



# **Mining old data for exploration success**

# Table of Contents

- Value of public geoscience and geological survey organisations
- Sunset Clause Project
- Data wrangling
- The challenges of data mining
- Project results

# The value of public geoscience and role of Geological Survey Organisations



# Value of data

**“Explorers highly regard the accessibility and provision of pre-competitive data by Australia’s geological survey organisations.”**

Mineral and Energy Resource Exploration, Productivity  
Commission Inquiry Report no.65





# What does the Geological Survey of NSW do?

**Collect, manage and deliver** geoscientific data:

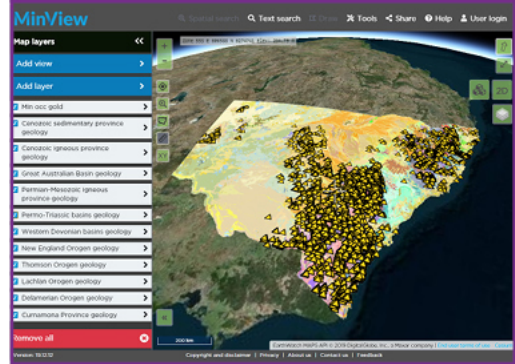
- to support the responsible development of NSW resources, including attracting resource industry investment into regional NSW
- to provide advice into land use planning, and natural resource and environmental management.

The custodian and **authoritative source** of up-to-date **knowledge** about the geology, geological evolution, and mineral and energy resources of NSW

## Geological mapping



## Information management



## Mineral systems studies



## Land use assessment



# Data strategy

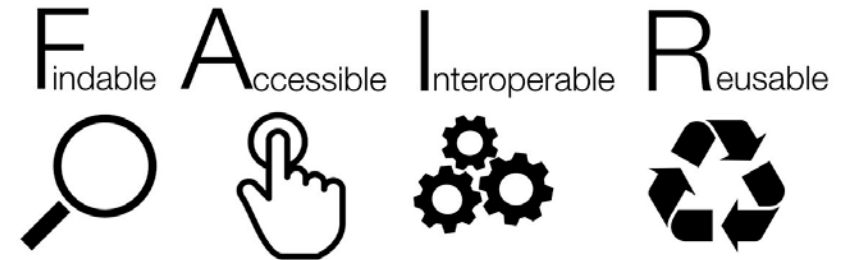
Provision of world-class geoscientific information and advice to meet the needs of the minerals and petroleum industries, and other stakeholders

- Understand stakeholder needs
- Use data to drive decisions
- **Build-in and promote data quality**
- **Standards based approach**
- Retain provenance, valuing raw and derived
- Design robust and simple delivery mechanism
- Maintain security measures to protect legal and privacy aspects



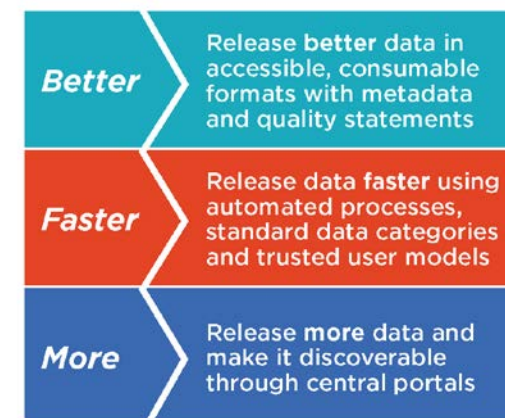
Principle based

<https://www.ga.gov.au/data-pubs/datastandards/fairdata>

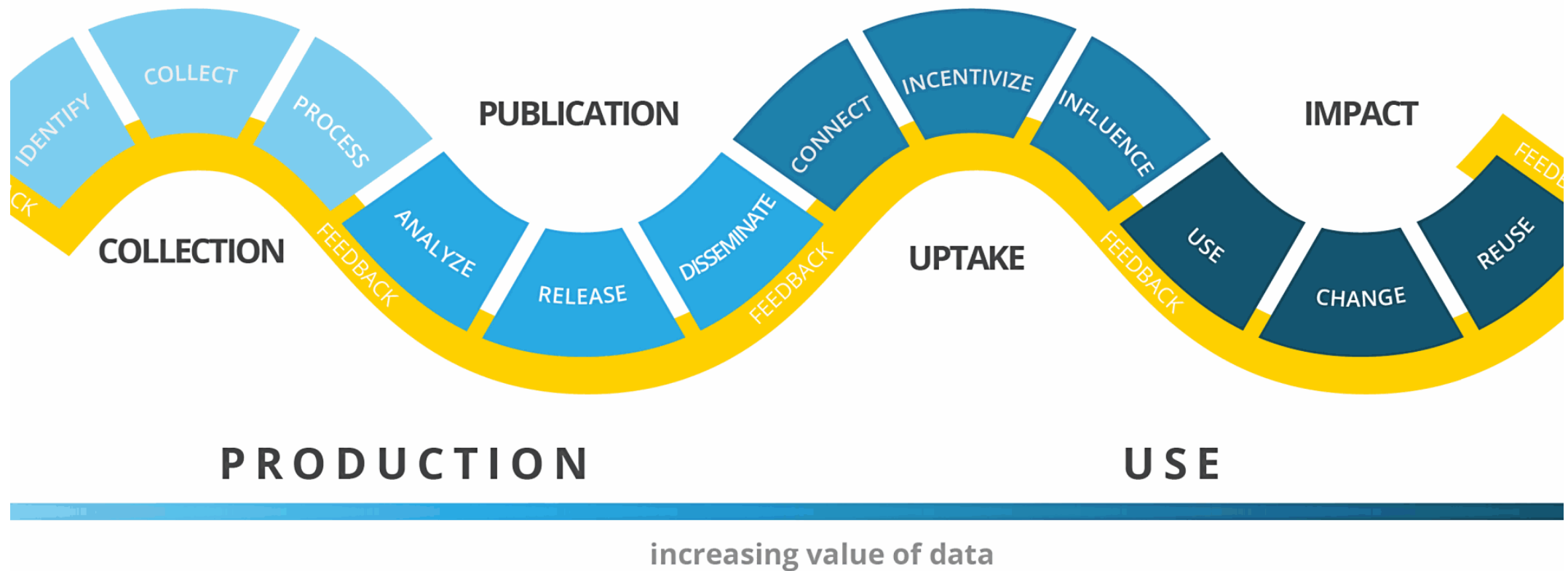


Alignment with NSW Gov. Open Data Policy

<https://data.nsw.gov.au/nsw-government-open-data-policy>



# DATA VALUE CHAIN



# The Sunset Clause Project

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# NSW Mineral Strategy

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- Aims to unlock the NSW metal potential
- Improve NSW competitiveness for investment
- Key theme is providing data and information
- Supported by NSW mining industry



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## 1.3

Make historical exploration data easily available

A significant amount of historic exploration data will become publicly available in June 2021. This will be validated, digitised, organised and made available in a readily accessible format.

Enable explorers to better target their efforts by providing easy access to historical exploration data.

June 2021

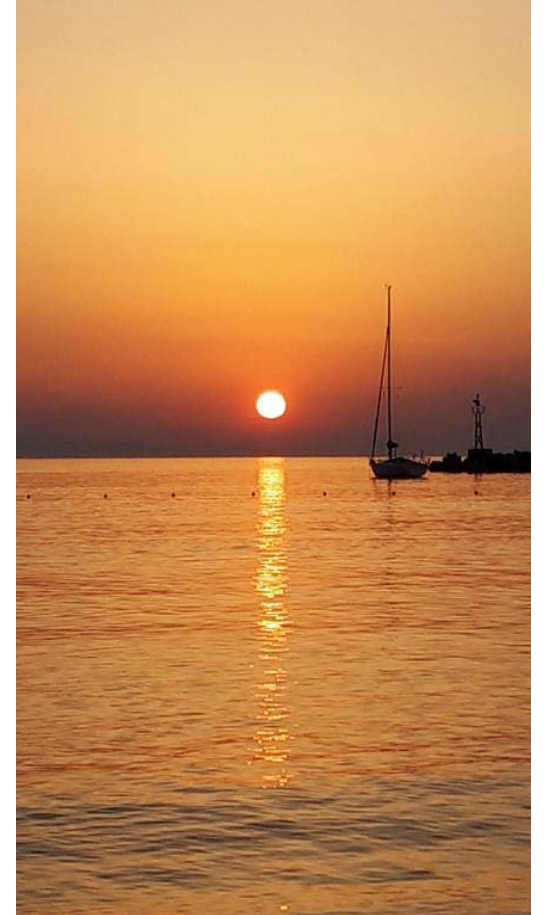
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# Background to Sunset Clause project

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## 2016 amendment of the *Mining Regulation*

- From 1 June 2021, MEG may release annual reports for all authorities granted under the Mining Act 1992 lodged before 1 June 2016.
- MEG may also release annual reports lodged after 1 June 2021 after a period of five years from lodgement has elapsed.
- Release is not mandated and there is discretion as to the nature and timing of release. Consultation with industry representatives is underway
- In 2016 the Government agreed to consider allowing grounds for objection for reports submitted prior to 1 June 2016. eg privacy and commercial in confidence



# Purpose

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- Stimulate state economic growth by attracting new exploration companies in NSW
- Increase opportunity for immediate job growth in regional NSW by **de-risking exploration activities**
- Improve potential for long term job creation in regional areas by **increasing the likelihood of locating a new economically-viable mineral deposits**. Increasing employment opportunities in mining and associated industries
- Encourage greater mineral exploration investment in **under-explored and under utilised areas** of regional NSW
- Improve investment attraction and export development opportunities by increasing mining activity in new prospective areas.

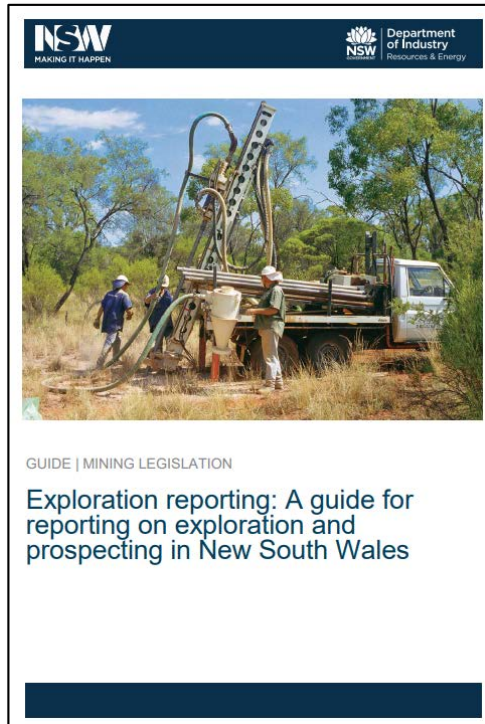
# Data wrangling

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# Exploration reports & data

Approach based on data type and format

Annual reports



Stored & delivered in DiGS

1. Drilling and surface geochemistry

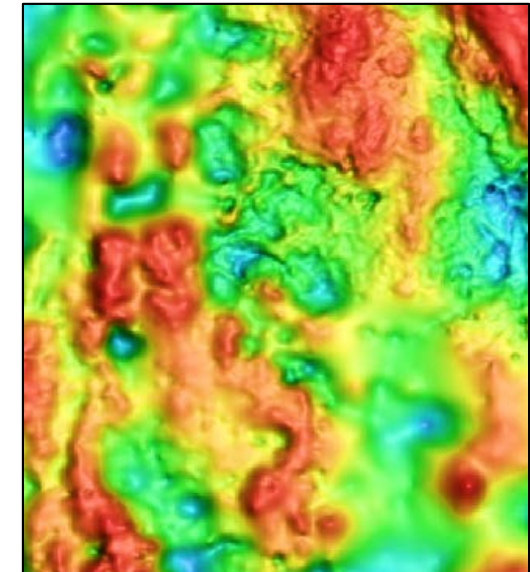
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H0004	Reporting_period_end_date	(date - DDMMYYYY)			
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H0101	Tenement_holder	Cosmos Exploration NL			
H0102	Project_name	Mount Hope Project			
H0105	Tenement_Operator	Pavane Exploration			
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H0201	End date of data acquisition	25/09/2011			
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H0204	Related_data_filenames				
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H0302	Downhole_lithology_data_file	EL4242_201109_A_13_lithology.txt			
H0303	Downhole_geochem_data_file	EL4242_201109_A_14_DrillholeGeochem.txt			
H0304	Downhole_survey_data_file	EL4242_201109_A_15_DrillholeSurvey.txt			
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H0600	Sample_code	HCORE	CHPS_RC		Add additional sample codes across the site
H0601	Sample_type	Half core	Dill Cuttings		Add additional sample descriptions
H0602	Sample_Description	Half core	Rifle split		Add additional sample descriptions
H0700	Sample_preparation_code	5031			
H0701	Sample_preparation_details	Pulverise to flour			
H0702	Job_Number	ADL 12345			
H0800	Assay_code	ICSP7			Add additional codes across the site
H0801	Assay_description	Induction Coupled Plasma			Add additional assay descriptions
H0802	Assay_company	Ph: Phlogaron Laboratories	DT: Dismstone Labs		Add additional assay companies

H1000	Hole_ID	Sample_ID	From	To	Sample_code
H1001	Units		Metres	Metres	
H1002	Assay_code				
H1003	Detection_limits				
H1004	Accuracy				
H1005	Upper_detection_limits				
H1007	Assay_Company_code				
ID	TRIC01	345	28	28.5	HCORE
ID	TRIC01	346	28.5	29	HCORE
ID	TRIC02	117	74.5	75	CHPS_RC
ID	TRIC02	118	75	75.5	CHPS_RC
ID	TRIC02	119	75	75.5	CHPS_RC

Extracted from reports  
Loaded into database  
Delivered through MinView

2. Geophysical surveys and data



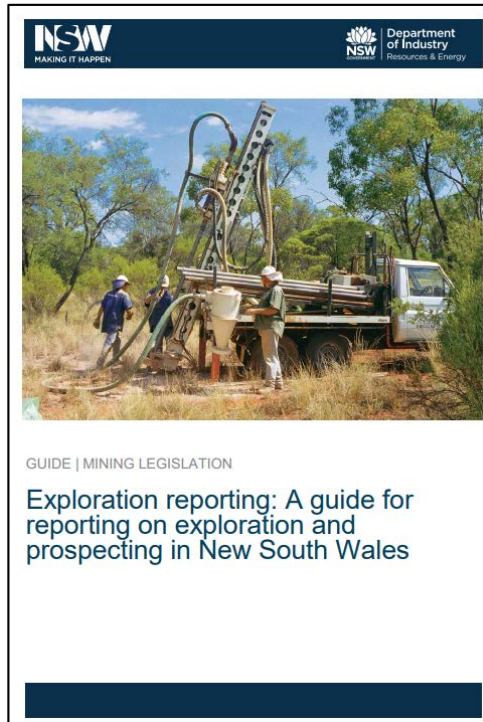
Stored separate to reports  
Delivered through MinView  
Merged into statewide image



# Exploration reports & data

Approach based on data type and format

## Annual reports



Stored & delivered in DiGS

## 1. Drilling and surface geochemistry

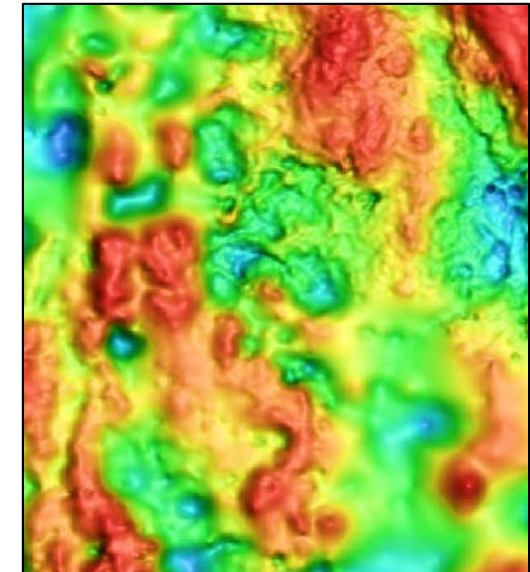
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H0003	Date_Generated	(date - DDMMYYYY)			
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H0005	State	NSW			
H0100	Tenement_no	CL4342			
H0101	Tenement_holder	Cosmos Exploration NL			
H0102	Project_name	Mount Hope Project			
H0105	Tenement_Operator	Pavenna Exploration			
H0200	Start_date_of_data_acquisition	23/09/2011			
H0201	End_date_of_data_acquisition	25/09/2011			
H0202	Template_Format	DG4			
H0203	Number_of_data_records	1			
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H0301	Location_data_file	EL4242_201109_A_12_DrillCollars.txt			
H0302	Downhole_lithology_data_file	EL4242_201109_A_13_Lithology.txt			
H0303	Downhole_geochem_data_file	EL4242_201109_A_14_DrillholeGeochem.txt			
H0304	Downhole_survey_data_file	EL4242_201109_A_15_DrillholeSurvey.txt			
H0307	Lithology_code_file	Company_data_dictionary			Company_data_dictionary
H0600	Sample_code	HCORE	CHIPS_RC		Add additional sample codes across the page
H0601	Sample_type	Half core	Drill Cuttings		Add additional sample descriptions
H0602	Sample_Description		Rifle split		Add additional sample descriptions
H0700	Sample_preparation_code	5031			
H0701	Sample_preparation_details	Pulverise to flour			
H0702	Job_Number	ADL 12345			
H0800	Assay_code	ICSP7			Add additional codes across the page
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H0802	Assay_company	Ph: Plogamon Laboratories	Dr: Dismstone Labs		Add additional assay companies

H1000	Hole_ID	Sample_ID	From	To	Sample_code
H1001	Units		Metres	Metres	
H1002	Assay_code				
H1003	Detection_limits				
H1004	Accuracy				
H1005	Upper_detection_limits				
H1007	Assay_Company_code				
ID	TRIC01	345	28	28.5	HCORE
ID	TRIC01	346	28.5	29	HCORE
ID	TRIC02	117	74.5	75	CHIPS_RC
ID	TRIC02	118	75	75.5	CHIPS_RC
ID	TRIC02	119	75	75.5	CHIPS_RC

Extracted from report  
Loaded into database  
Delivered through MinView

## 2. Geophysical surveys and data



Stored separate to reports  
Delivered through MinView  
Merged into statewide image

# Challenges of data mining

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# Quality issues discovered and fixed

**Quality Control (QC)** focusses on defect **detection**.

## Drillhole locations

- Incorrect/incomplete coordinate information
- Drillholes do not plot within the tenement area
- Hole\_id not consistent over reporting years
- Holes renamed if provided as part of a historical compilation
- Incomplete data record
- Content added to template incorrectly
- Duplicates!

Report use to check
Title, company, year, confidentiality
Purpose, drill type
End dept, dip/azimuth at surface
Location

## Drillhole Geochemistry

- Hole\_ids don't match Hole\_id's in surface location file.
- Analytical methods often not provided with data
- Element names in the H1000 row incredibly variable
- Text is provided within analytical result set, eg LOD  
Incorrect units given in templates eg AU ppm not ppb
- Sample\_id's aren't provided or are not unique

Sample data types (12mths)	No. records corrected
Drill holes & downhole	49,047
Drill hole geochemistry	48,759
Surface samples	4,673

# Improving accuracy and consistency

## Quality Assurance (QA) focusses on defect prevention

- Check report files on submission
- Check on uploading to database
- GSNSW Codes provide in templates

### GetDigsData

#### Instructions

This is a utility for reading exploration data files, extracted from DIGS, and writing the data into Geobank

Choose your folder:

Copy your files into:

#### Rules:

If (H0600 and no H0800) or (H0400 and no H0500)  
LITHOLOGY file  
else if H0500 and H0800 then  
SURFACE GEOCHEM file  
else if H0500 then  
LOCATION file  
else if H0502  
SURVEY file  
else if H0600 and H0800  
DOWNHOLE GEOCHEM file

.. or set H0202 to LOC, SVY, DGC, SGC or LTH to bypass the above rules

Backlog of files from DIGS are in G:\Geosurvey\Shared\Cogent\I\Data\DIGS-EXPLRPTS

Pre 2012 reports- 1<sup>st</sup> pass  
QC on digital files header  
info found over 60% files had  
issues that could not be  
easily fixed

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# Project results and database evolution



# Growing the minerals drilling database

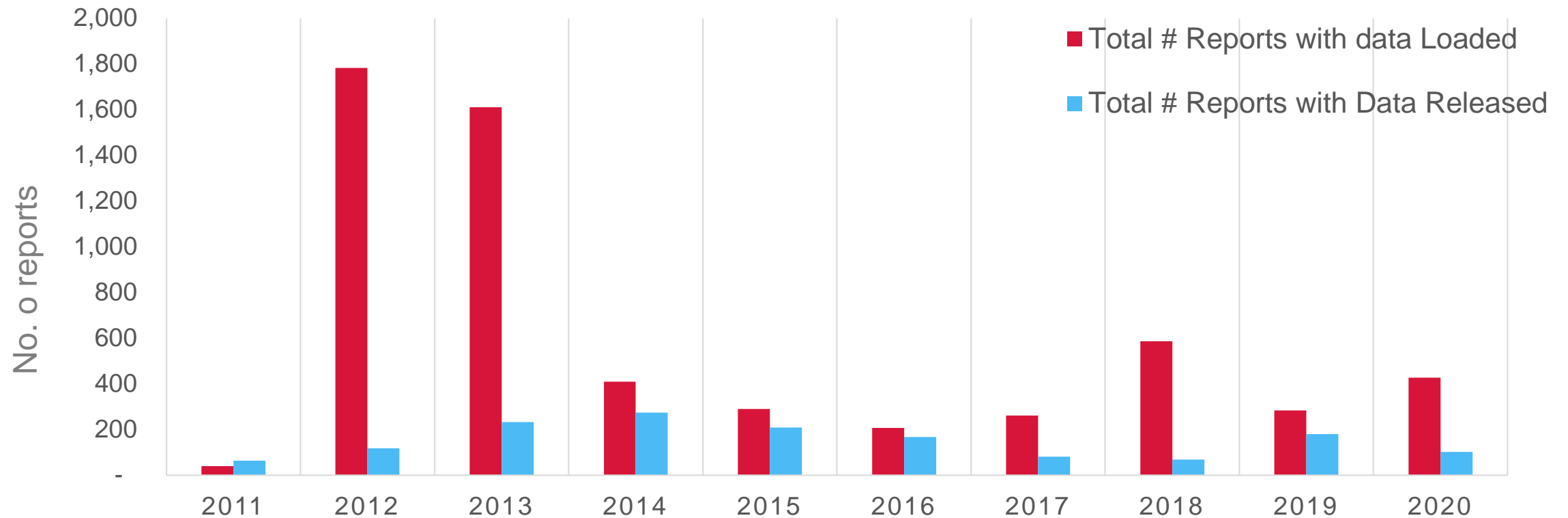
## Key events 2011-2012

- Geoscience Data Warehouse (GDW) launched
- Drilling database became part of relational data model
- QA of datafiles began on existing reports in DiGS for years 2000 – 2012 i.e. with digital data in csv loaded into GDW
- QC began on incoming reports datafiles
- Iterative process with initial focus on metadata information
- Adjust and extending the validation techniques
- Priority on open file reports initially

Year	No. of drill holes*
2000	25,000
2011	45,000
2013	130,000
2015	164,000
2016	224,000
2020	323,000

Table shows increase in drillholes records within NSW drilling database from 2000 to 2020

## MINERAL REPORT DATA MINING 2011 - 2020



Red is when reports where loaded into Geoscientific Data Warehouse  
Blue is the year the data was made open file based on expiring of licence and therefor made available in MinView

YEAR OPEN	Total # Reports with Data Released	Recordy Type	Total Drillholes Released	Summary Drillhole Samples	Summary Drillhole Assays	Total Surface Samples Released	Summary Surface Assays
2011	64	MINERAL	1,664	29,354	130,323	6,604	73,263
2012	118	MINERAL	1,089	21,493	259,699	17,863	410,365
2013	233	MINERAL	5,166	54,887	587,981	56,467	793,200
2014	274	MINERAL	7,657	86,022	915,825	69,104	1,095,170
2015	209	MINERAL	5,399	51,560	1,090,743	45,091	1,017,932
2016	168	MINERAL	5,527	47,437	648,652	24,339	475,267
2017	82	MINERAL	3,757	90,186	758,330	38,160	466,821
2018	69	MINERAL	1,030	17,288	248,332	9,469	205,539
2019	180	MINERAL	5,530	56,461	1,609,580	73,531	1,258,700
2020	103	MINERAL	1,478	37,223	1,015,040	29,696	563,034

Note: Open file records only

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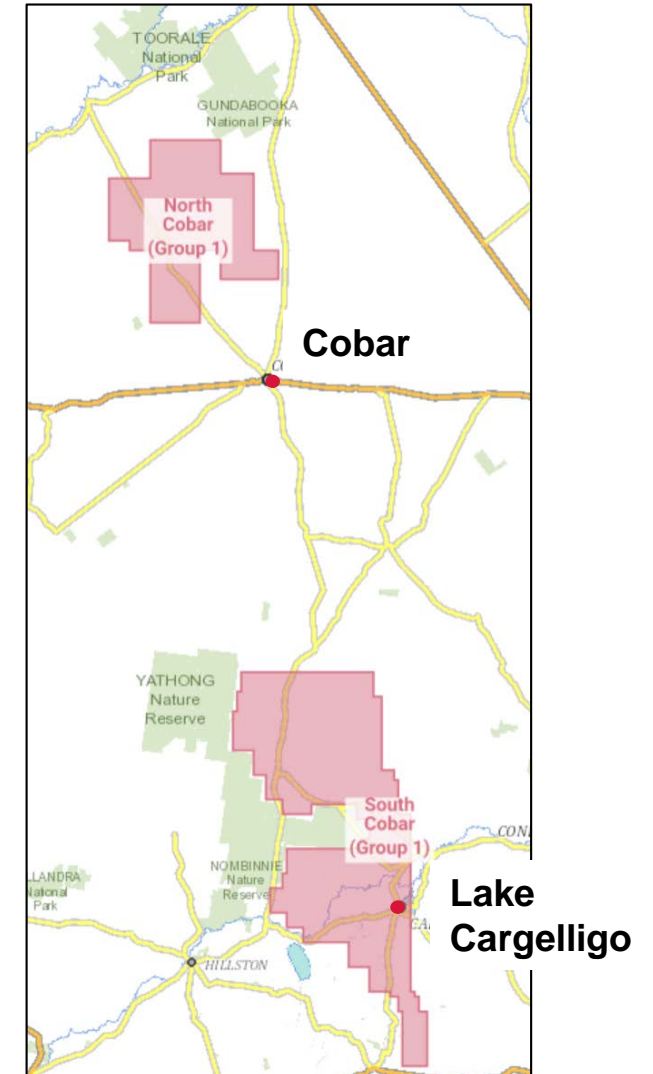
Note: Open file records only



# Mining historical mineral exploration data in 2020

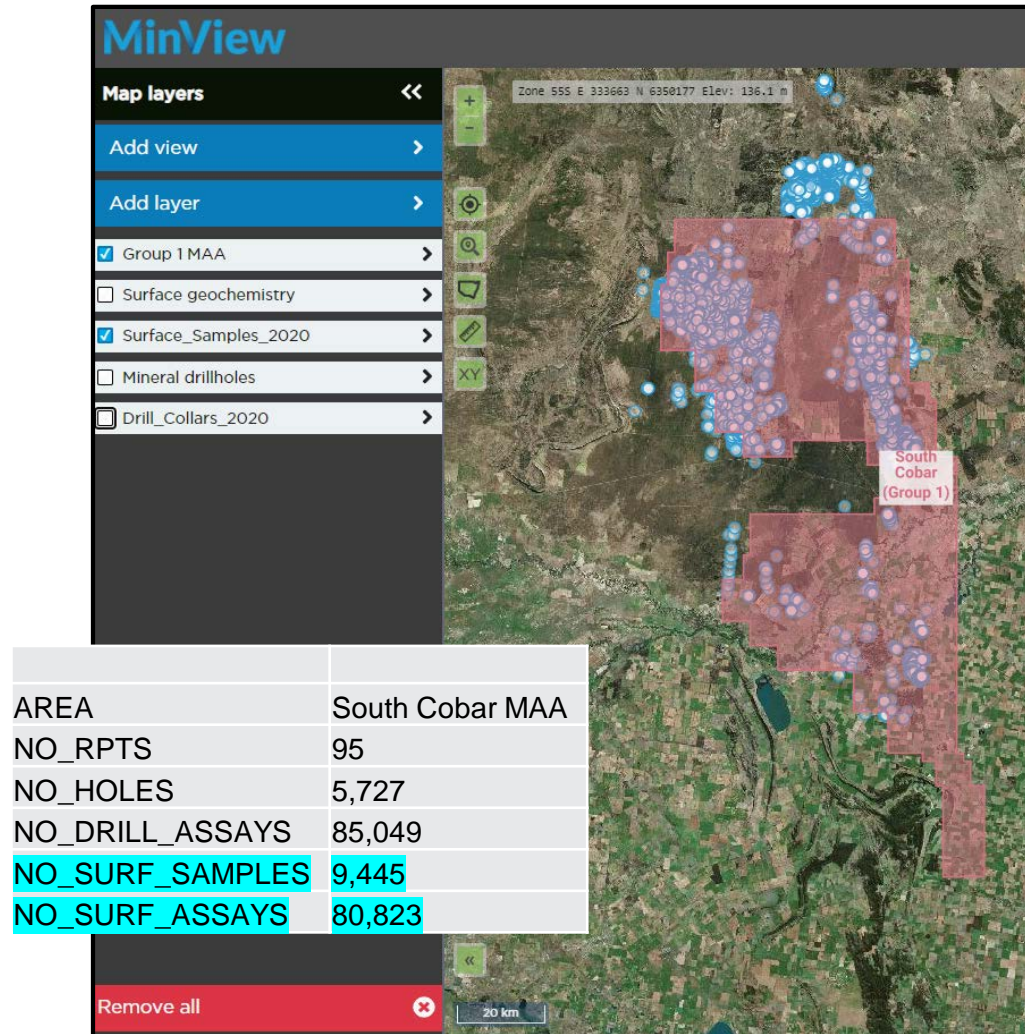
North and South Cobar MAA's project work completed in 2020

- The project reviewed over 350 pre-2000 mineral exploration reports stored in DIGS by external companies
- Age of the reports means no machine readable csv files
- Took 2.5 months by external companies to complete, and a similar time period for GSNSW to validate and integrate the data into the Geoscientific Data Warehouse (GDW)
- New data acquired from 187 historical reports
- Extra 16 reports from Macquarie Arc included

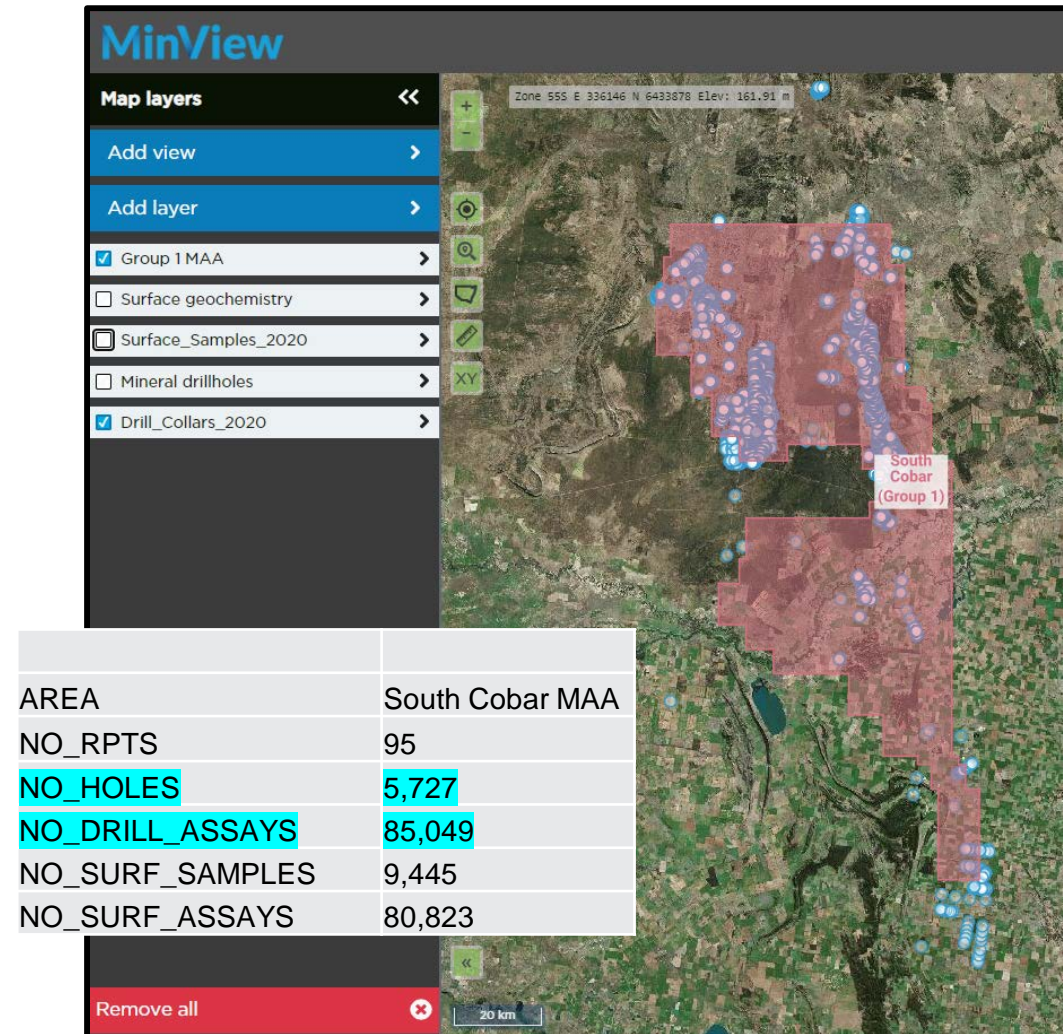


# South Cobar results

## Surface sample geochemistry



## Drill hole collar & downhole geochemistry



# Results for north and south Cobar area

Area	Reports reviewed	Reports with data	% Open file reports		Drill holes	Drill assays	Surface samples	Surface assays
North Cobar MAA	~150	76	43%		11,793	213,233	19,037	156,116
South Cobar MAA	~200	95	100%		5,727	85,049	9,445	80,823
Macquarie Arc	16	16	0%		921	34,441	52	194
<b>Total</b>		<b>187</b>			<b>18,441</b>	<b>332,723</b>	<b>28,534</b>	<b>237,133</b>

- Not all reports have equal number of associated data records
- North Cobar 80% drilling data is from confidential reports
- North Cobar ~50% surface samples is from confidential reports

# Potential available data

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- Data in Geoscientific Data Warehouse that could become open file on 1 June 2021
- Work underway to prepare 15,000 drillholes downhole geology underway
- Release is dependent on consultation process

Data type	Currently open file	To become open file
Surface geochemistry	~875,000	~600,000
Drillholes	~170,000	~97,000
Drillhole geochemistry	~990,000	~3,440,000



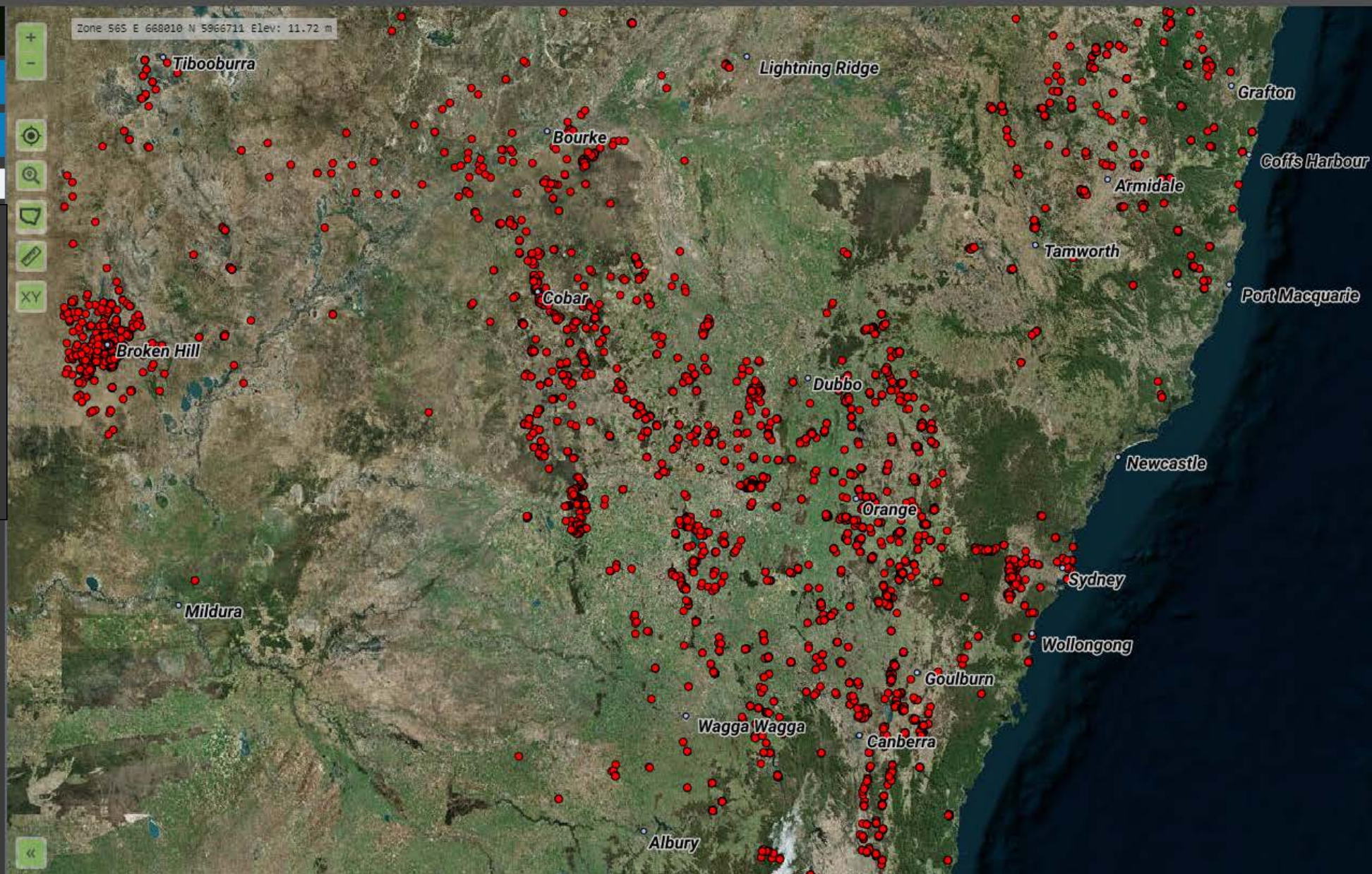
## Map layers

Add view

Add layer

☒ Locations Drillholes

\* Representative view not  
actual locations





## Map layers






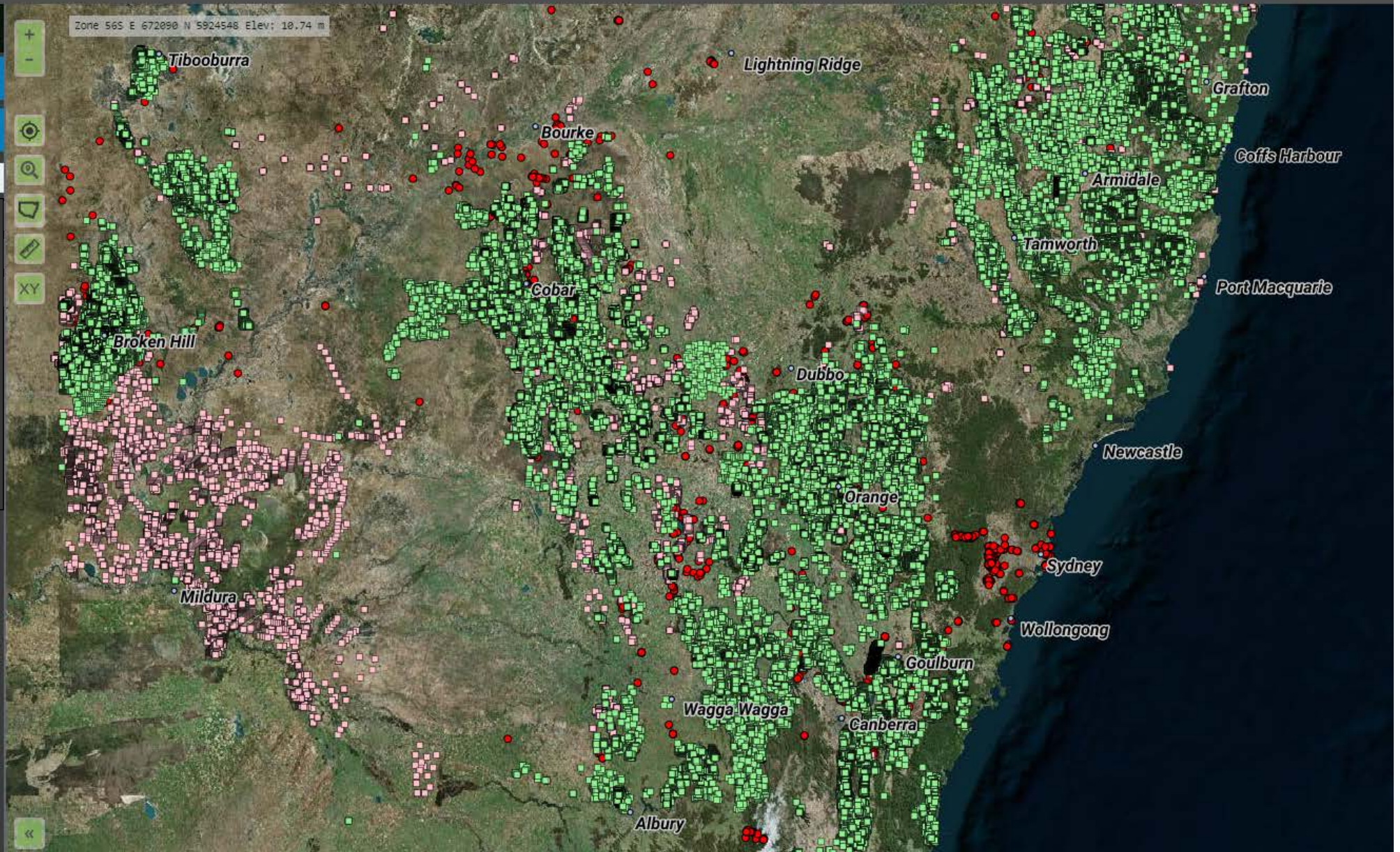
Add view



Add layer

☒ Locations

-  Drillholes
-  Surface geochemistry
-  Drillhole geochemistry





# Exploration NSW Webinar series

- Recorded in September 2020
- <https://vimeo.com/showcase/7564689>



Webinars from the Geological Survey of New South Wales

Share

Regional NSW

**Geoscience activities in the Cobar-Lake Cargelligo area: online information session**

57:11

Geoscience activities in the Cobar-L...

DPIE Training & Education

Geoscience activities in the Cobar-Lake Cargelligo area: online information session

Regional NSW

**Using MinView from project generation to discovery**

58:49

Exploration NSW: Session 4 - Using...

DPIE Training & Education

Introduction Chris Yeats (00:58) What can you do with MinView (tools, geological & geophysical data) Kim Marchiori (02:41)...

Regional NSW

**Exploration NSW webinar series: Predictive mapping of mineral systems**

52:11

Exploration NSW: Session 3 - Predi...

DPIE Training & Education

Trisha Moriarty, Acting Director Geoscience Information, Geological Survey of NSW (GSNSW) Introduction (00:00) Phil...

Regional NSW

**Exploration NSW: Undercover Cobar Webinar series**

46:12

Exploration NSW: Session 2 - Unde...

DPIE Training & Education

Chris Yeats, Executive Director, Geological Survey of NSW (GSNSW) Introduction (00:00) Astrid Carlton, Senior...



# Trisha Moriarty

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[Trisha.Moriarty@planning.nsw.gov.au](mailto:Trisha.Moriarty@planning.nsw.gov.au)

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