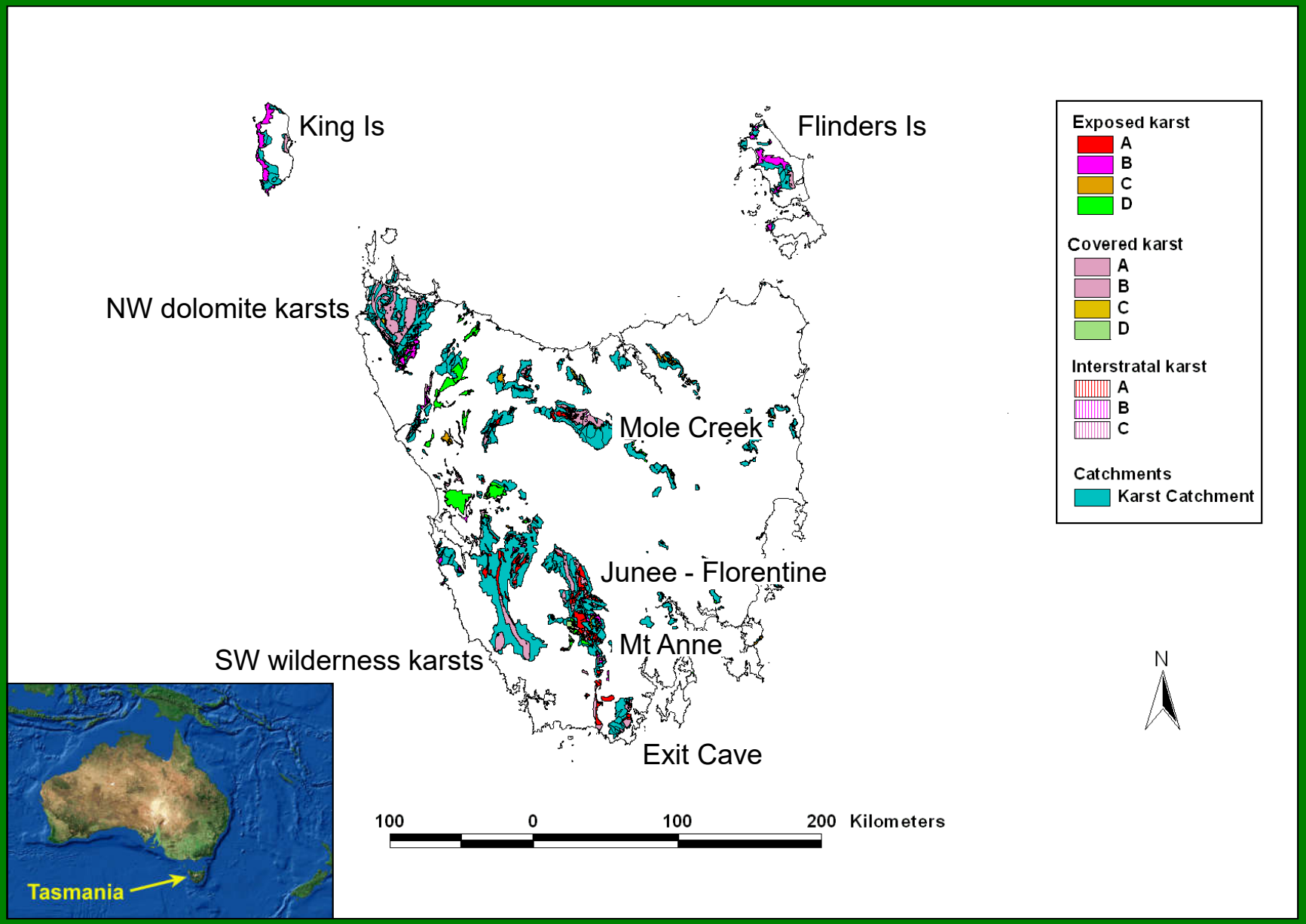
CONSERVATION OF TASMANIA'S KARST AND GROUNDWATER DEPENDENT ECOSYSTEMS

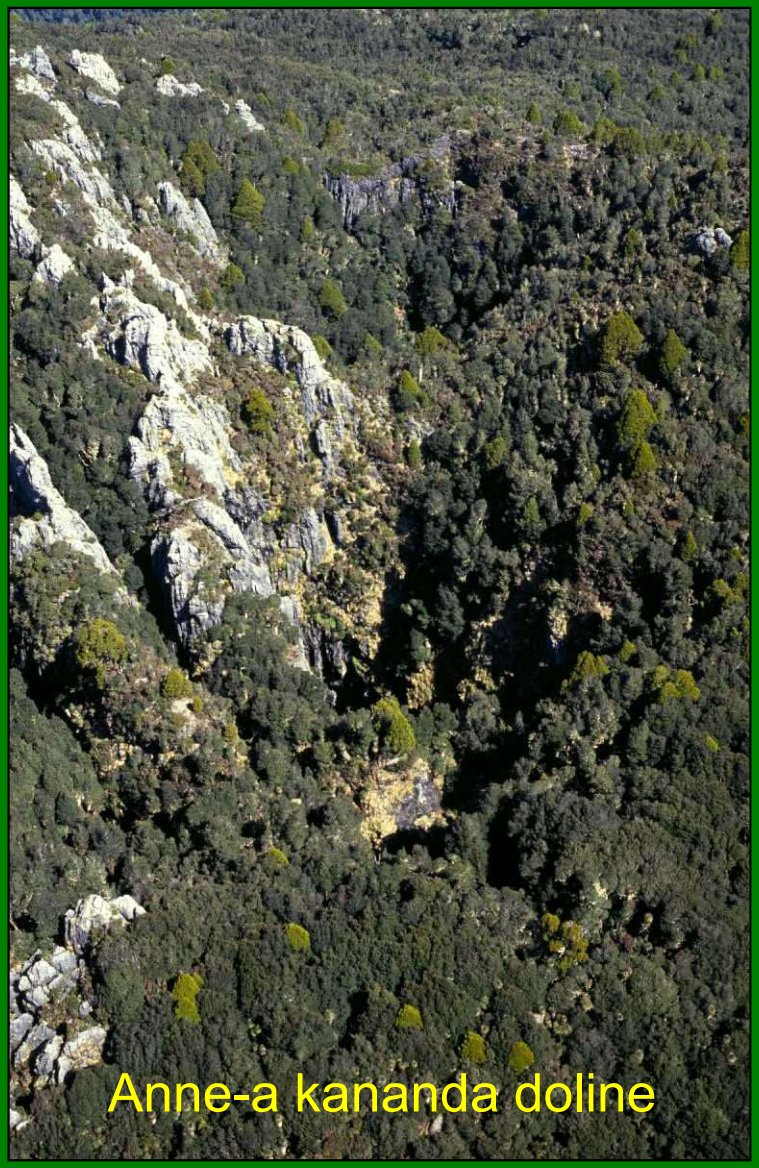
Ian Houshold
Earth Science Section DPIWE

Tasmania's karst areas



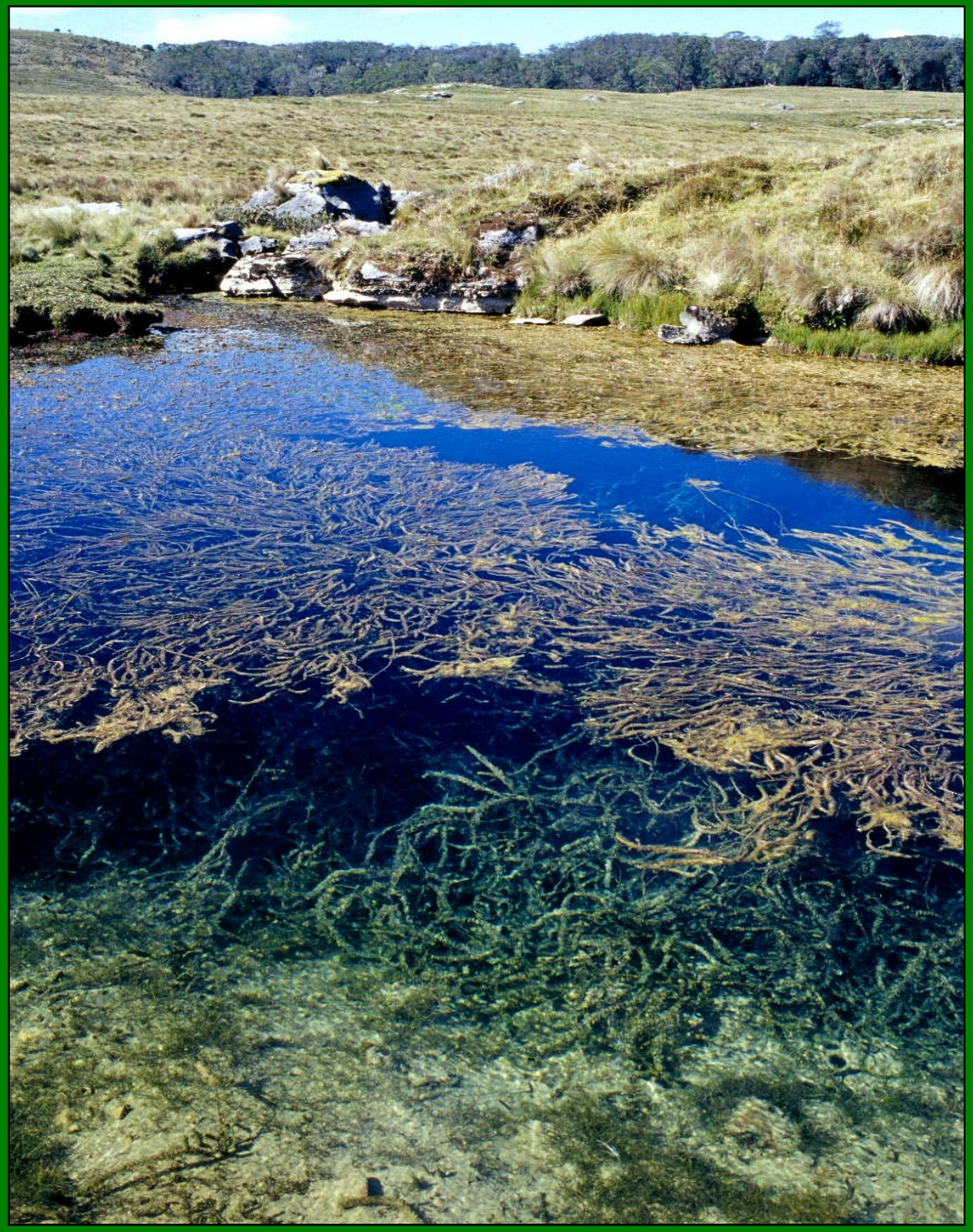
Wilderness karst SW Tasmania

Mt Anne alpine karst

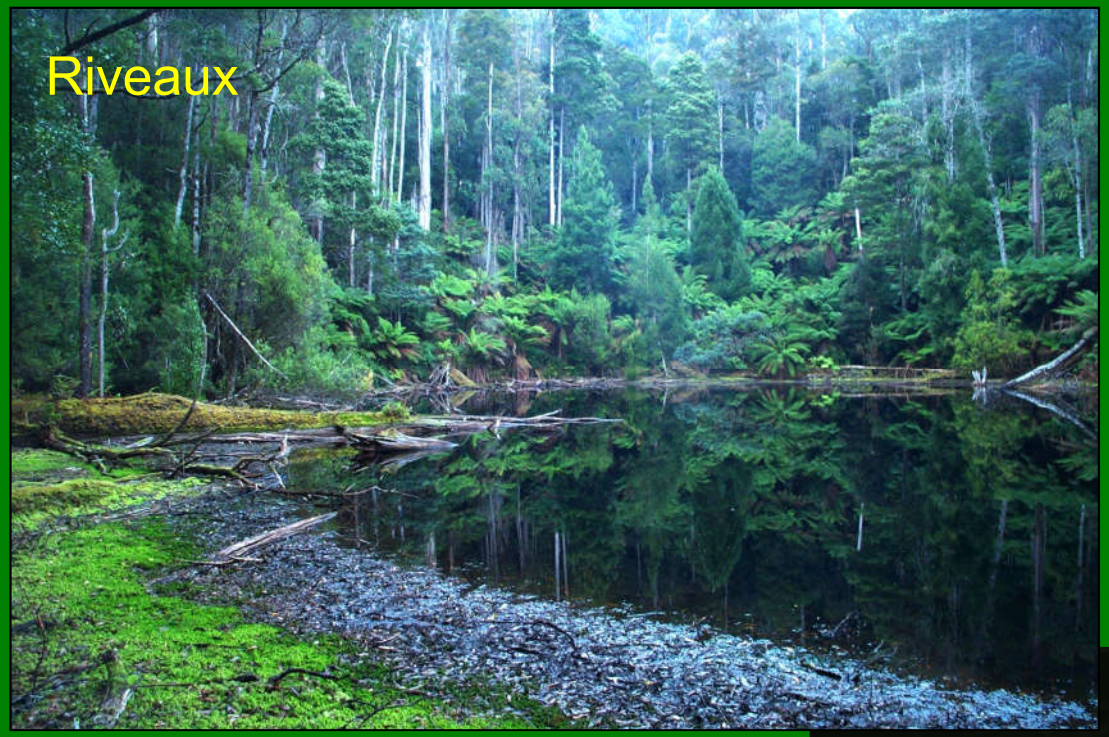


Anne-a kananda doline

Anne-a-kananda entrance



Sub-alpine karst
Vale of Belvoir
N Tasmania



Forested karst - drowned dolines

Coastal karst

NW dolomite - extensive karst groundwater systems


Dairy on mound spring, Mella

Pumping from mound spring

Dismal Swamp polje NW Tasmania

Montagu
Cave NW
Tasmania

Mayberry polje
Mole Creek karst

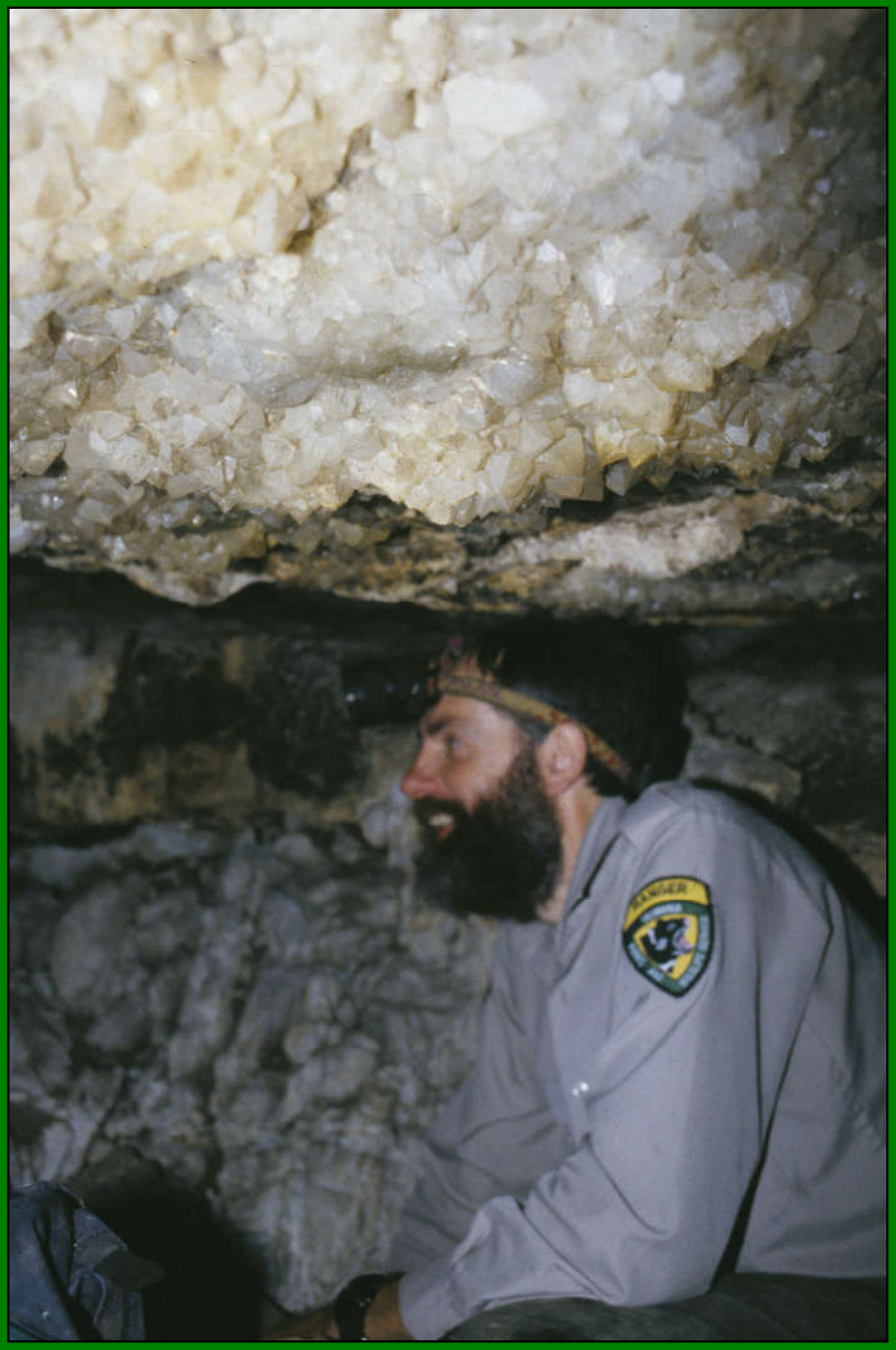
Photos Rolan Eberhard

Mole Creek Caves N Tasmania

Speleothems Mole Creek Caves

Exit Cave
Lune River
S Tasmania

Junee - Florentine

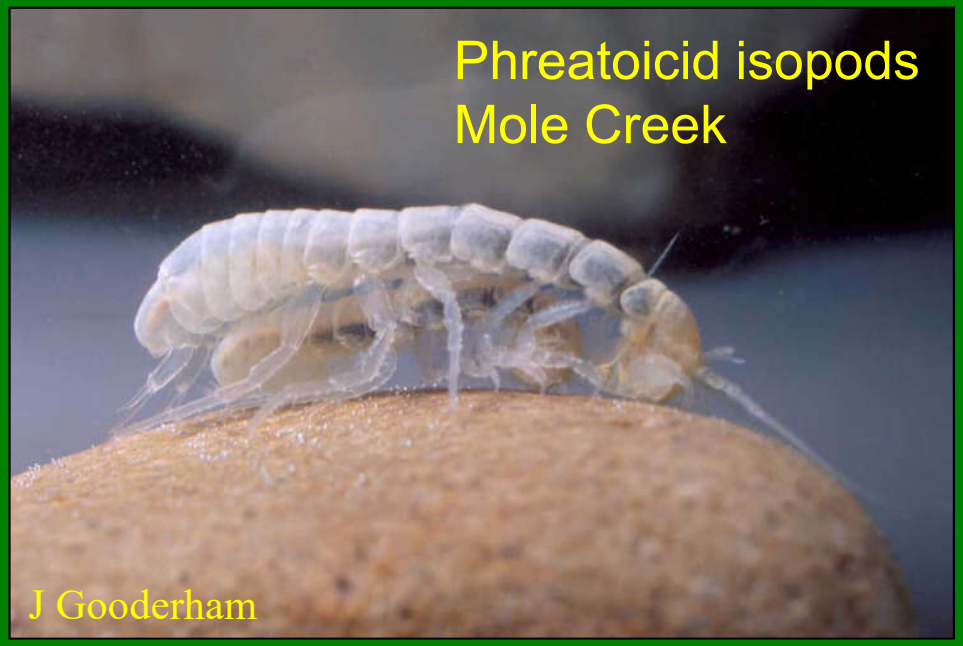


Crystal Cave
Mt Weld
S Tasmania

Megafauna subfossils
Montagu Caves
NW Tasmania

Tasmanian Cave Arachnids

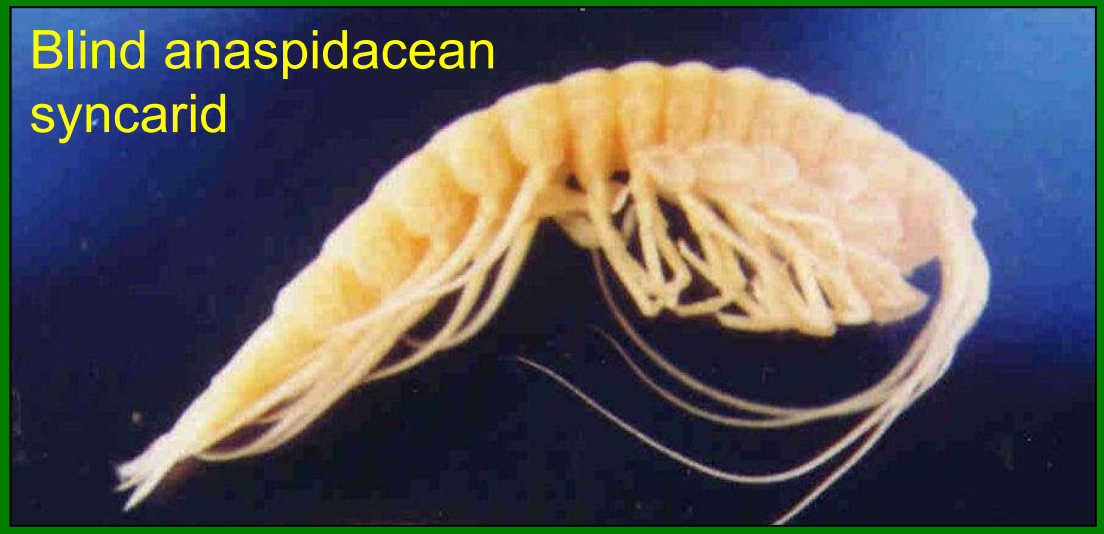
Aquatic cave fauna



Aquatic cave fauna

Photos by Arthur Clarke


Crangonyctoid amphipod


Blind anaspidacean syncarid


Undescribed phreatoicid

Platypus Nest Riveaux Cave

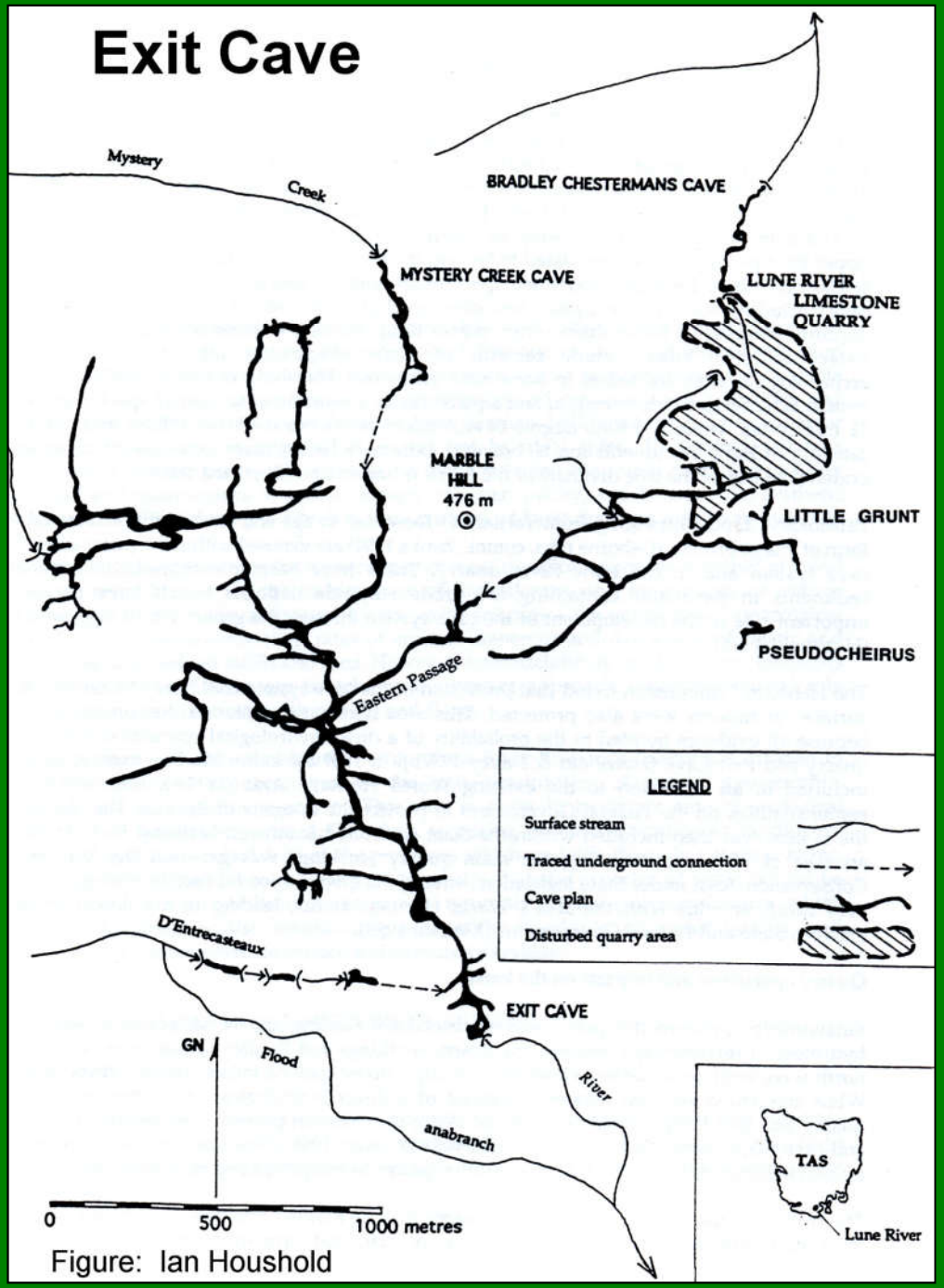
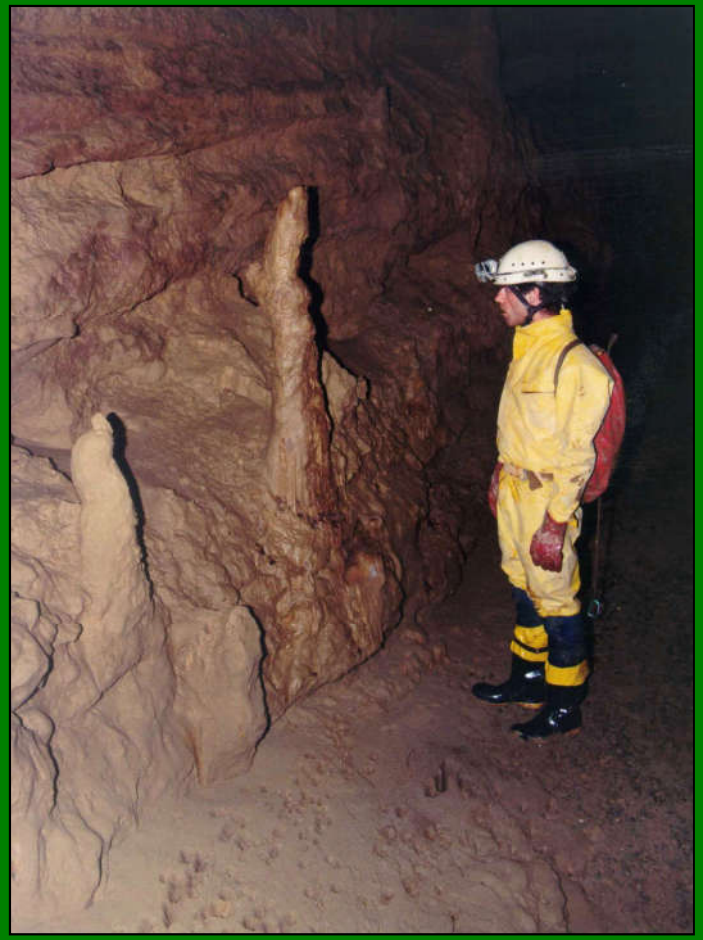


Figure: Ian Houshold

Lune River limestone quarry



Physical rehabilitation Lune River quarry

Railton cement works

Forest operations
Florentine Valley

Recreational impacts

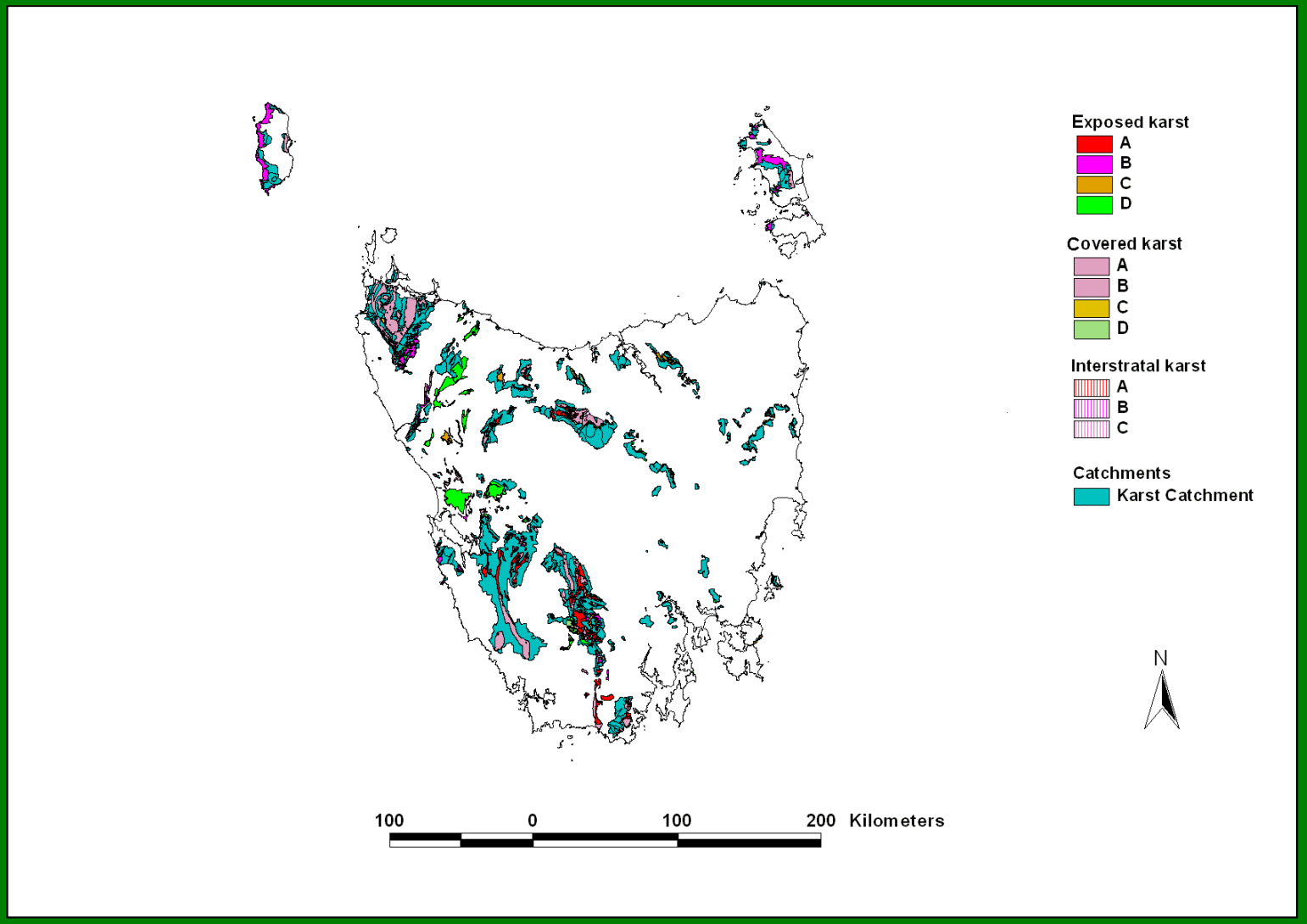
Precipitous Bluff

King Solomons Cave

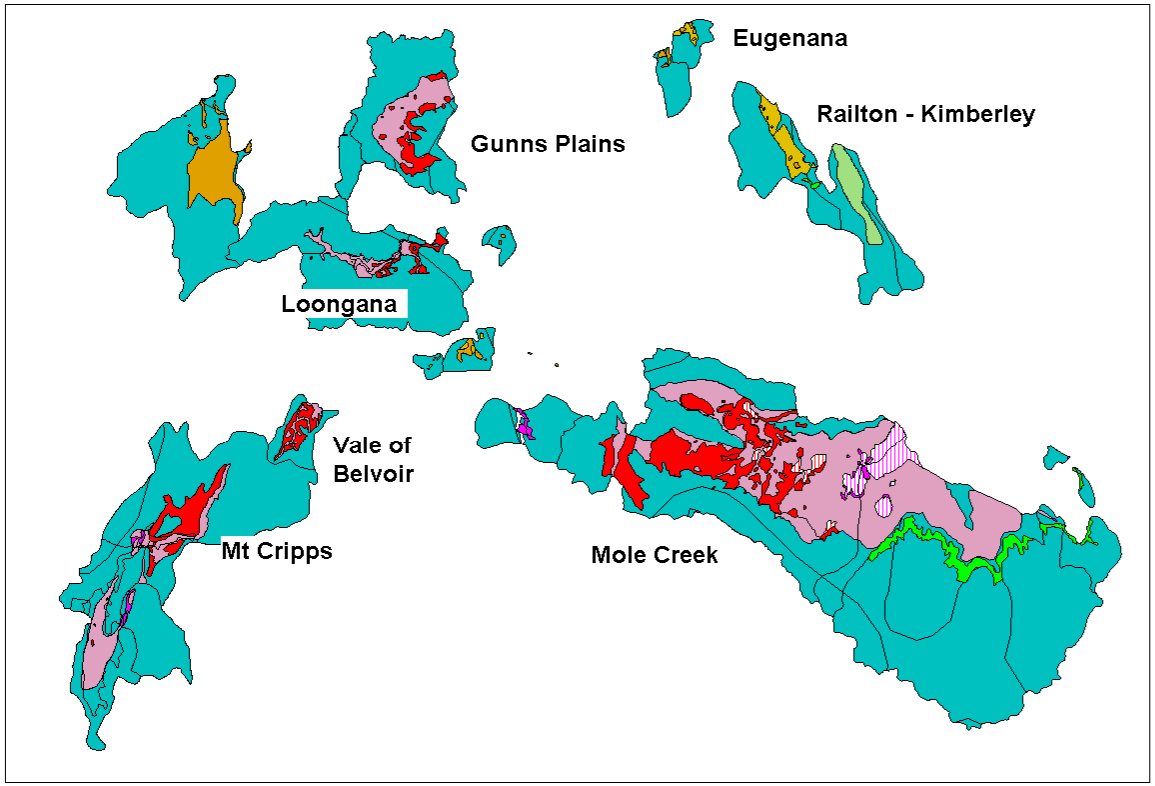
Management tools

- Tasmanian digital karst atlas project
- Tasmanian Geoconservation database
- Groundwater prospectivity and flow path mapping
- State geomorphic regionalisation
  - Allows context areas to be set for geoconservation
  - Permits ‘templates’ to be defined for rehabilitation
- Conservation of Freshwater Ecosystem Values (CFEV) project

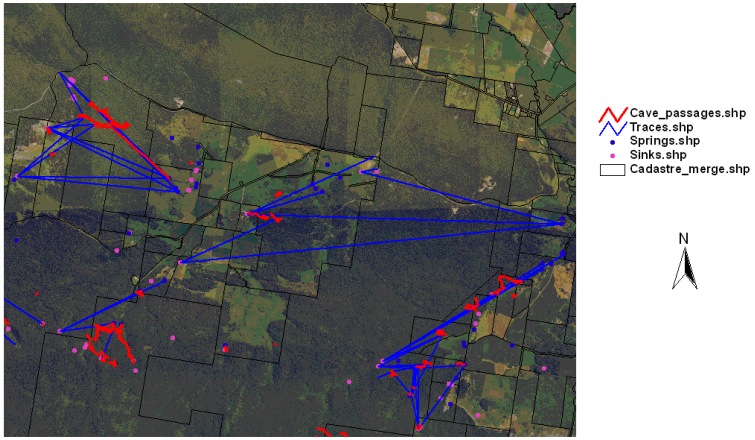
Tasmanian digital karst atlas project



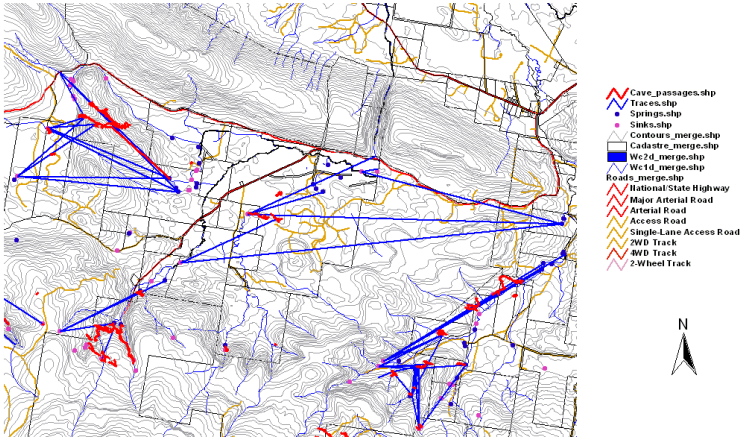
Tas Karst Atlas Mole Creek area



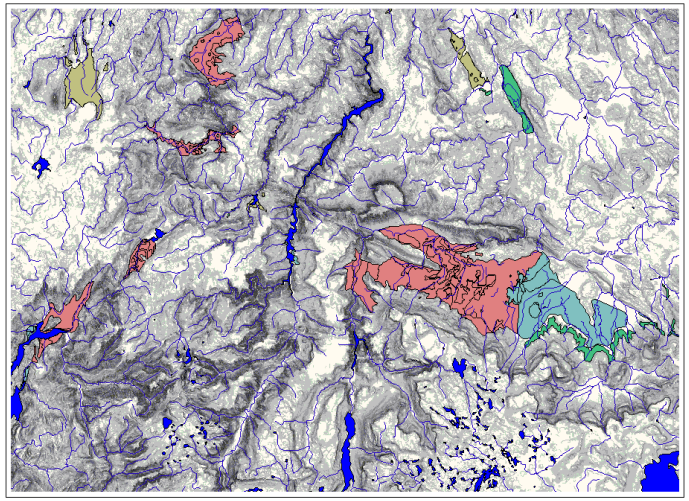
Local area karst atlas output



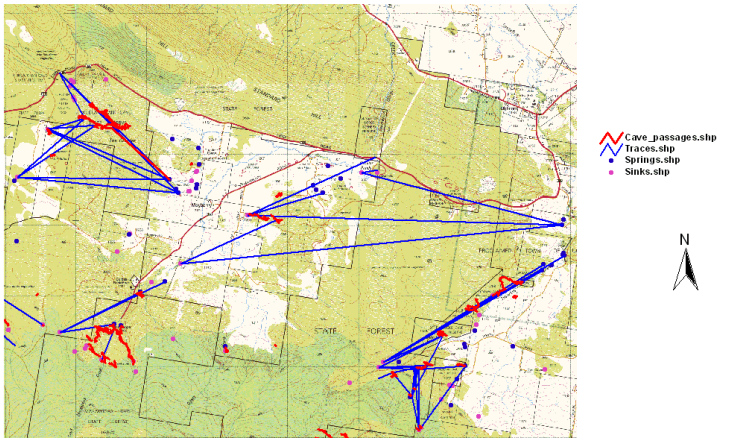
Mole Creek - aerial photos



Mole Creek vector map

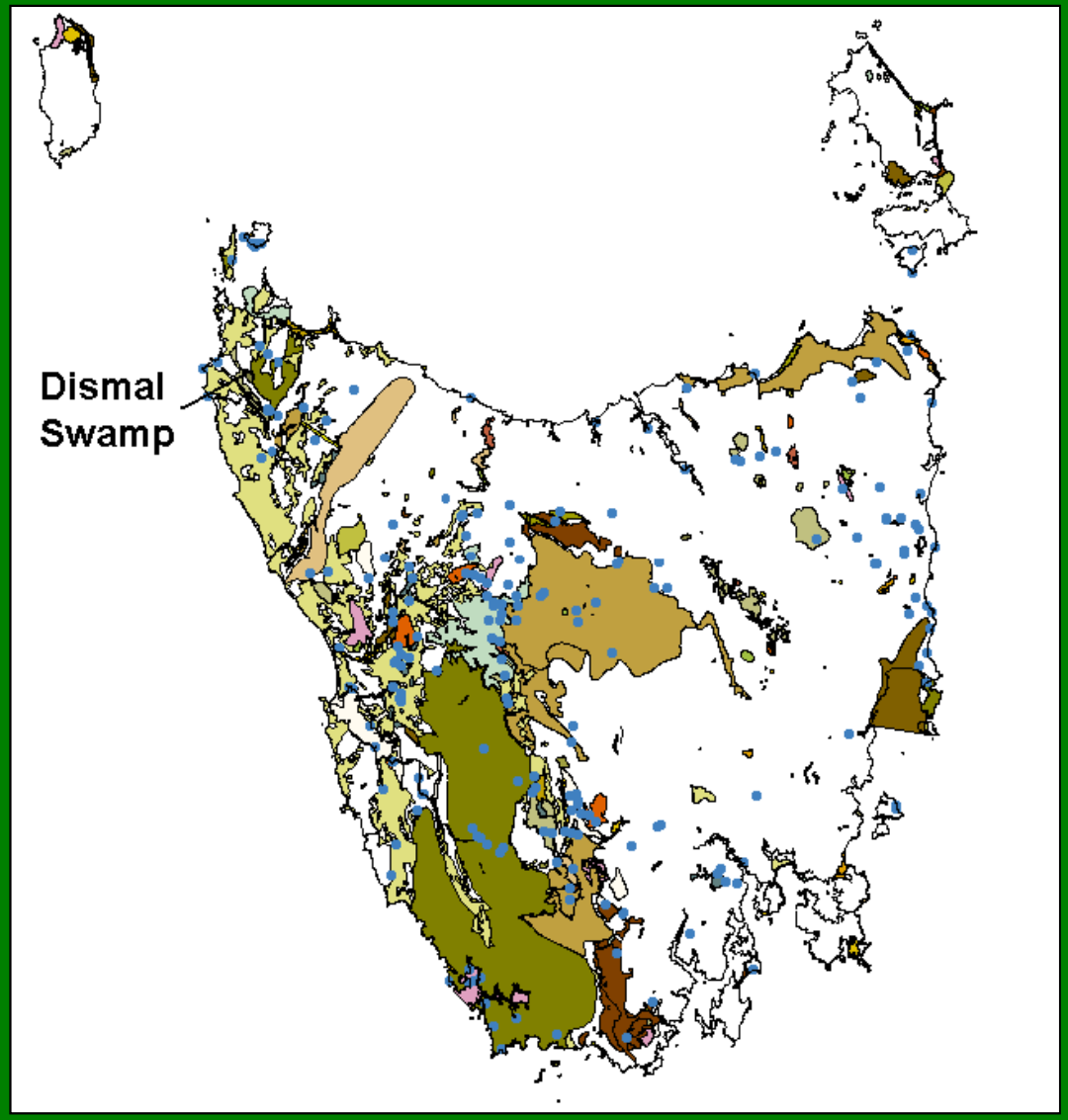


Mole Creek karst/slope



Mole Creek topo base

Tasmanian Geoconservation Database



GIS code: *Org*
HUN23

Site Name: **Dismal Swamp Polje**

Listing status: Listed

Site description: Far northwest Tasmania, about 27 km southwest of Smithton.

Co-ord Centre of the internally draining karst depression (polje).

AMG 317500 **1:100,000 map no. and** 7816 ~ HUNTER

AMG Northing: 5462500 **1:25000 map no. and** 3046 ~
MARRAWAH

Management suitable status: **Size:** Medium/area **Interpretation :**

Physical

Landform

National estate

status	criteria
Potential	D1
	B1

Tenure

name	
Dismal Swamp	Fo
Dismal Swamp	Na S

Geological features

type	significanc	level	age	sens-itivity	degrade

Geomorphological features

type	significanc	level	age	sens-itivity	degrade
Karst	Outstanding	Australia	Cainozoic	4	slight

Soil features

type	significanc	level	age	sens-itivity	degrade

Site signifance

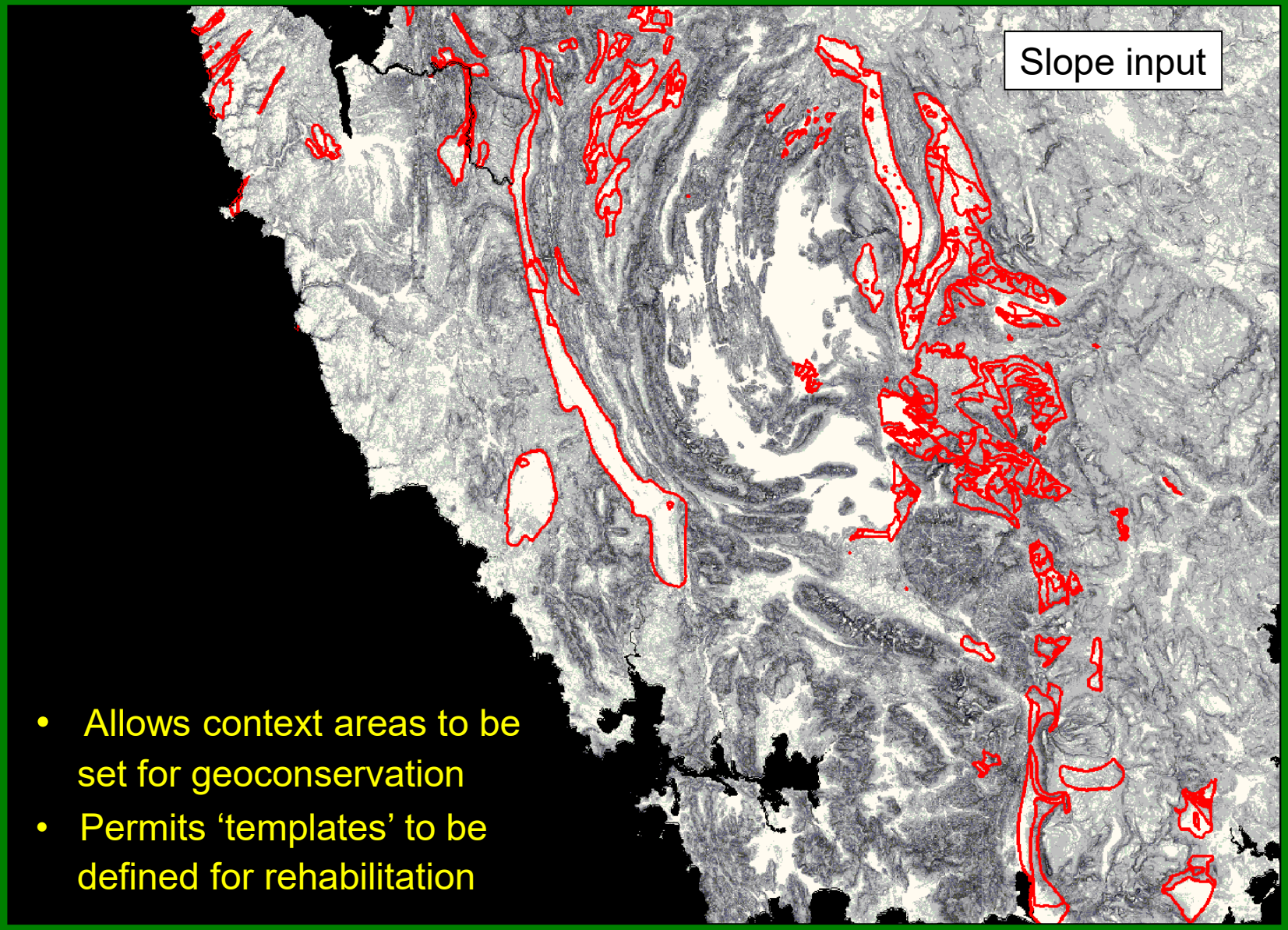
Most sig base	Most sig level	Most sig age	Overall
Outstanding	Australia	Cainozoic	

Comments:
Very large flat-floored internally draining karst depression (polje), with nested sink hole demonstrating karst drainage. A west-flowing stream has partly captured drainage from west side of swamp, but main portion of swamp still drains internally. Classical polje form, probably best example in Australia by comparison with Dinaric type examples. The swamp is unusual for lacking significant peat accumulations (contra Richley 1978); this is probably due to karst drainage allowing regular soil drying.Additional conservation values - the swamp is one of the few large swamps in northwest Tasmania which have not been artificially drained, and supports an important Blackwood Swamp forest which is the reason for the declaration of the Dismal Swamp Forest Reserve and Nature Reserve.

Management
Management area comprises Dismal Swamp valley floor and surrounding slopes draining into the swamp. Some degradation of the landform has occured due to roading on polje rim. The Forest Reserve and Nature Reserve cover only a portion of the polje floor, and do not include the nested sinkhole or polje rims. Major management concerns include maintaining characteristic form of rim slopes, preventing ground disturbance at western stream outlet which could lead to gullying and artificial drainage of the swamp, and maintaining quality of waters flowing into swamp.

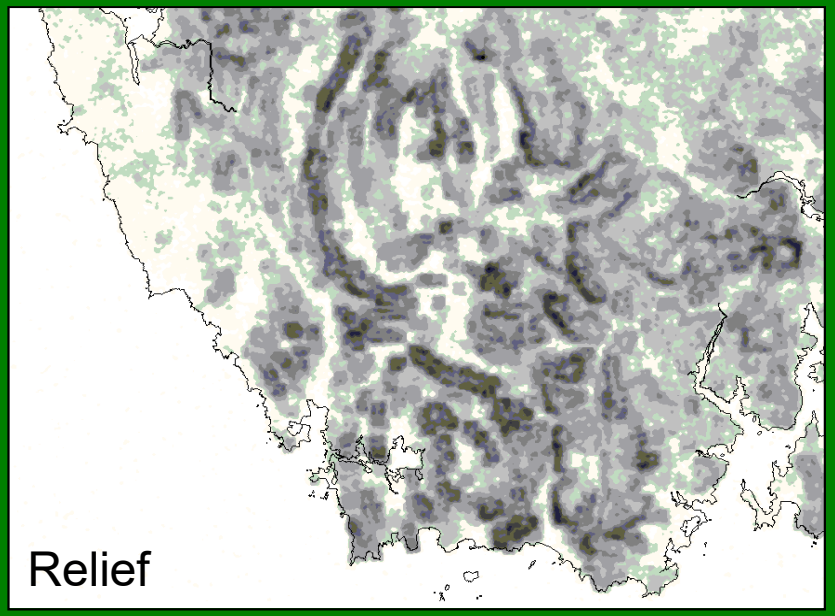
Nominated by: **date:** **Listed by:**
date:
09/10/2004

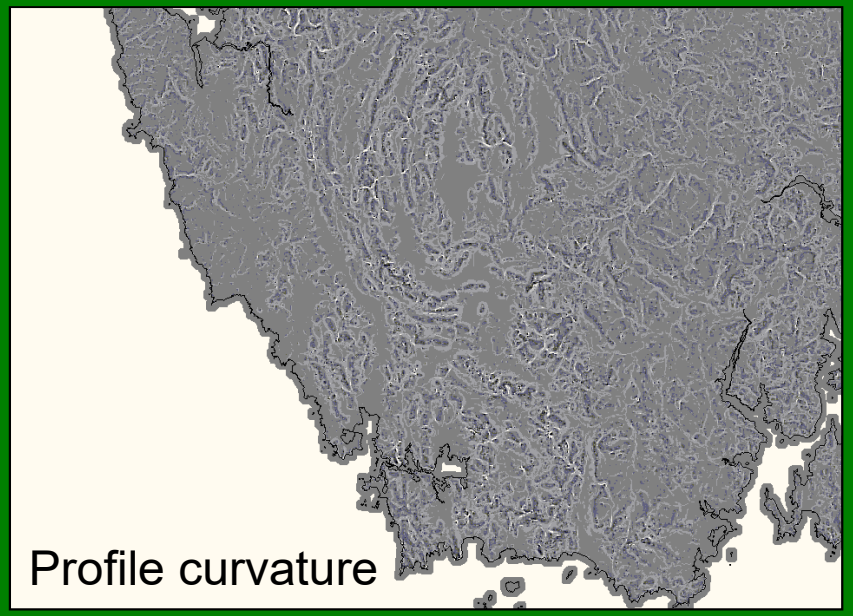
State geomorphic regionalisation - Environmental Domain Analysis

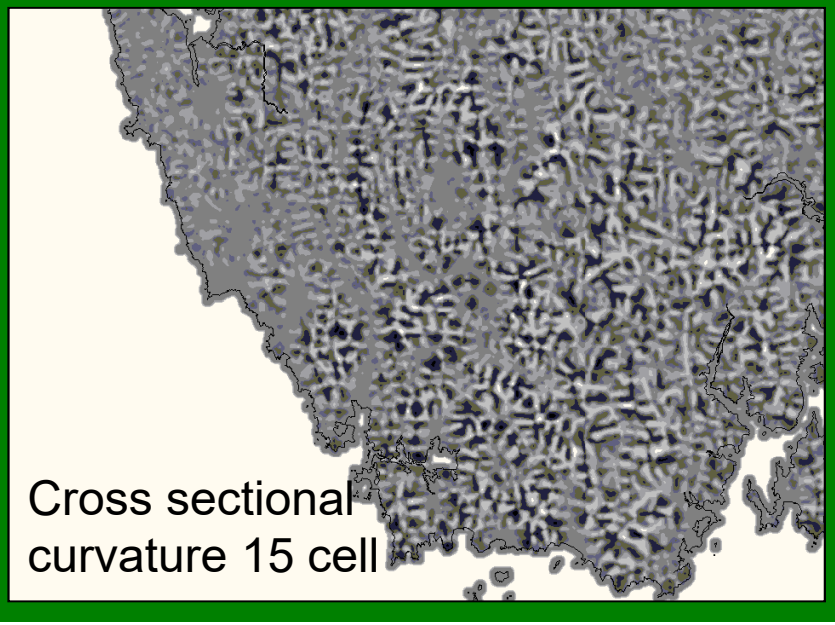


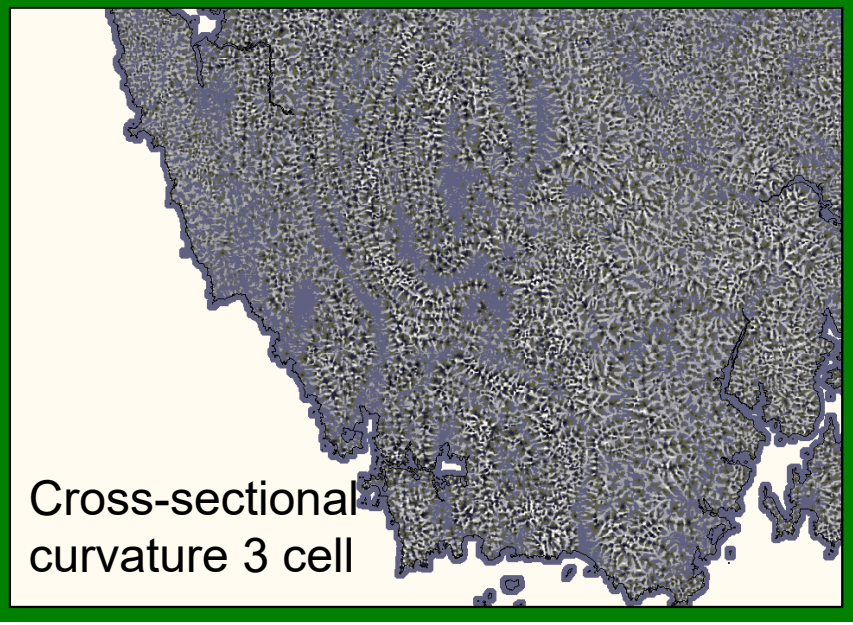
- Allows context areas to be set for geoconservation
- Permits ‘templates’ to be defined for rehabilitation

EDA topographic inputs

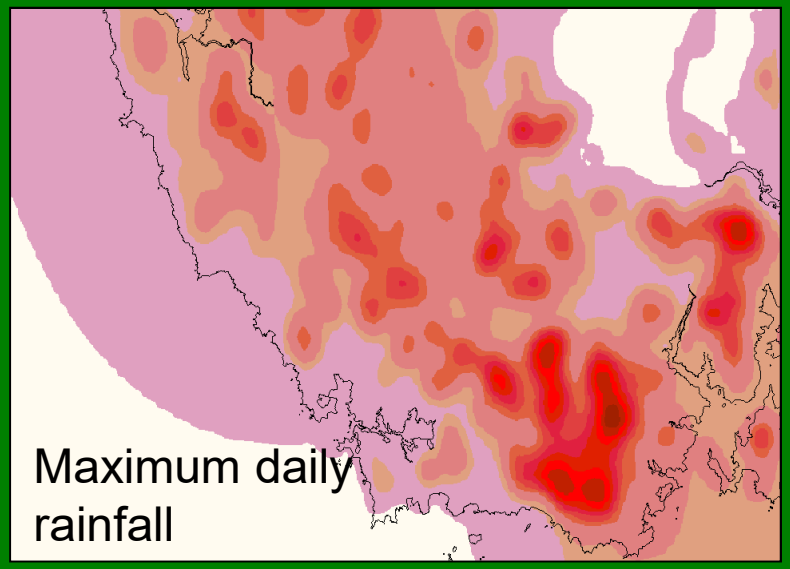


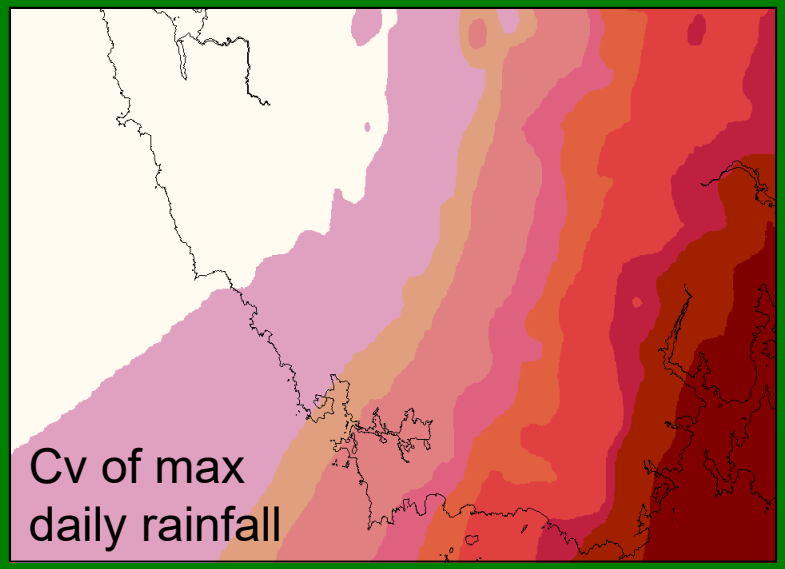


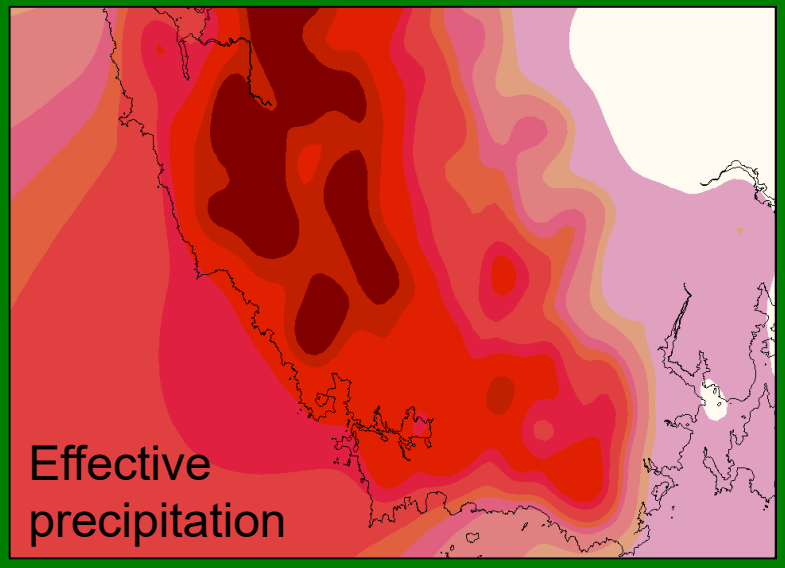


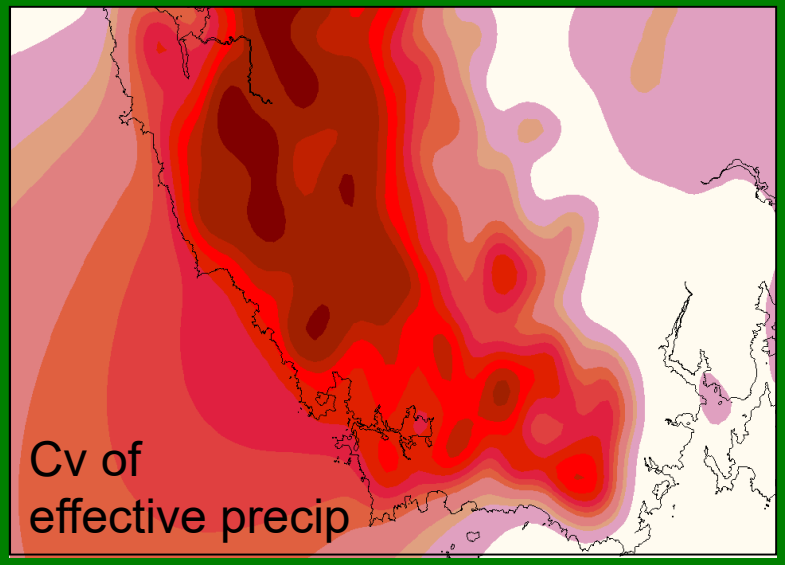


EDA climate inputs

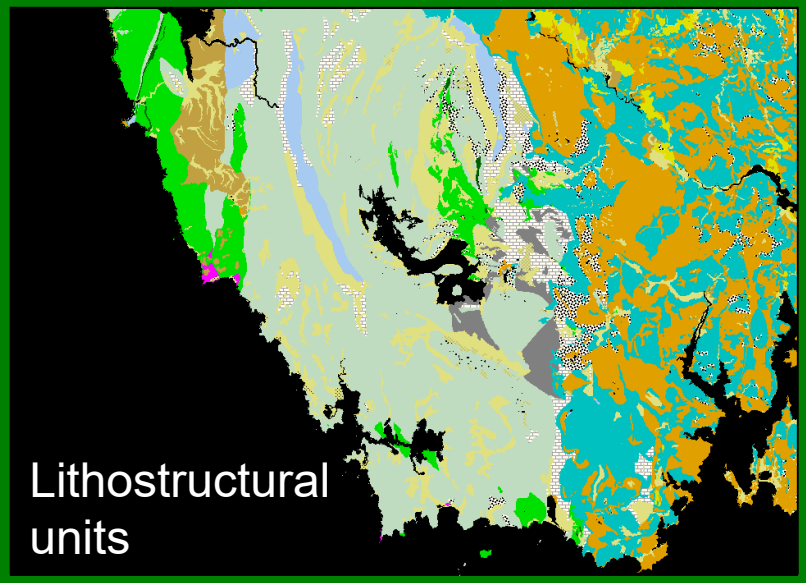


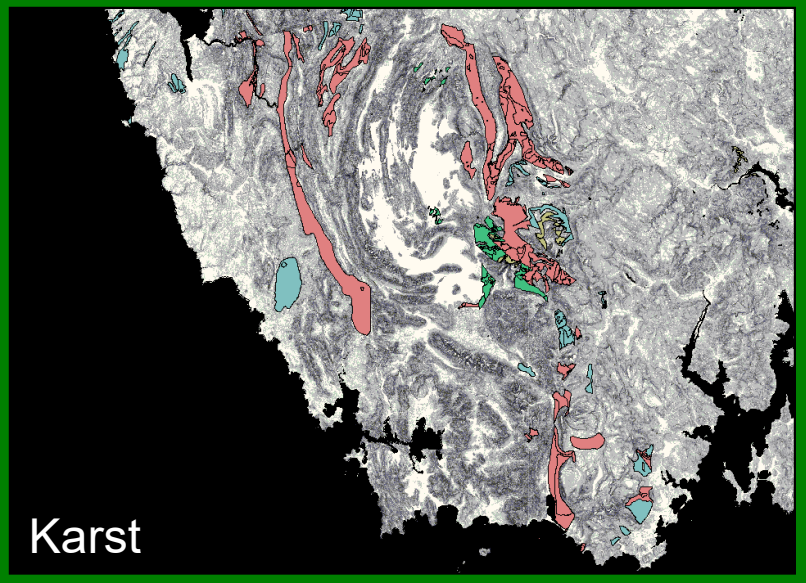


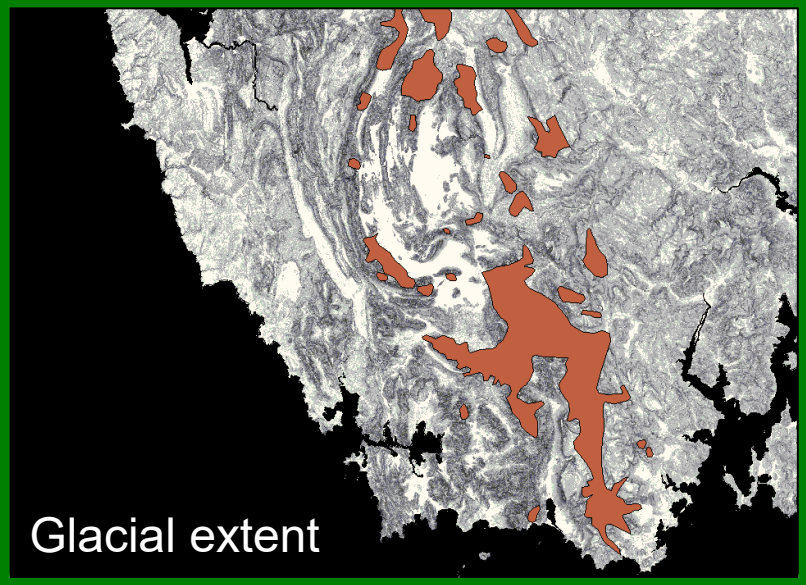


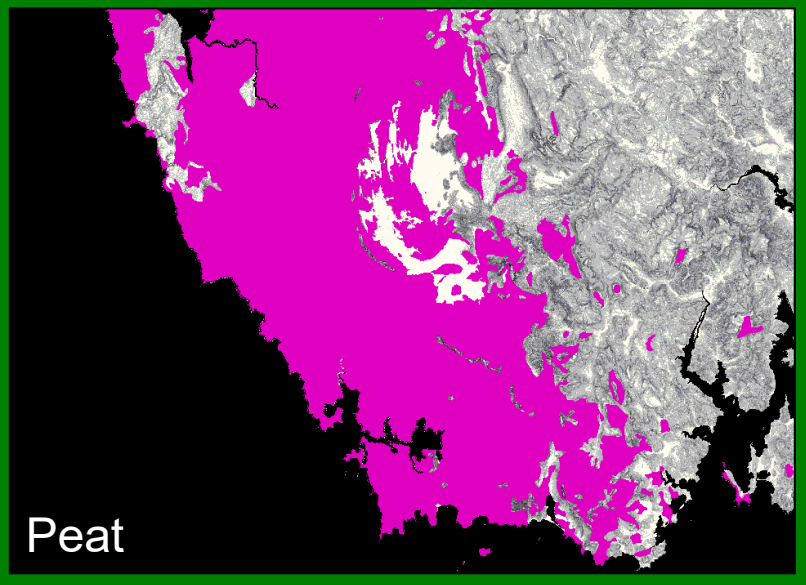


EDA lithostructure and process history

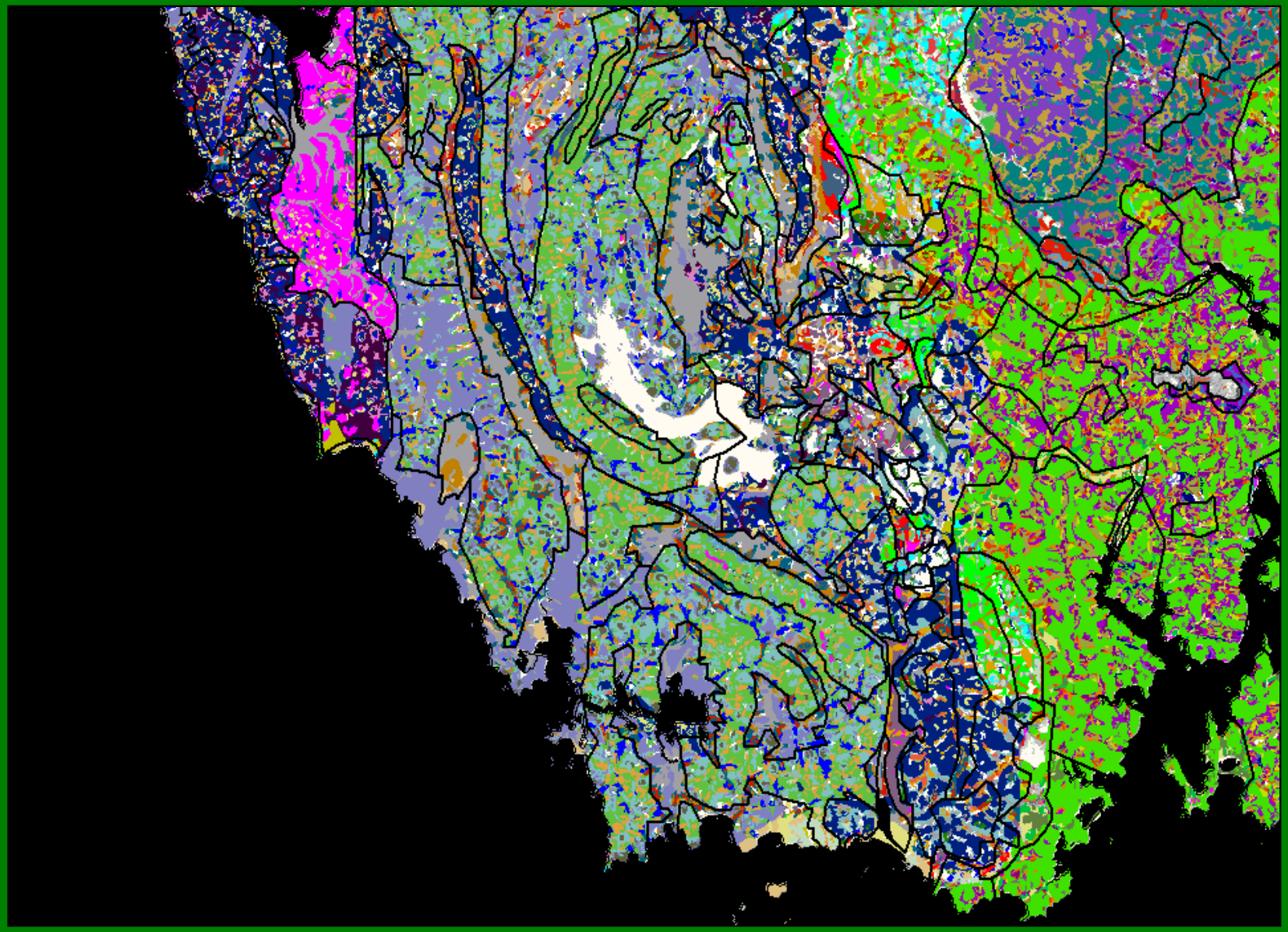




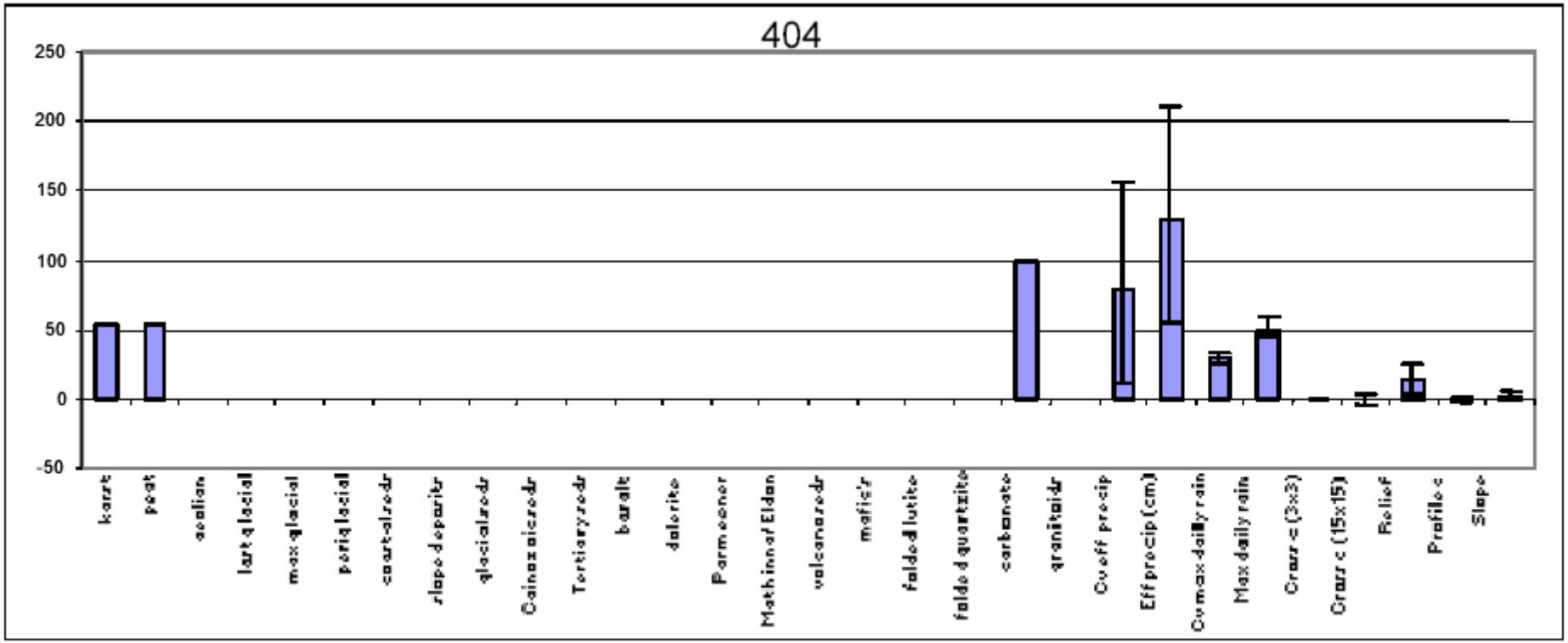




Final Environmental Domain Analysis and geomorphic mosaics

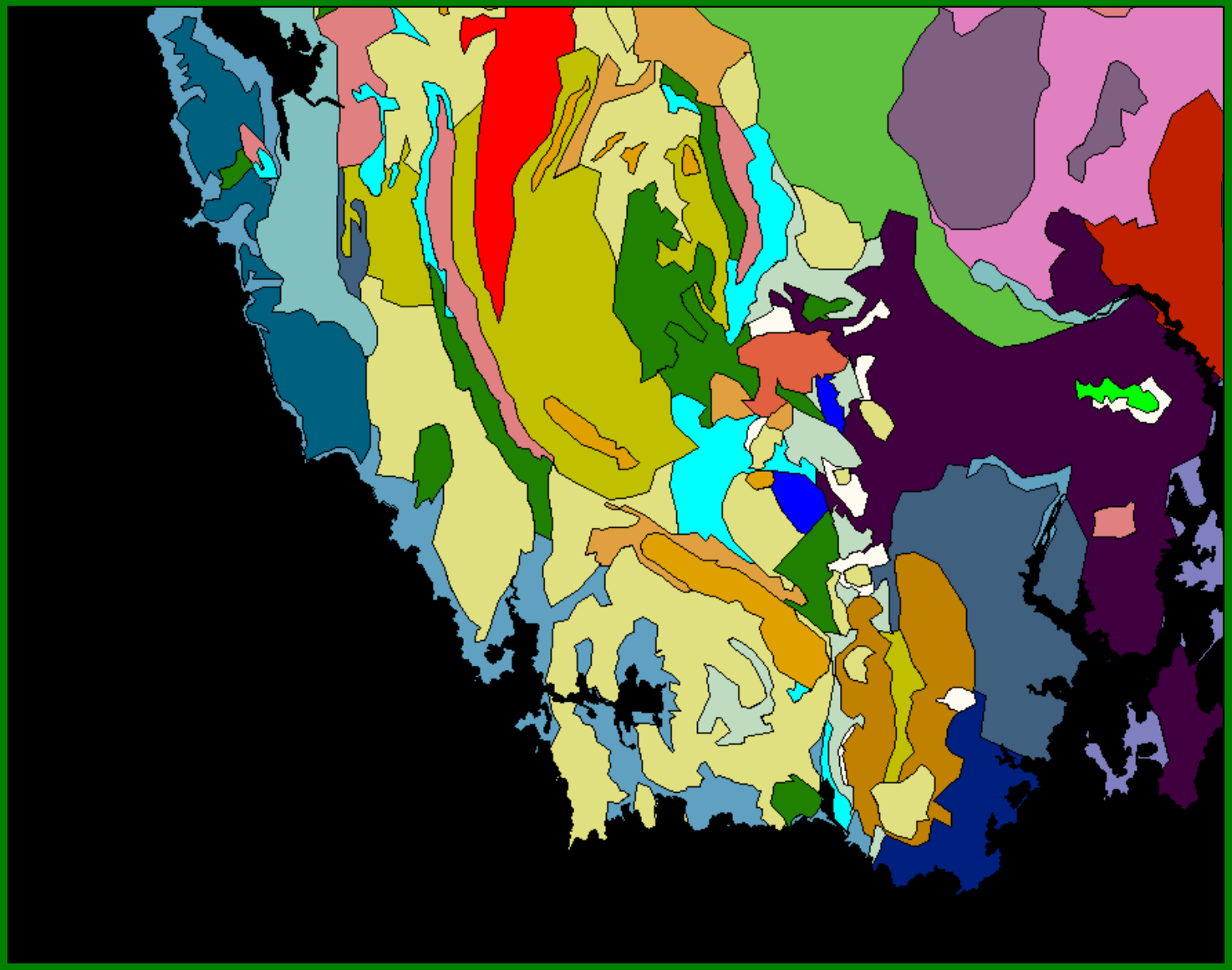


Components of Environmental domains

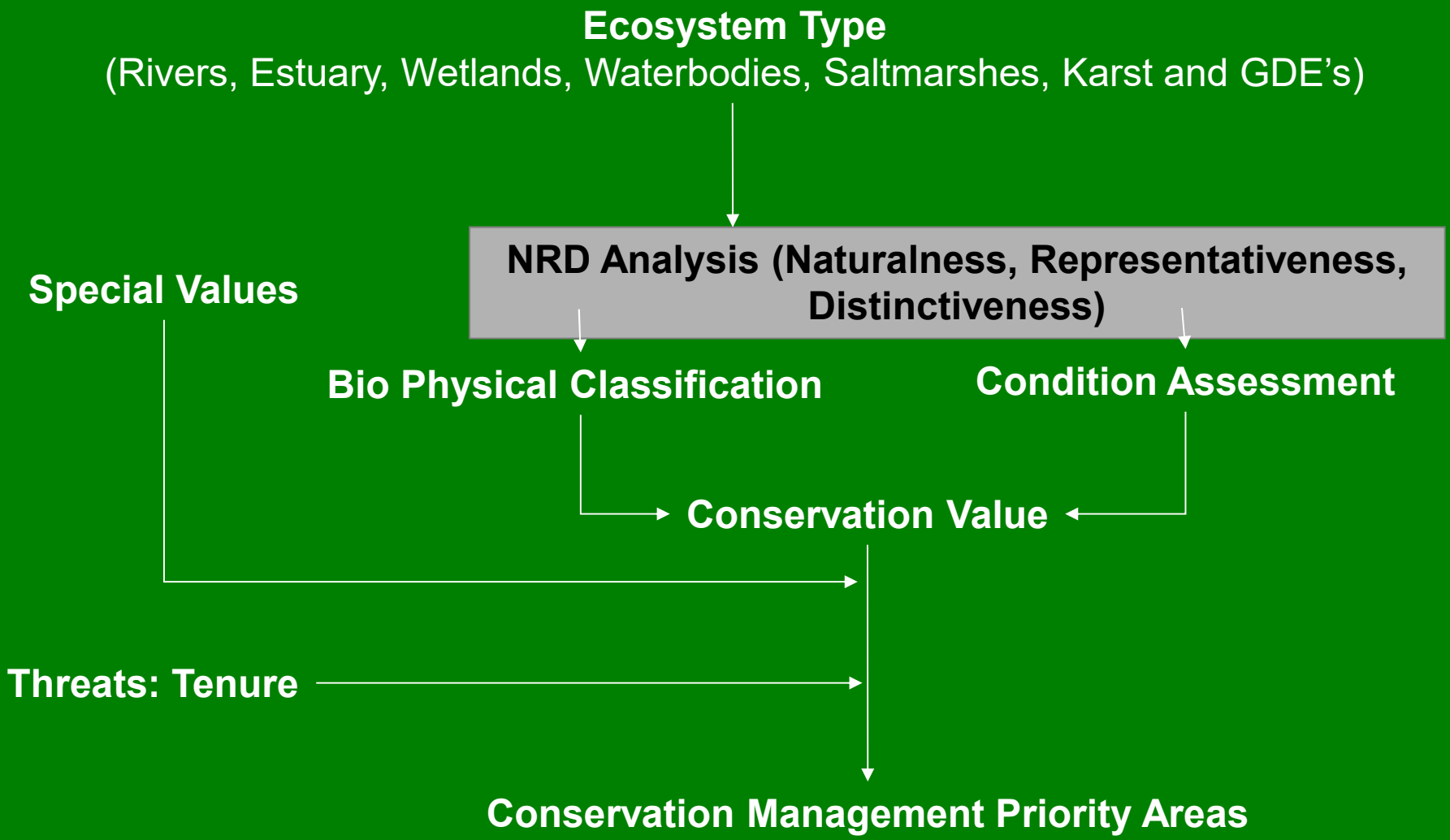


The range of each system control in domain 404

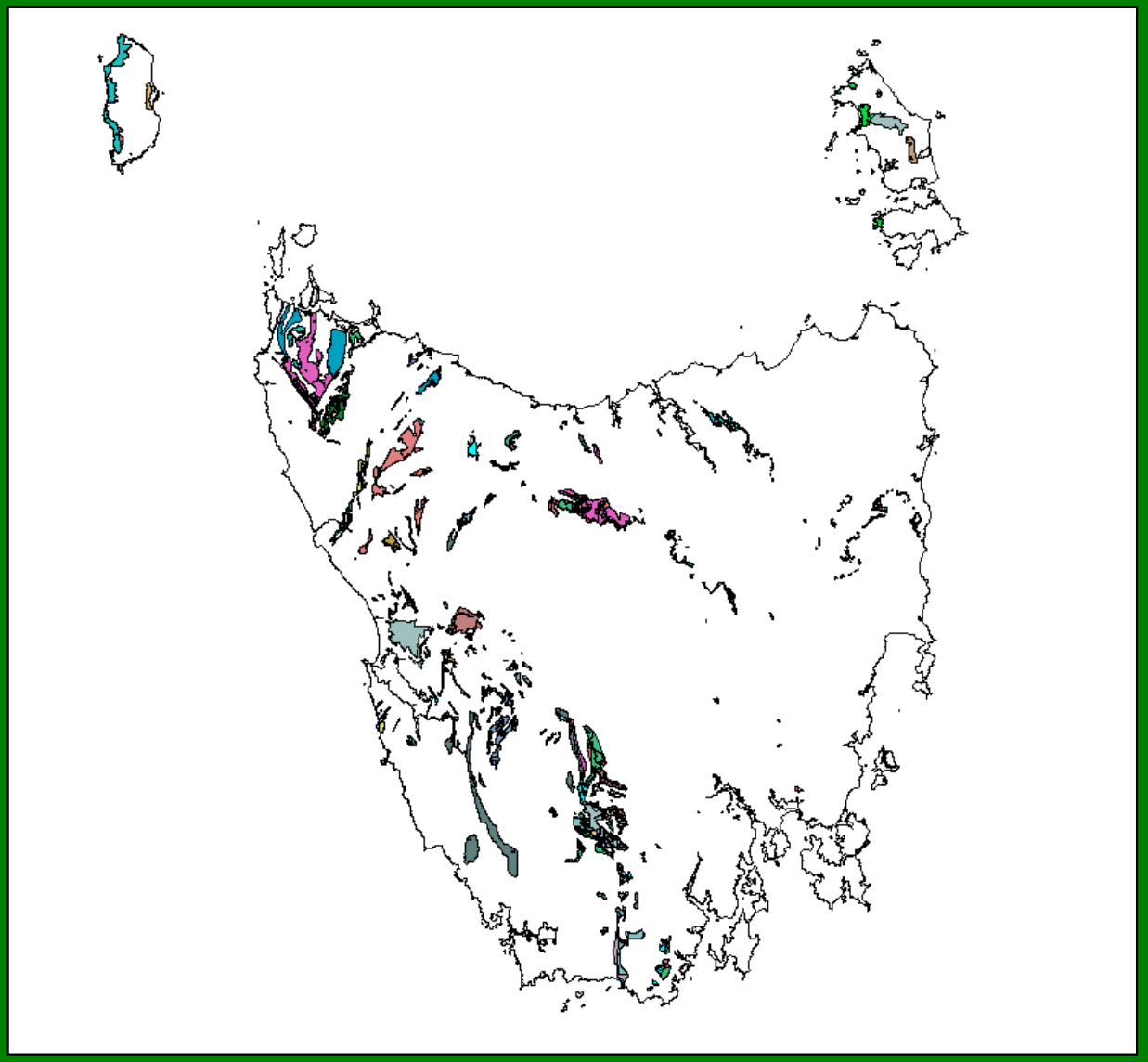
SW Tasmanian Geomorphic regions

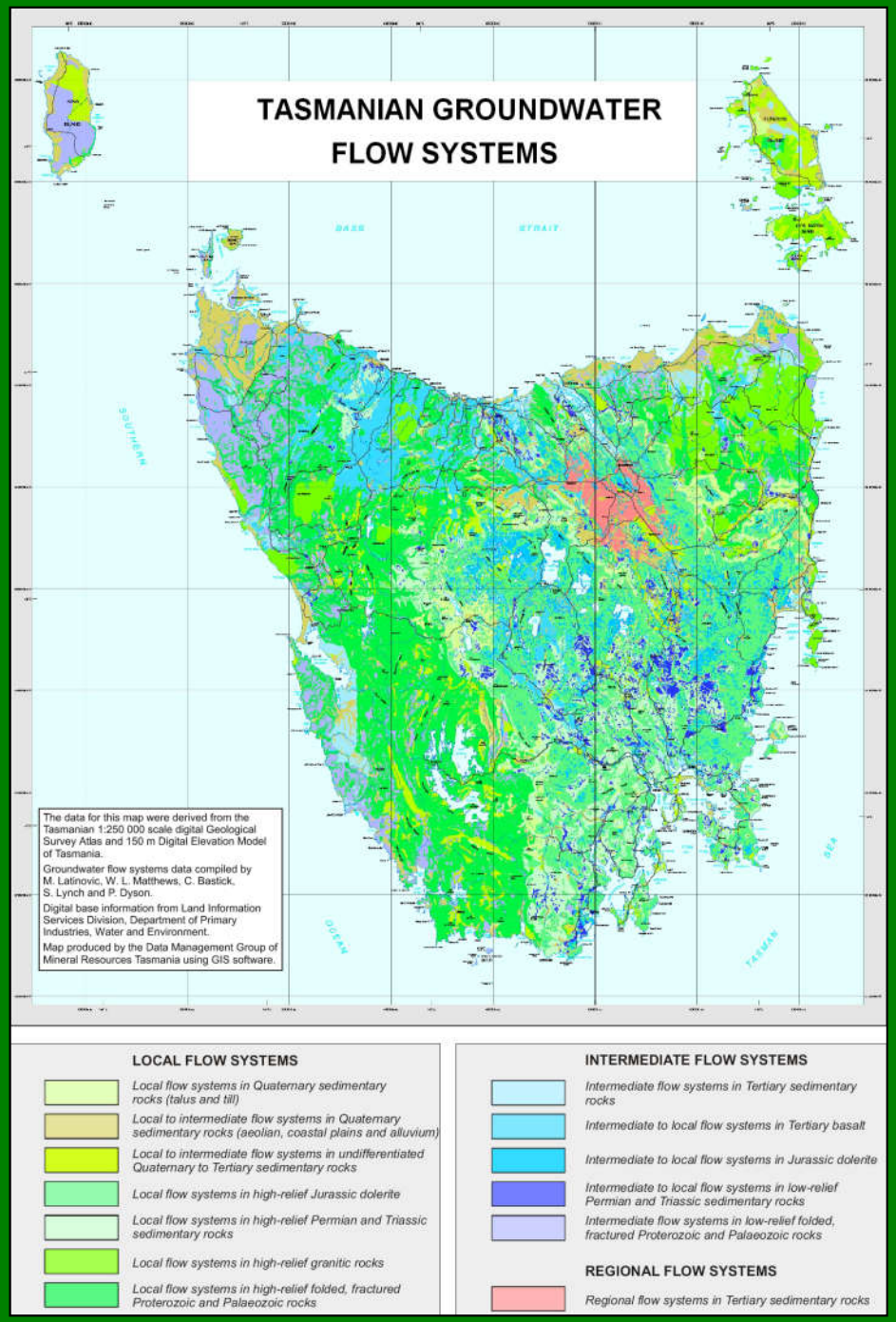


Conservation of Freshwater Ecosystem Values project



Physical karst classification for CFEV





Groundwater flow mapping for non-karst GDE's

Groundwater Dependent Ecosystem categories

- Terrestrial vegetation
- River baseflow systems
- Aquifer and cave ecosystems
- Wetlands
- Estuarine and near shore marine
- Terrestrial fauna

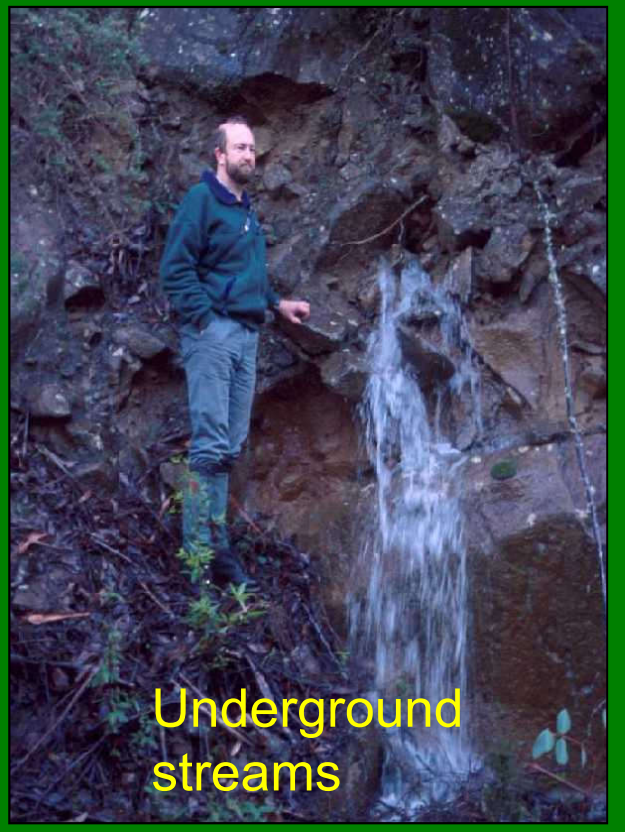
Working list of GDEs

- Karst systems: limestone, dolomite, magnesite
- Springs: warm springs, mound springs, karstic and non-karstic springs
- Preferential underground flows: dolerite colluvium, peat soils, Granite
- Dolerite slump Ponds: Weilangta, Mt Barrow, Ben Lomond, etc
- Alpine bogs: Mt Wellington, Mt Field, etc
- Coastal wetlands in Quaternary sands: Henty Dunes, New River, Wineglass Bay, Furneaux Ids, etc
- Alkaline Pans: Maxwell River, Davey River, Hardwood River
- Salt pans, lunettes, deflation hollows: Midlands, Central Plateau
- Tufas: Boggy Ck, Mole Ck, Maria Is, Forestier Peninsula
- Vegetation types on saturated soils: Sphagnum, blanket bogs

Peatlands - blanket bogs and sphagnum

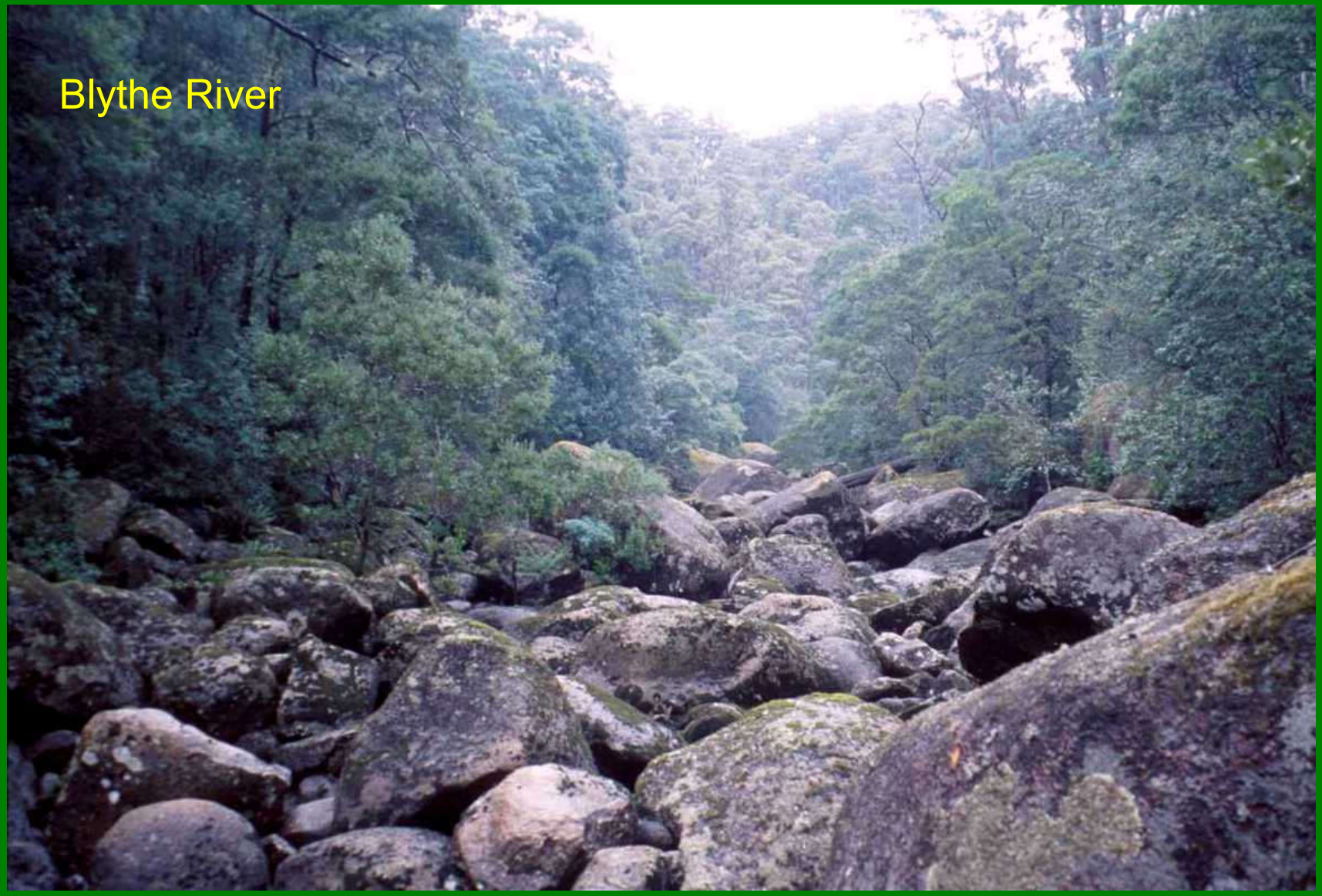
Subterranean streams in slope deposits - dolerite

Scree Western Tiers

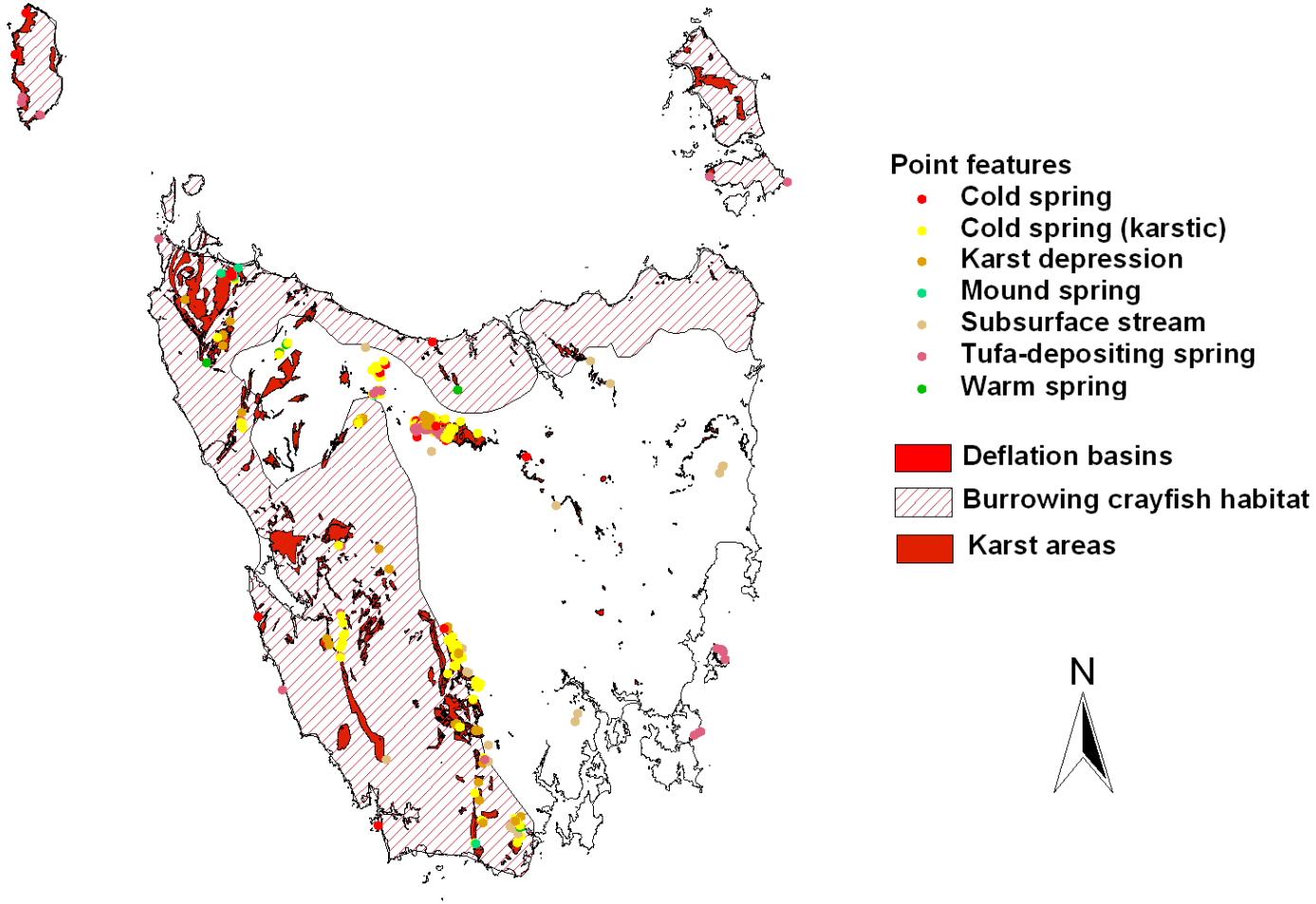


Underground streams

Underground streams in slope deposits - granite



Karst areas and GDE's mapped to date



Conservation mechanisms

- Formal reservation under *Nature Conservation Act*
  - 10 Reserve categories
- Informal reservation under *Forest Practices Act*
  - Forestry Tasmania Management decision classification
- Conservation covenants on private land
  - Private Forests Reserves Program (RFA)
  - Protected Areas on Private Land (non-forest ecosystems)
- Volunteer work on all tenures
  - Landcare, Rivercare, Karstcare

Karstcare

Tailender Cave

Tailender Cave

Flowers' property Mole Creek (Kubla Khan)