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## 3.4.2 Inverclyde Group rocks

The oldest Carboniferous rocks in the Midland Valley of Scotland belong to the Inverclyde Group (Figure 1)B, (Figure 2). In West Lothian the group comprises the Kinnesswood and Ballagan formations

Outcrops of Inverclyde Group rocks comprise approximately 3,300 hectares, or 7.7% of the surface area of West Lothian. They crop out in a strip south-east of the A70 between East Cairn Hill and Henshaw Hill, forming the high ground of the Pentland Hills, and a smaller area to the south-east of Livingston between Linhouse Water and Kirknewton (Figure 15).

The Inverclyde Group was laid down between 345 m and 355 million years ago (Ma) whilst Scotland lay in low latitudes south of the Equator. At this time, the climate was generally considered to be semi-arid and seasonally wet. A rather discontinuous vegetational cover of the land surface was probably the norm. Locally in the Pentlands, the base of the group is taken at an unconformity on Lower Devonian and older strata. It is because of the semi-arid climate that the sandstone-dominated Kinnesswood Formation contains calcareous and dolomitic pedogenic (soil profile) horizons (calcrete) and the overlying Ballagan Formation is characterised by grey mudstone and siltstone with nodules and beds of ferroan dolostone (cementstone), and evaporite (mainly gypsum). The group is also characterised by an absence of carbonaceous rocks, especially coal seams and oil shales, in comparison with overlying rocks.

### 3.4.2.1 Soils, habitats and land use

The hard resistant and largely glacial till-free Kinnesswood Formation sandstones that form the Cairn Hills have favoured the development of freely-draining humus-iron podzol and blanket peat soils (Figure 6); these support mainly dry and wet dwarf shrub heath. On the lower ground at the foot of the hills, the softer Ballagan Formation is mostly till-covered and gives rise to very poorly-drained blanket peat or peaty podzols (Figure 6) which support wet heath, acid grassland, marshy grassland and mire, used mainly for rough grazing. The mostly till-covered Ballagan Formation in the area to the south-east of Livingston has developed mostly poor to imperfectly- drained gley soils (Figure 6) used mainly for ley grassland and plantation forestry.

### 3.4.2.2 Biodiversity

The till-free sandstone slopes and summit of East Cairn Hill (Figure 16), (Figure 19) have been designated as a Listed Wildlife Site [NT 12 59]. Species present at East Cairn Hill include Clustered Dock, cloudberry and Common Cow-wheat. Listed Wildlife Sites also occur at Middlemuir [NT 06 55] and Kirknewton Estate [NT 11 66], with a Wildlife site at Harperrig Moss [NT 11 61] (Figure 16), but as these are situated on glacial till there is little direct influence of the bedrock on the biodiversity. The mixed till and peat covered area to the west of Craigengar [NT 091 551] is a biological SSSI and hosts three characteristic upland habitats — dry upland heath, blanket bog and flush communities within hill cleughs. It is of international importance for its dry upland heath, species-rich grassland and its marsh saxifrage and is a candidate Special Area of Conservation (cSAC). Templehill [NT 113 614] east of Harperrig Reservoir is listed on the Raised Bog Inventory. Inverclyde Group rocks also host several areas of Ancient Woodland, the largest being Selm Muir Wood and Overton Wood/Green Burn Wood south-east of East Calder.

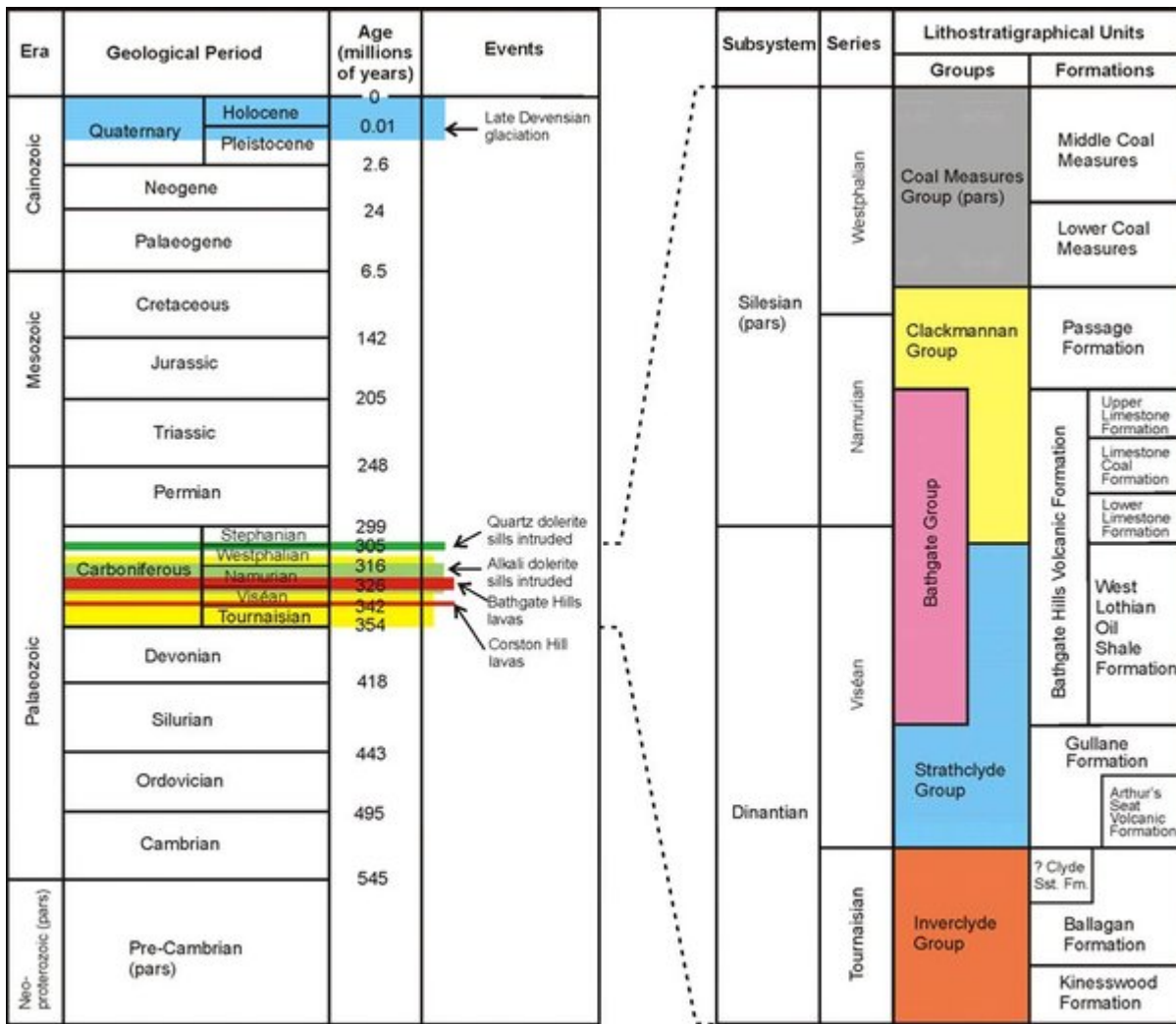
### 3.4.2.3 West Lothian Geodiversity Sites

Given the limited coverage of Inverclyde Group rocks, the four sites described below are considered to adequately represent the group (Figure 15).

[1 Baad Park Burn](#)

[2 West Cairn Hill, East Burn](#)

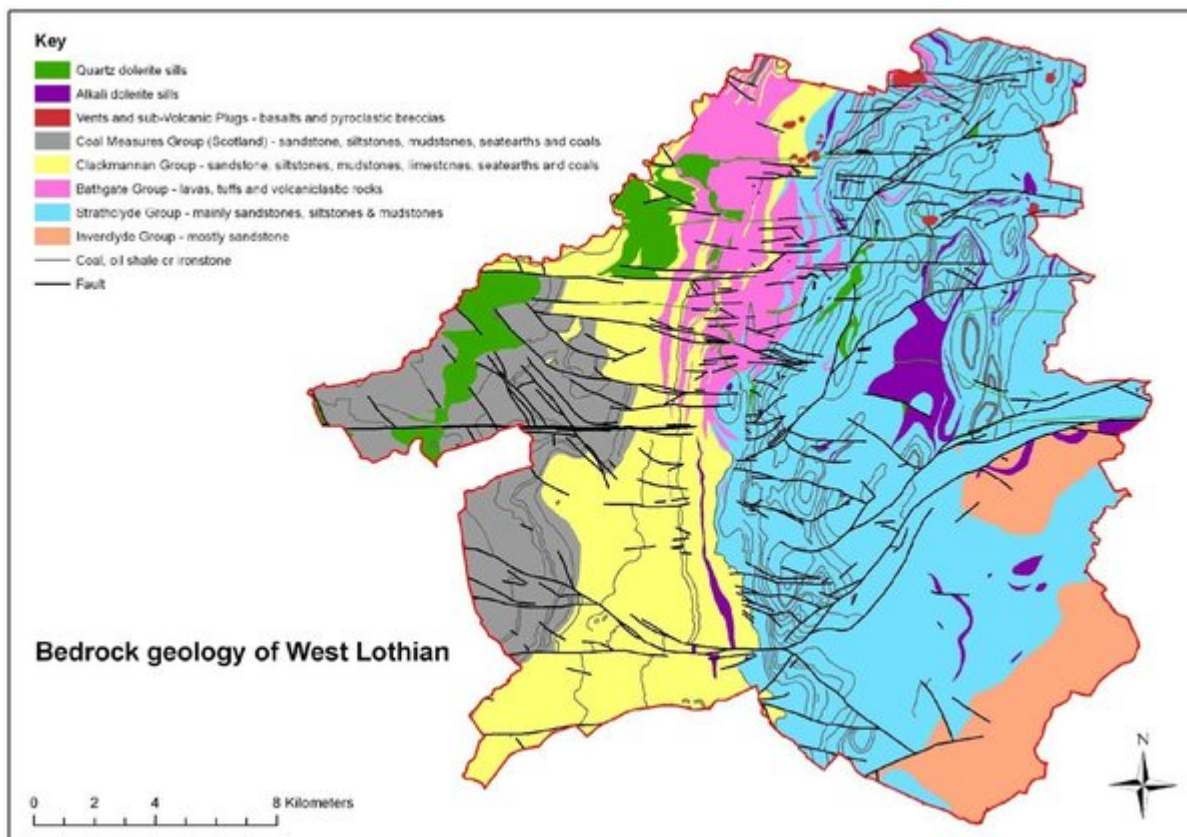
[3 Linhouse Water - Above Carstairs Viaduct](#)



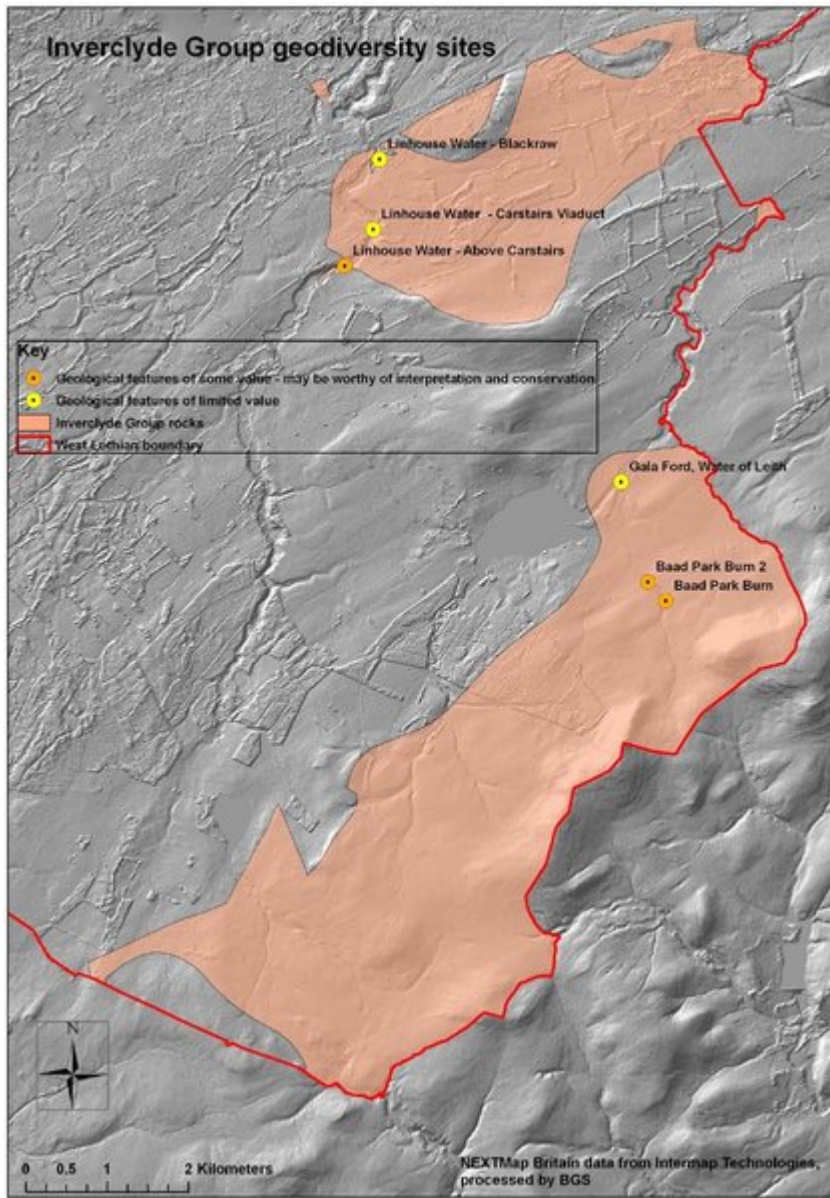
**A**

**B**

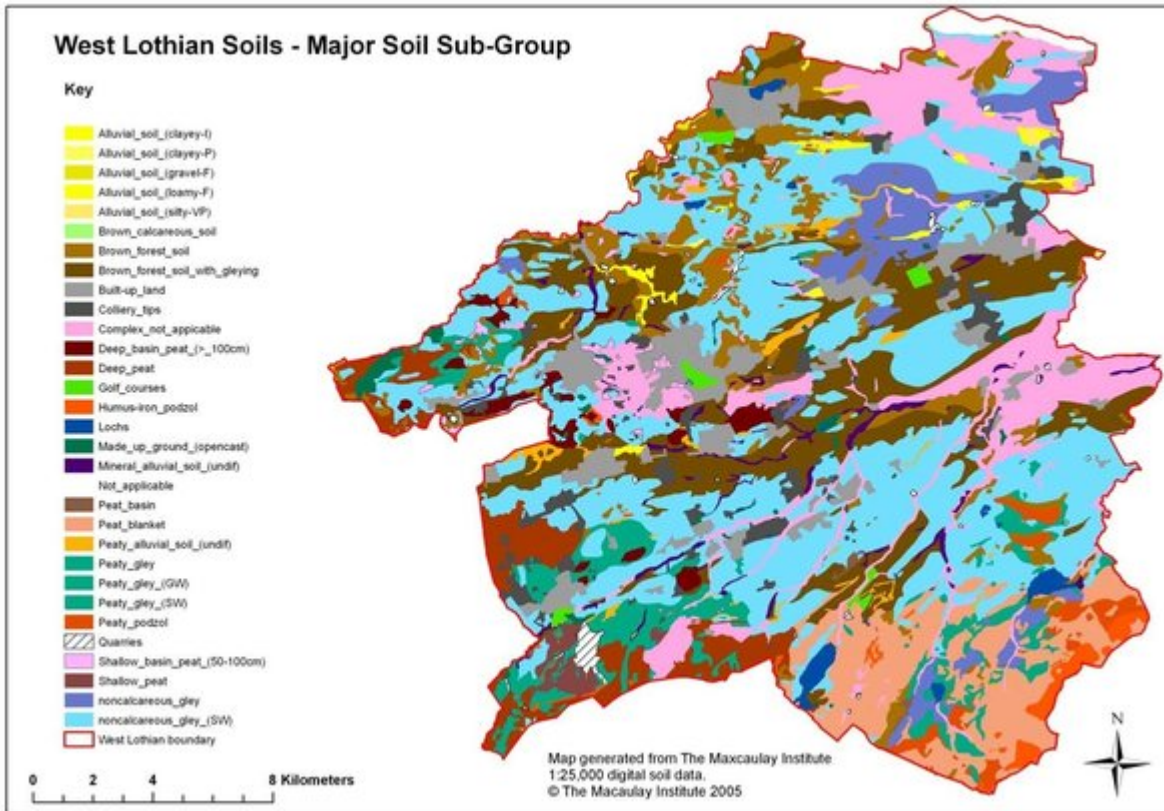
(Figure 1) A: Part of the geological timescale with colour bars representing the rocks of West Lothian. Yellow bar = Carboniferous sedimentary rocks; red bars = extrusive igneous rocks; green bars = intrusive igneous rocks. B: Classification of Carboniferous strata in West Lothian.



(Figure 2) Bedrock geology of West Lothian.



(Figure 15) Inverclyde Group geodiversity sites of West Lothian.



(Figure 6) Major Soil Sub-Groups of West Lothian. © The Macaulay Institute 2005.



(Figure 16) View across Harperrig Reservoir from Auchinoon Quarry (WLGS 36) beside the A70. The south-east boundary of West Lothian runs along the skyline from East Cairn Hill to West Cairn Hill. Inverclyde Group rocks form the hills and most of the low ground beyond the reservoir.



*(Figure 19) East Cairn Hill (561 m summit) from Baad Park Burn (WLGS 1), south-east of Harperrig Reservoir. The gently-inclined Kinesswood Formation (Inverclyde Group) sandstones show small-scale scarp featuring.*