

Tables

(Table 1.1) GCR Old Red Sandstone sites and proposed sites, with main criteria for their selection. Continued on page 7.

Site	Age	Selection criteria
Orcadian Basin		
Easter Rova Head	Mid-Devonian	Spectacular sea-cliff exposures of conglomerates.
Footabrough to Wick of Watsness	Mid-Devonian	Continuous sea-cliff exposures of Walls Formation.
The Cletts, Exnaboe	Mid-Devonian	Continuous sea-cliff exposures of cyclic lacustrine, fluvial and aeolian facies of the Brindister Flagstone Formation. Also a fossil fish GCR site.
Melby: Matta Taing to Lang Rigg (P)	Mid-Devonian	Fossil fish GCR site. Spectacular sea-cliff and foreshore exposures of lacustrine Melby Formation.
South Stromness Coast Section	Mid-Devonian	Best section in Orkney through the Caithness Flagstone Group.
Taracliff Bay to Newark Bay	Mid-Devonian	Thickest, best-exposed section of the Eday Group.
Greenan Nev Coast, Eday	Mid-Devonian	Best section through the Eday Marl Formation in Orkney.
South Fersness Bay, Eday	Mid-Devonian	Well-exposed, accessible section of the Eday Group.
Yesnaby and Gaulton Coast Section	Early Devonian	Superb sea-cliff sections of the Yesnaby Sandstone Group, including unique aeolian facies. Also sections in the Lower Stromness Flagstone Formation containing the best stromatolites in the Orcadian Basin.
Old Man of Hoy Coast	Late Devonian	Spectacular sea cliffs of the Hoy Sandstone Formation, including the Illoy Volcanic Member.
Bay of Berstane (P)	Mid-Devonian	Unique onshore evidence of marine-influenced deposition in the Middle Devonian Eday Marl Formation.
Red Point	Mid-Devonian	Spectacular lake-margin deposits and basement-cover topography.
Pennyland (Thurso–Scrabster)	Mid-Devonian	Well-exposed lacustrine cycles of the Orcadian lake (Upper Caithness Flagstone Group). Also a fossil fish GCR site.
John o'Groats (P)	Mid-Devonian	Fossil fish GCR site. Type locality of John o'Groats Sandstone Group.
Wick Quarries	Mid-Devonian	Spectacular exposures of fish-bearing lake deposits and shrinkage cracks in the Lower Caithness Flagstone Group in an otherwise poorly exposed part of the Orcadian Basin.

Achanarras Quarry (P)	Mid-Devonian	Fossil fish GCR site, the richest locality in Great Britain. Type locality of Achanarras Limestone Member (Fish Bed), of importance regionally as a marker horizon between the Lower Caithness Flagstone Group and Upper Caithness Flagstone Group.
Sarclet (P)	Early Devonian	Sea-cliff sections in the Lower Devonian Sarclet Group. Complete section of the Balnagown Group and of the apparently conformable junction with the Strath Rory Group.
Tarbat Ness	Mid-Devonian and Late Devonian	Dramatic exposure of Middle Old Red Sandstone conglomerates resting unconformably on Dalradian metasedimentary rocks and late Caledonian granites in the south-west of the Orcadian Basin.
Loch Duntelchaig (Dun Chia Hill)	Mid-Devonian	Fossil fish GCR site. Classic fossil fish locality yielding whole, well-preserved specimens, and important evidence on the nature of the southern margin of the Orcadian Basin at the time of maximum (Achanarras) lake extent.
Tynet Burn (P)	Mid-Devonian	Fossil fish GCR site, with superb coast sections at Gamrie Bay, Pennan (Lower ORS–Middle ORS) unconformity), New Aberdour and Quarry Haven.
Den of Findon, Gamrie Bay and New Aberdour (P)	Mid-Devonian (also Early Devonian)	Fossil plant GCR site. World renowned floral and arthropod lagerstätte. Exceptional preservation in a hydrothermal spring deposit.
Rhynie (P)	Early Devonian	
Midland Valley of Scotland and adjacent areas		
The Toutties (P)	Mid-Silurian	Fossil fish GCR site. Oldest (Mid-Silurian) Old Red Sandstone facies in Scotland containing fish and important arthropod fauna.
Dunnottar Coast Section (P)	Mid-Silurian–Early Devonian	Magnificent exposures in dramatic sea cliffs of conglomerates and sandstones.
Crawton Bay	Late Silurian–Early Devonian	Fine coastal sections of conglomerates and volcanics. Also a Caledonian igneous rocks GCR site
North Esk River	late Early Devonian	Best sections of the Strathmore Group Sea cliffs exposing one of the best sections of mature calcrete development in Scotland in the Kinnesswood Formation.
Milton Ness (P)	Late Devonian–Early Carboniferous	

Aberlemno Quarry (P)	Early Devonian	Fossil fish and Palaeozoic palaeobotany GCR site. Also important for arthropod fossils. Important for Dundee Flagstone and Scone Sandstone formations.
Tillywhandland Quarry (P)	Early Devonian	Fossil fish GCR site. Unique lacustrine facies in the Midland Valley of Scotland in the Dundee Flagstone Formation containing fish, arthropods and trace fossils.
Whiting Ness	Early and Late Devonian	Sea cliffs exposing Early Devonian sandstones unconformably overlain by Late Devonian sandstones, the units being separated by a spectacular unconformity.
Tay Bank	Early Devonian	Type locality of the Campsie Limestone Member, including the Stanley Limestone, representing mature calcrete development and providing an important stratigraphical marker horizon.
Glen Vale (P)	Late Devonian	Important sandstones (the Knox Pulpit Sandstone Formation) of aeolian origin.
Wolfs Hole Quarry (P)	Early Devonian	Fossil fish GCR site exposing the highest lava on the southern side of the Strathmore Basin.
Auchensail Quarry (P)	Early Devonian	Fossil plant GCR site yielding a well-preserved assemblage of land plants in the Teith Sandstone Formation.
Siccar Point to Hawk's Heugh (E)	Late Devonian-Early Carboniferous	Classic section at Siccar Point (Hutton's Unconformity). Fossil fish GCR site at Hawk's Heugh. Proposed extension to include the intervening superb sections of fluvial and ?aeolian sandstones at Pease Bay.
Largs Coast, Ayrshire	Late Devonian	Important coastal exposures in sandstones illustrating fluvial, braided river sandbody morphologies.
North Newton Shore, Arran	Late Devonian	One of the three classic Old Red Sandstone unconformities recognized by James Hutton.
Southern Scotland and the Lake District		
Palmers Hill Rail Cutting	Late Devonian	Exposures of calcrete in the Scottish Border Basin.
Pooley Bridge	Early Devonian	Best section of Old Red Sandstone facies conglomerates in north-west England.
Anglo-Welsh Basin		
Porth-y-Mor	Early Devonian	One of the best, most accessible Old Red Sandstone sections in the Anglo-Welsh Basin.

Devil's Hole (P)	Late Silurian-Early Devonian	Historically important fossil fish GCR site, with important 'Downtonian'-'Dittonian' boundary exposure.
Oak Dingle, Tugford (P)	Early Devonian	Fossil fish GCR site with well-documented sedimentological analysis.
The Scar	Late Silurian	Good inland exposure of the Raglan Mudstone Formation.
Cusop Dingle (P)	Late Silurian-Early Devonian	Best, most complete inland section through topmost Pŷdoli and lowermost Devonian strata.
Sawdde Gorge (E)	Late Silurian-Early Devonian	Proposed extension of GCR site to include higher Pŷdoli and basal Devonian strata.
Pantymaes Quarry (P)	Early Devonian	Excellent exposure of Lochkovian channel sandstones and floodplain mudstone facies, internationally known for its arthropod trackways.
Heol Senni Quarry	Early Devonian	GCR fossil fish site. Also representative of the Senni Formation.
Caeras Quarry	Early Devonian	Best exposure of local pebbly facies in the Brownstones Formation.
Craig-y-Fro Quarry (P)	Early Devonian	Classic fossil plant GCR site. Also Important for exposure of the Senni Formation.
Abercriban Quarries	Late Devonian-Early Carboniferous	Type locality of the Grey Grits Formation.
Mon y Waen (P)	Late Devonian	Potential fossil fish GCR site. Also important for exposure of the Plateau Beds Formation.
Duffryn Cwannon (P)	Late Devonian	Type locality of the Plateau Beds Formation, including possible aeolian facies.
Craig-y-cwm (P)	Late Devonian-Early Carboniferous	Representative section of the Quartz Conglomerate Group.
Ross-on-Wye, Royal Hotel	Early Devonian	Excellent, well-documented, accessible section of the Brownstones Formation.
Wilderness (Land Grove) Quarry	Early Devonian	Fossil fish GCR site with superb exposure of the lowermost strata of the Brownstones Formation.
Lydney	Late Silurian-Early Devonian	Fossil fish GCR site with good section of the Psammosteus Limestone horizon.
Albion Sands and Gateholm Island (P)	Late Silurian-Early Devonian	Magnificent sea-cliff and foreshore exposures of Wenlock marine strata and the overlying Old Red Sandstone.
Little Castle Head (P)	Late Silurian-Early Devonian	Reference section of the Pŷdoli Sandy Haven Formation and of the Townsend Tuff Bed.
West Angle Bay (North)	Late Silurian-Early Carboniferous	Continuous section of the entire Old Red Sandstone succession and of the underlying and overlying strata.

Freshwater West (P)	Late Silurian-Early Carboniferous	Superb, accessible dip section exposing the entire Old Red Sandstone succession.
Freshwater East–Skrinkle Haven ('Tenby Cliffs')	Late Silurian-Early Carboniferous	Excellent strike section of the entire Old Red Sandstone succession. Superb exposures of stacked carbonate palaeosols of the Chapel Point Calcretes Member (<i>Psammosteus</i> Limestone).
Llansteffan	Late Silurian-Early Devonian	Best section of the Old Red Sandstone succession east of Severn Estuary.
Portishead	Early and Late Devonian	Best section of Old Red Sandstone facies south of the Bristol Channel.
Glenthorne	Mid-Devonian	
P Potential site (most of these sites are confirmed GCR sites for their palaeontology)		
E Proposed extension to site		

(Table 1.2) GCR sites in the Old Red Sandstone described in the fossil fishes GCR volume. After Dineley and Metcalf (1999). Continued on page 9.

Site	Stratigraphy	Criterion	Treatment in this volume
			Full description FD Summary description SD Not described ND
Orcadian Basin			
Westerdale Quarry	Mid-Devonian; Eifelian	One of oldest fish-bearing horizons in Orcadian Basin; complete specimens	ND
Achanarras Quarry	Mid-Devonian; Eifelian–Givetian boundary	Richest Old Red Sandstone fish site in Britain	FD
Cruaday Quarry	Mid-Devonian; Eifelian–Givetian boundary*	Best Old Red Sandstone fish site in Orkney	ND
Black Park, Edderton	Mid-Devonian; Eifelian–Givetian boundary*	Fish well preserved in three dimensions	ND
Den of Findon, Gamrie	Mid-Devonian; Eifelian–Givetian boundary*	Prolific fish fauna	SD
Tynet Burn, Elgin	Mid-Devonian*	Rich fish fauna and historically important	FD
Melby	Mid-Devonian; Eifelian–Givetian boundary*	Northernmost occurrence of Achanarras horizon	FD
Papa Stour	Mid-Devonian; Eifelian–Givetian boundary*	Fish in sedimentary rocks in predominantly volcanic sequence	ND
Dipple Brae	Mid-Devonian	Fish fauna younger than that of the Achanarras horizon	ND
Spinal Quarry	Mid-Devonian	Rare fish fauna, including only Mid-Devonian cephalaspid	ND
Banniskirk Quarry	Mid-Devonian	First ORS site to yield fishes	ND
Holborn Head Quarry	Mid-Devonian; mid-Givetian	10–11 fish species, including <i>Osteolepis panderi</i>	ND

Weydale Quarry	Mid-Devonian	Well-preserved <i>Osteolepis panderi</i> and <i>Dipterus valenciennesi</i>	ND
Pennyland	Mid-Devonian; Givetian	Many fish specimens from several fish-bearing horizons	FD
John o'Groats	Mid-Devonian; late Givetian	Youngest fish fauna in Caithness	SD
The Cletts, Exnaboe	Mid-Devonian; late Givetian	Northernmost late Givetian fish site	FD
Sumburgh Head	Late Mid-Devonian; late Givetian	Possibly youngest fish fauna of the Orcadian Basin	ND
Midland Valley of Scotland			
The Toutties	Late Wenlock	Oldest Old Red Sandstone facies rocks in Scotland; unique fish fauna	FD
Tillywhandland Quarry	Early Devonian	One of best Early Devonian fish sites in Scotland	FD
Aberlemno Quarry	Early Devonian	Best surviving of the famous Turin Hill fish sites; also a fossil plant GCR site ((Table 1.3))	FD
Wolf's Hole Quarry	Early Devonian	Unique pteraspid fish fauna	FD
Whitehouse Den	Early Devonian	Fossil acanthodian fish	ND
Grampian Highlands			
Ardmore-Gallanach	Late Silurian-Early Devonian	Unique early fish fauna in sediments associated with Lorne lavas	ND
Bogmore, Muckle Burn	Earliest Late Devonian (Frasnian)	Diverse fish fauna with over 15 species	ND
Scaat Craig	Late Devonian	Diverse late Devonian fish fauna and a distinctive tetrapod	ND
* Achannaras Fish Bed horizon			
Southern Uplands			
Oxendean Burn	Late Devonian	Abundant fragments of <i>Bothriolepis</i>	ND
Hawk's Heugh	Late Devonian	Only British occurrence of <i>Remigolepis</i>	
Anglo-Welsh Basin			
Ludford Lane and Ludford Corner	Silurian; Pridoli	Internationally renowned for rich fish fauna; see also (Table 1.4)	FD ND
Ledbury cutting	Silurian; Pridoli	Historical site yielding complete specimens of <i>Auchenaspis</i> and <i>Hemicyclaspis</i>	ND
Temeside, Ludlow	Silurian: Pridoli	Historical site in Temeside Mudstone Formation yielding a rich fish fauna including <i>Hemicyclaspis murchisoni</i>	ND

Tite's Point (Purton Passage)	Silurian; Ludlow–Pridoli	<i>Thelodus parvidens</i> fish fauna, allowing correlation with Ludlow Bone Bed, and source of <i>Cyathaspis</i> Sequence of vertebrate	
Lydney	Late Pridoli–Early Devonian	faunas, including specimens of <i>Sabrinacanthus</i>	FD
Downton Castle area (network of 4 sites)	Early Pridoli	Several quarries in Downton Castle Sandstone yielding vertebrate remains	ND
Bradnor Hill Quarry	Late Pridoli	Late Pridoli thelodont fauna	ND
Devil's Hole	Pridoli–Lochkovian	Fish fauna straddling Downtonian-Dittonian boundary	SD
Oak Dingle, Tugford	Lochkovian (Dittonian)	Near-strike section of fish-bearing beds; earliest record of <i>Weigeltaspis</i>	SD
Cwm Mill	Lochkovian (Dittonian)	Unique preservation of complete cephalaspids, including three new species; also specimens of <i>Rhinopteraspis crouchi</i>	ND
Wayne Herbert Quarry	Lochkovian (Dittonian)	Well-preserved, diverse fish fauna	Nb
Besom Farm Quarry	Lochkovian (Dittonian)	Rich, diverse fish fauna, including 7 type specimens and sole occurrence of 5 of them	ND
Heol Senni Quarry	Lochkovian–Pragian	Only occurrence of <i>Althaspis senniensis</i>	FD
Portishead	Late Devonian	Unique fish fauna, including only British occurrence of <i>Groenlandaspis</i>	FD
Prescott Corner	Late Devonian (Frasnian)	Extensive Late Devonian fish fauna	ND
Mon y Waen	Late Devonian	<i>Bothriolepis</i> and <i>Holoptychius</i> in Upper Old Red Sandstone	FD

(Table 1.3) GCR sites in the Old Red Sandstone described in the Palaeozoic palaeobotany GCR volume. After Cleal and Thomas (1995).

Site	Stratigraphy	Criterion	Treatment in this volume
			Full description FD Summary description SD
			Not described ND
Orcadian Basin			
Sloagar	Mid-Devonian; Late Givetian	Only occurrence of <i>Svalbardia</i> in Britain	ND
Bay of Skail	Mid-Devonian	Important floral assemblage in Sandwich Fish Bed; type locality of <i>Protopteridium thomsonii</i>	ND

Rhynie	Early Devonian	Renowned Devonian palaeobotanical site; 22 species unique to this site	FD
Midland Valley of Scotland		Best example of	
Turin Hill	Early Devonian	<i>Zosterophyllum</i> Zone flora in world and type locality of <i>Cooksonia caledonica</i>	FD (as 'Aberlemno Quarry')
Ballanucater Farm	Early Devonian; Emsian	Best Emsian floral assemblage in Britain	ND
Auchensail Quarry	Early Devonian; Emsian	Well-preserved Emsian floral assemblage	FD
Anglo-Welsh Basin			
Targrove Quarry	Early Devonian; Gedinnian	Most diverse rhyniophytoid plant assemblage in world	ND
Capel Horeb Quarry	Late Silurian; Ludfordian–Pridoli	Oldest vascular plants in world in Ludlow Series; Long Quarry Formation yielded some rhyniophytoids including <i>Cooksonia</i>	ND
Perton Lane	Late Silurian; Pridoli	Classic locality and type locality of <i>Cooksonia</i>	ND
Freshwater East	Late Silurian; Pridoli	Most diverse Silurian flora in the world	FD
Llanover Quarry	Early Devonian; Siegenian	Classic locality yielding one of most diverse <i>Psilophyton</i> Zone flora in Britain	ND
Craig-y-Fro Quarry	Early Devonian	Some of best preserved Devonian plants in Britain; locality second only to the Rhynie site in Britain	SD

(Table 1.4) GCR sites in the Old Red Sandstone described in the Silurian stratigraphy GCR volume. After Aldridge *et al.* (2000).

Site	Stratigraphy	Criterion	Treatment in this volume Full description FD Summary description SD Not described ND
Anglo-Welsh Basin			
Marloes	Wenlock–Pridoli	Classic site showing early transition from marine to Old Red Sandstone facies	ND (included with report for Albion Sands and Gateholm Island)
Albion Sands and Gateholm Island	Ludlow–Pridoli–Lochkovian	Complete, conformable succession from Ludlow into early Devonian	SD
Freshwater East (South)	Wenlock–Pridoli	Wenlock marine strata overlain by Old Red Sandstone; faulted/unconformable relationship	ND

Ludford Lane and Ludford Corner	Ludlow–Pridoli	Classic, internationally renowned site traditionally regarded as reference section for Silurian-Devonian boundary; earliest known land ND animals, early plants (see (Table 1.3)), unusual arthropods and fish remains in Ludlow Bone Bed
Brewin's Bridge/Canal	Ludlow–Pridoli-Carboniferous	One of few sites in central England exposing marine Silurian-Old Red Sandstone ND junction, including Ludlow Bone Bed
Capel Horeb Quarry	Ludlow–Pridoli	Good section of unconformity between Ludlow and Pridoli; internationally important plant ND site ((Table 1.3))
Little Castle Head	Pridoli	Old Red Sandstone facies rocks; Townsend Tuff Bed SD
Lower Wallop Quarry	Ludlow–Pridoli	Marine to Old Red Sandstone transition later here, well into Pridoli ND

(Table 1.5) GCR sites with Old Red Sandstone sedimentary rocks described in the Caledonian igneous rocks volume. After Stephenson *et al.* (1999).

Site	Stratigraphy/ radiometric age	GCR selection criteria
Eshaness Coast	Mid-Devonian	Representative of Eifelian Eshaness volcanic succession, NW Shetland.
Ness of Clousta to the Brigs	Mid-Devonian	Representative of Givetian Clousta volcanic rocks, Walls, Shetland.
Point of Ayre	Mid-Devonian	Representative of Givetian Deerness Volcanic Member, mainland Orkney.
Too of the Head	Mid-Devonian	Representative of Givetian Hoy Volcanic Formation, Isle of Hoy, Orkney.
South Kerrera	Late Silurian to Early Devonian	Representative of Lorn Plateau Volcanic Formation. Exceptional examples of subaerial lava features and interaction of magma with wet sediment.
Ben Nevis and Allt a'Mhuilinn	Mid-Silurian 425 Ma	Representative of Ben Nevis Volcanic Formation.
		Exceptional intrusive tuffs.
		Internationally important as example of exhumed root of caldera, and historically for development of cauldron subsidence theory.

Stob Dearg and Cam Ghleann	Mid-Lochkovian 421 ± 4 Ma	Representative of succession in eastern part of Glencoe caldera, including basal sedimentary rocks. Exceptional rhyolites, ignimbrites and intra-caldera sediments. Possible international importance for radiometric dating in conjunction with palaeontology close to Silurian–Devonian boundary.
Crawton Bay*	Late Silurian–Early Devonian	Representative of Crawton Volcanic Formation.
Scurdie Ness to Usan Harbour	Early Devonian	Representative of 'Ferrydean' lavas and 'Usan' lavas, comprising lower part of Montrose Volcanic Formation.
Black Rock to East Comb	Early Devonian	Representative of 'Ethie' lavas, comprising upper part of Montrose Volcanic Formation.
Balmerino to Wormit	Early Devonian (Lochkovian) 410.6 ± 5.6 Ma	Representative of eastern succession of Ochil Volcanic Formation. Possible international importance for radiometric dating in conjunction with palaeontology close to Silurian–Devonian boundary.
Sheriffmuir Road to Menstrie Burn	Early Devonian 416 ± 6.1 Ma	Representative of western succession of Ochil Volcanic Formation. Exceptional topographic expression of Ochil fault-scarp.
Tillycoultrie	Early Devonian 415–410 Ma	Representative of diorite stocks, intruded into Ochil Volcanic Formation, surrounded by thermal aureole and cut by radial dyke swarm. Exceptional examples of diffuse contacts due to metasomatism and contamination, with 'ghost' features inherited from country rock.
Port Schuchan to Dunure Castle	Early Devonian	Representative of Carrick Hills volcanic succession. Exceptional features resulting from interaction of magma with wet sediment are of international importance.
Culzean Harbour	Early Devonian	Representative of inlier of Carrick Hills volcanic succession. Exceptional features resulting from interaction of magma with wet sediment are of international importance.
Tumberry Lighthouse to Port Murray	Early Devonian	Representative of most southerly inlier of Carrick Hills volcanic succession. Exceptional features resulting from interaction of magma with wet sediment are of international importance.

Representative of volcanic rocks in the SE of the Southern Uplands.
 Exceptional vent agglomerates, block lavas, flow tops and interflow high-energy volcanoclastic sediments.

Pettico Wick to St Abb's Harbour Early Devonian c. 400+ Ma

*described in this volume

References

Site	Age	Selection criteria
Orkadian Basin		
Easton Ross Head	Mid-Devonian	Spectacular sea-cliff exposures of conglomerates.
Forvieburgh to Wick of Wainess	Mid-Devonian	Continuous sea-cliff exposures of cyclic lacustrine, fluvial and aeolian facies of the Brindstone Flagstone Formation. Also a fossil fish GCR site.
The Close, Tingabur	Mid-Devonian	Continuous sea-cliff exposures of cyclic lacustrine, fluvial and aeolian facies of the Brindstone Flagstone Formation. Also a fossil fish GCR site.
Melby, Malla Tuing to Lang Rigg (P)	Mid-Devonian	Fossil fish GCR site. Spectacular sea-cliff and foreshore exposures of lacustrine Melby Formation.
South Stronness Coast Section	Mid-Devonian	Best section in Orkney through the Cathness Flagstone Group.
Tarskiff Bay to Newark Bay	Mid-Devonian	Thickest, best-exposed section of the Eday Group.
Greeness Ness Coast, Eday	Mid-Devonian	Best section through the Eday Marl Formation in Orkney.
South Fermaness Bay, Eday	Mid-Devonian	Well-exposed, accessible section of the Eday Group.
Yensaby and Galloway Coast Section	Early Devonian	Superb sea-cliff sections of the Yensaby Sandstone Group, including unique aeolian facies. Also sections in the Lower Stronness Flagstone Formation containing the best stromatolites in the Orkadian Basin.
Old Man of Hoy Coast	Late Devonian	Spectacular sea cliffs of the Hoy Sandstone Formation, including the Hoy Volcanic Member.
Bay of Bessene (P)	Mid-Devonian	Unique, rare evidence of marine-influenced deposition in the Middle Devonian Eday Marl Formation.
Red Point	Mid-Devonian	Spectacular lake-margin deposits and basement-cover topography.
Pennyland (Thurso-Scrabsby)	Mid-Devonian	Well-exposed lacustrine cycles of the Orkadian lake (Upper Cathness Flagstone Group). Also a fossil fish GCR site.
John o'Groats (P)	Mid-Devonian	Fossil fish GCR site. Type locality of John o'Groats Sandstone Group.
Wick Quarries	Mid-Devonian	Spectacular exposures of fish-bearing lake deposits and shrinkage cracks in the Lower Cathness Flagstone Group in an otherwise poorly exposed part of the Orkadian Basin.
Achanarras Quarry (P)	Mid-Devonian	Fossil fish GCR site, the richest locality in Great Britain. Type locality of Achanarras Limestone Member (fish Bed), of importance regionally as a marker horizon between the Lower Cathness Flagstone Group and Upper Cathness Flagstone Group.
Saerlet (P)	Early Devonian	Sea-cliff sections in the Lower Devonian Saerlet Group.
Tarfess Ness	Mid-Devonian and Late Devonian	Complete section of the Balgownie Group and of the apparently conformable junction with the South Rury Group.
Loch Duntuchlag (Dun Chis Hill)	Mid-Devonian	Dramatic exposure of Middle Old Red Sandstone conglomerates resting unconformably on Ordovician metasedimentary rocks and late Caledonian granites in the southwest of the Orkadian Basin.
Tynes Burn (P)	Mid-Devonian	Fossil fish GCR site. Classic fossil fish locality yielding whole, well-preserved specimens, and important evidence on the nature of the southern margin of the Orkadian Basin at the time of maximum (Achanarras) lake extent.
Dow of Fincos, Gamrie Bay and New Aberdeen (P)	Mid-Devonian (also Early Devonian)	Fossil fish GCR site, with superb coast sections at Gamrie Bay, Penman (Lower ORS-Middle ORS unconformity), New Aberdeen and Quarry Hatten.
Rhyrie (P)	Early Devonian	Fossil plant GCR site. World renowned floral and arthropod Lagerstätte. Exceptional preservation in a hydrothermal spring deposit.
Midland Valley of Scotland and adjacent areas		
The Tounies (P)	Mid-Silurian	Fossil fish GCR site. Oldest (Mid-Silurian) Old Red Sandstone facies in Scotland containing fish and important arthropod fauna.
Dunrobin Coast Section (P)	Mid-Silurian-Early Devonian	Magnificent exposures in dramatic sea cliffs of conglomerates and sandstones.
Gartnavel Bay	Late Silurian-Early Devonian	Fine coastal sections of conglomerates and volcanics. Also a Caledonian igneous rocks GCR site.
North Esk River	Late Early Devonian	Best sections of the Strathmore Group.
Milnervale (P)	Late Devonian-Early Carboniferous	Sea cliffs exposing one of the best sections of mature calcareous development in Scotland in the Kintorewood Formation.
Aberlone Quarry (P)	Early Devonian	Fossil fish and Palaeozoic palaeobotany GCR site. Also important for arthropod fossils. Important for Devonian Flagstone and lower Sandstone formations.
Tillyshandland Quarry (P)	Early Devonian	Fossil fish GCR site. Unique lacustrine facies in the Midland Valley of Scotland in the Dundee Flagstone Formation containing fish, arthropods and trace fossils.
Whiting Ness	Early and Late Devonian	Sea cliffs exposing Early Devonian sandstones unconformably overlain by Late Devonian sandstones, the units being separated by a spectacular unconformity.
Site		
Age		
Selection criteria		
Tay Bank	Early Devonian	Type locality of the Campsie Limestone Member, including the Stasley Limestone, representing mature calcareous development and providing an important stratigraphical marker horizon.
Glenn Vale (P)	Late Devonian	Important sandstones (the Kreen Polyp Sandstone Formation) of aeolian origin.
Wolf's Hole Quarry (P)	Early Devonian	Fossil fish GCR site exposing the highest lens on the southern side of the Strathmore Basin.
Auchmarnock Quarry (P)	Early Devonian	Fossil plant GCR site yielding a well-preserved assemblage of land plants in the Teith Sandstone Formation.
Siecar Point to Hawk's Hough (B)	Late Devonian-Early Carboniferous	Classic section at Siecar Point (Hutton's Unconformity). Fossil fish GCR site at Hawk's Hough. Proposed extension to include the intersecting superb sections of fluvial and aeolian sandstones at Princes Bay.
Large Coast, Appleby	Late Devonian	Important coastal exposures in sandstones illustrating fluvial, braided river sandbody morphologies.
North Newton Shore, Arisa	Late Devonian	One of the three classic Old Red Sandstone unconformities recognized by James Hutton.
Southern Scotland and the Lake District		
Palmer's Hill Red Cutting	Late Devonian	Exposures of calcareous in the Scottish Border Basin.
Preedy Lodge	Early Devonian	Best section of Old Red Sandstone facies conglomerates in north-west England.
Anglo-Weald Basin		
Purby-Mor	Early Devonian	One of the best, most accessible Old Red Sandstone sections in the Anglo-Weald Basin.
Devil's Hole (P)	Late Silurian-Early Devonian	Historically important fossil fish GCR site, with important 'Downtonian'-'Emsworthian' boundary exposure.
Oak Dingle, Tagford (P)	Early Devonian	Fossil fish GCR site with well-documented sedimentological analysis.
The Scar	Late Silurian	Good inland exposure of the Raglan Mudstone Formation.
Camp Dingle (P)	Late Silurian-Early Devonian	Best, most complete inland section through uppermost Piddili and lowermost Devonian strata.
Sawdle Gorge (B)	Late Silurian-Early Devonian	Proposed extension of GCR site to include higher Piddili and basal Devonian strata.
Prunston Quarry (P)	Early Devonian	Excellent exposure of Leithwaite channel sandstones and floodplain mudstone facies, internationally known for its arthropod trackways.
Heed Senni Quarry	Early Devonian	GCR fossil fish site. Also representative of the Senni Formation.
Carron Quarry	Early Devonian	Best exposure of local pebbly facies in the Brownstones Formation.
Craig-y-Dro Quarry (P)	Early Devonian	Classic fossil plant GCR site. Also important for exposure of the Senni Formation.
Abercrombie Quarries	Late Devonian-Early Carboniferous	Type locality of the Grey Grits Formation.
Alan y Waen (P)	Late Devonian	Potential fossil fish GCR site. Also important for exposure of the Plateau Beds Formation.
Duffryn Gwenton (P)	Late Devonian	Type locality of the Plateau Beds Formation, including possible aeolian facies.
Craig-y-cwm (P)	Late Devonian-Early Carboniferous	Representative section of the Quartz Conglomerate Group.
Brown-on-Wye, Royal Hotel	Early Devonian	Excellent, well-documented, accessible section of the Brownstones Formation.
Whithorn (Land Grove) Quarry	Early Devonian	Fossil fish GCR site with superb exposure of the lowermost strata of the Brownstones Formation.
Lindsey	Late Silurian-Early Devonian	Fossil fish GCR site with good section of the Prunstonian Limestone horizon.
Albion Sands and Galloway Island (P)	Late Silurian-Early Devonian	Magnificent sea-cliff and foreshore exposures of Wenslock marine strata and the overlying Old Red Sandstone.
Lake Castle Head (P)	Late Silurian-Early Devonian	Reference section of the Piddili Sandy Haven Formation and of the Townsford Tuff Bed.
West Angle Bay (North)	Late Silurian-Early Carboniferous	Continuous section of the entire Old Red Sandstone succession and of the underlying and overlying strata.
Fredwater West (P)	Late Silurian-Early Carboniferous	Superb, accessible dip section exposing the entire Old Red Sandstone succession.
Fredwater East-Skinkie Haven ('Trenby Cliffs') Llanerfyllan	Late Silurian-Early Devonian	Excellent strike section of the entire Old Red Sandstone succession.
Portlaidhead	Early and Late Devonian	Superb exposures of stacked carbonate palaeosols of the Chapel Point Calcareous Member (Prunstonian Limestone).
Glenochter	Mid-Devonian	Best section of the Old Red Sandstone succession east of Severn Estuary.
		Best section of Old Red Sandstone facies south of the Bristol Channel.

¹ Potential site (none of these sites are confirmed GCR sites for their palaeontology)

² Proposed extension to site

(Table 1.1) GCR Old Red Sandstone sites and proposed sites, with main criteria for their selection. Continued on page 7.

Site	Stratigraphy	Criterion	Treatment in this volume Full description FD Summary description SD Not described ND	Site	Stratigraphy	Criterion	Treatment in this volume Full description FD Summary description SD Not described ND
Orcadian Basin				Southern Uplands			
Westerdale Quarry	Mid-Devonian; Eifelian	One of oldest fish-bearing horizons in Orcadian Basin; complete specimens	ND	Oserdean Burn	Late Devonian	Abundant fragments of <i>Bolotriolepis</i>	ND
Achanarras Quarry	Mid-Devonian; Eifelian-Givetian boundary	Richest Old Red Sandstone fish site in Britain	FD	Hawk's Hough	Late Devonian	Only British occurrence of <i>Romigolepis</i>	FD
Craadley Quarry	Mid-Devonian; Eifelian-Givetian boundary*	Best Old Red Sandstone fish site in Orkney	ND	Anglo-Welsh Basin			
Black Park, Edderton	Mid-Devonian; Eifelian-Givetian boundary*	Fish well preserved in three dimensions	ND	Ludford Lane and Ludford Corner	Silurian; Pridoli	Internationally renowned for rich fish fauna; see also Table 1.4	ND
Den of Findon, Gamrie	Mid-Devonian; Eifelian-Givetian boundary*	Prolific fish fauna	SD	Ledbury cutting	Silurian; Pridoli	Historical site yielding complete specimens of <i>Auchenaspis</i> and <i>Hemicyclaspis</i>	ND
Tynet Burn, Elgin	Mid-Devonian*	Rich fish fauna and historically important	FD	Temesside, Ludlow	Silurian; Pridoli	Historical site in Temesside Mudstone Formation yielding a rich fish fauna including <i>Hemicyclaspis murchisoni</i>	ND
Melby	Mid-Devonian; Eifelian-Givetian boundary*	Northernmost occurrence of Achanarras horizon	FD				
Papa Stour	Mid-Devonian; Eifelian-Givetian boundary*	Fish in sedimentary rocks in predominantly volcanic sequence	ND	Tite's Point (Purton Passage)	Silurian; Ludlow–Pridoli	<i>Zhefodus parvidens</i> fish fauna, allowing correlation with Ludlow Bone Bed, and source of <i>Cyathaspis</i>	FD
Dipple Brae	Mid-Devonian	Fish fauna younger than that of the Achanarras horizon	ND				
Spital Quarry	Mid-Devonian	Rare fish fauna, including only Mid-Devonian cephalaspids	ND	Lydney	Late Pridoli–Early Devonian	Sequence of vertebrate faunas, including specimens of <i>Subinacanthus</i>	ND
Banniskirk Quarry	Mid-Devonian	First ORS site to yield fishes	ND				
Holborn Head Quarry	Mid-Devonian; mid-Givetian	10–11 fish species, including <i>Osteolepis panderi</i>	ND	Downton Castle area (network of 4 sites)	Early Pridoli	Several quarries in Downton Castle Sandstone yielding vertebrate remains	ND
Weydale Quarry	Mid-Devonian	Well-preserved <i>Osteolepis panderi</i> and <i>Dipterus eulencienensis</i>	FD	Bradnor Hill Quarry	Late Pridoli	Late Pridoli thelodont fauna	SD
Pennyland	Mid-Devonian; Givetian	Many fish specimens from several fish-bearing horizons	SD	Devil's Hole	Pridoli–Lochkovian	Fish fauna straddling Devonian–Dittonian boundary	SD
John o' Groats	Mid-Devonian; late Givetian	Youngest fish fauna in Caithness	FD	Oak Dingle, Tugford	Lochkovian (Dittonian)	Near-strike section of fish-bearing beds; earliest record of <i>Wegeliopsis</i>	ND
The Clets, Emsayoc	Mid-Devonian; late Givetian	Northernmost late Givetian fish site	ND	Cwm Mill	Lochkovian (Dittonian)	Unique preservation of complete cephalaspids, including three new species; also specimens of <i>Rhinopteropterus croucheri</i>	ND
Sunburgh Head	Late Mid-Devonian; late Givetian	Possibly youngest fish fauna of the Orcadian Basin	FD	Wayne Herbert Quarry	Lochkovian (Dittonian)	Well-preserved, diverse fish fauna	ND
Midland Valley of Scotland				Besom Farm Quarry	Lochkovian (Dittonian)	Rich, diverse fish fauna, including 7 type specimens and sole occurrence of 5 of them	FD
The Tousties	Late Wenlock	Oldest Old Red Sandstone facies rocks in Scotland; unique fish fauna	FD	Heol Senni Quarry	Lochkovian–Pragian	Only occurrence of <i>Althaspis senensis</i>	FD
Tillywhandland Quarry	Early Devonian	One of best Early Devonian fish sites in Scotland	FD	Portishead	Late Devonian	Unique fish fauna, including only British occurrence of <i>Groenlandaspis</i>	ND
Aberlemno Quarry	Early Devonian	Best surviving of the famous Turin Hill fish sites; also a fossil plant GCR site (Table 1.5)	FD	Prescott Corner	Late Devonian (Frasnian)	Extensive Late Devonian fish fauna	FD
Wolf's Hole Quarry	Early Devonian	Unique pteraspid fish fauna	ND	Alon y Waen	Late Devonian	<i>Bolotriolepis</i> and <i>Rholopterychius</i> in Upper Old Red Sandstone	ND
Whitchouse Den	Early Devonian	Fossil acanthodian fish	ND				
Grampian Highlands							
Ardfmore–Gallanach	Late Silurian–Early Devonian	Unique early fish fauna in sediments associated with Lorne lavas	ND				
Bogmore, Muckle Burn	Earliest Late Devonian (Frasnian)	Diverse fish fauna with over 15 species	ND				
Scait Craig	Late Devonian	Diverse late Devonian fish fauna and a distinctive tetrapod	ND				

* Achanarras Fish Bed horizons

Site	Stratigraphy	Criterion	Treatment in this volume Full description FD Summary description SD Not described ND
Orcadian Basin			
Sloagar	Mid-Devonian; Late Givetian	Only occurrence of <i>Svalbardia</i> in Britain	ND
Bay of Skail	Mid-Devonian	Important floral assemblage in Sandwich Fish Bed; type locality of <i>Protopteridium thomsonii</i>	ND
Rhynie	Early Devonian	Renowned Devonian palaeobotanical site; 22 species unique to this site	FD
Midland Valley of Scotland			
Turin Hill	Early Devonian	Best example of <i>Zosterophyllum</i> Zone flora in world and type locality of <i>Cooksonia caledonica</i>	FD (as 'Aberlemno Quarry')
Ballanucater Farm	Early Devonian; Emsian	Best Emsian floral assemblage in Britain	ND
Auchensail Quarry	Early Devonian; Emsian	Well-preserved Emsian floral assemblage	FD
Anglo-Welsh Basin			
Targrove Quarry	Early Devonian; Gedinian	Most diverse rhyniophytoid plant assemblage in world	ND
Capel Horeb Quarry	Late Silurian; Ludfordian–Pridoli	Oldest vascular plants in world in Ludlow Series; Long Quarry Formation yielded some rhyniophytoids including <i>Cooksonia</i>	ND
Perton Lane	Late Silurian; Pridoli	Classic locality and type locality of <i>Cooksonia</i>	ND
Freshwater East	Late Silurian; Pridoli	Most diverse Silurian flora in the world	FD
Llanover Quarry	Early Devonian; Siegenian	Classic locality yielding one of most diverse <i>Psilophyton</i> Zone flora in Britain	ND
Craig-y-Fro Quarry	Early Devonian	Some of best preserved Devonian plants in Britain; locality second only to the Rhynie site in Britain	SD

(Table 1.3) GCR sites in the Old Red Sandstone described in the *Palaeozoic palaeobotany* GCR volume. After Cleal and Thomas (1995).

Site	Stratigraphy	Criterion	Treatment in this volume Full description FD Summary description SD Not described ND
Anglo-Welsh Basin			
Marloes	Wenlock–Přidoli	Classic site showing early transition from marine to Old Red Sandstone facies	ND (included with report for Albion Sands and Gateholm Island)
Albion Sands and Gateholm Island	Ludlow–Přidoli–Lochkovian	Complete, conformable succession from Ludlow into early Devonian	SD
Freshwater East (South)	Wenlock–Přidoli	Wenlock marine strata overlain by Old Red Sandstone; faulted/unconformable relationship	ND
Ludford Lane and Ludford Corner	Ludlow–Přidoli	Classic, internationally renowned site traditionally regarded as reference section for Silurian–Devonian boundary; earliest known land animals, early plants (see Table 1.3), unusual arthropods and fish remains in Ludlow Bone Bed	ND
Brewin’s Bridge/Canal	Ludlow–Přidoli–Carboniferous	One of few sites in central England exposing marine Silurian–Old Red Sandstone junction, including Ludlow Bone Bed	ND
Capel Horeb Quarry	Ludlow–Přidoli	Good section of unconformity between Ludlow and Přidoli; internationally important plant site (Table 1.3)	ND
Little Castle Head	Přidoli	Old Red Sandstone facies rocks; Townsend Tuff Bed	SD
Lower Wallop Quarry	Ludlow–Přidoli	Marine to Old Red Sandstone transition later here, well into Přidoli	ND

(Table 1.4) GCR sites in the Old Red Sandstone described in the *Silurian stratigraphy* GCR volume. After Aldridge et al. (2000).

Site	Stratigraphy/ radiometric age	GCR selection criteria
Eshaness Coast	Mid-Devonian	Representative of Eifelian Eshaness volcanic succession, NW Shetland.
Ness of Clousta to the Brigs	Mid-Devonian	Representative of Givetian Clousta volcanic rocks, Walls, Shetland.
Point of Ayre	Mid-Devonian	Representative of Givetian Deerness Volcanic Member, mainland Orkney.
Too of the Head	Mid-Devonian	Representative of Givetian Hoy Volcanic Formation, Isle of Hoy, Orkney.
South Kerrera	Late Silurian to Early Devonian	Representative of Lorn Plateau Volcanic Formation. Exceptional examples of subaerial lava features and interaction of magma with wet sediment.
Ben Nevis and Allt a'Mhuilinn	Mid-Silurian 425 Ma	Representative of Ben Nevis Volcanic Formation. Exceptional intrusive tuffs. Internationally important as example of exhumed root of caldera, and historically for development of cauldron subsidence theory.
Stob Dearg and Cam Ghleann	Mid-Lochkovian 421 ± 4 Ma	Representative of succession in eastern part of Glencoe caldera, including basal sedimentary rocks. Exceptional rhyolites, ignimbrites and intra-caldera sediments. Possible international importance for radiometric dating in conjunction with palaeontology close to Silurian-Devonian boundary.
Crawton Bay*	Late Silurian-Early Devonian	Representative of Crawton Volcanic Formation.
Scurdie Ness to Usan Harbour	Early Devonian	Representative of 'Ferrydean' lavas and 'Usan' lavas, comprising lower part of Montrose Volcanic Formation.
Black Rock to East Comb	Early Devonian	Representative of 'Ethie' lavas, comprising upper part of Montrose Volcanic Formation.
Balmerino to Wormit	Early Devonian (Lochkovian) 410.6 ± 5.6 Ma	Representative of eastern succession of Ochil Volcanic Formation. Possible international importance for radiometric dating in conjunction with palaeontology close to Silurian-Devonian boundary.
Sheriffmuir Road to Menstrie Burn	Early Devonian 416 ± 6.1 Ma	Representative of western succession of Ochil Volcanic Formation. Exceptional topographic expression of Ochil fault-scarp.
Tillycultrie	Early Devonian 415–410 Ma	Representative of diorite stocks, intruded into Ochil Volcanic Formation, surrounded by thermal aureole and cut by radial dyke swarm. Exceptional examples of diffuse contacts due to metasomatism and contamination, with 'ghost' features inherited from country rock.
Port Schuchan to Dunure Castle	Early Devonian	Representative of Carrick Hills volcanic succession. Exceptional features resulting from interaction of magma with wet sediment are of international importance.
Culzean Harbour	Early Devonian	Representative of inlier of Carrick Hills volcanic succession. Exceptional features resulting from interaction of magma with wet sediment are of international importance.
Turnberry Lighthouse to Port Murray	Early Devonian	Representative of most southerly inlier of Carrick Hills volcanic succession. Exceptional features resulting from interaction of magma with wet sediment are of international importance.
Pettico Wick to St Abb's Harbour	Early Devonian c. 400+ Ma	Representative of volcanic rocks in the SE of the Southern Uplands. Exceptional vent agglomerates, block lavas, flow tops and interflow high-energy volcanoclastic sediments.

* described in this volume

(Table 1.5) GCR sites with Old Red Sandstone sedimentary rocks described in the Caledonian igneous rocks volume. After Stephenson et al. (1999).