DONEGAL

AREA OF COUNTY: 4,841 square kilometres or 1,869 square miles

COUNTY TOWN: Lifford

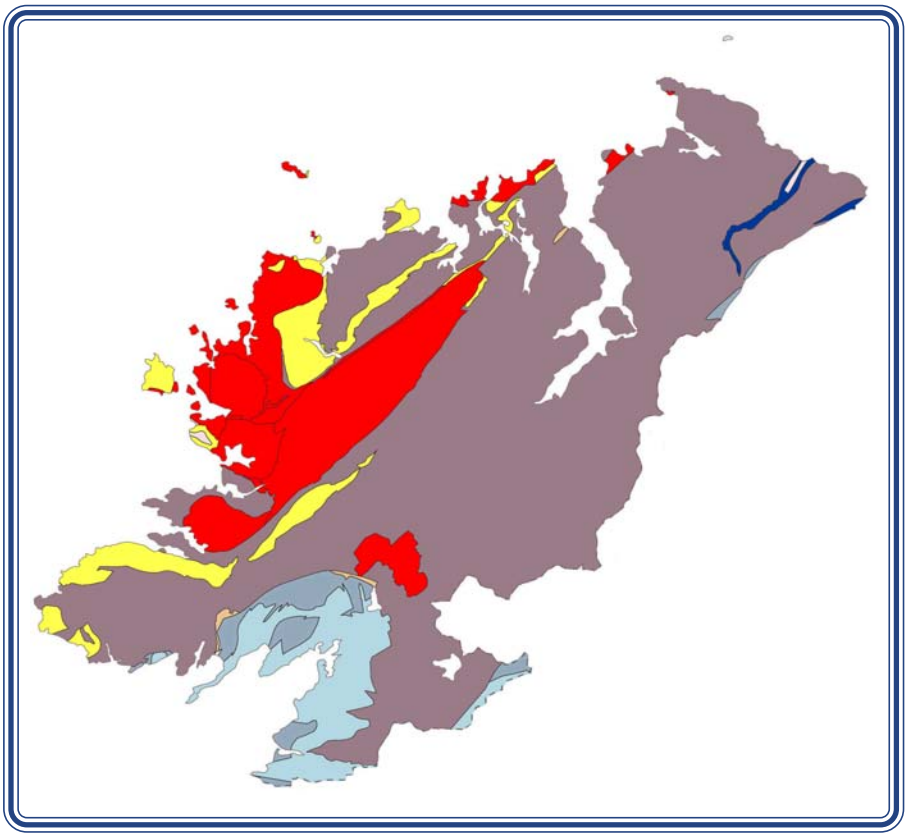
OTHER TOWNS: Bundoran, Donegal, Letterkenny, Stranorlar

GEOLOGY HIGHLIGHTS: Precambrian metamorphic rocks, granites, Lower Carboniferous sandstones and limestones, building materials

AGE OF ROCKS: Precambrian; Devonian to Carboniferous

Malin Head

Precambrian metamorphic schists and quartzite at Malin Head.
In the distance is Inishtrahull, composed of the oldest rocks in Ireland.



Geological Map of County Donegal

Pale Purple: Precambrian Dalradian rocks; **Bright blue:** Precambrian Gneiss and Schists; **Pale yellow:** Precambrian Quartzite; **Red:** Granite; **Beige:** Devonian sandstones; **Dark blue:** Lower Carboniferous sandstones; **Light blue:** Lower Carboniferous limestone.

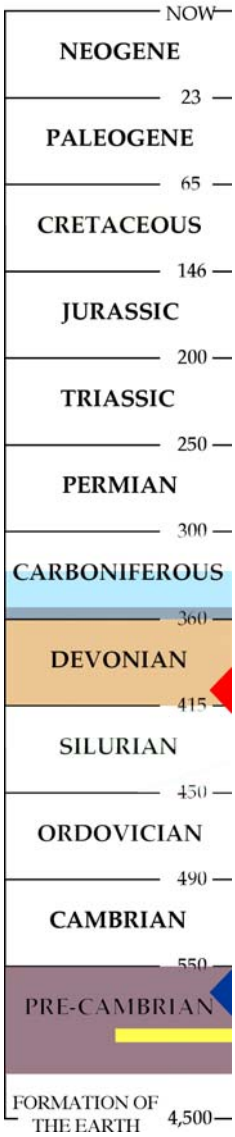
Geological history

The geology of Co. Donegal most closely resembles that of Co. Mayo, and the county contains the oldest rocks in Ireland, around 1780 million years old, exposed on the offshore island of Inishtrahull. 1000 million years ago [Ma] sediments were deposited in an ocean and an Ice Age that affected the Earth at this time produced glacial till of cobbles of rock set in a matrix of crushed rock. Between 470 and 395 Ma the whole area was subjected to a mountain-building event called the Caledonian Orogeny and the rocks were metamorphosed or altered into gneiss, schists and quartzites now known as the Dalradian Group. Errigal Mountain is composed of this quartzite which weathers to a 'sugarloaf' shape. The metamorphosed glacial deposits are called Tillites. In the late phase of the orogeny two continents collided and the north-east to south-west trend of the rocks in Donegal was produced. At the same time around 405 Ma a series of six granite masses were injected

Granites, Bluestacks Mountains

into the older rocks of which the Main Donegal Granite is the largest. Granite is an igneous rock which crystallised as it cooled down, and its constituent minerals - quartz (glassy), feldspar (white or pink) and mica (black or silvery) interlocked.

There are no Ordovician or Silurian rocks in Donegal and only a small patch of Devonian sandstones along the northern shore of Donegal Bay. In the Lower Carboniferous (350 Ma) a warm shallow ocean migrated northwards very slowly. When it reached Donegal it resulted, firstly, in the deposition of sands and muds carried south by rivers that drained the old continent. This material was laid down close to the shoreline and now forms the sandstones and mud stones at Doorin Point (pictured below). These gave way to limestones that often contain corals and other fossils. The sea level fluctuated at this time and a shallowing of the sea saw further sandstones (such as the Mountcharles Sandstone) being deposited. Later limestones were deposited in the deepening ocean in which some reefs rich in organisms such as corals, cephalopods (squids) and bryozoans also grew. The Carboniferous rocks are found in a semicircle around Donegal Bay.



Geological timescale showing age of rocks in Donegal.

Doorin Point. Layers of Lower Carboniferous mudstone and sandstone on the north shore of Donegal Bay

Inishtrahull

Inishtrahull is a small island off the northern coast of Donegal. It once supported a reasonable population which had its own National School. It is also the site for a Lighthouse. Geologically the island is fascinating as it contains the oldest rocks in Ireland. These are igneous rocks called syenite and have been dated using radiometric minerals. They are 1,779 million years old.

Dimension stones: Granites and the Mountcharles Sandstone

Stone is a most useful building material. In the past many small quarries exploited the diverse rock types of Donegal. Slates were quarried for roofing, weathered quartzite sands were used for glass-making, and talc was mined for lubricants and talcum powder. Several quarries still work some of the marble bands for agricultural lime and for decorative stone chippings or roadstone. The Donegal Granites were once cut into setts at Barnesmore Gap and transported from the quarries by rail for use as paving in Victorian cities. Now granite boulders are often used for headstones or commemorative stones. The Mountcharles Sandstone is a Lower Carboniferous yellow sandstone that was popular in the 1890s. It was used for the National Library and National Museum in Dublin but due to acid rain falling in the city between 1890 and 1930 it began to disintegrate. However elsewhere in Ireland where the air was clean it proved to be a hard-wearing stone and it continues to be quarried and used today. The photograph to the right shows one of the stone mine workings.

Map adapted with permission from Geological Survey of Ireland 1:1,000,000 map 2003.
Image credits: Mike Simms 1, 3 (top and bottom), 4 (top); Matthew Parkes 4 (bottom).

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