

## Willow management at Whangamarino Wetland

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## Introduction

- Whangamarino Wetland
- Purpose of willow control
- Preferred habitats and impacts
- Methods of control
- Results from aerial spraying
- Other environmental factors
- Lessons learnt / future willow management

## Whangamarino wetland

- Large wetland 7,290 ha
- ~4,500 ha managed by DoC
- On floodplain Waikato River
- Rare biota
- Ramsar site
- DOC Arawai Kākāriki programme

*Epilobium chionanthum*

Whangamarino Wetland

Courtesy DOC website

## Threats to Whangamarino

- Pests – deer, koi carp, mustelids
- Grazing – cattle and bulls
- Hydrology – weir, Waikato flood control scheme
- Nutrients – elevated levels, run off
- Sediment – inflow from Lake Waikare, run off
- Catchment landuse – dairy farming, future subdivision
- **Weeds – grey & crack willow, royal fern**

## Purpose of willow control

- Willows an aggressive invader
- Change structure of wetland
- Change vegetation
- Initial focus to preserve sedgeland  
(Greenwood, 1986)  
(Reeves thesis 1994)
- Protection of peat, prevent degradation
- **Review willow control programme (2009)**



## Preferred habitat of willows

- Grey willow
  - standing water or damp soils
  - prolific in fens & swamps
  - semi-mineralised soils
- Crack willow
  - flowing water or wave action
  - prolific in swamps
  - mineralised soils



*Salix cinerea*



Male flowers



Female flowers

## Impacts

- Rapid growth
- Shoots quickly root in or near water
- Blocks streams, drains, waterways and culverts
- Invades swamps
- Dominates lake margins



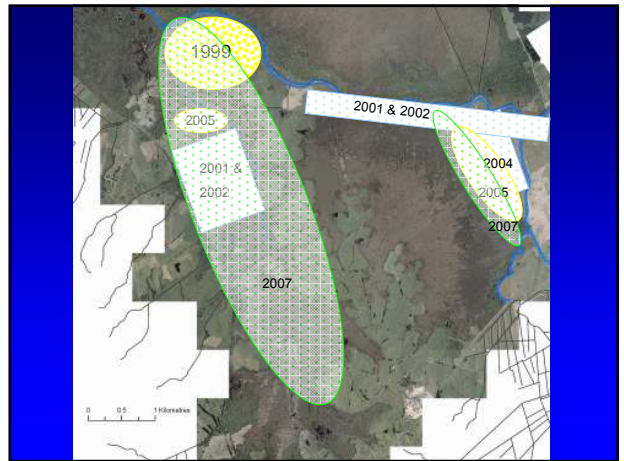
Blocks streams and waterways

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## Methods of control

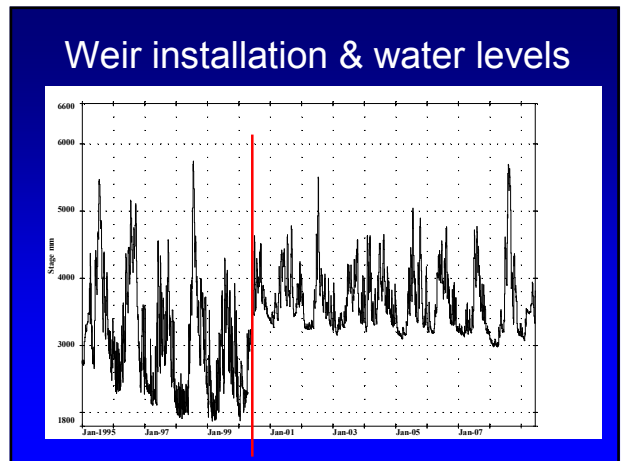
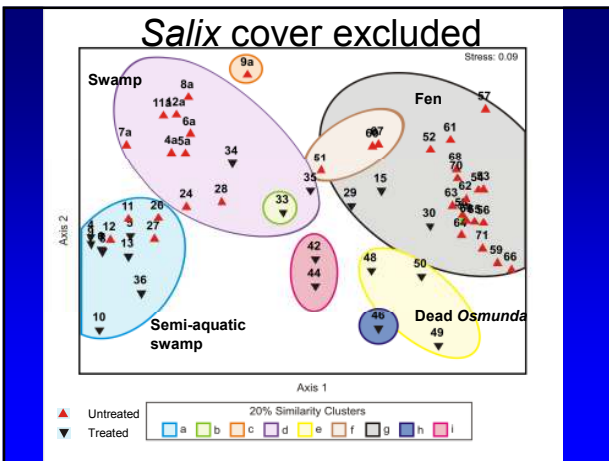
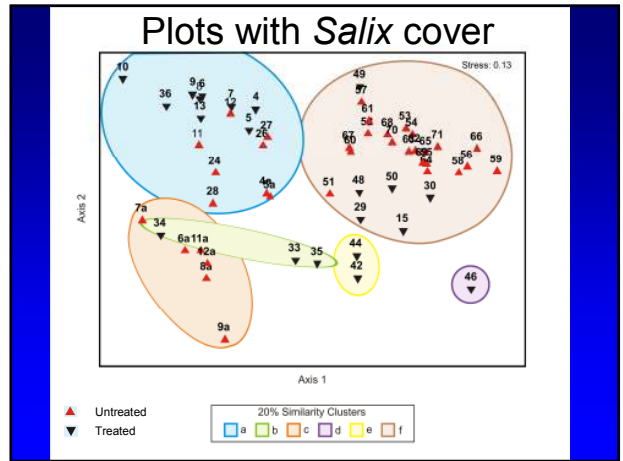
- Constraints: accessibility, potential water contamination
- Herbicide trials 1980's
- Aerial spraying of crack & grey willow
- 1999 to 2007 Glyphosate 9 L / ha
- 2008 small Garlon 360 trial 9 L / ha on crack willow
- 8 plots 1999 prior to aerial spray
- 27 vegetation plots surveyed 2009



Whangamano Wetland

Willow survey:  
 Plot locations (orange)  
 Transects (purple)





## Aerial spraying downside



Death of non target plants



## Garlon 360

- Triclopyr TEA herbicide trial
- Label includes stump treatment for willows
- Pot trial grey & crack willow
- Also tested native species
- Field test aerial spraying grey willow

## Aerial spraying of Garlon 360



South Taupo Wetland edge of trial site 6 WAT



South Taupo Wetland trial site 21 WAT  
note survival of harakeke, toetoe and sedges  
but dead grey willow



1 year after spray:  
grey willow shoots  
dead oioi  
orchids evident

## Other environmental factors

- Hydrology
- Grazing
- Nutrients
- Sediment
- Weeds
- Pests
- Catchment landuse and future development
- Landowners and community aspirations

## Moving forward

Future willow management:

- Refine herbicide selection
- Effective product application (user skill)
- Identify and manage high priority areas within the wetland

## Moving forward . .

Lessons learnt:

- Environmental factors alter herbicide performance
- Swamp vs fen vs bog need different goals
- Review management goals
- Monitoring a planned part of programme
- Funding, resources and planning

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