



Biologic Environmental Survey Pty Ltd

PO Box 179

Floreat, WA, 6014

31st January 2018

Attn: Belinda Barnett

BHP Billiton Iron Ore

125 St Georges Tce

Perth, WA, 6000

Dear Belinda,

Please find below a summary of the recent fauna habitat consolidation project.

The consolidation comprised two elements, as outlined below.

Correct errors in the 2015 database and incorporate additional areas of mapping

This work was undertaken by Gaia Resources (Gaia) using Esri ArcGIS software (unless stated otherwise), under the guidance of Biologic Environmental Survey (Biologic). The process summary is provided below:

The first step was to separate and remove the small, extraneous polygons (slivers). This required the *Multipart to Singlepart* tool to separate all multipart features into individual singlepart features. From here, all null geometries (singlepart features that have no geometry) were removed, i.e. slivers. This resulted in the removal of 4,100 features.

The second step was to create a topologically correct dataset. The tool *Clean Polygon Layer* (within the program *ET Geowizards*) was used, which resulted in 970 overlaps (areas where two polygons overlap) being cleaned.

The program *ET Geowizards* was used again to identify and fill any gaps between polygons using the tool *Clean Gaps* (and a user-defined tolerance). This resulted in 4,500 gaps cleaned; however, this did not clean any large gaps. Large gaps (specifically between fauna survey areas) were manually cleaned.

The tool *Eliminate* (*ET Geowizards*) was then used to join together all the polygons where a gap had previously existed and had been cleaned in the previous step. The join was determined by the longest boundary.

With respect to the “Drainage area/Floodplain” polygon slivers, these were dealt with separately. A separate layer of “Drainage area/Floodplain” features less than 1,000 m² was created. From this layer, the following features were selected in the following order:

- a. “Minor Drainage Line” features were selected from the original Fauna Habitat V3 dataset;
- b. Any “Drainage Area/ Floodplain” features were selected within the separated layer that was touching the boundary of the above selected “Minor Drainage Line” features;
- c. Any features in the Fauna Habitat V3 dataset that were identical to the selected “Drainage Area/ Floodplain” features from step “b” above were selected;
- d. The above selected features had their name changed to “Minor Drainage Line” within the Fauna Habitat V3 attribute table

To dissolve all identical habitat types that share boundaries, while not creating multipart features, the tool *Dissolve* was used.

All remaining small features (less than 50 m²) were corrected manually, and any other askew features were reviewed independently and corrected as instructed by Biologic.

The additional habitat fauna mapping was imported, reviewed, cleaned and merged with the original Fauna Habitat V3 dataset.

Overlapping areas were reviewed independently and corrected as instructed by Biologic.

The revised dataset was converted to the BHP Billiton WAIO Project Biodiversity Survey Data Template Requirements.

Update significant fauna habitat and habitat features layer

This work was undertaken by Biologic and the new habitat features layers incorporated into the dataset by Gaia.

The significant habitat layer was reviewed and compared to the base fauna habitat layer for inaccuracies and inconsistencies. All inaccuracies were corrected and the layer updated.

To update the consolidated significant fauna habitat layer, All BHP fauna reports available were searched for records of caves and waterholes. These records were added to the current database records and provided to Gaia in spreadsheet format.

This dataset was cleaned, projected, converted to spatial data and then converted according to BHP Billiton WAIO Project Biodiversity Survey Data Template Requirements.

The complete dataset was updated to the current data template requirements.

Please let me know if you have any questions.

Yours sincerely,

Brad Durrant

Managing Director

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