Groundwater dependent fauna of South Australia

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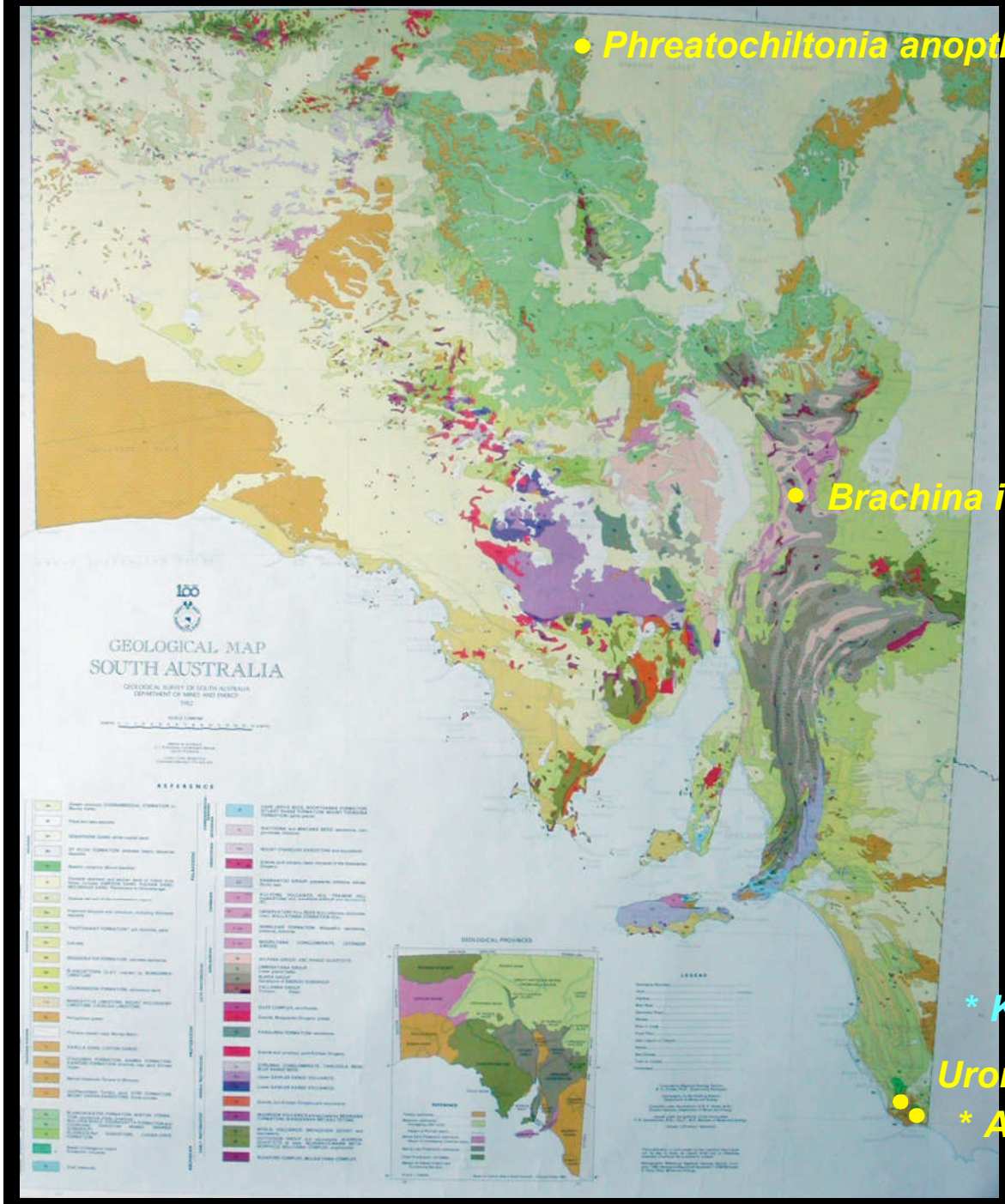
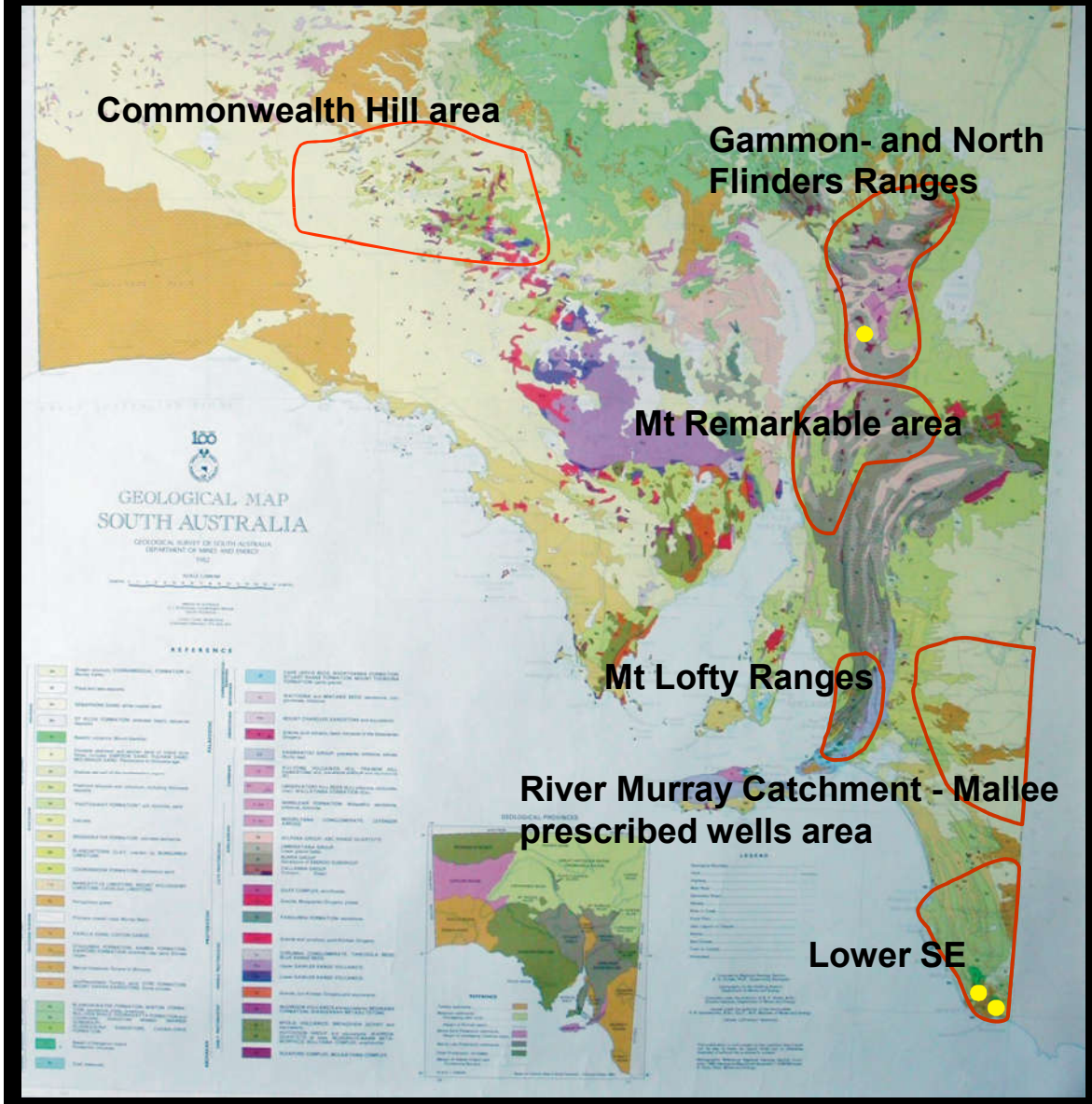


Current Knowledge

- ***Phreatochiltonia anopthalma*** (Hyalidae)
- ***Brachina invasa*** (Melitidae)
- * ***Koonunga crenarium*** (Syncarida)
- ***Uronyctus longicaudus*** (Neoniphargidae)
- * ***Austrogammarus telsosetosus*** (Paramelitidae)

Predicting areas with stygofauna potential



Evolutionary Factors:

Historical:

- marine regressions
- climatic catastrophes

Physical:

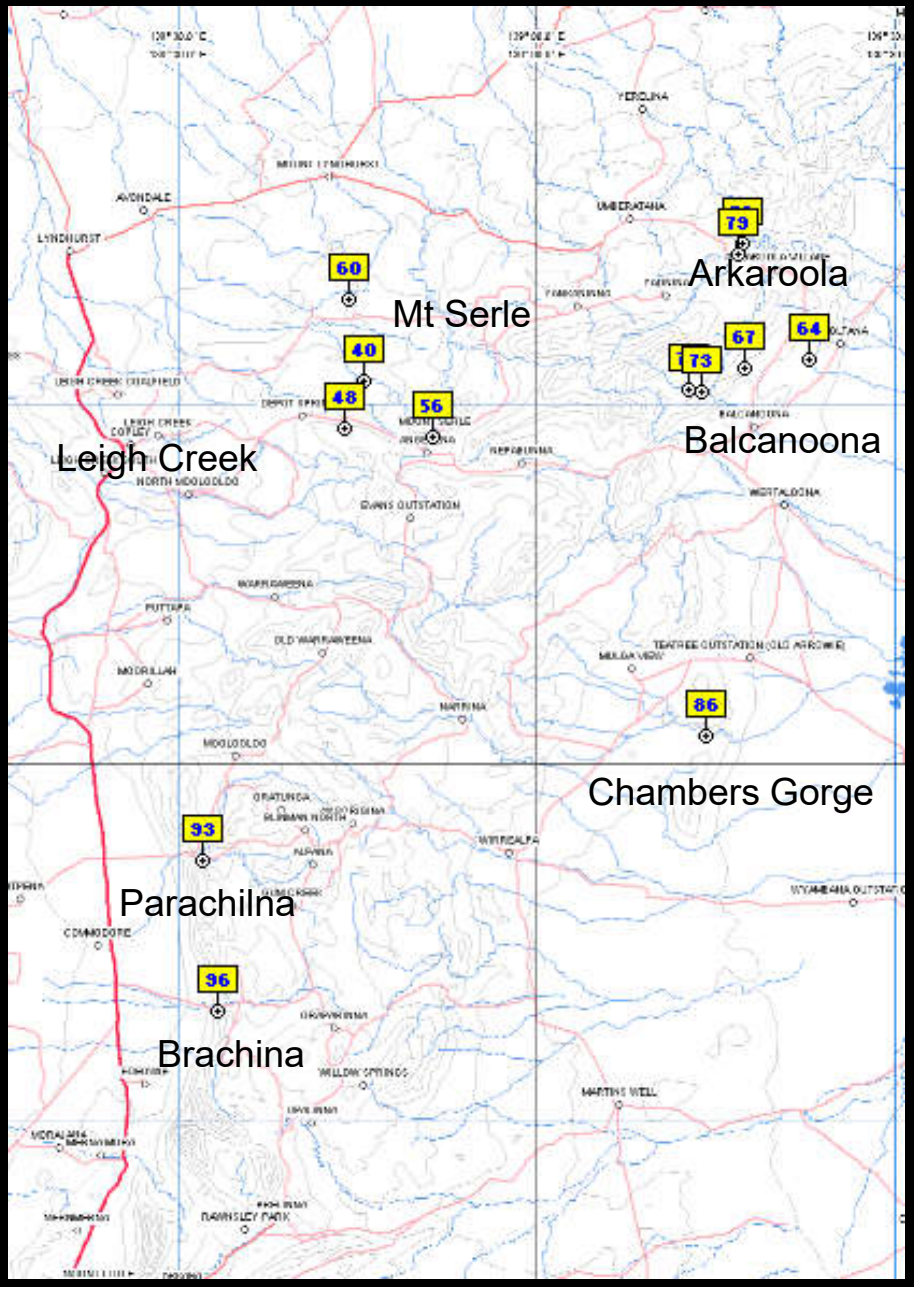
- proper interstitia sizes
  - karst
  - fractured rocks
  - coarse sediments
- permanent water

Commonwealth Hill area

- N-rim of Gawler craton
- Calcretes
- palaeodrainage valleys

- calcretes shallow, no aquifers
- groundwater deep >60 m
- no stygofauna found

Gammon- and North Flinders Ranges



Evolutionary Factors:

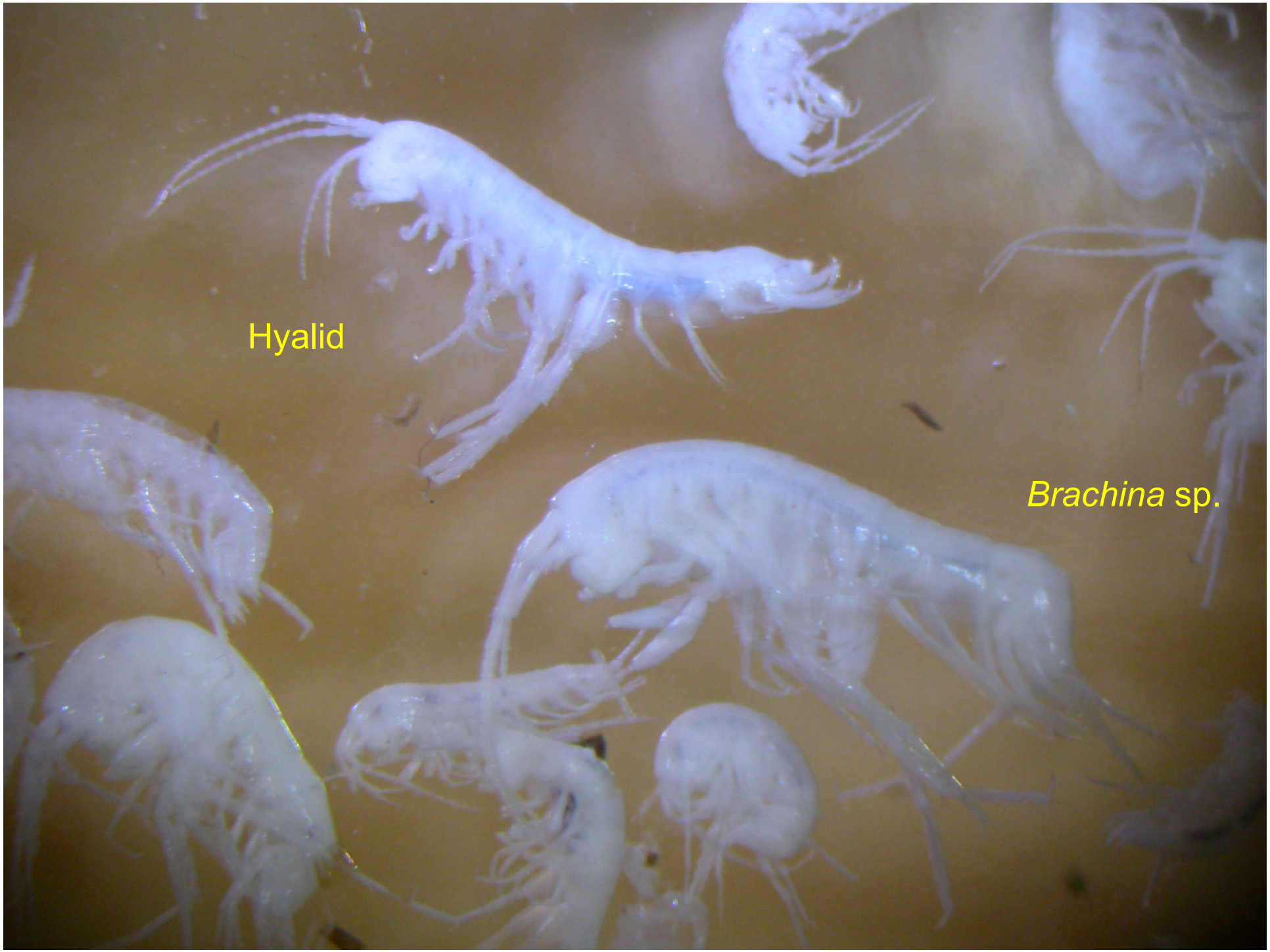
Historical:

- Creataceous (80Mya) shore line
- lacustrine episodes at
  - Eocene (45Mya)
  - Pleistocene (1.6-0.1Mya)

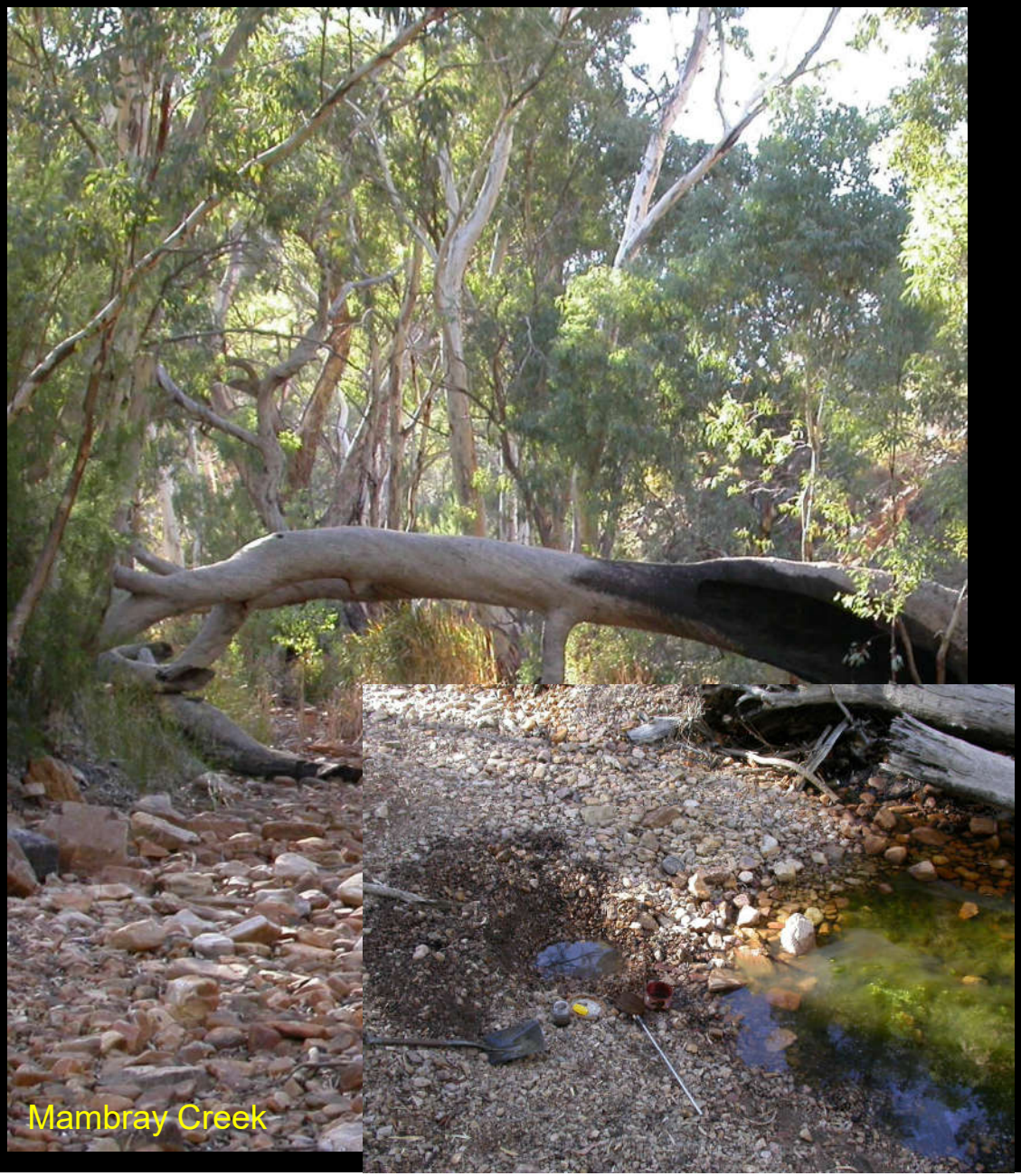
Physical:

- proper interstitia sizes
  - karst
  - fractured rocks
  - coarse sediments
- permanent water

Diverse Stygofauna !


Hyalid
Brachina sp.

Mount Remarkable and South East Flinders Ranges



Evolutionary Factors:

Historical:

- no obvious regressions

Physical:

- proper interstitia sizes
  - fractured rocks?
  - coarse sediments
- permanent water

Fauna :

Isopoda (*Heterias*)

Dytiscidae (*Copelatus*, *Limbodessus*)

Hydrobiid snails

Mount Lofty Ranges and Adelaide Hills

Evolutionary Factors:

Historical:

- no obvious regressions

Physical:

- proper interstitia sizes
  - fractured rocks?
  - coarse sediments
- permanent water

Fauna :
Isopoda (*Heterias*)
Dytiscidae (*Limbodessus*)
Hydrobiid snails

River Murray Catchment – Mallee prescribed wells area

Evolutionary Factors:

Historical:

- marine trans/regressions

Oligocene-Pliocene (30-5Mya)

Physical:

- proper interstitia sizes?
- karst?
- permanent water

No fauna found yet

Lower South-East SA - Mount Gambier area

Evolutionary Factors:

Historical:

- Miocene limestones (20-10Mya)
- Pleistocene regressions

Physical:

- karst (caves, sinkholes, springs)
- permanent water

Diverse Stygofauna !


Uronyctus longicauda
Hydrobiid snail
Heterias sp. nov.
Neoniphargus sp. nov.


Koonunga crenarium


Syncarid sp. nov.


Paracorophium sp. nov.
Austrogammarus sp. nov.
Austrochiltonia sp.


Perthia sp. nov.

Summary stygofauna survey

- Gammon Ranges and Northern Flinders Ranges
- Lower SE (Mount Gambier)

→ rich stygofauna biodiversity

- Hydrobiid snails and *Heterias* widespread

- Different amphipod families, locally diverse

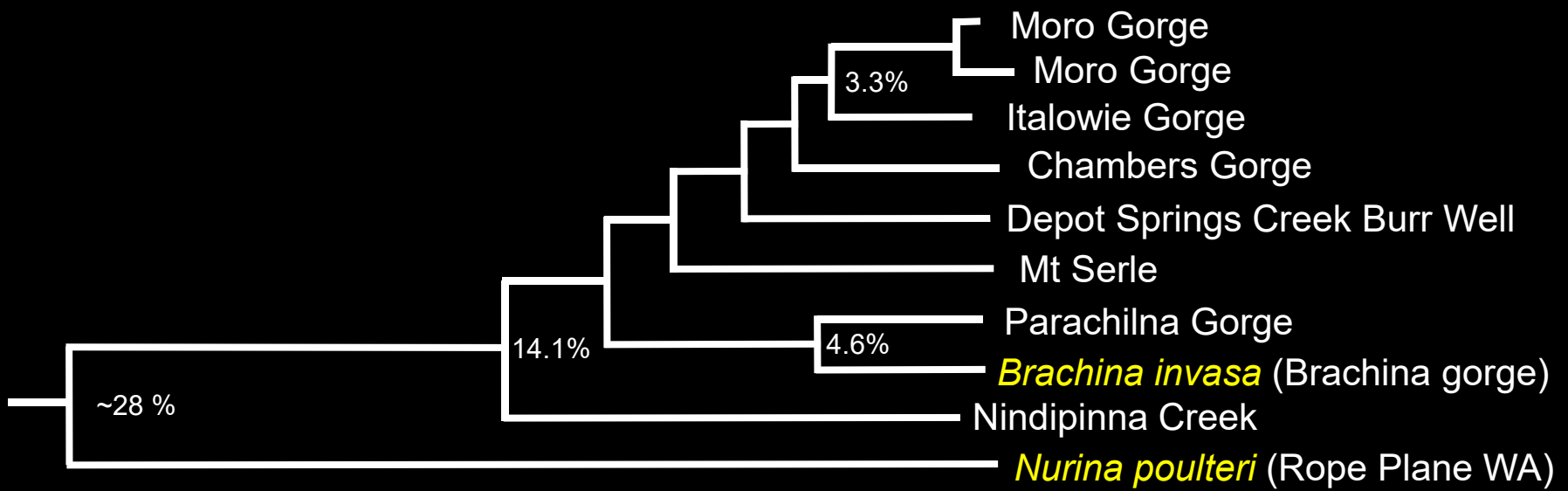
- Many more new species expected

Phylogenetic assessment of biodiversity

- Majority of the fauna undescribed
- cryptic species common in stygofauna
- lack of funding for alpha-taxonomy

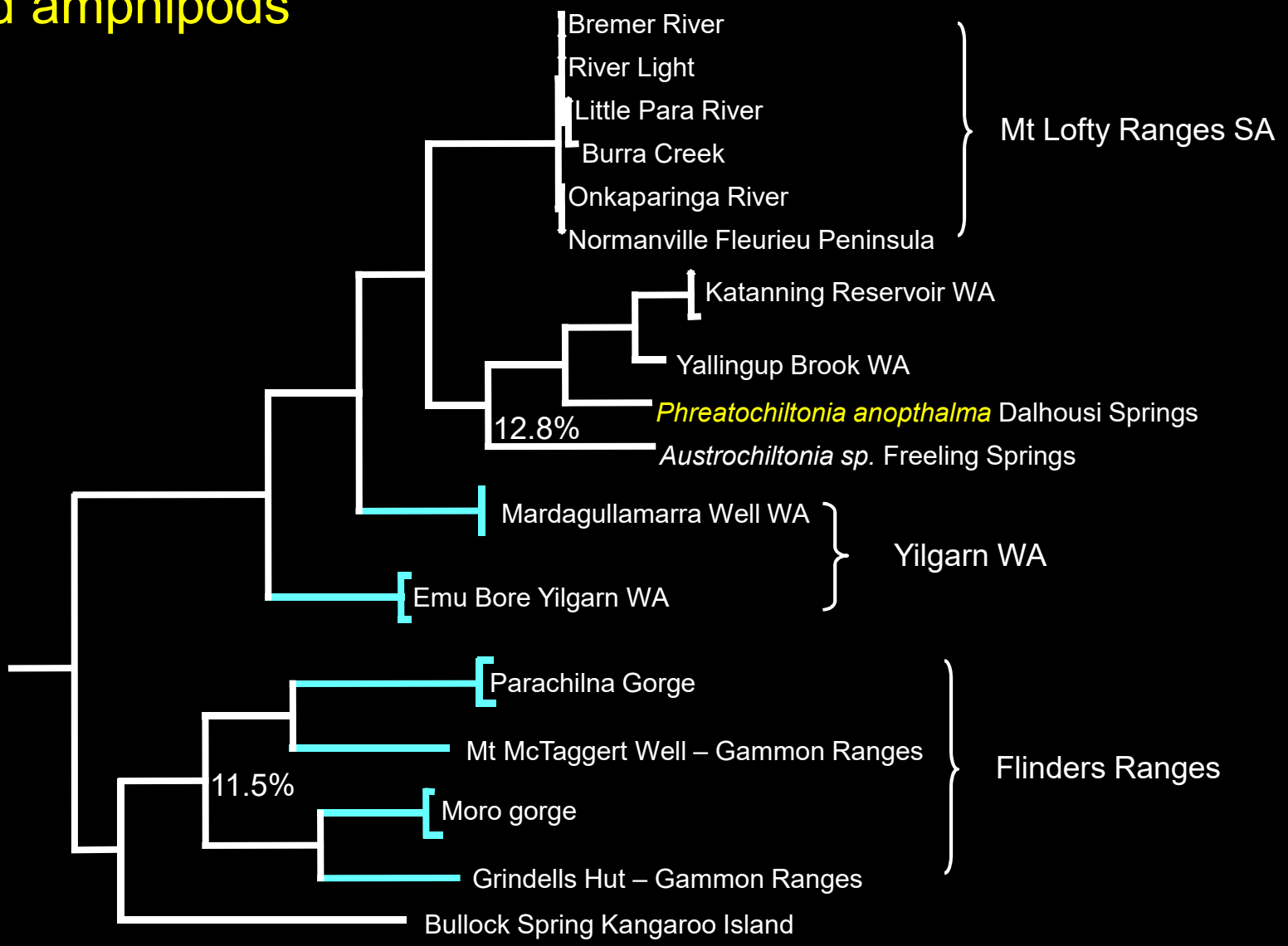
- extract DNA of body part
- keep rest as voucher
- sequence mtDNA (+nuclearDNA)
- do phylogenetic analyses
  (including molecular clock analyses)

Flinders Ranges melitid amphipods



- > 8 species of Brachina
- close localities isolated at least 1.6 Mya
- basal divergence at least 7 Mya
- huge divergence with Nurina

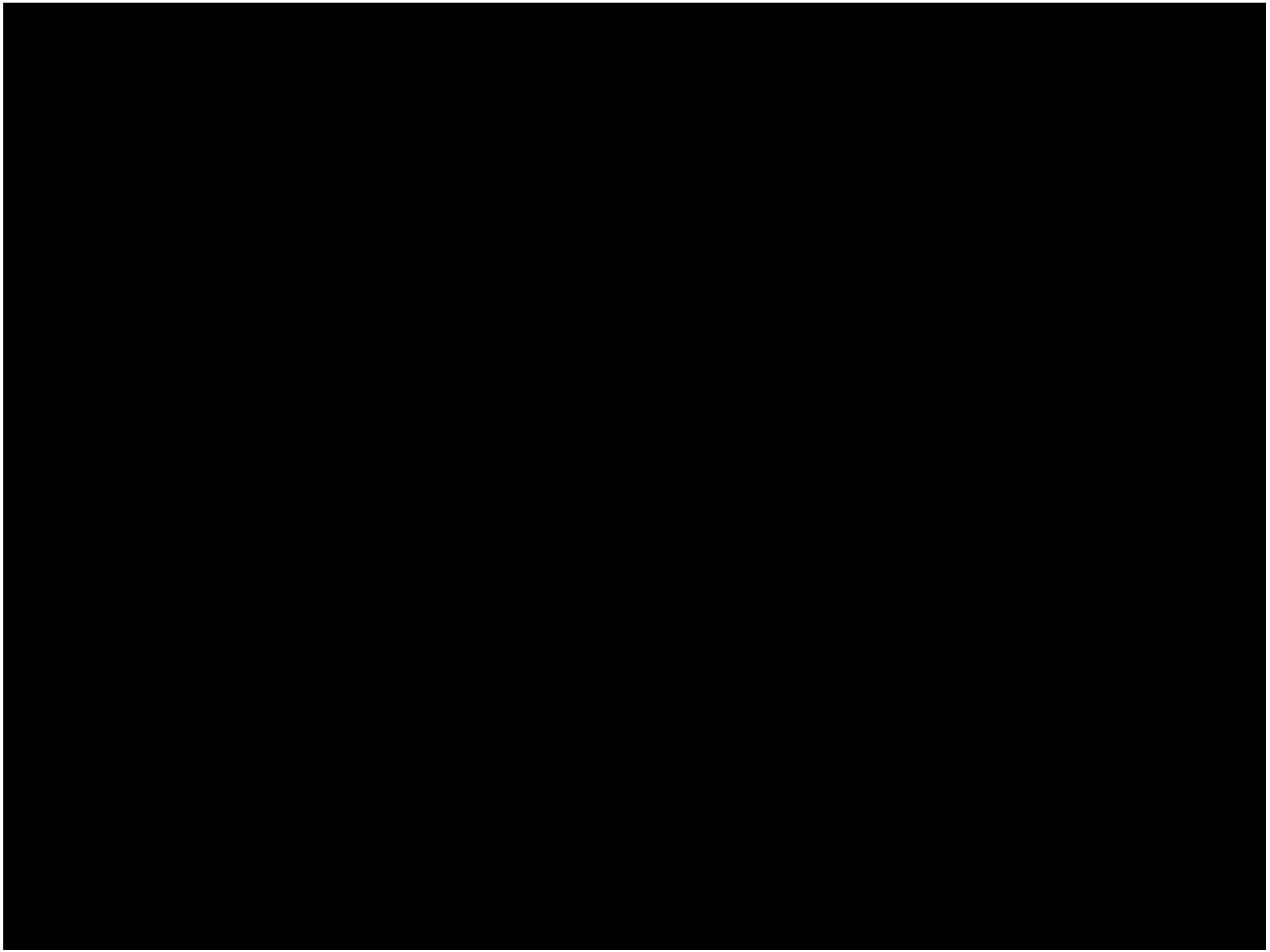
Hyalid amphipods



Summary Phylogenetic assessment

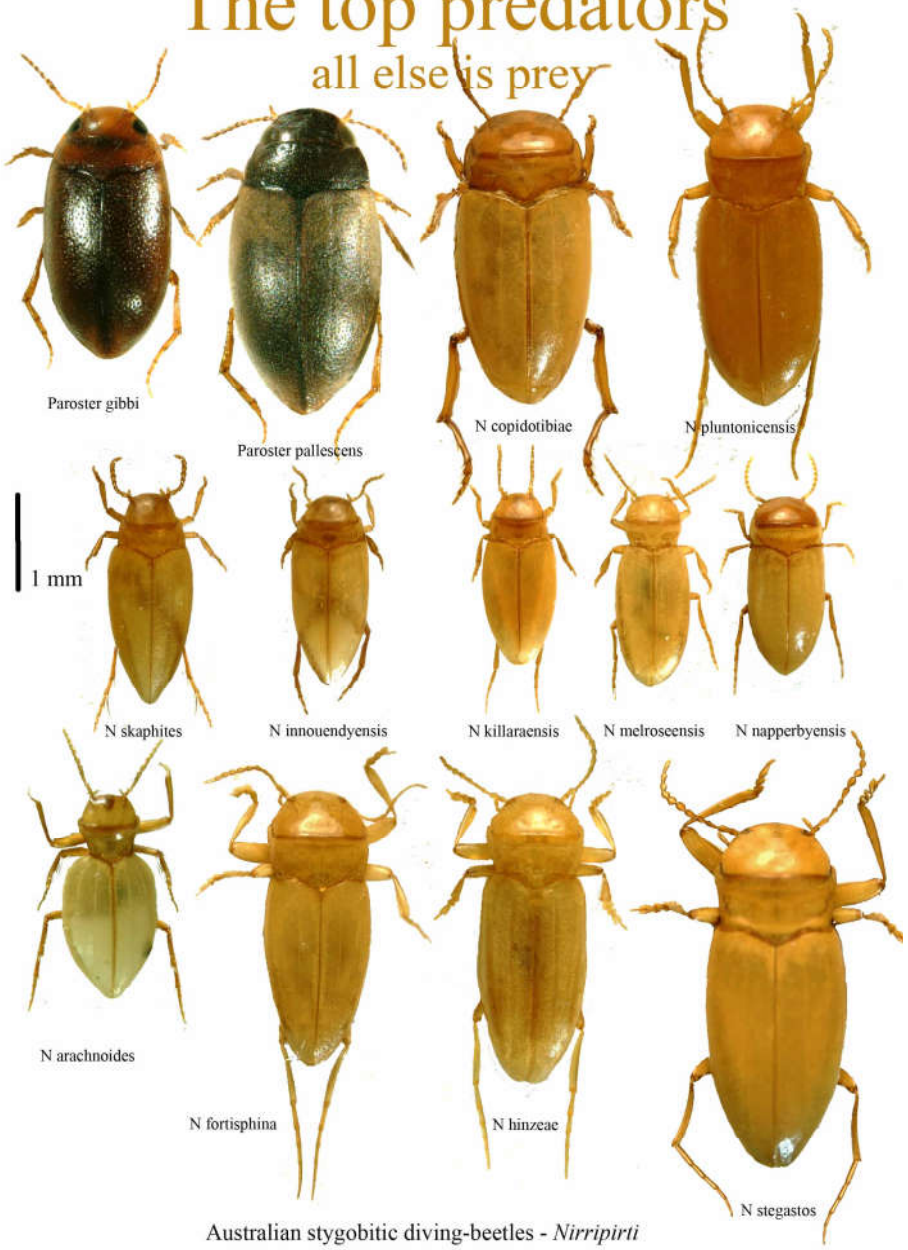
- detection of cryptic species
- relationship between species
- biological age of the species

- DNA-sequences data-based
- available for future reference
- study of evolution of stygofauna



The top predators

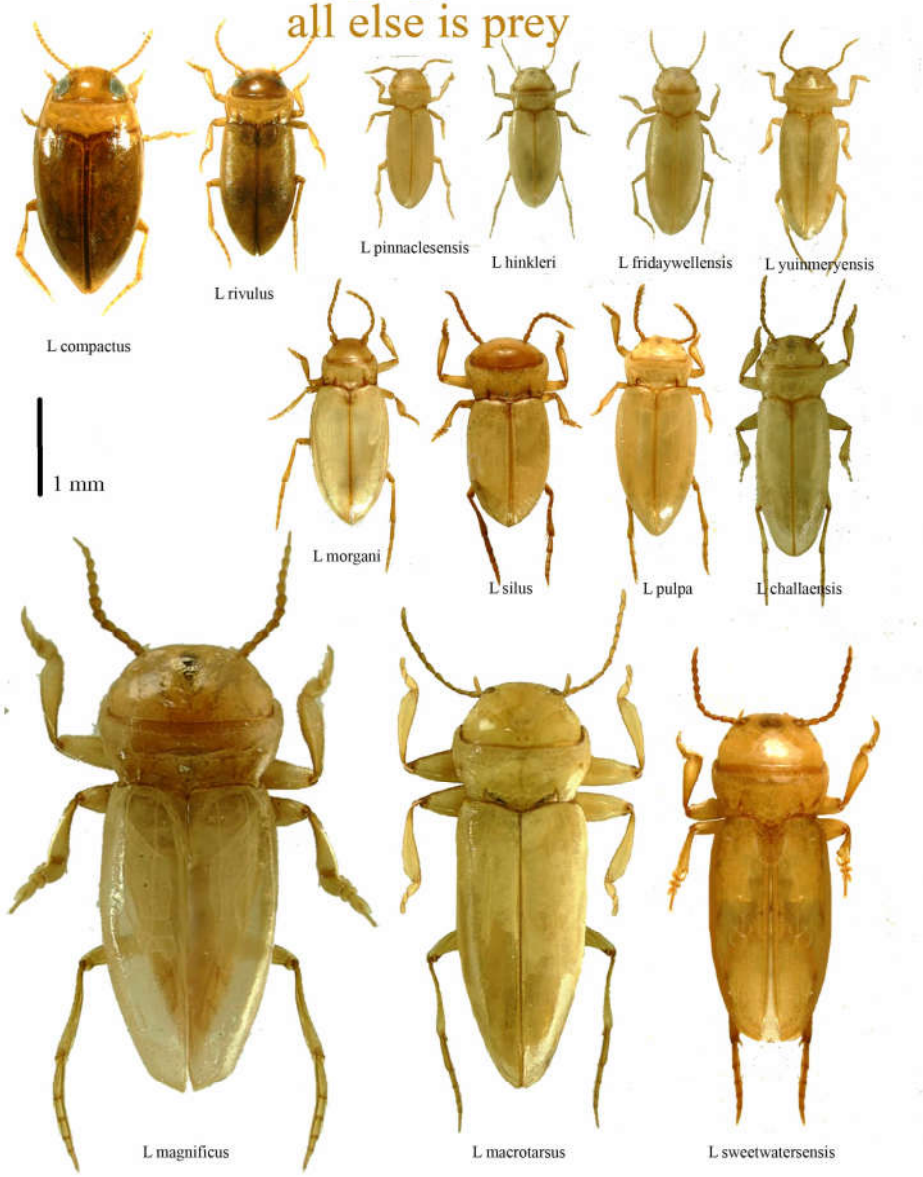
all else is prey



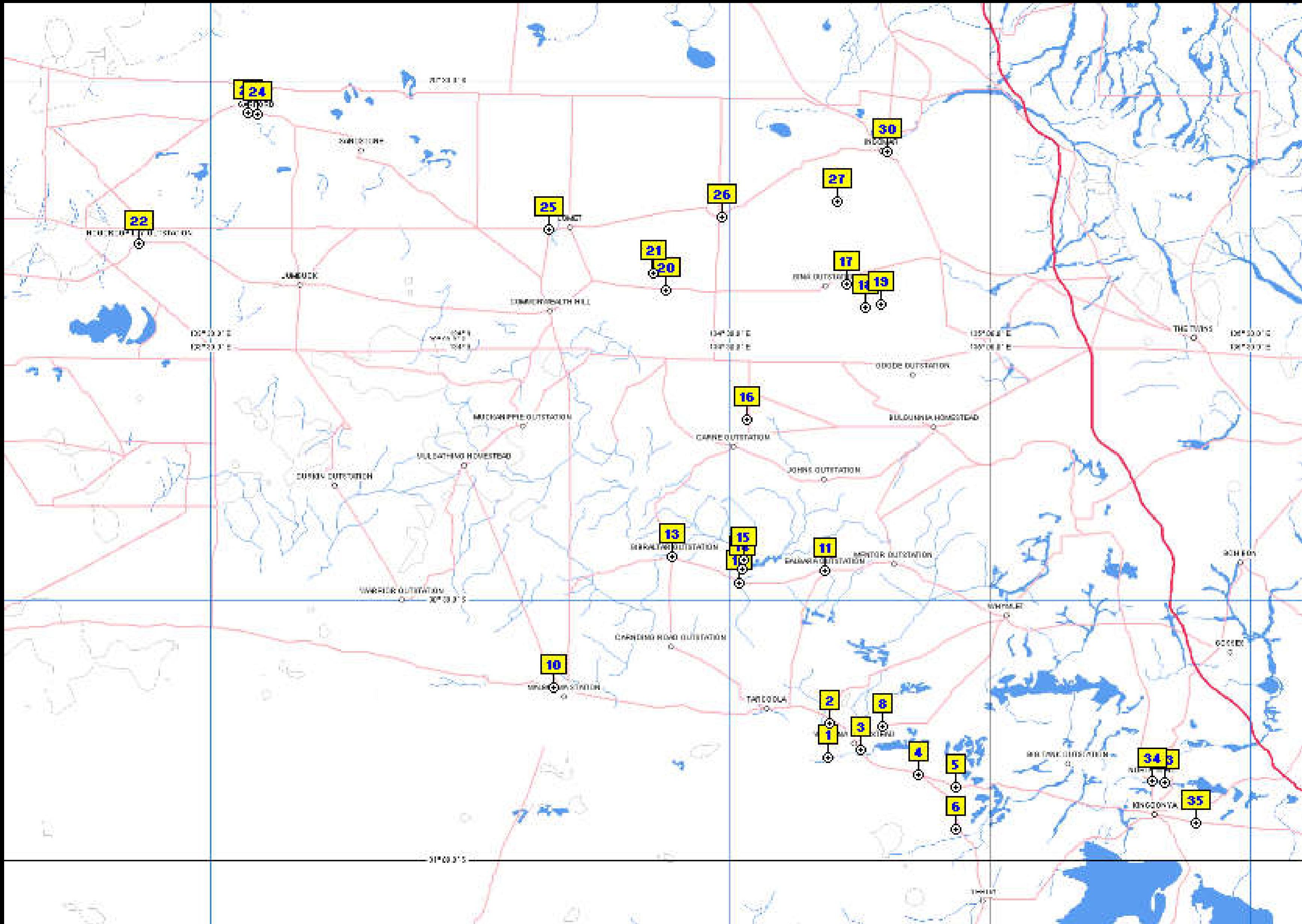
Australian stygobitic diving-beetles - *Nirripirti*

The top predators

all else is prey



Australian stygobitic diving-beetles - *Limbodessus*



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LAMBUCK
COMMONWEALTH HILL
THE TWINS
ODODE OUTSTATION
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MUCKANIPPIE OUTSTATION
BULGUNNIA HOMESTEAD
CARNE OUTSTATION
MULGATHING HOMESTEAD
JOHNS OUTSTATION
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MENTOR OUTSTATION
WARRIOR OUTSTATION
CARNDING ROAD OUTSTATION
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TARCOOLA
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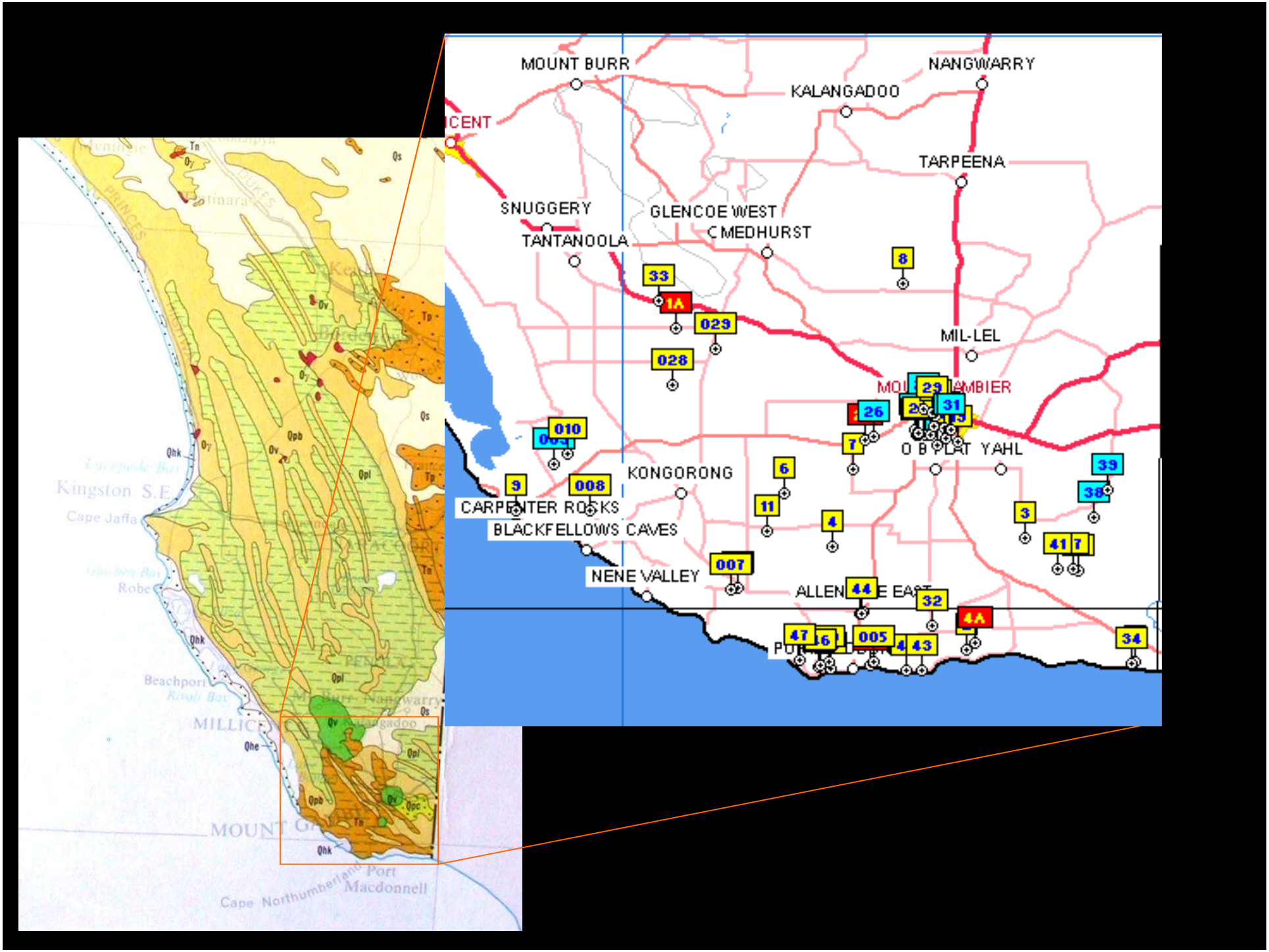
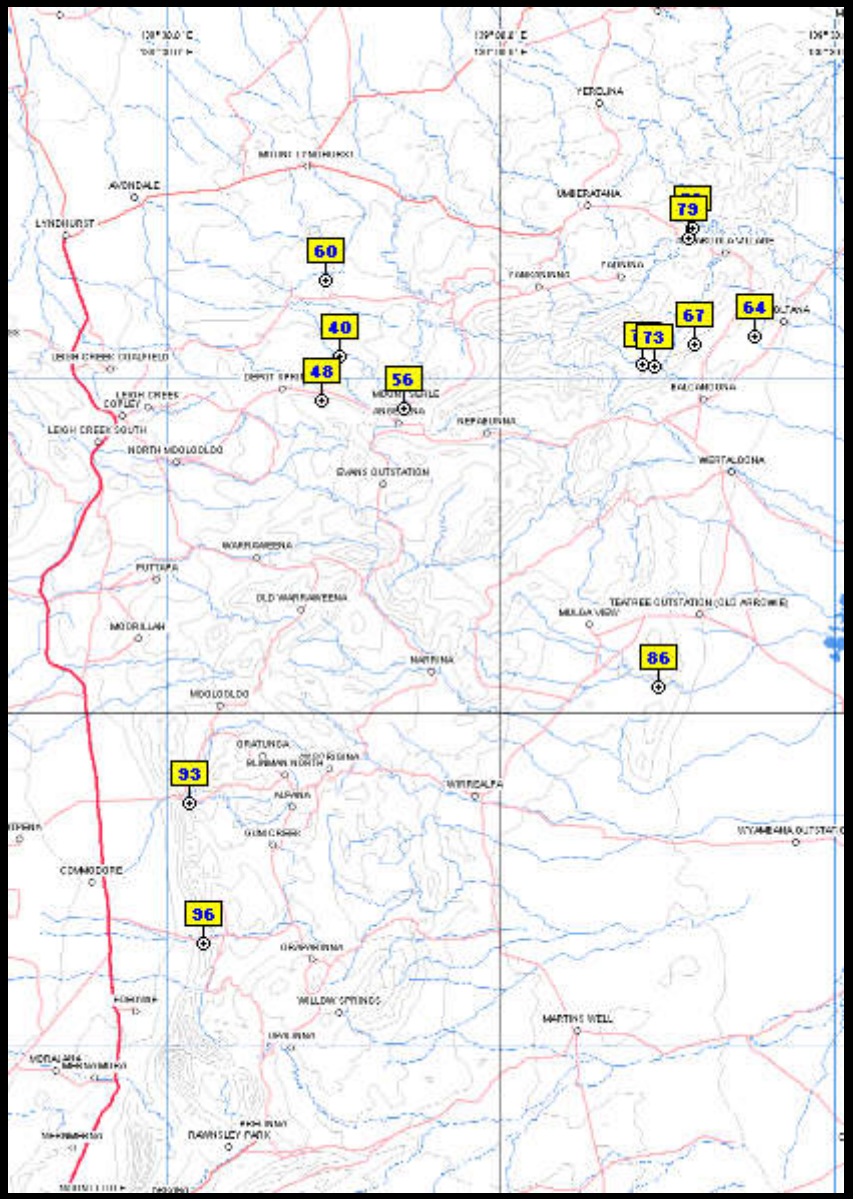
KINGOONYA


MOUNT BURR
NANGWARRY
KALANGADOO
TARPEENA
SNUGGERY
GLENCOE WEST
TANTANOOLA
MEDHURST
MIL-LEL
KONGORONG
CARPENTER ROCKS
BLACKFELLOWS CAVES
NENE VALLEY
Kingston S.E
Cape Jaffa
Beachport
Port Macdonnell
Cape Northumberland
Qs
Qv
Qpl
Qpb
Qhk
Qhe
Tn
Tp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AVONDALE
LYNDHURST
UMBERATANA
LEIGH CREEK SOUTH
NORTH MOOLOOLOO
EVANS OUTSTATION
PUTTAPA
MOOLILLAH
MOOLOOLOO
COMMODORE
WILLOW SPRINGS
MARTINS WELL
DAWSLEY PARK


Lyndhurst
Mount Lyndhurst
Arkaroola
Leigh Creek
RANGES
LAKE
Beltana
Parachilna
Blinman
TORRENS
St Mary Peak
Frome
Curnamona
Hawker
FLINDERS
Cradock
Quorn
Carrieton
Wilmington
Orroroo
Yunta