Creating Sustainable Native Grass Landscapes Using Direct Seeding

FLORA VICTORIA

Chris Findlay

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This is dependant on the expectations of the client

What are the most important ingredients for creating a sustainable native grass landscape?

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- Clean viable seed
- Appropriate site preparation

Soil Testing

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- Flora Victoria are compiling a database of soil tests to determine the viability of future projects

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- Subsoil used on pipeline surface unsuitable for growing native grass


Crop
Undisturbed Soil
Pipeline


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Undisturbed Soil
Crop

Weed Germination Test

Soil samples collected were placed in containers and maintained with regular water to ascertain the presence of any weed types. The samples were observed and then when germination occurred it was noted as well as the weed type.

	Days Germination	Weed Type
BH 20 300-500	15/11 days	Broadleaf/ Grass
BH 20 500 +	17 days	Broadleaf
BH 22 300- 500	16 days	Broadleaf
BH 22 500 +	Nil	Nil
BH 14 300-500	Nil	Nil
BH 14 500 +	Nil	Nil
BH 13 300-500	Nil	Nil
BH 13 500 +	Nil	Nil
BH 7 300-500	15 days	Broadleaf
BH 7 500+	Nil	Nil

Weed Comments

Of the bore holes samples tested three bore hole sites recorded weed seed germination these being the site bore hole 20, BH 22 and BH 7. The seeds germinated from the layer 300- 500mm and the only bore hole that had weed seed germinate from a depth of 500mm + was BH 20. The weed types observed tended to be broadleaf weeds or dicotyledons. BH 20 300 -500mm did have the presence of both broadleaf and grass weeds. The grass type weeds appear to be pasture grass such as ryegrass.

GREENVALE LAKES SOIL SAMPLING

28 April 2014

	Ideal Range	BH20 300-500	BH20 500+	BH22 300-500	BH22 500+	BH14 300-500	BH14 500+	BH13 300-500	BH13 500+	BH7 300 500
pH (water 1:5)	6.0 - 7.0	6.2	6.4	5.7	5.7	6.7	6.4	5.9	6.2	5.8
Electrical Conductivity (mS/cm) (water 1:5)	< 0.27	0.30	0.41	0.24	0.25	0.26	0.21	0.16	0.11	0.16
Total salts (ppm) (water 1:5)	< 800	891	1218	713	743	772	624	475	327	475
Phosphorus (Colwell) (ppm)	50 - 80	87	170	27	24	30	25	33	19	45
Exchangeable cations										
Potassium (meq /100g)	0.5 - 0.6	1.2	1.7	0.5	0.5	0.6	0.6	1.2	1.1	0.5
Calcium (meq /100g)	> 3.5	22.0	23.0	11.0	10.0	11.0	7.0	24.0	26.0	10.0
Magnesium (meq /100g)	0.8 - 1.0	9.9	12.0	9.9	9.9	9.9	11.0	11.0	12.0	12.0
Calcium Magnesium Ratio	2 - 5	2.2	1.9	1.1	1.0	1.1	0.6	2.2	2.2	0.8
Sum of Cations (CEC) (meq%)	> 5	33.8	37.5	22.5	21.7	23.3	20.7	36.9	40.0	23.9
% of CEC (Base Saturation)										
Potassium (%)	> 10	4	5	2	2	2	3	3	3	2
Calcium (%)	60 - 70	65	61	49	46	47	34	65	65	42
Magnesium (%)	18 - 23	29	32	44	46	43	53	30	30	50
Sodium (%)	< 5	2	2	4	6	8	10	2	2	5
Trace Elements										
Sulphur (ppm)	10 - 50	19	43	11	12	14	13	16	10	16
Zinc (ppm)	1 - 10	7.6	13.0	1.5	1.6	1.1	1.1	1.9	0.9	1.5
Copper (ppm)	1 - 10	19.0	37.0	1.2	1.0	1.2	1.2	1.0	0.8	1.2
Manganese (ppm)	1 - 4	23.0	78.0	15.0	19.0	13.0	11.0	41.0	24.0	41.0
Iron (ppm)	10 - 75	140	150	220	210	240	230	110	89	260
Boron (ppm)	0.3 - 1.0	1.4	1.5	1.1	1.2	1.4	1.7	1.4	1.7	1.3
Chloride (ppm)	< 100	77	110	93	150	84	110	20	16	41
Organic carbon (%)	1.2 - 2.5									
Sample Number		*21585533*	*21585534*	*21585541*	*21585542*	*21585543*	*21585544*	*21585547*	*21585548*	*21585553*

SportsTurf

low
medium
high

DISCLAIMER: Results are based on the analysis of the samples as received.

Because of the variability of the sampling procedures, environmental and managerial conditions, the Company does not accept liability for lack of performance based on these recommendations.

Recommendations are made in good faith based on the sample and information supplied.

Clean Viable Seed

Good quality native grass seed can be sourced from remnant vegetation or commercially from a trusted seed grower.

If you do not have control over harvesting the seed insist on the seed being certified.

REPORT OF SEED ANALYSIS

E.M. Pascoe Seed Testing Services
12 Ridge Road
Greensborough VIC 3088
Ph / Fax (03) 9434 5072
ABN: 59 372 820 518

Flora Victoria
PO Box 71
Altona Vic 3018

Seed Rytiosperma CV. _____ Lot Designation Sydenham

No. of Parcels	Weight of Lot	Date Sample Received	Date Statement Issued	Laboratory Number
		29/4/2015	1/6/2015	15/279

ANALYSIS RESULTS

Purity - % weight

Germination - % number Prechilled & KNO_3 treated

Pure Seed	Other Seeds	Inert Matter	First Count Day	First Count Normal Seedings	Final Count Day	Final Count Normal Seedings	Hard Seeds	Fresh Ungerm. Seeds	Abnormal Seedings	Dead Seeds
86.3	trace	13.7	7	16	21	86		4		10

Other Seeds

Rytidosperma duttinoana

Inert Matter

Empty glumes. sterile florets, plant pieces

Remarks

ELIZABETH M. PASCOE STPC

Site Preparation

We refer to the processes of site preparation for direct seeding a weedy site as

“Starting From Scratch”

Starting from scratch

is

Site preparation that eliminates or reduces weed propagules, and sometimes excessive nutrients from a site before seeding it with indigenous species.

Adequate site preparation is the key for successful direct seeding

The quality of site preparation is almost always directly proportional to the amount of post sowing maintenance required

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5. Repeated spraying

There are variables that can determine the time needed to reduce weed seed using the last two methods

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- Rainfall during the site preparation phase
- Site history (e.g. Has weed seed been spread through the soil profile)

To accommodate these variables land managers need to be flexible with the duration of site preparation

We generally don’t recommend including forbs in a seed mix when using these site preparation methods.

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- Risk is much lower than planting

An example of cost per area

2,500 m2 of *Poa labillardieri*

Sowing

- 500 grams of seed at a cost of $175.00 for approx 20 plants per m2
- Cost of sowing seed - $550.00

Total - $725.00

Planting

- 12,500 (5 plants per m2) at a cost of 50 cents per plant - $6,250.00
- Planting and watering at 25 cents per plant - $3,125.00

Total - $9,375.00

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- Sowed first crops in 2009
- Sowed them again in 2010 because of drought and lack of irrigation
- Site prep (boom spray/cultivate) commenced on areas for new crops
- Crops with the most site prep are the most weed free

At what point do we consider starting from scratch?

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- When weed densities make continual maintenance uneconomical. Weed densities will differ depending on species.

Lake Borrie Grassland
Western Treatment Plant

- Main weed is *Phalaris aquatica*
- Above approximately 50% cover it is cheaper to “start from scratch” than spot spray
- Seed was harvested from the site
- Maintenance was incorporated into existing budget


Lake Borrie Grassland Nov 2007


June 2009


Nov 2009


Feb 2011

Sydenham Park
Brimbank City Council

A 15 hectare paddock originally covered in *Nassella trichotoma* (Serrated Tussock)


Sydenham Park 2008

Sydenham Park July 2012


November 2013


Jan 2014

At what point do we consider starting from scratch?

- When weed densities make continual maintenance uneconomical. Weed densities will differ depending on species.
- When a site has been altered by earth moving

E-14 Bund Stage 1
Greenvale Reservoir

- 3 hectares of direct seeded native grass under jute mat
- As the site was covered in Nassella neesiana (Chilean Needle Grass), soil testing was carried out to determine the locations and depth that would yield the best weed free topsoil

E-14 Bund Stage 2
Greenvale Reservoir

- Sowing in mid summer
- 2 hectares of direct seeded native grass under compost mixed with a tackifier and wetting agent
- Soil testing done too late (after topsoil was stockpiled)
- Weeds outcompeted native grass before they could establish

At what point do we consider starting from scratch?

- When weed densities make continual maintenance uneconomical. Weed densities will differ depending on species.
- When a site has been altered by earth moving
- When persistent weeds threaten high value remnant vegetation

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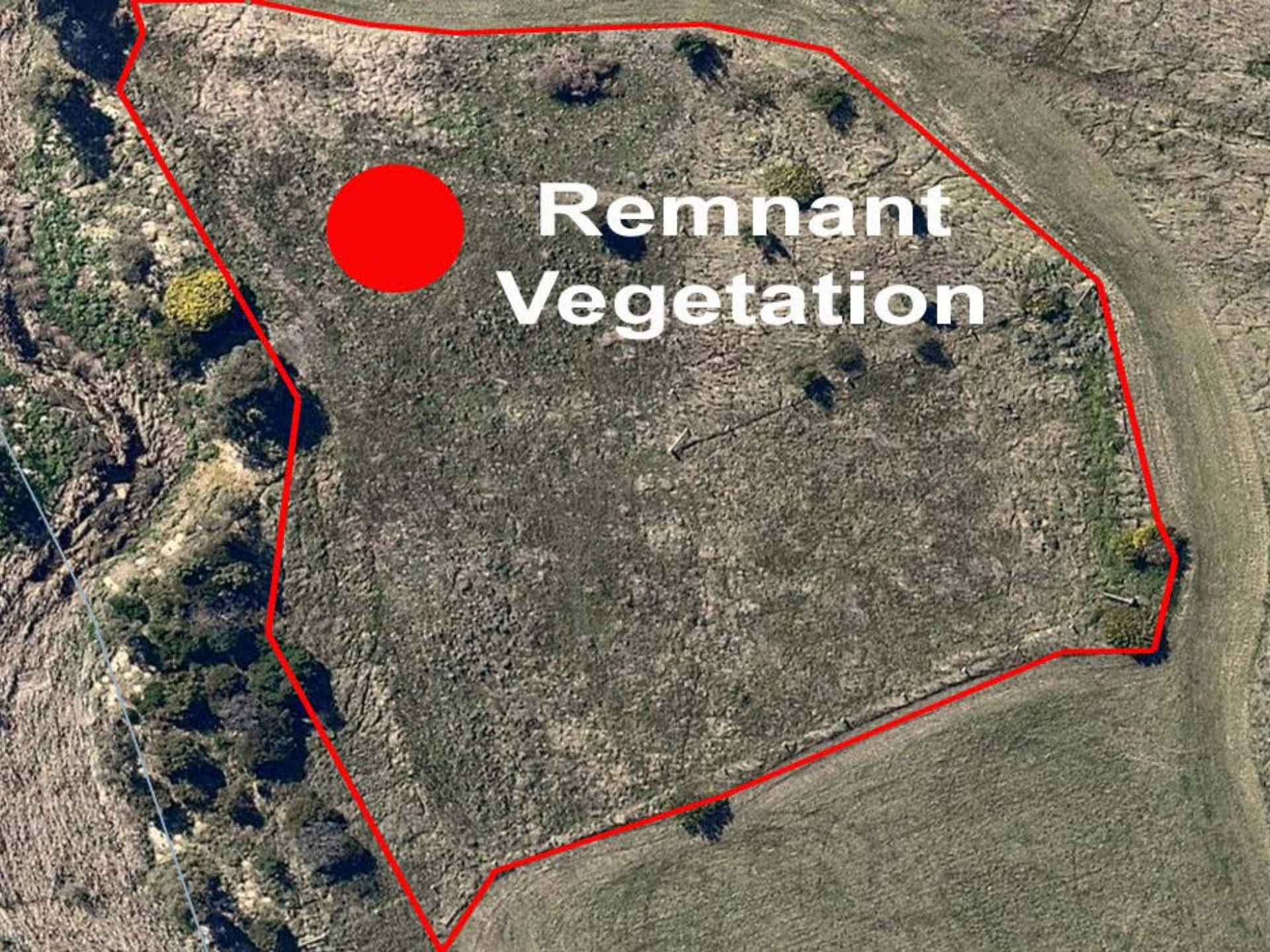
- Has a small core of remnant vegetation that is threatened by *Nassella neesiana*


Remnant
Vegetation

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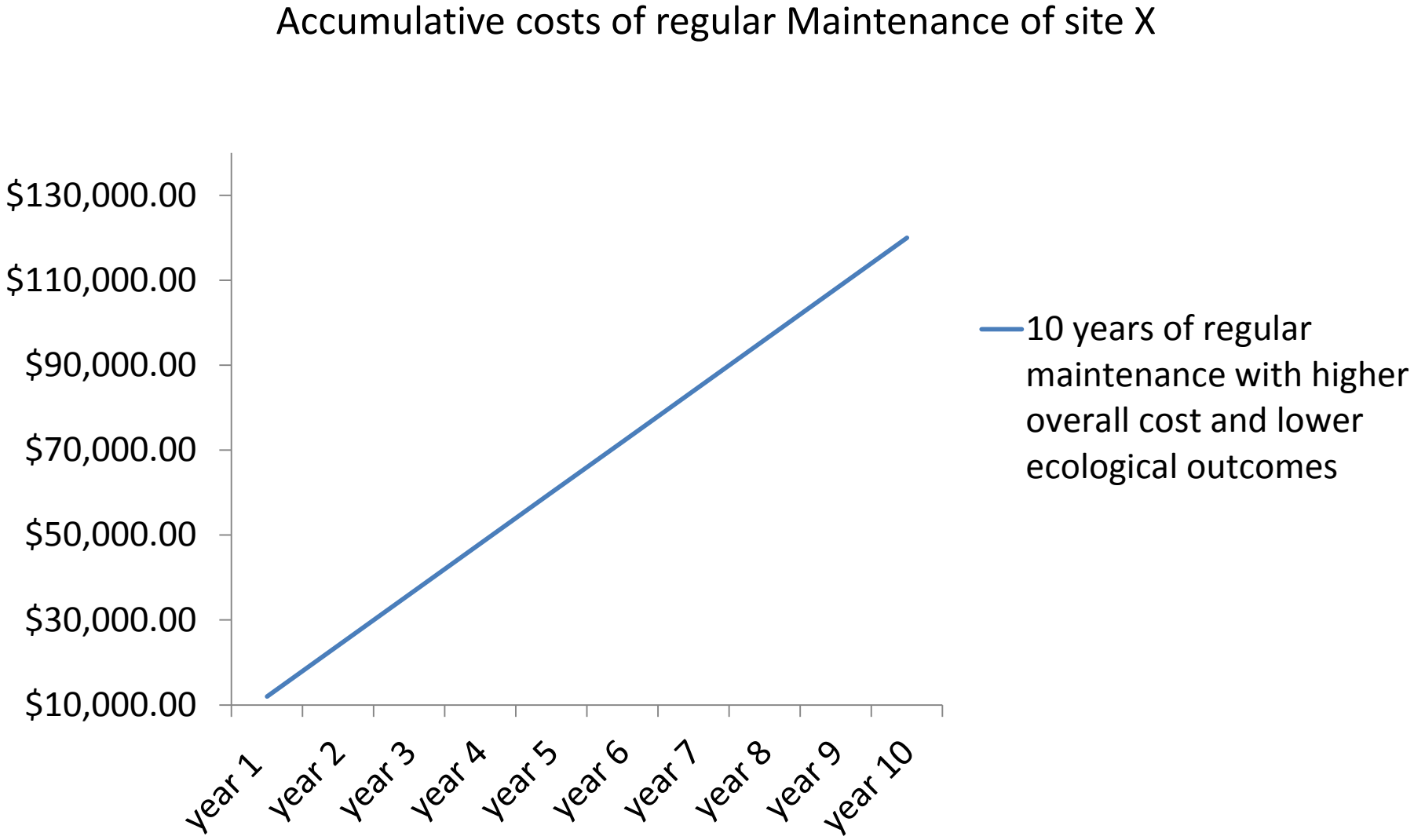
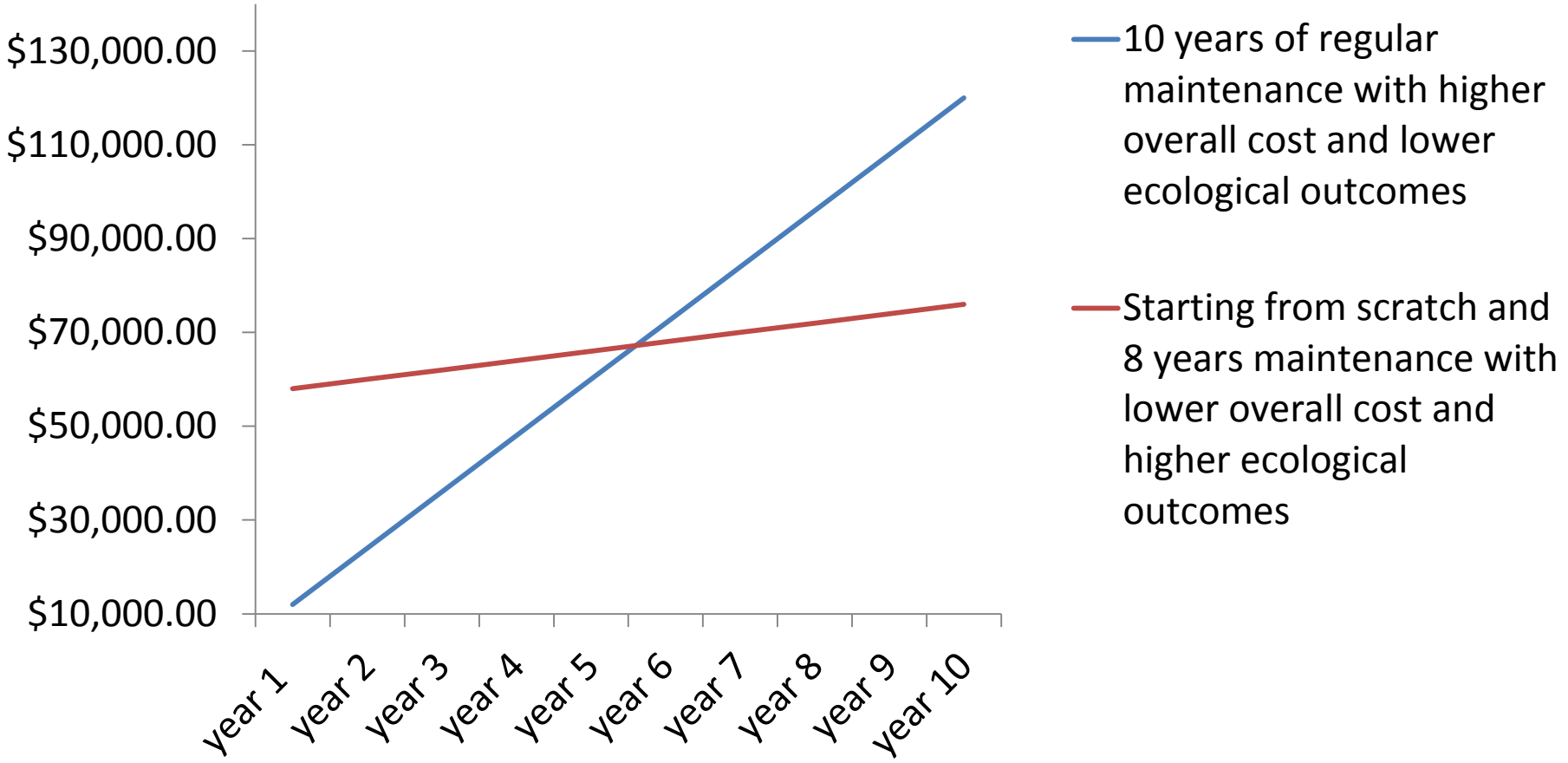
- Is approximately half a hectare in size
- Has a small core of remnant vegetation that is threatened by *Nassella neesiana*
- Current management is spot spraying with an annual budget of approximately $12,000
- The site has remained stable for the last 5 years
- Is this management sustainable?


Accumulative costs of regular Maintenance of site X
$130,000.00
$110,000.00
$90,000.00
$70,000.00
$50,000.00
$30,000.00
$10,000.00
year 1
year 2
year 3
year 4
year 5
year 6
year 7
year 8
year 9
year 10
10 years of regular maintenance with higher overall cost and lower ecological outcomes

Accumulative costs of regular maintenance versus starting from scratch using scraping as site preparation at site X



Dr Paul Gibson-Roy's work on grassland restoration demonstrates the effectiveness of scalping as a form of site preparation, especially where forb species are included in a grass seed mix.


GGRP site near Wickliffe

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- When weed densities make continual maintenance uneconomical. Weed densities will differ depending on species.
- When a site has been altered by earth moving
- When persistent weeds threaten high value remnant vegetation
- To create innovative landscape solutions for urban spaces

Gordon O'Keeffe Reserve Wyndham

- Required a hardy drought tolerant perennial grass to help fill in voids between weedy grasses over 4.5 ha in a very low rainfall area
- Minimal site preparation needed
- Site was covered in thick *Galenia Pubescens* and *Nassella hyalina*

Wooten Reserve Grassland Plain Landscape

Direct seeding v planting

The site had evidence of Kikuyu stolons and imported soil to raise soil level so a simple germination test was done to help determine what weeds might be present.

Because of the unknown weed issue we decided that forbs would be planted after the establishment of grasses rather than being sown with the grasses to enable the use of selective herbicides.

Hume Batters

A sustainable solution for steep batters that can not be easily mown


Riggall St Batter North West
LOWEST PRICES

Mandalay Golf Course

- Client wanted attractive drought tolerant roughs
- Less than ideal site preparation because of rock and time constraints
- Low Maintenance?
- Sustainable landscape?


Mandalay Dec 2013


Mandalay Dec 2013

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  - Insufficient or incorrect site preparation
  - Bad timing
- Cost cutting
  - No soil testing
  - Insufficient site preparation
  - Low seeding rates
- Bad luck
  - Drought
- Other contractors spraying out the project

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- Site prep including spraying should include at least one full season. If this is not possible seeding should be delayed until a full season site prep has been completed
- Weed control must be completed with a high degree of continuity

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