

# Helen Wood MEIANZ CEnvP



## Presentation

Weeds and seeds: The next gen project approach to weed control on linear infrastructure projects.

## Biography

EIANZ certified environmental specialist and environmental scientist with 25 years' experience focused on natural resource management, relating to ecological impact assessment, land disturbance, vegetation management, biosecurity, environmental offsets, land rehabilitation and managing threatened species. Nine years environmental management experience with infrastructure projects including coal seam gas fields, pipelines and mining. Experienced with stakeholder engagement, project management, contract management and HSE leadership.

## Abstract

Weed management is a key issue for major pipeline construction and operations, and any linear infrastructure project. Effective weed management maintains the social (and legislated) license to operate; while poor controls can result in spreading invasive species as well as impacts on agricultural productivity and costs to landholders. Additionally, in the long run poor management of weeds is costly in terms of project scheduling and delivery and increases the risk of losing project support from local communities and landholders.

Weed management undertaken on recent major pipeline projects in Queensland have had an over-reliance on one particular control – weed wash-downs. While wash-downs can be effective for some priority weed species, relying heavily on this strategy leaves gaps in weed management, leading to less than optimal weed control. Furthermore, experience suggests that local authorities and land holders can consider wash down as the only effective measure of control.

Similarly, a focus on declared weeds is common prior to disturbance and non-declared species are the focus of attention during initial rehabilitation. This is a reactive approach that ignores the potential to carry out more effective treatments targeting particular species groups with common vulnerabilities. Finally, if the weed surveying prior to project commencement is in any way compromised (poor coverage, carried out in the dry season etc..) then the project proponent will be exposed to the risk of being unfairly blamed for the introduction or spreading of weeds.

This paper identifies the steps to successfully develop a weed management strategy for major pipelines, and linear infrastructure projects, and addresses the gaps in the current approaches. By including a GIS based data collection strategy as the key management activity, and developing a comprehensive weed survey database over several seasons, proponents of this type of project can significantly improve on weed management performance.

# Ian Bridge

## Biography



Ian has extensive environmental management experience across a number of specialised disciplines. He has worked in the public and private sectors and on a number of projects. Ian has been involved in pre-feasibility and feasibility studies (including Environmental Impact Assessment), detailed engineering (and post EIA approvals), construction supervision (including tendering and contract management) and commissioning, operations and final disposal. A core skill developed by Ian, over many years is the ability to peer review reports and submitted materials and to understand technical environmental and engineering studies.

Ian has development of both corporate and public sector environmental policy, including compliance and environmental management systems. Additionally, Ian has experience in developing scopes of work and managing large teams and budgets to deliver work programs that meet the broader project schedule, budget and quality requirements.

Ian is an experienced negotiator with regulators and members of the general public with respect to consultation. Ian has degrees in environmental science and is currently studying for a Masters degree in Applied Law.

# Weeds and seeds: The next generation project approach to weed control on linear infrastructure projects



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Ian Bridge & Helen Wood, November 2016





Allan Leech, a Dalby cattle farmer, has accused CSG companies of spreading African Love Grass across Southern QLD properties.

Image Reference: 2013, "Weeds Spark Compo Action"



# Issues of Concern

- Focus of regulatory and industry attention is on vehicle hygiene (washdown or cleandown)
- High cost of vehicle hygiene requirements can threaten project feasibility
- A 'one size fits all' washdown solution does not consider project scale and activities
- Washdowns are not the solution for all weed species
- Vehicle hygiene does not address seed bank germination.



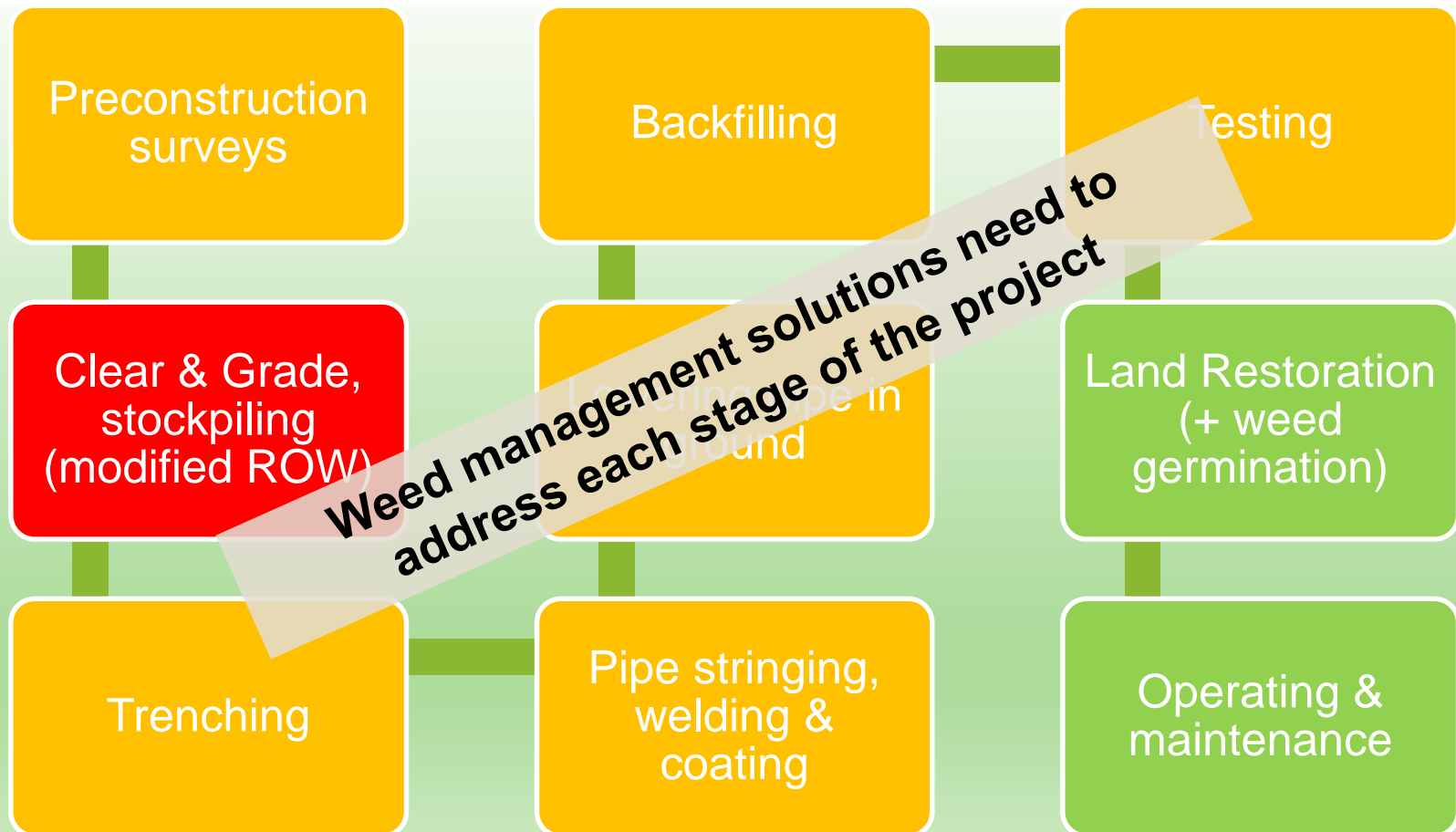
Next Gen weed management for pipeline and infrastructure projects should focus on the ‘science’ of weed control, rather than an over reliance on vehicle hygiene.

*Introducing the w...*

**WIMP**

*Do the new legislative obligations support the next gen approach?*

# Stages of a pipeline impact weed management differently- one size does not fit all



# Vehicle hygiene solutions must be practical for the project



Consider vehicle type & volume, project stage, work site location



Project weed management is a subset of regional and property weed management



# Example: Weed management must address the specific site conditions

Consideration	Example
Distribution of weeds	Widespread distribution vs. localised populations on a property
Emergent issues vs. established populations	African love grass vs Parthenium
Position in Landscape & growing conditions	Flood plain vs rocky escarpment
Plant phenology	Propagation, seed dispersal, flowering & seeding time, seed viability
Soil Properties	Clay vs. sandy soils – seedbanks, vehicle hygiene

# Why not a fit for purpose solution?



A sterile cover crop planted on a soil stockpile and along the ROW will inhibit weed growth of certain species



Utilise grazing management or exclusion to limit weed growth

## Addressing each species:

- Distribution & landholder concern
- Seasonal growth requirements
- Competitive ability
- Seed size & capacity to germinate
- Likelihood of growth in project stage



# WIMP

Weed impact  
management plan



## Define Phase

Quantify species presence & likelihood of establishment

- Field validated weed survey (baseline), part property
- Improves project planning & costing
- Identified 'clean properties to maintain status

Collect GIS based data

- Broad scoping maps eg snake maps
- Hot spot locations/ risk assessment
- Alignment construction sheets

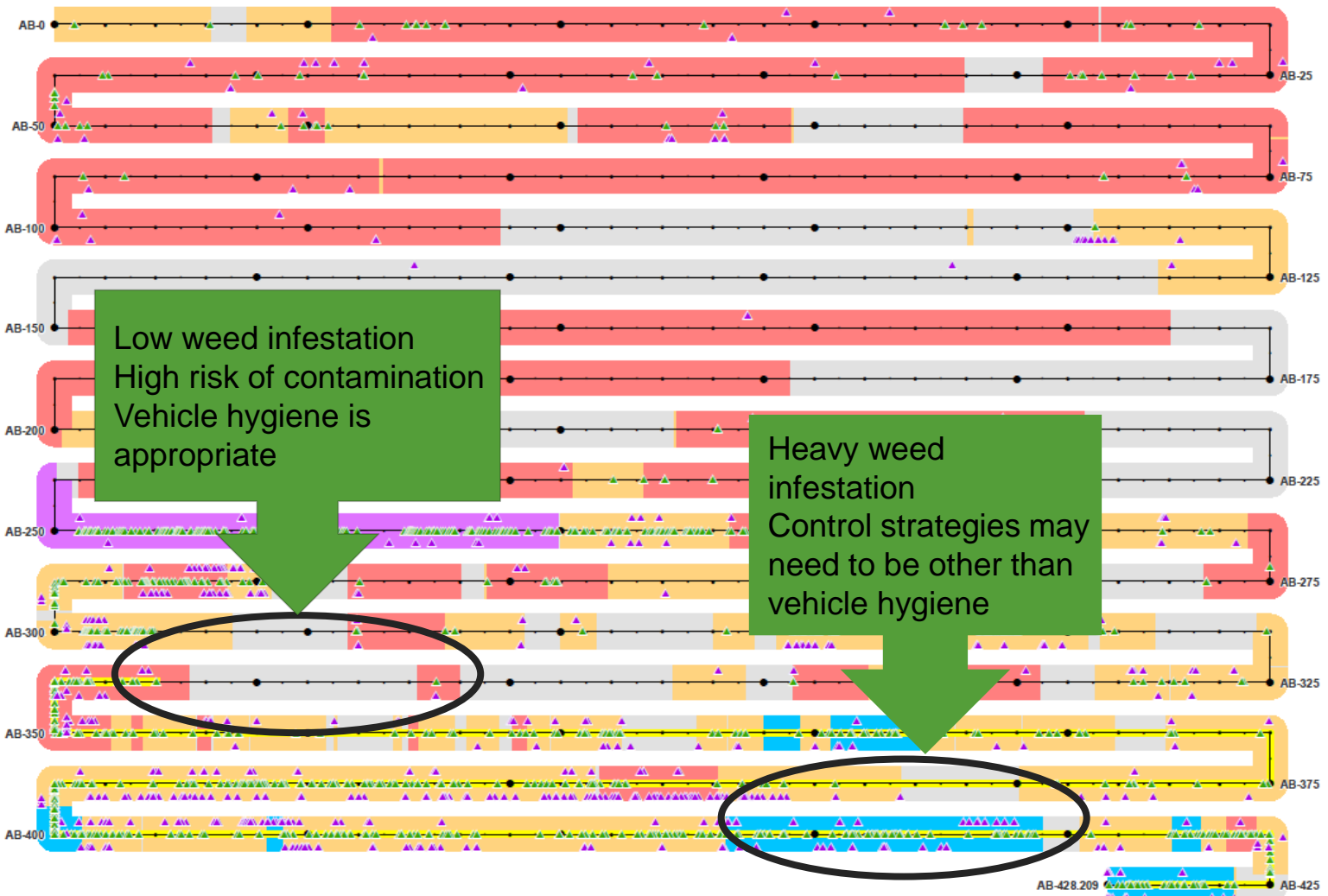
Landholder/ governments expectations

- Develop priority species list

Regional & property considerations

- Soil types, flooding, watercourse crossings, soil seed bank, paddock layout
- Species distribution





**Survey Locations - Weed Species**

- ▲ Location within ROW
- ▲ Location outside of ROW \*
- Parcels with Parthenium
- Parcels with Declared Weedy Sporobolus
- Parcels with GRT and Parthenium
- Parcels with other weeds present
- No weeds identified in current survey

## Develop Controls

### Construction /operating methods

- clear & grade, stripping soil, stockpiling, cover crops, laydowns
- Disturbance scale & duration
- Access for maintenance

### Control requirements

- Wet season weed control & regular seasonal maintenance
- Seedbank 'explosions' during construction
- Cover crops on stockpiles &ROW
- Transporting large volumes of construction workers

### Species control matrix

- Seasonality
- Stage of construction





# Example: Species control matrix

Species	Emergent spraying	Basal spray	Vehicle hygiene	Cover crop
<i>Opuntia sp</i>		X		
<i>Parthenium</i>	X		X	X
<i>Sporobolus sp</i>	X		X	X
<i>Lantana sp</i>	X	X		

## Execute Phase

### Stakeholder engagement strategy

- Detailed weed management property maps for construction & operating project stages
- Continual communication with landholders for each project stage

### Contractor/ construction strategy

- Tender method, specifications, detailed tender construction plans
- Subcontractors
- Schedule
- Company HSEQ systems

### Wash down method & locations

- All vehicle types & machinery, temp facilities & contaminant management
- In field methods- during survey phase
- Large machinery methods, clean properties worked together
- ROW zoning after topsoil stripping

### Restoration & monitoring

- Restore ROW & disturbed areas as soon as practical
- Plan weed control & access for life of operation

# Comparison Base Case

- Assuming 100 km of 40m cleared right of way, running through 30 different farms
- Parthenium, Giant Rats Tail grass, African Love Grass, Harissia cactus
- The control activity occurs over a full season, 1 year.



# Cost comparison case study

- Scenario A – current practice
  - strong emphasis on vehicle hygieneTotal = \$8,894,000
- Scenario B – hybrid approach to area weed controls
  - WIMP- specific to species/ region/ activities
  - controls a larger area & more weed speciesTotal cost = \$ 2,132,000

# Will the new legislative requirements allow next gen weed management?

## **Mineral and Energy Resources (Common Provisions) Act & Regulation 2016 (QLD)**

- requirements for behaviour on resources tenures
- Schedule 1, Part 2 – mandatory conditions relating to land access
  - Section 7- obligations to prevent the spread of declared pests
  - Section 7(4)- ‘a holder must ensure each person acting for the holder under a Resource Act washes down vehicles and machinery before entering a landholder’s land in the area of the resource authority, if the risk of spreading a declared pest is likely to be reduced by the washing down.’
  - Section 7(5) – holder must keep a record (the washdown record)....

# Conclusions

- Legislative basis leads towards vehicle hygiene as the favoured management option
- Reliance on vehicle hygiene is cost prohibitive and misdirected
- 'Science' of weed management is fundamental to success
  - Weed management is more than vehicle hygiene
  - Tailored to regional, property, activity requirements will lead to more effective weed management.