Geological mapping

During the 1960’s, 1970’s and 1980’s there was a national effort by the Commonwealth Government Bureau of Mineral Resources, Geology and Geophysics (BMR) and the Mining Departments in State and Territory Governments to survey and map the whole Australian continent from coast to coast.

Every year geological survey parties would systematically traverse across selected 1:250,000 scale sheet areas, examining rock outcrops and transferring the information onto aerial photographs. This field information would then be transferred to topographic base maps and published. These early maps still form the base for many geological maps today.
Geology of the Batemans Bay region

Geological mapping

Geological map resulting from 1960’s field work.

Legend

- Quaternary sediments, sand dunes, mudflats, etc.
- Permian–Triassic sedimentary rocks of the Sydney Basin; e.g. Wesp Head Formation, Pebbly Beach Formation, etc.
- Middle-Late Devonian Menindee Formation (Dum).
- Middle-Late Devonian Eden-Coomeen-Harwell Volcanic Zone; e.g. Cornervolcanics (Duc).
- Devonian granite plutons of the Bega Batholith; e.g. Braidwood Granite (ghb), Moruya Tonalite (gmg), etc.
- Late Silurian-Early Devonian volcanic rocks; e.g. Long Flat Volcanics near Braidwood, etc.
- Ordovician deep water turbidite sedimentary rocks of the Adaminaby Group; e.g. around Nelligen, etc.
- Cambrian-Caradocian sedimentary mélangé, chert, conglomerate, etc. of the Neronga - Batemans Bay accretional complex; e.g. Wagonga Beds.

Geological map based on the 1:250,000 scale Canberra and Ulladulla geological map sheets.

Communities in the Batemans Bay region.
Geology of the Batemans Bay region

Age of rock units given in millions of years (Ma).

Braidwood Granodiorite 410-411 Ma
Comerong Volcanics 370-379 Ma
Merimbula Group 354-365 Ma
Adaminaby Group 460-490 Ma
Termeil (Bawley Point) Essexite 241 Ma
Wasp Head Formation 286-290 Ma
Narooma – Batemans Bay mélange about 445-505 Ma
Moruya Tonalite 379 Ma


Geology of the Batemans Bay region

Map compiled from the 2008 Digital Geological Map of Australia derived from earlier 1:250,000 scale geological mapping of the continent.

Legend
- Quaternary sediments, sand dunes, mudflats, etc.
- Tertiary: (Bayport Point) Excerpt: (Mte) - Early Triassic intrusion.
- Wasp Head Formation, Pebble Beach Formation - Permian-Triassic sedimentary rocks of the Sydney Basin.
- Menindee Formation (Dum) and Comerong Volcanics (Ruc) - Middle-Late Devonian sedimentary and volcanic rift sequences.
- Braidwood Granodiorite (ghb) - Early Devonian granite pluton of the Bega Batholith.
- Moruya Tonalite (dmt) - Early Devonian pluton within the Moruya Supersuite.
- Leng Rat Volcanics (Svl) - Late Silurian-Early Devonian volcanic rock unit near Braidwood.
- Adamslady Group (Oa) - Ordovician deep water turbidite, sedimentary rocks, pelite, mudstones, sandstones, etc.
- Narooma - Batemans Bay Accretionary Complex – Cambrian-Ordovician sedimentary melanges, shales, conglomerates, volcanics of the Wanganba Group.

Extract from digital geological map - Surface Geology of Australia, 1:1million scale, 2008. Published by Geoscience Australia, Canberra.

Extract by David Haycraft and Doug Finlayson
The first geological map

William Smith (1769 – 1839) was the son of a blacksmith and born in Oxfordshire, England. Early in his life he worked in coal mines and noted the layers of rock and the fossils embedded in the various layers.

Later in life he became a surveyor and engineer building canals across the country. He made notes of all the rock layers and fossils and eventually compiled the information into the first geological map of any country, first published in 1815.

The map covered a large part of England and also parts of Scotland and Wales.

William Smith, as a surveyor for many canals across the country, travelled some 10,000 miles per year, mapping rock strata as he went. Digging a canal meant slicing through rock layers across miles of landscape, and the cross-sectional views of strata allowed Smith to confirm the order of rock layers across large distances.

He accumulated observations of strata and fossils in mines and canals. He found the key to telling the layers apart - their fossils were different. This was the finding that became known as Smith’s *Principle of Faunal Succession*. Today it appears in geology textbooks the world over.

http://earthobservatory.nasa.gov/Features/WilliamSmith/page2.php
Who said you can’t bend rocks?

When mapping the geology of an area, structural geologists try to work out the sequence of the various faults and folds they find in rock outcrops. Tectonic events at the margins of the continent place a stress across the whole continent and result in earthquakes, faulting and folding both at a large scale and at a small scale over many millions of years. Mapping structures in 3D is quite a difficult job.
Looking at structures under the surface

Using seismic exploration tools we can look at the structures under the Earth’s surface. Those geologists looking for oil and gas resources can interpret the faulting and folding seen on seismic profiling records and work out whether there are likely to be reservoirs worth drilling for energy resources.

https://en.wikipedia.org/wiki/Structural_geology
There’s much more information on web sites and in books and journals. Some of these are listed below.

Books, maps and publications


Web sites


A massive 8.1 magnitude earthquake at Kunlun Pass in central Tibet on 14 November, 2001, changed the landscape forever in a few seconds. The length of the surface rupture was 426 km.

**WE LIVE ON A DYNAMIC PLANET**