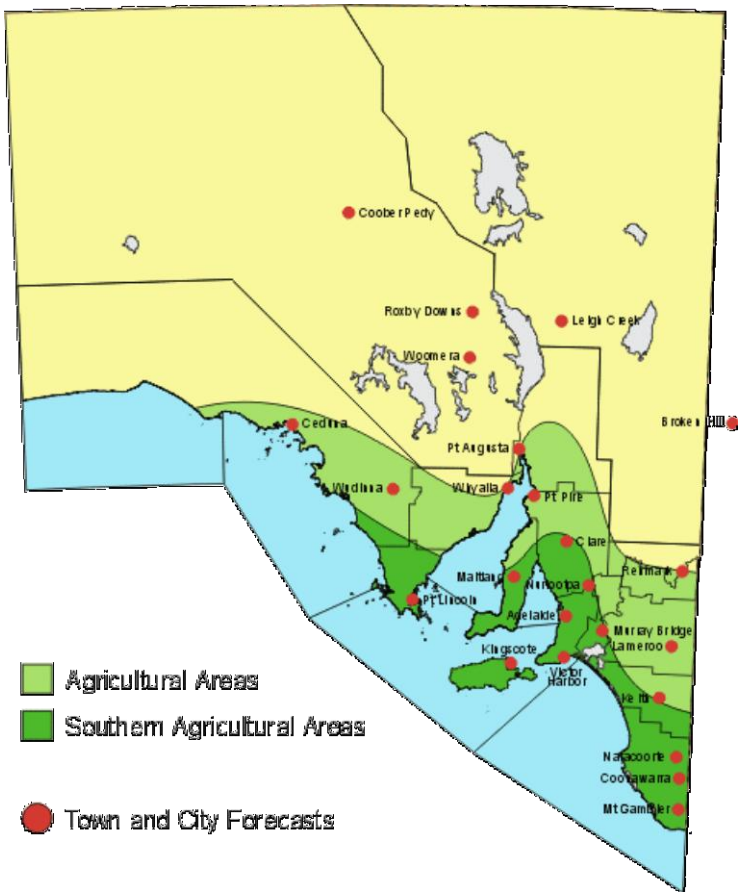
"It looks OK to me"

A personal SA perspective of the science and art of monitoring the rangelands since the 1973 Fowlers Gap rangeland monitoring workshops

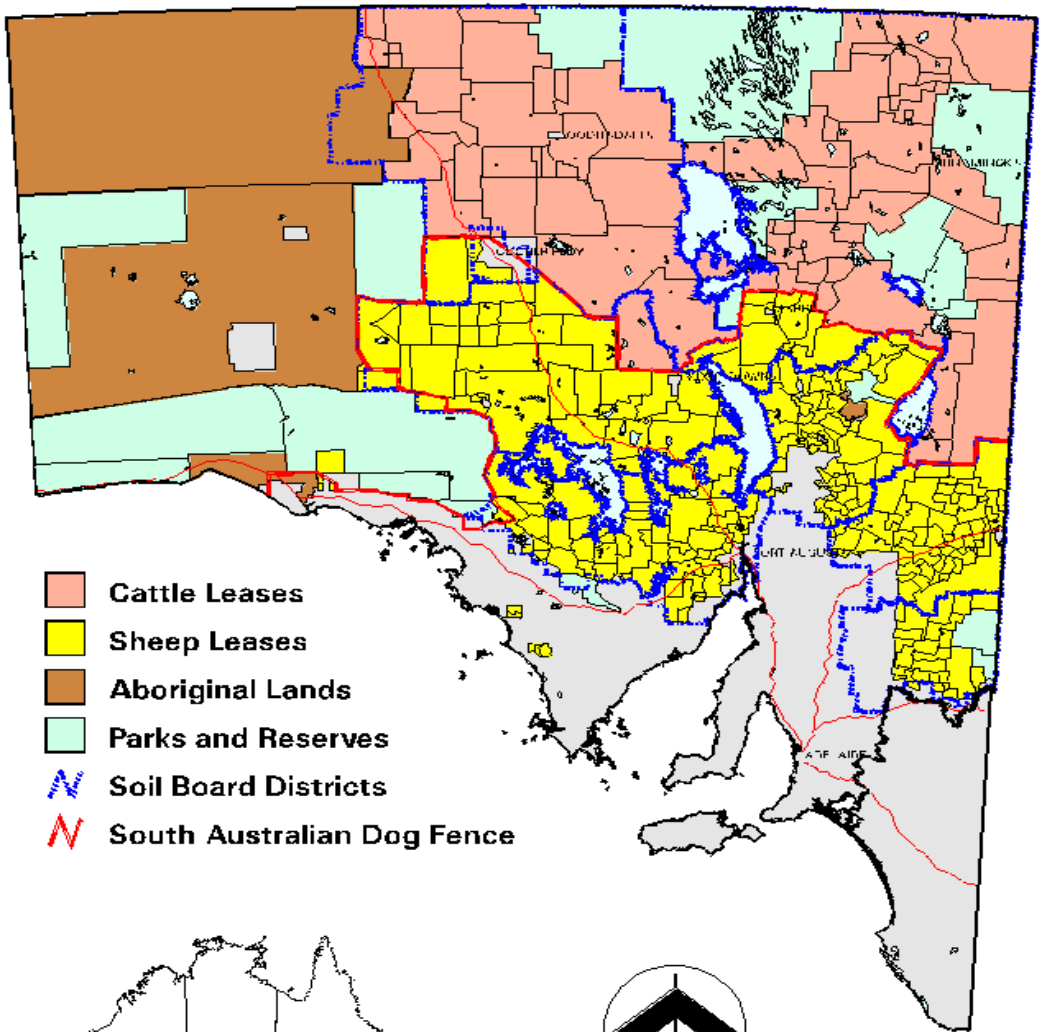
Murrumbidgee Landcare Forum Hay, 8/8/2012

By Brendan Lay, Retired senior scientist , DEWNR

The SA Outback – it's the yellow bit on this map



SOUTH AUSTRALIAN RANGELANDS

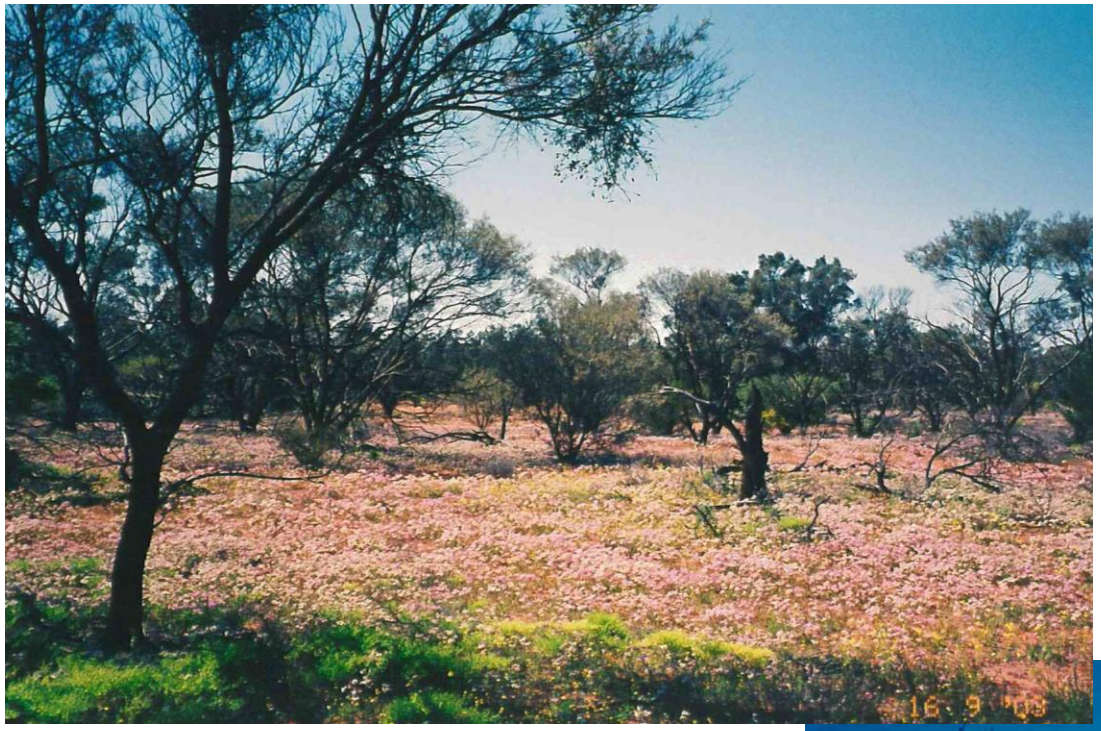


Map Compiled and Produced by John Maconochie
Pastoral Program Sustainable Resources PIRSA

Water erosion – perpetual lease lands in Southern Flinders Ranges

Wind erosion - Willouran Ranges near Marree

SA Arid Lands in good seasons – Belar, bluebush and flowering sennas, but no herbaceous cover - Kokatha Stn, Gawler Ranges district



“The challenge is separating seasonal noise from changes in land condition”

Everlastings after winter rains near Glendambo

Fred Jessup and Brendan Lay in 1970

"Calibration" on shrub density survey – note regulation footwear…

A “Jessup track” in 1970

on Millers Creek near Roxby Downs

Pumping fuel and fixing tyres at Muckanippie Outstation in 1971 – note attention to OH&S procedures!

John Potter (my boss) bogged on Millers Creek in 1973 - “crabhole country”

Bill Matheson (my next boss) in 1979 at Ingomar Station
Different car – same problem…!

Fowlers Gap workshops, May and Sept 1974

- **Organised by SCS Broken Hill**
- **Attended from SA by Bren Lay (Dept of Agriculture), and Bruce Evans (Pastoral Board of SA)**
- **Intoduced participants to four Rangland Condition techniques**
- **Tested these methods on three vegetation communities (Range sites) on Fowlers Gap station - Mitchell grass, Mulga and Saltbush**
- **Three areas in each vegetation type were used, representing good, fair and poor condition in the eyes of the organisers.**
- **The aim was apparently to seek to agree on which method was the best for assessing objectively the condition of the sites on Fowlers Gap**
- **Also it was hoped that we may reach agreement as to which method may hold most promise for development and adoption by the states in their monitoring programmes**
- **Report on the workshops prepared for Pastoral Board in 1974 by Lay and Evans**

Fundamental requirements for any condition method

- **Able to separate condition & trend from seasonal noise**
- **Able to be applied to all land uses and land types.**
- **Simple to use and understand, esp by the land manager.**
- **Able to be repeated with minimal observer variability**
- **Able to stand up to legal and scientific scrutiny, and**
- **Flexible and logical - able to be improved as further knowledge is obtained**

Methods tested at Fowlers Gap

1. Quantitative Climax (Clementian succession as applied to rangelands)
2. Parker 3-step (for assessing condition and trend of Forest ranges in USA)
3. Deming two-phase method for range assessment in USA
4. The NSW SCS method of rangeland assessment in the Western Division

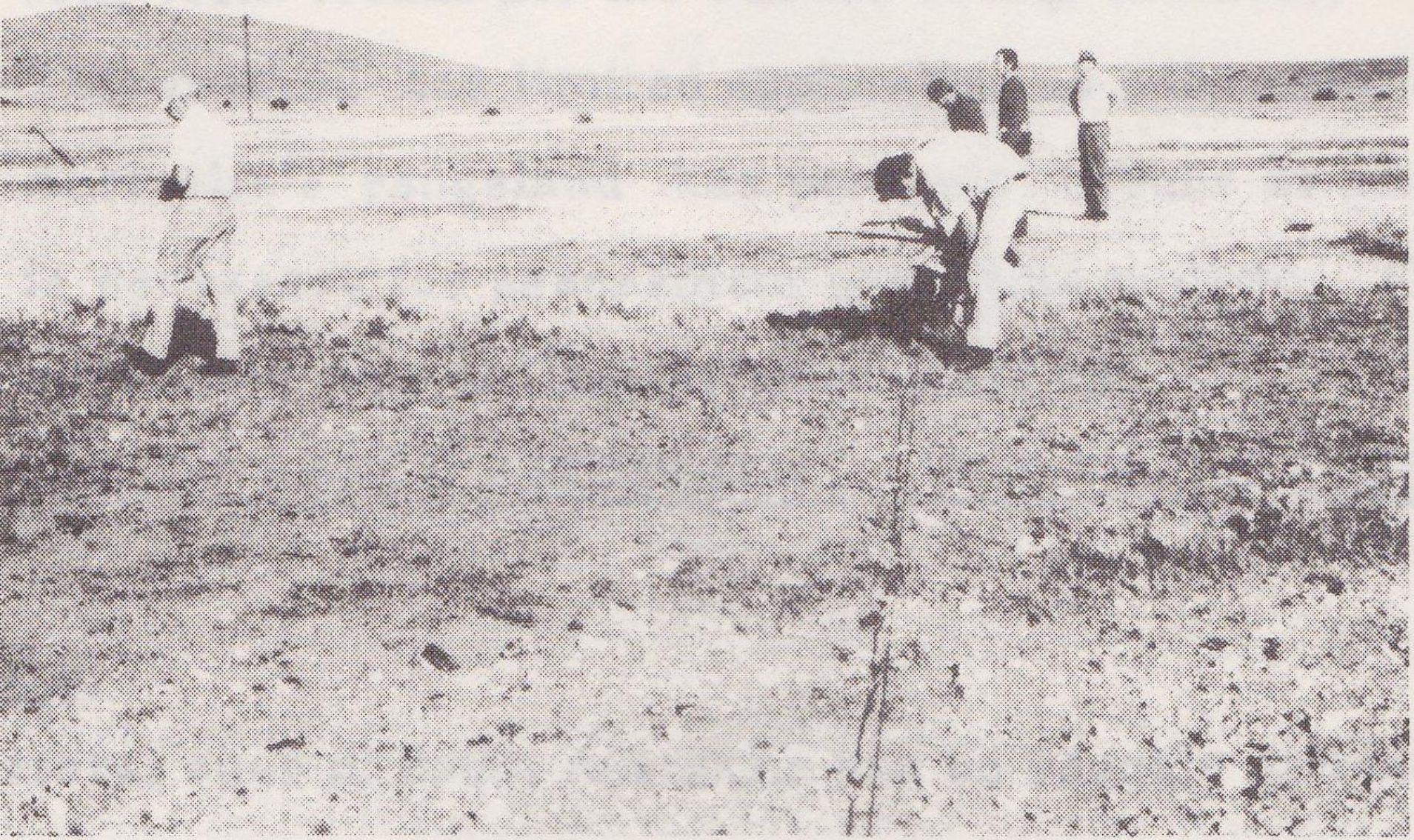


Plate 11: Saltbush site. Condition class: poor. May 1973. Parker 3-step method being tested across gilgai depression.

ate 2: Mitchell grass site, Fowlers Gap. Condition class: good.
eptember 1973. Note abundance of ephemeral herbage between
ass tussocks.

Our conclusions at the time

- “There was no general agreement at either workshop as to which method was “best” for assessing the sites at Fowlers Gap.
- The Deming and SCS methods appeared to be most favoured, though it was noted that the Deming method was not now used in the US where it was developed
- Lay and Evans noted that the Central Australian method being developed by Barney Foran and Colin Lendon may have more application in SA
- Jessup method useful for chenopod shrubland sites only

Lake Phillipson near Coober Pedy after record rainfalls in 1974

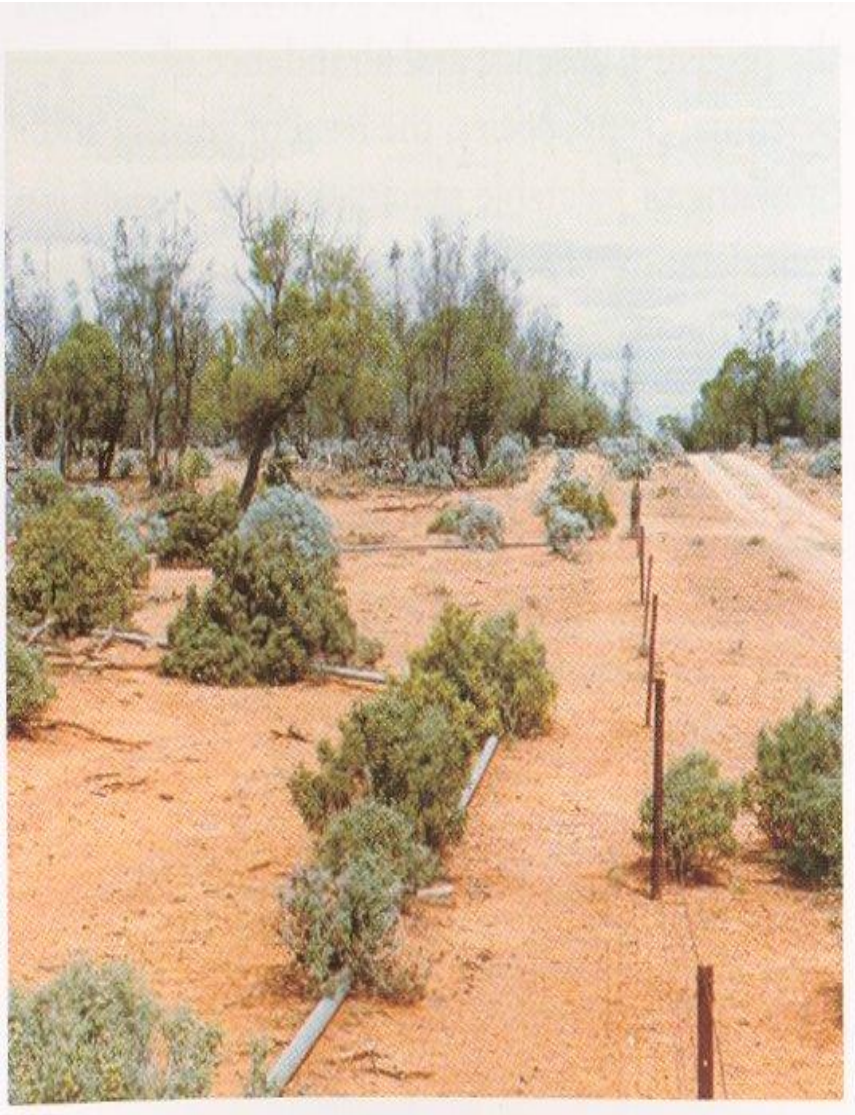
Western Myall and kerosene grass 1974

The Pastoral Board - How it all started

- 1894 – Pastoral Act & 3-man Board established to manage pastoral leases
- 1936 New Pastoral Act, 3-member Board with dedicated inspectors
- 1943 Inspector Cecil Goode began documented photo-record
- 1948 Soil Conservation Officer Fred Jessup's first shrub density study
- 1960 Current pastoral leases granted
- 1969 First Ecologist funded by Board (Brendan Lay) – second shrub density study
- 1976 – 1979 First assessment officers attached to Board – 3 staff
- 1985-7 Assessment Branch of Dept of Lands established – 8 staff
- 1989 New Pastoral Act – requiring assessment of all leases and Pastoral Board increased to six members
- 1991– First round of assessments begins in Kingoonya – 14 staff
- 1994 Third shrub density study in Kingoonya district (John Maconochie)
- 2000 First round of pastoral assessments completed
- 2005 Second round of pastoral assessments began in Kingoonya - 5 staff
- 2007 Kingoonya District second round completed,
- 2008 Brendan Lay retires

Historical Photo-relocation Project
A Postive Trend – E. of Burra SA

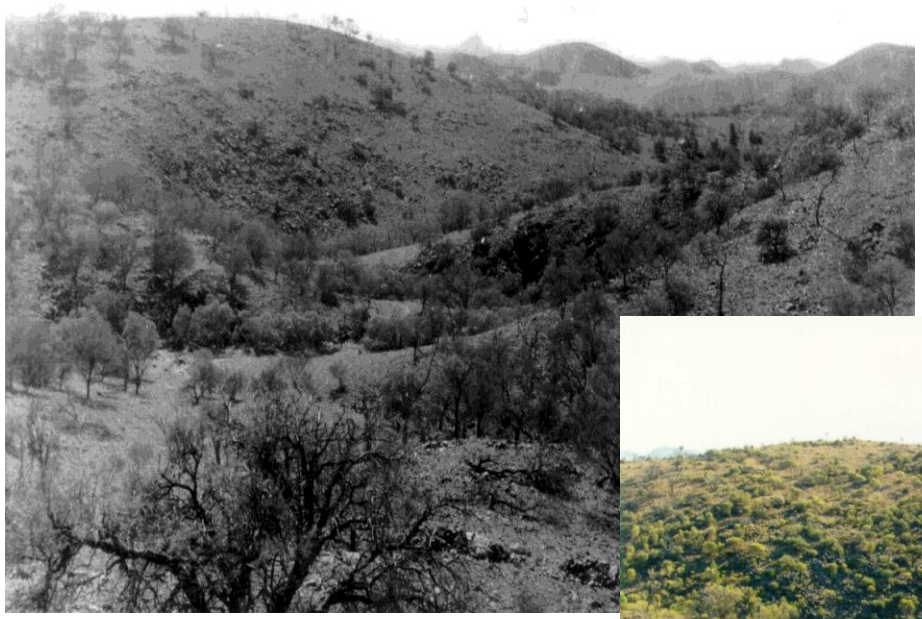
1962



1998

Changes in Gammon Range Nat. Park

1966



Increase in Mulga and silver wattle

1999

Historical Photo-relocation project
Oulnina Stn Barrier Hwy
North East SA

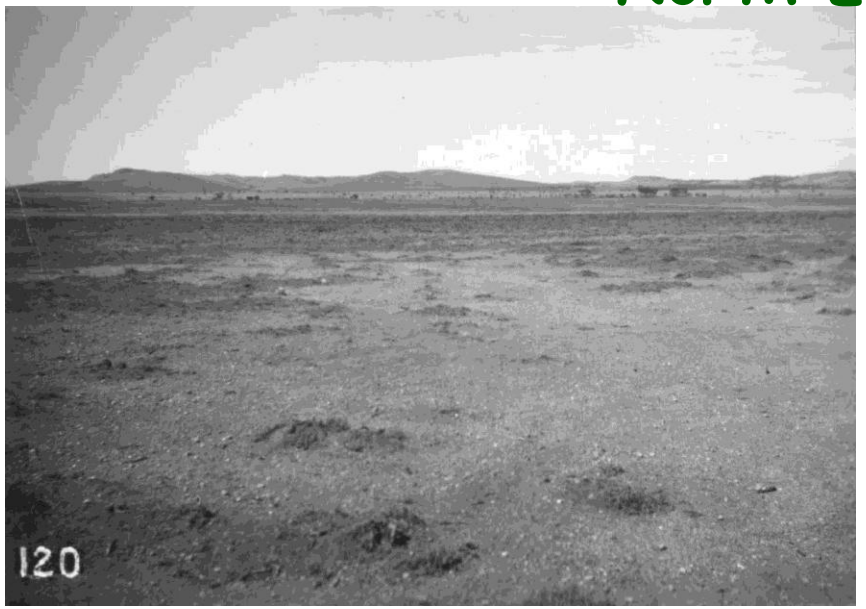


Photo
1942

Photo 1996
Changes observed in early 1970's, in run of exceptional seasons

Pastoral Board archives

Historic (Opportunistic) photopoint at North Well homestead near Woomera

Photopoint 14 , Bon Bon Station

1973 –showing bare ground and grazeline on *Acacia tarculensis* shrub

2003 – same area 30 years later showing regeneration of palatable Maireana and Atriplex shrubs and no grazeline on the *Acacia tarculensis*.

Photopoint 22 Bon Bon – fire effect on *A. ramulosa*

Photopoint 22 – Bon Bon -
fire effects on sandy mulga country

Death of mulga -
retention of timber

Second Fire 1994 -
killed mulga
regeneration

Transition: mulga woodland to
grassland

Where seasons come and go-

The Channel country –effect of record monsoonal rains in the 1970's

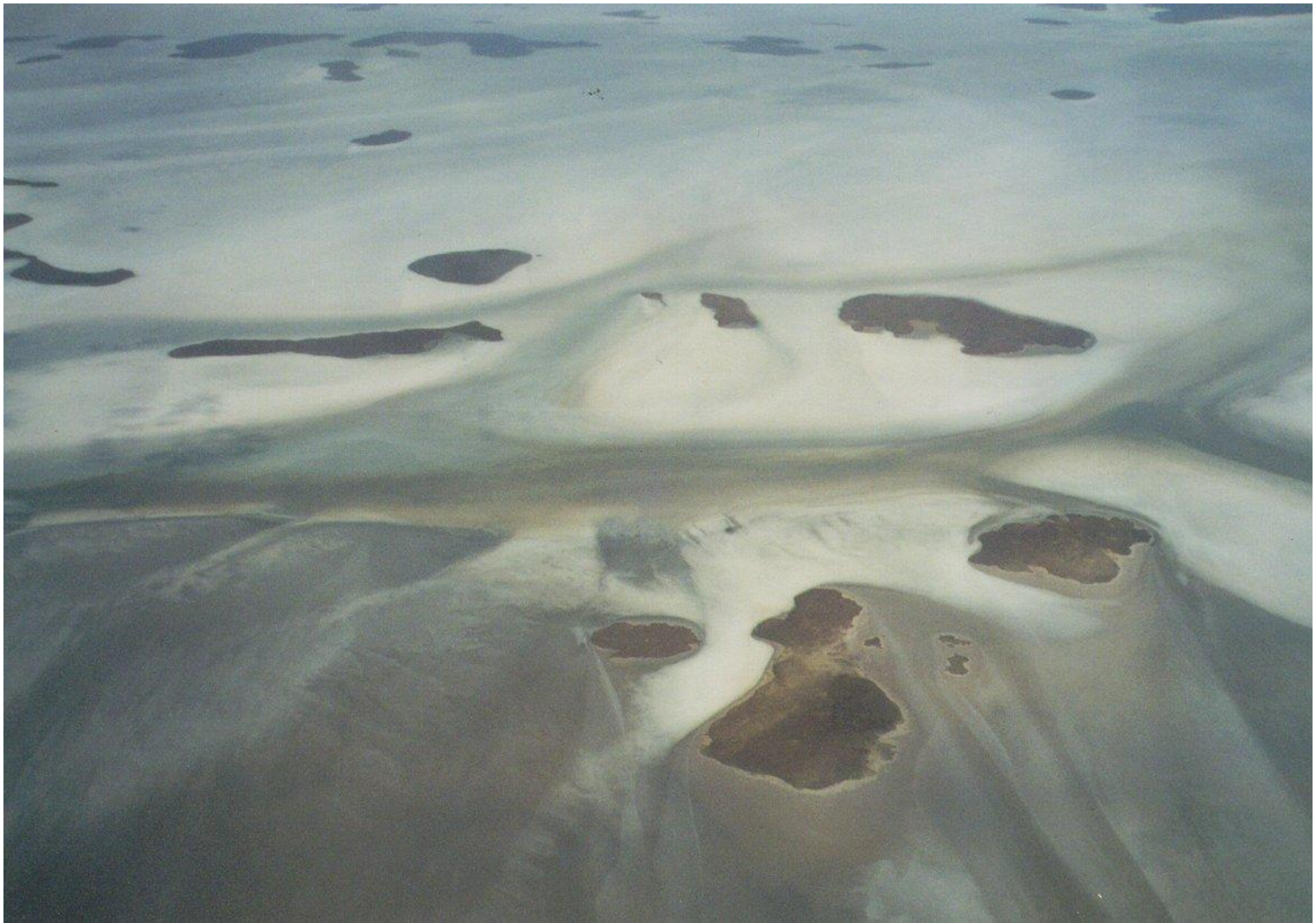
1962 – no flows down the river channel for more than 20 years

2002 – effect of several major summer flows have transformed the landscape – Coolabah trees have regenerated in the channel

Ahhh – exciting departmental talkfests!

The best project in my career - Lake Gairdner Island Monitoring –

Northern archipelago courtesy of “Robin Young airlines”



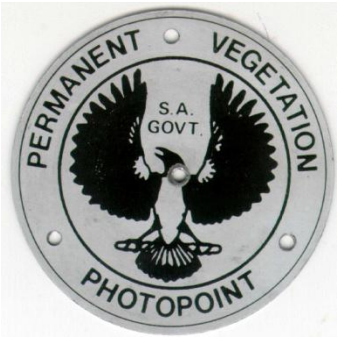
Vehicles used on the Lake Gairdner survey

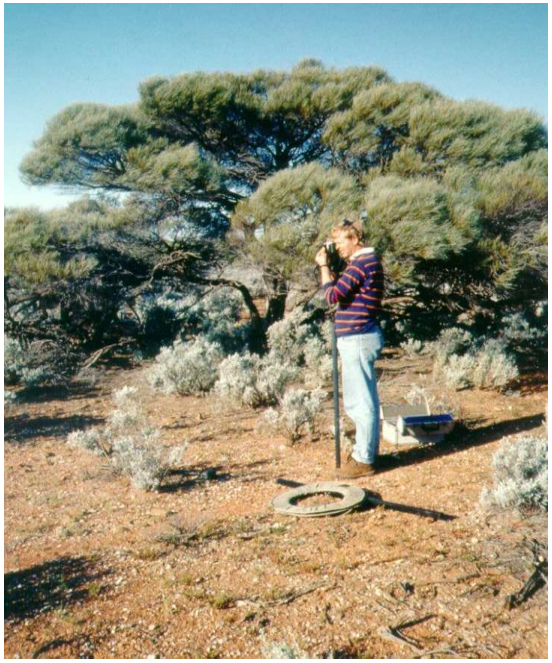
Island 26 – 1997 survey

Pastoral assessments -Photopoint monitoring

- Accurate location details vital to ensure re-photos of exact scene (now use GPS units to cross-reference)
- First series (1-1000)collected no data with photos – general notes on 5x8"cards only
- Now have as a minimum plant species lists with cover-abundance and life-stage attributes
- Density (Jessup) and cover measurements (steppoint) at many sites, now entered directly on field data tablets
- Markers originally mulga posts but now use mostly galv. reo-rod with polypipe covers, with GPS co-ords automatically recorded.

Disc as used on all photopoints – good target practice!





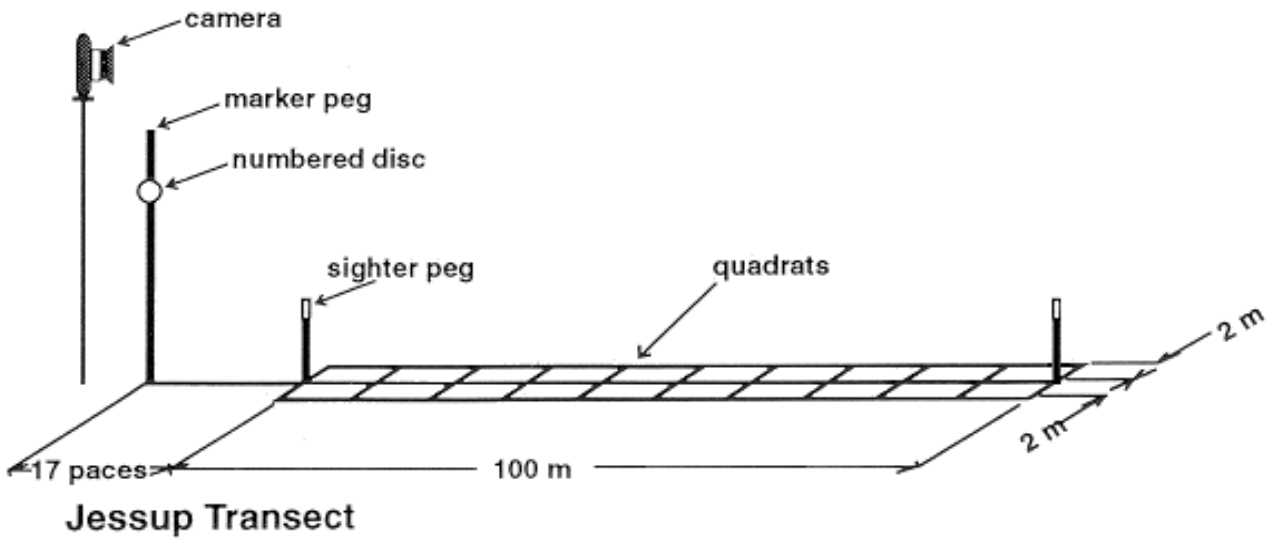
Craig Baulderstone and Bren Lay during first round of pastoral assessments in 1992

Mulga post typical of my early photopoints

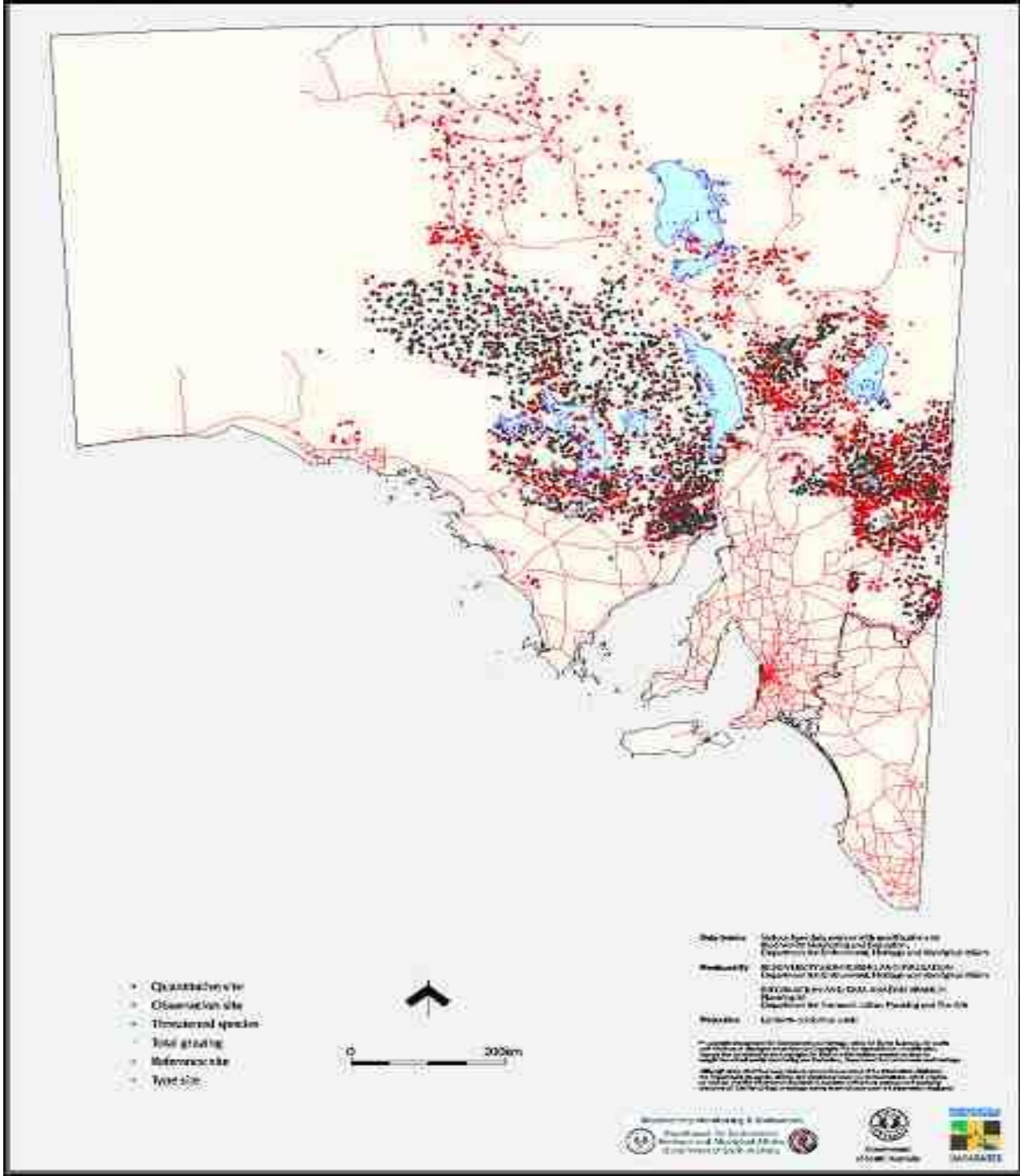
1-350 (1970-74) (Most are still sound after 40+ years).

Photopoint marker and layout as used today

A 25mm polypipe is inserted over reo-rod for extra visibility

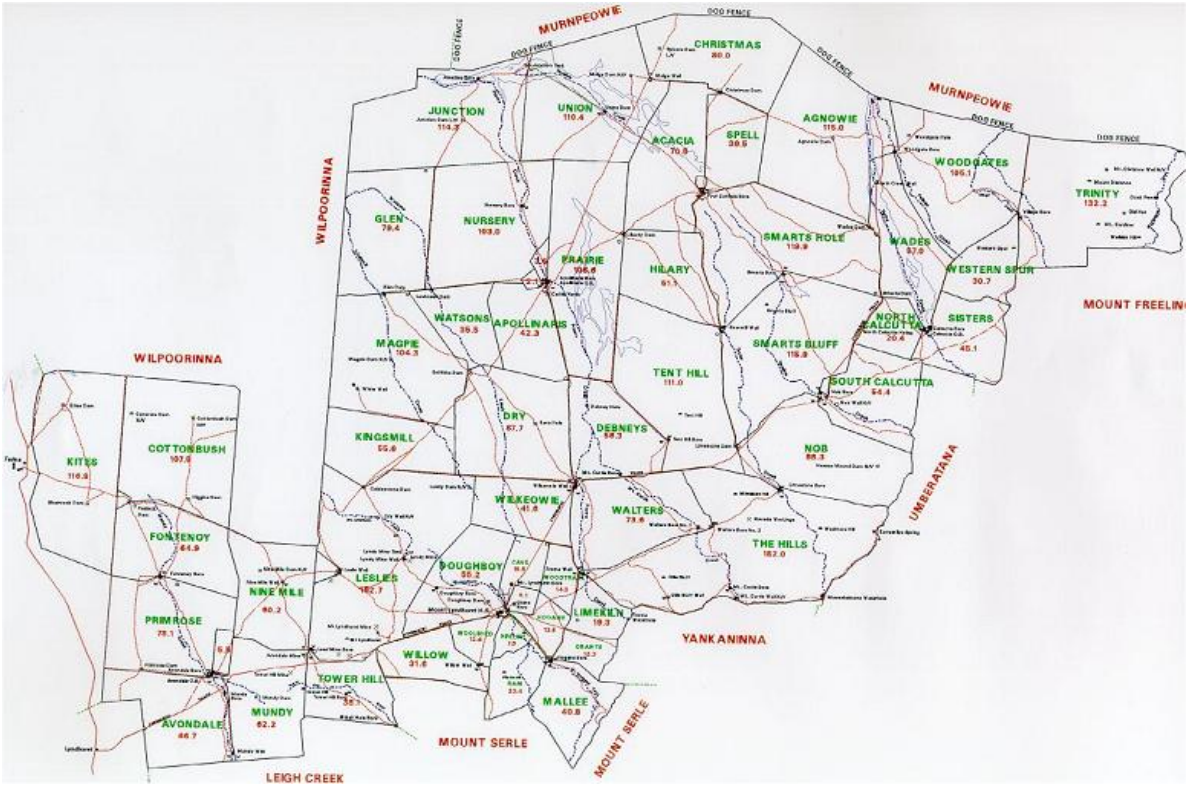


Coverage of photopoint sites using Bren Lay's numbering series (more than 10 000 as of 2008)



GIS: Landscapes and infrastructure

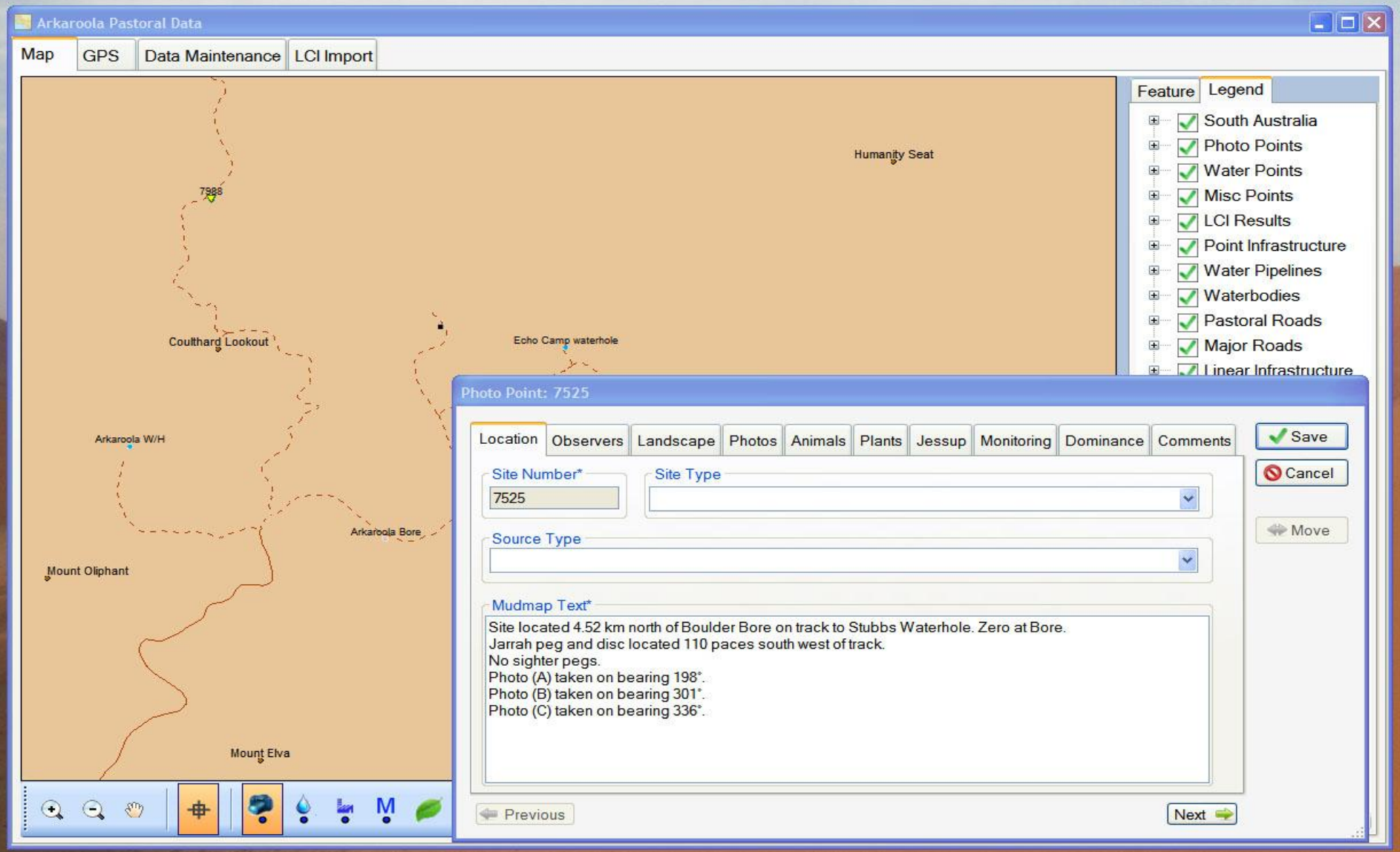
- Identify, describe and map vegetation and soil types-Land Systems
- **Identify and map infrastructure and its influence on condition- GPS**



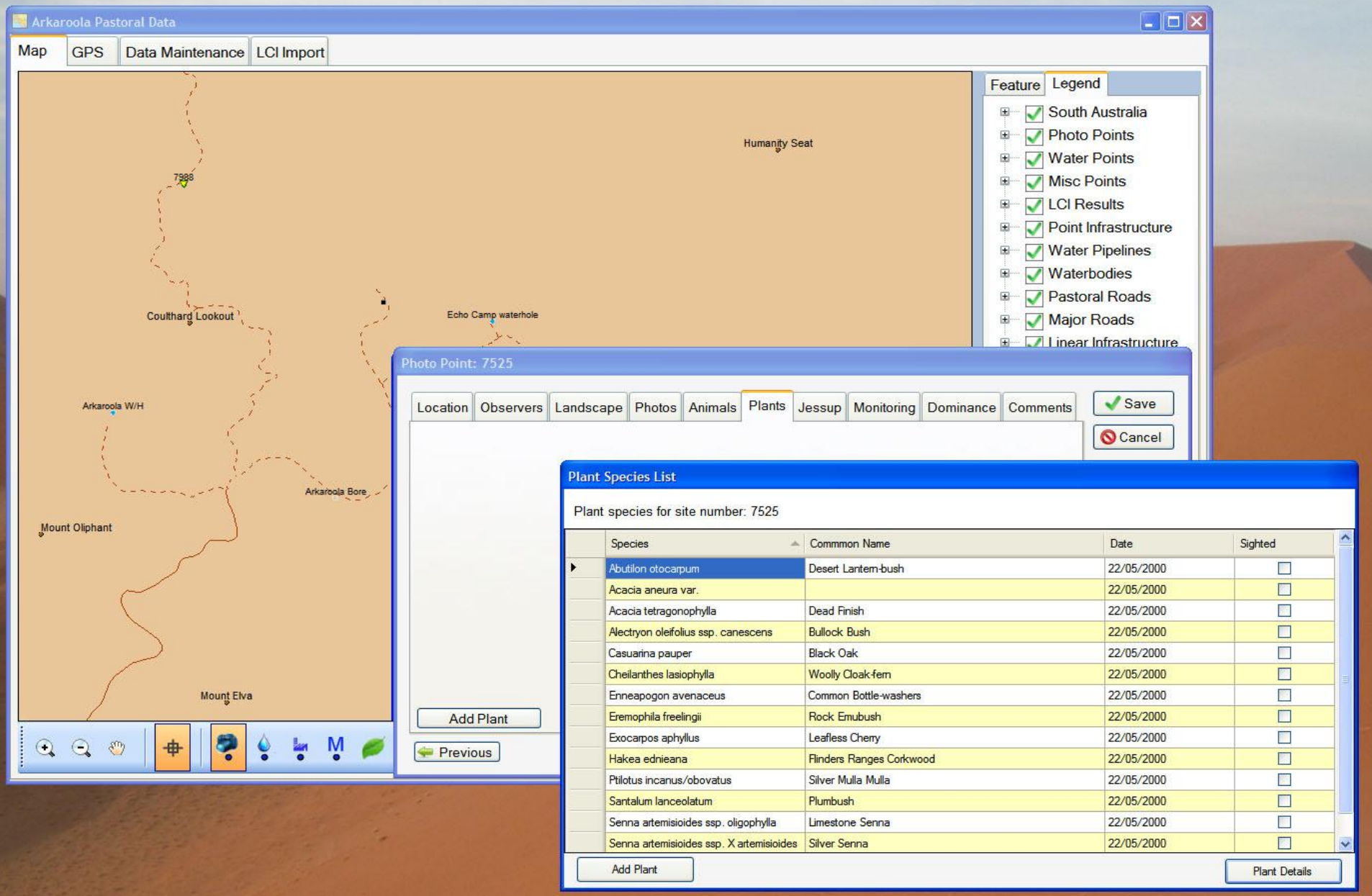
Standard Paddock Plan (Arc/Info - ArcMap)

Calibrating new assessment staff in the Jessup belt transect technique – July 2012

Screen grab of Pastoral Unit's FDE (field tablets) – Photopoint data sets



Screen grab of display on the Pastoral Unit's new FDE – Photopoint 7535



Whywhyana creek Arkaroola 1989

Whywhyana creek, Arkaroola 2008

What changes have occurred in the rangelands during the last 40 years?

- **General improvement in vegetation condition throughout, no matter which method used to determine this!**
- **Corresponding decrease in active erosion – particularly wind and scalding, - gully erosion continues where well advanced**
- **"Bounceback" by perennials during the 15 year period the rabbit calicivirus has been effective**
- **Worrying instances of spread of invasive weeds, particularly in last decade – e.g *Peganum harmala*, *Cylindropuntia prolifera and Acacia farnesiana***
- **Purchase of increasing numbers of leases for conservation purposes**
- **Purchase of increasing no. of leases for indigenous groups**

The joys of camping - Winter 1996 on Weekeroo station; Eddie Piedrahita and Chris Turner

Life after retirement

Building Copper Top walking track (near Oodnadatta) with Friends of Mound Springs 2011

Dalhousie Springs 2011 – Patron of "Friends Group of the Simpson Desert Parks"

Some elements of work in the Outback never change - testing floodwaters over Leigh Creek to Balcanoona road, May 2010

Wirilda revegetation project (Adelaide Hills) – Photopoint 6, June 1975

Wirilda Photopoint 6, Aug 2005