# 1 Memo

**SUBJECT**
Wallerawang Aquatic Habitat Assessment
**DATE**
21 April 2022
**CLIENT**
Greenspot Wallerawang Pty Ltd

**OUR REF**
30123695
**LOCATION**
Old Wallerawang Power Station

# 1 Introduction

This memo has been prepared in response to a submission to the Environmental Impact Statement (EIS) for the Wallerawang Battery Energy Storage System Project (the Project), which was on public exhibition between 9 February 2022 and 8 March 2022. Public exhibition provides the community, interested parties and key stakeholders (including government agencies and councils) with an understanding of the Project and provides the opportunity for interested parties to make a submission on the EIS.

The Department of National Resources Access Regulator (NRAR) raised a concern regarding the aquatic and riparian corridor features within the Project site. The submission from NRAR states that the EIS includes water quality and hydrology assessments however further investigation is required to assess the impacts of the Project on the aquatic and riparian features in the Project site.

In response to this submission, additional aquatic and riparian assessments have been completed. This included a site investigation to inform this memo and to assess whether impacts to aquatic and riparian features would result from the construction and operation of the Project.

# 2 Methodology

Arcadis ecologists Kate Carroll and Taylor Bliss-Henaghan attended the subject land on 31 March 2022 to make an assessment of the aquatic and riparian features of a watercourse running through the forestry area. Watercourse assessments were conducted at two locations, one within the pine plantation within the subject land and another upstream in the paddock outside the southwest extent of the subject land. At each location the aquatic features of the watercourse and adjacent riparian vegetation were investigated, and notes made on the condition of these. Weather on the day of survey was sunny with clear skies, however followed by a period of heavy rainfall. Location of habitat assessment points are shown in Figure 1.

Assessment of the watercourse was conducted in accordance with the Department of Primary Industry's (DPI) *Policy and guidelines for fish habitat conservation and management – Update 2013* (the Policy). Aquatic assessments at each waterway included:

- General description of the waterway
- Stream order
- Key Fish Habitat class and type (sensitivity) (DPI, 2013)
- Dimensions of waterway and depth of water
- Flow characteristics and hydrological features of aquatic habitat
- Bed substrate
- Habitat features (e.g. pools, riffles, billabongs, reefs)

- Instream vegetation
- Existing infrastructure and barriers to fish movement (natural or artificial)
- Width and species composition of riparian vegetation including the type of vegetation present and condition
- Visual assessment of water quality.


*Figure 1 Survey locations within the subject land*

# 3 Results

No Key Fish Habitat is mapped within the watercourse (DPI, 2022). The watercourse flows downstream to meet Lake Wallace, an artificial impoundment of the Cox's River (sixth order stream), that lies above Wallerawang Dam. Lake Wallace and the Cox's River are mapped both as a 'Sensitive Waterway' under the Lithgow LEP and contain mapped Key Fish Habitat (DPI 2022). No threatened fish listed on *Fisheries Management Act 1994* (FM Act) are mapped within either Cox's River or the watercourse (DPI 2022). An assessment of the aquatic and riparian characteristics of the watercourse transecting the subject land is provided below.

## 3.1 Aquatic habitat assessments

### 3.1.1 Cleared paddock site

**Description**: Narrow creek which runs through a cleared paddock and links farm dams in the local landscape. Creek channel is generally well defined, narrow, modified, approximately 0.5 metres wide, and snaking through the paddock. Banks short and low sloping.

**Hydrological Features:** Ephemeral creek with likely intermittent slow flow during high rain. Not flowing at time of survey.

**Stream Order:** 2nd

**Key Fish Habitat:** No mapped Key Fish Habitat. Class 3 Minimal Key Fish Habitat. No sensitivity class.

**Bed Substrate:** Clay and shale muddy substrate. Sparse cover of small rocks.

**Habitat Features:** Dense stands of *Typha orientalis* (Bulrush) in the farm dam, instream vegetation present, other refuges and fish spawning areas absent.

**Barriers to fish movement:** Two medium pipe culverts downstream.

**Instream vegetation:** Consistent high cover and density of vegetation instream. Mix of exotic and native species including *Typha orientalis, Eragrostis sphacelata* (Tall Spike-rush)*, Juncus usitatus* (Common Rush)*, Cyperus eragrostis* (Tall Flatsedge)*, Juncus sp.* and *Setaria sp.*

**Riparian zone:** Vegetation either side of the creek line, including the creek banks, is characteristic of agricultural pasture with a mixture of native and exotic flora species including *Themeda triandra* (Kangaroo Grass), *Plantago lanceolata* (Lambs Tongue)*, Cynodon dactylon* (Couch Grass)*, Conyza bonariensis* (Flaxleaf Fleabane)*, Hypochaeris radicata** (Catsear)*, Eleusine indica** (Crowsfoot Grass)*, Paspalum sp.,* and *Rubus fruticosus species agg.* (Blackberry) present.

**Water quality:** Poor quality - brown algae present, oil slicks visible, water brown/orange in colour, moderate turbidity. Agricultural activity surrounding creek may influence water quality.

**Fauna:** *Crinia signifera* (Common Eastern Froglet) heard during survey

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| Cleared Paddock: Upstream (farm dam) | Cleared Paddock: Downstream |

### 3.1.2 Forestry site

**Description:** Intermittent creek transecting *Pinus radiata* (Radiata Pine) plantation. Occasional pools and eroded undercut banks with a shallow gradient slope. Channel modified and generally 1.5 metres wide with wider pools up to four metres occurring intermittently. Creek banks were between two and three metres in width.

**Hydrological Features:** Ephemeral creek, moderate flow velocity at time of survey.

**Stream Order:** 2nd

**Key Fish Habitat:** No mapped Key Fish Habitat. Class 3 Minimal Key Fish Habitat. No sensitivity class. The flow velocity increases substantially downstream suggesting the watercourse is a gaining stream. According to Section 3.2.1 of DPI's '*Policy and guidelines for fish habitat conservation and management – Update 2013'* first and second order streams on gaining streams are not considered key fish habitat.

**Bed Substrate:** Both sand and clay substrate present, gravel and larger rocks and small boulders

**Habitat Features:** Refuge areas limited to pools upstream, undercut banks also present in one location. Gravel substrate/rock in parts and small volume of course woody debris.

**Barriers to fish movement:** Two medium pipe culverts upstream impede movement and dense blackberry stand

**Instream vegetation:** Sparse in-stream vegetation, exotic species dominant including *Cyperus eragrostis* and *Plantago major* (Large Plantain)

**Riparian zone:** Disturbed Radiata Pine forest with open understory. High cover of *Rubus fruticosus species agg.* In riparian and instream areas upstream and downstream. Exotic species dominant including *Solanum sp., Hypochaeris sp., Rosa rubiginosa* (Sweet Briar)*, Prunella vulgaris* (Self-heal)*, Conyza bonariensis, Cenchrus clandestinus* (Kikuyu Grass)

**Water quality:** Moderate quality - Low turbidity, evidence of pollution (foam) in places.

**Fauna:** None present.

Forestry Area: Upstream

Forestry Area: Downstream

# 4 Impact assessment

The construction of the Battery 'pad' for the Project would involve civil works for site levelling within the forestry area, and would include the installation of a 1.2 metre diameter pipe to manage flows of the ephemeral waterway. This would also require clearing and grubbing of riparian vegetation to allow for installation of the pipe. This would result in the permanent modification of the ephemeral creek that passes through the forestry area.

The condition of the creek within the forestry area is degraded with a high cover of weeds and minimal instream vegetation. Fish habitat is limited, though there are occasional pools and one pool contains undercut banks and gravel/rock which could provide fish habitat. The Blackberry infestation is likely reducing the habitat value of the watercourse limiting other aquatic fauna such as birds or turtles from inhabiting the waterway. The watercourse has connectivity to Cox's River which contains Key Fish Habitat and in periods of high flow, the watercourse could provide habitat for fish upstream from the Cox's River, though watercourse features would impede fish movements through the upper reaches of the forestry area and paddock such as the Blackberry infestation and the culvert. The creek modification would remove habitat values which could impact on fish populations in the area, though is unlikely to impact on any threatened fish. It should be noted that the forestry area is currently being harvested and will be fully harvested prior to the construction of the Wallerawang BESS commencing. This could lead to potential impacts on the condition of the creek, leading to further habitat degradation and removing shade.

There is potential for sedimentation and spills to affect water quality in watercourses during construction which could affect native frogs, and fish species located downstream of the site. Water quality management measures during construction would minimise the likelihood and extent of potential impacts to watercourses downstream and in the vicinity of the Project. Measures would include the implementation of appropriate sediment and erosion controls. Full impacts to water quality and mitigation measures for the Project have been assessed in the EIS.

The DPI (2013) *Policy and guidelines for fish habitat conservation and management* specify that Key Fish Habitat Type 1-3 are to be offset by environmental compensation. According to Section 3.2.1 of the Policy, first and second order streams on gaining streams are not considered Key Fish Habitat Types 1-3. The flow velocity increases substantially downstream suggesting the watercourse is a gaining stream and is a mapped second order stream. As such, the watercourse does not meet the definition of Key Fish Habitat and there is no requirement to offset.

*Plate 1 Culverts upstream of the forestry area*

# 5 References

Department of Primary Industries [DPI] 2013. *Policy and guidelines for fish habitat conservation and management. Update 2013.* NSW Government

Department of Primary Industries [DPI] 2022. *Fisheries NSW Spatial Data Portal.* Key Fish Habitat Maps. Accessed 05 April 2022 from: https://webmap.industry.nsw.gov.au/Html5Viewer/index.html?viewer=Fisheries_Data_Portal