

Cover Management for Improved Infiltration

Whole Property Erosion Control

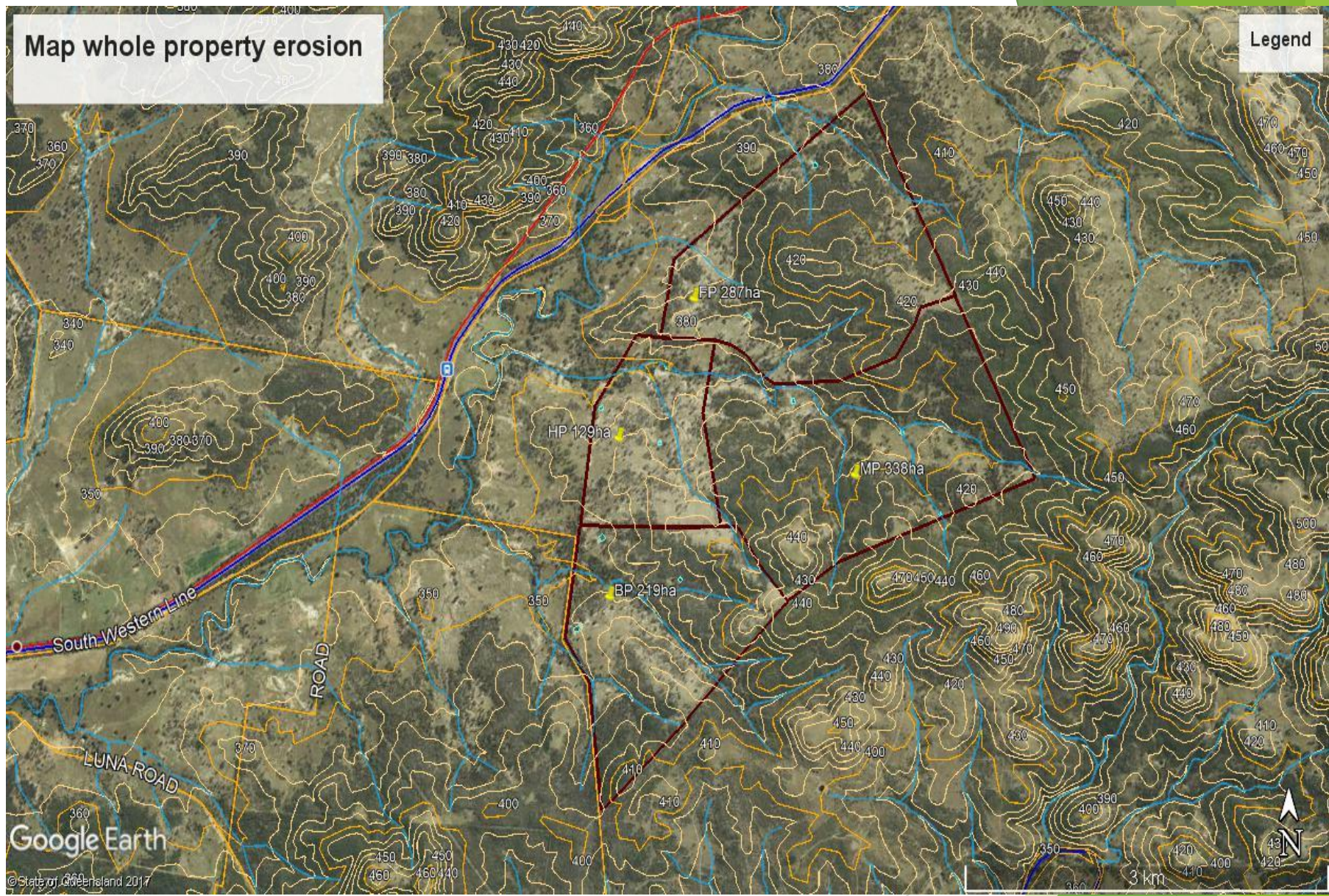


Points to Consider

- ▶ Topography
- ▶ *Land/soil types*
- ▶ Enterprise mix
- ▶ Management style - intensive, extensive
- ▶ *Logistics, access, infrastructure*
- ▶ *Timber status, cleared, open, regrowth, shade lines, clearing strategy/restrictions*
- ▶ Long term business plan

Map whole property erosion

Legend



Google Earth

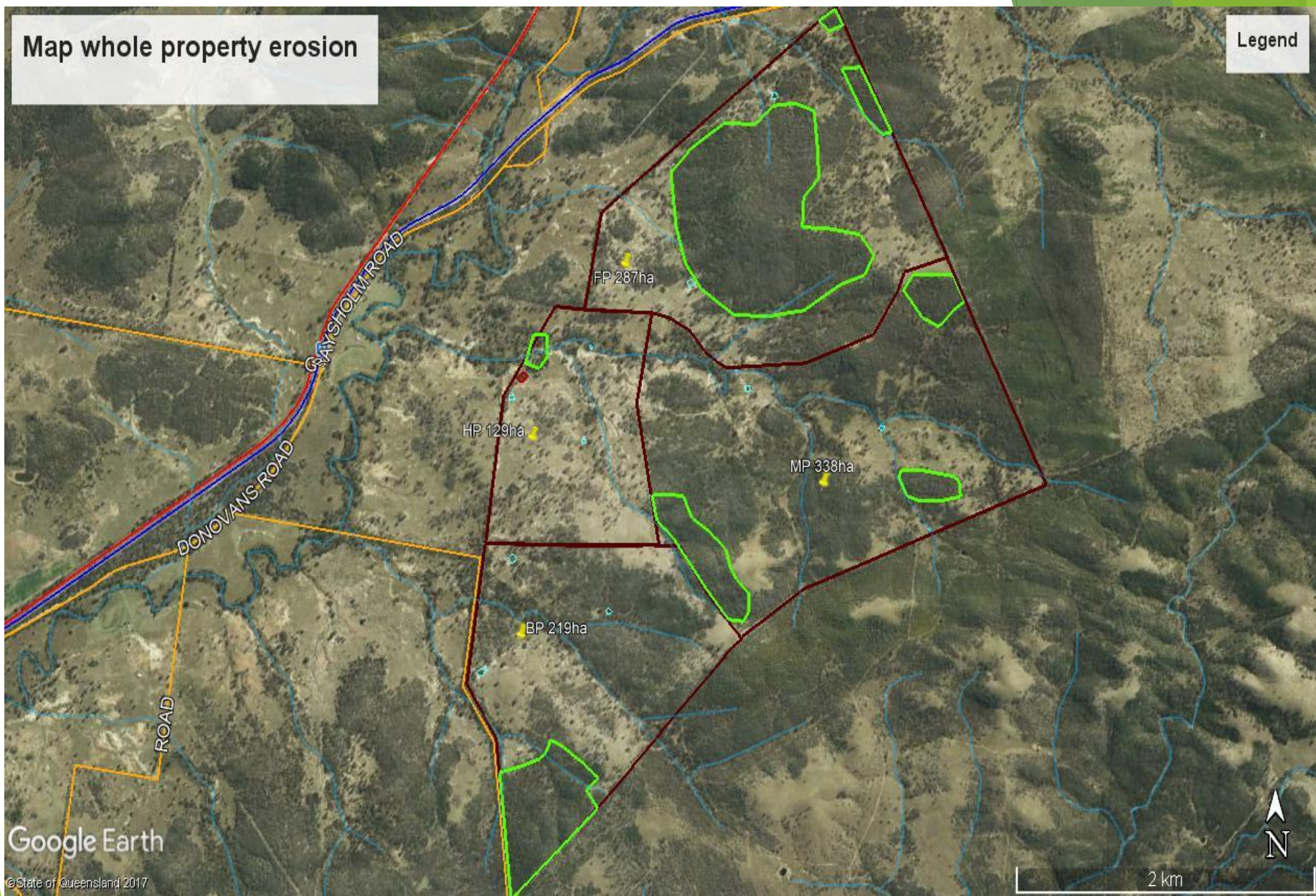
© State of Queensland 2017

43
N

3 km

Map whole property erosion

Legend



Google Earth

©State of Queensland 2017

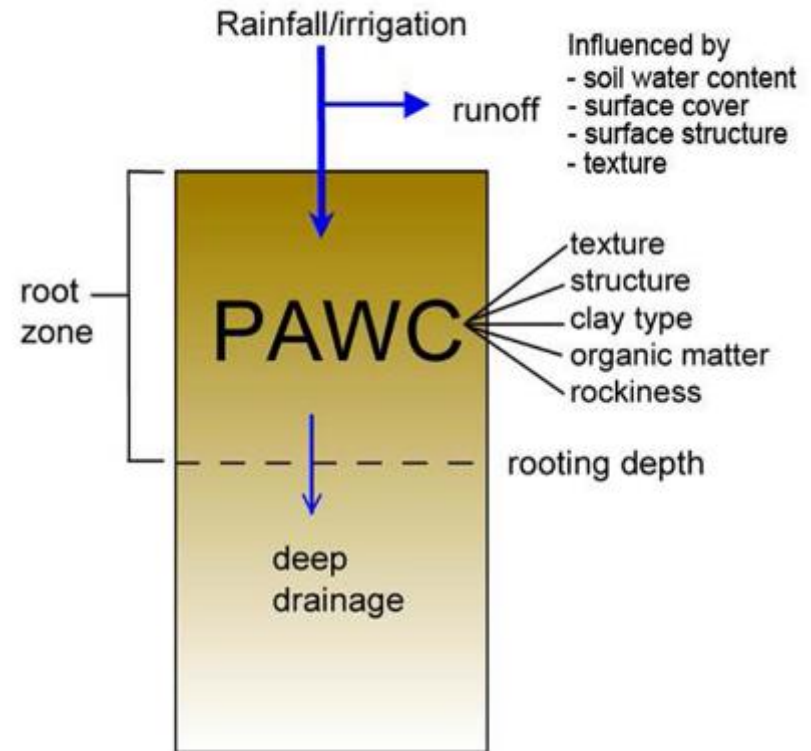
2 km

Soils

Water response

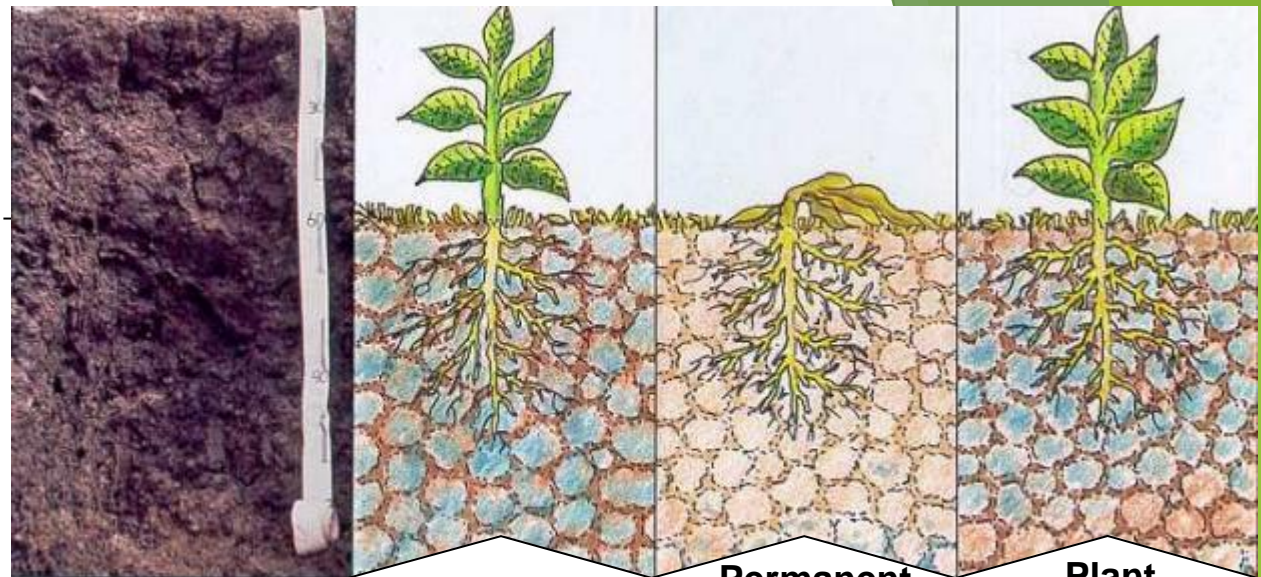
The ability of the soil to hold water for optimum plant growth

PAWC – Plant Availability Water Holding Capacity



PAWC for different soils

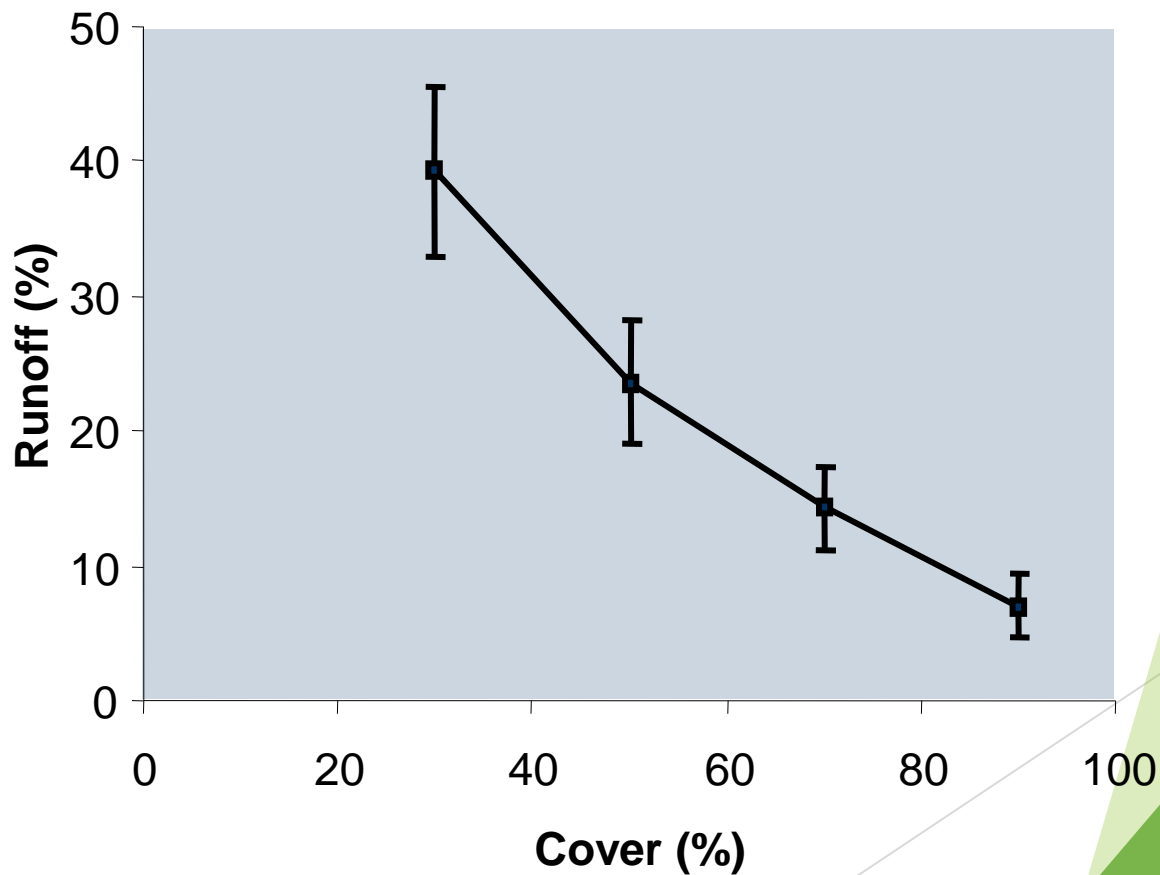
Ability of different soils to store plant available water (mm water to one metre of depth)



Soil texture	Field capacity	Permanent wilting point	Plant available water content
Well-structured clay	500	300	200
Clay	380	240	140
Loam	340	120	220
Sandy loam	230	90	140
Sand	90	20	70

Ground cover & water run off.

Loss of perennial grass cover disrupts water cycle



100% ground cover.



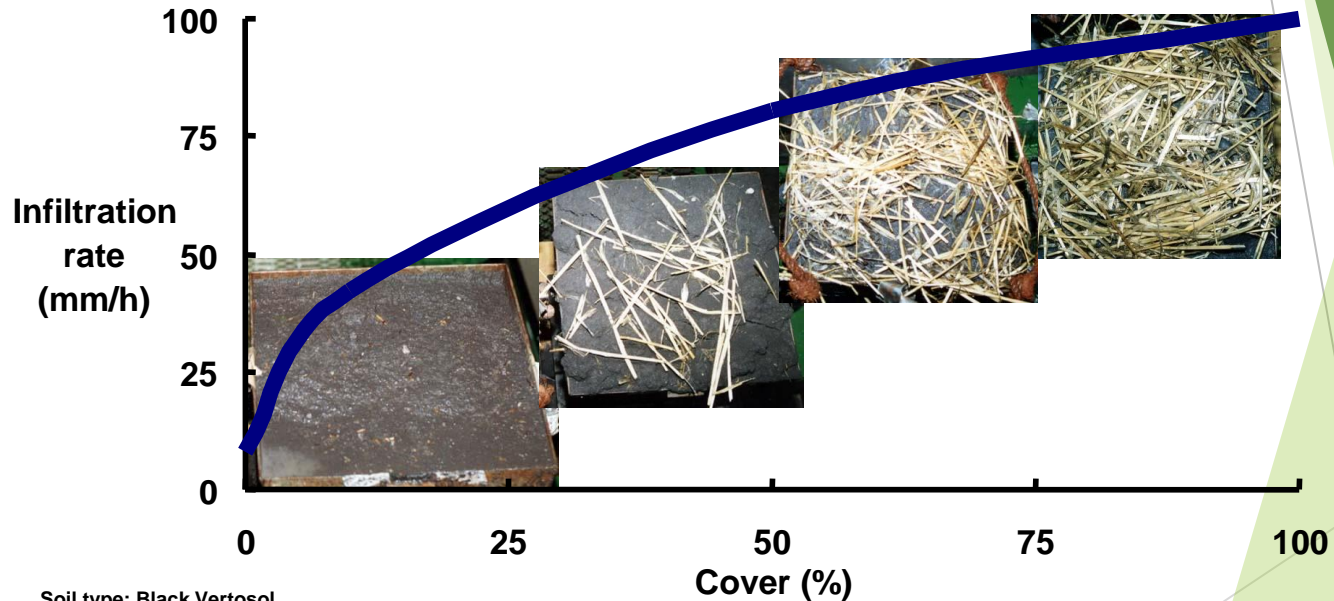
Approximately 50% cover.



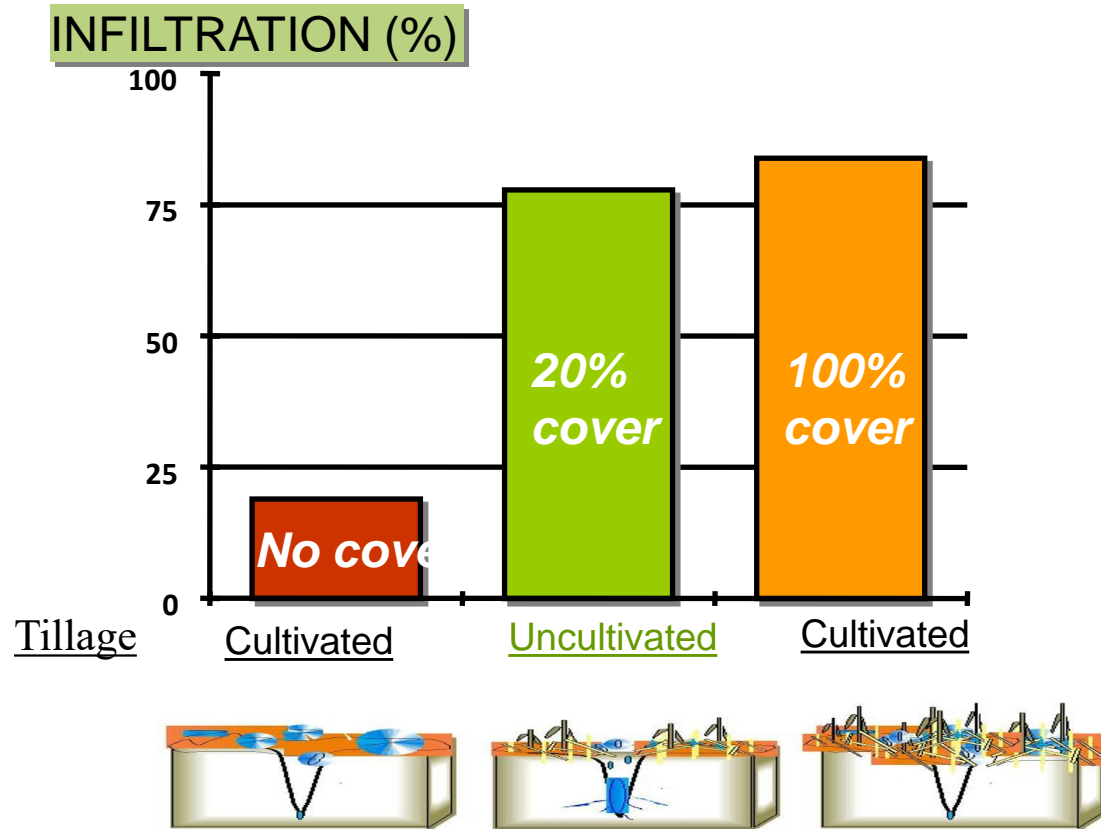
Less than 30% cover.



Cover increases infiltration by reducing crusting

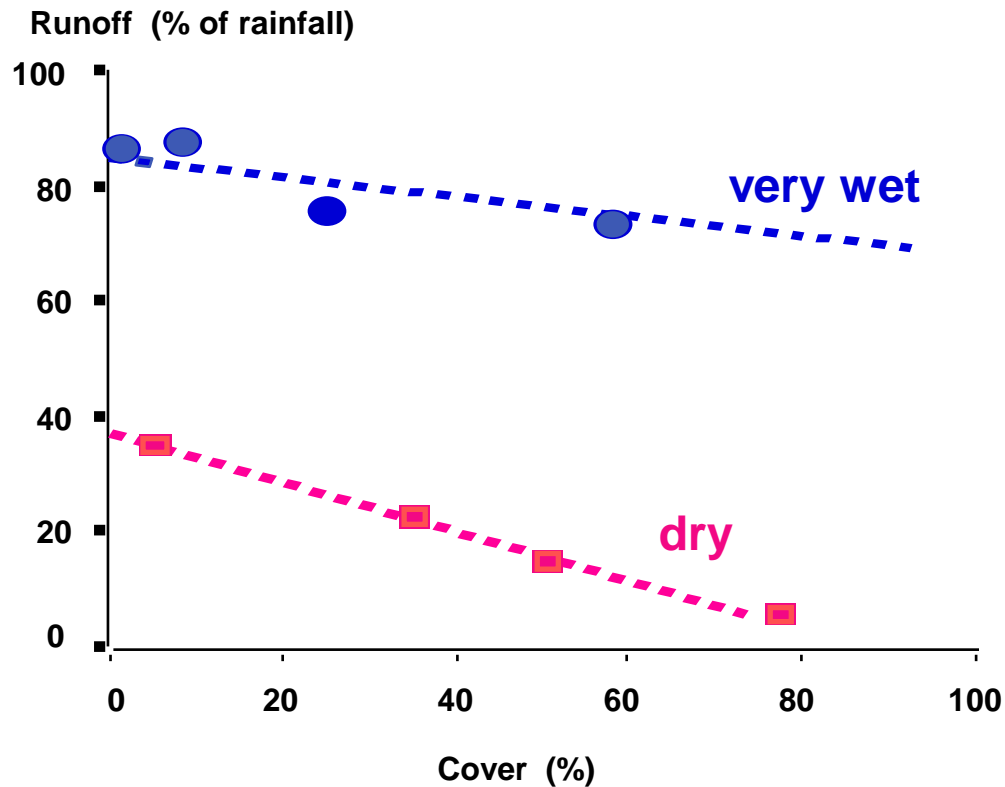


Soil type: Black Vertosol
Location: Taylors, Jimbour
Lab Infiltration after 50 mm
Rainfall rate = 100 mm/h

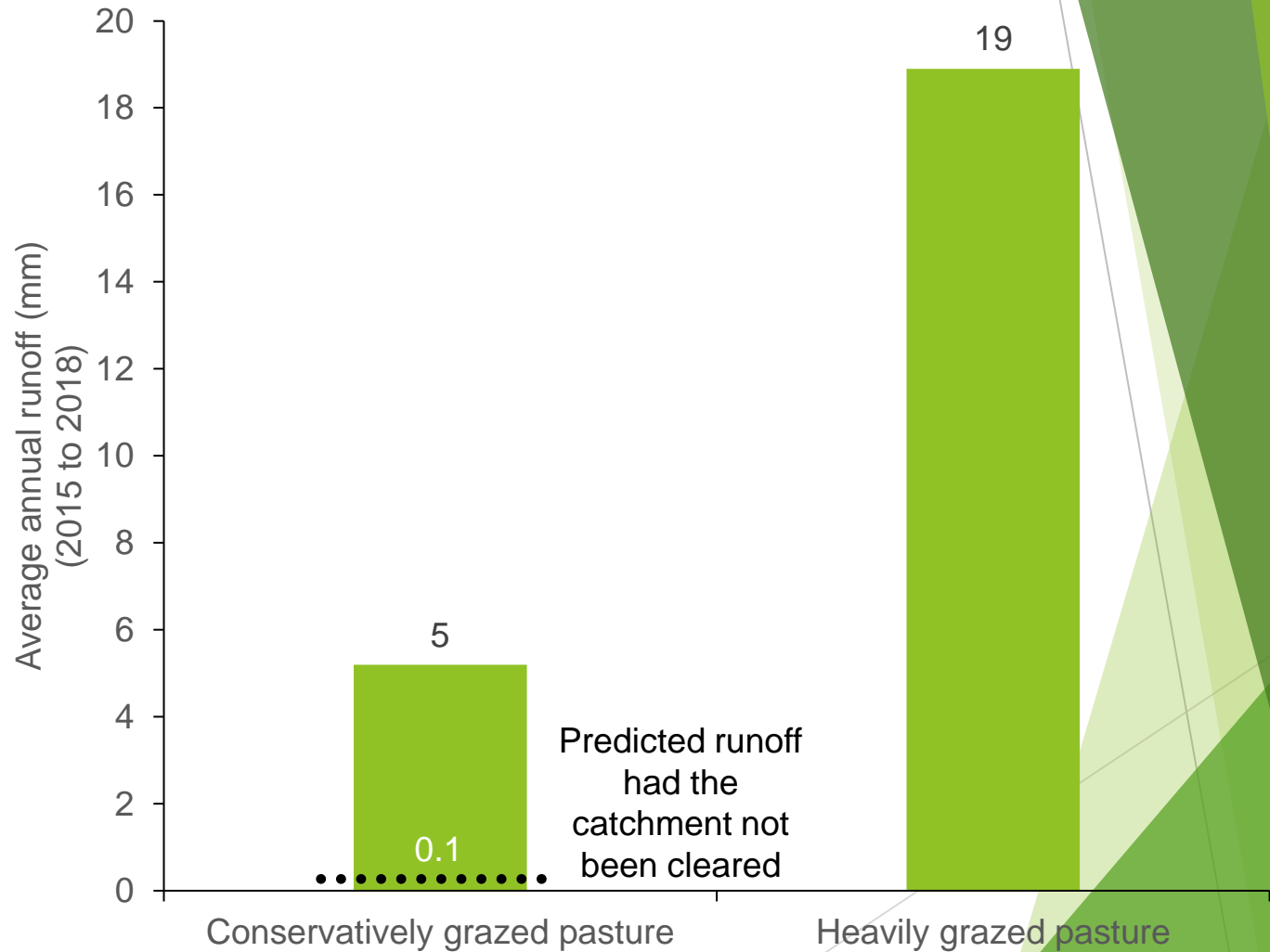


Simulated rainfall (40 mm at 100 mm/hour) on a brown clay -Wallumbilla

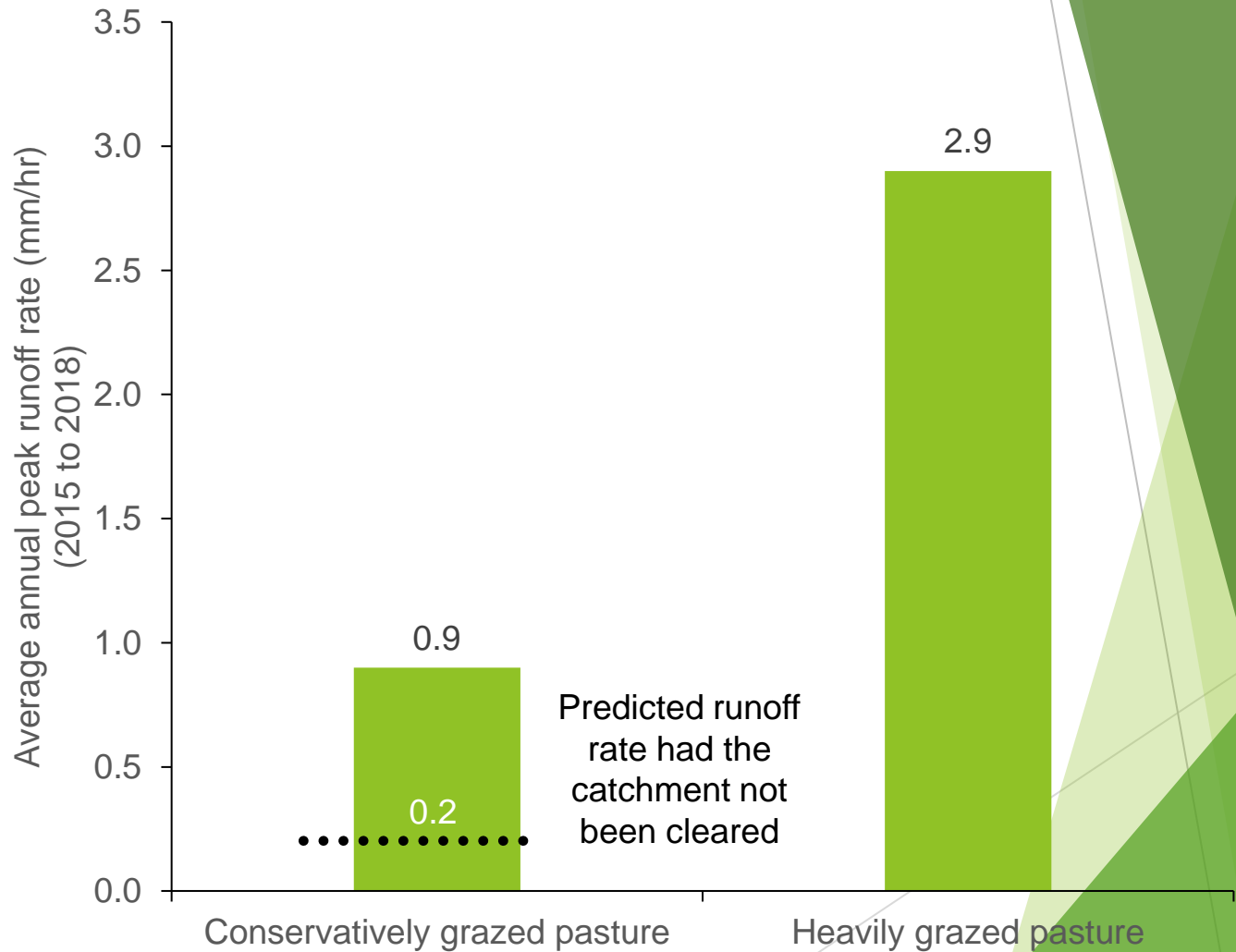
Effect of cover and soil moisture on runoff

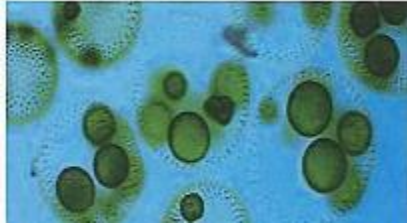


Overgrazing increases runoff



Overgrazing increases peak runoff rate

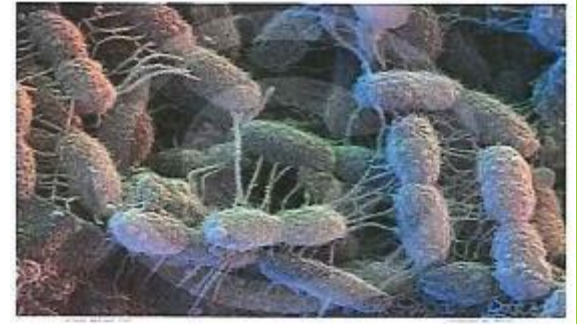




algae



bacteria



fungi



protozoa



mesofauna

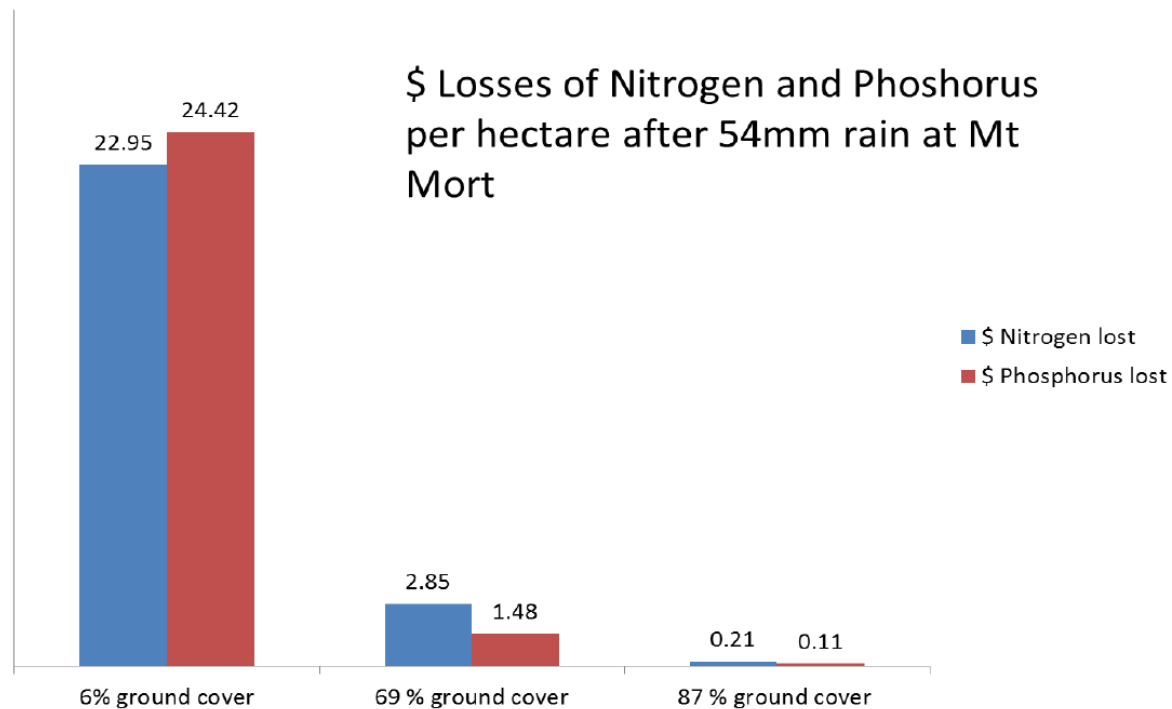


What does this mean for Production

Ground Cover

More ground cover less loss of soil and nutrients.

Ground cover



Water use Efficiency of Unfertilised Naturalised Pasture

Rhodes grass and Buffel from approx. 100 sites in QLD (Day et al 1997) ranged from 2 to 10 KG/ha/mm. Average 4kg/ha/mm.

1 In 5 Year storm event, 1 hr long. 50 mm per hour at Emerald. Rolling landscape slopes between 2 and 10 %. Run off from pasture:

Bare soil run off = 50 to 60%. Lost moisture 30mm

90%+ cover Run off = 5 to 10 %. Lost moisture 5mm
Difference 25mm = 100kg/ha. 10kg/hd/day, 10 days feed per hectare.

Over 50ha paddock = 500 days feed for one beast.

Over annual rainfall of around 600mm = loss of around 1,200kg/ha/year

- increase of 1% of carbon in top 30cm soil = an extra 144,000 litres of water/ha

(Comparing the water use efficiency of tropical pasture grasses and legumes

used in Queensland's mixed farming systems, Owens, Bell et al.)

Infrastructure.

- ▶ Fence lines, Tracks, Fire break, placement.
- ▶ On ridge lines, toe slopes, flats and on the contour.





© 2015 Google
Image © 2015 DigitalGlobe

Google earth

Imagery Date: 8/24/2010 29°51'28.17" S 150°47'34.96" E elev: 276 m eye alt: 965 m



Timber Management.

- ▶ Stick rake lines and shade lines
- ▶ On the contour



Basic Principles

- ▶ Managing ground cover
 - ▶ Grazing management
 - ▶ Grazing distribution, fencing and facilities
 - ▶ Animal behaviour
 - ▶ How animals move/graze in a paddock, cattle pads, waterpoints and distribution
- ▶ Managing water run off
 - ▶ Ground cover/management
 - ▶ Placement of infrastructure
 - ▶ Structures/physical intervention

Questions



Acknowledgements: Damien O'Sullivan, Ann Mckenzie, Sue Burt, DAF, CSIRO