

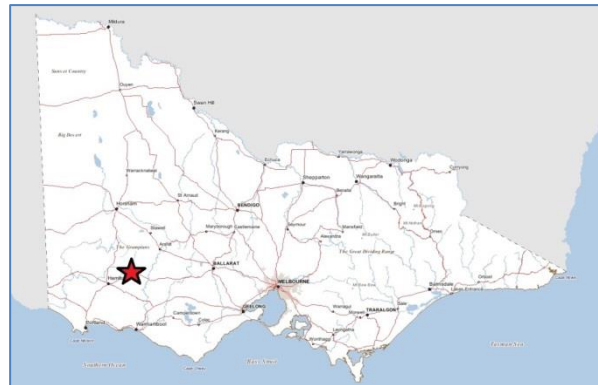


GOOSENECK SWAMP INFORMATION DAY - Saturday 14th December 2013

Progress of a restoration trial at Gooseneck Swamp - Grampians National Park, Victoria

Mark Bachmann, Nature Glenelg Trust (NGT)

Gooseneck Swamp is situated at the far south-eastern corner of the Grampians National Park in Victoria's South West. Gooseneck Swamp and Brady Swamp are wetlands of the Wannon River Floodplain, as the river reaches the flats after exiting the valley between the Serra and Mt William Ranges within the Grampians.



As a result of the artificial drainage of wetlands within the Bunnugal Rural Drainage Area (which was largely in place before the aerial image over the page was taken in 1948), both Gooseneck and Brady Swamp

were also made the terminus for drainage flows from the much larger Heifer Swamp system to the east. Brady Swamp itself was made more seasonal and less permanent in nature, by being drained into the Wannon River in 1957 – although lack of maintenance has seen a partial return of additional wetland habitat within Brady Swamp in more recent years.

Although Gooseneck Swamp naturally discharges into Brady Swamp, it must fill to a certain height before the natural discharge channel and wider connecting floodplain receive flows. Adding further complexity to the story, sometime after the drainage of Brady Swamp an unauthorised drain was cut in the lunette bank that separates Gooseneck Swamp from Brady Swamp, enabling the swamp to freely drain to its bed level once inflows ceased.

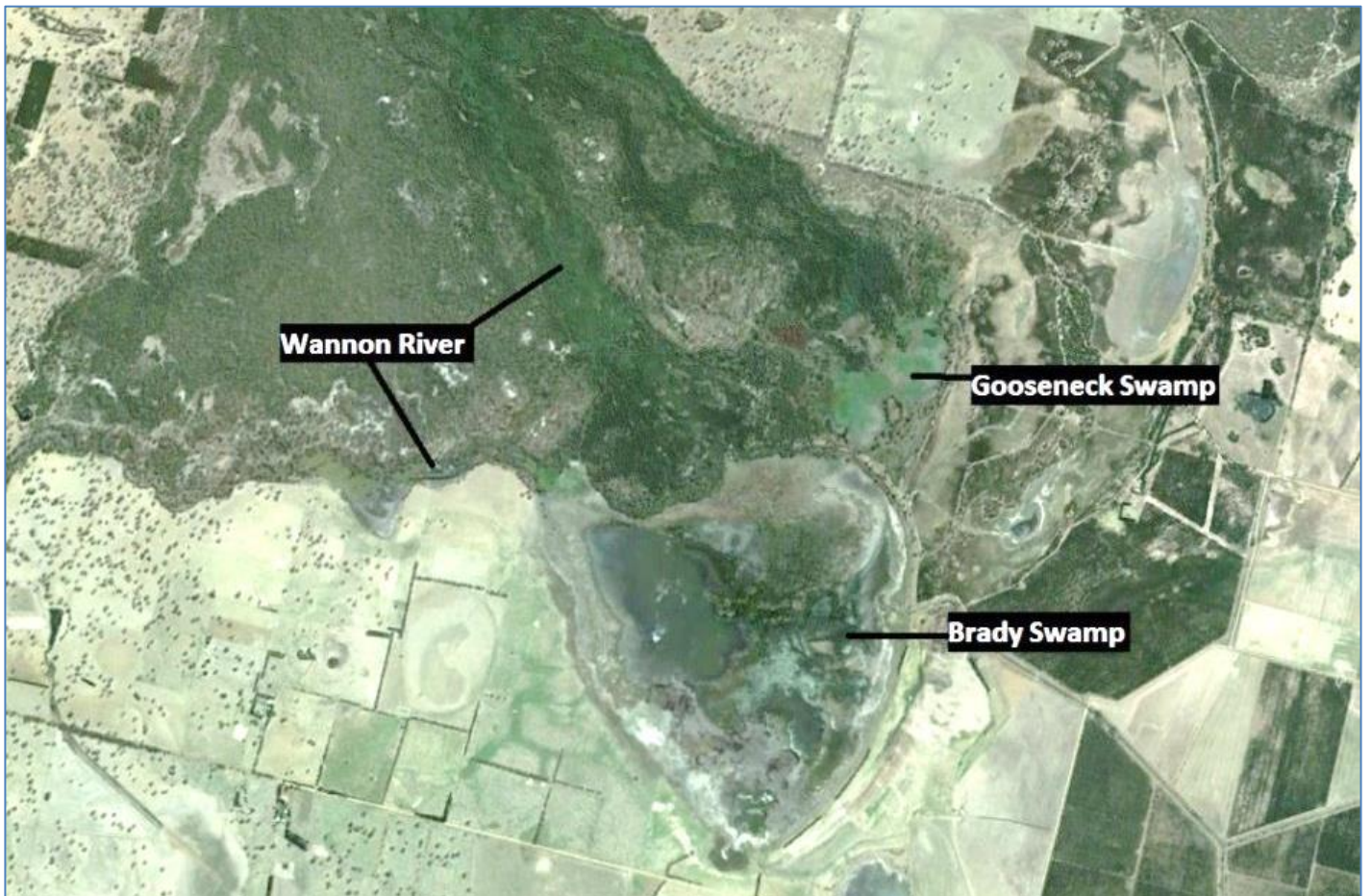


Artificial Outlet that drains Gooseneck Swamp (situated above the lunette bank shown) into Brady Swamp (bottom of image)

CHANGE THROUGH TIME - Wannon River and Walker's, Gooseneck and Brady's Swamps



1948



2012

Interest in the restoration of Gooseneck Swamp began in the mid-1980s, when the property was acquired by the Victorian Government and eventually incorporated into the Grampians National Park. In 2013, after many years of work, modelling studies and biological investigations by a range of organisations, Nature Glenelg Trust began working towards a staged process of restoration at the site in partnership with the Glenelg Hopkins CMA, Parks Victoria and local landholders – starting with a proposal to construct a low cost and low risk trial sandbag weir structure in the Gooseneck Swamp artificial outlet drain. The restoration trial is funded by a Victorian Department of Environment and Primary Industries, Communities for Nature Grant.

As well as some further review of previous studies and a closer look at the new detailed Digital Elevation Model (DEM) data for the site (work funded earlier in the year by the Glenelg Hopkins CMA), rapid progress with project communication and planning tasks meant that the restoration trial was ready to go ahead of schedule.

With this in mind, the site was inspected in early July to assess conditions on the ground and revealed that, although the drains upstream had commenced flowing and the connecting drain held a puddle of water, Gooseneck Swamp itself remained dry. So rather than wait another whole year before the trial would commence, the decision was made to plan for the works to occur immediately, in the hope that the swamp would receive sufficient flows in 2013 to begin the restoration trial.

The subsequent couple of weeks were very wet in the local catchment – meaning that by the time we arrived on site to undertake the works on Monday the 26th August, there was a little more water around than on our last visit! The swamp had gone from being empty to now holding enough water for the artificial drain to have commenced discharging a steady flow.



Conditions looking from the drain towards Gooseneck Swamp on the 9th August



Site conditions upon arrival at the site on the 26th August looking towards Gooseneck Swamp from the drain. The pegs indicate the proposed location of the sandbag weir, and the string-line was used to monitor the downstream change in channel water level in response to the works throughout the day,

Before we started any works, I also checked the natural outlet at the western end of the lunette (a short distance away) and discovered it was completely dry – clearly demonstrating the impact that the artificial cutting is having in removing water from Gooseneck Swamp at elevations below its natural sill level.

With the change in conditions, some improvisation was required to sufficiently reduce the drain flow rate – to make working on the sandbag weir more feasible. So the first task for the eager “sandbag crew” of 13 volunteers from NGT, the Hamilton Field Naturalists Club, Deakin University and local landholders (plus Doug’s tractor!), was to install an “ultra-temporary” hessian bag and log bund upstream of the selected sandbag weir site.

Although the wet conditions posed some logistical challenges, once the footing bags of the sandbag structure were firmly in place, the process of building the trial sandbag structure moved along at an excellent pace.

Once the structure was above water level, the job of laying sandbags was made somewhat easier and the structure was completed in quick time, having a noticeable and immediate impact on water levels. By the end of Monday the 26th August, we had achieved a temporary weir height that were we were hopeful would get close to lifting levels sufficiently to reactivate the original flow-path.

I managed to head back to Gooseneck Swamp on Monday the 2nd of September to check on how things were responding 1 week into the trial, after also being told by a neighbour that water levels upstream of the outlet had risen.

Sure enough, I made it out there to find that the level had risen by about 20cm from when we left a week earlier – see gauge-board photos over the page.



The First Step – Constructing a hessian sandbag and log bund to reduce flow rate and (to a lesser extent) depth in the channel.



The sandbag crew succeeding in getting the weir to reach the height of the channel water level. Notice the minor drop in water level downstream as the weir under construction starts to hold back water.



The Gooseneck Swamp Sandbag Crew proudly display the result of a solid day's work (Aidan, Jonathan, Dan, John, Rod, Ken, Rowena, Lauren, Nicki, Doug and Bill – minus Lachlan and Mark from NGT – holding cameras!)



53cm – 26th August 2013



**72cm – 2nd September 2013
(1 week into the trial)**



70cm – 23rd November 2013

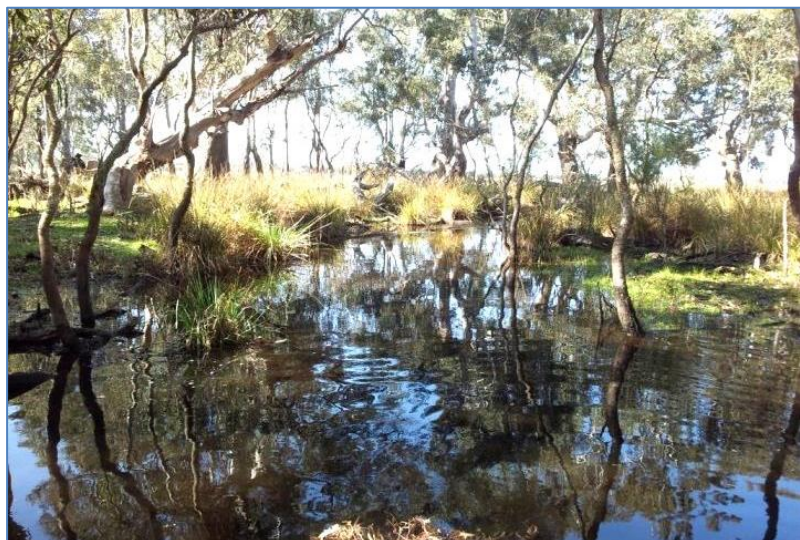
Since the trial began, water levels have been relatively stable as a result of steady inflows from the Wannon River that has continued into the beginning of summer. The latest reading prior to the information day, in response to recent rainfall, was 75 cm on the 5th of December 2013, with the sandbag weir still holding back approximately 45 cm depth of water compared to the Brady Swamp (downstream) side of the structure.

After checking on the levels during the first week of the trial (2nd Sept 2013), I took a short walk to the end of the lunette (to the west) and got a very pleasant surprise to find the natural outflow between the two swamps was now carrying a significant flow – both in the deeper defined channel and shallow sheet flows over a wider area of floodplain to the west (total of about 50-60m wide). The appearance of the flow-path – which was completely dry 1 week earlier – was particularly stark!



TOP RIGHT:
Dry on the 26th August – The natural flow path between Gooseneck Swamp and Brady Swamp, to the west of the artificial cutting in the lunette that separates the two wetlands.

RIGHT:
1 week later on the 2nd September – The natural flow path (and 50m wide shallow floodplain to the right of image) now carrying a significant volume of water through to Brady Swamp, at the natural sill level for Gooseneck Swamp.

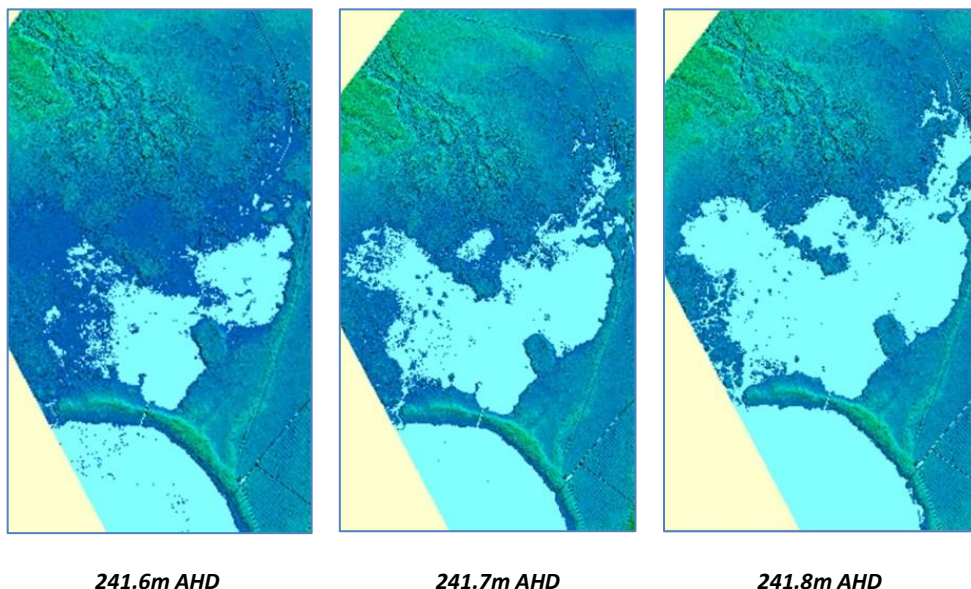


A much larger additional area of Red Gum floodplain to the west of Gooseneck Swamp – that was dry a week earlier – was now also under ankle deep water.



A small example of the now inundated Red Gum floodplain west of Gooseneck Swamp – 23rd Nov 2013

When I got back to the office, I decided to compare the situation on the ground to what the Digital Elevation Model (based on LiDAR imagery) had predicted. Although we haven't yet had our gauge board in Gooseneck Swamp surveyed in precisely, the swamp was filled to something around the 241.6m AHD level when we started working on the sandbag weir on the 26th August.



However now, 1 week (and 20cm of increased depth) later: the flow pattern and levels now appear to more closely resemble the 241.8m AHD scenario. At this elevation the natural flow path and associated floodplain at the end of the lunette become active with flows.

Based on the on-ground observations, the LiDAR information appears to have given us a very accurate indication of what would happen as Gooseneck Swamp levels increased – with a wider expanse of floodplain the west now inundated and the natural flow path to Brady Swamp activated. Used in this way, accurate elevation data is a great planning tool for wetland restoration projects.

Although now flowing out of Gooseneck Swamp at a higher elevation than was the case when water was passing through the artificial drain cutting in the lunette, the capacity of the 50-60m zone of natural overflow between Gooseneck and Brady Swamps (at the western end of the lunette) is large – capable of carrying much higher volumes of water than the drain cutting itself. In this way, Gooseneck Swamp will remain an “open system” capable of enabling water to pass through during higher flows or floods. In fact, from debris in the natural channel, it is clear that the swamp has reached its current level semi-regularly during higher flows in recent years already. The major – and extremely important – difference now will be that when inflows cease, the swamp won’t empty prematurely into Brady Swamp below its natural sill height, as was previously the case.



This gives the wetland flora and fauna at the site a much better opportunity to complete their life cycles, and provide refuge habitat that will last longer into the summer months – very good news for the Growling Grass Frogs that can often be heard calling this time of year at Gooseneck Swamp.



For more information on the progress of the Gooseneck Swamp Restoration Trial or our other wetland restoration projects, please visit the Nature Glenelg Trust website: www.natureglenelg.org.au

TOP RIGHT

Lachlan standing on the completed sandbag weir structure on the 26th August 2013, with the (now inundated) temporary bund visible in the background – no longer having an effect on flows or water level.

CENTRE RIGHT

The sandbag weir working nicely – 1 week later – 2nd September 2013

BOTTOM RIGHT

15th November 2013 – Note the increase in aquatic plant growth in the swamp in the background



Gooseneck Swamp



12th Sept 2013



15th Nov 2013