RIVERS OF THE ISLE OF WIGHT

Sandown Sea Wall

NRA

National Rivers Authority

Southern Region

Guardians of the
Water Environment

RIVERS OF THE ISLE OF WIGHT

HISTORY AND GEOLOGY

The shape of the Isle of Wight resembles a diamond, measuring 23.5 miles from East to West and 13.75 miles North to South. Even though its area is only 381 sq km (155 square miles), there is contrasting landscape as a result of the varied geology.

In fact the geology of the Island is almost a microcosm of that of the whole of South East England in a very small area. There are three distinct formations, the Tertiary Clays and Sands in the North of the Island which are similar to those in the Southampton area of the Hampshire Basin, the central Chalk ridge which used to connect via the Needles to the Chalk of the Isle of Purbeck, and the Greensands, Gault and Wealden Clays in the South of the Island which equate with the Weald of Kent and Sussex.

Eastern Yar

All these rocks were laid down in a series of subsiding sea basins mainly in the Cretaceous and Tertiary geological timescales. The Northern part of the Island simply forms a continuation of the Hampshire Basin with low and undulating topography characterised by often heavy soils and many small streams. On the central ridge the Chalk rock has been bent up in a geological structure known as a monocline so that the rock on the Northern edge of the ridge is lying almost vertically. As on the mainland there are few streams on the permeable Chalk. Across the South of the Island the Chalk used to lie in a manner similar to the Hampshire Downs but here the rivers over time have cut through the Chalk and exposed the older Greensands and ultimately on the South East and South Western coasts, the Wealden Clays. The Chalk cap of St Catherine's Down and St Boniface Down is now all that remains of a once more extensive Chalk downland. This area with its generally light sandy soils is again drained by a multitude of small streams and rivers which are often spring fed from either the Chalk or Greensands.

Where the Clays and Sands are exposed to the action of the sea on the South and East coast there are extensive areas of landslips. A subsidiary cause of this land slipping is groundwater moving through the relatively soft rocks. Some of the best examples of this can be seen around the Blackgang Chine and Brook areas where the coast is moving back at a relatively rapid rate. Where in Victorian times it was possible to walk to the sea down Blackgang Chine there is now a cliff up to 100 m high and fields, roads and properties are being lost to the sea.

Except for a few short brooks on the South coast and the steep rivulets which have created the chines of the Southern Cliffs, all the Island streams flow northwards. These include the Western Yar, the Newtown River (Caul Bourne) to the West, and the Palmer's, Blackbridge and Monktonmead Brooks to the East. Altogether there are no fewer than fifty separate catchments having outfalls into tidal waters.

The two largest rivers, the Medina and the Eastern Yar both rise as springs from St Catherine's Down which is a feature of the southern chalk outcrop. The Eastern Yar is 27 km long with a catchment of 76 sq km. The river flows North-East collecting the Wroxall Stream, the Scotchell's Brook and a number of small tributaries before it cuts through the central chalk ridge at Brading.

The River Medina is 17 km long with a catchment area of 71 sq km. The river flows due North, collecting the Merstone Stream at Blackwater before intersecting the ridge at Shide. The Lukely Brook which rises in the Bowcombe Valley joins the Medina at the head of the estuary in Newport. The apt name of the river derives from the symmetry with which it divides the Island into the two Hundreds or Liberties of East and West Medina.

Newtown Creek, Upper Reaches

The Western Yar was once a river with a well developed system of tributaries but its upper catchment has been destroyed by erosion of the Channel coast. Protection works now prevent the sea running into the Western Yar at Freshwater Gate though the freshwater spring which is its source ebbs and flows coincidently with the tide. The river must once have been one of the largest on the Island but is now no more than a brook with a disproportionately large estuary.

Until well after the last Ice Age the Isle of Wight was part of the mainland. A major trunk stream, the Solent River, flowed eastwards from the River Frome in Dorset along the line of the Solent and Spithead, to outfall to the sea in the Littlehampton area. Its northern tributaries would have included the Avon, Test and Itchen and its southern tributaries would have been the streams which drained from the northern slopes of Purbeck and the Isle of Wight. The drainage system was dismembered by the sea breaking into the main channel between Purbeck and the Island.

This breach occurred as a result of a depression of the land, or rise in sea level, which lasted until about 2,000 BC and also led to the submergence of the downstream reaches of the North flowing rivers, giving them their well marked estuaries. The Harbours of Yarmouth, Newtown, Cowes and Wootton Creek owe their origins to this movement.

HYDROLOGY

Rainfall on the Island varies from about 840 mm (33″) on the coast to about 736 mm (29″) inland. The Isle of Wight has suffered frequent water supply problems due to its limited surface sources and high summer population. The Island is, however, well provided with underground water and following several years of short supply and hosepipe bans in the early Seventies, several new sources have been developed. The Cross Solent Main was also laid between Fawley and Gurnard to import water from the lower reaches of the River Test. In addition to this almost all properties on the Isle of Wight have individual water supply meters which were fitted in the late 1980's. These meters have resulted in a decrease in water supply demand on the island which has also helped to balance the shortfall in water resources.

The porous chalk around Carisbrooke is a long standing source of underground water which is particularly close to the surface and requires minimal treatment for potable supply. Southern Water Services Ltd pumps the water from boreholes in the Bowcombe valley and at Carisbrooke to supply the local community.

Another source of groundwater is the Lower Greensand.

Water is taken from three boreholes in the Medina catchment and transferred via a pumping station at Blackwater to the nearby Eastern Yar at Kennerly. Three other boreholes in the Yar catchment are also used to discharge directly to the headwaters of the Eastern Yar for subsequent abstraction at Sandown.

In addition to abstractions for public water supply there are a number of small abstractions from groundwaters and rivers for sand washing, cooling water and for agriculture.

All abstractions, whether from groundwater or from rivers are subject to licences issued by the National Rivers Authority, which imposes conditions to ensure that water is taken at the right times and only from the places where it can most be spared.

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The NRA manages water resources by measuring river levels and flows using gauging weirs and water level recorders. On the Eastern Yar there are recorders at Sandown and Budbridge as well as recorders on the Scotchell's Brook and the Wroxhall Stream. In the Medina catchment there are recorders on the main river at Blackwater and Upper Shide, and on the Merstone Stream and the Lukely Brook.

There are more than fifty groundwater monitoring boreholes on the Island.

WATER QUALITY

River water quality is largely determined by the underlying geology, land use and urban development. Most water quality problems occur on the clay soils of the northern half of the Island, especially where there are problems with domestic septic tanks. Most livestock farming is carried out on these less well drained soils and this is reflected by the number of agricultural pollutions occurring in these areas.

However, the high level of public interest in environmental issues on the Island results in many pollutions being reported promptly to the Authority, allowing early action to be taken.

The National Rivers Authority sets quality objectives for each stretch of inland and tidal water and imposes conditions on permitted discharges to ensure that the environmental objectives are met.

On the Isle of Wight 51.5 km of river have an objective of Class 1B (suitable for high class game and coarse fisheries), and 36 km of river have an objective of Class 2 (suitable for reasonably good coarse fisheries). None of the Island's rivers have objectives of Class 3 or Class 4.

Most of the population is concentrated along the coast and the resulting domestic effluents are discharged to the sea. There is only one major inland sewage treatment works on the Island, which serves Newport and was commissioned in 1986. This discharges to the tidal River Medina at Fairlee and has a consented dry weather flow of 12,115 m³/d. There are small sewage works at Roud, Brading and St Helens discharging to the catchment of the River Yar as well as two relatively new sewage works at Wroxall and Godshill. Dry weather flows at these works are in the range of 300 and 900 m³/d. There is a smaller, but significant input of treated sewage effluent to the headwaters of the Medina at Chale (160 m³/d). A number of minor sewage works with flows of between 5 and 160 m³/d serve other small communities on the Island. Altogether only 6.5% of the Island's sewage is discharged to the freshwater sections of rivers and streams.

The Cowes sewerage scheme is now almost complete and the remaining few properties connected to old outfalls will be re-directed into the new sewerage system during 1992.

There are very few industrial discharges and most water quality problems result from surface water which has been contaminated with oil before being discharged from drains. In particular the Scotchell's Brook at Sandown receives significant diffuse pollution as a result of run-off from urban areas. In rural areas there are occasional pollutions from septic tanks or from farm slurry and silage.

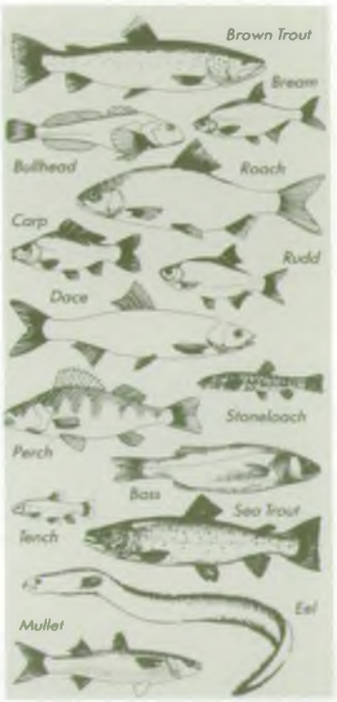
The natural quality of the streams is variable. Those arising from springs in the chalk are well buffered and neutral, whereas those originating from the iron rich sandstones may be acidic, depositing rusty deposits on vegetation and gravel. A particularly marked contrast can be seen between the River Medina and the Merstone stream where they meet at Blackwater. The bed of the Merstone Stream draining from the Ferruginous Sands of St George's Down is vividly stained by the iron deposits.

FISHERIES

The small size of the rivers on the Isle of Wight limits their potential as fisheries though the lower reaches of the Eastern Yar at Brading and Alverstone are fished for coarse fish. The steeper, smaller streams which comprise the headwaters of the Medina and Yar are characterised by small wild brown trout, stoneloaches, bullheads and eels. On the Medina these species are typical along the whole length of the river with a few fairly sizeable trout between Blackwater and Newport. Sea trout are infrequent visitors to the Medina Estuary and the freshwater reaches below Shide.

On the Eastern Yar, coarse fish such as carp are first found downstream of Horringford with dace becoming the predominant species below Heasley Manor. Between Newchurch and Alverstone small numbers of roach are found amongst the dace and below Alverstone carp and rudd add to the species diversity. In the slow flowing waters between Yarbridge and St Helens there are good stocks of dace, roach, carp and bream together with small numbers of rudd, perch and tench. Mullet and bass frequent the estuaries.

The Eastern Yar between Horringford and its mouth, and the Medina between Chillerton and Newport are designated as Cyprinid fisheries under the EEC Freshwater Fisheries Directive. This reinforces the water quality standards to which the rivers must be protected.



FLOOD DEFENCE

The National Rivers Authority is responsible for protecting people and property from flooding by rivers and from the sea. The Isle of Wight, although exposed to the full force of storms and gales in the English Channel, is well endowed with natural defences, namely its high coastline and cliffs.

There are 4.65 km of sea defences which protect land below sea level, the most significant being Sandown Sea Wall which has a 600 year history. The NRA is responsible for 550 metres of the frontage between Fort Street and the Grand Hotel whilst the adjacent coast protection works are the responsibility of South Wight Borough Council.

These defences prevent the sea breaking into the river system, protecting 300 hectares of farmland and about a hundred properties on the Brading and Sandown levels. The wall was strengthened in 1978 and the associated timber groynes were repaired. The Authority is also responsible for sea and tidal defences at Thorley Level, Yarmouth, Newtown, Gurnard, Ryde and the tidal walls adjacent to the sluices through which the Eastern Yar enters the Harbour.

There are 114 km (71 miles) of main river on the Island for which the Authority has flood defence responsibility. The river systems of the Island are typically small hill streams rising at the base of the chalk beneath the Downs, periods of high flow are therefore short-lived but peak flows are high. Consequently the lower reaches of the rivers, particularly the Eastern Yar and Thorley Brook, are subject to fairly frequent flooding adjacent to the main channel, especially when their discharge to the sea is tide-locked.

Following flooding of properties in the Schoolgreen area of Freshwater in August 1954 a flood alleviation scheme was carried out on the Western Yar.

Severe flooding occurred on the River Medina on October 1, 1960 when rainfall of 50–60 mm fell following a wet summer and autumn. River flooding was aggravated by tidal factors which limited the discharge of floodwater to the estuary. The valley flooded from Newport to Blackwater with the stretch below Carisbrooke being particularly badly affected. A second flooding incident followed at the end of January when rainfall of 60–70 mm produced floods in Newport which were only slightly less severe.

In response to these incidents a comprehensive flood relief scheme for 4 km of the River Medina and another for the Lukely Brook between Towngate Bridge and Westminster Mill were installed by the Isle of Wight River Authority. These schemes improved retaining walls, removed constrictions, re-aligned the channel and provided seven velocity-control weirs.

Other schemes to alleviate

flooding in the 1950s were carried out on the Shalfleet Mill Stream, Thorley Brook and on 20 km of the Eastern Yar between St Helens and Southford Mill.

At Monktonmead Brook two electrically operated pumps at the sea outfall supplement gravity drainage of water through tidal flaps when high rainfall and adverse tides coincide.

The NRA Flood Defence Department ensures that rivers are kept free from obstructions by maintaining channels and cutting weed throughout the year. It also ensures that tidal sluices are maintained in good condition.

CONSERVATION

The rivers of the Isle of Wight are small compared with those on the mainland and many have been modified by river engineering, but they support, in patches, a diverse aquatic flora. The more common species include Fool's water-cress, water mint and yellow flag as well as less common species like marsh mallow.

The river systems and associated wetlands including reed beds, marshy grassland and carr woodland provide important habitats for wildlife. Some are of national importance and have been designated as Sites of Special Scientific Interest. Freshwater Marshes, a Local Nature Reserve is such a site, where the NRA has been directly involved in management to maintain the interest of the site.

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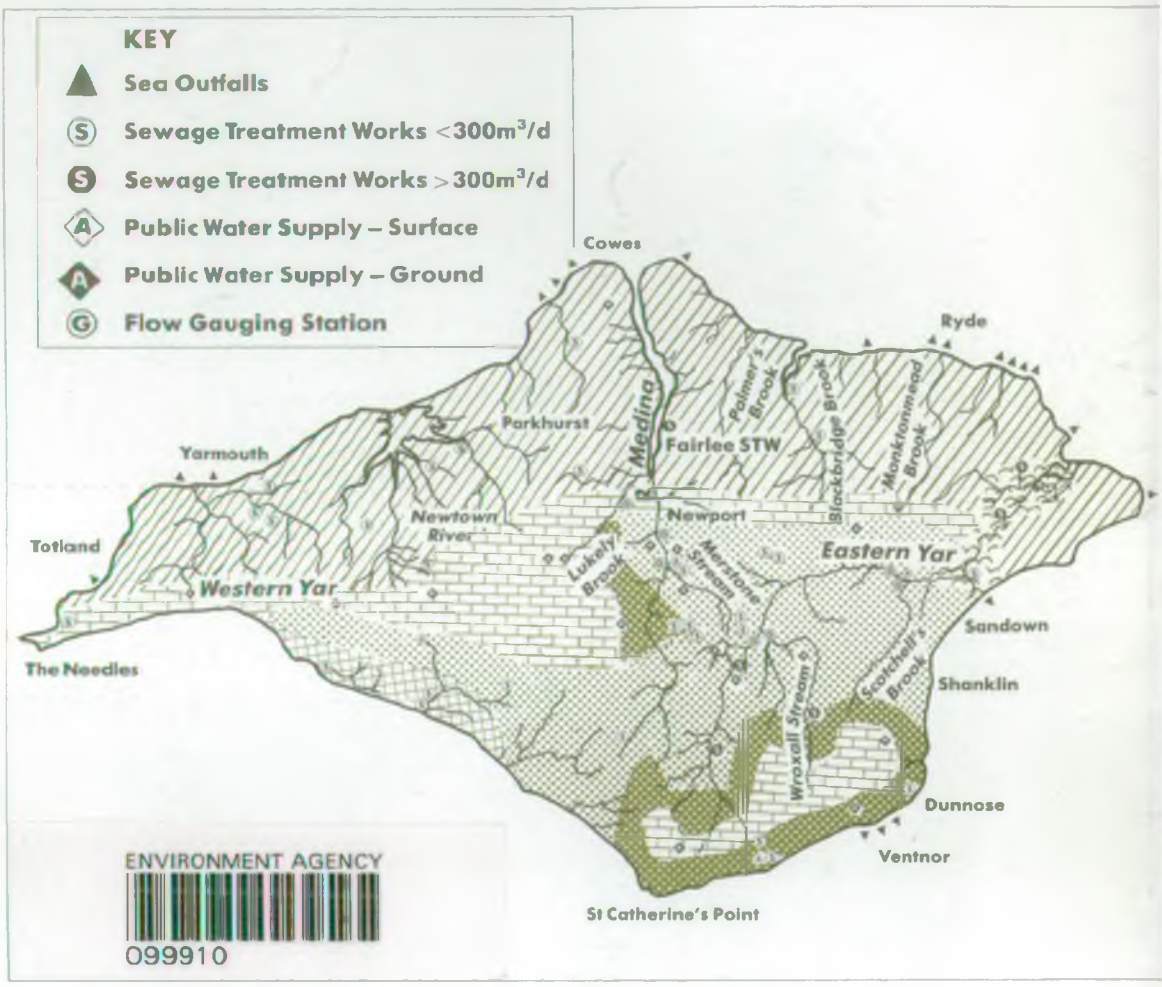
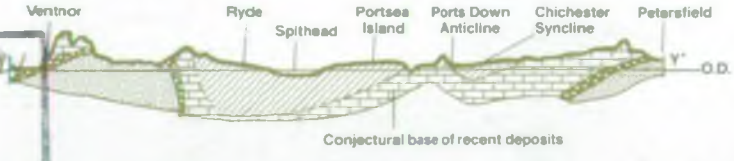


Sections showing the general relations of the rocks along the lines Y–Y' drawn on the map



Vertical Scale about ten times the Horizontal

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