



**WALKER SWAMP 1<sup>st</sup> ANNIVERSARY CELEBRATION –  
Sunday 29<sup>th</sup> September 2019**

*Mark Bachmann, Greg Kerr and Lachlan Farrington - Nature Glenelg Trust (NGT)*



**Welcome to the Walker Swamp Restoration Reserve!**

It has been 12 months since the Walker Swamp Restoration Reserve was launched, hence today marks a significant milestone in the establishment of this new private nature reserve on the Wannon River floodplain, adjacent to the Grampians National Park.

The first year has been exceptionally busy, with a wide range of works and activities taking place to begin the ecological restoration process. The material in this handout describes the progress of the project over that time, forming an accompaniment to the guided tours of the site as presented today by NGT ecologists.

As well as an incredible level of community and volunteer support throughout, the project activities presented in this summary have been made possible thanks to partnerships or direct grant funding support from a range of organisations and programs:

Glenelg Hopkins



C M A



**Australian Government**



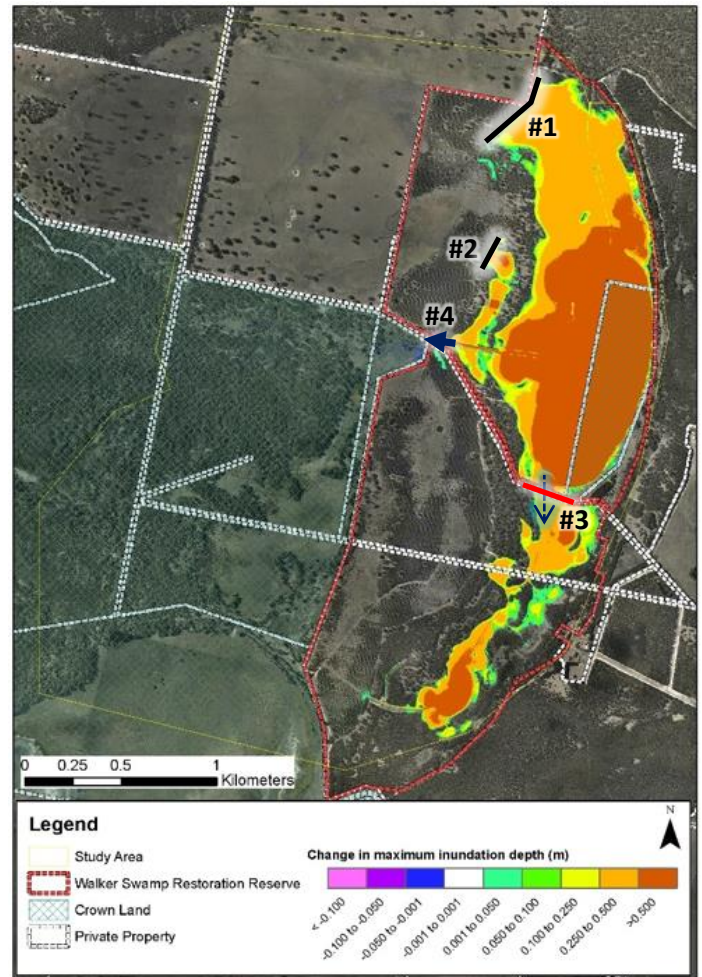
**Ararat Rural City**

## Hydrological Study

Prior to the commencement of any earthworks, a hydrological investigation, commissioned by the Glenelg Hopkins CMA, was undertaken by NGT to enable the impact of backfilling artificial drains across the property to be understood, and to inform the design, implementation and permit approvals for those works. The hydrological study allowed us to predict how drainage inflows into a restored Walker Swamp could be managed on the eastern floodplain portion of the property, as shown right (note that the floodplain wetlands on the western portion of the property are not highlighted on this map).

This in turn highlighted key locations on the property where additional remedial works would be required to facilitate restoration, such as:

- reinforcement of existing levee banks (black lines marked #1 and #2 on the map),
- upgrading the road (red line at #3) and culverts (thin arrow at #3) to allow flows to reach the full wetland extent to the south, and
- constructing a new spillway, set to the natural sill level (thick blue arrow at #4), to enable flows to be conveyed down the existing artificial channel to the west when the swamp is full.



## Levee Bank Reinforcement

The two northern levee banks on the property (see #1 and #2 on map above) are artefacts of the era when the artificial drains were constructed, and were designed to ensure that drainage inflows coming into Walker Swamp from the north-east were contained on the eastern portion of the property and prevented from spilling west during major rainfall events. After such events, even in its drained state Walker Swamp would temporarily inundate (acting as an equalisation basin), only to disappear again within days or weeks as the major channel through Walker Swamp would rapidly carry away the excess water, as soon as inflows dropped below the outflow capacity of the drain. This water would discharge towards Gooseneck Swamp via the main artificial outlet and under Lynchs Crossing Road, near the corner of the Grampians National Park.

With Walker Swamp restored, these now reinforced (approximately 50 cm high) levee banks will continue to be of strategic value for water management, by allowing NGT to hold the eastern wetlands (including Walker Swamp) to their full supply level whenever drainage inflows permit. The levee banks allow us to confidently do this without negatively impacting our neighbours, and to continue to manage a single exit point for outflows off the property, via the new spillway (#4), and down the short remaining section of artificial drain.

Because the eastern wetlands on the Walker Swamp Restoration Reserve have an artificially supplemented catchment (via the northern Bunnugal Drain, which is capable of delivering high volume, flashy flows from the north-east), it was vitally important that NGT demonstrate how those drainage flows were going to be effectively managed in conjunction with our approach to restoration works. The reinforced levee banks have been integral to this approach to future water management.



## Walker Swamp Outlet Spillway

The single exit point chosen for conveying flows from Walker Swamp and the wetlands on the eastern portion of the property (see #4, on page 2 map) presented the following design challenges. On the upstream side, as discussed in the previous section, the goal was to completely backfill all the artificial drains through Walker Swamp, and to use the finished height of the spillway itself at natural surface to set the restored full supply level of the wetland. However, on the downstream side we were planning to keep a short existing section of drain operational in order to have a means of managing outflows in major events under Lynchs Crossing Rd, using existing drainage infrastructure. That meant establishing a spillway capable of resisting erosion and conveying flows over an approximate 1.5m drop from the restored natural surface level upstream into the base of the artificial channel downstream, noting that this drain is now not expected to carry flows very often, due to the immense increase in water storage capacity within Walker Swamp and adjacent eastern floodplain wetlands.

After weighing up the options, rather than using concrete, we decided to adapt an inexpensive and more flexible construction method we have previously employed in trials, by building the spillway out of an interlocking structure of 2500 geo-fabric sandbags. After surveying the site and setting the levels in January 2019, over 2 days in March 2019 a team of volunteers helped us get the job done in quick time – as shown right (images from Jan, March, May, Aug).



After lining the whole structure with fabric, backfilling the drain upstream and capping the spillway with donated rock, the job was done...

## Lynchs Crossing Road Upgrade

Lifting water levels in Walker Swamp meant that Lynchs Crossing Road was going to be at risk of regularly inundating in the future as a result of our restoration works. We also needed to make sure that any upgrade works to the road then didn't inadvertently isolate the important chain of wetlands south of the road, which we had also earmarked for restoration, from their water source.

The solution (see right) was to build up Lynchs Crossing Rd by approximately 50 cm, and to install additional culverts with sufficient capacity to carry flows (which will



occur when Walker Swamp is full enough to spill southward, noting that at the time of writing this is very close but has not quite happened yet in 2019) through to the southern wetland chain, maintaining connectivity and ensuring the road remains all-weather accessible. Ararat Rural City generously provided a significant contribution to this component of the project, as well as incredibly helpful design and technical assistance.

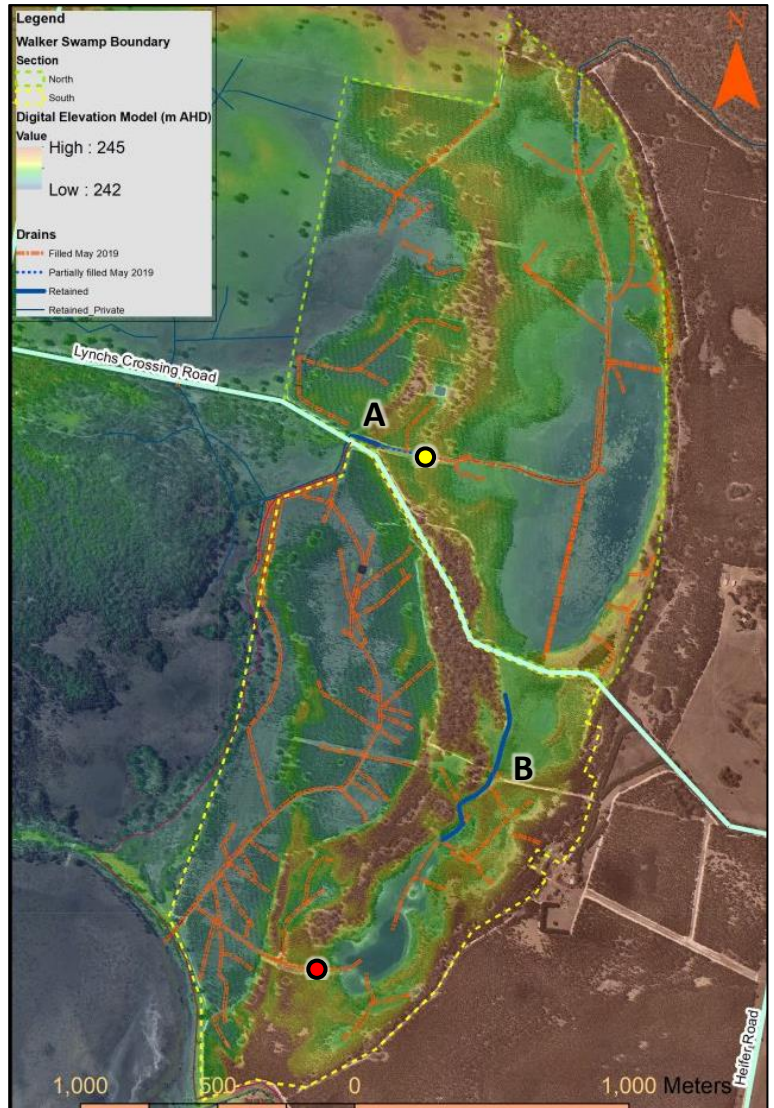


## Backfilling Drains on the Property

With 26 km of artificial drains situated across the property, addressing this legacy of past land use was one of the most important issues we have tackled over the past 12 months. Using a combination of machinery, including an excavator, laser bucket and grader, almost all of these artificial drains have now been fully backfilled, resulting in the restoration of natural inundation patterns across the property in 2019 for the first time in several decades.

The remediated former drains are marked in orange on the map right (see example before and after images below). On the map, you will notice that only two drains (blue lines) remain:

- The one marked A is the short section of the major deep drain that is being kept to convey occasional flows downstream of the Walker Swamp outlet spillway.
- The one marked B is a shallow connecting channel that we are going to observe over the next couple of years, to assess its role in delivering water to the southern-most wetland in the chain of wetlands on the eastern side of the property. Because it is only a minor channel, future works (if required) will be simple and inexpensive.



*Looking east at the former 2014 trial location on the main drain out of Walker Swamp. (See yellow dot on map above)*



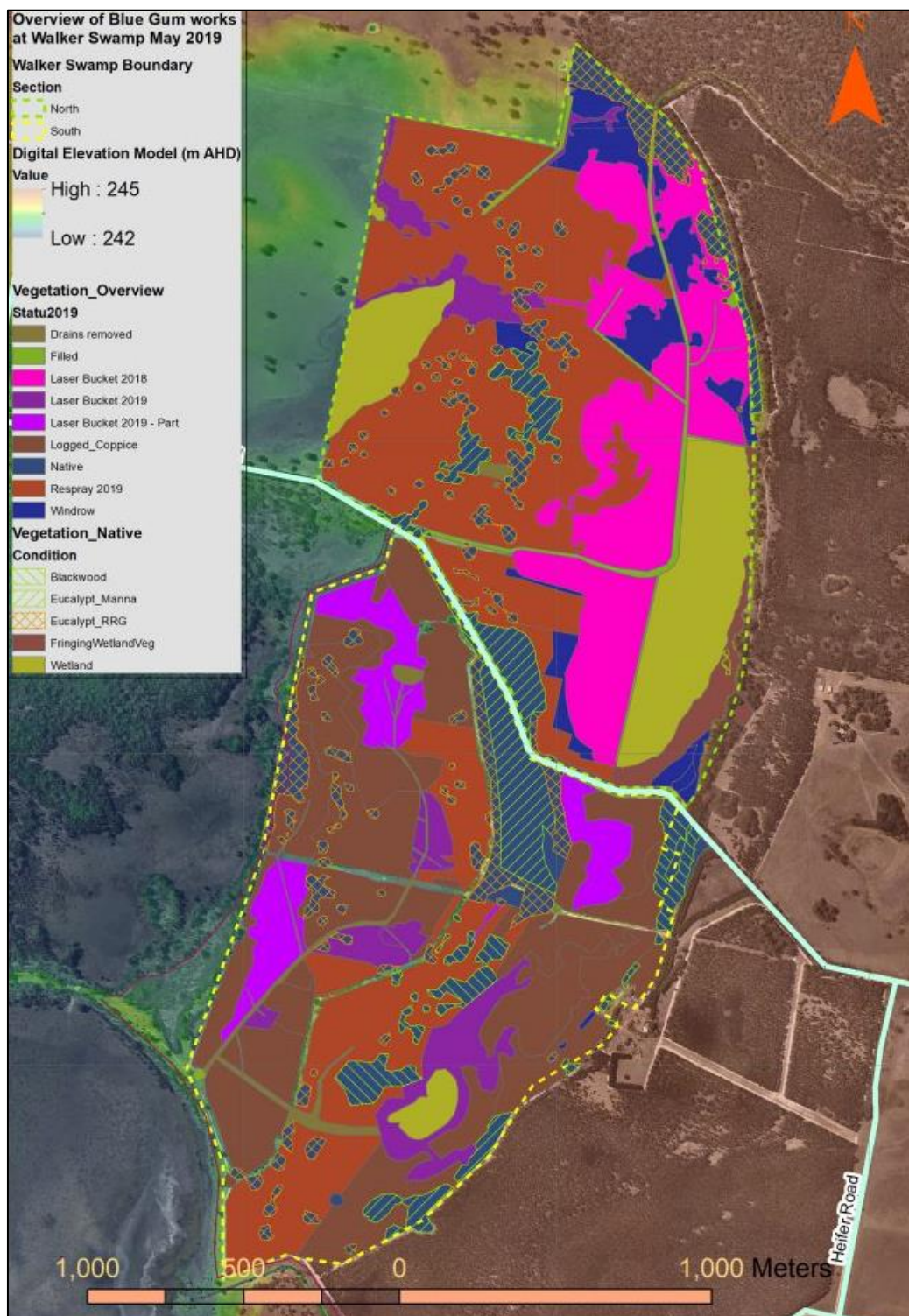
*Looking west at the now completely backfilled southern outlet drain through the lunette. (Red dot on map above)*



## Addressing the Legacy of Blue Gum Plantations

Outside of artificial drainage, which dates to the development of the property from the 1950s-1990s for livestock grazing purposes, by far the most substantial other impact on the property was its almost complete conversion to Tasmanian Blue Gum Plantations in the early 2000s. Hence when NGT came along, we inherited a property with a complex mix of current and former plantation areas. These could be broadly categorised as follows: (1) recently harvested areas that were coppicing, (2) standing plantations that the previous plantation manager deemed uneconomic to harvest and (3) areas that were still subject to temporary inundation where the plantations had failed to establish.

This major change in land use and management history had a series of impacts that we have begun to manage and will continue to address for many years to come, as shown below, and explained over the page:





## 1. Recently Harvested Areas and Coppice Spraying

The plantation areas that had been recently logged prior to NGT taking possession of the property were at various stages of regrowth, due to coppicing from the stumps. These areas were located across the northern part of the property, west of Walker Swamp, and in a central strip through the southern portion of the property. The coppice was sprayed by contractors in autumn 2018 and repeated (thanks to Ararat Prison via the Landmate Environment Program) in autumn 2019, leaving these areas requiring only minor follow-up.



## 2. Removal of Standing Plantations

Small leftover areas of plantation in the northern part of the property (see dark blue areas on p. 5 map) remained uneconomic, so NGT contracted an excavator to remove and stack these trees (roots and all) for burning, avoiding the need for any further treatment (right).



However large areas of the southern portion of the property retained standing trees. We were fortunate that based on extra growth since the property changed hands, and improved woodchip market conditions in early 2019, we were able to negotiate their harvest at no cost to NGT (right) and indeed generate a modest income stream. That income will help us cover the cost of coppice spraying as these areas reshoot over the next two years.



## 3. Failed Plantations and Wetland Bed Remediation

The vast majority of the 1000 acre (420 ha) property was mounded to prepare for plantation establishment, including Walker Swamp (right) and almost all other wetlands across the site. As a result of the plantations not surviving in the deepest areas of those wetlands (which still temporarily inundated each winter despite the artificial drains), the mounds and furrows still remained in these heavy wetland soils. As well as interfering with natural inundation patterns and water movement, the elevated ridges of the mounds were also harbouring weeds in areas that would otherwise be too wet for them to grow, and negatively impacting on the natural zonation and recovery of native wetland plants.



After progressively remediating the ground over two seasons in all the failed areas of plantation in those deepest wetland beds (right), these areas are now rapidly and spectacularly recovering with native wetland plants, establishing in the right zones within and around each wetland.

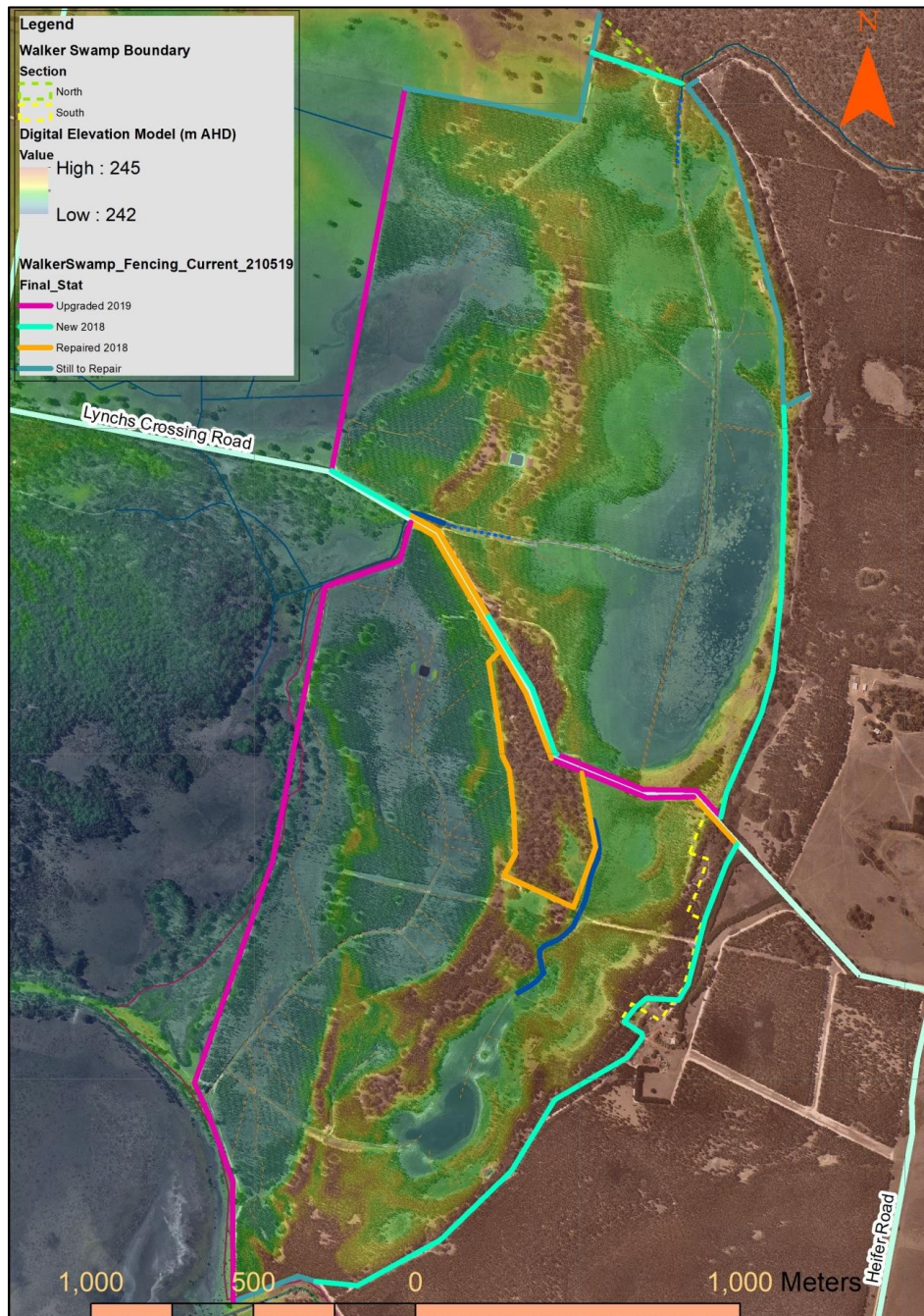


The future challenge is to deal with more of the upslope wetland areas and across the wider floodplain (amongst the Red Gums) where plantations successfully established. In these areas where the mounding remains, we are unable to undertake remediation works until the Blue Gum stumps rot, and so will continue to evaluate our future management options while we wait for that to occur.



## Fencing

Maintaining our boundary fence is an important part of managing the property as it allows us to prevent unauthorised access to the site, with issues like unauthorised firewood cutting, rubbish dumping, hunting and trail bike riding occurring in the adjacent National Park. It also provides us with maximum future management flexibility, including options that might allow us to implement experimental research at the site to test strategies for managing overabundant kangaroos. Thanks to contractors, our volunteers and the Landmate program, the Reserve is now fully fenced, with only a few sections left that still require repairs (see below).

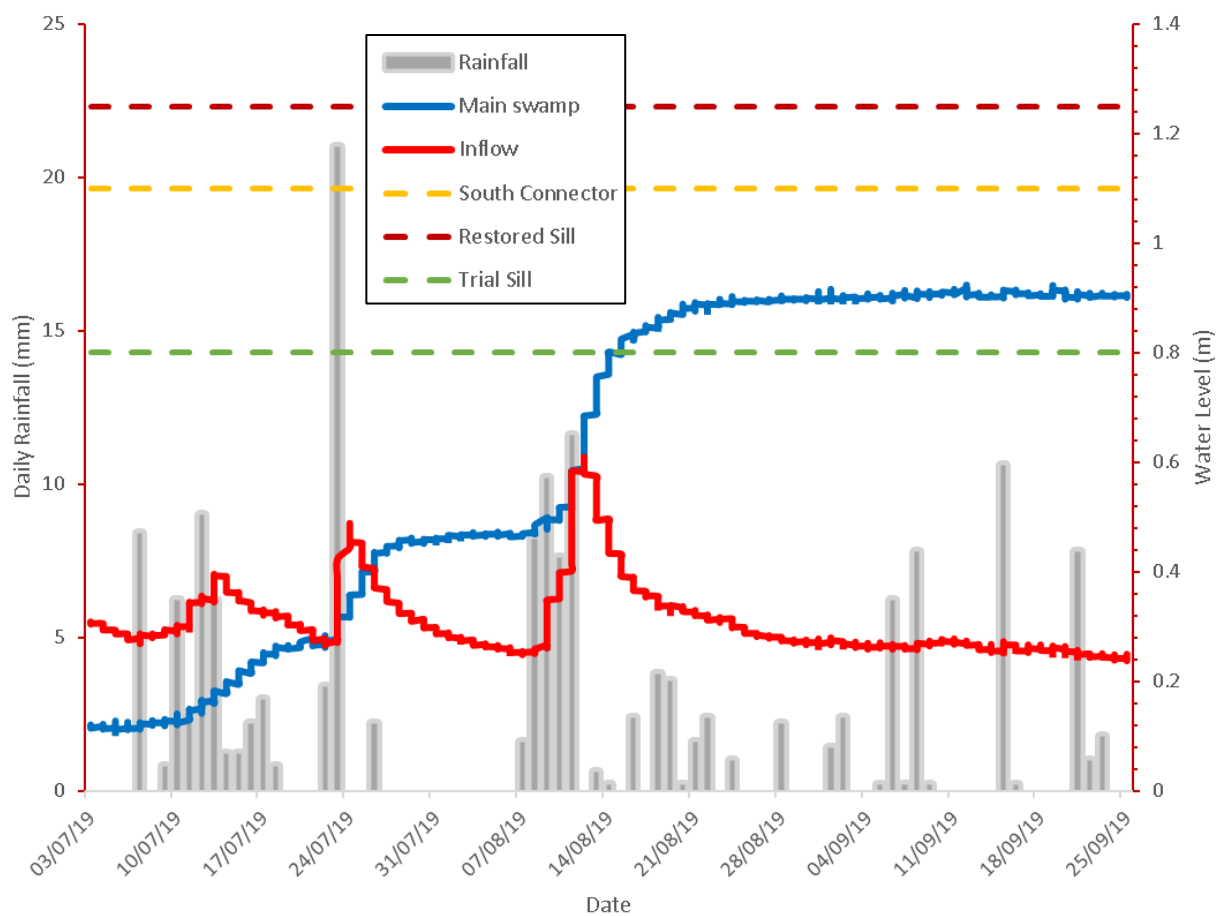


## Aboriginal Heritage

An Aboriginal cultural heritage survey has been undertaken across the property. Like other wetlands in western Victoria, the lunette banks around the wetlands are home to considerable evidence of past Aboriginal occupation. Things are still at a very early stage, but subsequent site visits with representatives from Eastern Maar have commenced and we genuinely hope this will lead to positive outcomes for traditional owners and the recovery of living indigenous culture at this site.

## Weather Station, Water Level and Flow Monitoring

We now have a complementary network of data loggers in place across the property, including the recently installed weather station (see right – also note the areas of treated Blue Gum coppice in the image). This is allowing us to record temperature, wind speed, gust speed, wind direction, rainfall, relative humidity, solar radiation, dew point and atmospheric pressure around the clock, via a system that can be remotely accessed via the internet. In combination with our network of water level loggers, we are now able to more accurately chart and predict how the site and its wider catchment respond to rainfall events, as shown in the graph below.



This year the main wetland started filling in July and peak inflows occurred after consecutive days of rainfall in early August. Unfortunately no noteworthy runoff from the drainage catchment has subsequently occurred since then and into spring – a period when we would normally hope to see peak seasonal runoff, meaning that so far these remain the only two significant inflow events to have occurred in 2019.

Despite these challenging climatic conditions, retained water levels in Walker Swamp in 2019 have surpassed those achieved during the trial period (2014-2018), as a direct result of the successful restoration works outlined in this paper, but (due to below average rainfall) are currently still sitting about 35 cm below the now restored full supply level of the swamp. If we are to witness flows passing south under Lynchs Crossing Rd, or see the new spillway fully operating this year, we are going to need at least two significant rainfall events (>30 mm daily rainfall) between now and December, subject to upstream catchment conditions at the time.



## Bird Observation Tower, Site Interpretation and Signage

The observation tower that was donated in 2018 was relocated earlier in the year to its new permanent home, set up behind brush fence screening (to minimise disturbance to birds), and situated a short walk from our nearby visitor carpark. Interpretative signage along the path helps to give visitors a glimpse into the fascinating history of the site. The viewing deck has now been fully enclosed to offer protection from the elements, and the site is already proving its value for bird counts and educational activities. Once the remaining fundraising target to cover land purchase costs has been achieved, this is where permanent signage will be installed to recognise everyone who has participated or donated towards the project so far.



## Ecological Monitoring

Over the past 12 months, NGT has started collecting baseline data at the Reserve to allow:

- monitoring of changes in extent, condition and composition of Ecological Vegetation Classes of vegetation
- associated diversity and abundance of bird species in both aquatic and terrestrial habitats at the site
- associated fish, crustacean and frog diversity / abundance
- aquatic macroinvertebrate diversity
- terrestrial vertebrate and selected invertebrate diversity and abundance
- annual assessment of river red gum condition, and
- annual assessment of aquatic physical and chemical factors in the wetlands.



## The Role of Volunteers and the Community

Volunteers have played an incredibly important role during the establishment phase for the property. A small sample of some of the volunteer activities includes:

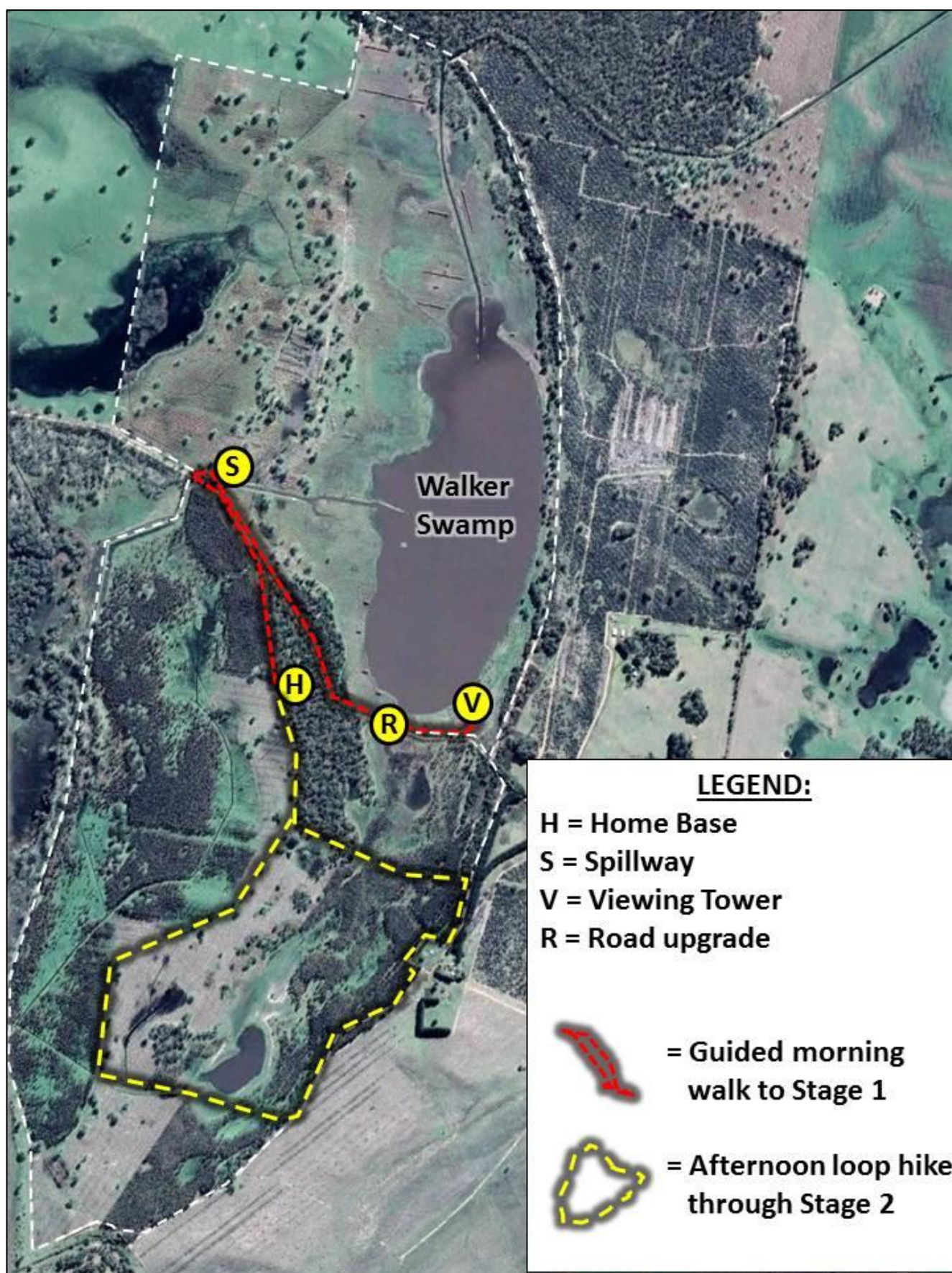
- Avian monitoring by Rod Bird and other members of the Hamilton Field Naturalists Club.
- Gordon Page, Todd Burger and Andy Macgugan helping to assemble the bird observation tower (right).
- Fencing works, maintenance and repair conducted by Fred Aslin, Jeanette Aslin, Dave Lawson, Rod Lockwood & Glen Bowmer.
- Assistance from dozens of volunteers, including neighbours and members of the wider community and environment groups who assisted with the construction of the first trial structure in 2014, and the permanent spillway in 2019 (right).



In spring 2018, Greg hosted a ten week birdwatching and identification course in Dunkeld with over 30 people attending, and this utilised Walker Swamp and our new facilities. We are also excited about the future possibilities for involving local schools in the site, and integrating it into their science curriculum, having started this process with Year 7 and 8 students from Good Shepherd College and currently looking to expand to other schools in Hamilton.



*Map of what you will be seeing today (note: base aerial image is from 2018, prior to works)*



For more information about the project, please visit the NGT website: [www.natureglenelg.org.au](http://www.natureglenelg.org.au), or contact us by calling 08 8797 8596, or emailing [info@natureglenelg.org.au](mailto:info@natureglenelg.org.au).