

15 July 2021

EPA Services
Department of Water and Environmental Regulation
Locked Bag 10
Joondalup DC, WA 6919

Sent via email: info.epa@dwer.wa.gov.au

Dear Sir / Madam,

RE: CONSULTATION FOR DRAFT TECHNICAL GUIDANCE – SUBTERRANEAN FAUNA SURVEY FOR ENVIRONMENTAL IMPACT ASSESSMENT

The Chamber of Minerals and Energy of Western Australia (CME) is the peak resources sector representative body in Western Australia (WA). CME is funded by member companies responsible for more than 88 per cent of the State's mineral and energy workforce employment.¹ The value of royalties received from the sector totalled \$9.3 billion in 2019-20,² accounting for 28.8 per cent of general government revenue.³ Now accounting for 47 per cent of the State's total industry Gross Value Added,⁴ the sector's exports are likely to remain a major contributor to Australia's economic recovery from its largest global contraction since the 1940s.⁵

CME welcomes the opportunity to provide a submission to the Department of Water and Environmental Regulation (DWER) EPA Services unit on the draft Technical Guidance – Subterranean Fauna Survey for Environmental Impact Assessment (the draft Guidance), released for public consultation on 3 June 2021. Detailed comments and recommendations have been outlined in the table below.

CME thanks DWER for the opportunity to comment on the draft Guidance and looks forward to continuing to work with DWER through this review process.

Should you require any further information, please contact Kira Sorensen, Senior Adviser – Environment & Sustainability.

Yours sincerely,

Robert Carruthers
Director – Policy & Advocacy

¹ Full-time employees and contractors onsite in 2019-20, excludes non-operating sites. Government of Western Australia, *2019-20 Economic indicators resources data*, Safety Regulation System, Department of Mines, Industry Regulation and Safety, 25 September 2020.

² Ibid.

³ Government of Western Australia, *2019-20 Annual report on State finances*, Department of Treasury, 25 September 2020.

⁴ Cassells, R. *et al*, *BCEC Quarterly economic commentary*, Bankwest Curtin Economics Centre, 26 November 2020, p. 2.

⁵ Commonwealth of Australia, *Resources and energy quarterly: September 2020*, Department of Industry, Science, Energy and Resources, 29 September 2020.

Page	Relevant Excerpt from the Guidance	Comments / Recommendations
1 Introduction		
2	“[...] <i>Environmental Protection Authority’s (EPA) Environmental Factor Guideline – Subterranean Fauna.</i> ”	Recommend including document link to improve user-friendliness.
2 Desktop study		
3	<p>Section 2 – Background environmental information</p> <p>“This information should include discussion of relevant:</p> <ul style="list-style-type: none"> • [...] <i>landscape characteristics, e.g. land systems, soil-landscapes, geology, topography, elevation, aquifers, surface water and drainage</i>” 	Recommend include “surface geology” and “downhole stratigraphy”.
4	<p>Section 2.1 – Database searches</p> <p>“[...] <i>data sources include:</i></p> <ul style="list-style-type: none"> • <i>The specimen databases of the Western Australian Museum</i>” 	Recommend detail the specimen databases to be searched (arachnids / myropods, crustaceans, worms, insects etc.) to maintain consistency of desktop reviews.
4	<p>Section 2.3 – Habitat assessment</p> <p>“[...] <i>including, but not limited to: alluvial formations; calcretes – particularly when associated with paleochannel aquifers; fractured rock aquifers; karstic limestone and dolomite.</i>”</p>	Recommend include channel iron deposit (CID), hyporheos, and marine interstitial as stygofauna habitat.
5	<p>Section 2.3 – Habitat assessment</p> <p>Table 1 – Depth to watertable</p> <p>“<i>For example, there is a significantly reduced probability of stygofauna in the Pilbara bioregion when depth to watertable exceeds 40-50 metres (Halse et al. 2014), but may occur up to 100 metres (Hose et. al. 2015).</i>”</p>	<p>Under the current drafting, the potential for inconsistencies exist between proponents in determining whether sampling is required where watertable depths exceed 40-50m. Such inconsistencies have the potential to consequently impede regional assessment of connected habitats and cumulative impacts.</p> <p>Recommend remove specific depth threshold (40-50m) and establish a more conservative threshold to ensure consistency of proponent sampling plans.</p>

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5	<p>Section 2.3 – Habitat assessment</p> <p>Table 1 – Aquitards or aquicludes</p> <p><i>“The presence of clay strata, dykes, sills, fill zones or other impermeable layers may hydraulically separate aquifers, with the potential to restrict the distributions of stygofauna species and limit the extent of groundwater dewatering extents.”</i></p>	<p>Recommend include fresh / impervious rock and shale as other aquitard / aquicludes.</p> <p>Clarification required regarding “fill zones”.</p>
5	<p>Section 2.3 – Habitat assessment</p> <p>Table 1 – Groundwater physicochemical parameters</p> <p><i>“How do aquifer conditions in the proposal area compare with documented ranges for key parameters from <u>other areas where stygofauna have previously been recorded?</u>”</i></p>	<p>Recommend reword to guide proponents to compare similar hydrogeological settings:</p> <p><i>“How do aquifer conditions in the proposal area compare with documented ranges for key parameters from other areas <u>of comparable hydrogeological setting?</u>”</i></p>
	<p>Section 2.3 – Habitat assessment</p> <p>Table 2 – Stratigraphy above watertable</p>	<p>Recommend include:</p> <p>“Drill logs and any other stratigraphic information available (e.g. geological / cross-sections of drill lines and 3D Leapfrog modelling) should be considered jointly with surface geological mapping.”</p>
3 Determining survey type		
7	<p>Section 3 – Determining survey type</p> <p>Figure 1 – Process for determining the level of survey for subterranean fauna</p>	<p>Recommend update flowchart to include the following steps:</p> <ul style="list-style-type: none"> • Detailed survey → Inconclusive results → Targeted survey(s) • Detailed survey → Conclusive results
4 Survey types		
8	<p>Section 4.2 – Detailed</p> <p><i>“Detailed surveys require repeat sampling, over multiple phases, and <u>adequate survey effort</u> to characterise the subterranean fauna of a proposal area and its habitats. The purpose of a detailed survey is to gather <u>quantitative data</u> on species, assemblages and habitats in an area. A detailed survey requires <u>comprehensive survey design</u> and should include at least three survey phases appropriate to the biogeographic region (bioregion).”</i></p>	<p>Recommend clarifying:</p> <ul style="list-style-type: none"> • How the adequacy of survey effort is to be assessed. • How the current collection setting and protocols are linked to quantitative based data collection. • Expectations regarding what is considered “comprehensive survey design”. • Definition and timeframes of the different survey phases.

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8	<p>Section 4.2 – Detailed</p> <p><i>“Detailed surveys require repeat sampling, over multiple phases, and adequate survey effort to characterise the subterranean fauna of <u>a proposal area</u> and its habitats.”</i></p>	<p>Coverage of a broader area can provide contextual data required for environmental impact assessment.</p> <p>Recommend detailed survey to include the proposal area and surrounding areas outside of impacts, where reasonably practicable.</p>
8	<p>Section 4.2 – Detailed</p> <p><i>“A detailed survey requires comprehensive survey design and should include <u>at least three survey phases</u> appropriate to the biogeographic region (bioregion).”</i></p>	<p>The requirement for at least three survey phases is a new requirement which has significant timing implications for proposals required to undergo Part IV assessment under of the <i>Environmental Protection Act 1986</i>.</p> <p>Strongly recommend transitional arrangements enable sufficient time to transition to the new guidance without undue delay to project proposals currently undergoing or soon to be under assessment.</p>
8	<p>Section 4.2 – Detailed</p> <p><i>“[...] should include at least three survey phases <u>appropriate to the biogeographic region</u> (bioregion).”</i></p>	<p>Clarification required regarding what level of survey would be considered “appropriate” for a bioregion.</p>
8	<p>Section 4.3 – Targeted</p> <p><i>“Where the targeted survey does not clarify the knowledge gaps, then repeat sampling of the targeted areas, or sampling of additional areas, may be required. Because impacts must be placed into context, targeted surveys are not necessarily confined to potential impact areas. For example, if the extent of habitat outside of the impact area is unknown, targeted sampling in the surrounding region may be required to obtain contextual data.”</i></p>	<p>Recommend include habitat assessment / modelling to support targeted surveys to provide further context to existing knowledge gaps, such as habitat connectivity, singleton fauna, and the likelihood a species may be restricted to the proposal area.</p>
5 Preparation for survey		
9	<p>Section 5 – Preparation for survey</p>	<p>Recommend including guidance regarding bore construction requirements for subterranean fauna sampling.</p>
9	<p>Section 5 – Preparation for survey</p> <p><i>“Surveys should be coordinated and led by zoologists with at least five years of experience in systematic subterranean fauna sampling, identification and analysis methods.”</i></p>	<p>Recommend rewording to:</p> <p>“Surveys should be coordinated and led by zoologists with experience in subterranean fauna assessments.”</p>

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6 Survey techniques		
10	Section 6.1.1 – Stygofauna – Haul nets “[...] sorted in the laboratory under a dissecting microscope by zoologists.”	Recommend reword to include subterranean fauna experience: “[...] sorted in the laboratory under a dissecting microscope by zoologists <u>trained in the identification of subterranean fauna.</u> ”
11	Section 6.1.2 – Stygofauna – Pumping Section 6.1.3 – Stygofauna – Phreatic sampling	Recommend include the Karaman sampling method. Karaman sampling can be used to infer the likelihood fauna represent true obligate stygofauna or surface variants, such as stygophiles or stygoxenes. This method can provide context of vertical distribution of taxa and indication of the hyporheic fauna which may be more widely dispersed than obligate stygofauna occupying deep groundwater (assumed more restrictive) habitats.
12	Section 6.2.1 – Troglifauna – Trapping “[...] longer trap deployment may result in reduced specimen collections from predation within the trap microhabitat [...]”	Further research is required regarding the impacts of longer trap deployment (it may also allow a greater potential for increased colonisation). Recommend remove reference to reduced effectiveness of longer trap deployment.
7 Survey design		
16	Section 7.2.1 – Sampling effort – Stygofauna “Generally, sampling six months after borehole construction provides time for stygofauna to colonise new boreholes and has been shown to reliably record stygofauna. In the event that sampling of likely stygofauna habitats is conducted within six months of bore completion, and no or few stygofauna are collected, then repeat sampling would be required.”	The requirement for sampling six months after borehole construction conflicts with the requirement from the Department of Mines, Industry Regulation and Safety (DMIRS) to rehabilitate drill holes within six months of development. Recommend revise guidance to provide flexibility of sampling consistent with other departmental requirements. Additionally, DWER EPA Services should liaise with DMIRS to ensure DMIRS is aware of and understands DWER EPA Services requirements. Do <u>not</u> support the assessment of sampling validity based on species abundance (i.e. “no or few stygofauna”). This approach lacks rigour and does not take into consideration the inherent low abundance and singleton fauna recorded during subterranean fauna sampling. Recommend revise guidance to incorporate a more robust method for assessment of sampling validity.
16	Section 7.2.1 – Sampling effort – Stygofauna “Where possible, it is recommended that at least as many samples are taken in reference areas, outside of the impact area, as within it and that the reference habitats sampled should be similar to those within the impact area.”	Recommend revise guidance to require reference sampling to be based on the mitigation of restricted species and validating extent and connectivity of habitat rather than number of samples. Reference sampling outside proposal areas can be constrained by multiple factors, including availability of drill holes / bores, presence of environmental and heritage sensitive areas, accessibility to remote areas, and tenure constraints. In such

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18	<p>Section 7.2.2 – Sampling effort – Troglifauna</p> <p><i>“Where possible, it is recommended that at least as many samples are taken in reference areas, outside of the impact area, as within it and that the reference habitats sampled should be similar to those within the impact area.”</i></p>	<p>circumstances, habitat assessment / modelling should be used to provide further context to address gaps.</p> <p>Recommend include that where reference sampling outside of the proposal area is not reasonably practicable, habitat assessment / modelling can be used.</p>
18	<p>Section 7.2.2 – Sampling effort – Troglifauna</p> <p><i>“For troglifauna, it is expected that each site will be sampled using both trapping and scraping methods.”</i></p>	<p>Recommend revise guidance to clarify whether this refers to ‘each phase’ or for validity of a sampled site over the course of the detailed survey.</p> <p>Recommend revise guidance to clarify this is required for detailed surveys only, as sampling methods for targeted survey may be dependent on targeting specific fauna groups.</p>
8 Habitat connectivity		
19	<p>Section 8 – Habitat connectivity</p> <p><i>“The interpretation of habitat connectivity is only appropriate in situations where adequate sampling has already been completed and the data suggest taxa may be restricted to impact areas.”</i></p>	<p>The limitation of the interpretation of habitat connectivity to areas with adequate sampling is not always possible due to sampling constraints (lack of available holes outside impact) or tenure constraints.</p> <p>Recommend revise guidance to recognise habitat assessment / modelling as a complimentary means to interpret habitat connectivity where sampling limitations exist.</p> <p>Genetic data should be made public during the environmental impact assessment process, by registering sequences on public database such as GenBank, to support cumulative impact assessment.</p>

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21	<p>Section 8.3 – Demonstrating adequate consideration of habitat connectivity</p> <p><i>“Habitat connectivity should be determined by demonstrating that the information has been adequately considered this includes: [...]</i></p> <ul style="list-style-type: none"> • <i>use of appropriate examples of widespread species i.e. those that:</i> <ul style="list-style-type: none"> ○ <i>have similar biological and ecological attributes to the singleton species in question</i> ○ <i>have been recorded from the same site and multiple sites within the study area, or adjacent areas</i> ○ <i>are not taxa that are known to have broad regional or cross-regional ranges</i> • <i>maps or figures illustrating the locations of widespread species, between impact and non-impact areas, in relation to the habitat and proposed impact areas”</i> 	<p>The Guidance should include discussion of 3D habitat modelling that combines multiple variables to provide high confidence / fine-scale resolution of subterranean habitats used to interpret habitat connectivity.</p> <p>The Guidance should include a discussion of habitat modelling, including the value of providing further context to existing knowledge gaps.</p>
9 Specimens		
22	<p>Section 9.1 – Identification</p> <p><i>“Robust analysis of putative species boundaries is gained from the combined consideration of molecular data and morphological diagnosis, using suitable reference material available.</i></p> <p><i>However, due to the absence of regional-scale surveys for subterranean fauna and inherent difficulties in sampling, a specimen is often identified as not belonging to any currently known taxa, instead representing an undescribed species.”</i></p>	<p>The regional comparison of taxa requires standard taxonomic and genetic frameworks to facilitate morphological and/or genetic comparisons. Genetic data should be made public during the environmental impact assessment process, by registering sequences on public database such as GenBank, to support regional comparison and cumulative impact assessment.</p>
23	<p>Section 9.3 – Specimen vouchering and lodgement</p> <p><i>“Registered specimens should be provided to the WA Museum for lodgement within six months of completion of the EPA’s report on a project.”</i></p>	<p>Recommend include requirement for reference material to be kept within private consultancy collections until work on the project area is finalised.</p> <p>Recommend include expectations around DNA extraction material, as WA Museum Taxonomic Services guidelines are insufficient.</p>

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10 Data analysis		
24	<p>Section 10.2 – Assessment of survey effectiveness <i>“Survey adequacy should be determined by demonstrating that the sampling effort undertaken:</i></p> <ul style="list-style-type: none"> <i>• is reasonable to predict the species richness and assemblage present</i> <i>• can confidently predict the distributions of taxa, particularly when concluding that species are likely to be found outside the areas of impact</i> <i>• sufficient information is available to inform the assessment of impacts from the proposal.”</i> 	<p>Recommend revise guidance to include specific detail about the types of analyses and the appropriate confidence threshold required to demonstrate survey adequacy.</p>
24	<p>Section 10.2 – Assessment of survey effectiveness <i>“For the purposes of EIA, information that is considered when determining survey adequacy includes:</i></p> <ul style="list-style-type: none"> <i>• the desktop study used contemporary and appropriate datasets and sources of information</i> <i>• relevant for the proposal area</i> <i>• the surveys are current (within five years) and follow contemporary guidance”</i> 	<p>In the context of the long timeframes required to complete baseline studies, develop a proposal and complete the environmental impact assessment process, a five-year validity period for data is unrealistic. Reliability of survey data should be reviewed against current guidance / standards. There is also limited evidence that survey results for subterranean fauna that are five or more years old become outdated. This may be different to other flora and fauna surveys which can face different threatening processes and where a five-year timeframe may be more appropriate.</p> <p>Recommend remove the five-year validity period for survey data.</p>
25	<p>Section 10.3 – Data retention <i>“All raw data collected during surveys (e.g. dates, locations, specimen records, habitat details) should be retained in the form it was originally collected.”</i></p>	<p>For projects that have undergone assessment by EPA, the essential transferrable data should be made available via a governance / guidance system that sets clear standards for publicly available data such as morphological IDs, genetic sequences, reports, etc.</p>
12 Reporting		
27	<p>Section 12 – Reporting <i>“They should be written by a zoologist involved in conducting the survey, and any significant changes made to the report by those who were not involved in the survey should be justified.”</i></p>	<p>Many highly experienced senior or principal zoologists who are more than qualified to write reports do not play a large part in field work for a variety of reasons. This requirement creates unnecessary complications for consultant workflows.</p> <p>Recommend revise guidance to require zoologists who take part in field surveys to have an active role in report writing and review.</p>