



INTRODUCTION & LIBRARY HISTORY

The Oil, Gas and Salt Resources Library (OGSR Library) is a non-profit geoscience research center focusing on data associated with wells drilled under the Oil, Gas and Salt Resources Act (OGSRA). The management of Ontario petroleum well data by the OGSR Library is now in its 20th year representing a rare case of an industry-funded petroleum data centre. The OGSR Library is responsible for providing the public with:

- Access to core, cuttings and public well files
- A service area for client research
- GIS, geological and clerical services
- Online resources and web maps
- Publications, Open File Reports (OFR) and research initiatives regarding Ontario geology

The OGSR Library is now operated by the Oil, Gas and Salt Resources Trust, created by the Ontario Ministry of Natural Resources and Forestry (MNRF) under the authority of the OGSRA (figure 1).

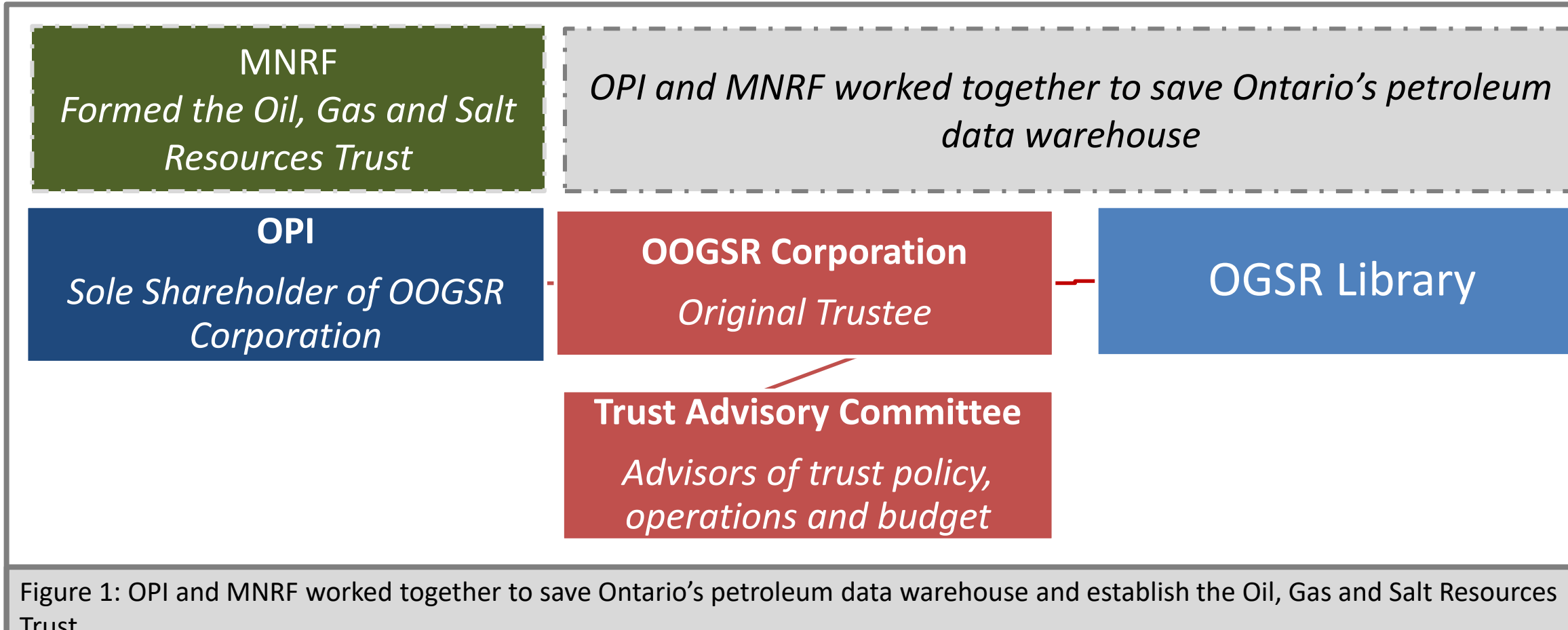


Figure 1: OPI and MNRF worked together to save Ontario's petroleum data warehouse and establish the Oil, Gas and Salt Resources Trust

DATA MANAGMENT

The OGSR Library manages the following resources on behalf of the industry:

- 26,720 well files, dating back to 1858
- 20,430 geophysical well logs
- 10,928 wells with drill cuttings
- 1,185 cores from 999 wells
- 289,600 formations with geologic top picks
- 33,861 geological formations reviewed by QA/QC geologists

1. PHOTOGRAPHY

High resolution photography is completed in priority order upon client request. Our most extensive database is of core photos. There are 3 photos taken for each core box in this order: white light (dry core), ultraviolet light and white light (wet core) photo (figure 2).



Figure 2: TO11552 drill-core photos of dry-white light (left), ultraviolet (UV) light (middle), & wet-white light (right).

High resolution photography of drill cuttings are now available. Tray photos are useful for a quick snapshot of well geology (figure 3). Trays are shaken between photos to capture movement and orientation of cuttings in vials.

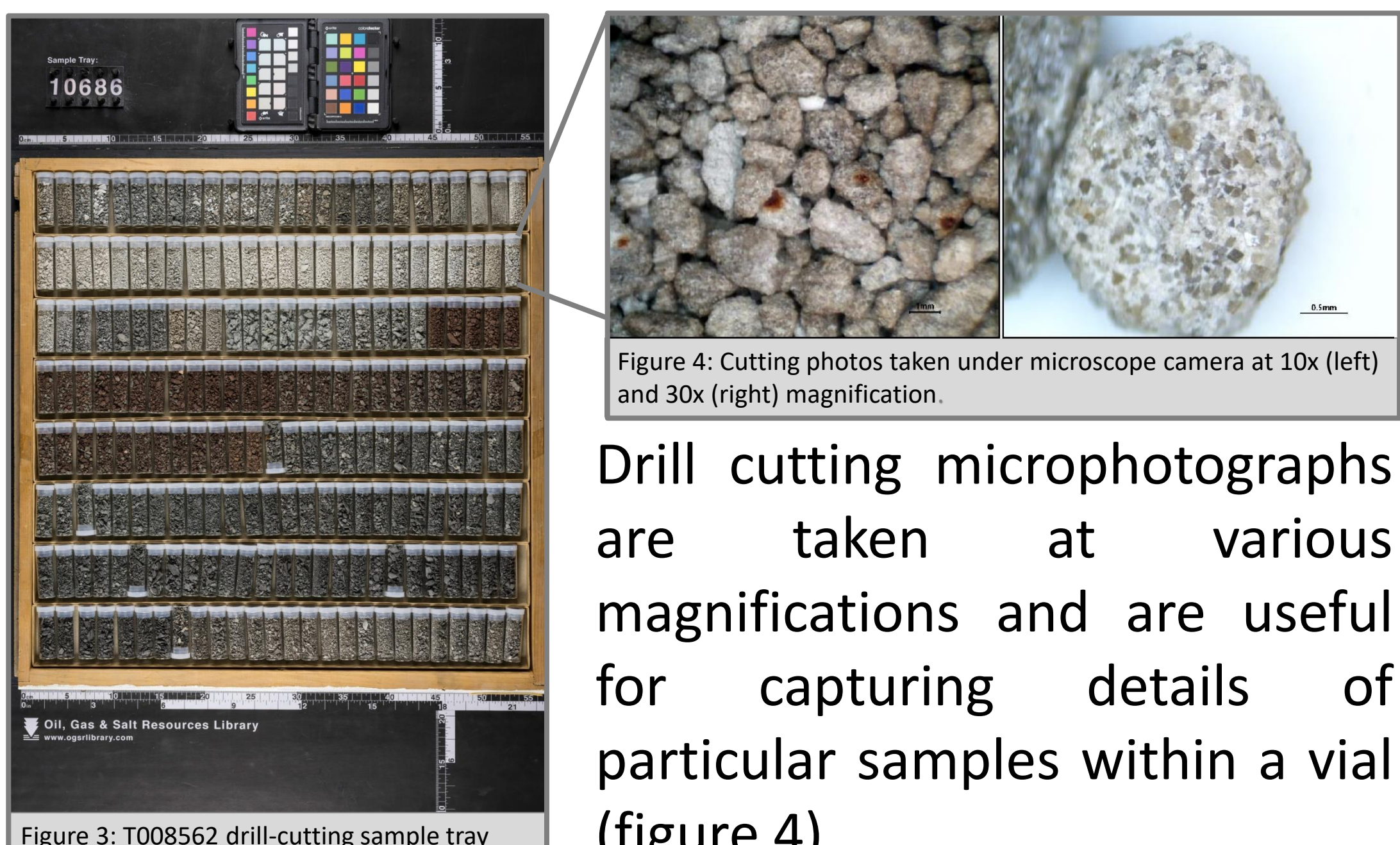


Figure 3: TO08562 drill-cutting sample tray

Figure 4: Cutting photos taken under microscope camera at 10x (left) and 30x (right) magnification.

Drill cutting microphotographs are taken at various magnifications and are useful for capturing details of particular samples within a vial (figure 4).

2. QUALITY ASSURANCE

The OGSR Library completes research projects to review the accuracy of the geologic picks recorded in the petroleum well files (figure 5). Geologists review geophysical logs, drill-cuttings and core at the Library to make geologic picks.

Information in the well files is stored and entered in Ontario Petroleum Data Systems (OPDS). Geologic picks are confirmed, corrected or added to the database based on a geologists interpretation. The picks are given quality assurance codes (QA codes) to rate their reliability (table 1).

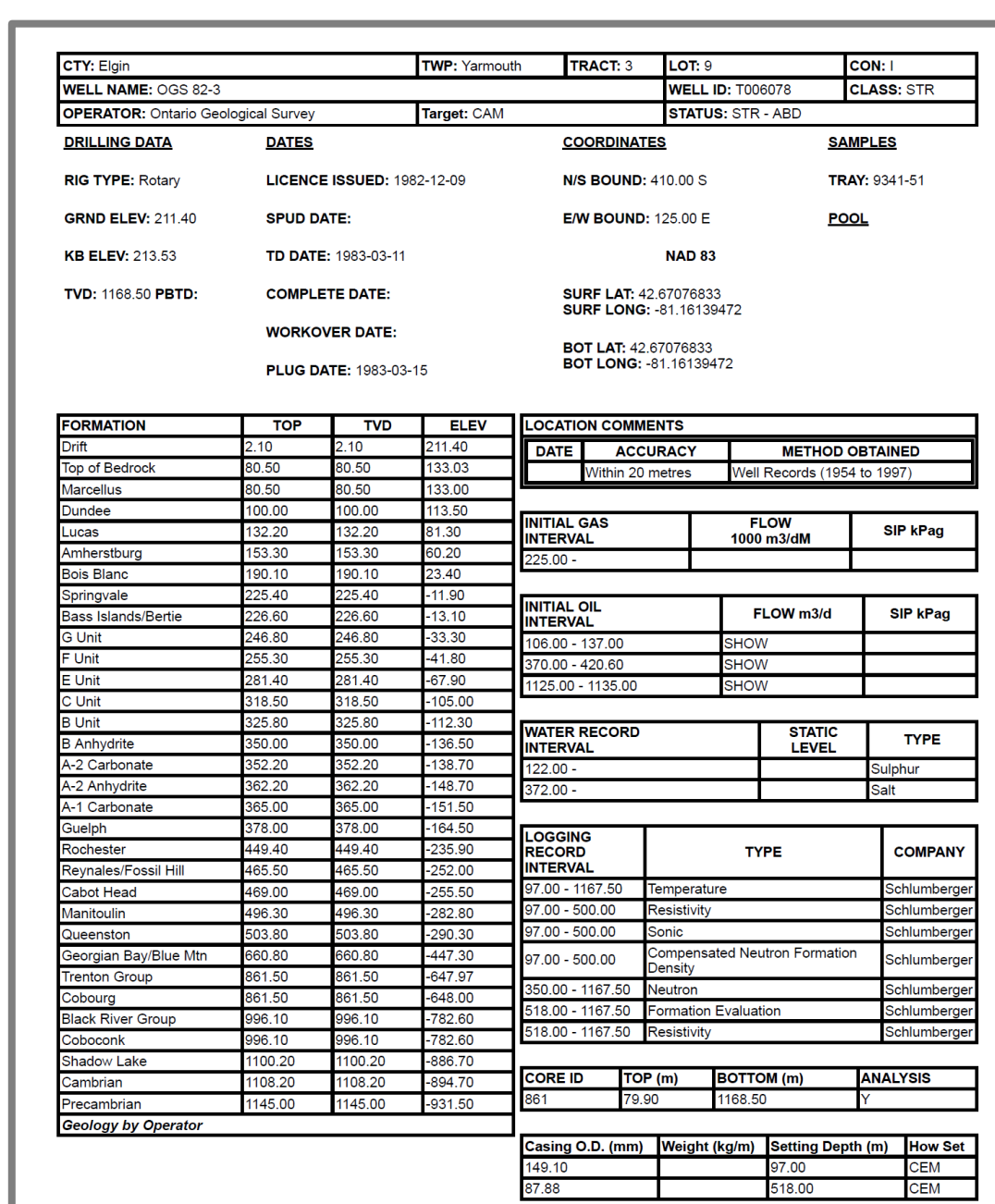


Figure 5: A well card displays all information taken when the well was drilled.

Table 1: A table for the decision making process used to assign QA codes to geological formation depth picks reviewed at the OGSR Library.

GEOLGY QUALITY ASSURANCE TABLE	Unreliable pick, could not be verified	Anomalous, requires verification	Not Anomalous, unchecked from sample/logs	Picked by geologist from samples or logs with uncertainty	Confirmed by geologist from samples or logs
CELL COLOUR CODES	red	orange	blue	teal	green
Non-Geologist		-1	1		
Student Geologist (Undergrad)		-1	1	1.2	1.7
GI/Graduate	-2	-1	1	1.3	1.8
Client Geologist		-1	1	1.4	1.9
Professional Geologist	-2	-1	1	1.5	2.0

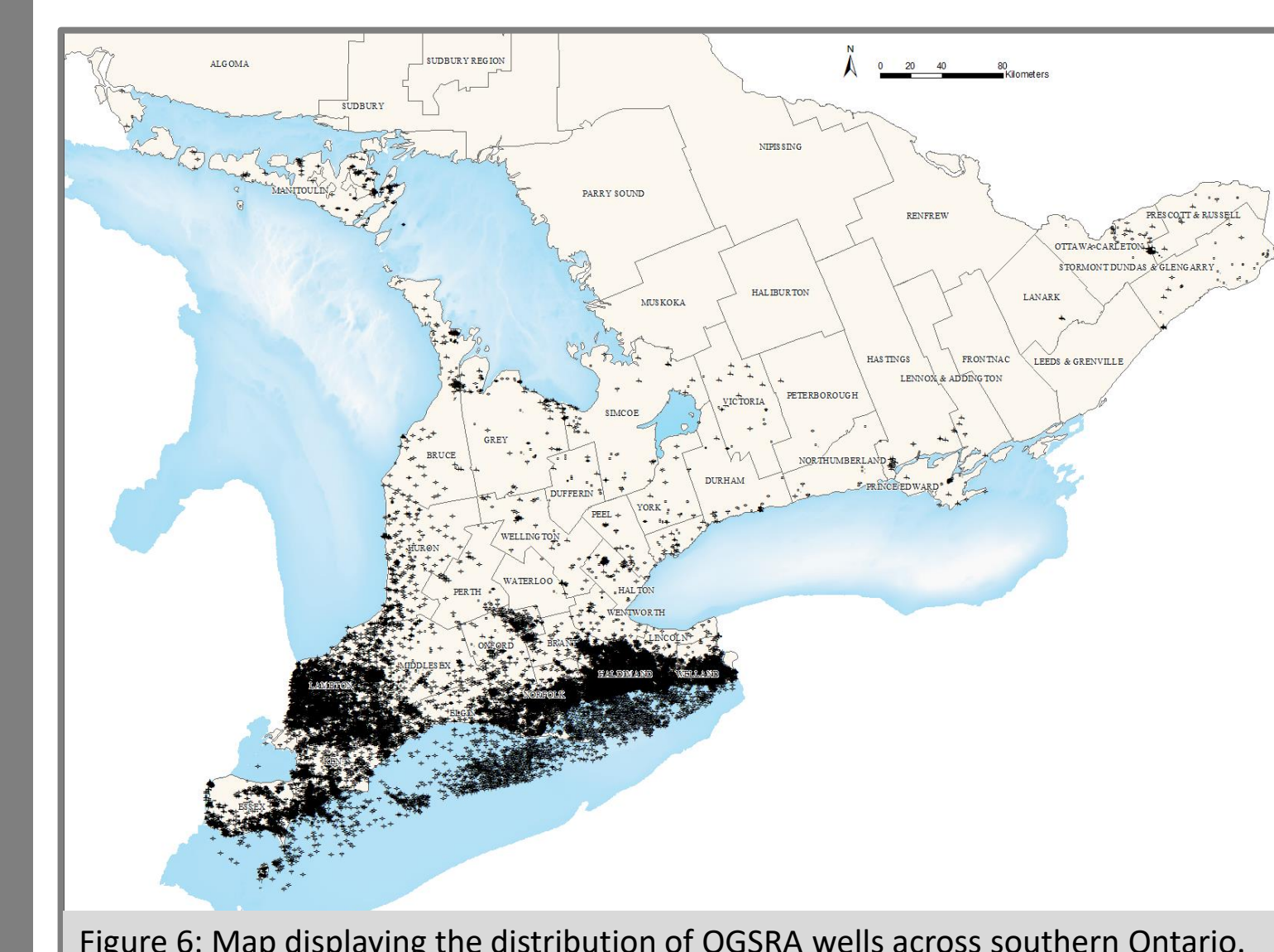


Figure 6: Map displaying the distribution of OGSR wells across southern Ontario.

QA codes allow the database to be queried for reliability allowing the user to view the quality of geologic data in petroleum wells across southern Ontario (figure 6).

EXPANDING OUR DATA

The OGSR Library has prioritised the digitization and modernization of the data catalogue to provide maximum value to industry. In response to a strong digital catalogue, industry and government partners have engaged with the Library on more complex and innovative projects and geologic research that would not have been possible otherwise.

OGSR Library Goals

1. Establish the Library as a Research Center
2. Expand the scope and quality of data holdings
3. Publish and promote data holdings

The Library believes the highest quality of information is a fundamental requirement for the responsible harvest of energy and environmental management.

New efforts to improve and maintain data quality are undertaken each year. These efforts have been made through projects including: 1. photography, 2. quality assurance and 3. geologic mapping.

PROJECTS

1. Photography

Photo Type	No. of Photos	Units Completed
Drill-Core	13,419	56 Wells
Drill-Cuttings	1,060	265 Trays
Microphotography	4,262	52 Wells

2. Quality Assurance

Project	No. of Wells	Data Output
Chatham Sag	2,956	3D Model (Round 1)
Hydrogeology	1,323	3D Model (Round 2)
Devonian Sands	1,319	OFR
Top of Bedrock	680	Subcrop Map/OFR (in press)

3. Geologic Mapping

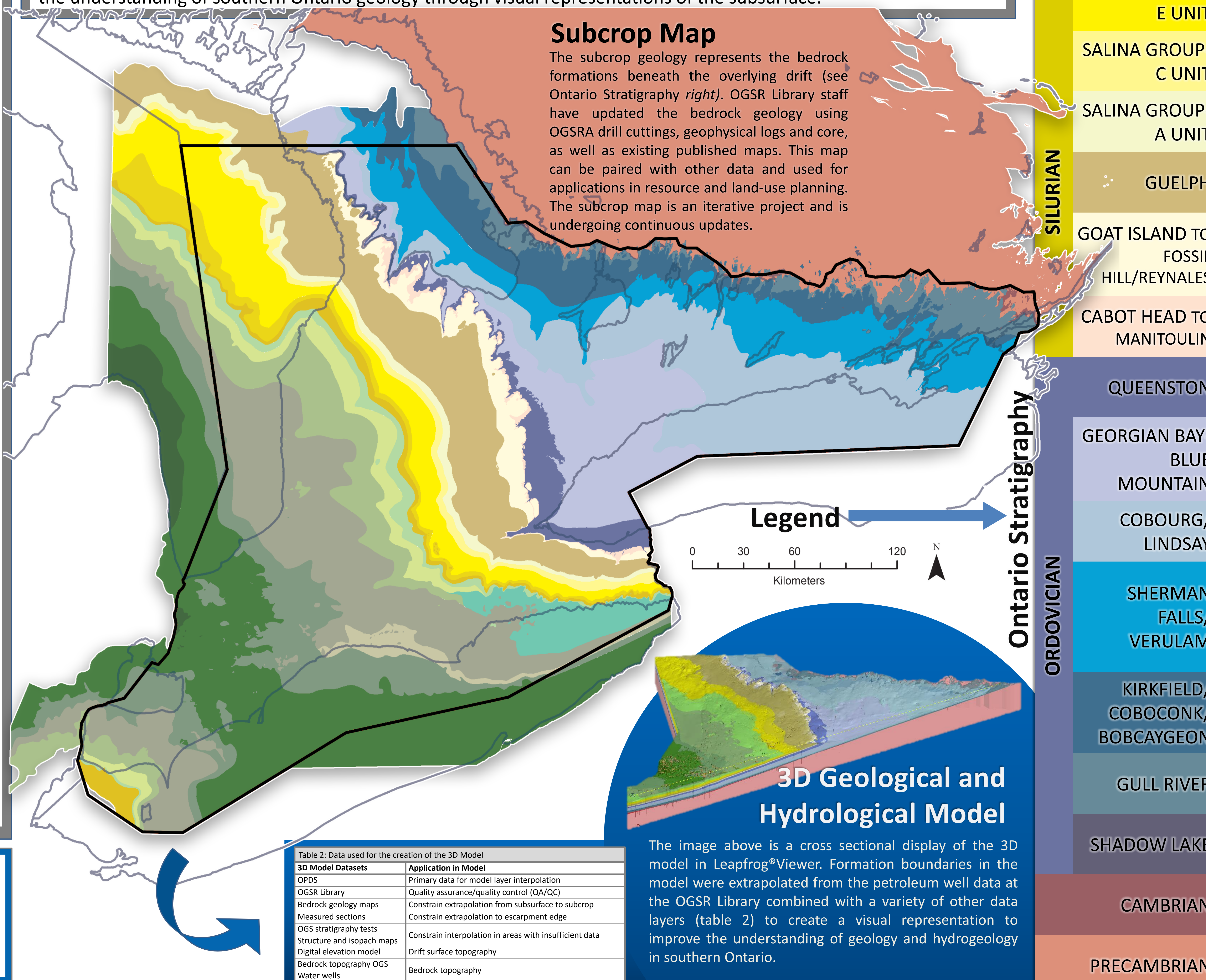
Geologic Map	Collaborative Organizations
Subcrop Map	OGSR Library, MNRF Ontario Geological Survey (OGS)
3D Model	OGSR Library, MNRF, OGS, Geological Survey of Canada (GSC)

3. GEOLOGIC MAPPING

Understanding the distribution of Southern Ontario geology is key to subsurface mapping. Quality assurance projects improve the accuracy and distribution of petroleum well data. Geologic maps combine data layers to provide insight to the understanding of southern Ontario geology through visual representations of the subsurface.

Subcrop Map

The subcrop geology represents the bedrock formations beneath the overlying drift (see Ontario Stratigraphy right). OGSR Library staff have updated the bedrock geology using OGSRA drill cuttings, geophysical logs and core, as well as existing published maps. This map can be paired with other data and used for applications in resource and land-use planning. The subcrop map is an iterative project and is undergoing continuous updates.



Legend

0 30 60 120
Kilometers

3D Geological and Hydrological Model

The image above is a cross sectional display of the 3D model in Leapfrog®Viewer. Formation boundaries in the model were extrapolated from the petroleum well data at the OGSR Library combined with a variety of other data layers (table 2) to create a visual representation to improve the understanding of geology and hydrogeology in southern Ontario.

Table 2: Data used for the creation of the 3D Model

3D Model Datasets	Application in Model
OPDS	Primary data for model layer interpolation
OGSR Library	Quality assurance/quality control (QA/QC)
Bedrock geology maps	Constrain extrapolation from subsurface to subcrop
Measured sections	Constrain extrapolation to escarpment edge
OGS stratigraphy tests	Constrain interpolation in areas with insufficient data
Structure and isopach maps	Drift surface topography
Digital elevation model	Drift surface topography
Bedrock topography OGS	Bedrock topography
Water wells	Bedrock topography

REFERENCES

- ¹Carter, T.R., Brunton, F.R., Clark, J., Fortner, L., Freckelton, C., Logan, C., Russell, H.A.J., Somers, M., Sutherland, L., K. Yeung, 2017. 28. Status Report on 3D Geological and Hydrogeological Modelling of the Paleozoic Bedrock of Southern Ontario. Summary of Field Work and Other Activities. 2017, Ontario Geological Survey, Open File Report 6333.
- ²Davis, C.L., 2017. Quartzose Sands in the Lower to Middle Devonian Strata of Southwestern Ontario: Geographic Distribution and Characterization in Drill Cuttings and Geophysical Logs; Geological Survey of Canada, Open File 8286, 42 p. <https://doi.org/10.4095/305359>

Note: All information and data is available through the OGSR Library website – www.ogsrlibrary.com