

DAF Webinar series - May 2020

Resilience strategies for small landholders : Grazing land management 8

Grazing land management & pasture recovery

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Grazing Land Management

- Productivity & resilience is driven by 2 key factors
 - Productive capacity of our land soils & pastures
 - How we manage our land
- Good grazing land management is about managing land and animals to optimize pasture growth & composition for profit & sustainability.
- Should consider property as a whole & seeks to
 - reduce threats land degradation, pests
 - improve resilience to disturbance (drought, flood, wildfire)
 - protect & enhance biodiversity
- Starts with understanding your land its capabilities, limitations and condition & having a Property Management Plan

Land Types & Soils

A land type is a unique parcel of land distinguishable by its characteristic landform, soil and vegetation.

230 Land Type descriptions developed by DPI for 16 regions across Qld, based on previous land resource assessments & extensive research & field work.





Land types : Blue gum on alluvial flats



Land types : Ironbarks on granite



Land types : Ironbarks on duplexes & loams



Land types : Ironbark & Spotted gum ridges



Land types : Softwood scrub



Land types affect pasture growth



Soil health – functions & properties



Soil Health - Plant available water content

(PAWC) is defined by the amount of water in fully wetted soil 'field capacity' minus the water or 'soil moisture' remaining when the plant has reached its permanent wilting point, the point at which the plant has wilted and died.



Soil health - Nutrient availability

- Plants need steady supply of macronutrients and micronutrients for healthy growth & function
- Macronutrients Nitrogen, Phosphorus, Potassium, Sulphur, Calcium, Magnesium
- Micronutrients Boron, Copper, Iron, Manganese, Molybdenum, Zinc
- Pastures largely influenced by levels of Nitrogen, Phosphorus & Cation Exchange Capacity (CEC) levels
- CEC is measure of soils ability to hold influenced by clay content & type and Organic Matter



Soil health - Soil Organic Matter

- Supplies nutrients for plants
- Binding aggregates, helping improve soil structure
- Improving infiltration & water storage
- Providing food for soil microbes & macro-organisms
- Insulates plant roots & buffers pH

Typically measured as Soil Organic Carbon SOC

Determined by amount of dry matter grown & returned to soil + rate of microbial breakdown



• Therefore maximise SOC by growing diverse perennial pastures, and maximising groundcover levels.

Soil health – Groundcover management

Groundcover is defined as anything that breaks the fall of rain up to 30cm above the ground, including pasture, leaf litter, dung, biological soil crusts, sticks & rocks.

- Maximises infiltration and minimises erosion of precious topsoil & runoff
- Insulates soil surface from drying winds and evaporation to retain moisture and protect microbes
- Buffers soil temperatures to maximise microbial activity
- Helps minimise invasion/colonisation by annuals or weeds
- Provides organic matter for soil & microbes
- Provides habitat for variety of ground dwelling fauna



Soil health - Ground cover management





Ground cover percentage	87	69	6
Runoff (mm of rain)	1.5	14	38
Soil loss (t/ha)	0.03	0.3	22
Sediment lost with run-off (g/L)	1.5	1.9	63

Managing limitations & at-risk areas

Some Soils/Land Types require special management due to their physical & chemical properties and position in landscape.

• Salinity – presence of soluble salts in soil profile where impacts plant growth



- Sodicity excess of Sodium leads to poor structure, infiltration -soils are prone to dispersion (dissolve) on wetting.
- Soil erosion where soil particles are detached due to the above constraints or loss of groundcover, concentrated water flows, over clearing/overgrazing grazing particularly on slopes.

Managing soil limitations & at-risk areas



- Prevention Maintain high levels of groundcover all year around , lower utilisation rates , longer or more frequent spelling may be required.
- Careful planning in placement & establishment of infrastructure, particularly erodible & dispersible 'sodic' soils to minimise loss of cover, exposing at-risk soils &/or concentrating water flows.
- For areas affected by erosion/salinity this may involve fencing off scalds/eroded combined with restoration works to stabilise and establish vegetation cover.

Grazing ecosystem - Three gateways model



Grazing Land Condition

The **capacity** of grazing land to **respond** to rain and produce **useful forage**...

...a measure of how well the grazing ecosystem is functioning.

3 components :

- Pasture Condition
- Soil Condition
- Woodland Condition



Features of a healthy pasture

- high % of **Perennial**, **Productive**, **Palatable** (3P) grasses
- small number of annual plants
- small number of pasture weeds (eg verbenas)
- high frequency of desirable forbs (eg native & introduced sown legumes)
- a variety of other favourable species for particular Land type

Perennial = longevity & resilience to grazing & climate pressures Palatable = livestock readily eat plants Productive = grows quantity of quality forage

Features of healthy pastures

Desirable 3P species :

Better at energy capture & conversion - perennial tussocks more green leaf & extensive root storing energy.

Better at accessing & cycling nutrients in soil profile - larger root systems, improved SOM & microbial activity.

Large perennial tussocks improved infiltration, slow runoff, groundcover & SOM protecting soil surface from sun,wind,heat



Some Pastures & Indicator species

- Desirable 3P species include Kangaroo grass, Forest Blue, Qld Bluegrass, Black speargrass, most sown pastures eg Buffel, Rhodes, Panic & most native & introduced legumes.
- Intermediate species include
 Pitted bluegrass, Couch grass,
 native panic & Barbwire grass
- Undesirable species include Wiregrasses, slender chloris, native rats tail, burrgrass





'ABCD' land condition scoring

Grazing land condition can be split into 4 broad categories:

Α	B	С	D
Good	Fair	Poor	Very Poor

Land in 'A' Good Condition

'A' condition land has all of the following:

- good coverage of palatable, productive, perennial(3P) grasses
- 3P species make up more than 80% of yield
- few weeds and no significant infestations
- good soil condition, good surface condition and no erosion



Land in 'B' Fair condition

'B' condition land similar to 'A' with the following features:

- some decline in 3P grasses & an increase in other species (less favoured grasses, weeds)
- 3P grasses make up between
 60 80% of DM yield
- maybe some slight decline in soil condition, some signs of previous erosion and/or current susceptibility to erosion



Land in 'C' Poor condition

- **'C' condition land show more** pronounced decline / degradation than B condition and with the following features:
- general decline in 3P grasses and large amounts of less favoured species
- 3P grasses only make up between 10 and 60% of yield
- obvious signs of past erosion and/or high susceptibility to erosion
- maybe general thickening in density of woody weeds



Land in 'D' - Very Poor condition

'D' condition land has one or more of the following features:

- general lack of any perennial grasses or forbs
- 3P grasses make up less than 10% of yield
- severe erosion or scalding, resulting in a hostile environment for plant growth
- thickets of woody plants may cover most of area



The rolling ball – Land Condition



Figure 17 Rolling ball model illustrating land condition change

Land condition affects pasture growth

Land Condition

DM kg/ha/yr A Condition B Condition C Condition D Condition

Maintaining Land in Good Condition



- = improved productivity & profitability
- = greater resilience to disturbances
- = enhanced biodiversity

Land condition - the drivers

- Climate
- Land type & soil type
- Plant type
- Grazing management

Which of these factors do you have most control over ?

Pasture and Land condition is **most influenced by long**term grazing management .

It is **slow to change -** over a number of years.

Pasture & Land condition – resilience





Grazing management tools

- Use stocking rates appropriate for the land types & land condition
- Monitor land and pasture condition annually and undertake regular forage budgets to adjust stock numbers to seasonal forage availability
- Ensure grazing system incorporates routine spelling that allows for desirable pasture species to rest, recover & seed
- Time stock management to help match grazing pressure to seasonal variations in pasture quantity and quality
- Using fencing & infrastructure to advantage to avoid overgrazing/degradation of land types, vulnerable areas, riparian
- Managing fire appropriately protection &/or planned burns to improve pasture vigour, composition, manage weeds

Long term Carrying capacity vs Stocking rate

Long-term carrying capacity



 The number of animals that a paddock can support, on average, in the long-term (10+ years)

Forage budgeting



Balancing demand and supply

Safe utilisation rates

Aim is to Balance supply & demand over time by adopting safe **utilisation** levels - to optimise production and prevent land degradation.

Utilisation rate = maximum rate of average annual use that is consistent with maintaining or encouraging good land condition. It may vary with

- Land type
- Grazing strategy
- Evenness of forage use, both across a paddock & from year to year.
- Typically ranges 25 40% by weight (not height) depending on land type, pasture type, land condition

Rest at critical times is key



Rest at critical times is key

•Photo demonstrates how grazing affects the growth of pasture plants.

•Regular clipping of the plant on the right (every 2-3 weeks for just 1 growing season) reduced the plant's above and below ground biomass.

•The plant on the left was only clipped a few times in the growing season, and has a much greater biomass

The amount and timing of rest is critical for plant health and recovery



Managing the grazing system

- 'Grazing System' -how stock are allocated to grazing paddocks
- The key to improving or maintaining land condition = rest and recovery
 - Continuous grazing conservative stocking rate
 - Rotational grazing opportunistic or strategic planned spelling, wet season spelling, cell grazing, ultra-high density grazing.
- Important to determine appropriate grazing/spelling regime for your enterprise and pasture – depends on your goals, land types & infrastructure, resources & time
- CSIRO / DPI study on Grazing systems found NOT system but rather grazing management determined Land condition

Management of Land types & Soils

- Understand the Land Types & Soils on property and differing productive capacity & limitations – Property Maps & Plans
- Use information for Property Planning & management decisions – eg safe carrying capacity, utilisation rates, fencing to land types, location of fences, water points, feed areas, track design
- Erosion / salinity risk areas require specific management. Act early on erosion areas
- Maintain high levels (>90 %) of effective groundcover all year around
- Maintaining healthy diverse perennial pastures key to maintaining organic matter, soil biology & healthy soils
- For cropping/hay need to soil test & replace nutrients

Maintaining Pasture & Land Condition

Key to production & resilience is to maintain land in Good Condition, by implementing grazing practices which promote healthy, diverse pastures, dominated by desirable 3P species with high groundcover levels (>90%) all year round.

- Assess pastures & use forage budgets to adjust stock numbers according to seasonal forage availability.
- Grazing system needs strategic rest/spelling at times during growing season to allow desirable species to recover & set seed.
- Management tools fencing & water infrastructure, strategic fire management, pasture improvement on suitable land types
- Monitor Pasture & Land condition annually est photopoints & records
- Manage fragile at-risk areas & degraded sites (erosion, compaction, scalded)
- Control priority weeds & pests

Restoring Pasture & Land Condition

- We are at End of Growing Season, ideal time to assess our Pasture & Land Condition
 & see how it has recovered / coping with drought impacts.
- Help identify areas that require strategic spelling in next growing season to allow for recovery, seeding so you can plan & prepare sales, re-stocking
- May also identify where degraded pastures may benefit from planned fire to improve pasture composition eg decrease undesirable pasture species eg wiregrass & weeds & favour desirable 3Ps- Speargrass, bluegrass.
- Undertake Dry season forage budget to assess supply of useful forage in paddocks to safely carry livestock through to green date (spring/summer) & adjust stock # early.
- Consider pasture renovation/ improvement of degraded areas with suitable grass & legume species for land type – cost/benefit & special management required for establishment & maintenance.
- Plan & implement restoration works on eroded, compacted areas may involve fencing, deep ripping, adding soil conditioner & organic matter & revegetation with cover crop & perennial pasture species.

Resources

Futurebeef website - <u>www.futurebeef.com.au</u>

Long Paddock website – <u>www.longpaddock.qld.gov.au</u>

Queensland Globe – <u>www.qldglobe.information.qld.gov.au</u>

Contact DAF and your Regional NRM group regarding local grazing management initiatives, Property Management Planning & Mapping and further information.

The current Grazing best practices project in SEQ is supported by the Queensland Government through funding from Dept. of Natural Resources, Mines & Energy's Natural Resources Investment Program, and ongoing support from Qld Department of Agriculture & Fisheries.

Thankyou

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Resources - www.longpaddock.qld.gov.au -FORAGE

FORAGE REPORT: INDICATIVE LAND TYPE

http://www.iorgpaddock.gkt.gov.au/longe April 3, 3017 Lot on Plan: 67CSH715,68CSH715,71CSH715,72CSH atc. Labol: Mt.Stanlay

Queensland Government

Introduction

This report displays the most current version of the Grazing Land Management (GLM) land types for the selected Lot on Plan. The land type may is generated from a GLS shapefile which is developed based on regional ecosystems mapping and GLM information. Most of the land types and their boundaries have not been validated with field observations. Therefore, the land type map is only indicative and can be used to understand what land types are expected on the area selected. The approximate land type area (hectares) and their percentage of the total area are summarised on the second page.



FORAGE REPORT: RAINFALL AND PASTURE

http://www.iongpaddock.gkt.gov.au/longe April 3, 2017 Lot on Plan: 67CSH715,68CSH715,71CSH715,72CSH etc. Label: Mt Stario



Introduction

This Pasture and Rainfall Report is for the location indicated by the red crossbair symbol on the map below. This report includes a rainfall and pasture growth summary, and graphs showing historical time series for. 1) monthly average pasture Total Standing Dry Matter (TSDM); 2) monthly average ground cover, 3) annual rainfall (April to March) and 4) annual pasture growth (April to March). Pasture TSDM, cover and growth are simulated using the CRASP/AussieGRASS model; accuracy may be limited by available stock number and climate data.





Limitation of liability: the State of Queensland, as represented by the Department of Science, Information Technology and Innovation (DSITI) gives

Resources - www.longpaddock.qld.gov.au -FORAGE

FORAGE REPORT: GROUND COVER

http://www.longpaddlock.pht.gov.au/longpo April 5, 2017 Lot on Plan: 67CSH715,68CSH715,71CSH715,72CSH etc. Labor Mt.Stanlog

Queensland

Introduction

Percentage out of the total area

0.0

0.0

This report presents three ground cover information products: (i) a ground cover map for the chosen season; (ii) a minimum ground cover map for the period 1966 to 2013, and, (iii) a graph showing the historical time series of susannal ground cover. The maps and historical time series graph are generated from the ground cover products which are produced by the Queensland Government's Remote Sensing Centre using Landau satellite image data from the United States Geological Survey.

ŧ	Background information of the Lot	on Plan	Location map
	Latitude/longitude: -26.66/152.18 Total land area : 2245 ha	Local government: Somerset Regional Average woody vegetation cover: 21.6%	
	Long-term annual mean temperature : 19.5 $^{\rm o}{\rm C}$ Last 12-month rainfall : 699.3 mm	Long-term annual mean rainfall : 825.1 mm Last month rainfall: 232.9 mm	

Ground cover map (The image is for the period from December 2016 to February 2017)



1.1

98.9

FORAGE REPORT: REGIONAL CLIMATE PROJECTIONS



Introduction

This report is for the location indicated by the red crossbair symbol on the map below. The report present istication indicated constraint of the sectors of COS and the constraint of the const

The monthly median values for the historical climate (1960-2015) and climate projections for 2030, 2050 and 2070 are presented in the bar-dot graphs (below) which indicate the seasonal patterns of historical climate and projected climate under the different global warming rates and scenarios in 2030, 2050 and 2070.

The results for annual projections as shown by the projected annual climate range plots (next page) indicate a range of possibilities of projected temperature, rainfall and other parameters under the different global warning rates and scenarios. For more information, see https://www.enegopadokc.du/guevaa/climateprojections/guide.html.

Climate Variable (Median Annual)	Historical 1960-2010	Projection 2030	Projection 2050	Projection 2070
Rainfall (mm)	768.7	767.2	761.5	754.2
Evaporation (mm)	1667.2	1734.8	1776.6	1816.0
Mean Temperature (°C)	19.5	20.5	21.0	21.5
Maximum Temperature (°C)	26.2	27.1	27.7	28.2
Minimum Temperature (°C)	12.8	13.7	14.3	14.8
Average Vapour Pressure (kPa)	16.6	17.6	18.2	18.7



Historical and projected monthly median climate

