

WATERFORD

AREA OF COUNTY: 1,837 square kilometres or 709 square miles

COUNTY TOWN: Dungarvan

OTHER TOWNS: Cappoquin, Kilmacthomas, Portlaw, Tramore, Waterford

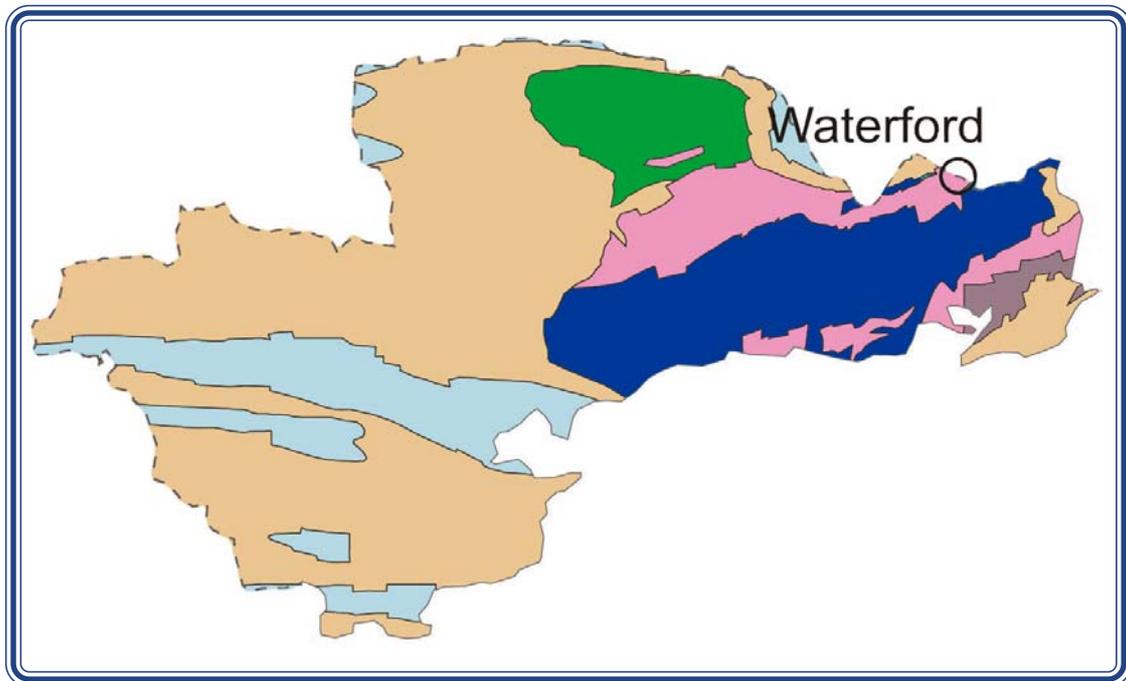
GEOLOGY HIGHLIGHTS: Copper Coast Geopark, Ordovician volcanic rocks and fossils at Tramore

AGE OF ROCKS: Precambrian; Ordovician to Carboniferous



Looking south from Slievenamon across Co. Waterford

Sandstone blocks are scattered across the summit of Slievenamon. The River Suir below flows over Carboniferous Limestone, with the Devonian Old Red Sandstone ridge of the Comeragh Mountains rising in the distance.



Geological Map of County Waterford

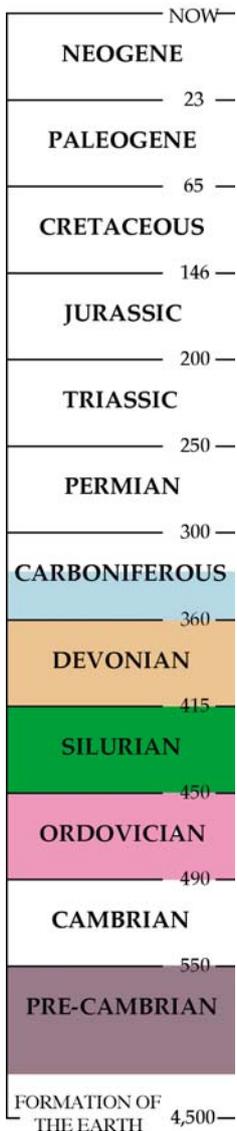
Light purple: Precambrian metamorphic rocks; **Pink:** Ordovician; **Dark blue:** Ordovician volcanic rocks; **Green:** Silurian sediments; **Beige:** Devonian sandstones and conglomerates; **Light blue:** Lower Carboniferous limestone.

Geological history

The Precambrian rocks in Waterford are 600 million years old [Ma] and are now metamorphosed or altered sediments that were first deposited into an ocean and later changed during a later mountain-building event. During the Ordovician period (488-444 million years ago [Ma]) shallow water limestones and some deeper-water muds were laid down in the Iapetus Ocean that divided Ireland into two. The Tramore Limestone dates from this time and contains bell-shaped fossil bryozoans called *Diplotrypa*. Some brachiopods (shells) and trilobites (arthropods, like Horseshoe Crabs) have also been found. As this ocean slowly closed the continents on either side were subjected to great stress and volcanoes produced lavas and ash during eruptions. Along the coast at Kilfarrassy and Bonmahon these volcanic rocks can be seen. During the Silurian period sediments continued to be deposited in the ocean that finally closed. This closure caused another mountain-building event to take place causing many of the Silurian rocks to be tilted and then eroded away.



Ordovician limestones at Tramore (left); 19th century painting of Devonian sandstones overlying tilted and eroded Silurian rocks, Waterford harbour (right)



A new continent was created in the Devonian, around 400 Ma, as the Iapetus Ocean closed. Large rivers drained from the newly formed mountains and deposited great thicknesses of sand and gravel on the flood plains. In a few places these Devonian rocks can be seen lying on an ancient erosion surface on steeply tilted older rocks. The boundary between them is called an unconformity. These sandstones and conglomerate (pebble beds) now form all of the higher ground, above 200 metres, in the county, such as the Comeragh and Knockmealdown mountains. By about 360 Ma, at the start of the Carboniferous, sea level was slowly rising and it drowned the flood plains. The limestones deposited in this warm, shallow equatorial sea now form much of the low ground across the county.

After the Ice Age the rivers in southern Ireland flowed north to south. As they eroded downwards the upstream parts of rivers were reorientated by the underlying east to west trend of the landscape in south Munster. The River Blackwater flows for most of its length eastwards but at Cappoquin makes a marked right-hand turn and flows south to Youghal.

Geological timescale showing age of rocks in Waterford



Gorge on the River Blackwater, south of Cappoquin. At Cappoquin the Blackwater turns through 90 degrees and cuts through four Devonian sandstone ridges. This is the most northerly of them.

Copper Mining

The coast between Fenor and Kilfarrasy is a European Geopark called 'The Copper Coast' and with good reason. In the nineteenth century copper was mined at a number of localities by miners, some of whom brought their skills from Cornwall. Along the coast rocks can be seen with the tell-tale staining of copper minerals. Bonmahon was the centre of mining where the Mining Company of Ireland started to extract ore in 1826. A thriving industry needed Engine Houses with their square outlines and tall chimney to pump water out of the mine shafts that went deep underground, water wheels and dressing floors which were used to remove the ore from the surrounding rock, and slipways to allow the ore to be transported to ships that carried it to Swansea for smelting into metal ingots. By the late 1800s copper mining had ended. **Take care in the area. Do not enter mine shafts or other openings or climb cliffs as these are very dangerous.**

Suggested reading

• *The Copper Coast; Dunabrattin to Benvoy Strand; Stradbally to Ballydwane. Landscapes from Stone: Geological Survey of Ireland (1998).*

Map adapted with permission from Geological Survey of Ireland 1:1,000,000 map 2003.

Image credits: Mike Simms 1, 4; Patrick Wyse Jackson 3 (left); Geological Survey of Ireland 3 (right).