ABSTRACT

OzKarst and GIS — the big picture with a Nullarbor perspective

BOB KERSHAW, Illawarra Speleological Society

With many clubs undertaking survey work on the Nullarbor and those clubs using OzKarst to store the data, the question arises as to how to present the data to club members.

OzKarst has the ability to export some of the data as a Published Map (pmf) for use in ESRI ArcReader. This workshop brings together the OzKarst database and the full GIS program to show you possible uses of GIS to graphically present all your work in a cave area. The workshop uses the Nullarbor as an example, but due to licencing conditions, the data is shown in ArcReader.

Though bits of your work can be done in separate programs, like OziExplorer and Illustrator, GIS brings all your work — maps, survey data, GPS references, your surface tracks and aerial maps data — together to present your work to your club.

The author has presented data in this fashion for the Ning Bing Range, Bullita and cave areas in New South Wales.

WORKSHOP

OzKarst export feature and using GIS with the Nullarbor area as an example of the output that can be presented

Bob Kershaw

Illawarra Speleological Society

With many clubs undertaking survey work in various karst areas in Australia and a few of those clubs using OzKarst to store the data, the question arises as to how to present the data to club members? Though some of your work can be undertaken in separate programs like OziExplorer and Illustrator, Geographical Information System (GIS) programs bring all your work – sketch maps, survey data, GPS references, your surface tracks, and aerial photographs and topographic maps together to present your work to your club.

OzKarst now has the ability to export some of the data as a shapefile for use in ESRI's ArcMap, if you wish. This workshop brings together the OzKarst database and the full GIS

program to show you possible uses of GIS to graphically present all your work within a cave area. The workshop uses the Nullarbor data as an example to show relationships between various karst features.

The aims of this workshop were to:

- Briefly describe how to use exporter from OzKarst to GIS;
- Explain what you can show and do in the GIS;
- Examine how many of what Feature types are on the Nullarbor using the data in OzKarst and show the distribution of them on a topographic map.

The recent export function of some limited data from OzKarst provides a linked table for use with GIS. There is a full explanation of how to undertake this exercise in the OzKarst Manual available for users of OzKarst or GIS users.

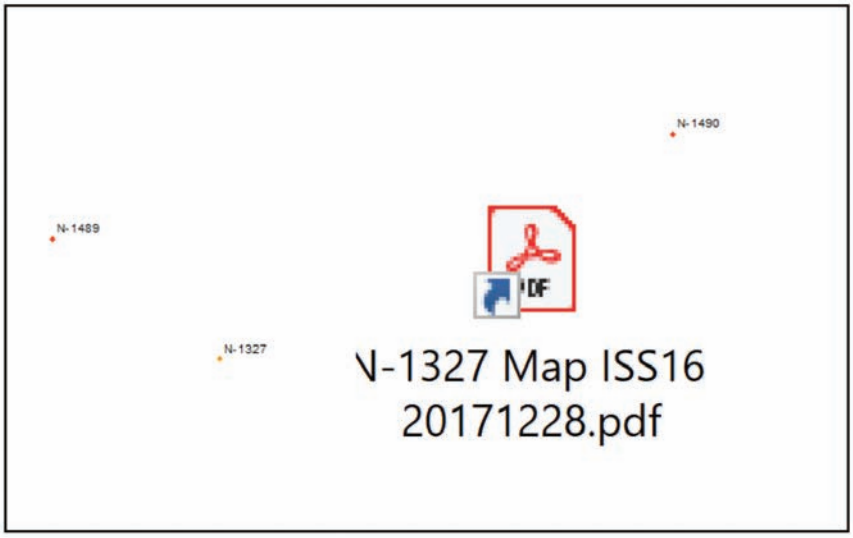
The information or data of the karst area you wish to use is selected and exported for use in your GIS is: Region, Karst Code, Feature Type (Ftype), Tag location, Named, Description, Location, datum, UTM Zone, Easting, Northing, Accuracy of the GPS reading, date, and elevation. This information is shown in the GIS program as in the box below.

Field	Value
FID	1896
Shape	Point
Region	AU5
Karst_Code	N-1659
s	1
Kkey	3032
Ftype	Blowhole cave
Tag_locati	Under N lip of BH 0.5 down.
named	
Descriptio	In rock pav at base of rock/rubble sided doline 14x11x1.65m @320. BH has be
Location	500m NE of SE/NW track which S of the Sleeper Camp to Forrest track, at arou
ZEN_datum	AGD 66
UTMZone	52
Easting	269205
Northing	6644061
ZEN_Accura	75
ZEN_date	20 Apr 2000
elevation	Australian Height Datum
Elevatio_1	220

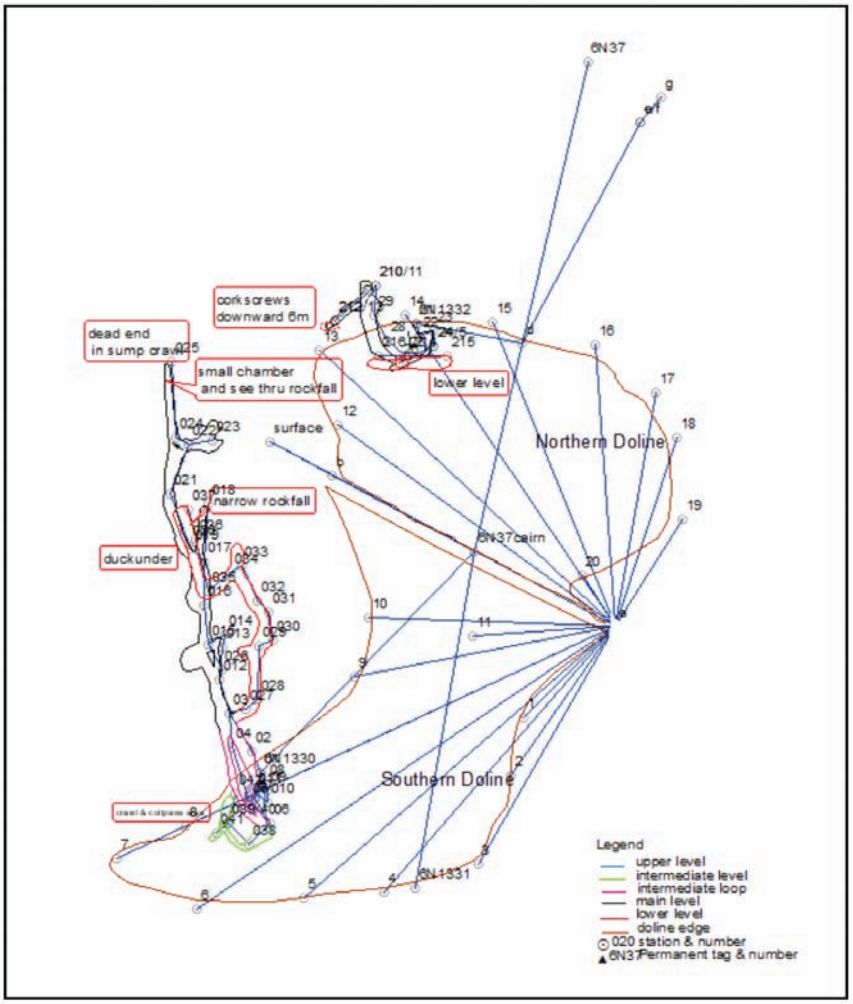
This is sufficient for use in the GIS and enables checking of the feature in the GIS using the information arrow icon.

The newest version of the OzKarst database includes latitude and longitude rather than Easting and Northing.

Using the GIS program you can add a link to an existing map you may have drawn,



or draw your map in the GIS.

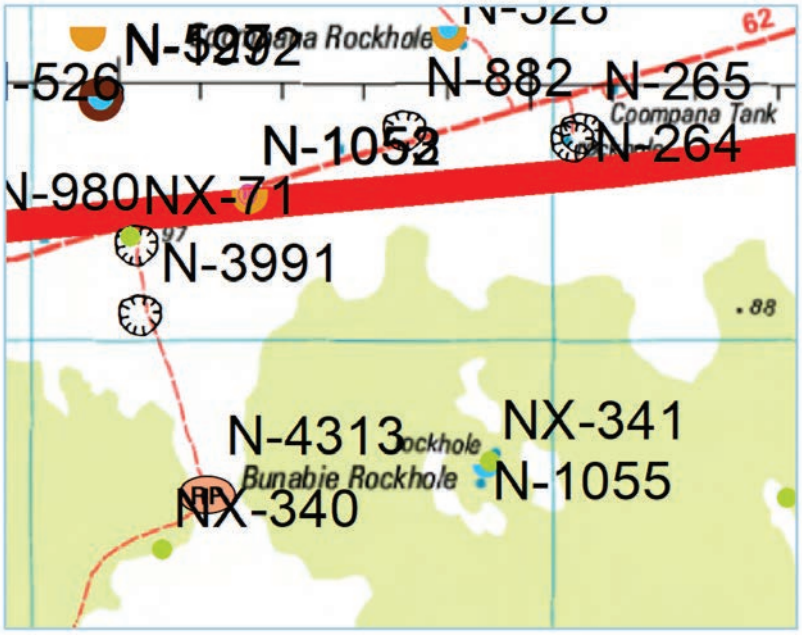


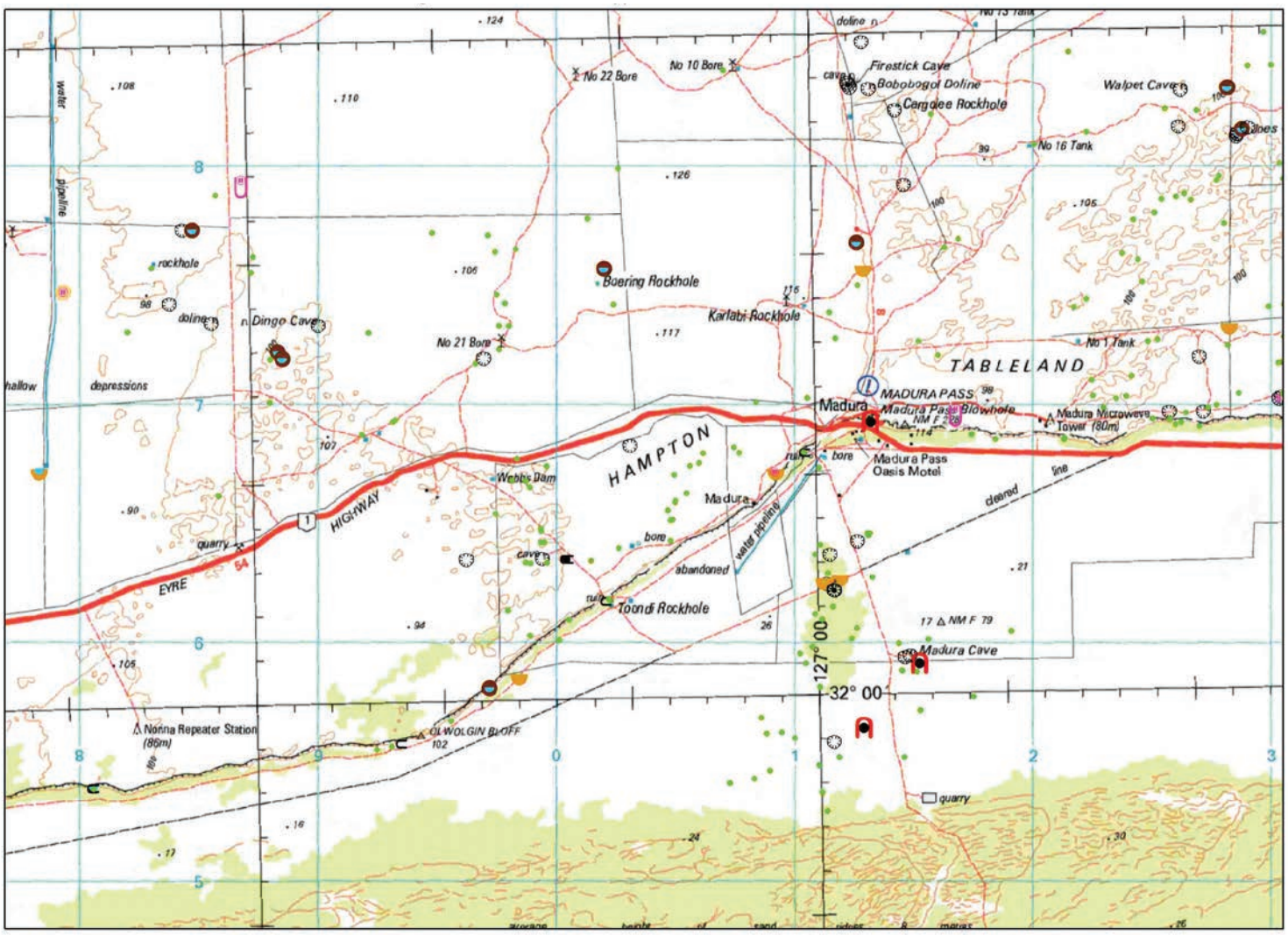
You can present your information with a topographic map and produce a georeferenced map for use in Avenza Maps as you walk over your area or the Nullarbor as shown below.

But the greatest benefit is being able to look at the distribution of the various karst features in your area of interest.

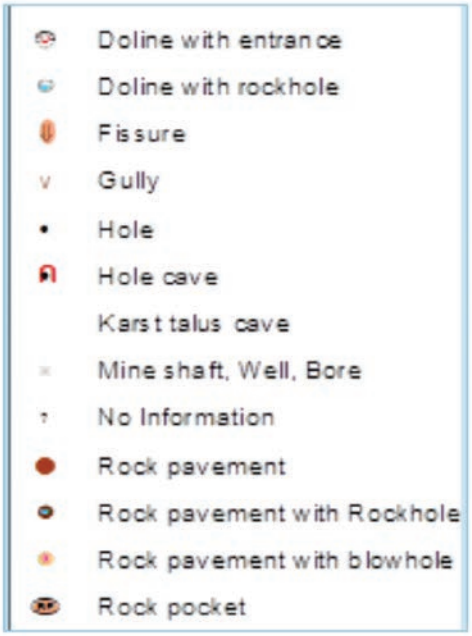
A section of the Nullarbor around Madura is shown in the map below.

The background map below is from Geoscience Australia.





You can develop your own legend for features if you wish as shown on the right.



But just as interesting is the ability to quantify your features.

The table below is based on the OzKarst Structure Version 5.2 dated: 30 Sep 2018.

Many of the descriptions of each feature type were made by the author and a few have been changed by the Nullarbor coordinator. Note that the Victorian Speleological Association (VSA) has many more recorded features which are not included in the statistics below.

Feature Type	Description	Number of features	% of Nullarbor features
		12413	
NXK	Ken Boland — airborne	1168	9.41
NXP	Paul Devine	4539	36.57
NX	General X	653	5.26
NXC	Plane Cavers	30	
NXD	Nullarbor Dongas	33	
NXG	Graham Pilkington	49	
NXPRD	Peter Dykes	37	
NXU	Extra Ken Boland	67	
NXH	Max Hall	7	
NXI	Illawarra Speleos	2	
NXL	Ian Lutherborrow for HCG	83	
No information	*Blocks of numbers allocated to Paul Hosie, Peter Ackroyd and VSA but counted in allocated features*	790	6.36
	NO OF ALLOCATED FEATURES Not including 790	4955	39.92
Arch	Arch, mainly sea caves	3	0.06
Basin in rock	Rock basin in pavement; a shallow broad hollow in rock	3	0.06
Blind valley	A valley that is closed abruptly at one end by a cliff or steep slope	5	0.10
Blowhole	Blowhole with no significant cave passage	466	9.40
Blowhole cave	Blowhole with cave present (>3m long passage)	625	12.61
Blowhole shaft	Blowhole enlarged and squared as a shaft	2	0.04

Boulder cave	A cave in boulders; compare with a Talus cave	2	0.04
Caprock		5	0.10
Caprock cave	Cave under caprock. Often rabbit or wombat excavated.	22	0.44
Caprock entrance	Caprock with possible entrances (air photos)	6	0.12
Collapse	Subsidence of surface into cavity	2	0.04
Crater	Not a karst feature, but a crater	1	0.02
Crevasse	Crevasse or crevice probably formed by solution	2	0.04
Depression	Missing overburden; smooth dirt sides, slope typically < 30˚; D/W <0.2	108	2.18
Depression with Blowhole	Depression with Blowhole within the Depression	664	13.40
Depression with cave	Depression with cave present rather than blowhole	5	0.10
Depression with hole	Depression with hole rather than blowhole	19	0.38
Depression with Rockhole	Depression with Rockhole rather than a blowhole	56	1.13
Doline	Doline; normally with exposed rock on one or more sides	488	9.85
Doline & rockshelter	Doline with rockshelter(s)	5	0.10
Doline cave	Doline with cave present	245	4.94
Doline hole(s)	Doline with hole(s) and/or draught, no cave visible	525	10.60
Doline with blowhole	Doline with blowhole	577	11.64
Doline with entrance	Entrance of unknown type from Doline	9	0.18
Doline with rockhole	Doline with rockhole rather than blowhole	13	0.26
Doline with rocket pocket		1	0.02
entrance	Entrance of unknown type	3	0.06
Fissure	Fissure or slot formed by rock movement or any other process	14	0.28
Gully	Gully, especially of escarpment	1	0.02
Hole	Hole, undifferentiated, often impenetrable	63	1.27
Hole cave	Hole with cave present (e.g. roof-hole into cavern)	38	0.77
Karst talus cave	A cave formed in talus with solutional features	1	0.02
Mine shaft, Well, Bore	Excavated feature, essentially vertical	2	0.04

Rock pavement	A flat horizontal area of clear rock	10	0.20
Rock pavement with blowhole	Rock pavement with blowhole	282	5.69
Rock pavement with Rockhole	Rock pavement with Rockhole	479	9.67
Rock pocket	Small hole in pavement	14	0.28
Rock shelter	Shelter height at the dip line is < shelter recess	33	0.67
Rockhole	A shallow small hole in rock outcrops often rounded and holding water after rain	115	2.32
Runaway hole	Where water gathers and sinks; compare to Streamsink	2	0.04
Sea cave	A cave in present-day or emerged sea cliffs	30	0.61
Solution pit	Significant pitting in rock	1	0.02
Talus cave	A cave formed in talus (collapsed rock); compare to a Boulder cave	1	0.02
Window	Karst window into a cave	3	0.06
Wombat warren	wombat warren, doline or diggings	4	0.08

Recommendations or ideas for those members undertaking future survey work in Australia

- There are more than 7000 NX features still to examine on the Nullarbor;
- Find ways to use your Database, GIS and smartphone when exploring and caving.
- Acquire an up to date copy of OzKarst before travelling to the Nullarbor
- Place the GIS information on your laptop using ArcMap or at a minimum as a PMF and using ArcReader if you don't have OzKarst on your laptop
- And make georeferenced pdf maps that include your cave maps or plotlines of your caves within your area for use with Avenza maps as you walk over the surface of your area if you don't have a GPS with topographic maps on it.

References

Kershaw, R., *New Ideas in Cave Mapping and Navigation* in Caves Australia. No.204 June 2018, p6. Australian Speleological Federation