

# Effects of Willow (*Salix* spp.) Removal on Freshwater Ecosystem Dynamics: New Monitoring Sites



Paul McInerney, Sylvia Zukowski and Ben Gawne



Final Report  
prepared for the  
North East Catchment Management Authority



November 09

## Effects of Willow (*Salix* spp.) Removal on Freshwater Ecosystem Dynamics: New Monitoring Sites

A report prepared for the North East Catchment Management Authority by The Murray-Darling Freshwater Research Centre.

### North East Catchment Management Authority

PO Box 616

Wodonga Vic 3689

**Ph:** (02) 6043 7600; **Fax:** (02) 6043 7601

This report was prepared by The Murray-Darling Freshwater Research Centre (MDFRC). The aim of the MDFRC is to provide the scientific knowledge necessary for the management and sustained utilisation of the Murray-Darling Basin water resources. The MDFRC is a joint venture between the Murray-Darling Basin Authority, La Trobe University and CSIRO (through its Division of Land and Water).



### For further information contact:

#### Paul McInerney

The Murray-Darling Freshwater Research Centre

PO Box 991

Wodonga Vic 3689

**Ph:** (02) 6024 9650; **Fax:** (02) 6059 7531

**Email:** [p.mcinerney@latrobe.edu.au](mailto:p.mcinerney@latrobe.edu.au)

**Web:** [www.mdfrc.org.au](http://www.mdfrc.org.au)

**Enquiries:** [info@mdfrc.org.au](mailto:info@mdfrc.org.au)

**Citation:** McInerney P, Zukowski S and Gawne B (2009) Effects of Willow (*Salix* spp.) Removal on Freshwater Ecosystem Dynamics: New Monitoring Sites. Final Report prepared for the North East Catchment Management Authority by The Murray-Darling Freshwater Research Centre, November, 9 pp.

**Cover Images:** (l to r) Electrofishing Little Snowy Creek, Willowed Reach Little Snowy Creek, Native Reach Little Snowy Creek, Macroinvertebrate sampling in Little Snowy Creek.

### Disclaimer:

The material contained in this publication represents the opinion of the author only. Whilst every effort has been made to ensure that the information in this publication is accurate, the author and MDFRC do not accept any liability for any loss or damage howsoever arising whether in contract, tort or otherwise which may be incurred by any person as a result of any reliance or use of any statement in this publication. The author and MDFRC do not give any warranties in relation to the accuracy, completeness and up to date status of the information in this publication.

Where legislation implies any condition or warranty which cannot be excluded restricted or modified such condition or warranty shall be deemed to be included provided that the author's and MDFRC's liability for a breach of such term condition or warranty is, at the option of MDFRC, limited to the supply of the services again or the cost of supplying the services again.

Copyright in this publication remains with the author. No part may be reproduced or copied in any form or by any means without the prior permission of the author.

## Document History and Status

Revision	Date Issued	Reviewed by	Approved by	Date Approved	Revision type
1	6/10/2009	SZ		7/10/2009	Review and edit
2	15/10/2009	BG		5/11/2009	Review and edit
3	12/11/2009	VL		15/11/2009	Review and edit
4	26/11/09	RLS		27/11/09	Review and edit

## Distribution of copies

Revision	Copy No.	Quantity	Issued to
4	1	1	NECMA

**File name:** Effects of Willow Removal  
**Author:** Paul McInerney, Sylvia Zukowski and Ben Gawne  
**Client:** North East Catchment Management Authority  
**Project Title:** Effects of Willow Removal  
**Document Version:**  
**TRIM Project Number:** M/BUS/274

**Acknowledgements:**

## **Table of Contents**

Table of Contents .....	3
Background .....	4
Milestones .....	6
New Sites .....	7

## Background

In March 2006, The Murray-Darling Freshwater Research Centre (MDFRC) was commissioned by the North East Catchment Management Authority (NECMA) to develop a literature review and a long term monitoring program detailing the effects of willow removal on freshwater aquatic systems and to monitor these effects. The literature review was completed in June 2006. This review demonstrated that although anecdotal evidence suggests an overall increase in 'stream health' in the long term following willow removal, there is a consistent lack of data describing the effects of willows and willow removal on Australian aquatic environments. This made accurate predictions about short and long term effects of willow removal difficult and led to the second phase of the project that identified key issues and recommended a monitoring program.

The monitoring and key issues report developed a protocol for identifying key issues and a monitoring program associated with potential long term effects of willow removal on aquatic systems. These key issues were based on the knowledge available and their importance to stream ecology.

The third phase of the project was the implementation of the monitoring program at willow removal and control sites to ascertain the key long term effects of willow removal on aquatic systems. Willow removal was undertaken in sites along a 600m reach of Little Snowy Creek, Eskdale (Victoria), during April 2007. Monitoring was undertaken before (March 07), one week (May 07) and six months (October 07) after willow removal in control and willow removal sites along Little Snowy Creek. A report outlining the first years monitoring results was produced in November 2007.

Monitoring was continued and undertaken bi-annually at one year (May 08) and one and a half years (October 08) intervals, after willow removal in control and willow removal sites along Little Snowy Creek and is planned to continue in 2009 and 2010.

Discussions between MDFRC and NECMA in November 2008 identified the need for more sites to be included in the monitoring program. It was agreed that along with the existing willow removal and control sites being monitored on Little Snowy Creek, the 2009-10 monitoring would also include two additional willowed sites (one that it expected to be dewillowed within the next 12 months and one that will not, acting as a control) and two sites with only native riparian vegetation, to give a benchmark for the health of non-impacted sites in the same catchment. This report details the selection of these four new additional monitoring sites.

## Milestones

This report has been written in fulfilment of the milestone highlighted in yellow in Table 1. Monitoring of the new sites will commence once the new selected sites are approved by NECMA.

**Table 1: Willows monitoring project milestones**

Milestones	Start Date	End Date	Amount (excl GST)	Description
Report	Nov-08	Nov-09	\$10,000	Ongoing monitoring of established willow removal and control sites in Little Snowy Creek (Lt Snowy, Sites 1 & 2).
Sign off on new sites	July-09	Sept-09		Identify new monitoring sites.
Document outlining new sites	Sept-09	Oct-09	\$10,000	Establish new monitoring sites.
Report	Oct-09	Apr-10	\$10,000	Undertake Monitoring of new willow removal and control sites (Sites 3 & 4) (pre works).
	Oct-09	Apr-10	\$5,000	Undertake monitoring of new native vegetation sites (Sites 5 & 6) (autumn & spring sampling).
	Oct-09	Apr-10	\$5,000	Undertake monitoring of new willow removal and control sites (during/post works) (Autumn & Spring sampling).
	June-10	July-10	\$10,000	Document Monitoring Program undertaken.
Invoicing Frequency : Refer drop down menu			On Milestone completion	

## New Sites

All six sites being monitored in the program are displayed in Figure 1. Eskdale (E147 14.52; N36 28.16) and Smythes Road (E147 13.18; N36 30.26) are the existing willow removal and control sites that have been monitored continuously since 2007.

Supheert's (E147 13.60; N36 29.27) is a site currently lined with willows. Discussions with NECMA project officer, Anthony Wilson, identified this reach as one likely to be dewilled in the near future. The aim is to complete a spring and autumn sampling on this site before dewilling occurs. Thompson's (E147 12.50; N36 31.15) is also lined with willows but is unlikely to be dewilled in the immediate future, so it was therefore selected as the second control site.

Ideally, the two native vegetation sites should be as close in altitude and stream order size as possible. As occurs in most valleys in the North East of Victoria, all the friable relatively flat land along Little Snowy Creek has been cleared for agriculture and are now lined with willows. Significant remnant native vegetation was only found where the Little Snowy Creek exists from the foothills.

The first native vegetation site has been placed just upstream of Gervasoni's property (E147 12.06; N36 33.29) since this was the first available site with mature native forest and the closest in altitude to the other site (400m). It is lined with tall sclerophyll forest dominated by Manna Gum (*Eucalyptus viminalis*) and Narrow-leaf Peppermint (*E. radiata*) with an Acacia, Leptospermum and Callistemon dominated understorey.

Communication with local residents highlighted that while this site is in 'native forest', a number of introduced deciduous tree species lining the banks of Little Snowy Creek upstream of this point were planted by early gold mining settlements. Further inspection confirmed this and the second site was selected at Concrete Bridge (E147 12.33; N36 35.42) approximately 3kms upstream of any introduced trees in the riparian zone.

While the altitude is about 500m (approximately 200m higher than the Eskdale site) the stream at this point is not significantly smaller in order than at the willow removal and control sites due to very few tributary streams entering in between. Riparian vegetation at this site is dominated by Manna Gum (*E. viminalis*) and Narrow-leaf Peppermint (*E. radiata*) with a thick *Leptospermum* and tree fern understorey.



Figure 1: Location of new monitoring sites