

The Importance of Swampy Meadows

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Key Points

- Swampy meadows are at risk due to poor understanding of their structure and function
- Rehabilitation of knickpoints can be achieved utilising ‘soft engineering’ principles
- Education is critical to protecting and rehabilitating swampy meadows

Abstract

Swampy meadow wetland systems are comprised of dense layers of peat dominated by macrophyte vegetation and were once common throughout the Central Tablelands of NSW. Poor understanding of the importance of these systems in regulating flows, hydrating the surrounding landscape and biodiversity values has led to many systems being deliberately drained. An intact swampy meadow was identified in the Neville State Forest that was threatened by knickpoints or headcuts in the downstream waterway. Rehabilitation of these knickpoints utilising ‘soft engineering’ principles has protected this system, with an associated educational campaign leading to a greater understanding of swampy meadows within the Central Tablelands and further afield.

Keywords

Swampy Meadow; Rehabilitation; Education; Collaboration; Wetland

Introduction

Swampy meadows were once ubiquitous throughout the Central Tablelands of NSW but have, over time, been drained, cleared, burnt or otherwise altered either deliberately, through poor land management practices or through ignorance (Mactaggart et al. 2008). Swampy meadow systems are a form of wetland which develop as valley fills, capable of holding vast quantities of water within dense layers of peat, and that are dominated by macrophyte vegetation – grasses, sedges and rushes (Mactaggart et al. 2006). Due to the ability of these systems to hold vast quantities of water, which are slowly released over time, swampy meadows play an integral part in overall catchment management as they regulate flows in upper catchments during rainfall events, provide baseline flows in downstream waterways during dry periods, hydrate surrounding landscapes and provide unique biodiversity values (Mactaggart et al. 2006). An intact, ecologically and hydrologically functioning swampy meadow is located with the Neville State Forest, south-west of the Village of Neville within the Central Tablelands of NSW.

The swampy meadow within the Neville State Forest, and its importance to the ecology and hydrology of the surrounding forest and downstream waterway, were highlighted at the site during a World Wetlands Day Event hosted by the NSW Office of Environment & Heritage on 2 February 2016. This event had Dr. Barbara Mactaggart and Dr. Andrew Rawsthorne as expert presenters, during which time they outlined the importance of the Neville site, how a swampy meadow is defined and the threats to swampy meadow systems throughout the Central Tablelands of NSW and further abroad. A broad range of stakeholders attended this event including participants from the local community, Landcare, Local Government, State Government and other interested parties. This awareness raising day was the catalyst for the Neville Swampy Meadow Protection project.

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A key issue identified at the site was the presence of an active headcut or knickpoint in the creek system downstream from the swampy meadow. Within the Southern Tablelands of NSW, where similar geology and vegetation communities exist in comparison the Central Tablelands, early European explorers described the dominant stream type as 'chain of ponds' characterized by pools or ponds divided by grassy channels, however, the majority of these systems now exist as incised waterways that rapidly release water from the landscape following rainfall events (Hazell et al. 2003). It is recognised that stream degradation is a key cause of the development of knickpoints which lead to erosive headcutting and dynamic migration upstream (Muehlbauer and Doyle 2012). This swampy meadow was at risk of being drained if the knickpoint within the stream was left unattended and allowed to migrate upstream where it inevitably would have undercut the swampy meadow.

As such, our objectives for this project were:

- to protect the ecological values of the swampy meadow through remediation of the active headcut in the creek that threatens to drain the wetland system; and
- to educate the community to the value of swampy meadows and their role in regulating stream flows.

Methods

In order to initiate the project, the Environment & Waterways Alliance Project Support Officer arranged a site meeting with representatives from Central Tablelands Local Land Services, Neville & Region Landcare, Cowra Council and NSW Department of Primary Industries – Fisheries to ensure that all agencies with an involvement in the project were on the same page. From this point the Alliance sourced funding from Central Tablelands Local Land Services, which was directed to Neville & Region Landcare, to fund the remediation works. An experienced local contractor – Skillset Environment Land Works – was engaged to conduct the rehabilitation works.

In order to provide appropriate restoration of a swampy meadow it is important to have a clear understanding of the underlying characteristics of the site in terms of ecological, hydrological and geomorphological characteristics (Mactaggart et al. 2008). Following advice from Dr. Barbara Mactaggart who has extensive knowledge of this particular site through her work with swampy meadows (Mactaggart et al. 2006; Mactaggart et al. 2007; Mactaggart et al. 2008), it was understood that the underlying soils in this area are highly sodic and dispersible meaning that rock structures may not be the most appropriate means of remediation at the site. As such it was elected that 'soft engineering' techniques would be utilised at the site incorporating coir logs and hessian sandbags filled with inert compost combined with planting of macrophytes.

No formal engineering drawings were utilised during this project with basic sketches developed prior to works proceeding. A key issue to address was the undercutting of the surface associated with the knickpoints at the site. These undercut areas were filled with inert compost that had been packed into hessian sacks with a considerable volume required to support the remaining surface soils. A combination of inert compost filled hessian sacks and coir logs were then utilised to create drop structures and receiving pools in order to de-energise the water as it moves from higher grades to the lower creek bed. Hardwood stakes were utilised to hold the coir logs and compost sacks in place as required with a range of local macrophyte species then planted into the compost sacks to provide long term stabilisation as these plants develop.

Results

Preliminary results suggest that the works completed have succeeded in stabilising the system without negatively impacting on this fragile site. Water is now moving from the upper grades to the lower with reduced velocity. The creation of pools at the base of the knickpoints, supported in the base by compost filled sandbags, is providing protection for the underlying sodic soils with no evidence of transportation of soils downstream. The vegetation planted is fast establishing and already disguising the fact that the works were completed which is in keeping with our aims to create minimal disturbance on the site. Monitoring over time will provide further evidence as to the success of the works, but preliminary findings are very positive.

Discussion

While the protection of this swampy meadow has resulted in the prevention of potential further channel incision, loss of extensive volumes of peat, a vast change in hydrology and significant alterations in the local biodiversity (Mactaggart et al. 2006), an additional and far reaching benefit has been the creation of a targeted education campaign regarding swampy meadow systems. This has involved the production and distribution of a project fact sheet as well as an educational video (Central West Councils Environment & Waterways Alliance 2018). Initially it was agreed in the funding contract for this project that a field day would be held on site, however, it was decided that given the fragility of the site in combination with access issues and safety concerns that the production of a video would be a better result.

In order to meet the funding obligations Central West Councils Environment & Waterways Alliance partnered with Skillset Environment Land Works to host a video launch in lieu of the agreed field day. This was held on Tuesday 16 May at Two Heads Brewing in Bathurst with over 50 people in attendance. The video has subsequently been promoted and distributed through various media as well as other organisations including NSW Office of Environment & Heritage. As one of the greatest risks to swampy meadows is ignorance in respect to how these systems function, how land use practices can have adverse effects, and what degraded swampy meadows once represented (Mactaggart et al. 2008), the educational campaign has been of critical importance to the overall success of this project.

Conclusions

We have shown that swampy meadow rehabilitation can be achieved using 'soft engineering' principles without great cost and the use of hard materials. While the protection of the swampy meadow within Neville State Forest is important in terms of localised hydrology and biodiversity outcomes, the combination of an educational campaign has great potential to provide system change across the Central Tablelands and beyond. While it is unlikely that we will again see healthy, functional swampy meadows being ubiquitous throughout the landscape, it is considered that this project has led to a greater understanding of these systems within the natural resource management/conservation industry as well as the general public, which will hopefully lead to further protection of swampy meadows and more appropriate rehabilitation of degraded systems.

Acknowledgments

This project would not have proceeded without the tireless efforts of Lisa Paton of the Neville Landcare Group Inc. promoting the benefits of this site and the risk of losing this important swampy meadow. We are also appreciative of the outstanding work of DC Media in preparation of such a high quality video product that assists in getting our educational message out to the public.

References

Full Paper

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