

THE RIVER MEDWAY



National Rivers Authority

Southern Region

Guardians of
the Water Environment

National Rivers Authority
 Information Centre
 Head Office

Class No 

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THE RIVER MEDWAY

COURSE AND GEOLOGY

The River Medway rises in the Ashdown Forest as a spring issuing from the Tunbridge Wells Sands just above Turners Hill. The sands and clays of the High Weald dictate the character of the river, which with its many deeply incised tributaries, contrasts sharply with the chalk streams found in other parts of the region. The Wealden clays are impermeable to rainfall and water must find its way across the surface of the steeply sloping land, creating a multitude of small rushing streams.

These meet to form a typical Wealden vale as the Medway flows north-eastwards towards Penshurst. There, the river is joined by the River Eden. As it flows across the Vale of Kent the gradient is less, though the river still collects tributaries which rise in other parts of the High Weald. These include the Rivers Bourne, Teise and Beult. The River Teise has mixed origins; the Upper Teise once flowed eastwards to the Rother but was captured by the Lower Teise when it cut away the soft clay ridge dividing the two streams. The River Beult which rises in the Hythe sandstone ridge is the longest tributary of the river.

The Medway cuts its way through the Greensand Ridge beyond Yalding and collects two more tributaries, the Loose Stream and the River Len before reaching the County Town of Maidstone. The Loose Stream for part of its length flows underground. The River Len is larger and longer, but flows more slowly and has its source near the village of Lenham. Unlike the tributaries arising in the High Weald the Loose and Len have more reliable springs which sustain their flow through the summer months.

Allington Lock forms the tidal limit of the Medway in Maidstone from whence the river flows North, cutting through the chalk. The estuary

widens between Rochester and Sheerness until the River Medway flows into the Thames Estuary.

The total length of the main Medway from source to the Estuary at Sheerness is 110km (70 miles). The river has a catchment area of 1400 sq km above the tidal limit and 402 sq km below the tidal limit.

HISTORY

The name of the river may derive from a Celtic word, Medu meaning mead, presumably signifying a river with "sweet" water. The Romans called the river Fluminus Meduwaeias and the Saxons knew it as the Medwaeg.

Historically the importance of the area lay in its relatively rich and accessible iron deposits. These were exploited on a small scale in the Iron Age (the grey Wadhurst clay contains iron nodules or "sows", some with an iron content as high as 55%). In Roman times the ore was heated by charcoal in a clay-walled mound through which air was forced by bellows. The Ashdown Forest and the High Weald supplied abundant timber for fuel. After several centuries of decline the industry was revived in Tudor times when the more sophisticated blast furnaces introduced by the French were pioneered on the headstreams of the Medway.

The process produced cast iron which was forged into wrought iron. The steep Wealden streams proved ideal for impounding as "furnace" or "hammer" ponds to provide a head of water to drive the twin waterwheels characteristic of Tudor forges. These drove furnace bellows and trip hammers to forge the iron.

Another important product of the Medway Valley was Kentish ragstone. This was quarried by the Romans in the Maidstone area and transported to London to build the City walls. The Normans continued the process, ferrying ragstone from the Isle of Grain to build the Tower of London. Kentish ragstone is still used by the National Rivers Authority to build tidal defences. Its workmen continue the traditional skills of shaping the rocks to interlock into a durable defence without the need for mortar.

HYDROLOGY

The Wealden rivers respond rapidly to rainfall and extremes of flow may vary five-hundredfold between summer and winter. There are six flow gauging stations on the main river, three on the River Eden and three on the River Teise. The Eridge Stream, the Bartley Mill Stream and the Rivers Bourne, Bewl and Beult are also gauged.

There are three water supply reservoirs in the Medway catchment, Bough Beech, Weir Wood and Bewl Water.

RESERVOIR	VOLUME (MI)	DESIGN YIELD (MI/d)	WATER AREA (ha)	LOCATION
Bough Beech (East Surrey Water Company)	8,630	22.7	113	Tributary of River Eden
Weir Wood (Southern Water Services Ltd.)	5,623	14.1	113	Upper Medway
Bewl Water (Southern Water Services Ltd.)	31,367	76	312	Tributary of River Teise

Bewl Water near Lamberhurst is the largest reservoir in the Southern Region and is filled partly by inflow from its natural catchment and partly by water pumped from the River Teise at Goudhurst. Pumping normally takes place in autumn and winter to fill the reservoir for use during the summer. The amount of water taken from the River Teise is regulated by the National Rivers Authority by a licensing system which ensures that flow does not fall below 23 MI/d (5 mgd). Releases of water from the reservoir are used to support Southern Water's abstraction on the River Medway in Maidstone when natural flow in the river is insufficient. Once river flows are below 352 MI/d (77½ mgd), no more water may be taken in Maidstone than is being released from Bewl Water. The scheme benefits the River Teise and the River Medway between the reservoir and the abstraction point. Mid Kent Water Company also uses Bewl Water to supply its treatment works on site.

Whilst the largest single abstraction on the river is Southern Water's intake at Maidstone, there are numerous small abstractions for agriculture and industry licensed by the NRA. Spray irrigation is the major agricultural use particularly on the River Teise and the River Beult.

Average yearly rainfall in the catchment ranges from 667 mm in the lower Medway to 756 mm in the upper catchment.



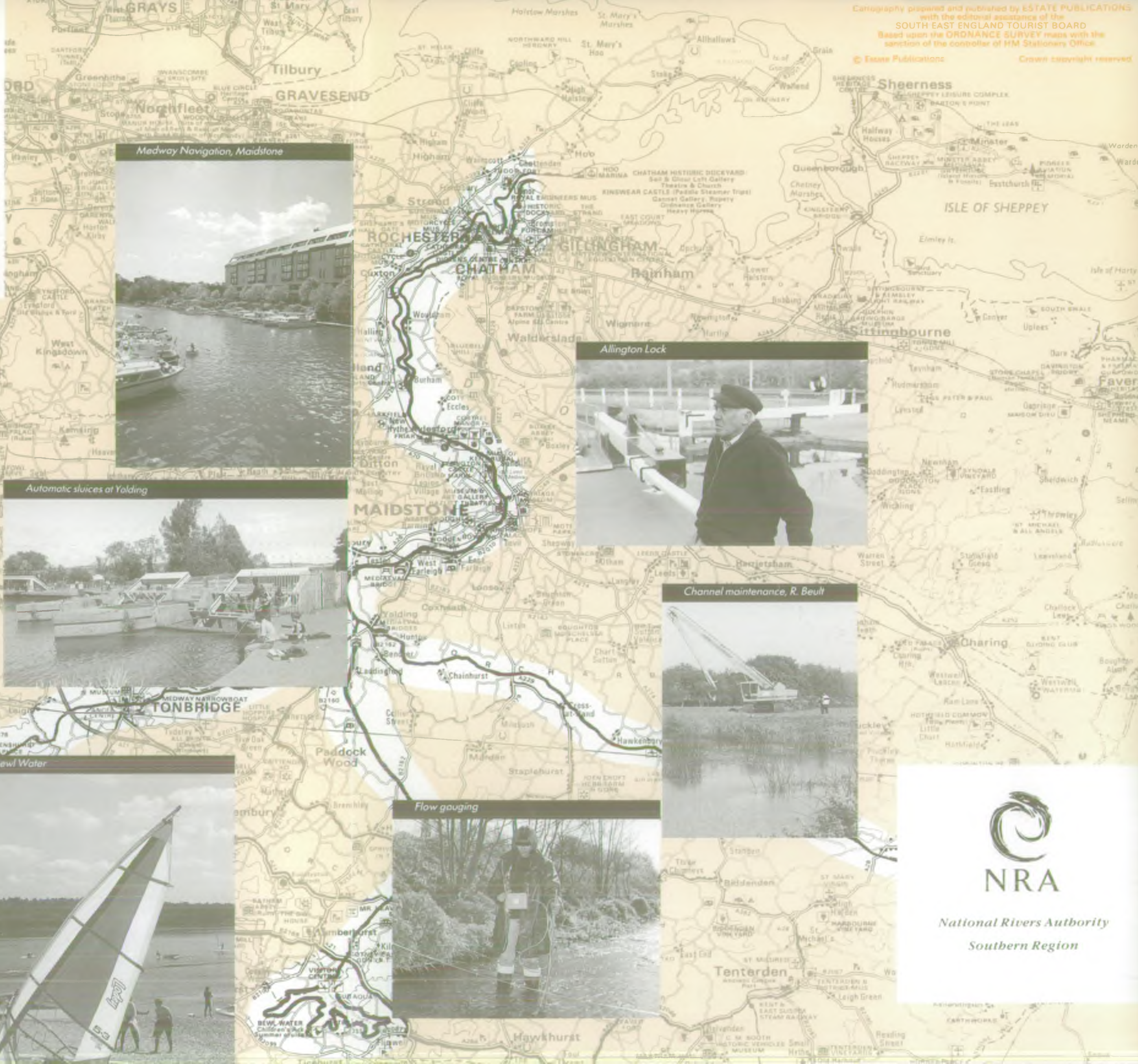
THE MEDWAY NAVIGATION

The Medway Navigation is maintained by the National Rivers Authority Southern Region (under the River Act 1949) and the Medway Navigation Authority (under the Medway Navigation Act 1963). The Authority is a body corporate established by the Medway Navigation Act 1963. It is a public body and is not a company.

There are five locks and associated sluices and weirs which operate the river into ten reaches, known locally as 'pools'. The length of the pools vary - the shortest being approximately 1.2m (3.75 miles) and the longest being 2.1 miles. Sluices are provided to allow the water level of the pools to be raised 2.1 metres (6.75 feet) and 1.2 metres (3.75 feet) the first set from the head of Down Lock. Locks are provided at the head of Allington Lock being 17.28 metres (56.7 feet).

The locks are operated by a system of electrically operated up to 200 tonnes (200 tons) cast iron gates. The gates are 12 metres (39 feet) high and 12 metres (39 feet) wide. The gates are operated by a system of electrically operated up to 200 tonnes (200 tons) cast iron gates. The gates are 12 metres (39 feet) high and 12 metres (39 feet) wide.

Lock	Length	Width
Down Lock	17.28 metres (56.7 feet)	12 metres (39 feet)
St. Mary's Lock	1.2 metres (3.75 feet)	12 metres (39 feet)
St. Andrew's Lock	1.2 metres (3.75 feet)	12 metres (39 feet)
St. Peter's Lock	1.2 metres (3.75 feet)	12 metres (39 feet)
St. John's Lock	1.2 metres (3.75 feet)	12 metres (39 feet)
St. James' Lock	1.2 metres (3.75 feet)	12 metres (39 feet)



Medway Navigation, Maidstone



Allington Lock



Automatic sluices at Yalding



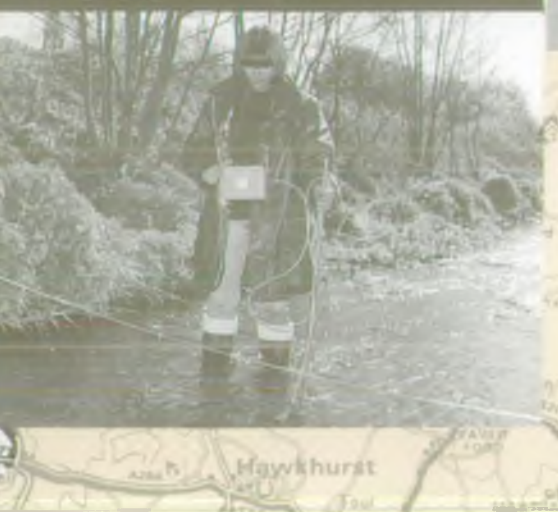
Channel maintenance, R. Beult



Bowl Water



Flow gauging



Flood control centre at Leigh



Medway Flood Alleviation Scheme, Leigh



NRA
 National Rivers Authority
 Southern Region

WATER QUALITY

The National Rivers Authority sets objectives for river quality to protect its natural stocks of fish and the uses to which it is put. To achieve these objectives, the Authority sets limits on all permitted discharges to the river, restricting their strength and quantity. These are known as consent conditions.

Historically urban development and industrialisation have taxed the river's ability to absorb waste. However, the National Rivers Authority and its predecessors have been able to bring about improvements by imposing increasingly more stringent consent conditions.

QUALITY CLASS	LENGTH OF RIVER (km)
1A Water of high quality suitable for potable supply abstraction, high class game and coarse fisheries	23.7
1B Water of high quality suitable for high class game and coarse fisheries	312.8
2 Water supporting good coarse fisheries with moderate amenity value	59.8
3 Water from which fish may be absent or only rarely present and which is suitable for low grade industrial abstractions	0.2
4 Grossly polluted	None

Low summer flows and high temperatures make Wealden rivers less easy to protect than the chalk streams in other parts of the Region. The risk of pollution from agricultural activity is a significant factor, especially in the High Weald where there are many small dairy farms. The steeply sloping land and the impermeable clay aggravate the effects of slurry and silage pollutions, particularly during periods of heavy rainfall.

Between Tonbridge and Maidstone the river flows through the 'Garden of England' where fruit growing predominates, sometimes giving rise to pollution from agricultural chemicals.

Population growth in Tonbridge, Tunbridge Wells and other commuter areas has resulted in greater quantities of treated domestic effluent being discharged to the river. In particular there are relatively large sewage treatment works on the River Eden, the River Grom, the Somerhill Stream and the Botany Stream.

Despite low dilutions in summer, the receiving water-courses are maintained in Class 2. The River Medway itself achieves Class 1A and 1B for all but an 11.8 km stretch below the confluence with the River Grom which achieves Class 2.

Historically, the naval base at Chatham gave great economic impetus to the lower reaches of the river and its estuary. Urban and industrial development have been significant factors affecting the water quality. The principal discharges comprise effluents from the paper and chemical industries, cooling waters from power stations and sewage effluents from several large treatment plants. Apart from the cooling waters, all effluents are treated before discharge to the estuary.

Motney Hill and Aylesford Sewage Treatment Works are the two largest in Southern Region with flows of 42,000 ML/d and 25,900 ML/d respectively.

Under normal flow conditions, effluents are diluted and dispersed in the tidal waters of the estuary. However, at times of low flow and high temperatures the upper reaches can become substantially devoid of oxygen. This is aggravated because the major polluting loads are imposed towards the head of the estuary. To meet the challenge, the NRA plans to review consent conditions on discharges to improve water quality in the estuary.

FISHERIES

The iron rich streams of the Weald support resident populations of small but highly coloured brown trout. The River Teise is managed as a game fishery down to Marden whereas the lower stretches of both the Teise and Beult are managed as coarse fisheries with chub, dace, roach and pike. In the middle and lower reaches of streams where the water is deeper, there are bream and tench. Minnows, gudgeon, stone loaches, bullheads, brook lampreys and perch are also found in riffles.

The main river has considerable angling interests over its entire length and attracts large numbers of fishermen. The upper reaches support chub, roach and pike along with several other species. The stretch below Ashurst Weir has a breeding population of bar-

bel and is an important spawning ground. Grayling have been stocked to the upper reaches over recent years and some also find their way down the River Teise into the River Medway.

Eels are not so prolific in the Medway catchment as on the Kentish Stour and the River Rother. In wet years the occasional sea trout or salmon is reported but existing water conditions in the estuary prevent a self sustaining population from being re-established at present.



FLOOD DEFENCE

The impermeable clay and the large areas of urban development give the river its flashy character making the NRA's Flood Defence role of paramount importance.

Historically the Medway Valley and Eden Valley suffered flooding of both agricultural land and property. In September 1968 the worst flood in living memory occurred causing massive damage both in the town of Tonbridge and in the downstream areas.

In order to alleviate flooding, a flood storage area was created above Tonbridge at Leigh and is now operated by the NRA. This is the largest on-river flood storage area in the UK. In times of heavy rainfall three gates in an earthen embankment across the river regulate the amount of flood water passing downstream to Tonbridge. Some of the run-off is held back, forming a temporary lake whenever the flows exceed the channel capacities through the town. The "lake" can be drained at a controlled rate once flood flows have abated.

Information from flow gauging stations, level recorders

and rain gauges in the catchment is telemetered to a control room, so that flow through the gates can be regulated.

Between Leigh and the tidal limit at Allington there are ten navigational locks, and accompanying flood control sluices. Nine have by-pass channels with automatic high capacity sluices which maintain a constant upstream level and take surplus flows. Six of these have radial gates finely balanced by a counterweight on the end of an arm. A device with a float-like action is attached to the arm causing it to tip the balance when water levels rise. The gate then opens until water levels fall and the "float" resumes its original position. Three other sluices have vertically operated gates which are electrically powered. The tenth lock has hand-operated rack and pinion, tumbler sluices but will be modernised in 1991.

The NRA sluice and lock keepers trim levels and operate Allington Lock and the lifting bridge at Yalding. A hydraulic dredger is operated by the Authority all year round to clear blockages and shoals.

MEDWAY PROJECT

In March 1988 the Medway River Project was established to improve the leisure and tourism potential of the Navigation.

It is funded by a partnership of the NRA, Countryside Commission, Kent County Council, Maidstone Borough Council and Tonbridge & Malling Borough Council.

The aims of the project are to:

- Re-establish and maintain a continuous towpath between Allington and Leigh.
- Develop circular walks linking points of special interest.
- Enhance landscape and wildlife.
- Manage the river for the benefit of recreation and wildlife.
- Encourage local communities and landowners to take a positive role in caring for the Medway.
- Encourage river users to enhance the Medway and its boating facilities.

HISTORY OF THE MEDWAY NAVIGATION

1531 "Commissioners of Sewers" were established to improve land drainage and prevent flooding. The Medway Commissioners also proposed to clear the river for navigation, "so that its natural course is unobstructed and her Majesty's subjects can travel along it in boats as a highway with carts."

1624 Further moves were made to make the river navigable to transport oak trees from the Weald to Chatham for ship building. The weirs and a low bridge at Nettlestead seem to have stopped this scheme.

1664 The first specific Navigation Act gave powers for certain "undertakers" to "erect, build, set-up and make" locks, weirs, turnpikes, pens of water, wharfs and cranes to load and unload iron, ordnance balls, timber and other materials.

1739 A second Act was passed to make the river navigable to Forest Row. Locks were built between Maidstone and Tonbridge by 1746. The "Company of the Proprietors of the Navigation of the River Medway" transported materials down river for the Navy and com, hops, coal and lime upstream.

1828 James Christie was engaged as canal engineer to plan an extension from Tonbridge to Penshurst. He asked for special rates for his own barges and purchased Tonbridge Town Mills to control the water rights. His draining of the Town Pen in 1829 which stranded all barges at the wharfs resulted in legal and physical battles which bankrupted him.

1842 The railway brought competition to river transport. In 1892 a new navigation company was formed but fell into receivership by 1910.

1911 The prospect of the river becoming derelict led to the creation of the Medway Conservancy Board. The Navigation between Maidstone and Tonbridge was re-opened in 1915.

1934 Powers were taken over by the River Medway Catchment Board under the 1930 Land Drainage Act. Successor bodies were the Kent River Board and the Kent River Authority.

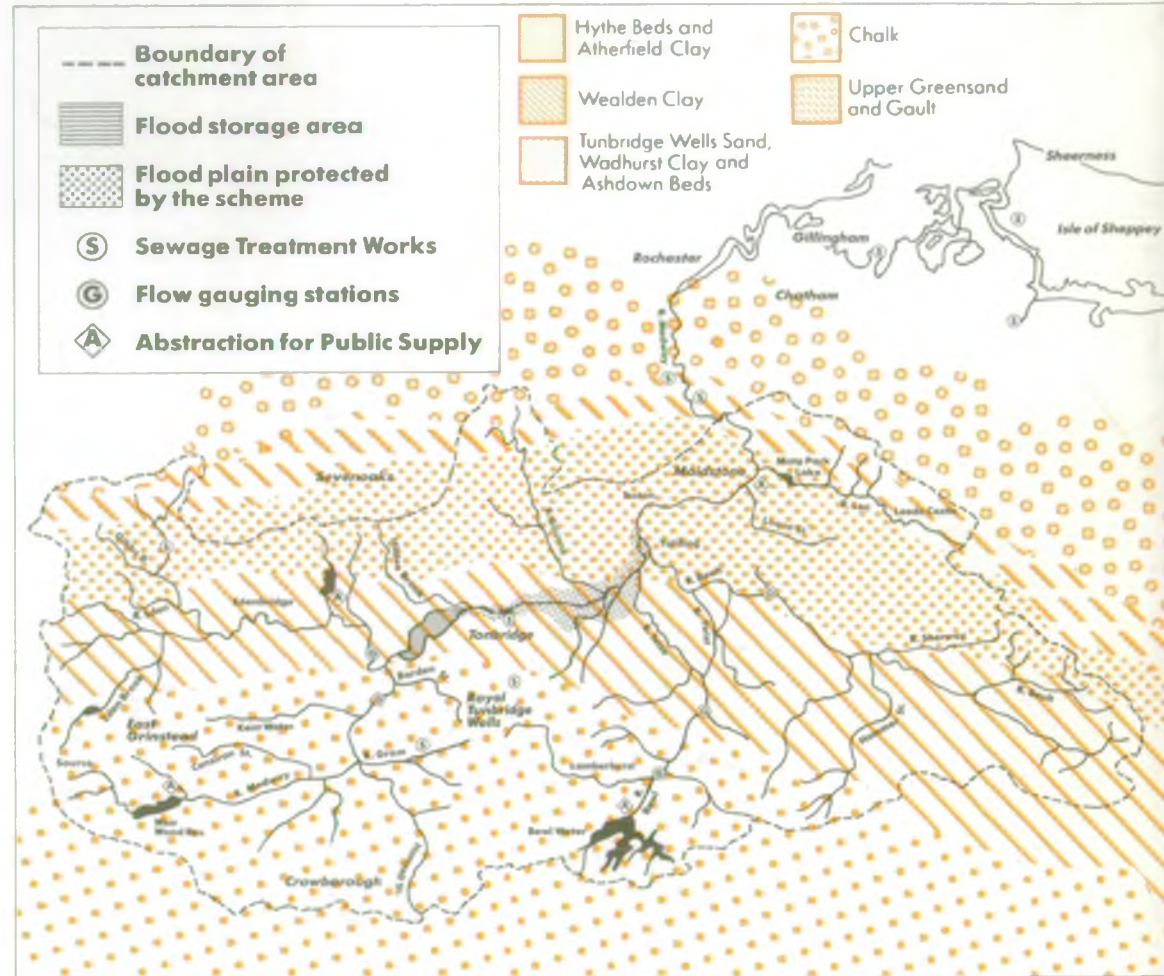
1974 Responsibility for the Navigation transferred to the Southern Water Authority. Commercial traffic had ceased, but the water remained popular for pleasure boats.

1989 The Water Act invested responsibility for the Navigation in the National Rivers Authority. A restoration and maintenance programme ensures that it will continue to be enjoyed by boat owners, anglers, ramblers and the general public.

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Penn R. (1981), *Portrait of the River Medway*. Robert Hale Ltd.
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The Medway Flood Relief Scheme, National Rivers Authority, Southern Region.



Sections showing the general relations of the rocks along the lines X-X', drawn on the map



Vertical Scale about ten times the Horizontal



ENVIRONMENT AGENCY



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