PRODUCTIVE SALTLAND PASTURES

FOR SOUTHERN WA

MLA PDS L.PDS.2203

STANDISH PDS SITE REPORT

Producer Demonstration Site

mla MEAT & LIVESTOCK AUSTRALIA

GILLAMII CENTRE Sustainable Agriculture In Practice

TAMGAREE KIKUYU

About the Project

2022-2027

In early 2022 the Gillamii Group was successful in obtaining funding for a new project through Meat and Livestock Australia (MLA) Producer Demonstration Sites (PDS) Program. The project is called 'Productive Saltland Pastures for Southern WA' and is a continuation of Gillamii's commitment to the remediation of salt-affected land into productive pasture systems for livestock grazing.

This PDS Project aims to improve members' knowledge and skills in the establishment, management, and benefits (profitability, productivity, and sustainability) of salt-tolerant forage systems on moderately salt-affected land. The objective of this program is to establish 150 hectares of salt-tolerant forage pastures on 6 local sites to demonstrate variation in productivity of key shrub and understory varieties and a paddock scale increase in:

- a. late summer/autumn (February – April) biomass production (up to 300%)
- b. soil organic carbon and total carbon

A cost-benefit analysis will also be conducted at each site to determine relative economic performance of the salt-tolerant feed-base systems as well as key livestock data (stocking rates, grazing days and liveweight gain of livestock).

This project is funded through Meat and Livestock Australia's (MLA) Producer Demonstration Sites (PDS) Program, supported by a group of dedicated host farmers.

Contents

Project Stakeholders

The Team

Role	Responsibility
Freya Spencer Gillamii Centre Project Manager	Responsible for the management of the project (deliverables as per Project Deliverables: Gillamii Responsibility section of landholder agreement, milestone stones, organisational structure, reporting and finances).
Alana McEwan MLA Project Manager	Responsible for the management of MLA's National PDS Program.
Hilary Waterson Gillamii Centre Financial Manager	Responsible for day-to-day management of project finances and financial audits.
PDS Host Landholder Tomlinson Addis Standish House	Responsible for project deliverables as per Project Deliverables: Landholder Responsibility section of the landholder agreement.

Project Partners

Role	Responsibility
Meat & Livestock Australia	Provide main financial support for site establishment, monitoring and extension.
CSIRO	Provide technical support for site establishment, extension and in-kind pasture analysis (nutrition and biomass).
DPIRD	Provide technical support for site establishment and extension.

Site Overview

Standish Family

Koonji Road, Cranbrook

Site: 9 Hectares

Site Plan & Establishment

9ha site (including waterway) for total grazing, 2ha to be planted.

Site Preparation

1. Mounding of Alleys with Wilson Ripper Mounder on the 16th February 2022

2. Winter Spray of Mounds on the 22nd of July 2022

Site Planting

1. Seedlings planted on the 26th and 27th of July and the 18th of August 2022

- Single row of seedlings (saltbush, eucalyptus occidentalis and melaleuca cuticularis) - 3000 stems total
- 2m interrow spacing, 3m row spacing

Mounding of alleys in February 2022

9ha site (including waterway) for total grazing, 2ha to be planted.

Planting at the Standish Site, mounds sprayed ready to plant seedlings and puccinellia/volunteer pasture present in understory.

Pasture Monitoring

2022 - 2027

Soil Analysis

As this site was being established in an area with pre-exisitng vegetation (native trees) and a water course, it was not suitable to use the Veris i-scan machine. 4, 10cm composite samples were taken at the site, with a comprehensive analysis conducted by

Note: Soil Analysis to be conducted twice only (2022 &2027)

Soil - Elevation

N/A

Soil - pH (CaCl2 - 4B1)

Soils are extracted in deionised water at a ratio of 1:5, stirring for one hour. Water pH and electrical conductivity of the extract are measured using a pH and conductivity electrode. Code 4B1 indicates direct use of 0.01M CaCl2, at a soil/solution ratio of 1:5.

Soil - Organic Carbon (LO I % 6G1)

Unprepared soil sample is weighed and heated in an oven overnight. The sample is weighed a second time, post heating, to determine percentage moisture. Soils are then heated to 400oC to determine loss of sample on ignition. Loss on ignition measurements are an estimate of organic matter of soil.

Soil Salinity - EC (3A1)

Electrical conductivity (EC) of 1:5 soil/water extract.

Results

Sample	pH	OC%	EC
1	5.1	4.85	1.07
2	5.4	1.51	0.52
3	5.4	3.13	1.35
4	5	9.96	2.59
Average	**5.22**	**4.77**	**1.38**

Notes: Highly saline, slightly acidic, good level of organic matter

Photo Points

Year 1: February 2022 (Prior to Establishment)

PP1

PP2

PP3

Photo Point Map

Photo Points

Year 2: April 2023

PP1

PP2

PP3

Photo Point Map

Biomass

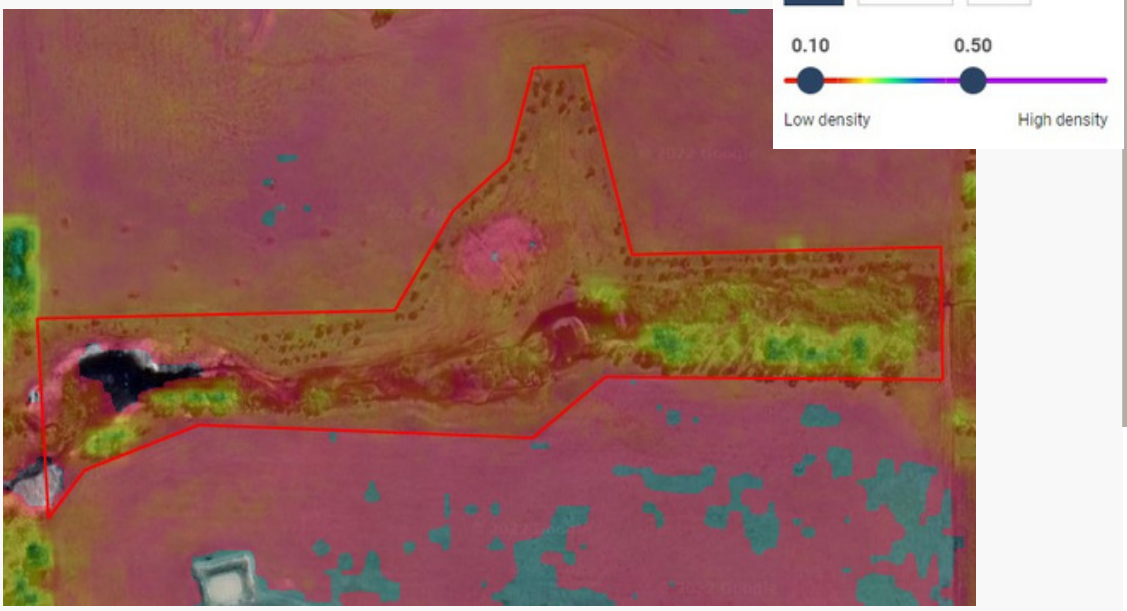
Year 1: Biomass Breakdown (Prior to Establishment)

Site sampled on the 18th February 2022
Summer-Autumn Rainfall to Date: 13.2mm (Kendenup W DPIRD Station)

Site:
Mean rank = 2.0
biomass/ha = 1339kg DM
biomass/site = 12053kg DM

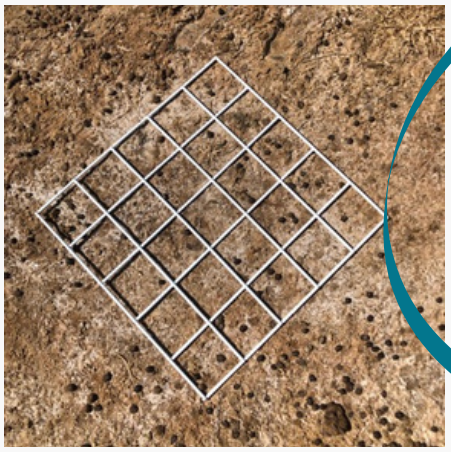
Please note that total biomass is not FOO and therefore does not represent total feed available to stock - see Pasture Nutrition section below for further information.

NDVI February 2022 - March 2022



Year 1: Biomass On Offer (Rank)

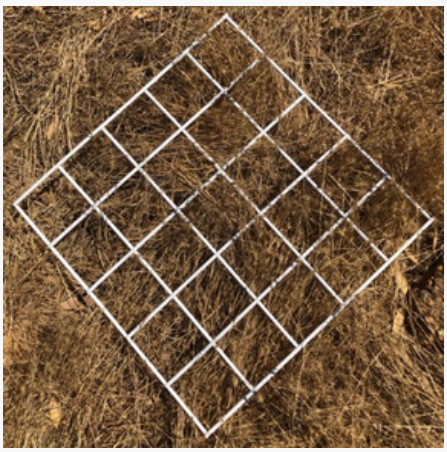
1



2

3

4



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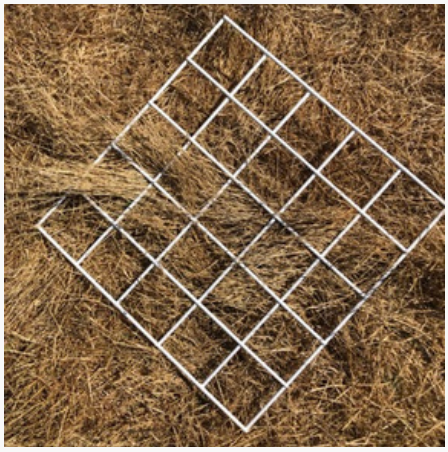


Average Ranking of 2.0

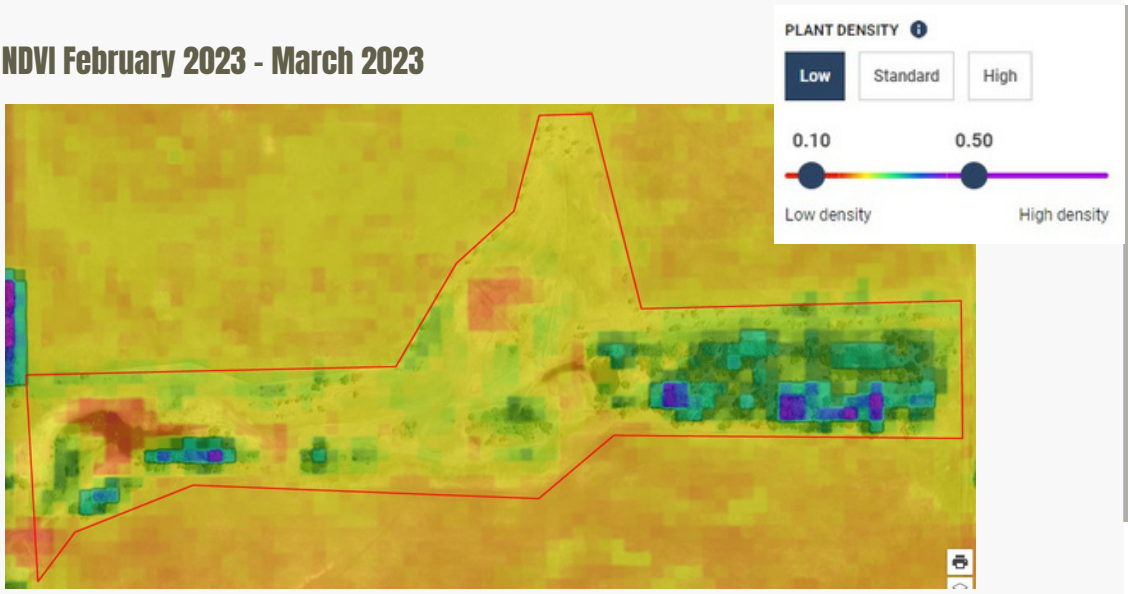
Year 2: Biomass Breakdown

Site sampled on the 12th April 2023
Summer-Autumn Rainfall to Date: 58.8mm (Kendenup W DPIRD Station)

Site:
Mean rank = 3.1
biomass/ha = 2586kg DM
biomass/site = 23273kg DM

Please note that total biomass is not FOO and therefore does not represent total feed available to stock - see Pasture Nutrition section below for further information.

NDVI February 2023 - March 2023



Note: Site had not been grazed

Year 2: Food On Offer (Rank)

1

2

3

4

5

Average Ranking of 3.1

Nutrition

Note: Sampling has been conducted during the summer-autumn period as this project focuses on that specific seasonal food gap

Year 1: Species Composition (Summer-Autumn Baseline Prior to Establishment)

Site	Site Composition	Kg DM/Ha	DMD (%)
Barley Grass	55.60%	744	44.87
Puccinellia	26.20%	352	54.81
Broome Grass	10.80%	144	47.92
Rye Grass	7.40%	99	39.02

Species Nutrition

Site	ME (Mj/Kg)	Crude Protein (%)
Barley Grass	6.01	5.31
Puccinellia	7.72	3.27
Broome Grass	6.53	3.14
Rye Grass	5.00	2.92

Total Kg DM/Ha = 1339
Total Kg of DDM/Ha = 634
Average DMD =47.37%
Average ME(Mj/Kg) = 6.44
Average Crude Protein = 4.36%

Species Nutrition

Dry Matter Digestibility (DMD)
DDM (or DMD) is the portion of the dry matter in a feed that is digested by animals at a specified level of feed intake.

Metabolisable Energy (ME)
The energy value of a feed available for an animal's maintenance or growth, and can be expressed in megajoules per kilogram of dry matter (MJ/kgDM). ME is calculated from feed digestibility and estimates the total energy available to the animal.

Crude Protein (CP)
The protein in a feed is estimated from the measured nitrogen (N) content of that feed. The estimate is termed crude protein, and is expressed as a percentage.

- Weaner lambs and pregnant or lactating ewes need 15% protein
- Growing adult sheep need 12% protein
- 9% protein is needed for survival

Year 2: Species Composition (Summer-Autumn 2023 Period)

Site	Site Composition	Kg DM/Ha	DMD (%)
Barley Grass	41.20%	1066	33.10
Puccinellia	36.60%	948	33.90
Rye Grass	13.80%	357	32.10
Old Man Saltbush	6.30%	163	51.74

Melaleuca cuticularis made up the remainder 2% (not economical to analyse).

Species Nutrition

Site	ME (Mj/Kg)	Crude Protein (%)
Barley Grass	4.00	3.40
Puccinellia	4.10	3.00
Rye Grass	3.80	5.70
Old Man Saltbush	7.15	6.38

Total Kg DM/Ha = 2534
Total Kg of DDM/Ha = 873.20
Average DMD =34.50%
Average ME(Mj/Kg) = 7
Average Crude Protein = 4.2%

Species Nutrition

Dry Matter Digestibility (DMD)
DDM (or DMD) is the portion of the dry matter in a feed that is digested by animals at a specified level of feed intake.
Metabolisable Energy (ME)
The energy value of a feed available for an animal's maintenance or growth, and can be expressed in megajoules per kilogram of dry matter (MJ/kgDM). ME is calculated from feed digestibility and estimates the total energy available to the animal.
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- Weaner lambs and pregnant or lactating ewes need 15% protein
- Growing adult sheep need 12% protein
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Nutritional Interpretation: Grazing Days and Stocking Rates Over Time

Assumptions/Notes:

1. One DSE is based on the feed energy required to maintain a 45 kilogram liveweight Merino wether with zero weight change, no wool growth additional to that included in maintenance, and walking 7 km/day. 1 DSE has an energy requirement of approximately 8.7 MJ ME/day (DPIRD 2023).
2. Stocking rate of 4 DSE/Ha during the summer-autumn period
3. Grazing is not occurring on the site during the 2022-2023 period to allow the saltbush seedlings to adequately establish

2022

Based on Species Composition, Kilogram of Dry Matter per hectare (Kg DM/Ha), Dry Matter Digestibility (DMD) and Metabolisable Energy (ME) 36 Merino wethers could graze this site for 117 days (4h/ha) before a paddock rest period would be required. Protein is below 9% and full nutritional analysis has not been conducted, supplementary feeding would be required.

2023

Based on Species Composition, Kilogram of Dry Matter per hectare (Kg DM/Ha), Dry Matter Digestibility (DMD) and Metabolisable Energy (ME) 52 Merino wethers could graze this site for 176 days (4h/ha) before a paddock rest period would be required. Another way to view this is stocking rate could increase to 6DSE/ha (50% increase) for the same grazing period as 2022. This is a 50% increase in grazing days within the 1st year of establishment. Protein is still below 9% and full nutritional analysis has not been conducted, so some sort of supplementary feeding would still be required.

Summary

- 50.4% increase in Total Kg DM/Ha
- 37.7% increase in Total Kg of DDM/Ha
- 8.7% increase in Average ME(Mj/Kg)
- 29% decrease in Average DMD
- 4% decrease in Average Crude Protein

Animal Productivity Monitoring

2024 - 2027

Cost-Benefit Analysis

2022 - 2027

Site Costings

Establishment Cost Summary - 2022

Seedlings	Amount	Unit Cost	Total Cost
• Oldman, Melaluca & Eucalyptus	1500/ha	$0.60/stem	$1800.00
Fertiliser/Chemical			
• Glyphosate 450	2L/ha	$8.00	$32.00
Operational			
• Mounding	2ha	$5.00/ha	$10.00
• Spraying	2ha	$5.00/ha	$10.00
• Planting	2ha	$40/hr	$800.00

Cost/ha = $1,326
Cost/Site = $2,652

Maintenance Cost Summary - Annual

TBC	Amount	Unit Cost	Total Cost

Site Income

Income Summary

Not currently grazed	Amount	Unit Cost	Total Cost