

17 October 2012

Mr Daniel Coffey  
Area Manager South  
Department of Environment and Conservation  
Locked Bag 104  
Bentley Delivery Centre  
Bentley WA 6983

Dear Dan,

**Polaris Vegetation Scope and Methodologies: J4, J5 & Bungalbin East**

I refer to your email of 10 October providing DEC comments on discussions held between Polaris, their Botanist's Mattiske and Ecologia and members of the DEC, OEPA and DMP on 3 October.

I have requested that senior representatives from our botanists Mattiske and Ecologia thoroughly review these comments and acknowledge the DEC's expectations for application to their survey methodologies by way of response as provided in Attachment 1. Please note that Polaris as the proponent fully endorses these responses.

Yours Sincerely



James Hesford  
Environmental Manager  
Polaris Metals Pty Ltd

Cc: Nyomi Bowers: Environmental Officer, OEPA

## Attachment 1

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1	General	<p>The banded iron formation (BIF) hills and ranges of the Yilgarn Craton have been identified as having high conservation significance.</p> <p>The relevant minimum standards for vegetation and flora investigations associated with proposals for mine developments on these BIF hills and ranges are the DEC <i>Recommended Interim Protocol for Flora Surveys of Banded Ironstone Formations (BIF) of the Yilgarn Craton</i> and EPA Guidance Statement 51.</p> <p>DEC expects the flora and vegetation survey, analysis, interpretation and reporting to be best practice, and of sufficient rigour to inform an impact assessment, one which considers both biodiversity conservation and ecological function. Where taxa or communities of interest are found, it is essential that the surveys are extended to provide a comprehensive understanding of the taxa and communities in a local and regional context. Without this, a conservation assessment on the potential impact of the proposal on these taxa or communities cannot be conducted with confidence. The vegetation and flora work conducted for and reported on in the Karara PER shows the standard and quality of information DEC expects for this assessment.</p>	<p>Mattiske Consulting and ecologia Environment agrees to the minimum standards of vegetation and flora investigations associated with proposals by using the DEC <i>Recommended Interim Protocol for Flora Surveys of Banded Ironstone Formations (BIF) of the Yilgarn Craton</i> and EPA Guidance Statement 51.</p>
2	Timing	<p>It is critical that the surveys are conducted at the appropriate time of year to ensure:</p> <ul style="list-style-type: none"> <li>• Compatibility between quadrat based surveys for comparison.</li> <li>• The best quality material is collected for identifications.</li> <li>• The most comprehensive plant list is recorded.</li> </ul> <p>For the Helena-Aurora Range, DEC considers the appropriate time of year to be spring. This is consistent with the requirements outlined in DEC <i>Recommended Interim Protocol for Flora Surveys of Banded Ironstone Formations (BIF) of the Yilgarn Craton</i> and the EPA Guidance Statement 51.</p> <p>DEC will require a statement from the consultants on the limitations of the timing of the surveys and the availability of flowering material for identification.</p>	<p>A Table of Limitations of the Survey will be included as part of the Mattiske Consulting and ecologia Environment report.</p> <p>Previous extensive studies in the area have indicated that many species opportunistically flower and fruit during the year (including after post cyclonic rainfall events in summer months). Therefore, although it is recognised that there are peaks of flowering in spring months, there are many other opportunities in other seasons depending on rainfall events to capture the variety of flora.</p> <p>NOTE: Consultant's survey times are dependent</p>

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		<p>The proposed survey in March 2013 is not likely to provide quality material for collection or identification.</p>	<p>on the required DEC permit applications being approved promptly.</p>
3	Targeted surveys	<p>DEC's expectations on <u>targeted</u> surveys for threatened, Priority and conservation significant<sup>1</sup> flora are:</p> <ul style="list-style-type: none"> <li>• Targeted surveys should be conducted in areas of potential suitable habitat. Systematic quadrat or transect based sampling is not considered an adequate level of search intensity to map population numbers and boundaries.</li> <li>• Timing of targeted surveys should be when the taxa of interest are most detectable/identifiable in the field.</li> <li>• The level of survey effort will depend on the conservation status and the proposed level of potential impact to the taxa (e.g. the expectation is that all individuals of a taxa ranked critically endangered will be recorded; population estimates may be adequate for Priority flora at a lower category).</li> <li>• Quantitative impact assessments should be conducted for each taxa of conservation significance (at the population level and in a local and regional context).</li> <li>• If conservation significant taxa are located near or in the potential impact area, surveys should record the number of individuals located within and outside the potential impact area.</li> <li>• Surveys may need to be conducted outside project/tenement boundaries to capture the entire population(s) of taxa of conservation significance.</li> <li>• Further targeted surveys may be required if the level of impact is considered significant.</li> <li>• Environmental and declared weeds should be surveyed for and recorded.</li> </ul> <p>If there is any uncertainty with specific flora taxa, clarification should be requested from DEC (through Environmental Management Branch).</p>	<p>Mattiske Consulting and ecologia Environment agrees to conduct targeted surveys for threatened, priority and conservation significant flora when taxa are most detectable/identifiable etc. as per reviewers comments and negotiations and discussions between DEC staff, DEC BIF regional staff, ecologia Environment staff, Mattiske Consulting staff and client representatives.</p>
4	Vegetation mapping	<p>DEC is expecting:</p>	<p>Mattiske Consulting and ecologia Environment agrees to provide mapping based on floristic vegetation units, reporting on quantitative impact assessment and including local and regional</p>

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		<ul style="list-style-type: none"> <li>• Vegetation mapping to be based on floristic vegetation units.</li> <li>• Boundaries for each vegetation unit to be ground truthed.</li> <li>• The relative conservation significance of each vegetation unit to be provided.</li> <li>• Surveys may need to be conducted outside project/tenement boundaries to provide context on each vegetation unit that may be proposed for impact.</li> <li>• Quantitative impact assessments should be conducted for each vegetation unit of conservation significance (or unit that could be impacted by a development proposal) in a local and regional context.</li> </ul>	<p>context. Mattiske Consulting and ecologia Environment undertakes detailed analyses on both presence absence and quantitative data (the latter often provides a clearer ecological pattern and the former aligns with current DEC analyses on BIF in a regional context).</p>
5	Priority ecological community	<p>DEC does not have good boundary information for the majority of the BIF associated vegetation PECs. In general, these PECs are mapped from a combination of 1:100 000, 1:250 000 geology mapping, Beard vegetation mapping and topography. DEC relies on good data from proponents/consultants to further define the PEC(s) for impact assessment purposes.</p> <p>Please also note that some of the vegetation units that make up a PEC may in themselves be restricted in distribution, and may meet the criteria for a higher ranking on their own.</p>	<p>Mattiske Consulting and ecologia Environment agrees to conduct the flora and vegetation surveys as negotiated as requisite by DEC in compliance with Recommended BIF survey guidelines and Guidance Statement 51 standards, and to supply this information to DEC.</p>
6	Taxonomy	<p>The bioregion is known to contain conservation significant species. From an analysis conducted by the Western Australian Herbarium in 2010, one in every nine specimens lodged from the Mount Manning area was new to science.</p> <p>If a potentially new species or variant is identified from the surveys, the identification of the potentially new species or variant needs to be confirmed by an appropriate specialist(s) and a specimen vouchered at the Western Australian Herbarium. DEC (Environmental Management Branch) should be notified as soon as the confirmation of a new species or variant is made.</p>	<p>Mattiske Consulting and ecologia Environment agrees to submit potentially new species or variants to the Western Australian Herbarium for identification where required; vouchered specimens to follow. The DEC (Environmental Management Branch) will be notified as soon as the confirmation of a new species or variant is made.</p>
7	Voucher specimens	<p>DEC expects that there will be comprehensive voucher specimens of all conservation significant taxa lodged at the Western Australian Herbarium in a timely manner. This will enable identifications to be confirmed and any changes in taxonomy to be correctly applied.</p> <p>It is also expected that the report(s) produced from the surveys will include the Western</p>	<p>Mattiske Consulting and ecologia Environment agrees to submit specimens and associated collecting details of all conservation significant taxa to the Western Australian Herbarium in a timely manner.</p>

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		Australian Herbarium assigned collection number.	It is our understanding that vouchered specimens may not always be accepted by the Western Australian Herbarium unless they provide some additional information to assist taxonomists. Our experience is that it is up to the Herbarium as to whether or not a vouchered specimen is accepted. As such, this is out of the control of Mattiske Consulting and ecologia Environment.
8	Adequacy	<p>The intensity of the surveys should be shown by:</p> <ul style="list-style-type: none"> <li>• Map(s) showing the areas traversed by foot and other means.</li> <li>• Species accumulation curve(s).</li> <li>• Species area curve(s).</li> <li>• A table showing the breakdown of the number of person days to survey the different components (e.g. survey the quadrats, map the vegetation, targeted flora surveys, survey 'x' hectares along the proposed haul road alignment etc.).</li> </ul> <p>This information may show that the area has not been adequately surveyed and that additional surveys may be required.</p>	Mattiske Consulting and ecologia Environment agrees to provide the requisite information as specified, including details from GPS data.
9	Quadrats	<p>The number of quadrats required is dependent on the complexity and mosaic of the vegetation units, where the area is complex (which is likely for the Helena-Aurora Range) more quadrats will be required. As with the surveys for Karara it is expected at least three quadrats will need to be established in each plant community type and additional quadrats will need to be located within the project (impact) area.</p> <p>The quadrats should be 20 x 20 m, and permanently marked.</p>	<p>Mattiske Consulting and ecologia Environment is following this requirement as negotiated by DEC staff, DEC BIF regional staff, ecologia Environment and Mattiske Consulting staff. Permanent 20 m x 20 m quadrats are marked with a pin-peg in the northwest corner.</p> <p>ecologia Environment will mark each permanent 20 m x 20 m quadrat with a star picket on the BIF ranges or a galvanised fence dropper in other areas as required in the <i>Recommended Interim Protocol for Flora Surveys of Banded Ironstone Formations (BIF) of the Yilgarn Craton</i>.</p>
10	Ancillary infrastructure	All areas that could be proposed for locating ancillary infrastructure should be surveyed and reported on.	Mattiske Consulting and ecologia Environment is following this requirement which has been negotiated by DEC staff, DEC BIF regional staff

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		<p>As the location of ancillary infrastructure is not fixed, surveys in these areas should be broad enough to allow for flexibility in selecting the preferred locations of haul roads, waste dumps etc. to avoid or minimise potential impact(s).</p>	<p>ecologia Environment and Mattiske Consulting staff.</p>
11	Electronic data	<p>DEC requires the following electronic data:</p> <ul style="list-style-type: none"> <li>• Site / quadrat data sheets (including photographs).</li> <li>• Flora species list and site by site species matrix (in excel, database or text format).</li> <li>• Coordinates of threatened, Priority and conservation significant<sup>1</sup> flora (in excel, database or text format).</li> <li>• Coordinates of weeds (in excel, database or text format).</li> <li>• List of quadrats by floristic group (in excel, database or text format).</li> <li>• Dendrogram of vegetation community analysis.</li> <li>• Two way table of floristic classification (at high resolution).</li> <li>• Matrix showing correlation between mapping units and site groups based on floristic classification.</li> </ul> <p>If additional data is used in the analysis (e.g. other surveys on the Helena-Aurora Range, not specific to this proposal) that data should also be provided to DEC to inform our review of the analysis.</p>	<p>Mattiske Consulting and ecologia Environment agrees to provide the electronic data as specified here.</p>
12	Spatial data	<p>DEC requires the following spatial data:</p> <ul style="list-style-type: none"> <li>• GIS (in ARC GIS 9 format) and spatial point data for: <ul style="list-style-type: none"> <li>- Threatened, Priority and conservation significant<sup>1</sup> flora location (including the numbers of individuals at each point).</li> <li>- Quadrat locations.</li> <li>- Weed species locations.</li> </ul> </li> <li>• Polygons (in ARC GIS 9 format) for: <ul style="list-style-type: none"> <li>- Surveyed areas.</li> <li>- Vegetation community mapping (floristic and structural).</li> </ul> </li> </ul>	<p>Mattiske Consulting and ecologia Environment agrees to provide the electronic data as specified here.</p>

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		<ul style="list-style-type: none"> <li>- Impact footprint (direct and indirect).</li> </ul>	
13	Reporting	<p>In addition to standard requirements for reports and other comments in this table, DEC specifically expects the survey report(s) to include the following:</p> <ul style="list-style-type: none"> <li>• Practitioners <ul style="list-style-type: none"> <li>- The name, role and experience of all the practitioners involved in the survey, identifications, analysis, interpretation and reporting needs to be provided (both in terms of general experience and experience specific to BIF hills and ranges of the Yilgarn Craton or Mount Manning).</li> </ul> </li> <li>• Methods and analysis <ul style="list-style-type: none"> <li>- The methods used and analysis pathways used must be fully documented and justified.</li> <li>- Discussion on any limitations in the methods or with the analysis.</li> <li>- As requested above, the data from the analysis is required by DEC for the department's specialists review.</li> </ul> </li> <li>• Quantitative impact assessment <ul style="list-style-type: none"> <li>- Quantitative impact assessments (numbers and proportions) should be provided for all impacted vegetation units and conservation significant taxa.</li> <li>- Impacts to vegetation units should include the number of hectares and the proportion of the vegetation units that is proposed to be impacted in the local and regional context.</li> <li>- Impacts to conservation significant taxa should include the number of individuals, proportion of known individuals and proportion of known populations in a local and regional context.</li> <li>- An example of a quantitative impact table for a mine development proposal on BIF hills and ranges of the Yilgarn Craton can be found in Woodman Consulting (2009) or Western Botanical (2008).</li> </ul> </li> <li>• Conservation significant taxa <ul style="list-style-type: none"> <li>- Discussion on the environmental conditions leading up to the survey(s) and the likelihood that conservation significant taxa were present but not identified during the survey(s). This would include a discussion on the</li> </ul> </li> </ul>	<p>Mattiske Consulting and ecologia Environment agrees to provide the specific information as specified here as part of the standard report format.</p>

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		<p>results from database searches.</p> <ul style="list-style-type: none"> <li>- Discussion should detail the distribution of each taxa so this can be used to generate local and regional context data.</li> <li>- Discussion should include information on the known or proposed threats and security of other populations.</li> <li>- Discussion on the potential requirement for further survey for conservation significant taxa for which proposed impact on known distribution is significant.</li> <li>- Discussion on any taxonomic issues.</li> </ul> <ul style="list-style-type: none"> <li>• Vegetation units <ul style="list-style-type: none"> <li>- Vegetation unit descriptions include a description of substrate/soils, and underlying geology.</li> <li>- Discussion should detail the distribution of each vegetation unit so this can be used to generate local and regional context data.</li> <li>- Discussion should include information on the known or proposed threats and security of other locations of the vegetation unit(s).</li> <li>- Discussion on the potential requirement for further survey for vegetation units for which proposed impact on known distribution is significant.</li> </ul> </li> <li>• PEC <ul style="list-style-type: none"> <li>- Recommendations (and discussion on) which vegetation units that could make up the PEC (this should be based on flora, vegetation and substrate – the vegetation units on BIF and BIF outwash).</li> <li>- Recommendations (and discussion on) the conservation significance of the vegetation units (e.g. which ones are rare, restricted, endemic, support conservation significant taxa etc.?).</li> </ul> </li> <li>• Figures / maps <ul style="list-style-type: none"> <li>- Vegetation unit mapping to be overlaid on direct and indirect impact zones.</li> <li>- The individual locations of conservations significant flora taxa should be shown relative to vegetation units, direct and indirect impact zones.</li> <li>- Each vegetation unit and conservation significant flora taxa need to be</li> </ul> </li> </ul>	



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		<p>clearly labeled.</p> <ul style="list-style-type: none"> <li>- For complex areas of mapping (multiple taxa overlays), separate maps should be provided.</li> <li>• Literature <ul style="list-style-type: none"> <li>- The report(s) should include discussion on the results of and references to relevant literature resources regarding: <ul style="list-style-type: none"> <li>▪ The Helena-Aurora Range;</li> <li>▪ The Mount Manning area;</li> <li>▪ Flora and vegetation surveys (values) of BIF hills and ranges of the Yilgarn Craton; and,</li> <li>▪ Development proposals on BIF hills and ranges of the Yilgarn Craton.</li> </ul> </li> </ul> </li> </ul>	
14	J4	<p>Whether J4 is floristically aligned with the Mount Jackson Range PEC or the Helena-Aurora Range PEC can only be determined following a statistical comparison of the quadrat data from the J4 area with the quadrat data from the Mount Jackson Range and Helena-Aurora Range. In this regard, the regional data from DEC (see Gibson <i>et al.</i> 1997), Portman 2002 Koolyanobbing Expansion Project assessment (surveys conducted by Mattiske Consulting) and Cliffs Iron Ore Asia Pacific 2009 J1 assessment (surveys conducted by Western Botanical) should be used in the comparison.</p>	<p>Mattiske Consulting agrees to provide the comparison as specified here; providing access is granted from DEC and Cliffs Iron Ore Asia Pacific for access to this data. Noting that there may be some limitations as the data collected earlier was collected prior to the DEC BIF survey recommendations. (This item is not relevant to ecologia Environment). Mattiske Consulting and ecologia Environment are happy to have work peer reviewed; however notes that few botanists have the appropriate experience for this assessment in Western Australia.</p>
15	Peer review	<p>DEC may request the work conducted is peer reviewed. If required, the selection of a peer reviewer should be based on their experience and expertise.</p>	
16	Malleefowl	<p>Whilst botanists may be able to identify Malleefowl mounds in the field, the status of these should be confirmed by a suitably qualified and experience fauna biologist. Reporting of Malleefowl mounds should be made in the fauna specialist report and to DEC, not in the flora and vegetation specialist report.</p>	<p>Mattiske Consulting agrees to supply the data for confirmation of Malleefowl records to the relevant specialist and that this will necessitate a definition of limitations to the Clearing Principles section that related to fauna. Ecologia will provide all data and photographs for confirmation of Malleefowl records to the relevant specialist.</p>

