Land capability assessment, mapping and planning

Land capability and decision making

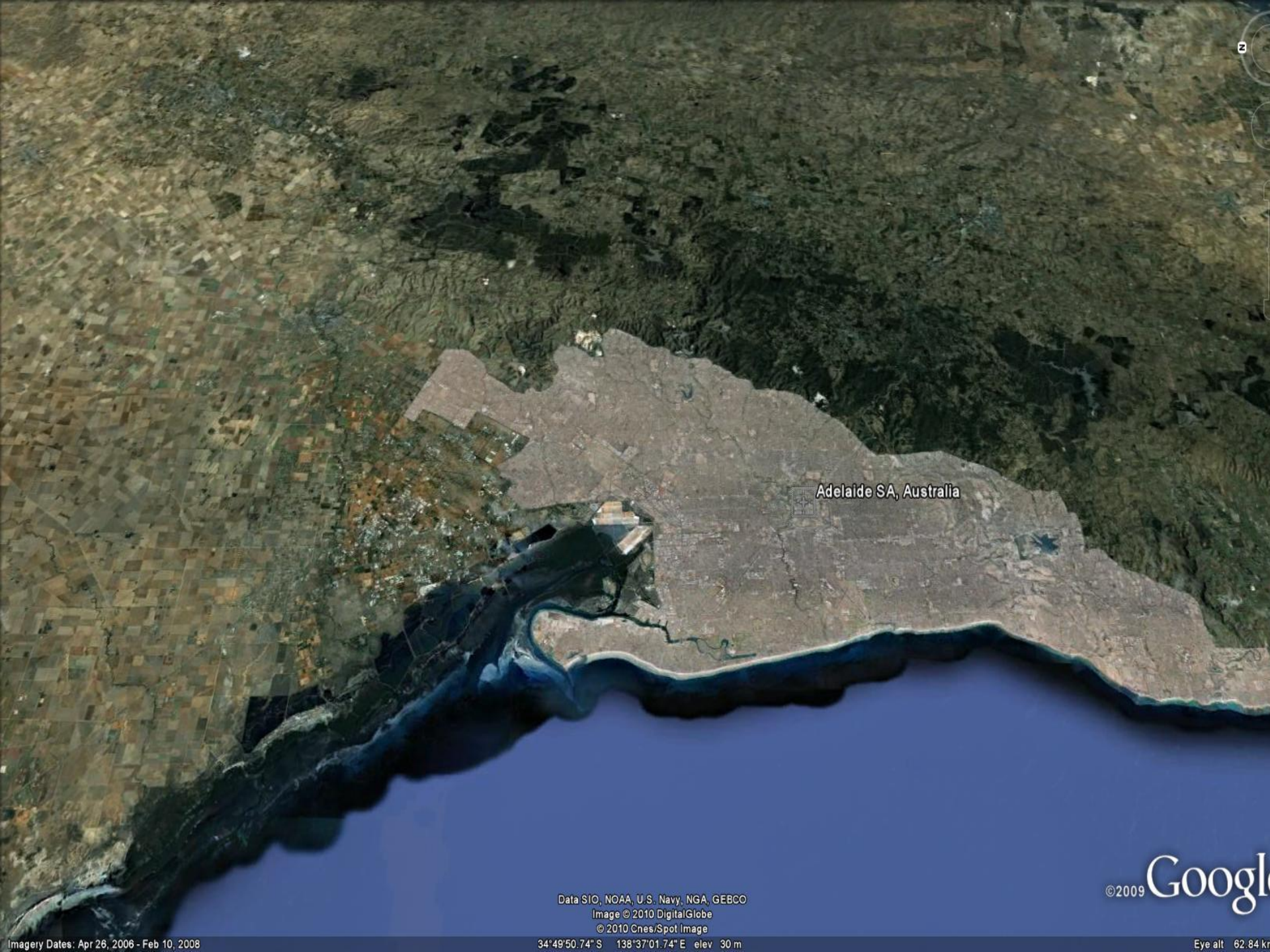
- Personal aims – scale, species, place, lifestyle, becoming a primary producer?
- Latitude
- Altitude
- Climate – temperatures, rainfall, frost, chill, humidity, evaporation, hail, wind

Bioregions

- Bioregions are relatively large land areas characterised by broad, landscape-scale natural features and environmental processes that influence the functions of entire ecosystems

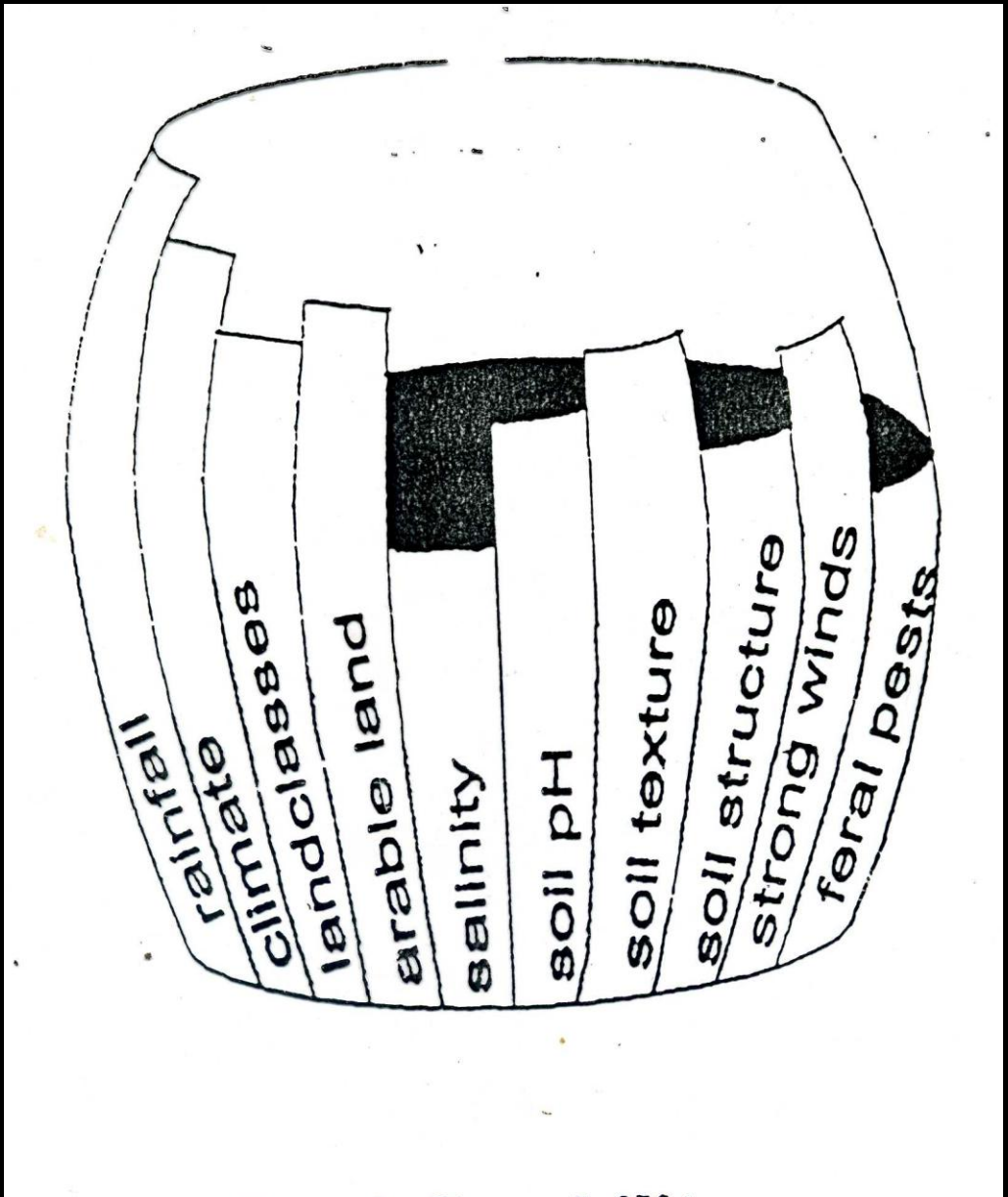
- They capture the large-scale geophysical patterns which are linked to fauna and flora assemblages and processes

- They also influence human use and culture and are sometimes used as political units

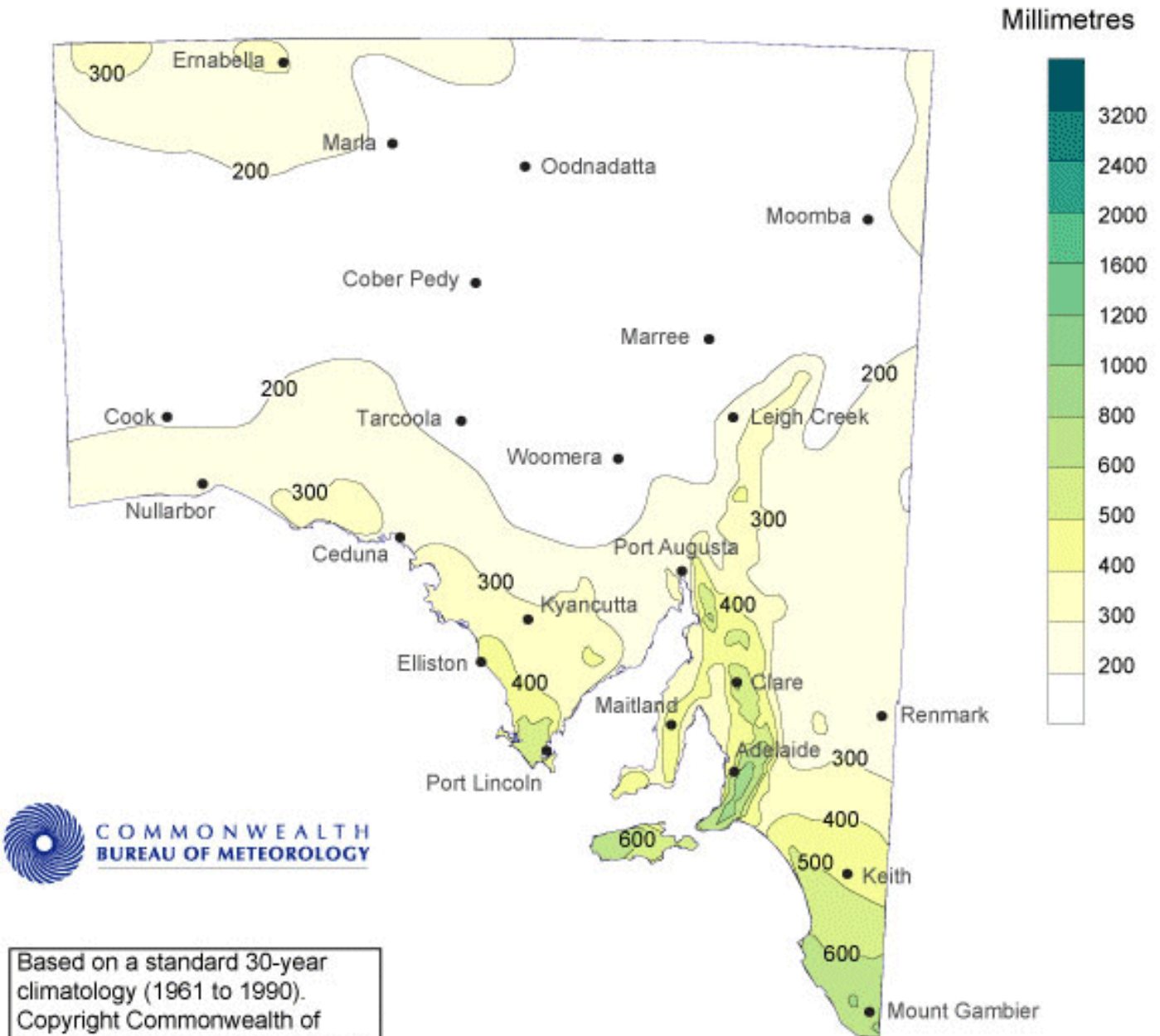

Adelaide SA, Australia
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2010 DigitalGlobe
© 2010 Cnes/Spot Image
©2009 Google
Imagery Dates: Apr 26, 2006 - Feb 10, 2008
34°49'50.74" S 138°37'01.74" E elev 30 m
Eye alt 62.84 km

My piece of land

Limiting factors



Average Rainfall - Annual

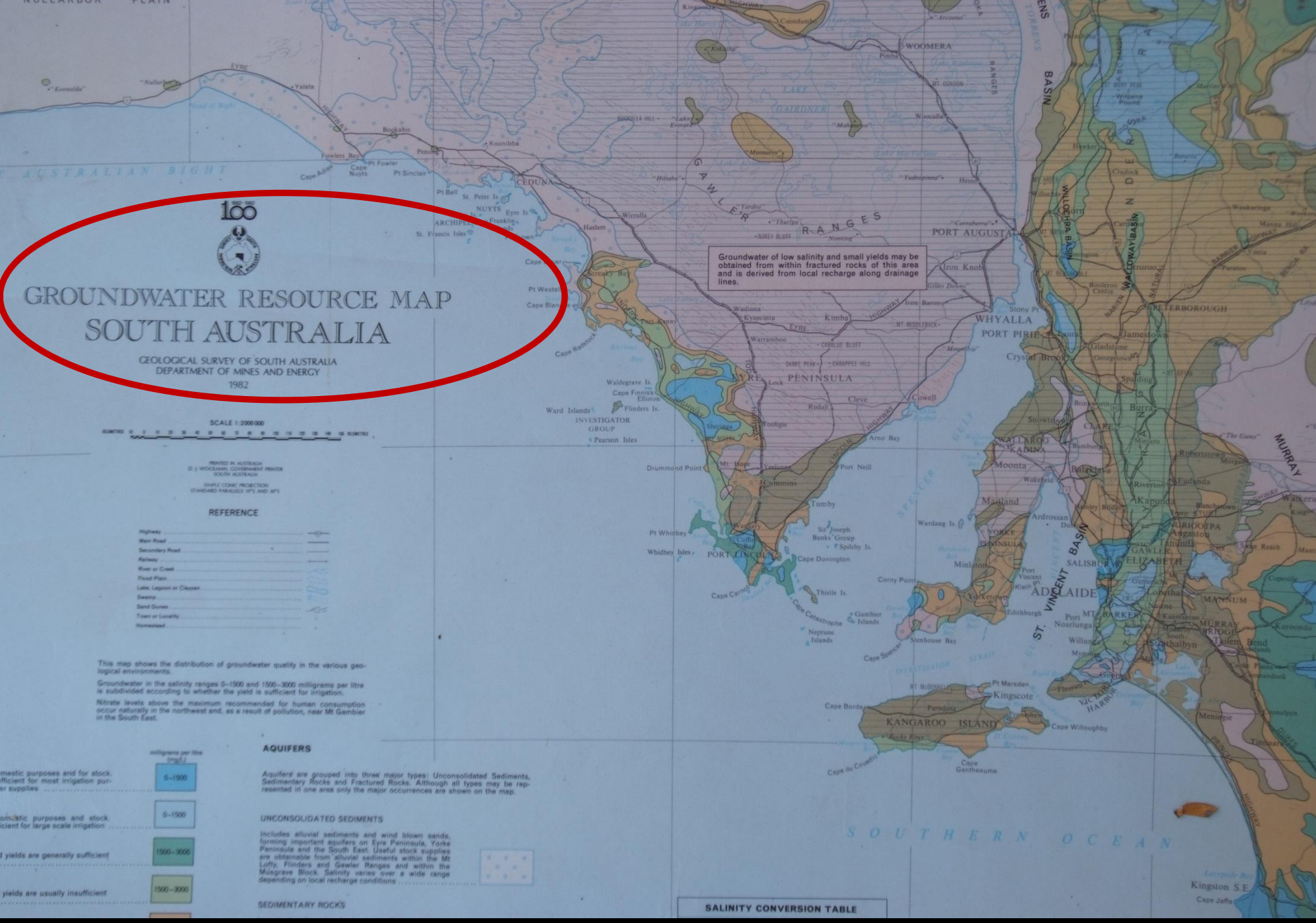


COMMONWEALTH BUREAU OF METEOROLOGY

Based on a standard 30-year climatology (1961 to 1990).

Quality is important

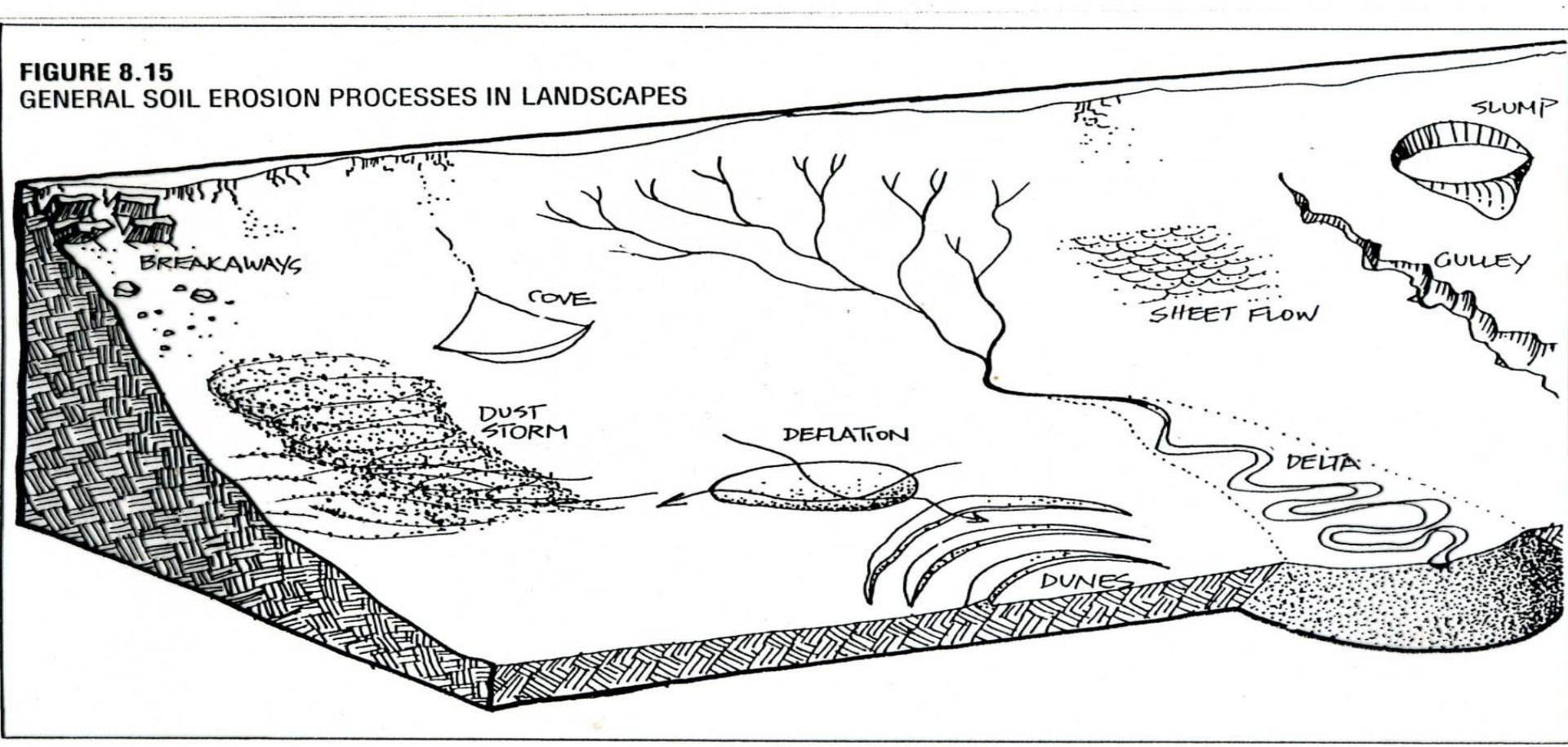
SALINITY (maximum)	VEGETABLES	TREES	ORNAMENTALS	
	Ultra Sensitive			
	(Completely intolerant of salt)			
300 mg/L		Loquat	Violets	
	Sensitive			
700 mg/L	French beans Strawberry Peas (not above 575)	Walnut	Bauhinia Gladiolus Fuchsia Camelia Azalea Begonia	Dahlia Poinsettia Aster Rose Zinnia
	Moderately Sensitive			
850 mg/L	Beans (broad & field) Celery Lettuce Potato (sweet) Radish Raspberry	Apple Apricot Almonds Lemons Orange Grapefruit Quince Peach Pear Prune, Plum	Coprosma Vinca Bougainvillaea Hibiscus Carnation	
	Moderately Resistant			
1300 mg/L	Onions Broccoli Cantaloup Cauliflower Cereals Carrot (after 3-4 fern leaves) Gherkins Cucumber Potatoes (must have good drainage) Sweet corn	Grape vines Fig Olive Pomegranate	Chrysanthemum Stock Oleander	
	Resistant			
1700 mg/L	Artichoke Tomato (furrow irrigated)			
	Highly Tolerant			
2100 mg/L	Asparagus Beetroot Cabbage Spinach			


GROUNDWATER RESOURCE MAP
SOUTH AUSTRALIA
GEOLOGICAL SURVEY OF SOUTH AUSTRALIA
DEPARTMENT OF MINES AND ENERGY
1982
Groundwater of low salinity and small yields may be obtained from within fractured rocks of this area and is derived from local recharge along drainage lines.
SCALE 1:2000000
REFERENCE
This map shows the distribution of groundwater quality in the various geological environments.
Groundwater in the salinity ranges 0–1500 and 1500–3000 milligrams per litre is subdivided according to whether the yield is sufficient for irrigation.
Nitrate levels above the maximum recommended for human consumption occur naturally in the northwest and, as a result of pollution, near Mt Gambier in the South East.
AQUIFERS
Aquifers are grouped into three major types: Unconsolidated Sediments, Sedimentary Rocks and Fractured Rocks. Although all types may be represented in one area only the major occurrences are shown on the map.
UNCONSOLIDATED SEDIMENTS
Includes alluvial sediments and wind blown sands, forming important aquifers on Eyre Peninsula, Yorke Peninsula and the South East. Useful stock supplies are obtainable from alluvial sediments within the Mt Lofty, Flinders and Gawler Ranges and within the Musgrave Block. Salinity varies over a wide range depending on local recharge conditions
SEDIMENTARY ROCKS
SALINITY CONVERSION TABLE
EYRE PENINSULA
YORKE PENINSULA
GAWLER RANGES
ADELAIDE
PORT AUGUSTA
WHYALLA
PORT PIRIE
PORT LINCOLN
WOOMERA
CEDUNA
KANGAROO ISLAND
SOUTHERN OCEAN
AUSTRALIAN BIGHT
ST. VINCENT BASIN
MURRAY BASIN

SALINITY

	milligrams per litre (mg/L)
Suitable for general domestic purposes and for stock. Yields are generally sufficient for most irrigation purposes and for town water supplies	0–1500
Suitable for general domestic purposes and stock. Yields are usually insufficient for large scale irrigation	0–1500
Suitable for all stock and yields are generally sufficient for pasture irrigation	1500–3000
Suitable for all stock but yields are usually insufficient for large scale irrigation	1500–3000
Stock water, suitable for cows, horses, sheep and cattle	3000–7000

Soil and slope



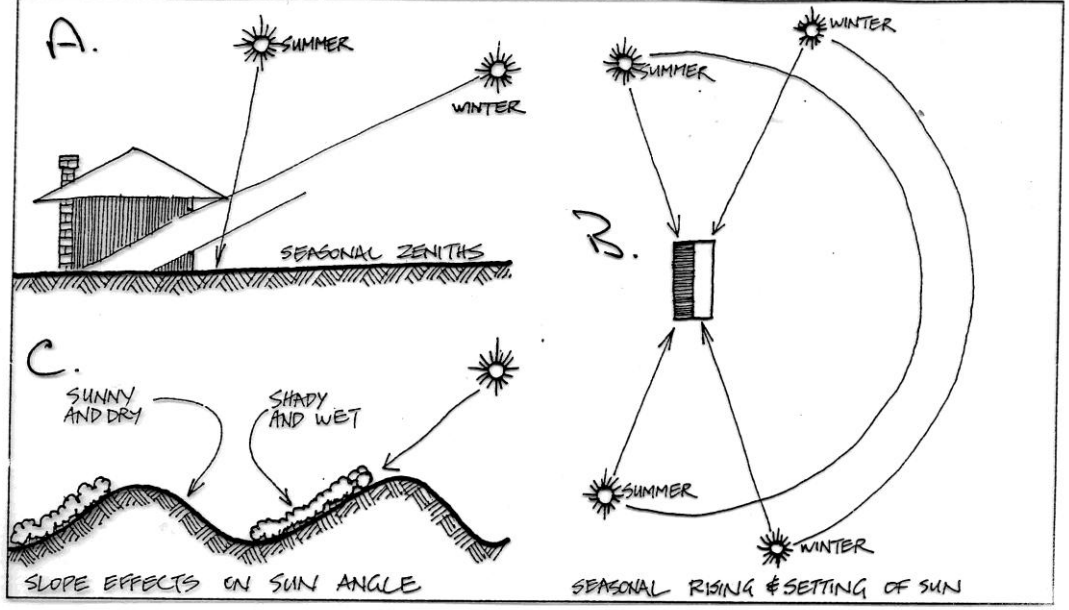


FIGURE 2.1 Sun direction and its seasonal height affect house design and plant communities.

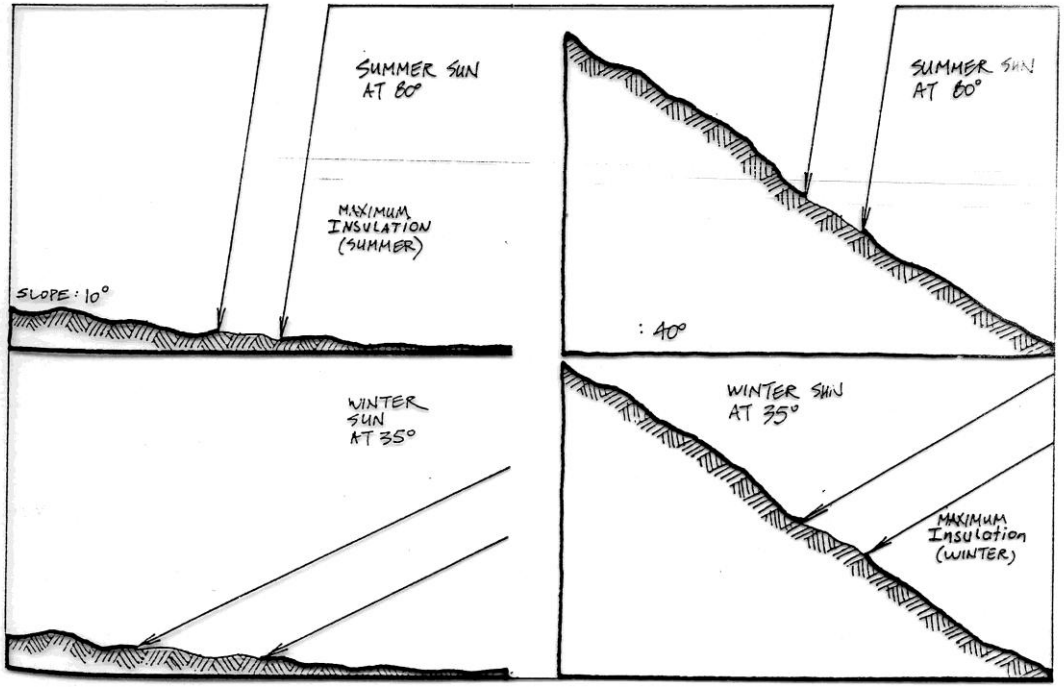


FIGURE 2.2 How slope affects the amount of direct solar radiation received at different seasons.

Topography
Aspect
Microclimates

Land Classes

Land capability refers to the ability of land to support a type of land use without causing damage. It considers:

- requirements of the land use, e.g. rooting depth or soil water availability
- risks of degradation associated with the land use, e.g. phosphorus export hazard or wind erosion.

Five land capability classes (UN)

Capability class	General description	
1 Very high	Very few physical limitations present and easily overcome. Risk of land degradation is negligible[18].	Flat, good soil
2 High	Minor physical limitations affecting either productive land use and/or risk of degradation. Limitations overcome by careful planning.	Undulating
3 Fair	Moderate physical limitations significantly affecting productive land use and/or risk of degradation. Careful planning and conservation measures required[19].	Some salinity
4 Low	High degree of physical limitation not easily overcome by standard development techniques and/or resulting in high risk of degradation. Extensive conservation measures and careful ongoing management required.	Sand dune
5 Very low	Severe limitations. Use is usually prohibitive in terms of development costs or the associated risk of degradation.	Cliff

SA's 8 land classes

Category	Land Capability	Options	Management
I	very high	many	**Arable:** No special requirements.
II			**Arable:** Simple practices required. eg contour working, strip cropping, reduced tillage, liming
III			**Arable:** Intensive practices required. eg contour banks and waterways, stone-picking, drainage, grade furrows, salt-tolerant crops & pastures
IV	↓	↓	**Semi-arable:** Occassional cropping or perennial crops. Growing annual crops to be avoided unless it is an integral part of soil conservation management (eg cereal rye on sandhills), best used for improved pastures or tree crops
V			**Non-arable:** Improved pastures or arable perennial crops. Capable for tree crops provided that appropriate erosion control practices applied
VI	↓	↓	**Non-arable:** Rough grazing only. Land not traversable with standard machinery but capable of supporting grazing of native or volunteer pastures
VII			**Non-arable:** Permanent vegetation cover essential.
VIII	very low	none	**Non-arable:**No agricultural use possible. Has neglible erosion potential (eg rock face, swamps, saltpans)

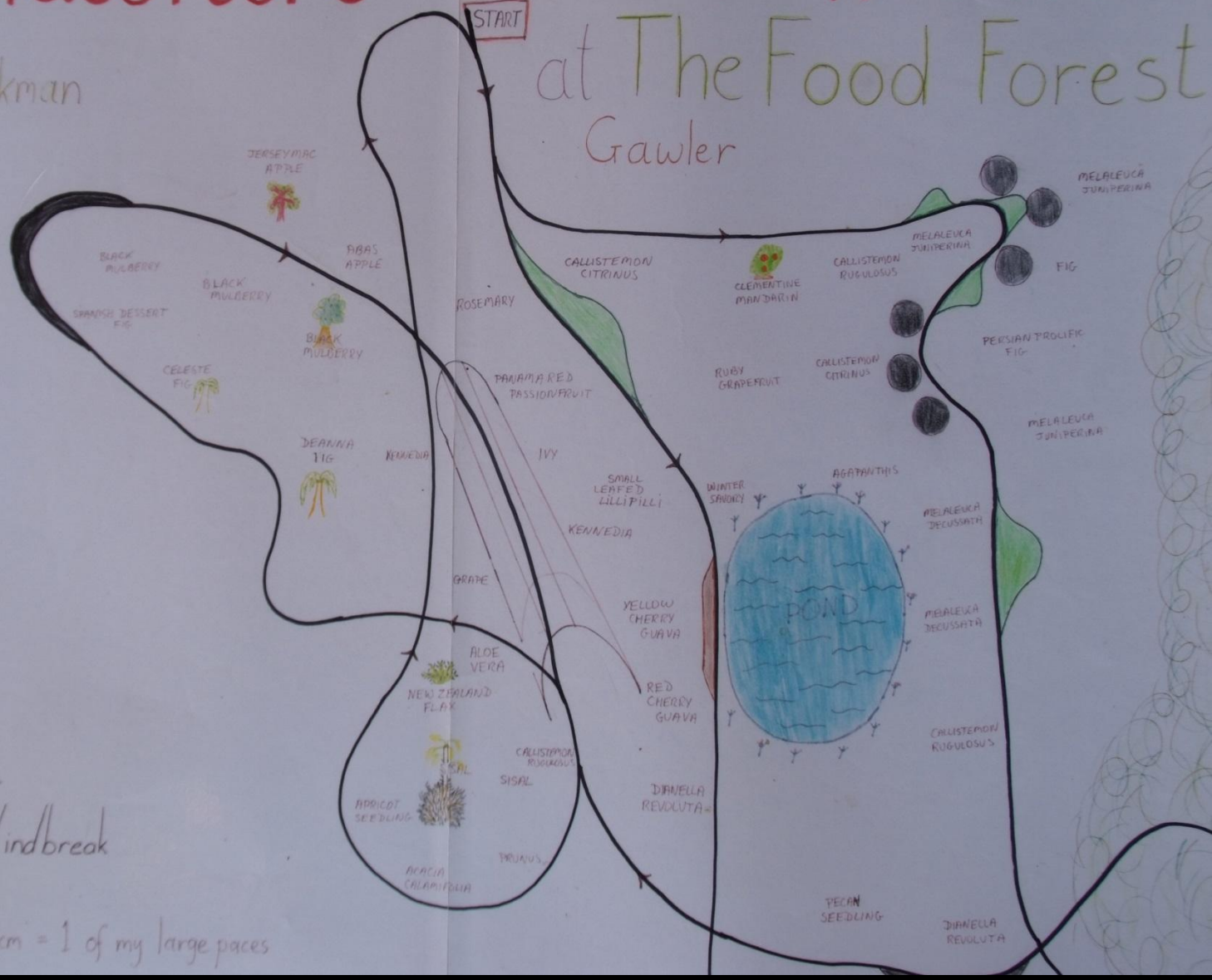
Mapping

Permaculture BMX Track

at The Food Forest Gawler

Designer: Tom Brookman

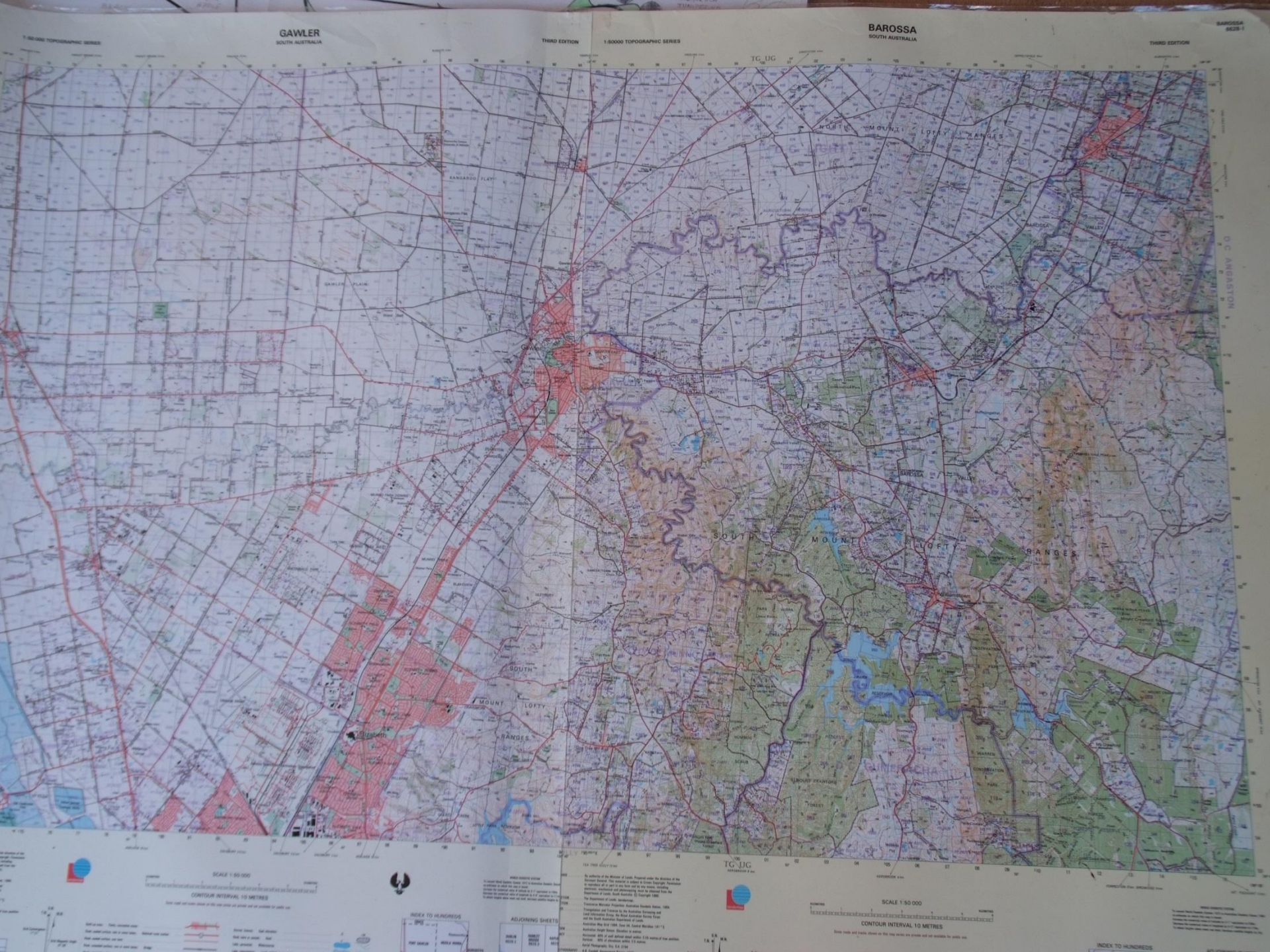
Yr 4 Trinity College



LEGEND

- Agapanthis
- Jump
- Tyre
- Bridge
- Tunnel
- Banked Corner
- Peppercorn
- Windbreak

Scale: 1cm = 1 of my large paces

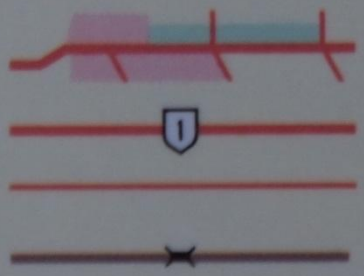

GAWLER
SOUTH AUSTRALIA
1:50 000 TOPOGRAPHIC SERIES
THIRD EDITION
BAROSSA
SOUTH AUSTRALIA
1:50000 TOPOGRAPHIC SERIES
THIRD EDITION
BAROSSA
6628-1
TG UG
NORTH MOUNT LOFTY RANGES
SOUTH MOUNT LOFTY RANGES
KANGAROO FLAT
GAWLER PLAIN
BAROSSA VALLEY
SCALE 1:50 000
CONTOUR INTERVAL 10 METRES
INDEX TO HUNDREDS
ADJOINING SHEETS

SCALE 1:50 000

KILOMETRES 0 1 2 3 4 5 6 KILOMETRES

CONTOUR INTERVAL 10 METRES

Some roads and tracks shown on this map series are private and not available for public use.



tion areas. .....

ore lanes; National route marker. ....

.....

more lanes; Bridge. .....

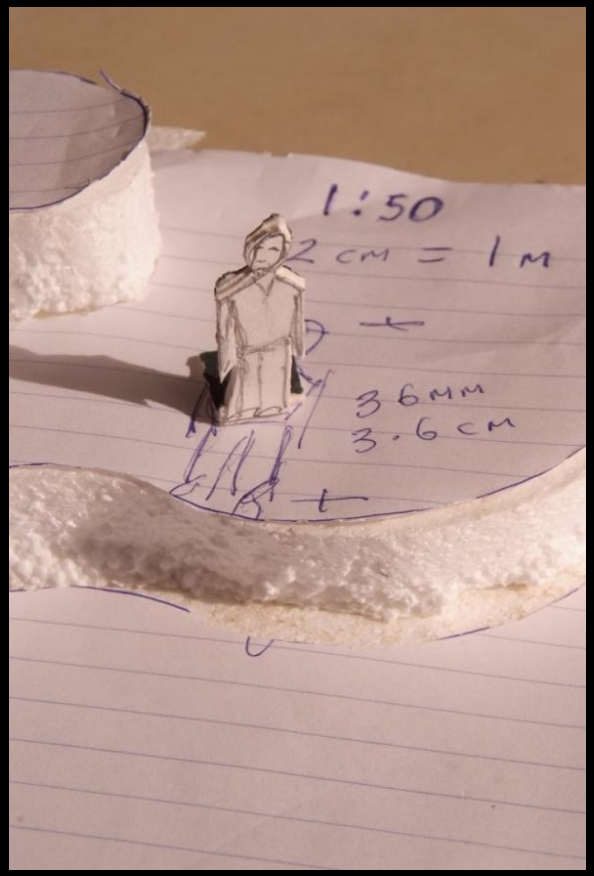
Survey beacon; Spot elevation. .....

Rock, bare or awash; Reef. .....

Lake, perennial; Watercourse. .....

Lake, intermittent; Land subject to inundation. .....

Scale



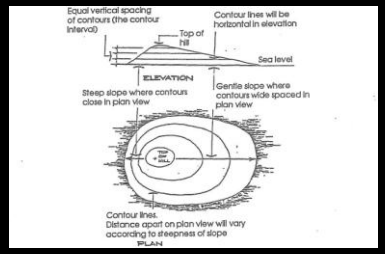
Scale 1:50 means:

1cm = 50cm (1cm x 50)

2 cm = 1m (2cm x 50= 100cm=1m)

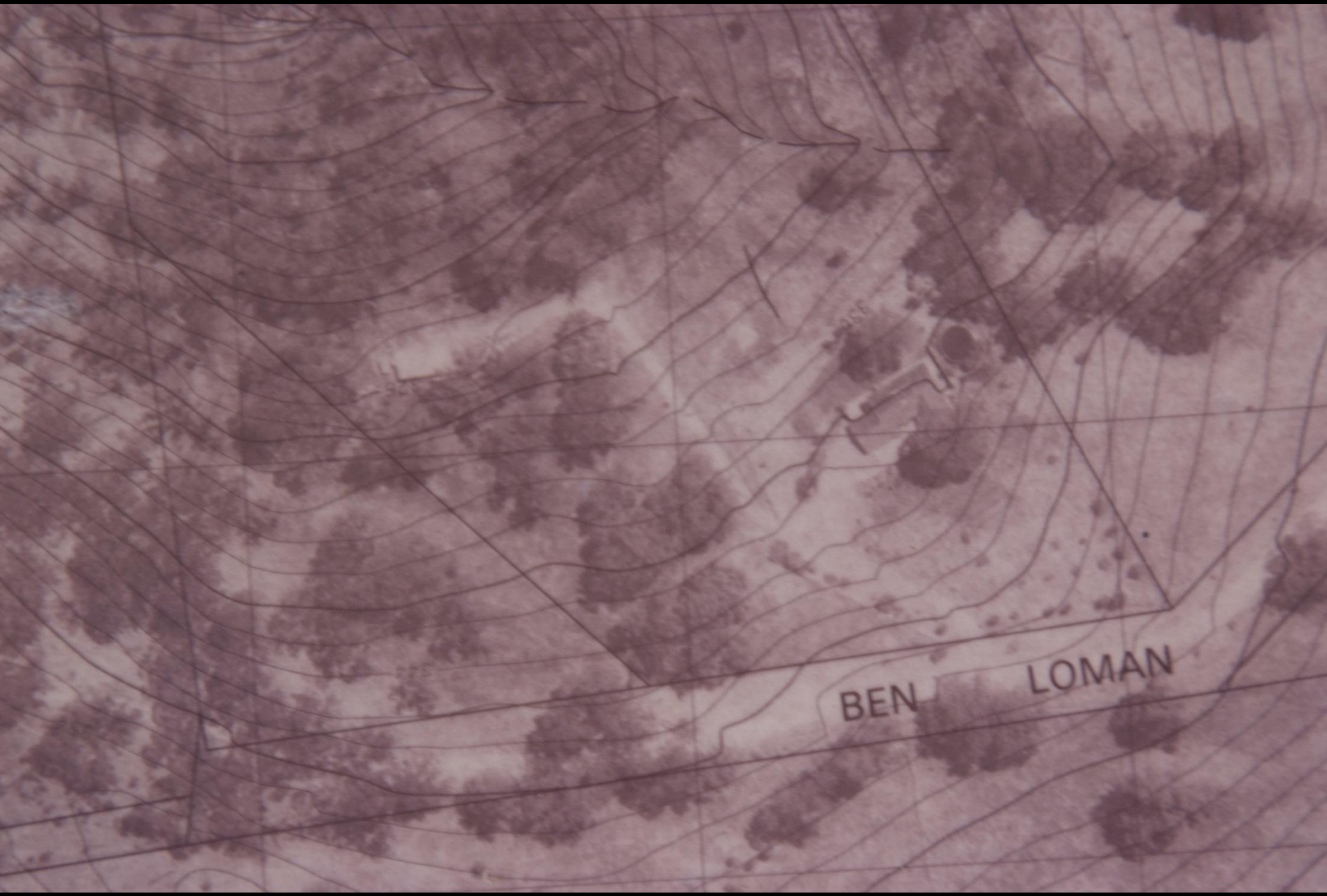
Contour lines:

- are horizontal
- measured from sea level
- are equal in vertical spacing

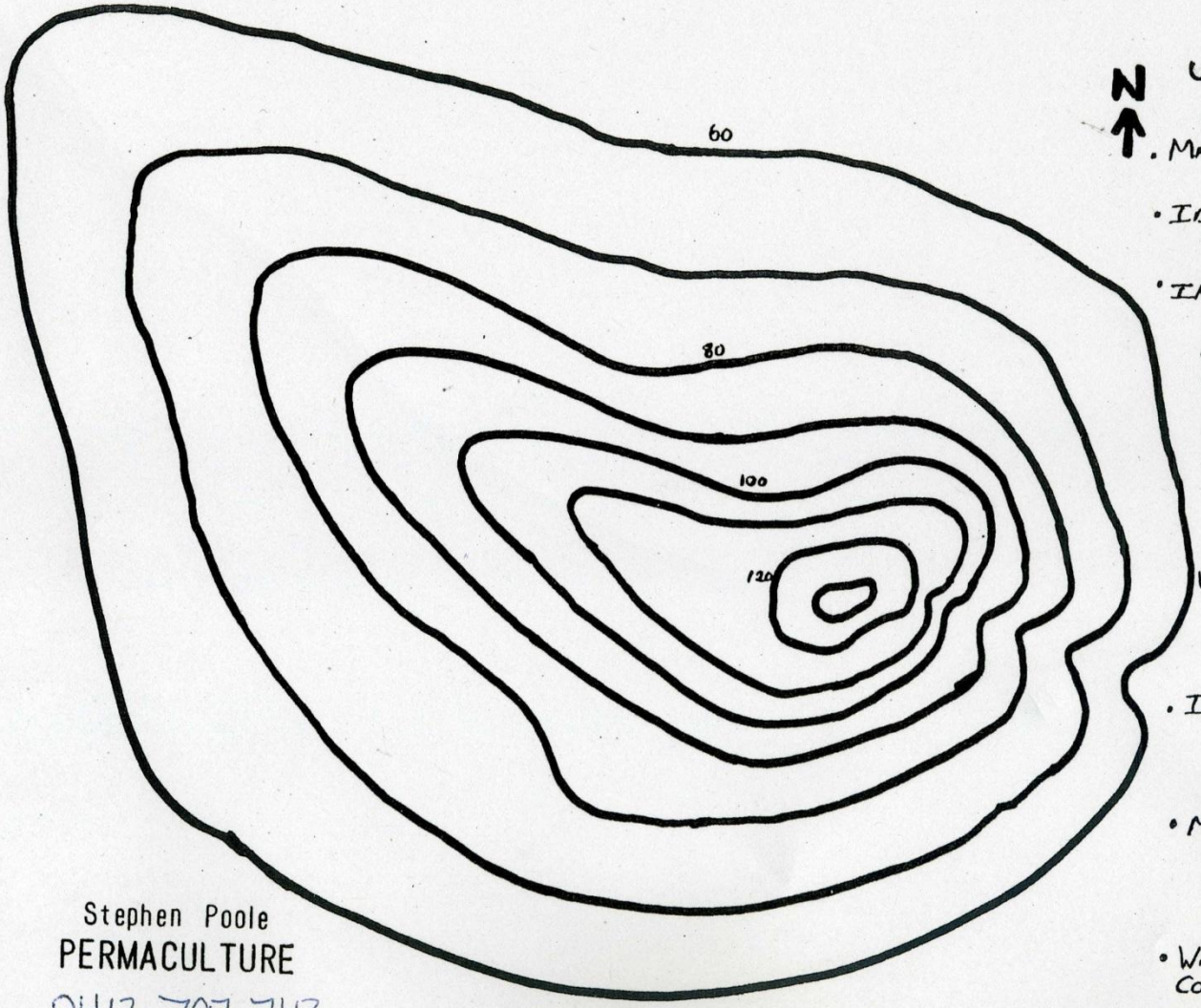



761
762
3132
3128
OF
HUNDRED
3135
TWEEDIE
TWEEDIE
GULLY
ROSS
Reserve No.1
360
3136
3182
GULLY


762
245
255
270
280
ROAD
236
245
568
267


BEN
LOMAN

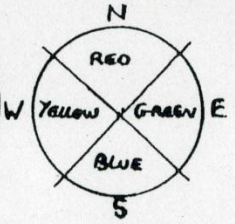
Scale 1:10,000
(1 cm = 100 m)



N

UNDERSTANDING ASPECT:

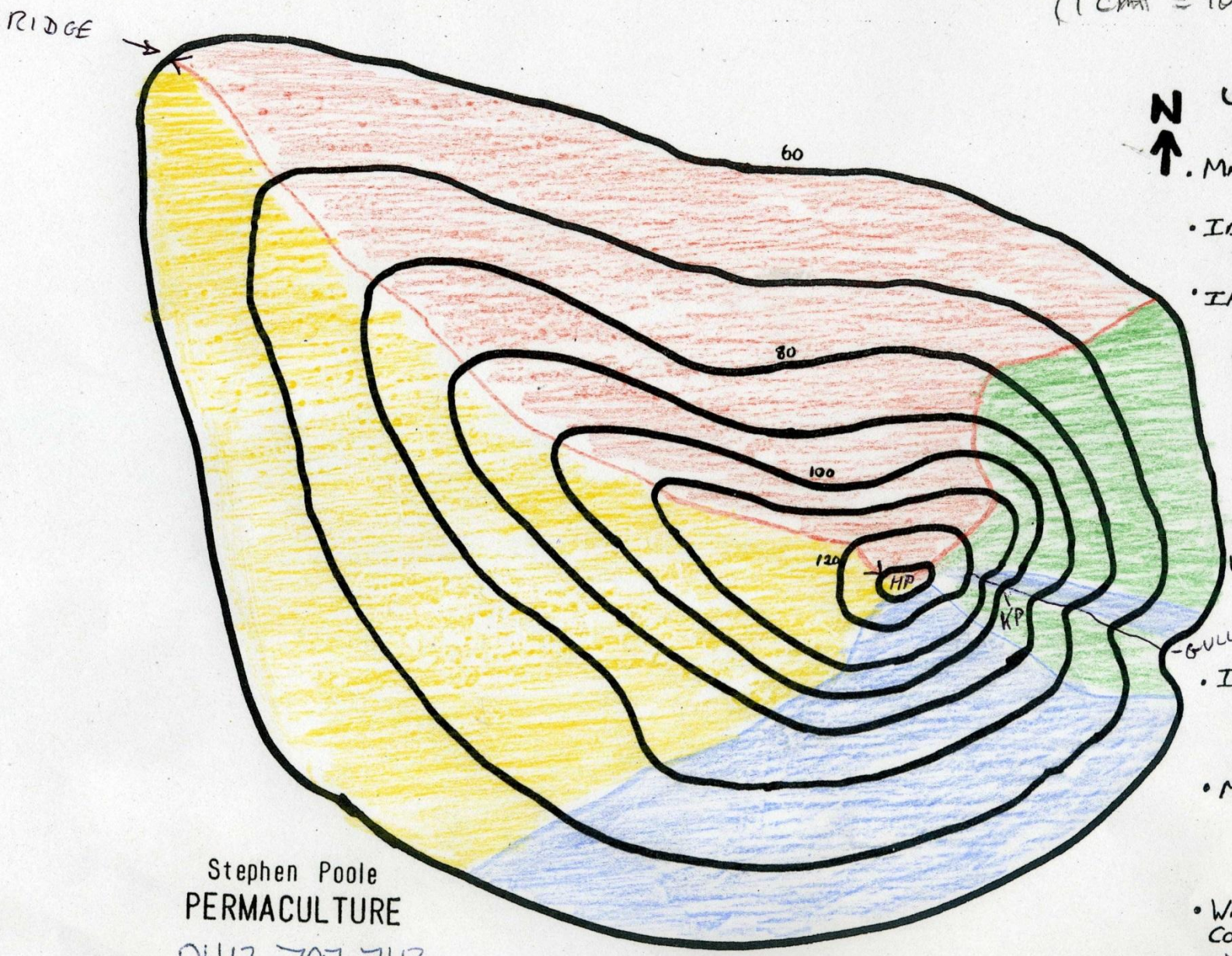
- MARK IN THE (H.P.) HIGH POINT.
- IDENTIFY THE RIDGE WITH A RED LINE.
- INDICATE THE ASPECTS OF ALL SLOPES, BY SHADING IN THE COLOUR SCHEME BELOW.



- IDENTIFY THE GULLY, WITH A BLUE LINE.
- MARK IN THE KEY POINT™ (K.P.)
- WHAT IS THE CONTOR INTERVAL ? MT.

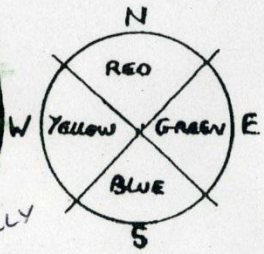
Stephen Poole
PERMACULTURE
0412 797 742

Scale 1:10,000
(1 cm = 100 m)



UNDERSTANDING ASPECT:

- MARK IN THE (H.P.) HIGH POINT.
- IDENTIFY THE RIDGE WITH A RED LINE.
- INDICATE THE ASPECTS OF ALL SLOPES, BY SHADING IN THE COLOUR SCHEME BELOW.



- IDENTIFY THE GULLY, WITH A BLUE LINE.
- MARK IN THE KEY POINT™ (K.P.)
- WHAT IS THE CONTOR INTERVAL 10 m.

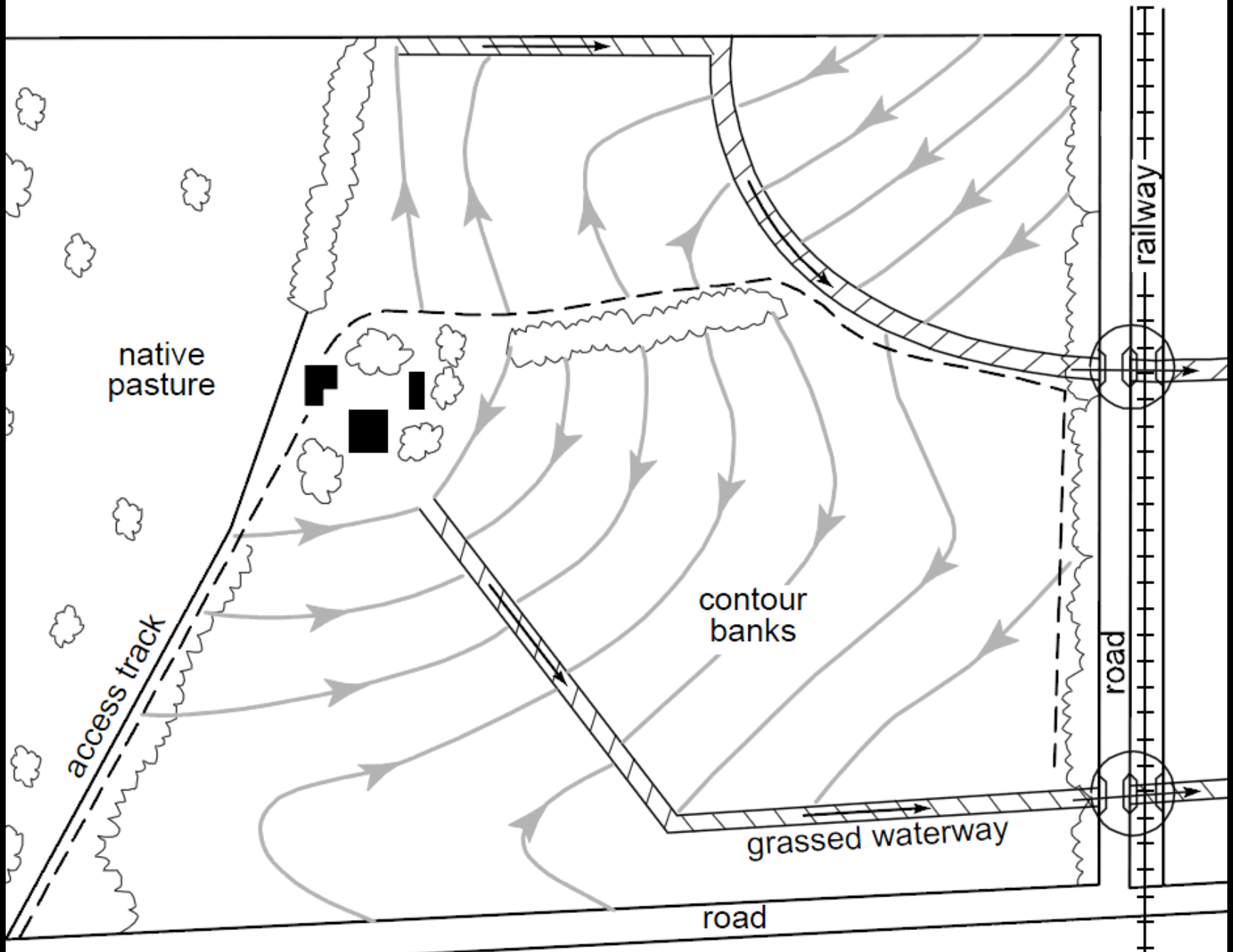
Stephen Poole
PERMACULTURE
0412 797 742

Models

Slopes and angles

- A slope is often expressed as 1 in 20, which is a 5% slope
- The angle of the slope is 2.86 degrees according to an on-line calculator
- Land steeper than 1 in 20 is in the running for the use of contour banks/swales
- Contour banks are not actually on a contour…they drop at about 0.5% slope to discharge points

Plan of a contour bank and waterway layout



Google Earth

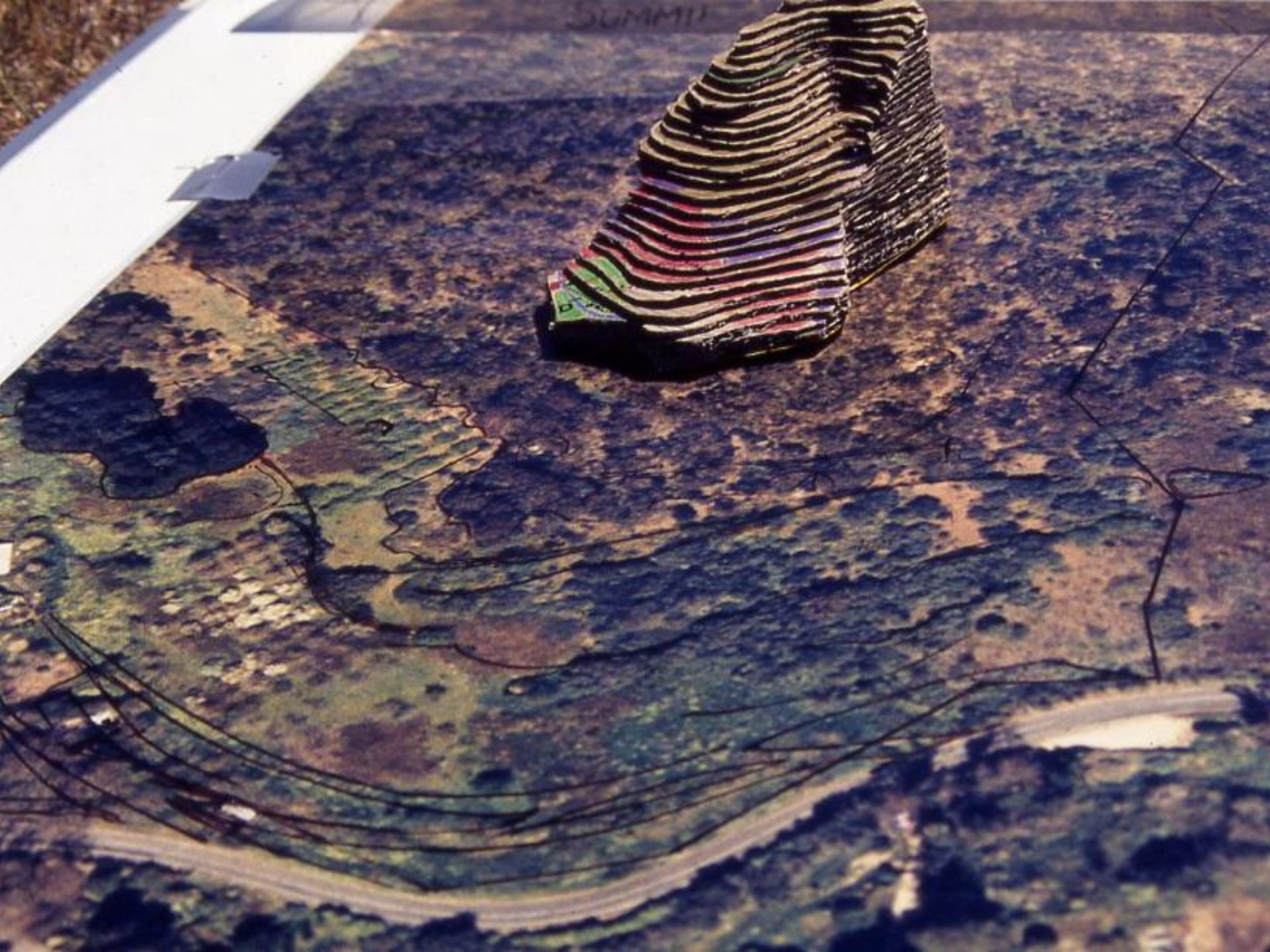
Nearmap

Nearmap features

- Photomaps (plan view)
- Multiview (3-D)
- line (includes length and bearing)
- path
- area
- street map
- property boundaries
- terrain

Model, overlay and aerial


PhotoMap
StreetMap
Terrain
MultiView
I
J
C
F
E
M
HOT SUMMER WINDS
FIRE SECTOR
WINTER SUN SECTOR
SUMMER
BULK COMP.
GEESE
Z3
Z3
G
F.H.
W.B.
S
VEG.
T
WT.
VIEWS
COLD WINTER WINDS
H
G
D
A
B
K
L




N
NATIVE VEG
GULLY WINDS
PINE VOID
3 BUSH FOOT
4 NATIVE GRASS TIMBER PRODUCTION
CUT FLOWERS
TIMBER
NATIVE GRASS TOAST
CHICKENS/ STOCK
VELIES
CREEK
VELIES
VELIES
1
1
3
3
3
ROAD
ROAD
DAM
2

At last you can let your artistic juices run wild