>Past, present and future</i></p>	Entire	Severe
<p>Host population size decrease and isolation increase</p> <p>It is possible that if the host population becomes too small, it may not be able to sustain a viable population of the plant-louse, thereby leading to its extinction,</p> <p>The plant-louse is a short range endemic, and the host plant</p>	Entire	Severe

subpopulations are now too far apart to allow for exchange and recolonisation. <i>Future</i>		
Climate change A drying climate could lead to the loss of the montane habitats in Stirling Range NP. This may lead to the loss of the host plant and therefore the plant-louse. Climate change may also increase the frequency and intensity of wildfires and drought. <i>Future</i>	Entire	Severe
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"/>
<p>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).</p> <ul style="list-style-type: none"> Department of Conservation and Land Management (2005). <i>Feather-leaved Banksia (Banksia brownii) Interim Recovery Plan 2005-2010 (Interim Recovery Plan No. 210)</i>. Perth, WA: Department of Parks and Wildlife. Retrieved from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/198-approved-interim-recovery-plans Department of Conservation and Land Management (2005). <i>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 (Management Plan No. 195)</i>. Perth, WA: Department of Parks and Wildlife. Retrieved from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/198-approved-interim-recovery-plans Department of Conservation and Land Management (1999). <i>Stirling Range and Porongurup National Parks Management Plan 1999-2009 (Management Plan No. 42)</i>. Perth, WA: Department of Parks and Wildlife. Retrieved from: https://www.dpaw.wa.gov.au/parks/management-plans/approved-management-plans Department of Conservation and Land Management (1991). <i>South Coast Region Regional Management Plan 1992-2202 (Management Plan No. 24)</i>. Perth, WA: Department of Parks and Wildlife. Retrieved from: https://www.dpaw.wa.gov.au/parks/management-plans/approved-management-plans Commonwealth Threatened Species Scientific Committee (2014). <i>Approved Conservation Advice for Proteaceae Dominated Kwongan Shrublands of the southeast coastal floristic province of Western Australia</i>. Canberra, ACT: Department of the Environment and Energy. Retrieved from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/126-conservation-advice.pdf 		
<p>List current management or research actions, if any, that are being undertaken that benefit the conservation of the species.</p> <ul style="list-style-type: none"> Phosphite spraying of all <i>Banksia brownii</i> plants to control the spread of <i>Phytophthora cinnamomi</i> dieback. Collected seeds and successfully translocated <i>B. brownii</i> to suitable sites within the species' known distribution. Annual monitoring of <i>B. brownii</i> to determine plant numbers, recent deaths, impact of threats and general plant and habitat health. Sites where the <i>B. brownii</i> are located within the Stirling Range National Park have been identified as a fire exclusion zone. Prescribed burn of the <i>B. brownii</i> subpopulation at Vancouver Peninsula to improve health and regeneration 		

of plants.

- The plant-louse has been translocated to two translocated subpopulations of the host species at Kamballup, and Snake Hill.

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

- Conduct research into the effect of phosphite spraying on the plant-louse and whether it is negatively affecting the remaining individuals.
- Continue *Phytophthora cinnamomi* and other plant disease hygiene practices.
- Continue to implement fire exclusion practices of all *B. brownii* subpopulations except where a prescribed burn is required to improve plant regeneration. If a prescribed-burn is required, consider conducting a translocation of the plant-louse until the *B. brownii* subpopulation recovers, as was done for the Vancouver Peninsula subpopulation.
- Obtain further biological and ecological information: Conduct research to determine the relationship between the plant-louse and the host plant species, with a focus on what is required for the plant-louse to establish on new plants.
- Continue to monitor the translocated plant-louse subpopulations to determine if they were successful, and investigate the possibility of further translocations to ensure the survival of the plant-louse.
- Conduct regular monitoring of all subpopulations of the plant-louse, and survey for the plant-louse on all known occurrences of the host species.

Nomination prepared by:

Contact details:

Date submitted:

19/9/2016

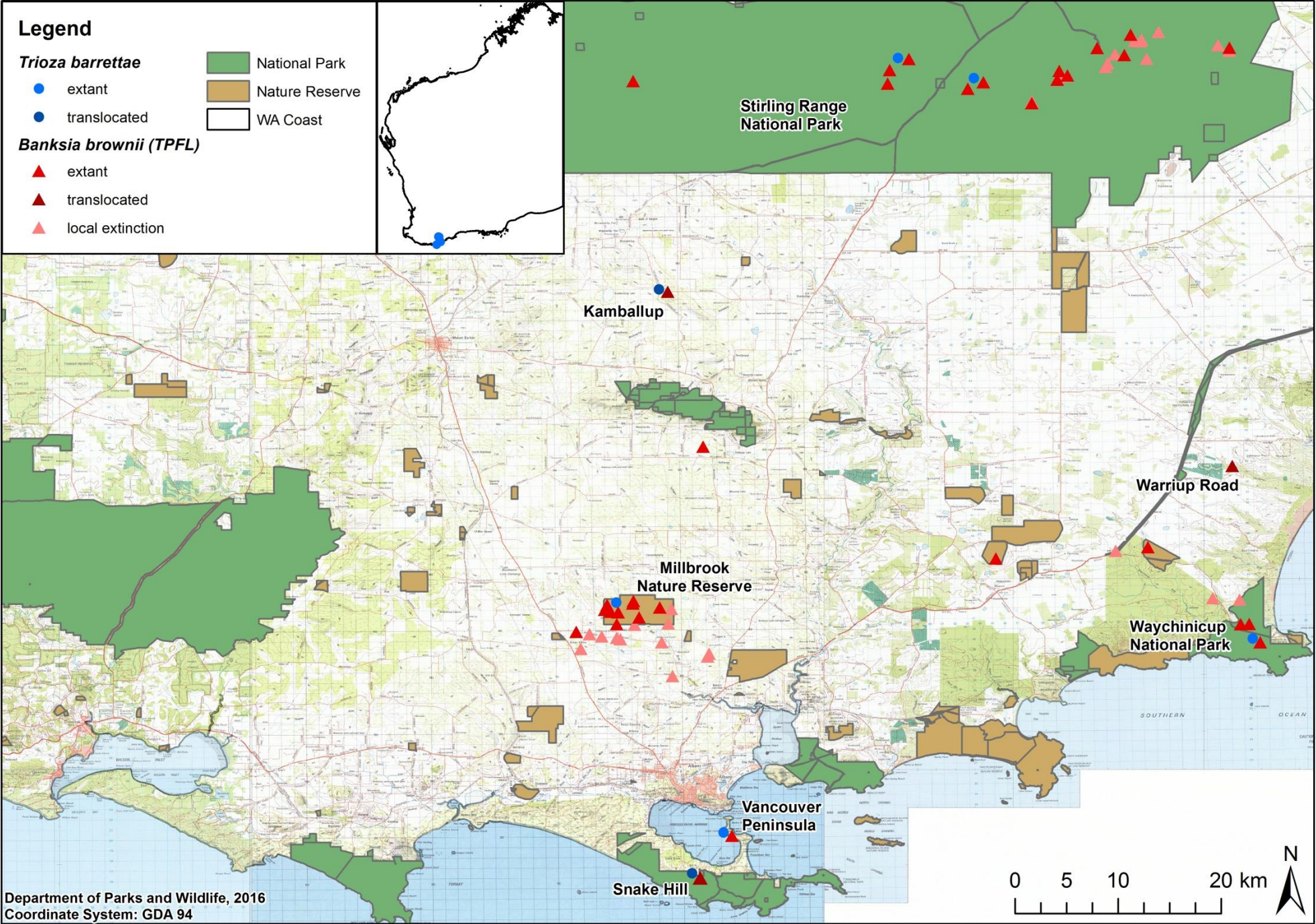
If the nomination has been refereed or reviewed by experts, please provide their names and contact details:

Summary of subpopulation information (detailed information to be provided in the relevant sections of the form)						
Location	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
Mt Hassel, Stirling Range National Park	National Park	2007	400 m ²	Habitat in very good condition. <i>Banksia brownii</i> plants are moderately healthy with few signs of disease.	<p><i>P. cinnamomi</i> dieback & other plants diseases (aerial canker and <i>Armillaria</i> fungus): <i>past, present and future</i></p> <p>Wildfire and inappropriate fire regimes: <i>past, present and future</i></p> <p>Drought: <i>future</i></p> <p>Host population size decrease and isolation increase: <i>future</i></p> <p>Climate change: <i>future</i></p>	<p>Continue aerial phosphite spraying of host plants to control <i>P. cinnamomi</i>.</p> <p>Continue disease hygiene practices.</p> <p>Continue to implement fire management strategy.</p> <p>Continue to collect and store seeds of host plants for future translocations.</p> <p>Translocate the plant-louse to other populations of the host species.</p> <p>Survey for the plant-louse on all known occurrences of the host species and identify possible translocation sites.</p>
Yungemere Peak, Stirling Range National Park	National Park		< 1 km ²	Habitat in very good condition. Frequent deaths of <i>B. brownii</i> plants on lower parts of slope due to <i>P. cinnamomi</i> dieback and drought. Otherwise plants are in moderate to good condition.	<p><i>P. cinnamomi</i> dieback & other plants diseases (aerial canker and <i>Armillaria</i> fungus): <i>past, present and future</i></p> <p>Wildfire and inappropriate fire regimes: <i>past, present and future</i></p> <p>Drought: <i>past, present and future</i></p> <p>Host population size decrease</p>	<p>Continue aerial phosphite spraying of host plants to control <i>P. cinnamomi</i>.</p> <p>Continue disease hygiene practices.</p> <p>Continue to implement fire management strategy.</p> <p>Continue to collect and store seeds of host plants for future</p>

					and isolation increase: <i>future</i> Climate change: <i>future</i>	translocations. Translocate the plant-louse to other populations of the host species. Survey for the plant-louse on all known occurrences of the host species and identify possible translocation sites.
Millbrook Nature Reserve	Nature Reserve		< 1 km ²	Habitat in good condition, but with patches of <i>P. cinnamomi</i> dieback infection. <i>B. brownii</i> has been lost from multiple areas within the NR. The remaining plants range from poor to healthy condition.	<i>P. cinnamomi</i> dieback & other plants diseases (aerial canker and <i>Armillaria</i> fungus): <i>past, present and future</i> Wildfire and inappropriate fire regimes: <i>past, present and future</i> Drought: <i>future</i> Host population size decrease and isolation increase: <i>future</i> Climate change: <i>future</i>	Continue disease hygiene practices. Continue to implement fire management strategy. Continue to collect and store seeds of host plants for future translocations. Translocate the plant-louse to other populations of the host species. Survey for the plant-louse on all known occurrences of the host species and identify possible translocation sites.
Crown Reserve (R25295), Vancouver Peninsula	Shire Reserve	2008: found on host plants within an area of 300 m ² 2011: host plants extremely diseased, only found in area of <100 m ² 2015: all plant-louse located were removed	< 100 m ²	Prior to a planned burn in October 2015, the <i>B. brownii</i> were in poor condition due to old age, aerial canker, <i>Armillaria</i> and <i>P. cinnamomi</i> dieback, and had been long unburnt (requires fire for regeneration)	<i>P. cinnamomi</i> dieback & other plants diseases (aerial canker and <i>Armillaria</i> fungus): <i>past, present and future</i> Wildfire and inappropriate fire regimes: <i>past, present and future</i> Drought: <i>future</i> Host population size decrease and isolation increase: <i>future</i>	Continue disease hygiene practices. Continue to implement fire management strategy. Continue to collect and store seeds of host plants for future translocations. Translocate the plant-louse to other populations of the host species.

		and translocated to Snake Hill and/or Warriup Rd.			Climate change: <i>future</i>	Survey for the plant-louse on all known occurrences of the host species and identify possible translocation sites.
Waychinicup National Park	National Park		< 1 km ²	Habitat in excellent condition. <i>B. brownii</i> has been lost from several areas within the NR. The remaining plants range from poor to moderate condition.	<p><i>P. cinnamomi</i> dieback & other plants diseases (aerial canker and <i>Armillaria</i> fungus): <i>past, present and future</i></p> <p>Wildfire and inappropriate fire regimes: <i>past, present and future</i></p> <p>Drought: <i>future</i></p> <p>Host population size decrease and isolation increase: <i>future</i></p> <p>Climate change: <i>future</i></p>	<p>Continue disease hygiene practices.</p> <p>Continue to implement fire management strategy.</p> <p>Continue to collect and store seeds of host plants for future translocations.</p> <p>Translocate the plant-louse to other populations of the host species.</p> <p>Survey for the plant-louse on all known occurrences of the host species and identify possible translocation sites.</p>
Note: The following are translocation sites but the required 5 years of monitoring has not yet been conducted to determine if they are successful, self-sustaining subpopulations.						
Seed Orchard, Washpool Rd (Kamballup)	Private Property	<p>2012: translocation</p> <p>2013-2014: failed to detect plant-louse (i.e. failed translocation)</p>	0.01 km ²	Habitat in excellent condition but showing some signs of summer drought stress. Numerous <i>Banksia brownii</i> plants were beginning to die in 2013-2014, most likely due to drought and aerial canker.	<p><i>P. cinnamomi</i> dieback & other plants diseases (aerial canker and <i>Armillaria</i> fungus): <i>past, present and future</i></p> <p>Wildfire and inappropriate fire regimes: <i>past, present and future</i></p> <p>Drought: <i>past, present and future</i></p> <p>Host population size decrease and isolation increase: <i>future</i></p> <p>Climate change: <i>future</i></p>	<p>Continue disease hygiene practices.</p> <p>Implement fire management strategy.</p> <p>Continue to monitor the translocated host subpopulation.</p> <p>Continue to monitor the plant-louse's establishment on the host plants to determine if the translocation was successful.</p>

Snake Hill, Torndirrup National Park	National Park	2015: translocation		<i>Banksia brownii</i> plants in healthy condition with evidence of new growth since 2012.	<i>P. cinnamomi</i> dieback & other plants diseases (aerial canker and <i>Armillaria</i> fungus): <i>future</i> Wildfire and inappropriate fire regimes: <i>past, present and</i> <i>future</i> Drought: <i>future</i> Host population size decrease and isolation increase: <i>future</i> Climate change: <i>future</i>	Continue disease hygiene practices. Implement fire management strategy. Continue to monitor the translocated host subpopulation. Continue to monitor the plant- louse's establishment on the host plants to determine if the translocation was successful.
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Department of
Environment and Conservation

Our environment, our future



Form to nominate a Western Australian species for listing as threatened, change of category or delisting 2011 (updated 2016).

NOTICE: Incomplete forms may result in delays in assessment, or rejection of the nomination. To fill out this form you must refer to the Guidelines and contact the relevant Officer in the DEC Species and Communities Branch. DEC staff can advise you on how to fill out the form and may be able to supply additional, unpublished information.

Answer all relevant sections, filling in the white boxes and indicating when there is no information available. **Note**, this application form applies to both flora and fauna species, and hence some questions or options may not be applicable to the nominated species – for these questions, type “N/A”.

To mark boxes with a **cross**, double click the box and select not checked or checked.

SECTION 1. NOMINATION					
1.1. Nomination for:					
Flora	<input type="checkbox"/>	Fauna	<input checked="" type="checkbox"/>	Threatened / DRF	<input type="checkbox"/>
Change of category	<input type="checkbox"/>	Delisting	<input type="checkbox"/>		
1.2. Scientific Name					
This name will be used to identify the species on all official documentation. Use the approved name used by the Western Australian Museum or Herbarium. If this is not possible, use unpublished names or numbers of voucher specimens.					
<i>Trioza barrettae</i> (Insecta: Hemiptera: Triozidae)					
1.3. Common Name					
If the species has a generally accepted common name, please show it here. This name will be used on all official documentation.					
<i>Banksia brownii</i> plant-louse					
1.4. Current Conservation Status. If none, type 'None'.					
	IUCN Red List Category e.g. Vulnerable		IUCN Red List Criteria e.g. B1ab(iv);D(1)		
International IUCN Red List	None		None		
National EPBC Act 1999	None		None		
State of Western Australia	Critically Endangered		B1+2ab(i,ii,iii,iv,v)		
State of WA Priority	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Is the species listed as 'Threatened' in any other Australian State or Territory? If Yes, list these States and/or Territories and the status for each.					
No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					

Does the species have specific protection (e.g. listed on an annex or appendix) under any other legislation, inter-governmental or international arrangements e.g. CITES? If Yes, please provide details.					
No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
1.5. Nominated Conservation Status.					
	IUCN Red List Category e.g. Vulnerable			IUCN Red List Criteria e.g. B1ab(iv);D(1)	
State of Western Australia	Critically Endangered			B2ab(i,ii,iii,iv,v)	
State of WA Priority	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
1.6. Reasons for the Nomination. Briefly summarise the reasons for the nomination in dot points. Please include details relevant to the IUCN Categories and Criteria where appropriate.					
The reason that we nominate <i>Trioza barrettae</i> for conservation status is based on the following: <ul style="list-style-type: none"> • it is dependent on another, highly threatened species (<i>Banksia brownii</i>) for its survival, • the total area of occupancy is <4 km² (the four subpopulations of host plant combined, that host the known populations of <i>Trioza barrettae</i>, occur in an area less than this) and there are only five known subpopulations of the species • despite intensive searches on other likely host plants around the known populations, as well as other known populations of the host plant <i>B. brownii</i> along the south coast, no further specimens have been uncovered, • low dispersal ability, • the immediate threats to the survival of host plants such as dieback, wildfire and climate change. 					
Please refer to the Nomination Summary for the species eligibility against the IUCN Red List criteria					
SECTION 2. SPECIES					
2.1. Taxonomy. Describe the taxonomic history, using references, and describe the key distinguishing features that can be used to separate this taxon from closely related taxa. Include details of the type specimen, changes in taxonomy, scientific names and common names used for the species.					
<i>Trioza barrettae</i> is a recently described species (Taylor & Moir, 2014).. It is very small, approximately 3 mm in length. Its colour varies from green to orange. Wing venation distinguishes it as a species of <i>Trioza</i> . Species placement, however, is determined by genitalia dissection. As such, taxonomic expert opinion is essential for a correct identification. The holotype specimen has been lodged in the Western Australian Museum, while paratypes are lodged with the holotype, as well as the University of Adelaide Insect Collection.					
Is this species conventionally accepted? If no, explain why. For example, is there any controversy about the taxonomy? For undescribed species, detail the location of voucher specimens (these should be numbered and held in a recognised institution and be available for reference purposes).					
No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>					
<i>Trioza barrettae</i> is the first species of <i>Trioza</i> to be described from Western Australia. Gary Taylor (pers. comm.) has not seen the species previously and suggests that the closest relative could be a <i>Trioza</i> sp. found on a <i>Banksia</i> species in Sydney, NSW, Australia.					
Describe any known hybridisation with other species in the wild, indicating where this occurs and how frequently.					
None known.					

2.2. Description

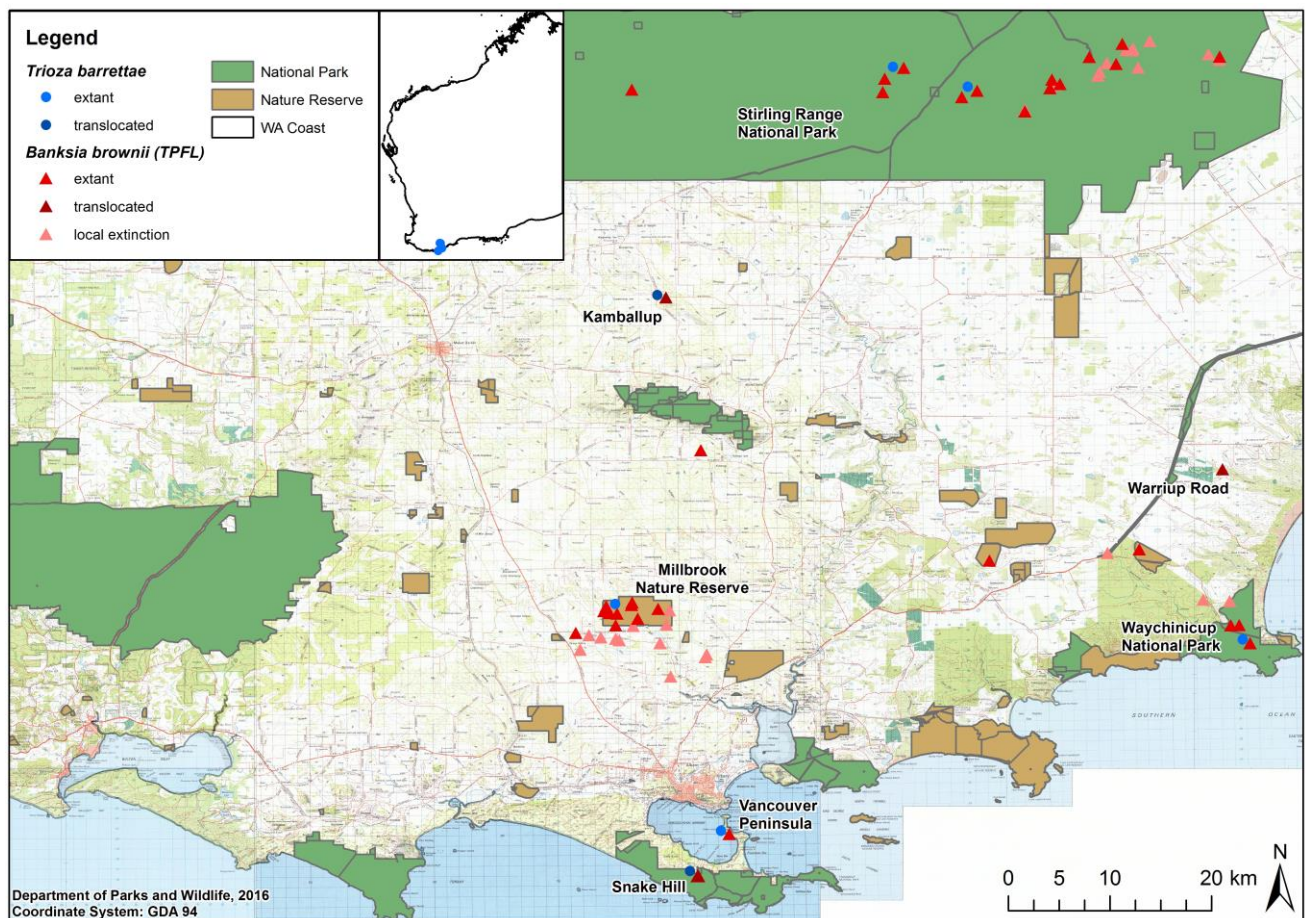
Describe the physical appearance, habit, behaviour/dispersion and life history. Include anatomy or habit (e.g. size and/or weight, sex and age variation, social structure) and dispersion (e.g. solitary, clumped or flocks etc), and life history (eg short lived, long lived, geophytic, etc).

Very little is known of the biology of *Trioza barrettae*, which has only been recently discovered. It is very small, approximately 3mm in length, and its colour varies from green to orange. It is presumed to have poor powers of dispersal like most other members of Triozidae. It is also presumed to be short-lived (see sections 2.6 and 2.8 below for an account of life history).

2.3. Distribution

Describe the distribution of the species in Australia and, if possible, provide a map.

To date, the plant-louse has been recorded from Western Australian subpopulations of *B. brownii* at Mt Hassell and Yungemere Peak in Stirling Range National Park (SRNP), Millbrook Nature Reserve, Vancouver Peninsula, and Waychinicup National Park.



2.4. Habitat

Describe the non-biological habitat (e.g. aspect, topography, substrate, climate) and biological habitat (e.g. forest type, associated species, sympatric species). If the species occurs in various habitats (e.g. for different activities such as breeding, feeding, roosting, dispersing, basking etc) then describe each habitat.

Non-biological habitat

<p><i>Trioza barrettae</i> is associated with its host plant <i>Banksia brownii</i>, which occurs on rocky sand clay loams, sandy loam and sandy clay soils. Peninsula.</p> <p><i>Banksia brownii</i> occurs in areas of high elevation in the SRNP, but it also persists in several disjunct populations within 90 km to the south and south-east. Although there is no historical record of <i>B. brownii</i> in the surrounding area, recent population genetic studies suggest that it was probably distributed throughout the region during at least the mid Pleistocene (Coates and McArthur 2010). These studies also suggest that the current disjunct distribution is the result of subsequent climatic events (Hopper 2009) and significantly pre-dates any land clearing over the last 150 years (Coates and McArthur 2010).</p> <p>Climate hasn't been recorded but 5 km north of Vancouver Peninsula, Albany has an average annual rainfall of 929 mm. Approximately 50 km northeast of the SRNP, Ongerup receives 385 mm annually (Bureau of Meteorology—Australia 2011), this may be a close approximation of the rainfall in the low-lying regions of the SRNP, but in montane conditions where the threatened host plant occur, it is wetter and cooler.</p>
<p>Biological habitat</p> <p><i>Trioza barrettae</i> is associated with its host plant <i>B. brownii</i>, which is associated with a range of habitats including thickets and mallee-heath and mallee heath shrublands and woodlands. The associated habitat is rich in proteaceous and myrtaceous species (Gilfillan & Barrett, 2005)</p>
<p>Does the (fauna) species use refuge habitat e.g. in times of fire, drought or flood? Describe this habitat.</p> <p>No, <i>Trioza barrettae</i> is not known to use refuge habitat.</p>
<p>Is the species part of, or does it rely on, a listed threatened ecological community? Is it associated with any other listed threatened species?</p> <p><i>Trioza barrettae</i> is closely associated with its host plant, <i>B. brownii</i> R.Br. (Proteaceae: Spicigeraceae). <i>Banksia brownii</i> is listed nationally as Endangered under the <i>Environmental Protection and Biodiversity Conservation Act 1999</i>, and is also listed as Critically Endangered under the <i>Western Australian Wildlife Conservation Act 1950</i>.</p> <p>It occurs within the Montane Mallee Thicket of the Stirling Range Threatened Ecological Community (Critically Endangered) and the EPBC listed Proteaceae Dominated Kwongan Shrubland TEC (Endangered). In Millbrook Nature Reserve, there is the EPBC listed <i>Banksia coccinea</i> Thicket TEC (Endangered).</p>
<p>2.5. Reproduction</p> <p>Provide an overview of the breeding system.</p> <p>For <u>fauna</u>: Provide an overview of the breeding system and breeding success, including: when does it breed; what conditions are needed for breeding; are there any breeding behaviours that may make it vulnerable to a threatening process?</p> <p>For <u>flora</u>: When does the species flower and set fruit? Is the seed produced viable? What conditions are needed for this? What is the pollinating mechanism? If the species is capable of vegetative reproduction, a description of how this occurs, the conditions needed and when. Does the species require a disturbance regime (e.g. fire, ground disturbance) in order to reproduce?</p> <p>Very little is known on the ecology and biology of <i>Trioza barrettae</i> as it has only recently been discovered (2007, Moir), and has only been recently named (Taylor & Moir, 2014). It is part of the second largest family of Psylloidea; an account of the general biology of psyllids is given below.</p>

2.6. Population dynamics Provide details on ages of sexual maturity, extent of breeding success, life expectancy and natural mortality. Describe population structure (presence of juveniles/seedlings, mature and senescing individuals).
<p>Reproduction of psylloids is bisexual with heterogametic males. Breeding predominantly occurs in autumn when most of the males will die and the females become dormant during winter. Surviving females then emerge in spring to lay eggs. Females may lay anywhere between 67 - 415 eggs. Depending on weather conditions, eggs may take approximately 14 days to hatch.</p> <p>Sex ratios are 1:1 with males emerging before females and females usually living longer than males. Eggs are laid singularly, in clusters, arcs, circles, or if gall-inducing, embedded in leaf margins. There are five larval instars after which, approximately 45 days later, adults emerge. Once adults emerge it has been shown they are not strong active dispersers. However, they are able to disperse relatively long distances (~12 km) on prevailing wind systems.</p>
Questions 2.7 and 2.8 apply to <u>fauna</u> nominations only
2.7. Feeding Summarise food items or sources and timing/availability.
Both larval and adult psylloids feed on soluble plant material found in plant phloem tissue of their host plant during the season's spring and summer.
Briefly describe feeding behaviours, including those that may make the species vulnerable to threatening processes.
Mouth parts are adapted for plant phloem sap feeding, which include paired maxillary and mandibular stylets which form a 'food channel'. As <i>Trioza barrettiae</i> is reliant on their host plant, any threatening process to the plant can be viewed as an indirect threat to <i>Trioza barrettiae</i> . As they are also relatively sedentary they make easy prey for a range of predators. The most frequent being anthocorid, lygaeid and nabid bugs, earwigs, brown and green lacewing larvae, coccinellid beetle larvae and adults, ants, syrphid fly larvae, mites, spiders, harvestmen, and birds are the main vertebrate predator. All these predators mainly feed on the larvae but spiders, adult coccinellid beetles and birds will also feed on adults.
2.8. Movements Describe any relevant daily or seasonal pattern of movement for the species, including relevant arrival/departure dates if migratory. Provide details of home range/territories.
Psylloids are relatively sedentary with often colonial lifestyles. They are low active dispersers and usually rely on prevailing wind systems for long distant dispersal of anywhere up to 12 km. They are capable of short dispersal distances of less than 1 m. Migration occurs approximately 2-4 days after adults have emerged and usually occur in the season's summer and autumn.
SECTION 3. INTERNATIONAL CONTEXT
For species that are distributed both in <u>Australia</u> and in <u>other countries</u>.
3.1. Distribution Describe the global distribution.
Only found in south-west Australia
Provide an overview of the global population size, trends, threats and security of the species outside of Australia.
n/a
Explain the relationship between the Australian population and the global population. What percentage of the global population occurs in Australia? Is the Australian population distinct, geographically separate or does part, or all, of the population move in/out of Australia's jurisdiction? Do global threats affect the Australian population?
n/a

SECTION 4. CONSERVATION STATUS AND MANAGEMENT					
4.1. Population What is the total population size in terms of number of mature individuals? Has there been any known reduction in the size of the population, or is this likely in the future? – provide details. Are there other useful measures of population size and what are they? Or if these are unavailable, provide an estimate of abundance (e.g. scarce, locally abundant etc).					
The total population size is unknown and hence it is not known if there has been a reduction of <i>Trioza barrettae</i> to date.					
Provide locations of: captive/propagated occurrences or <i>ex situ</i> collections; recent re-introductions to the wild; and sites for proposed re-introductions. Have these sites been identified in recovery plans?					
<p>In 2012, a trial translocation was undertaken using Stirling Range NP individuals to translocated hosts at a private property near Kamballup (approx. 40km south of SRNP). Surveys in the following 6-18 months failed to locate any plant-louse, and it was deemed a failed translocation.</p> <p>In 2015, a translocation proposal was approved by the Department of Parks and Wildlife to salvage plant-louse from the Vancouver Peninsula and translocate them to translocated hosts at Snake Hill, Torndirrup National Park, prior to a prescribed spring regeneration burn proposed for October 2015.</p>					
How many locations do you consider the species occurs in and why? Where a species is affected by more than one threatening event, location should be defined by considering the most serious plausible threat.					
<p><i>Trioza barrettae</i> is found at four locations, totally five subpopulations. It has been recorded from subpopulations of <i>B. brownii</i> in Western Australia at Mt Hassell and Yungemere Peak in SRNP, Millbrook NR, Vancouver Peninsula, and Waychinicup NP. Twenty-one species of <i>Banksia</i>, 16 species of other Proteaceae and a further 69 species of other plant have been surveyed in and around the SRNP, and the <i>Trioza barrettae</i> was not found on any other plants but their one host species <i>B. brownii</i> (Moir <i>et al.</i> 2011). Furthermore, this sampling included other sister taxa to <i>B. brownii</i>, as well as other <i>Banksia</i> species occurring naturally within 100m of <i>B. brownii</i> individuals and no <i>Trioza barrettae</i> were detected.</p>					
For <u>flora</u>, and where applicable, for <u>fauna</u>, detail the location, land tenure, estimated number of individuals, area of occupancy, and condition of site for each known date, location or occurrence.					
<p><i>Trioza barrettae</i> known occurrence in south-west Western Australia. See Nomination Summary for an updated list of subpopulation locations.</p>					
Date of survey	Location	Land status	Number of individuals at location	Area of occupancy at location	Condition of site
29 th Sept 2007	Mt Hassle, Stirling Range Southwest WA.	National Park	unknown	~400 m ²	<i>Banksia brownii</i> populations healthy, no signs of disease.
7 th October 2008	Vancouver Peninsula, South of Albany, WA.	Albany city council land	unknown	~300 m ²	<i>Banksia brownii</i> populations healthy, no signs of disease.

16 th October 2011	Vancouver Peninsula, South of Albany, WA.	Albany city council land	not collected	<100 m ²	<i>Banksia brownii</i> populations were severely diseased, suspected pathogens (S.Barrett pers.comm.) aerial canker, <i>Armillaria</i> and <i>Phytophthora</i> dieback.
Has the number of individuals been counted, or is this an estimate? Provide details of the method of determining the number of individuals.					
No, the numbers of individuals have not been counted as this is hard to achieve due their small size and rarity.					
Has there been any known reduction in the number of locations, or is this likely in the future? – provide details.					
As there are no estimates of population size it is not known if there has been any reduction in numbers. However, as <i>Trioza barrettae</i> is reliant on it host plant, <i>B. brownii</i> , for survival, any threats to its host plant population can be seen as a threat to the plant-louse. <i>B. brownii</i> is known to be highly susceptible to <i>P. cinnamomi</i> infestation, corresponding to the death of over 80% of plants after infestation occurs Prior to the prescribed burn in 2015, the subpopulation of <i>B. brownii</i> at Vancouver Peninsula was in poor condition and the majority of the plants were highly diseased and senescing. The host plant, <i>Banksia brownii</i> , has had severe losses (local extinctions) due to inappropriate fire regimes, drought/drying climate due to climate change, and <i>Phytophthora cinnamomi</i> infestation and other plant diseases including aerial canker (<i>Zythiostroma</i> sp.) and <i>Armillaria</i> sp. fungus.					
What is the extent of occurrence (in km²) for the species; explain how it was calculated and datasets used. If an accurate estimate is unavailable, provide a range of values or a minimum or maximum area estimate. Include estimates of past, current and possible future extent of occurrence. If available, include data that indicates the percentage decline over 10 years or 3 generations (whichever is longer) that has occurred or is predicted to occur.					
<i>Trioza barrettae</i> extent of occurrence is associated with the extent of its host plant <i>B. brownii</i> . Of these <i>B. brownii</i> populations, <i>Trioza barrettae</i> individuals were found at four locations (SRNP, Millbrook NR, Waychinicup NR and Vancouver Peninsula). These <i>B. brownii</i> populations covered an area <4 km ² (AOO). The EOO is estimated to be 1,996 km ² .					
Is the distribution of the species severely fragmented? Why?					
The distribution of <i>Trioza barrettae</i> is severely fragmented due to its very narrow host-breath association with its host plant <i>B. brownii</i> . <i>Banksia brownii</i> was once widely distributed throughout the SRNP in south-west Western Australia. However over time the distribution of <i>B. brownii</i> has been reduced to small isolated areas that are severely fragmented due to past climatic events. To date all <i>B. brownii</i> populations are under threat from <i>Phytophthora</i> dieback and other diseases, inappropriate fire regimes (Barrett et al. 2008), fragmentation and a drying climate due to climate change. Given the distance between other <i>B. brownii</i> subpopulations, <i>Trioza barrettae</i> recolonization of new sites is highly unlikely.					
Identify important occurrences necessary for the long-term survival and recovery of the species? This may include: key breeding populations, those near the edge of the range of the species or those needed to maintain genetic diversity.					
To ensure <i>Trioza barrettae</i> survival and recovery there is a need to protect and manage their host plant <i>B. brownii</i> from threats such as <i>Phytophthora</i> dieback disease, inappropriate fire regimes (Barrett et al. 2008), fragmentation and climate change.					

4.2. Survey effort

Describe the methods to conduct surveys. For example, (e.g. season, time of day, weather conditions); length, intensity and pattern of search effort (including where species not encountered); any limitations and expert requirements.

Survey was conducted in daylight hours during the periods from April 2000-Nov 2001, Sept-Nov 2007, October 2008 and October 2011. The majority of survey effort occurred in spring as it coincided with the adult life stage of *Trioza barrettae*.

Populations of *B. brownii* were targeted (except during April 2000-Nov 2001, which occurred at Jarrahdale and was part of a different project examining the recolonisation of Hemiptera into restored mine pits) as they are the host plant of the *Trioza barrettae*. Hand foraging was used to collect the specimens using the methods of beating and vacuum sampling. Sampling effort was reliant upon the *B. brownii* population size. That is, longer time (~1hr+) was spent sampling if populations were large and a shorter time (~30mins) if populations was small. Depending on *B. brownii* population size the number of plants sampled ranged from 30 plants to over 100 plants.

If the *B. brownii* population was severely affected from *Phytophthora* dieback or was unhealthy it was not sampled. Severe wet weather conditions also limited sampling due to the difficulty in sampling in these conditions.

For localities of sampling please refer to section below.

Provide details on the distinctiveness and detectability of the species, or the distinctiveness of its habitat, that would assist survey success.

Trioza barrettae. is very small, approximately 3mm in length. Its colour varies from green to orange. Defining characters of *Trioza barrettae* comprise the unique trifurcating veins R, M and Cu of the adult forewing. *Trioza barrettae* also has a very narrow host-breadth and is only found on its host plant *B.brownii*. By specifically targeting *B. brownii* populations it will further assist survey success in detecting *Trioza barrettae*.

Has the species been reasonably well surveyed? Provide an overview of surveys to date (include surveys of known occurrences and surveys for additional occurrences) and the likelihood of its current known distribution and/or population size being its actual distribution and/or population size. Include comments on potential habitat and surveys that were conducted, but where the species was not present/found.

Twenty-one species of *Banksia*, 16 species of other Proteaceae and a further 69 species of other plants have been surveyed in and around the Stirling Range National Park, and *Trioza barrettiae* was not found on any other plants but their one host species *B. brownii* (Moir *et al.* 2011). Furthermore, this sampling included other sister taxa to *B. brownii*, as well as other *Banksia* species occurring naturally within 100m of *B. brownii* individuals and no *Trioza barrettiae* were detected. Further to this sampling effort, Gary Taylor, Australian Psylloidea expert, has not seen this species in any collection that he has examined. Below is an account of the sampling effort to date:

April 2000 – Nov 2001

Jarradale area, species absent.

Sept – Nov 2007

Mt Hassel, Stirling Range National Park, present, **8 individuals collected.**

Stirling Range Drive, Stirling Range National Park, species absent.

West Kamballup, Albany region, species absent.

The Lookout, Stirling Range National Park, species absent.

Mt Toolbrunup, Stirling Range National Park, species absent.

Mt Talyuberlup, Stirling Range National Park, species absent.

SE gully, Stirling Range National Park, species absent.

SE sand plains, Stirling Range National Park, species absent.

Mt Trio, Stirling Range National Park, species absent.

Bluff Knoll, Stirling Range National Park, species absent.

Moingup Springs, Stirling Range National Park, species absent.

October 2008

Vancouver Peninsula, Albany region, present, **2 individuals collected.**

Northern Stirling Range National Park, species absent.

Formby Nature Reserve, Stirling Range National Park, species absent.

Southern Stirling Range National Park, species absent.

Mt Hassel, Stirling Range National Park, species absent.

Paper collar, Stirling Range National Park, species absent.

Moir Hill, Stirling Range National Park, species absent.

North Ongerup, Ongerup region, species absent.

South of Lake Grace, Lake Grace region, species absent.

Bullaring, species absent.

Totagin Rock, Merredin region, species absent.

October 2011 – specifically targeting host plant *B. brownii* populations

Mt Hassel, Stirling Range National Park, not sampled due to wet weather conditions.

Vancouver Peninsula, Albany region, not sampled due to very poor state of host plant population.

Yungemere Peak, Stirling Range National Park, species absent.

South Sister, Albany region, species absent.

Milbrook Reserve, Albany region, species absent.

Waychinnicup National Park, Albany region, species absent.

2014/015

Yungemere Peak, Stirling Range National Park, **species located**

Millbrook Nature Reserve (south-west corner), **species located**

Waychinnicup National Park, **species located**

4.3. Threats

Identify past, current and future threats indicating whether they are actual or potential. For each threat describe:

- a). how and where they impact this species**
- b). what the effect of the threat(s) has been so far (indicate whether it is known or suspected**
- c). present supporting information/research**
- d). does it only affect certain populations?**
- e). what is its expected effect in the future (is there supporting research/information; is the threat only suspected; does it only affect certain populations?).**

Climate change

- a) Montane habitats in SRNP, due to drying of the habitat.
- b) Suspected to impact on the species in the future, and signs that *B. brownii* plants and the surrounding habitat have been affected by previous droughts.
- c) No research of climate change on the host population (or the plant louse) has been conducted to date, although we are monitoring the climate at some localities.
- d) Mountain populations of host plant through drying of the habitat (although all populations of host plant could be experiencing similar conditions).
- e) Drying of the habitat (through less rainfall) may extinguish populations of the host plant, and therefore the plant-louse.

Phytophthora dieback disease and other plant diseases

- a) All subpopulations, by reducing the number of host plants available to the plant-louse.
- b) Prior to the prescribed burn in October 2015, the state of the host plants at Vancouver Peninsula was severely diseased with three suspected pathogens: aerial canker, *Armillaria* fungus and *Phytophthora* dieback (S.Barrett pers.comm.). Host plants at SRNP and other affected areas are being sprayed with phosphite to counter dieback.
- c) No research of the effect of plant diseases on the populations of the plant-louse has been conducted to date.
- d) Vancouver Peninsula population of host plants have been severely reduced by plant diseases and is expected to therefore cause the local extinction of the plant-louse.
- e) See d) above – the extinction of the Vancouver Peninsula population of plant-louse.

Fragmentation

- a) All subpopulations, as too small a subpopulation of host plant will not support a subpopulation of plant-louse (termed the 'extinction threshold' of population size).
- b) Unknown.
- c) Not conducted to date.
- d) All known subpopulations as both localities are too far apart for the plant-louse to recolonise sites if they become locally extinct.
- e) Local extinctions with no recolonisation, even if the host population restores itself, because the plant-louse subpopulations are too far apart for natural recolonisation to occur.

Wildfires and inappropriate fire regimes

- a) All populations are at risk of wildfires. Fire will extinguish available host plant structures and therefore cause the local extinction of the insect herbivores if no nearby host can be located. *B. brownii* requires fire to regenerate, so a subpopulation that is long unburnt will begin to senesce and eventually lead to a local extinction for both the host plant and the plant-louse.
- b) Prior to the prescribed burn in October 2015, the state of the host plants at Vancouver Peninsula was severely diseased with three suspected pathogens: aerial canker, *Armillaria* fungus and *Phytophthora* dieback (S.Barrett pers.comm.).
- c) Not conducted to date.
- d) All populations are at risk.
- e) The local extinctions, with no recolonisation, even if the host population restores itself because the plant-louse subpopulations are too far apart for natural recolonisation to occur.

If possible, provide information threats for each current occurrence/location:

Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)
Mt Hassel, Stirling Range National Park, WA.	Fire, plant disease.	Fire, plant disease.	Climate change, fragmentation.	Conserve host population in adequate numbers.
Vancouver Peninsula, South of Albany, WA.	Fire, plant disease, fragmentation.	Fire, plant disease, fragmentation.	Climate change.	Conserve host population in adequate numbers.

See Nomination Summary for an updated list of subpopulation details

Identify and explain why additional biological characteristics particular to the species are threatening to its survival (e.g. low genetic diversity). Identify and explain any models addressing the survival of the species.

This species of plant-louse is particularly at risk of extinction as its likely host breadth is very low (1 host plant species). We have used the host-breadth models of Vesk et al. (2010), which assess host-breadth in light of uncertainty (such as the potential of the insect to be a tourist and not actually feeding on any given plant species that it is found on), to examine this. Coupled with the low dispersal ability, the probability of extinction is high.

4.4. Management

Identify key management documentation for the species e.g. recovery plans, conservation plans, threat abatement plans etc.

At this stage there are no management or plans developed for *Trioza barrettae*,

Does this species benefit from the management of another species or community? Explain.

Trioza barrettae should benefit from the management of subpopulations of its host plant *B. brownii* as to date it has only been recorded from this plant host. Any threat to *B. brownii* can be considered a threat to *Trioza barrettae*.

How well is the species represented in conservation reserves or covenanted land? Which of these are actively managed for this species? Provide details.

No areas are actively managed for the plant-louse. It is found in the Department managed lands and Albany Town Council land.

Are there any management or research recommendations that will assist in the conservation of the species? Provide details.

See Nomination Summary for a full list of management and research recommendations.

4.5. Other

Is there any additional information that is relevant to consideration of the conservation status of this species?

We note that despite other subpopulations of the host *Banksia brownii* being surveyed (e.g., South Sister) for the plant-louse, no additional subpopulations have been discovered.

SECTION 5. NOMINATOR

Nominator(s) name(s)	
Organisation(s)	
Address(s)	
Telephone number(s)	
Email(s)	
Date	13 th January 2012

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

Dr Gary Taylor
Earth & Environmental Sciences
The University of Adelaide, SA

SECTION 6. REFERENCES

What references or sources did you use to prepare your nomination? Include written material, electronic sources and verbal information. Include full references, address of web pages and the names and contact details of authorities with whom you had verbal communications.

Barrett, S., Shearer, B.L., Crane, C.E., Cochrane, A., 2008. An extinction-risk assessment tool for flora threatened by *Phytophthora cinnamomi*. Australian Journal of Botany 56, 477–486.

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Moir, M.L., Vesk, P.A., Brennan, K.E.C., Hughes, L., Keith, D.A., McCarthy, M.A., Coates, D.J., Barrett, S., 2011. A preliminary assessment of changes in plant-dwelling insects when threatened plants are translocated. Journal of Insect Conservation. On-line early.

Vesk, P.A., McCarthy, M.A., Moir, M.L., 2010. How many hosts? Modelling host breadth from field samples. Methods in Ecology and Evolution 1, 292–299.

Gilfillan, S. & Barrett, S. (2005). *Feather-leaved Banksia (Banksia Brownii) Interim Recovery Plan 2005-2010 (Interim Recovery Plan No. 210)*. Albany, WA: Department of Parks and Wildlife. Retrieved from: <https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/198-approved-interim-recovery-plans>