JOINT NATURE CONSERVATION COMMITTEE

An inventory of UK estuaries

Volume 5
Eastern England

Compiled by A.L. Buck

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5 The estuaries

A.L. Buck

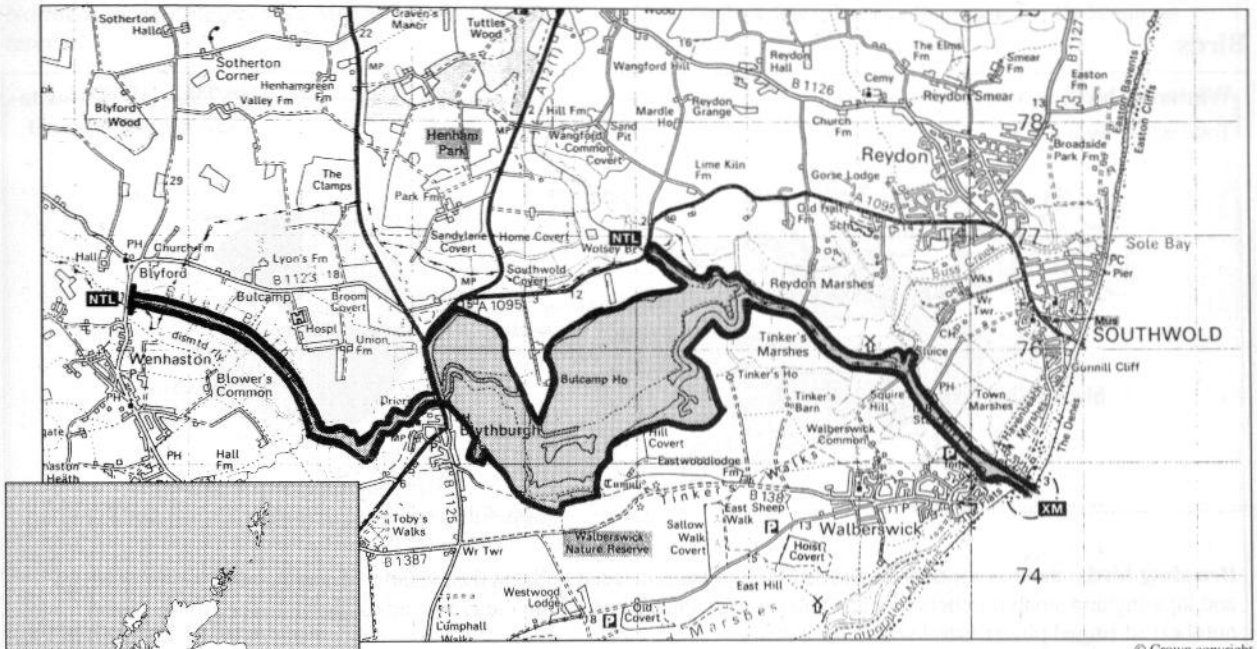
Many estuaries in south-east England have long lengths of sea defences. Due to sea level rising relative to the land, some sea defences are being breached or failing altogether, such as here on the Blackwater Estuary. (Peter Wakely, English Nature.)

105 Blyth Estuary (Suffolk)

Centre grid: TM4776
County: Suffolk

Districts: Suffolk Coastal, Waveney
EN area: Suffolk

Review site location



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NTL = Normal tidal limit XM = Across mouth = Core site

Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
311	235	25.4	10.8	2.1	Bar built	<5,000

Description

The estuary of the river Blyth has been extensively altered by man. Historically large areas of the estuary have been claimed for grazing marsh, but since 1840 some areas have reverted to intertidal flat and saltmarsh, due to breaches in the sea walls. Water quality within the estuary has been classified as grade A.

Today the upper estuary is a narrow channel which, downstream of Blythburgh, opens out into a broad, sheltered, intertidal flat. This mudflat, with narrow fringing saltmarsh on the southern shore, is the remains of what was once grazing marsh that has reverted to its natural state, within a mosaic of breached bunds. The saltmarsh is dominated by low-mid marsh vegetation with some upper marsh. On the lower marsh there is some *Spartina*.

In its lower reaches the estuary connects with the sea by a narrow, canalised channel, surrounded on either side by grazing marshes with a series of drainage dykes. These marshes have an extremely rich invertebrate fauna, particularly moths.

The Blyth Estuary regularly supports nationally important populations of avocet and black-tailed godwit.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●		●				●		
Area (ha)	76	79	156							

● = major habitat ● = minor habitat

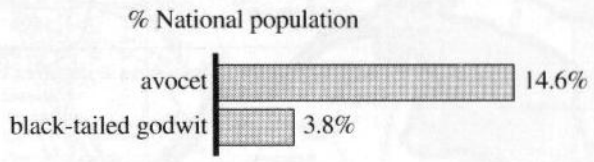
Aquatic estuarine communities

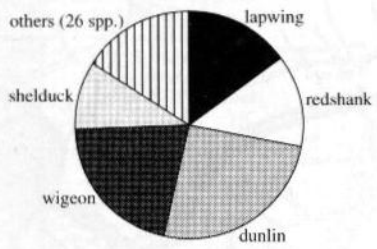
Information unavailable.

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 8,700





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: there is a moderate-sized colony of black-headed gulls on the estuary. Moderate numbers of redshank and lapwing and small numbers of snipe and oystercatcher breed within the grasslands adjacent to the Blyth. Small numbers of ringed plover breed within the estuary.

Additional wildlife features

The invertebrate fauna recently recorded on or adjacent to the estuary includes the RDB 2 flies *Cephalops perspicuus, Erioptera bivittata* and *Erioptera meijerei* and RDB 3 species include the white-mantled wainscot moth *Archanara neurica*, the dotted foot-man *Pelosia muscerda*, Fenn's wainscot moth *Photedes brevilinea*, Flame wainscot moth *Senta flammea* and the flies *Haematopota granda, Tipula marginata* and *Campsicnemus magius*. A further nine proposed RDB species and 67 Notable species have also been recorded.

Otters are present on the estuary.

Conservation status

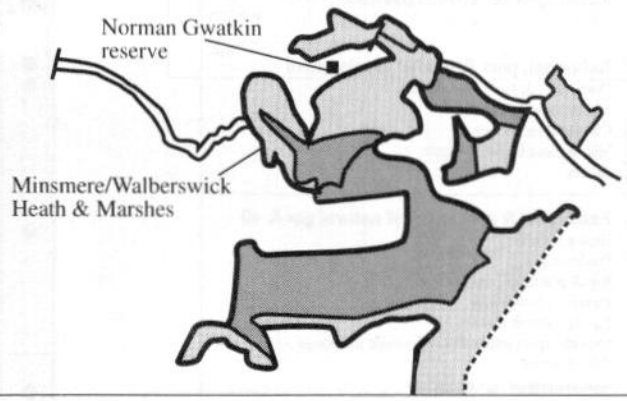
● = designated ● = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
			●			●		●	●		●	●		●					●	
No.			1			1		1	1		1	1		1					1	

A large proportion of the intertidal flats lie within the Minsmere-Walberswick Heath and Marshes biological Site of Special Scientific Interest (2,326 ha), of which part forms the Walberswick National Nature Reserve. Norman Gwatkin Reserve is a Suffolk Wildlife Trust reserve.

The Blyth is part of the Minsmere and Walberswick Ramsar site and Special Protection Area. The estuary lies within the Suffolk Coast Area of Outstanding Natural Beauty and the Suffolk Heritage Coast. It is also part of the Suffolk River Valleys Environmentally Sensitive Area.

Conservation status



= NNR
= SSSI
■ = County Wildlife Trust

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Features of human use

Leisure and recreation is the dominant use on this estuary, for there are moorings all along the channel and a boat park at Southwold, although most sailing from here is directly out to sea. Power-boating and water-skiing occur along the Tinker's Marsh stretch and canoeing occurs over 90% of the site. Bird-watching and walking occur along the banks.

Exploitation of the natural resource includes grazing of a small area of saltmarsh in Tinker's Marsh, fyke-netting for eels and bait-digging (by licence) which occurs over 50% of the intertidal area. A wildfowling syndicate shoots over 90% of the intertidal flats and saltmarsh. Parts of Southwold Town Marshes are being drained for agricultural land.

Proposals in 1989 included a golf course over the remaining Southwold Town Marshes, which would involve a land-claim of over 20 ha. Jet-skiing on the estuary has recently become an issue.

Features of human use

▲ = industry
● = harbour/quay
O = caravan park
= leisure

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Human activities (in 1992)

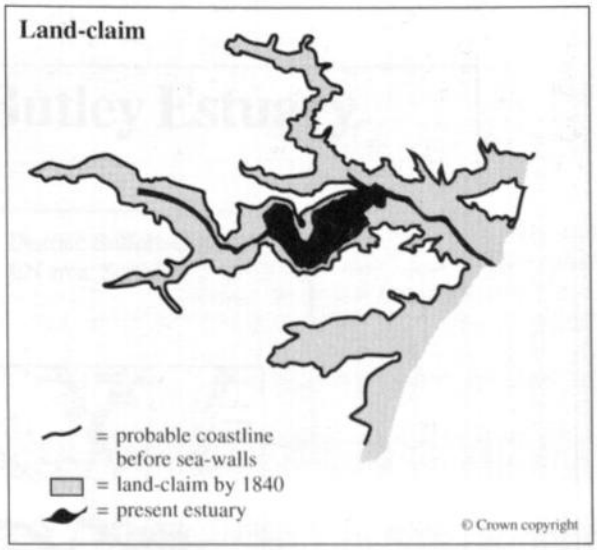
Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
		Manufacturing industries
		Chemical industries
●		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
		Others
		Waste discharge
		Domestic waste disposal
●		Sewage discharge & outfalls
		Sewage treatment works
		Rubbish tips
		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
		Dredge spoil
●		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
		Capital dredging
		Maintenance dredging
		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
●		Tunnels, bridges & aqueducts
●		Causeways & fords
		Road schemes
●		Ferries
		Cables
		Urbanisation
		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
●		Seismic studies & geological test drilling
		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
		Marinas
●		Non-marina moorings
●		Dinghy & boat parks
●		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
●		Other non-commercial fishing
		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
		Horse-riding
		Rock-climbing
		Golf courses
●		Clay-pigeon shooting
		Others
		Airborne recreation
		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
		Fish-netting & trawling
●		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
●		Agricultural land-claim
		Fish-farming
		Shellfish farming
●		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
●		Terrestrial
		Habitat management
		Others

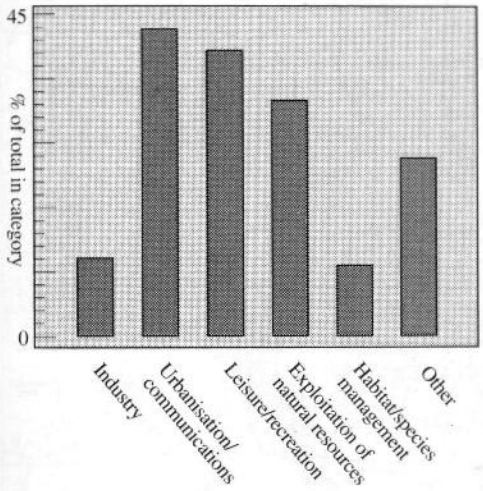
Land-claim

Historically large areas of land have been claimed from many estuaries in Suffolk and the Blyth is no exception. By 1842 an estimated 1,100 ha of intertidal area had been claimed for arable land, which restricted the estuary to a thin channel reaching Blyford bridge. More recently, the sea walls have suffered a series of breaches and over 200 ha of the previously claimed land have reverted to the intertidal zone that remains today.

An approximate 1,278 ha of the previous saltmarsh and mudflat has been claimed from the estuary.



Categories of human use



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106 Ore/Alde/Butley Estuary

Centre grid: TM4357
County: Suffolk

District: Suffolk Coastal
EN area: Suffolk

Review site location

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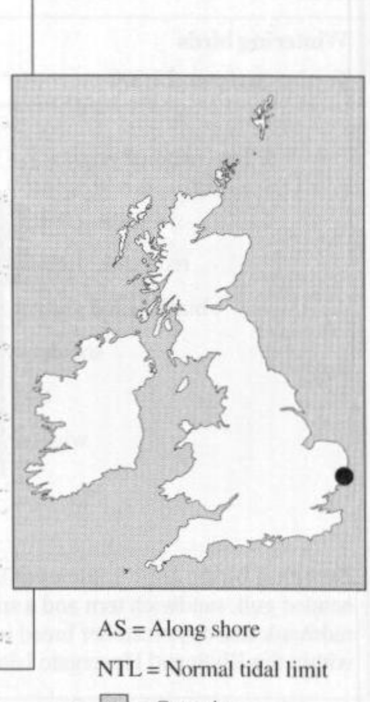


AS = Along shore

NTL = Normal tidal limit

= Core site

Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
1,821	1,332	73.2	28.0	2.2	Bar built	<5,000

Description

The estuary of the rivers Ore, Alde and Butley is dominated by the very large shingle spit of Orfordness. This spit has been extending rapidly along the coast since 1530, pushing the mouth of the River Ore progressively south-west to its present position. The water quality of the estuary has been classified as grade A.

The River Alde is relatively wide and shallow, with a wide expanse of mudflats in its uppermost reaches. Along both banks there is saltmarsh, comprising discrete patches of low marsh vegetation joined by pioneer communities and *Spartina*. Further downstream the estuary is deeper and narrower, with fringes of saltmarsh which show signs of erosion. The Butley river has extensive saltmarsh development along its length, with a small reedbed in its upper reaches. Here mid-upper marsh vegetation is extensive, with driftline communities: further downstream the saltmarsh is eroding. At the confluence of the Ore and Butley is the low-lying Havergate Island, with fringing saltmarsh on most sides: here mid-upper marsh dominates and grades into grassland.

The seaward boundary of the estuary is dominated by the shingle spit of Orford Beach, protecting the Stonyditch Creek and its associated saltmarsh, which blends gradually into shingle vegetation. The spit has one of the finest areas of undisturbed shingle vegetation in Britain, with a highly specialised and delicate flora. It also supports a diverse population of lichens and bryophytes. To the west of the estuary mouth lagoons have developed within the shingle; these are known to have a specialist invertebrate fauna which includes two national rarities.

The estuary is of international importance for waterfowl, for it supports a very large number of wintering waterfowl including internationally important populations of redshank and avocet and nationally important populations of four species.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●		●			●	●	◍	
Area (ha)	489	562	770							

● = major habitat ◍ = minor habitat

Soft substrate

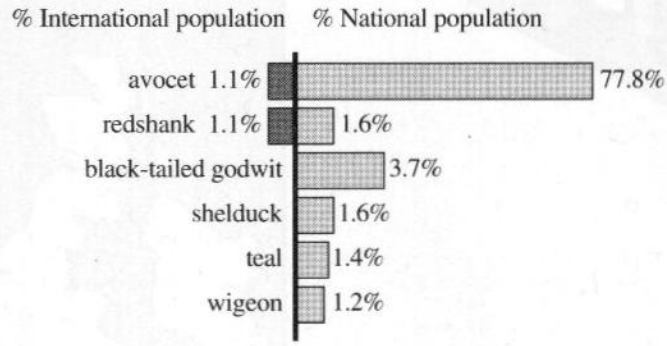
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
														●	

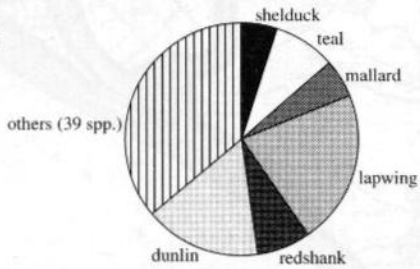
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 22,500





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: large colonies of little tern, herring gull and lesser black-backed gull, moderate-sized colonies of black-headed gull, sandwich tern and a small colony of common tern breed within the estuary. Low numbers of lapwing, snipe, redshank and oystercatcher breed in the grasslands adjacent to the estuary. Moderate numbers of ringed plover breed within the Blyth and Havergate Island supports the largest breeding colony of avocets in Britain.

Additional wildlife features

The invertebrate fauna recently recorded on the estuary includes the RDB 2 spider *Trichoncus affinis* and several RDB 3 species: the starlet sea anemone *Nematostella vectensis*, the lagoon sand shrimp *Gammarus insensibilis*, the ground lackey moth *Malacosoma castrensis* and the spiders *Baryphyma duffeyi*, *Euphrys browningi* and *Haplodrassus minor*. A further 41 Notable species have also been recorded.

Conservation status

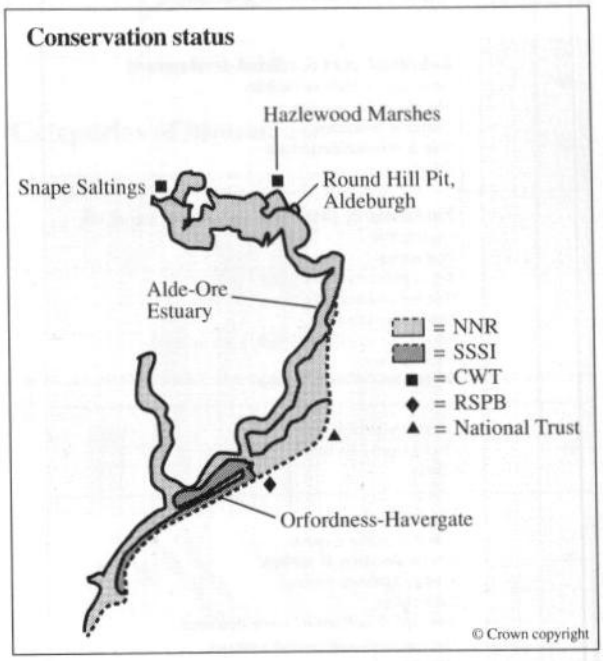
● = designated ● = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●	●	●	●	●	●		●	●	●	●	●	●	●			●		●	●
No.	1	4	1	1	1	1		1	2	1	1	2	1	1			1		1	3

Much of the estuary lies within the Alde-Ore Estuary Site of Special Scientific Interest (2,554 ha), notified for both its biological and geomorphological interest. Part of this area forms the Orfordness-Havergate National Nature Reserve; it is also a Nature Conservation Review site and an Area of Special Protection. Snape Warren (47 ha) is a biological SSSI and Round Hill Pit, Aldeburgh is a geological SSSI (0.5 ha) and a Geological Conservation Review site. There are further GCR sites at Orfordness, Round Hill and The Cliff, Gedgrave.

The Alde-Ore Estuary has been designated as a Ramsar site and a Special Protection Area, and Orfordness-Havergate is a SPA. Orfordness-Shingle Street has been proposed as a Special Area of Conservation. There is a Sanctuary Order for Orfordness-Havergate.

Orfordness is owned by the National Trust. The Suffolk Wildlife Trust have reserves at Snape Saltings and Hazlewood Marshes and the RSPB have a reserve at Havergate Island. The estuary lies within the Suffolk River Valleys Environmentally Sensitive Area and the Suffolk Heritage Coast, and the Suffolk Coasts and Heaths is an Area of Outstanding Natural Beauty. A Sensitive Marine Area covers the area offshore from Orfordness.



Human activities (in 1992)

Present	Proposed	
		Coast protection & sea defences
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		Chemical industries
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		Others
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		Pipeline installation
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		Non-commercial aggregates extraction
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		Causeways & fords
		Road schemes
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●		Cables
		Urbanisation
		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
●		Seismic studies & geological test drilling
		Marine & terrestrial archaeology
		Fossil collecting

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●		Dinghy & boat parks
		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
●		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
		Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
●		Fish-netting & trawling
●		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
		Molluscs – Hand-gathering
		Dredging
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		Cultivation of living resource
		Saltmarsh grazing
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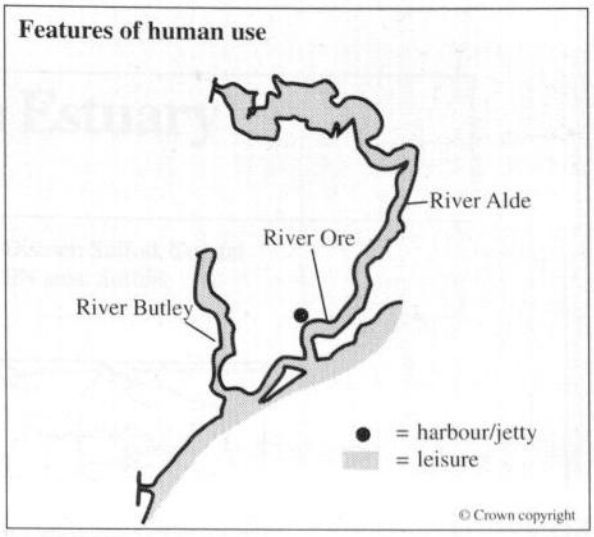
		Agricultural land-claim
		Fish-farming
		Shellfish farming
●		Bottom & tray cultivation
	●	Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
●		Gulls
		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
●		Terrestrial
		Habitat management
●		**Others**

Features of human use

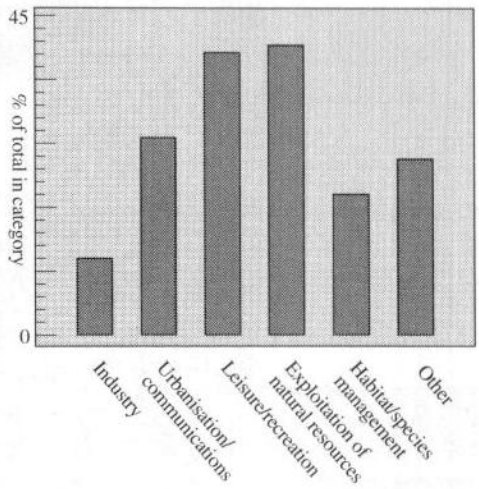
Leisure and recreation uses constitute the most numerous forms of activity. Sailing occurs throughout the estuary, although only in small numbers, and there are many moorings along the shores and dinghy parks at Aldeburgh and Orford. Wind-surfing and canoeing also occur and water-skiing is permitted in 100 ha of the lower estuary. There is a speed limit for power-boating. Beach recreation is occasional around the estuary mouth and bird-watching is centred on Havergate. 4WD and trial-biking have caused problems at Orfordness by damaging the shingle and causing disturbance to birds.

Exploitation of the natural resource includes oyster cultivation, trawling for fish, fyke-netting for eels and cutting reeds for roofing. Bait-digging occurs near Aldeburgh and a wildfowling club shoot over the northern shore of the Alde, over part of the Butley and over Orfordness. An estimated 60% of the intertidal area is used.

There is little industrial activity, with only two small quays for trawlers and a yacht-building yard. In 1989 there was a proposal to seed and harvest mussels in Stoney Ditch.



Categories of human use



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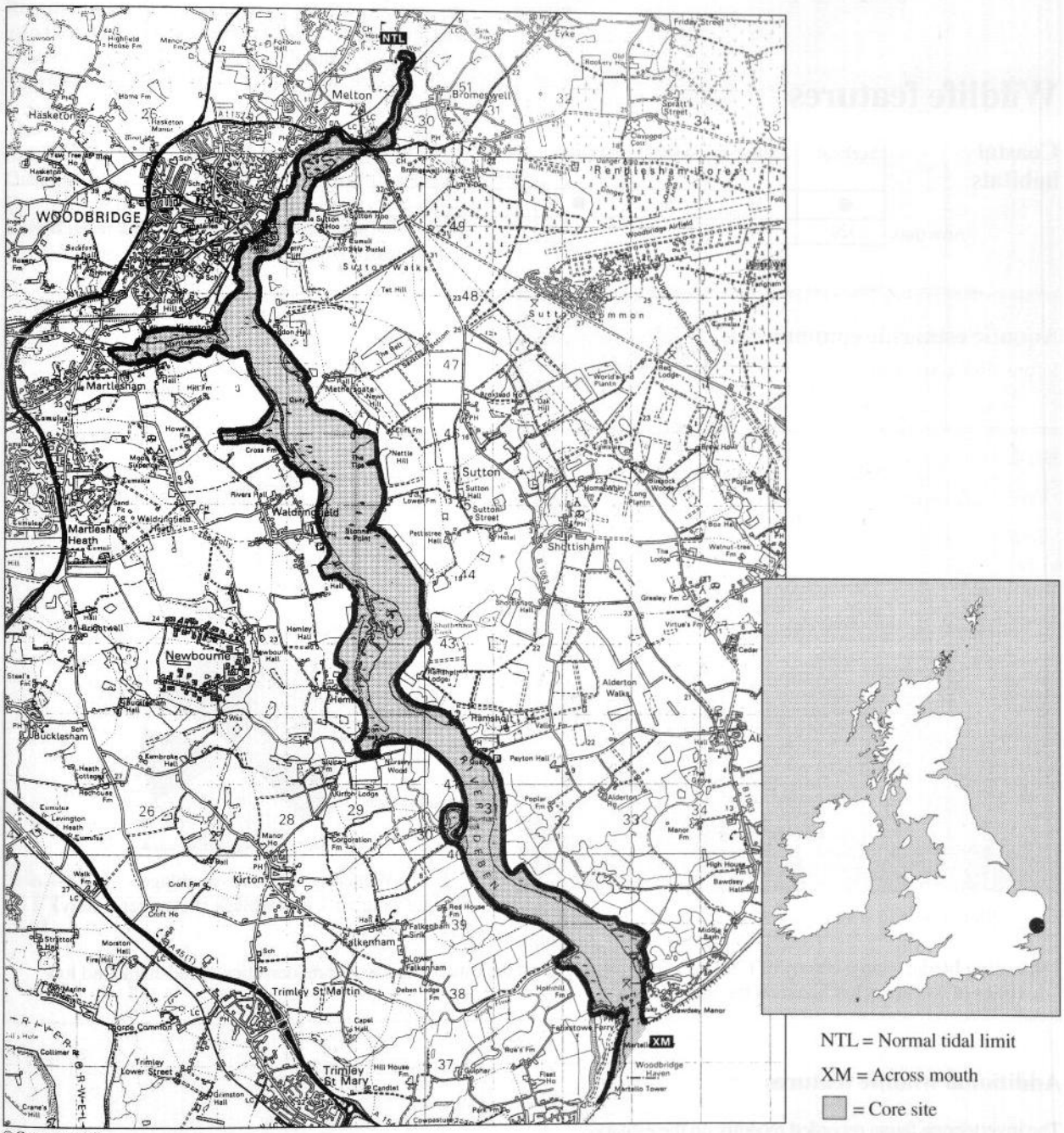
107 Deben Estuary

Centre grid: TM2945
County: Suffolk

District: Suffolk Coastal
EN area: Suffolk

Review site location



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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
1,007	687	49.8	19.7	3.2	Coastal plain	10,000

Description

The Deben is a long, narrow estuary, with extensive mudflats in its inner reaches that extend to the estuary mouth, where there is a very small area of sandflat. Historically the estuary has been greatly modified by land-claim and it is estimated that around 2,500 ha of saltmarsh and mudflat have been lost to agriculture. However, in recent years floods have breached some sea defences and some areas of claimed land have since reverted to saltmarsh. Water quality within the Deben has been classified as grade B in its upper reaches, becoming grade A further downstream.

From Melton to Bawdsey there is extensive saltmarsh along both banks, with a wide representation of saltmarsh communities. A small *Phragmites* reedbed lies in Martlesham Creek, south of which there is extensive mid-upper marsh. In places pioneer communities have developed where flooding has breached the sea defences.

The Deben supports a diverse invertebrate fauna which includes many uncommon species. The estuary is of particular importance for wintering waterfowl, for it regularly supports nationally important populations of six species of waterfowl.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	◍	◍	●				●		
Area (ha)	320	461	226							

● = major habitat ◍ = minor habitat

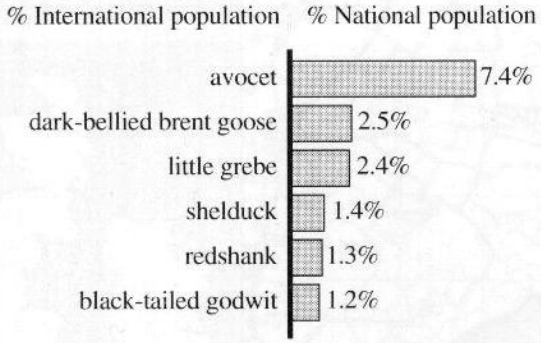
Aquatic estuarine communities

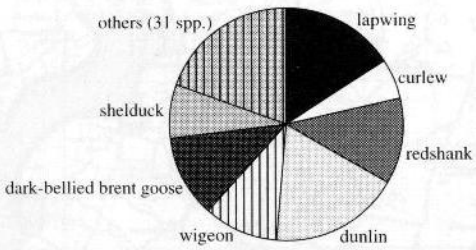
Information unavailable.

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 15,500





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: a large colony of black-headed gulls breed on the estuary and moderate densities of redshank and low densities of oystercatcher breed on the saltmarshes.

Additional wildlife features

The invertebrate fauna recorded recently on the estuary includes the RDB 1 snail *Vertigo angustior* and four Notable species.

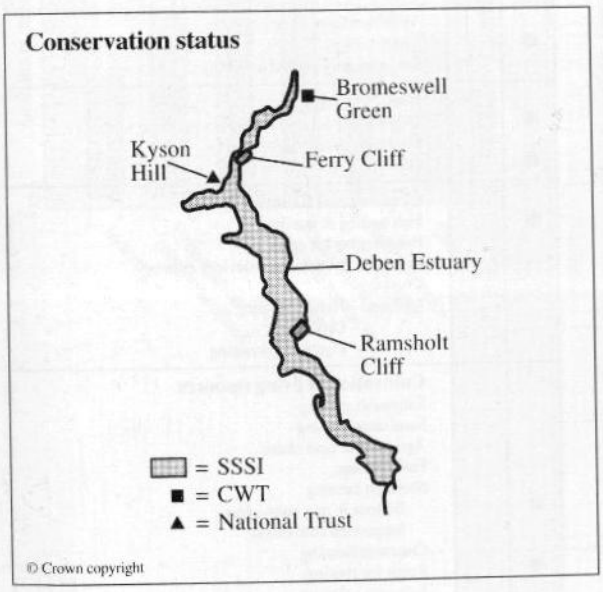
Conservation status

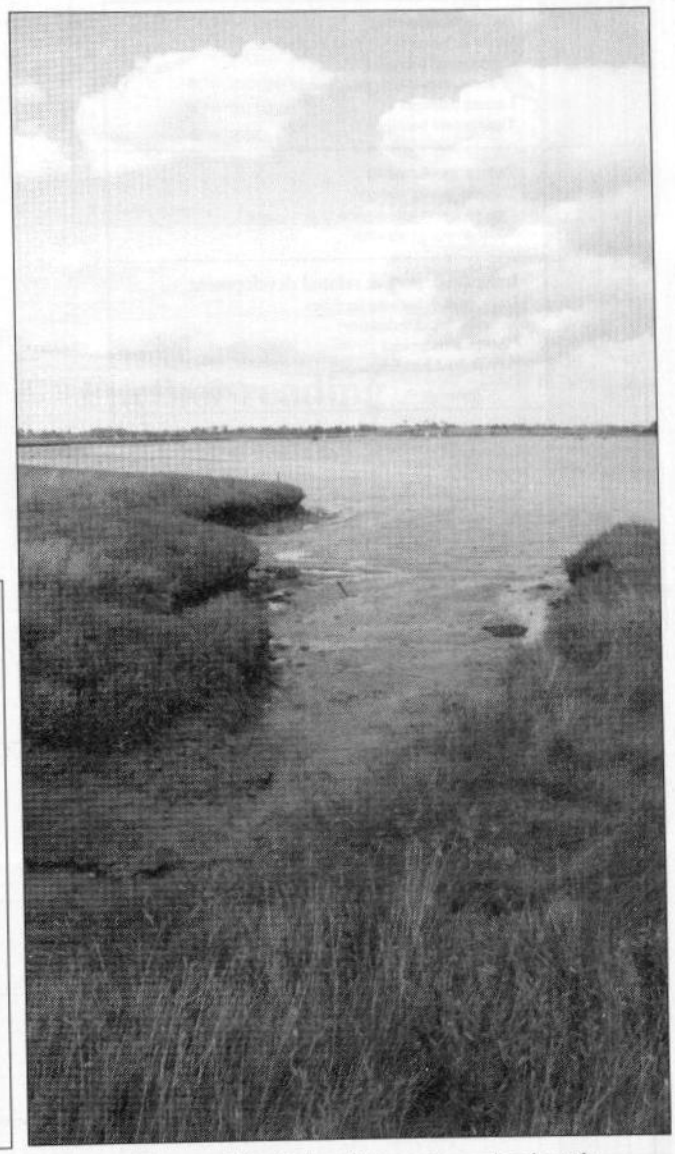
● = designated ● = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
		●	●	●				●	●		●	●		●			●		●	
No.		2	1	2				1	1		1	1		1			1		1	

The whole of the estuary is designated as the Deben Estuary biological Site of Special Scientific Interest (976 ha). There are two small geological SSSIs at Ramsholt Cliff (2 ha) and Ferry Cliff (3 ha), which are also Geological Conservation Review sites. The Deben Estuary has been designated as a Ramsar site and a Special Protection Area.

The National Trust own land at Kyson Hill and the Suffolk Wildlife Trust have a reserve at Bromeswell Green. The estuary lies within the Suffolk Coast and Heaths Area of Outstanding Natural Beauty and the Suffolk Heritage Coast, and is partly within the Suffolk River Valleys Environmentally Sensitive Area.





The intertidal area of the Deben Estuary is predominantly saltmarsh. (Nick Davidson, JNCC.)

Human activities (in 1993)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
		Manufacturing industries
		Chemical industries
●		Ship & boat building/repair
●		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
●		Others
		Waste discharge
		Domestic waste disposal
●		Sewage discharge & outfalls
		Sewage treatment works
		Rubbish tips
		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
		Dredge spoil
		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
		Capital dredging
		Maintenance dredging
		Commercial estuarine aggregates extraction
●		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
●		Tunnels, bridges & aqueducts
		Causeways & fords
		Road schemes
●		Ferries
		Cables
		Urbanisation
		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
		Fossil collecting

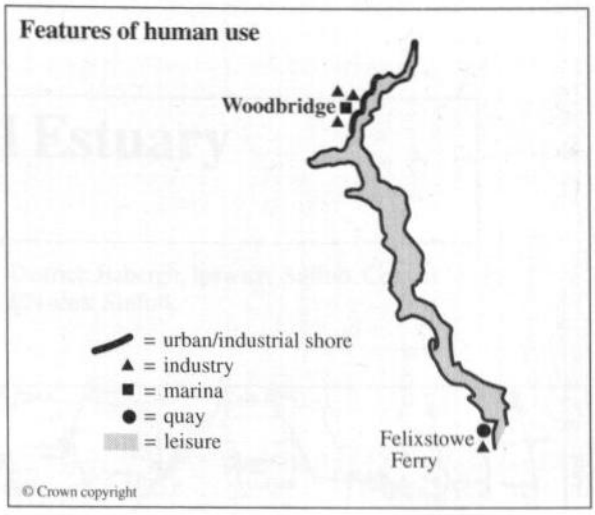
Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●		Marinas
●		Non-marina moorings
●		Dinghy & boat parks
		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
●		Tourist boat trips/leisure barges
●		Angling
●		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
		Horse-riding
		Rock-climbing
●		Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
●		Others
		Commercial fisheries
●		Fish-netting & trawling
		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
●		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
●		Reeds for roofing
		Salicornia picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
●		Intertidal
		Terrestrial
		Habitat management
		Others

Features of human use

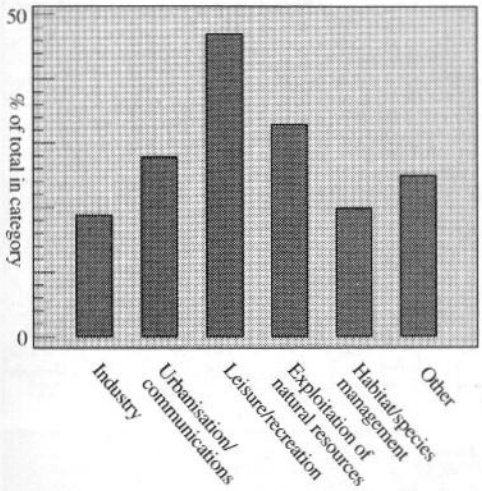
Leisure is the most numerous form of activity. Water-based pursuits are extensive, with moorings at Woodbridge, Waldringfield, Ramsholt and Felixstowe Ferry and a marina at Woodbridge; sailing, wind-surfing and canoeing are widespread. Water-skiing is permitted only in 60 ha of Falkenham Creek. Walking occurs along parts of the shore and bird-watching is centred on Martlesham Creek and Felixstowe Ferry.

Exploitation of the natural resource includes cutting reeds for thatching; trawling and seine-netting for fish; and bait-digging and boulder-turning for bait occurs over a small area. A wildfowling club shoot over 50% of the intertidal area.

Industrial activity includes yacht-building yards at Woodbridge and a former tidal mill which now serves as a tourist attraction. There are also small quays and boatyards at Felixstowe Ferry and Martlesham Creek.



Categories of human use



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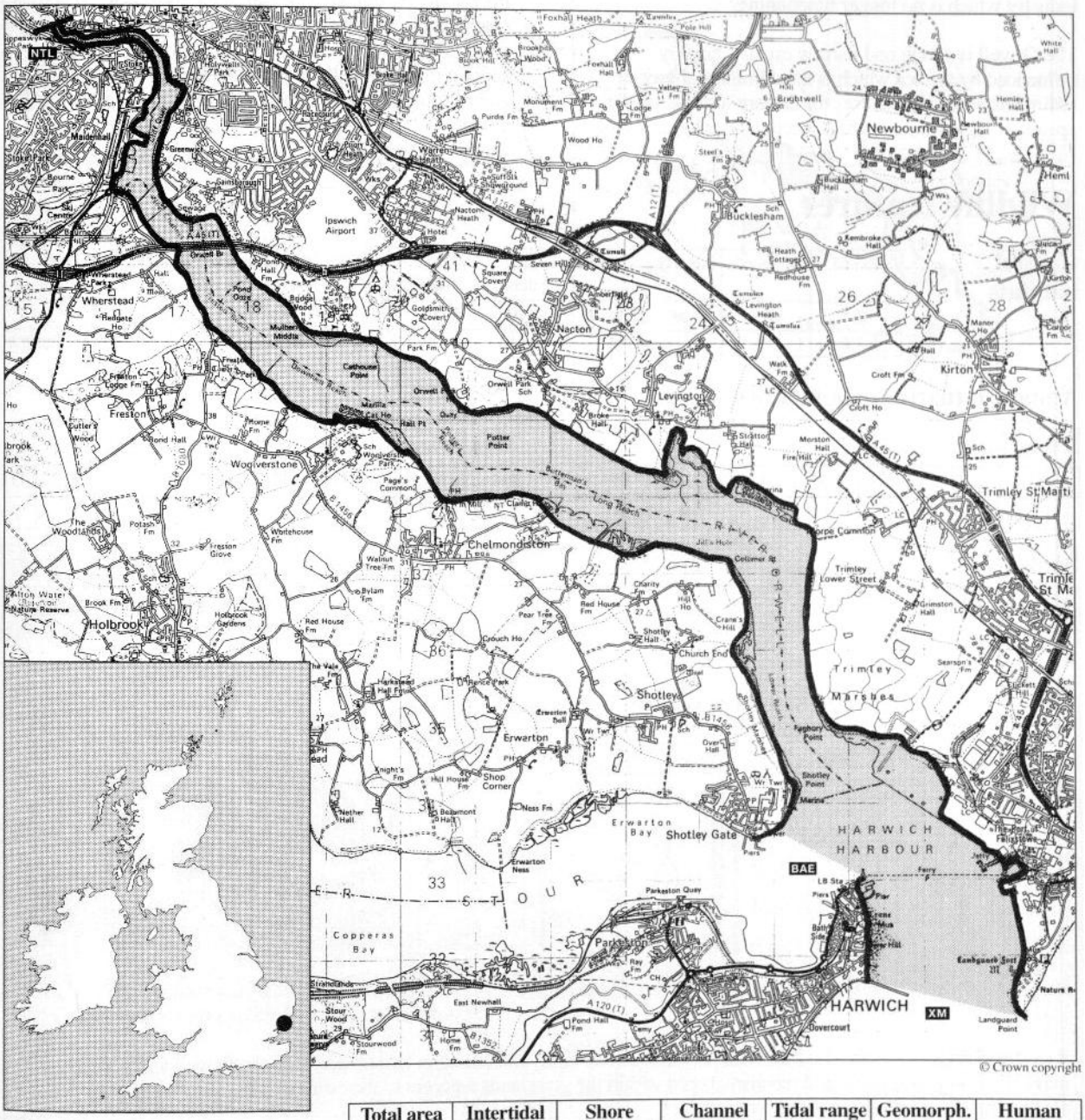
108 Orwell Estuary

Centre grid: TM2338
County: Suffolk

District: Babergh, Ipswich, Suffolk Coastal
EN area: Suffolk

Review site location



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NTL = Normal tidal limit

XM = Across mouth

BAE = Boundary with adjacent estuary

= Core site

Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
1,786	576	50.7	20.1	3.6	Coastal plain	154,000

Description

The Orwell is one of a cluster of estuaries that extend from the East Anglian coast to the Thames Estuary. The lower reaches of the Orwell are adjacent to the Stour Estuary and together the two estuaries form an important complex. The upper tidal limits of the Orwell are enclosed by the city of Ipswich and its lower reaches are dominated by the port of Felixstowe. The water quality of the estuary varies; in its upper parts it has been classified as grade D, gradually improving through grades C, B and A further downstream. High levels of sewage discharge into the estuary and heavy loads of cadmium reside in the sediments of the Black Ooze flats, probably relicts of an industry which is no longer functioning.

The Orwell is a long and narrow estuary, heavily influenced by the sea which is the dominant source of sediments and which causes the estuary to be saline far upstream. Extensive mudflats occur along the shores of the upper reaches and these flats become increasingly sandy towards the estuary mouth.

Saltmarshes have developed within the embayments and small tributaries, and although the individual areas of saltmarsh are not large, the vegetation is varied. The most extensive saltmarshes are at Levington and Colton Creeks and these have a good representation of pioneer, low-mid marsh and upper marsh communities.

The mid-estuary is flanked by long stretches of farmland and wet meadows. These, and the freshwater marshes near the estuary mouth, provide roosts for waterfowl. There is considerable interchange of waterfowl between the Orwell and nearby estuaries, but the Orwell alone is known to support internationally important numbers of waterfowl and nationally important populations of seven species of waterfowl. It is also used by several species of breeding waders and sea birds.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	◍	●				●		
Area (ha)	1,210	119	457							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
												●	●	●	

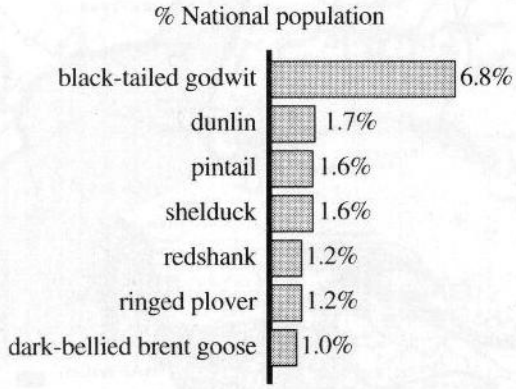
Hard substrate

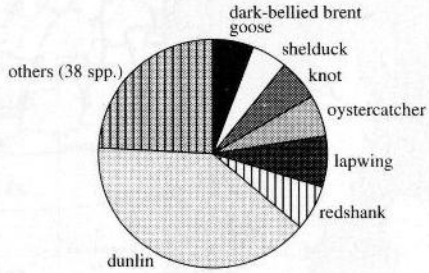
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 22,200





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: there are small colonies of black-headed gull and common tern breeding on the Orwell and small numbers of lapwing, snipe and redshank breed within the grasslands adjacent to the estuary. The estuary also supports small numbers of breeding ringed plover.

Additional wildlife features

The nationally rare plant stinking goosefoot *Chenopodium vulvaria* grows on the estuary. The invertebrate fauna recently recorded on the Orwell includes two Notable species of beetle.

Conservation status

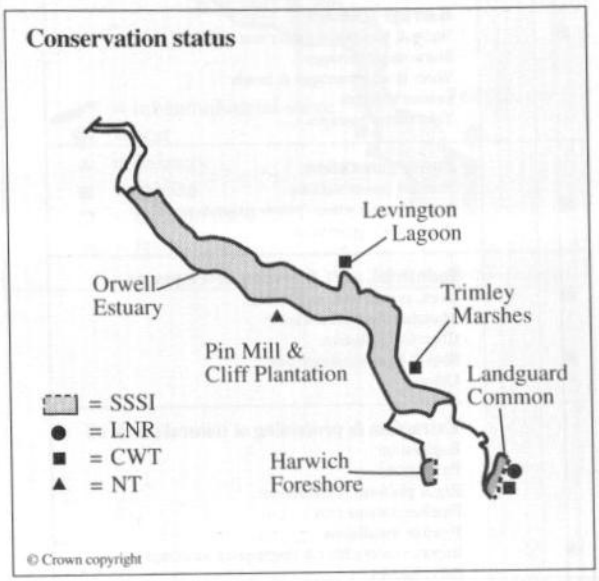
● = designated ● = proposed

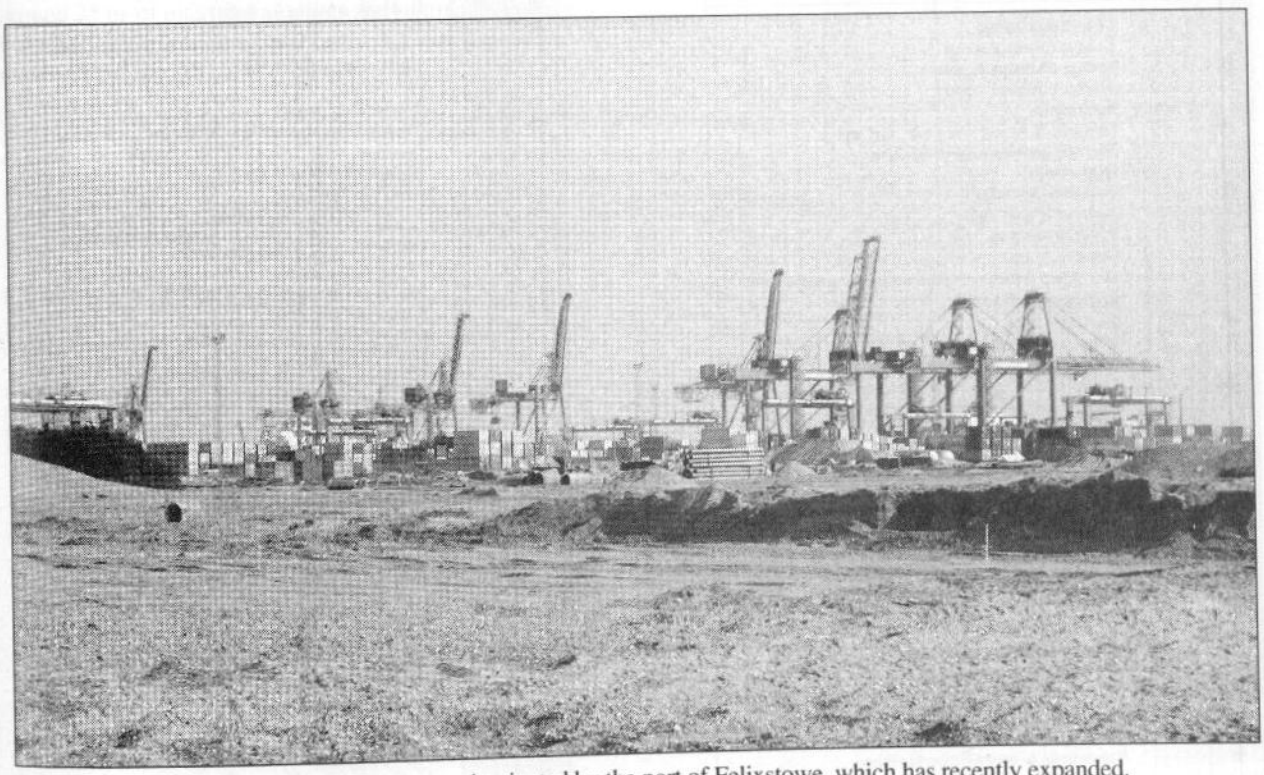
	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AON B	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
		●	●	●			●	●	●		●	●		●			●			
No.		1	2	1			1	1	1		1	3		1			1			

Much of the estuary lies within the Orwell Estuary biological Site of Special Scientific Interest (1,293 ha) and adjacent to the estuary mouth is Landguard Common, a biological SSSI (31 ha). Landguard Common is also a Local Nature Reserve. Harwich Foreshore is a geological SSSI (11 ha) and a Geological Conservation Review site.

The Orwell lies within the Stour and Orwell Special Protection Area and Ramsar site. It is also part of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty and lies within the Suffolk River Valleys Environmentally Sensitive Area.

Landguard Common, Trimley Marshes and Levington Lagoon are reserves managed or owned by Suffolk Wildlife Trust and the National Trust own land at Pin Mill and Cliff Plantation.





The lower reaches of the Orwell Estuary are dominated by the port of Felixstowe, which has recently expanded. (Nick Davidson, JNCC.)

Human activities (in 1993)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
●		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
●		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
		Manufacturing industries
		Chemical industries
●		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
●		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
		Others
		Waste discharge
		Domestic waste disposal
●		Sewage discharge & outfalls
		Sewage treatment works
		Rubbish tips
●		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
		Dredge spoil
●		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
●	●	Capital dredging
●		Maintenance dredging
		Commercial estuarine aggregates extraction
●		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
●		Airports & helipads
●		Tunnels, bridges & aqueducts
		Causeways & fords
	●	Road schemes
●		Ferries
●		Cables
		Urbanisation
		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●	●	Marinas
●		Non-marina moorings
●		Dinghy & boat parks
●		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
●		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
●		Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
●		Others
		Commercial fisheries
●		Fish-netting & trawling
●		Fyke-netting for eels
●		Fish traps & other fixed devices & nets
		Crustacea
		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
●		Intertidal
●		Terrestrial
		Habitat management
		Others

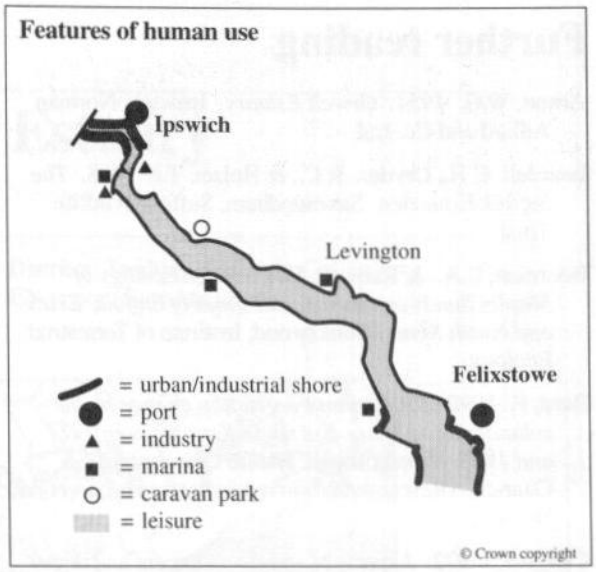
Features of human use

Leisure and recreation are the most numerous types of activity. Water-based pursuits dominate, with marinas at Shotley Point, Levington, Woolverston and Ipswich, numerous moorings at Pin Mill, and dinghy/boat parks at Orwell, Freston and Pin Mill. Sailing is widespread, power-boating and water-skiing occur at Levington and canoeing takes place in the upper estuary. Land-based pursuits include walking, horse-riding, and 4WD and trial-biking which are restricted to Nacton. Overflying by light aircraft from Ipswich occurs.

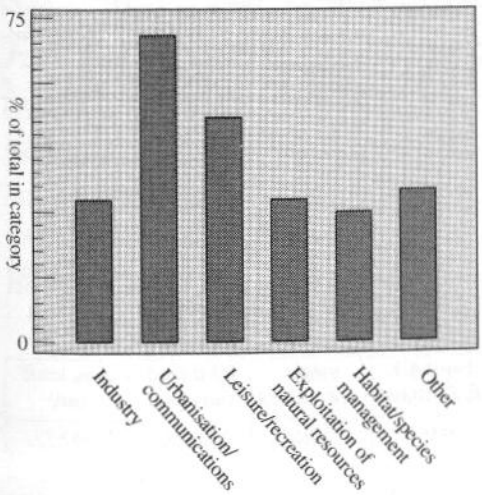
Industrial activity includes large container ports at Ipswich and Felixstowe; the latter has undergone development which involved land-claim of mudflats and saltmarsh. There are two small boat-building yards at Ipswich. Capital dredging has deepened the dock at Felixstowe and dredging maintains shipping channels.

Exploitation of the natural resource includes seine-netting, tangle-netting in the creeks and trawling for fish, and fyke-netting for eels. Bait-digging affects 70% of the estuary and there is also boulder turning for crabs for bait. A wildfowling club shoots over 40% of the intertidal and 90% of the saltmarsh, centred on Levington Creek, Shotley and Hares Creek. Habitat and species management includes culling geese on farmland, creation of brackish lagoons at Levington, freshwater lagoons and grazing marsh at Trimley. There is some small-scale planting of *Zostera* eelgrass and a trial foreshore recharge scheme on the mudflats at Trimley.

Proposals in 1989 included dredging to extend and deepen the dredged river channel, a road scheme at Piper's Vale, and marinas at Levington and Dovercourt. Since that time around 25 ha of intertidal mudflats and saltmarsh have been lost to land-claim around Fagbury Flats, due to the expansion of the Port of Felixstowe.



Categories of human use



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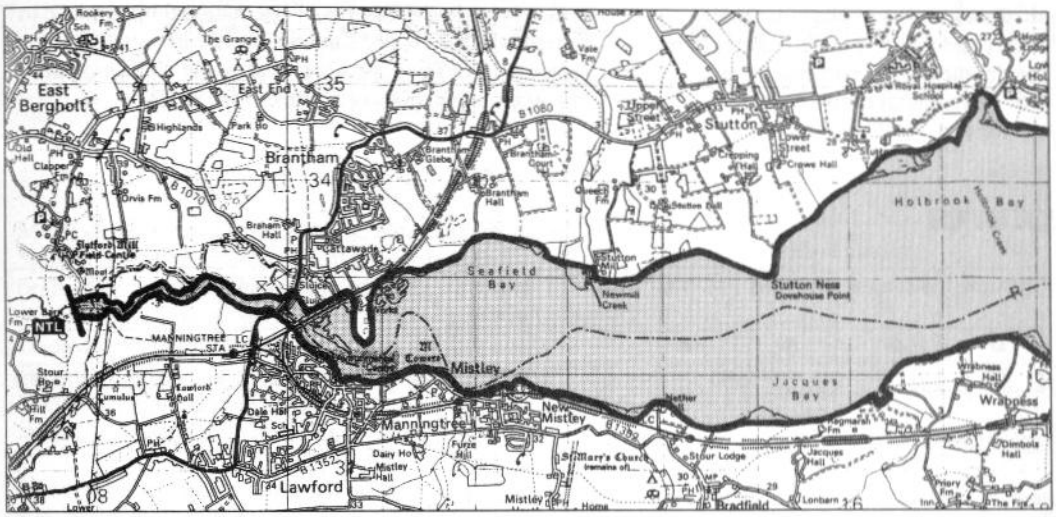
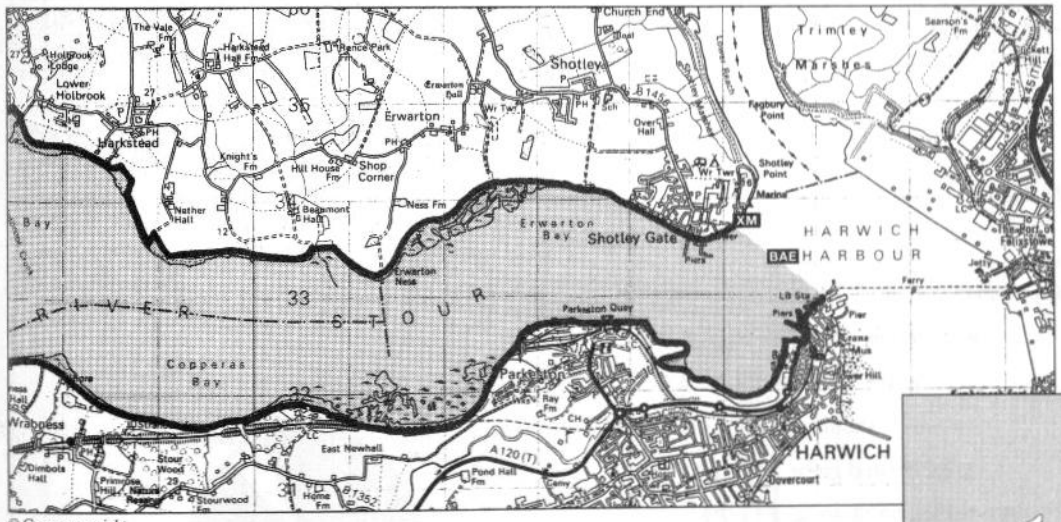
109 Stour Estuary

Centre grid: TM1833
Counties: Essex, Suffolk

Districts: Tendring, Babergh, Colchester
EN region: East Anglia

Review site location





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XM = Across mouth

NTL = Normal tidal limit

BAE = Boundary with adjacent estuary

= Core site

Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
2,531	1,637	48.1	19.6	3.6	Coastal plain	17,000

Description

The Stour is a long estuary, with an indented shoreline that has five main bays: Seafield, Holbrook, Erwarton, Jacques and Copperas. The mouth of the estuary discharges into the lower reaches of the adjacent Orwell estuary. Water quality in the Stour has been classified as grade A.

The intertidal flats are found mainly in the bays and are predominantly muddy but become sandy towards Harwich. The mudflats are extremely rich in invertebrates and in Erwarton and Holbrook Bays there are extensive growths of *Enteromorpha* algae and *Zostera* eelgrasses.

For much of its length, the estuary is marked by sharply rising land or boulder clay and red crag cliffs, leaving little room for saltmarsh development. It occurs mostly as a fringe of saltmarsh with a substantial proportion of *Spartina;* only in Erwarton Bay and Copperas Bay is the saltmarsh more extensive, with low-mid marsh vegetation communities. Copperas Wood is the only example in Essex of a transition from saltmarsh to woodland. At the head of the estuary, between the freshwater and tidal channels of the Stour, there is an area of grazing marsh with associated open water and fen at Cattawade Marshes. This is a breeding area for waterfowl that complements the estuary itself.

The Stour Estuary regularly supports large numbers of wintering waterfowl, with which there is considerable interchange with the adjacent Orwell Estuary. However, in its own right the Stour is of international importance to waterfowl for it supports internationally important populations of three species of waterfowl and nationally important populations of a further nine species.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	●	●			◍	●		
Area (ha)	894	297	1,340							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
												●	●	●	

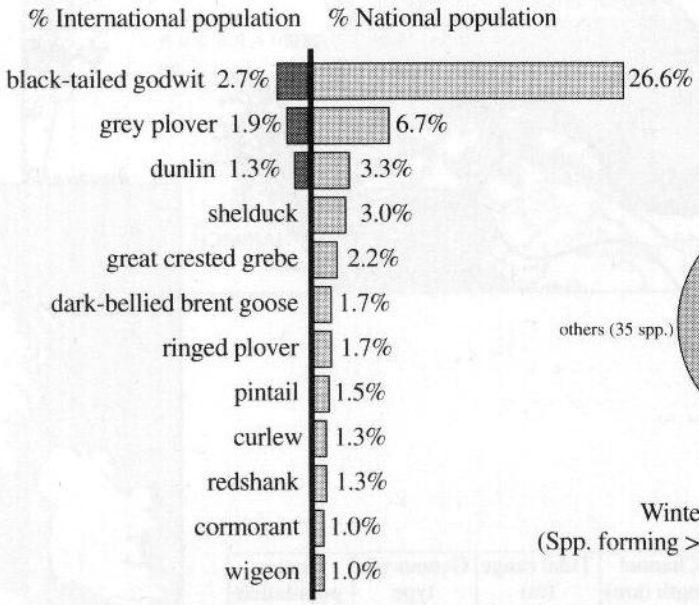
Hard substrate

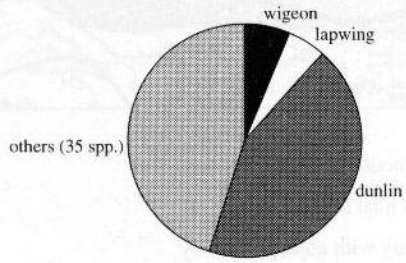
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 45,400





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: there are small colonies of black-headed gull and common tern breeding on the estuary. Small numbers of redshank, oystercatcher and lapwing breed within the grasslands adjacent to the estuary. The Stour also supports small numbers of breeding ringed plover.

Additional wildlife features

There are 20 nationally scarce plant species present on the Stour Estuary, including marsh mallow *Althaea officinalis:* the Stour is the only remaining site in Essex for this species.

The invertebrate fauna recently recorded on the estuary includes the RDB3 fly *Haematopota grandis,* a proposed RDB spider and twelve Notable species.

Conservation status

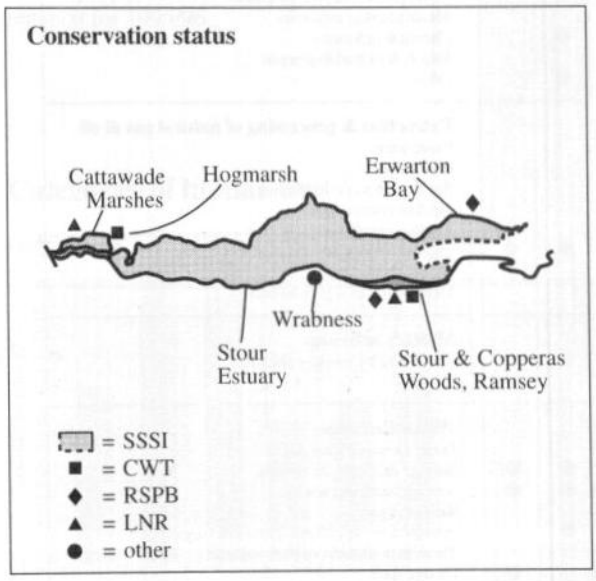
● = designated ● = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AON B	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●	●	●		●		●	●	●		●	●	●	●			●			●
No.	1	2	2		1		1	1	1		1	2	2	1			1			1

Much of the estuary lies within the Stour Estuary Site of Special Scientific Interest (2,150 ha), which was designated for its biological and geological interest. It is also a Nature Conservation Review site and contains two Geological Conservation Review sites at Stutton and Wrabness. Cattawade Marshes (88 ha) is a biological SSSI and adjacent to the estuary is Stour and Copperas Wood, Ramsey biological SSSI (77 ha).

The Stour Estuary lies within the Suffolk River Valleys Environmentally Sensitive Area and the Suffolk Coast and Heath Area of Outstanding Natural Beauty, and is part of the Stour and Orwell Estuaries Ramsar site and Special Protection Area.

The RSPB has reserves at Erwarton Bay and at Stour and Copperas Wood, Ramsey, which is also an Essex Wildlife Trust reserve and Woodland Trust reserve. The Essex Wildlife Trust have a reserve at Hogmarsh and part of Catawade is National Trust land. Wrabness is a Local Nature Reserve.



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Human activities (in 1991)

Present	Proposed	
		Coast protection & sea defences
●	●	Linear defences
		Training walls
●		Groynes
		Brushwood fences
		Spartina planting
	●	Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
●		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
		Manufacturing industries
●		Chemical industries
		Ship & boat building/repair
●		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
●	●	Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
		Others
		Waste discharge
		Domestic waste disposal
●	●	Sewage discharge & outfalls
●	●	Sewage treatment works
		Rubbish tips
●		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
	●	Dredge spoil
●		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
●	●	Capital dredging
●		Maintenance dredging
●		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
●		Tunnels, bridges & aqueducts
●		Causeways & fords
	●	Road schemes
●		Ferries
●		Cables
		Urbanisation
	●	Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●	●	Marinas
●		Non-marina moorings
●		Dinghy & boat parks
●		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
●		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
●		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
●		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
	●	Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
		Fish-netting & trawling
		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
●		*Salicornia* picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
	●	Intertidal
●	●	Terrestrial
●		Habitat management
	●	**Others**

Features of human use

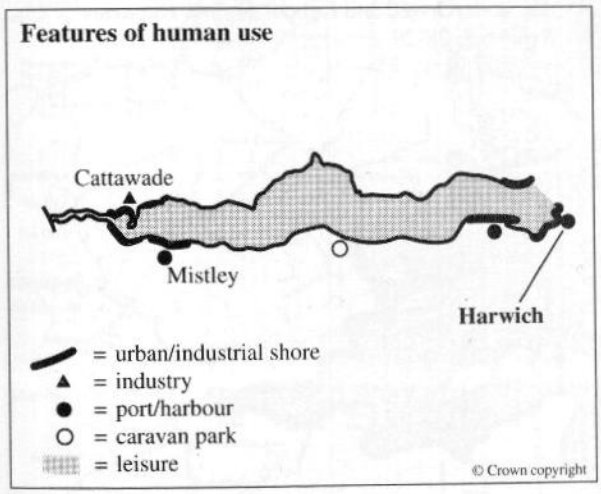
Leisure is the most numerous form of activity. Sailing occurs throughout the estuary, but is not intensive, and there are moorings at Wrabness, Mistley and Holbrook. Water-skiing is limited to 250 ha in the mid-estuary. Beach recreation occurs at Wrabness and walking and bird-watching take place along most of the shoreline. 4WD occurs on the intertidal flats and horse-riding occurs occasionally.

Industrial activity includes the three ports/docks at Mistley, Parkeston Quay and the major port at Harwich, and a dock is currently under development at Bathside Bay. Capital dredging and maintenance of the shipping channels occurs. There are two chemical works at Cattawade.

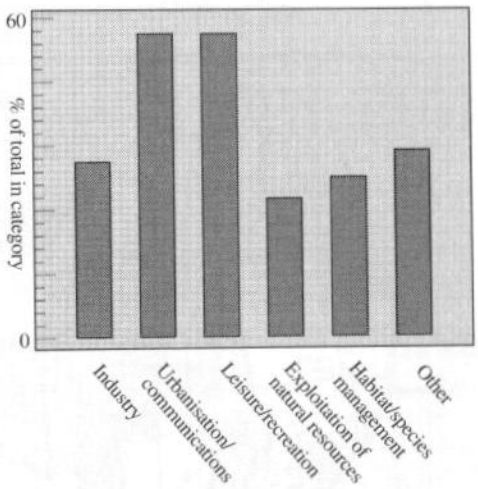
Exploitation of the natural resource includes culling Canada geese, and bait-digging at Holbrook, Wrabness and Erwarton. Two wildfowling clubs shoot over Holbrook Bay (100 ha) and Seafield Bay (300 ha) and 5 punt guns are known to work the estuary.

In 1989 there were several proposals involved with the development at Bathside Bay: these included a marina, land-claim for housing, capital dredging and a road scheme. There was also a proposal to build on associated land. By 1993 the proposals at Bathside Bay were underway apart from the marina, and the proposal to build a jetty at Parkeston had been fulfilled.

Since 1989 there has been a proposal to upgrade the sewage treatment works in the Harwich Dovercourt area. The new sewage treatment works near Parkeston will discharge into the mouth of the Stour following secondary treatment, replacing untreated discharges to Harwich foreshore. In 1993 major dredging and deepening of the channel to Harwich Harbour began, associated with the production of aggregate for beach feeding, e.g. as a sea defence on Copperas Bay and for land-claim in Bathside Bay. Also in 1993, a gas pipeline was installed across Cattawade Marshes which had little impact on the SSSI. A new proposal to rebuild the road bridge at Cattawade is planned for 1995/96.



Categories of human use



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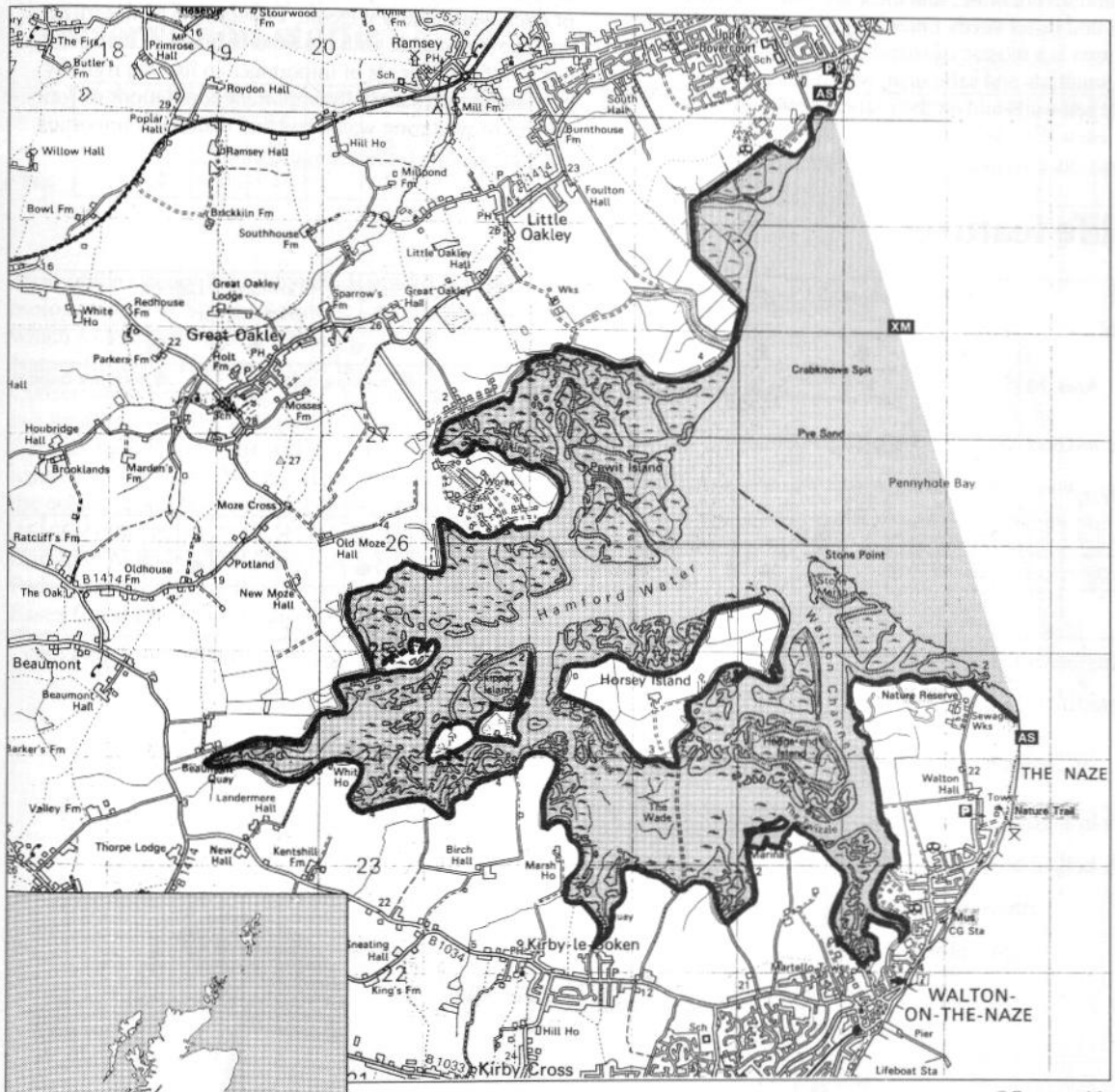
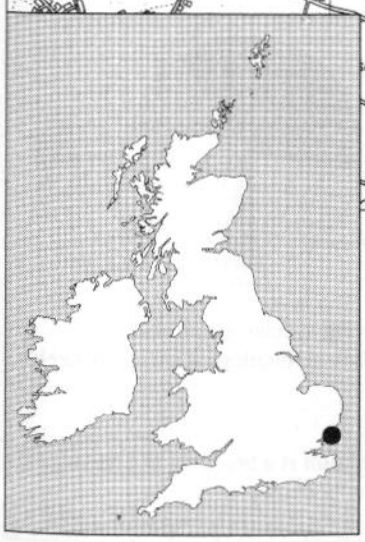
110 Hamford Water

Centre grid: TM2325
County: Essex

District: Tendring
EN region: East Anglia

Review site location





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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
2,377	1,570	54.0	8.3	3.8	Embayment	<5,000

XM = Across mouth

AS = Along shore

= Core site

Description

Hamford Water is a shallow, sheltered basin on the most easterly part of the Essex coastline. On either side of the mouth there are two shingle spits, one from Dovercourt southwards to Crabknowe and the other northwards from Naze to Stone Point. Both spits are low and topped by sand dunes and shell banks and are gradually spreading inland over the saltmarsh due to the action of wind and stormwaves. Water quality of the estuary has been classified as grade A.

Towards the sea, soft intertidal muds provide substrates for algae and invertebrates and there are beds of *Zostera* eelgrasses and tasselweeds *Entermorpha* spp. The intertidal area is a mosaic of islands, tidal creeks, mudflats, sandflats and saltmarsh, which lies mainly outside the sea walls and on the islands, or within breached sea walls. Skipper's Island, like much of the estuary, was once formerly enclosed from the sea as grazing marsh, but following breaches in the sea wall it has reverted to saltmarsh. The brackish and freshwater marshes that remain support a varied invertebrate population.

There are small areas of sand dune and shingle on the outer fringes of the shore that support a number of rare and scarce plants.

The estuary is the focus for a remarkable number and diversity of waterfowl in autumn and winter and in very severe winters it can provide shelter for tens of thousands of duck, particularly wigeon. Populations of waterfowl are interchangeable with the Stour Estuary to the north, but Hamford Water is of importance in its own right by supporting internationally important populations of four species of wintering waterfowl and nationally important populations of a further seven species.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	●	●	◍		◍	●	◍	
Area (ha)	807	863	707							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
						●	●					●	●		

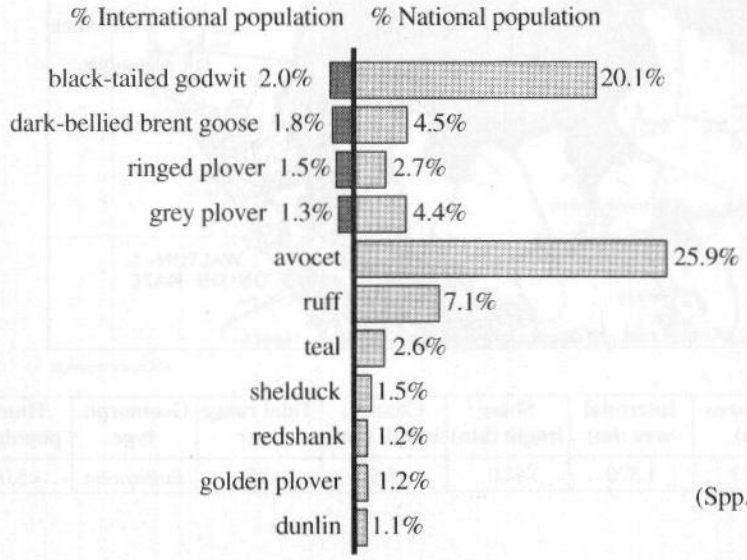
Hard substrate

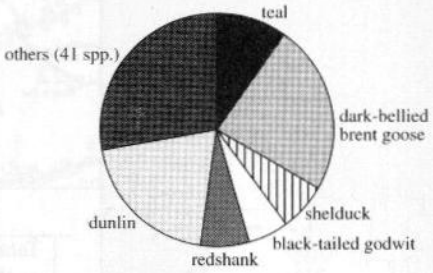
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
						●					●					

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 36,000





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: a large colony of black-headed gulls breed on Horsey Island and Stone Point is a breeding site for a large colony of little terns. Moderate densities of redshank and low densities of oystercatcher breed within the saltmarshes. Moderate numbers of ringed plover also breed within Hamford Water.

Additional wildlife features

The estuary supports the nationally rare plant sea hog's-fennel *Peucedanum officinale* and a further 25 nationally scarce plant species.

The invertebrate fauna recently recorded on Hamford Water includes the RDB 2 Fisher's Estuarine moth *Gortyna boreleii* (this area is the only breeding ground for this species in Britain); the RDB 3 ground lackey moth *Malacosoma castrensis;* two proposed RDB species and 29 Notable species.

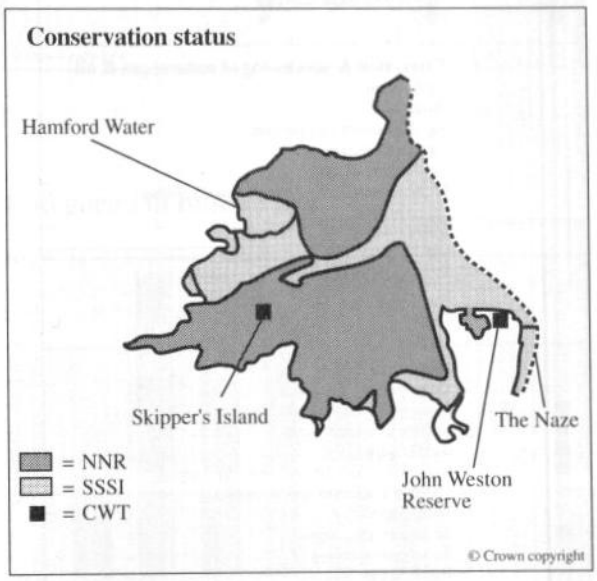
Conservation status

● = designated ● = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AON B	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●	●	●	●		●		●	●			●		●						
No.	1	2	2	1		1		1	1			2		1						

Most of the estuary lies within the Hamford Water biological Site of Special Scientific Interest (2,140 ha), of which a large part of the intertidal area is a National Nature Reserve. Hamford Water is also a Nature Conservation Review site. The Naze, adjacent to the site, is a geological SSSI (22 ha) and is a Geological Conservation Review site with two single interest localities. The Essex Wildlife Trust manage two areas on the estuary, John Weston Reserve and Skipper's Island.

Hamford Water has been designated as both a Special Protection Area and a Ramsar site, and forms part of the Essex Coast Environmentally Sensitive Area.



Human activities (in 1991)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
		Groynes
●		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
	●	Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
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		Industrial, port & related development
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		Pipeline construction
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		Oil refineries
		Mothballing of rigs & tankers
		Military activities
		Overflying by military aircraft
		Others
		Waste discharge
		Domestic waste disposal
●	●	Sewage discharge & outfalls
●		Sewage treatment works
●		Rubbish tips
●		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
		Dredge spoil
●		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
		Capital dredging
●		Maintenance dredging
		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
●		Airports & helipads
		Tunnels, bridges & aqueducts
●		Causeways & fords
		Road schemes
		Ferries
●		Cables
		Urbanisation
●	●	Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
●		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●		Marinas
●		Non-marina moorings
●		Dinghy & boat parks
●		Caravan parks & chalets
	●	Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
●		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
●		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
		Golf courses
●		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
●		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
●		Fish-netting & trawling
●		Fyke-netting for eels
		Fish traps & other fixed devices & nets
●		Crustacea
		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
●		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
●		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
●		Marine
		Intertidal
●		Terrestrial
●		Habitat management
		Others

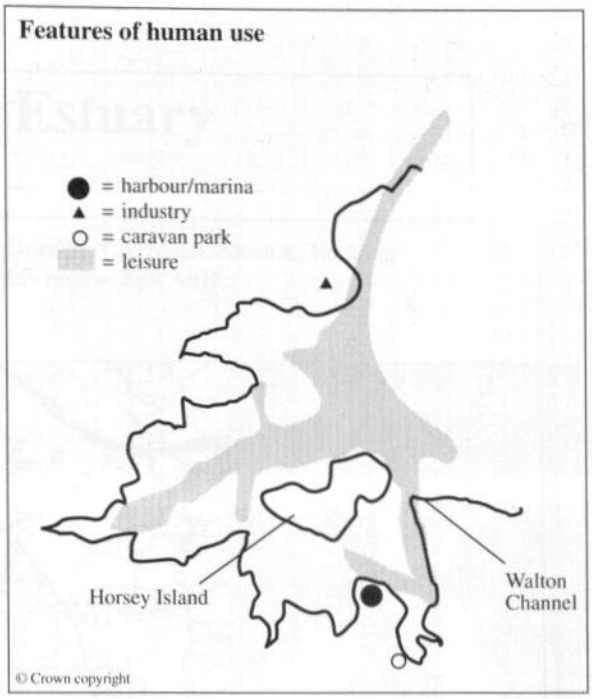
Features of human use

There is virtually no industry or urbanisation around this estuary, as it is used largely as a recreational resource. Aquatic sports take place on all the main channels but the marinas and moorings are concentrated on the Walton Channel and the Twizzle. The shore from Walton to Stone Point is a focus for walking and bird-watching; the sand dunes from Pewit Island to Dovercourt in the north are used for unauthorised trial-biking and 4WD, and also for horse-riding. Three wildfowling clubs shoot over 1,050 ha of saltings and flats; some parts of the shore (Foulton Hall, north and south-west shores of Horsey Island, saltmarsh south of Skipper's Island) are no-shooting zones.

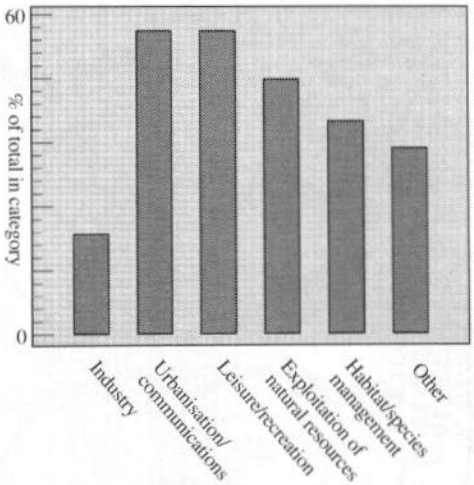
Off the north-eastern shore of Horsey Island, a line of Thames barges have been fixed to act as an offshore breakwater.

Since 1989 the offshore barges at Horsey Island have been extended and the area landward of the barges has been experimentally pump-filled with dredge material. There is a proposal for a much larger recharge scheme using dredge material and some recharge is taking place off the mouth of the embayment at Pye Sand. On the Naze a proposal for hard defences are still under discussion. Silt may be dumped in arable land inside defences on the Naze to build up levels prior to reversion to saltmarsh. The whole of the northern shore of Hamford Water is undergoing upgrade of its sea defences.

An area for jet-skiing was designated in 1990 adjacent to the north-eastern part of the site.



Categories of human use



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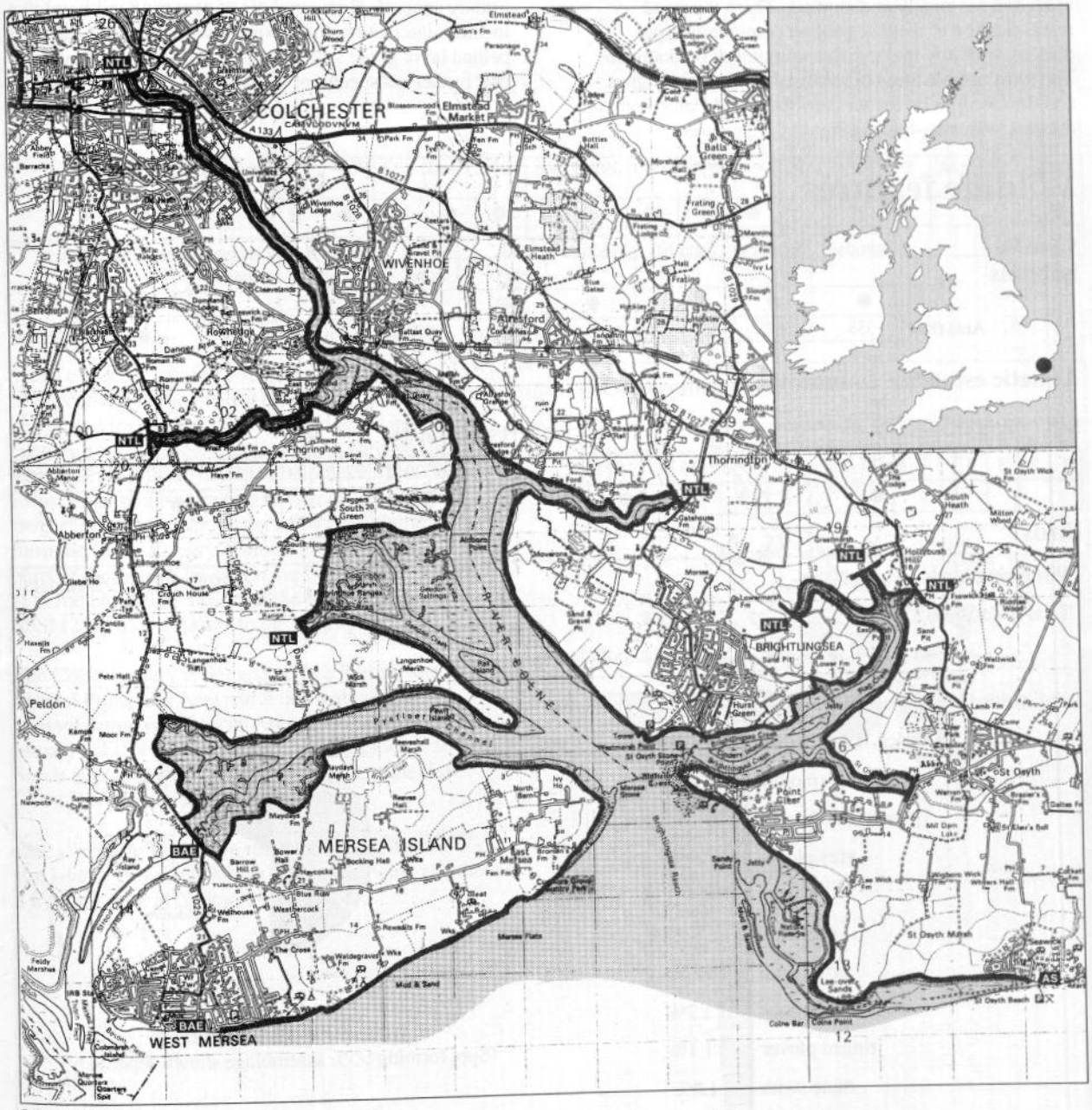
111 Colne Estuary

Centre grid: TM0617
County: Essex

Districts: Colchester, Maldon, Tendring
EN region: East Anglia

Review site location



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NTL = Normal tidal limit BAE = Boundary with adjacent estuary AS = Along Shore ▢ = Core site

Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
2,335	2,002	89.6	16.2	4.6	Coastal plain	107,000

Description

The Colne Estuary is adjacent to the Blackwater Estuary: the tidal limit of the Pyefleet Channel and the western boundary along the shore are both adjacent to the Blackwater site. Water quality within the Colne Estuary has been classified as mainly grade A, apart from the upper reaches of the Colne channel which are grade B.

Each of the individual channels within the site have a large area of mudflats which are exposed at low tide. In the lower reaches of the estuary the intertidal flats become a mixture of mud and sand. The Colne has a very large area of saltmarsh for its size, with extensive individual areas that are largely undisturbed. There is a good representation of most vegetation community types present, with low-mid marsh communities predominant. The most notable areas of saltmarsh are at Fingringhoe and the Geedons on the western shore and Colne Point on the east, which is showing signs of degradation.

At Colne Point there are two shingle spits enclosing a large area of saltings. This is a relict of an area of extensive shingle ridges that once existed between Walton-on-the-Naze and St. Osyth until the mid-1800's. The spits grade from sandy shingle in the north through pure shingle to shingle with mud, and in the lows and on the foreshore a fine sediment covering has become vegetated by saltmarsh.

The Colne Estuary has considerable expanses of a variety of habitats and has a varied and unusual invertebrate fauna, particularly at Fingringhoe and at Colne Point. The estuary supports large numbers of wintering wildfowl that includes internationally important populations of dark-bellied brent goose and nationally important populations of a further ten species of waterfowl.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●		●	◍		●	●		
Area (ha)	333	671	1,331							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
						●						●	●	●	

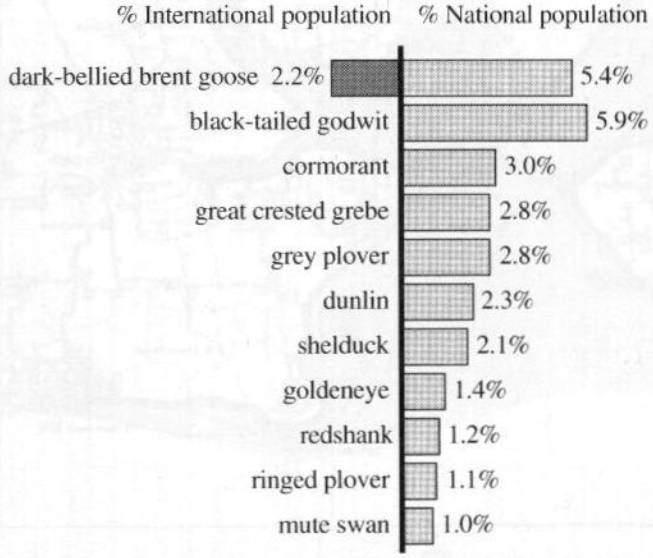
Hard substrate

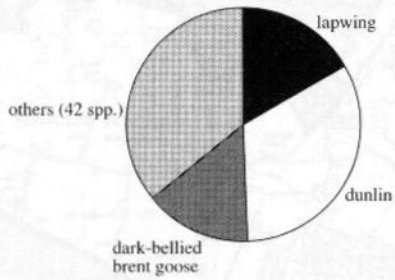
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
											●					

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 35,800





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: there is a small colony of breeding black-headed gull and a moderate-sized colony of little tern breeding on the estuary. High densities of redshank and low densities of oystercatcher breed within the saltmarshes and the grasslands adjacent to the estuary support small numbers of breeding lapwing, snipe, redshank and oystercatcher. Large numbers of ringed plover also breed on the Colne.

Additional wildlife features

34 nationally scarce plant species are found on or adjacent to the Colne Estuary.

Amongst the invertebrate fauna recently recorded on the estuary are the following RD2 species: the dragonfly *Lestes dryas,* the beetle *Polistichus connexux*, the flies *Aedes flavescens* and *Erioptera bivittata* and the spider *Trichoncus backmani*. Also found were several RDB 3 species: the beetles *Graptodytes bilineatus* and *Phytobius quadrinodusus*, the bright wave moth *Idaea ochrata*, ground lackey moth *Malacosoma castrensis*, the flies *Haematopota bigoti* and *Hybomitra ciureai*, the ant *Myrmica specioides* and the spiders *Euphrys browningi* and *Haplodrassus minor*. A further nine proposed RDB species and 139 Notable species have been recorded.

Conservation status

● = designated ● = proposed

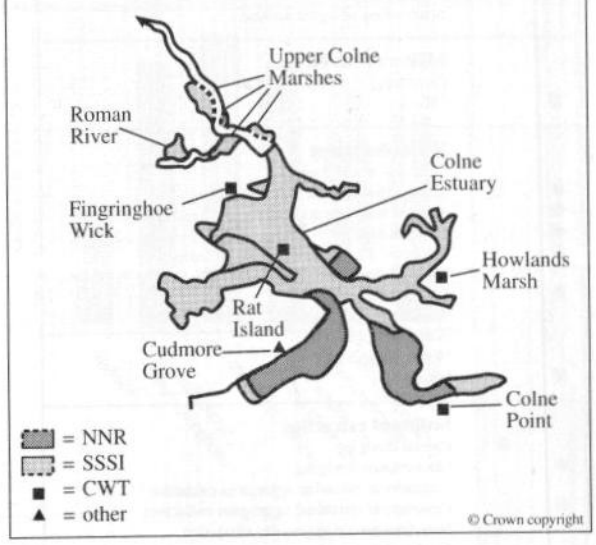
	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AON B	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●	●	●		●	●		●	●	●		●		●						●
No.	1	2	2		1	1		1	1	1		4		1						2

Much of the estuary lies within the the Colne Estuary Site of Special Scientific Interest (2,915 ha) which was designated for its biological and geological interest and contains two Geological Conservation Review sites, East Mersea and St Osyth Marsh, Colne Point. The Colne Estuary is also a Nature Conservation Review site and Brightlingsea Marshes, Mersea Flats and Colne Point form the Colne Estuary National Nature Reserve. Other parts of the estuary lie within the Upper Colne Marshes (114 ha) biological SSSI, and the Roman River biological SSSI (275 ha) is adjacent to the upper parts of the estuary.

The Colne Estuary is designated as a Ramsar site and Special Protection Area and it lies within the Essex Estuaries proposed Special Area of Conservation. The estuary also forms part of the Colne/Blackwater to Maplin Sands Sensitive Marine Area and is part of the Essex Coast Environmentally Sensitive Area.

Essex Wildlife Trust have reserves at Fingringhoe Wick, Rat Island, Howlands Marsh and Colne Point, and there is a Country Park at Cudmore Grove.

Conservation status



Human activities (in 1991)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
●		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
●		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
●		Manufacturing industries
		Chemical industries
●		Ship & boat building/repair
●		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
		Overflying by military aircraft
●		Others
		Waste discharge
		Domestic waste disposal
●		Sewage discharge & outfalls
●		Sewage treatment works
●		Rubbish tips
●		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
●		Dredge spoil
		Accidental discharges
		Aerial crop spraying
		Waste incinerators
●		Others
		Sediment extraction
	●	Capital dredging
●		Maintenance dredging
		Commercial estuarine aggregates extraction
●		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
●	●	Tunnels, bridges & aqueducts
●		Causeways & fords
	●	Road schemes
		Ferries
●		Cables
		Urbanisation
●	●	Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
●		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●	●	Marinas
●		Non-marina moorings
●		Dinghy & boat parks
●	●	Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
●		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
●		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
●		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
	●	Golf courses
●		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
●		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
●		Others
		Commercial fisheries
●		Fish-netting & trawling
●		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
●		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
●	●	Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
●		*Salicornia* picking
●		Others
		Management & killing of birds & mammals
●		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
●		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
●		Terrestrial
●		Habitat management
		Others

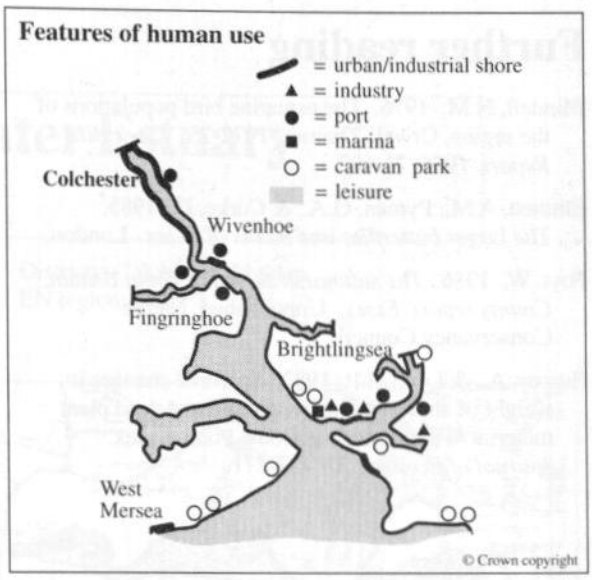
Features of human use

Leisure is the most numerous activity, with water-based sports particularly dominant. There are moorings throughout the estuary, with several dinghy or boat parks, and sailing and wind-surfing occur over most of the site. Power-boating and water-skiing are restricted by bylaw to Brightlingsea Creek and East Mersea, where there is considerable disturbance to birds, and to an area between Fingringhoe and Brightlingsea. Jet-skiing occurs at St.Osyth Stone and at Brightlingsea. Beach recreation occurs in the outer parts of the estuary and walking and bird-watching take place along the sea walls and at Colne Point. Horse-riders use Colne Point/St.Osyth and Mersea, where trial-biking and 4WD also occur. Overflying of light aircraft causes disturbance to roosting birds.

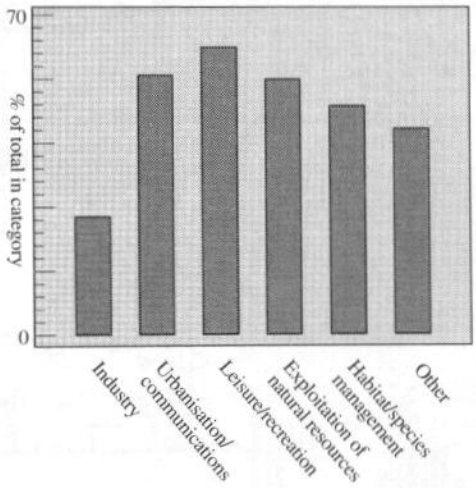
Exploitation of the natural resource includes livestock grazing on the saltmarsh, oyster fisheries, picking sea lavender and sampling for studies and nature trails/ interpretation. Wildfowling is extensive over the saltings and grazing marsh: there are five wildfowling clubs on the estuary and several private owners. East Mersea Flats and upstream of Alresford Creek are not shot over. Habitat and species management includes culling geese under licence, fox culling and creation of freshwater lagoons at Point Clear and Langenhoe.

Industrial activity is not extensive nor particularly intensive, but includes docks at Brightlingsea, Wivenhoe, Rowhedge and Hythe and there are other jetties for exporting goods. There is also a light engineering works and a boat-building/repair yard at Brightlingsea, and a boat-building yard at St.Osyth. Gravel extraction also occurs.

In 1989 there were proposals for a storm surge barrage scheme with associated capital dredging, a road scheme over Hythe marshes, a marina with housing development at East Mersea and oyster farming. Since that time the storm surge barrier has been completed and the port at Wivenhoe has closed and is being redeveloped as housing and light industry. At Brightlingsea Marshes major improvements to the sea walls are under way to upgrade the walls on the marsh front and around the town. A new bridge at Colchester will affect the upper reaches of the estuary by removing some tidal area of reed beds. Jet-skiing has spread into Pyefleet Channel and a foot ferry from Fingringhoe to Rowhedge has recently been reinstated for tourism. There has also been a proposal to build a supermarket on the site of grazing marsh north of Wivenhoe.



Categories of human use



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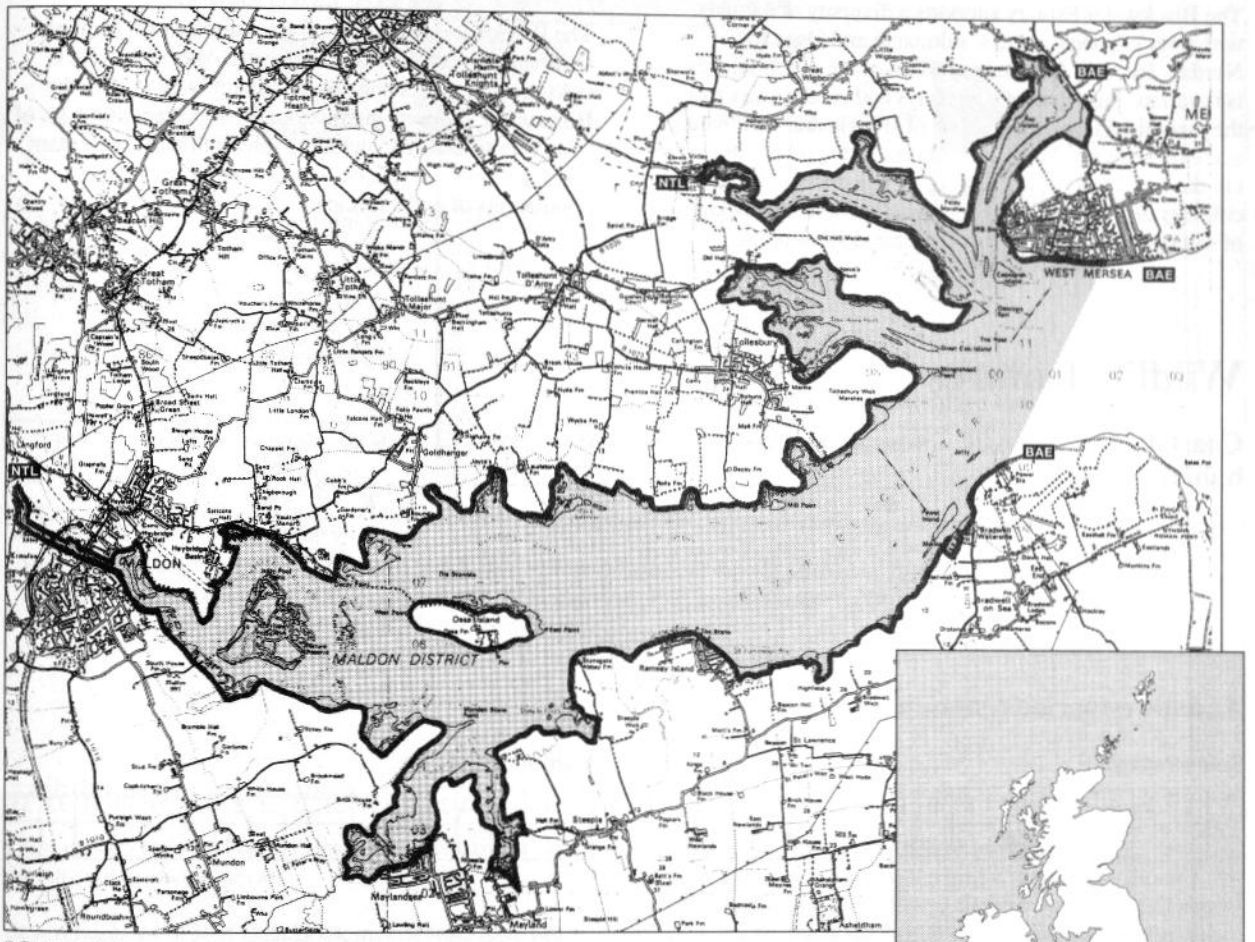
112 Blackwater Estuary

Centre grid: TL9507
County: Essex

Districts: Colchester, Maldon
EN region: East

Review site location



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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
5,184	3,315	107.5	21.2	4.6	Coastal plain	20,000

NTL = Normal tidal limit

BAE = Boundary with adjacent estuary

= Core site

Description

The Blackwater is one of the largest estuary complexes in East Anglia. It lies in close proximity to the Colne Estuary: the Strood Channel of the Blackwater is separated from the Pyefleet Channel of the Colne by the road to Mersea Island, and the mouths of the two estuaries are adjacent. Dengie Flat is adjacent to the south of the Blackwater Estuary. Water quality within the Blackwater has been classified as grade A.

The Blackwater Estuary supports a diversity of habitats, with river channels, creeks, saltmarsh and Osea and Northey Islands. A large proportion of the intertidal area is mudflats, particularly in the bays and creeks away from the main tidal flow. Deposition of shingle and shell banks and exposed gravel beds are features of the tidal flats. On the inner parts of the estuary there are extensive colonies of *Enteromorpha* eelgrasses. There are pockets of saltmarshes along the more sheltered areas of the estuary such as at Old Hall Creek, Northey Island and south of Osea Island. Much of the Blackwater saltmarsh is suffering erosion.

Many of the saltings once merged into coastal grasslands, but a large proportion of the saltmarshes were claimed behind the sea walls which run along the entire length of the estuary shore. The marshes that remain support a rich invertebrate fauna.

The Blackwater Estuary is of great importance for the wintering waterfowl that it supports. Although there is considerable interchange of birds with Dengie Flat, the Blackwater supports internationally important numbers of wintering waterfowl, including internationally important populations of six species and nationally important populations of eight species.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	●	●			◍	●	◍	
Area (ha)	1,869	1,103	2,212							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
						●						●	●		

Hard substrate

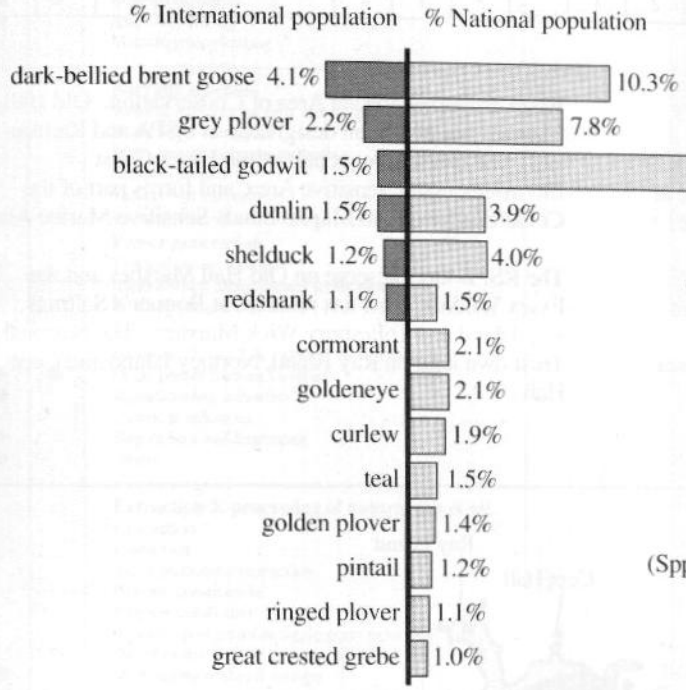
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
										●						

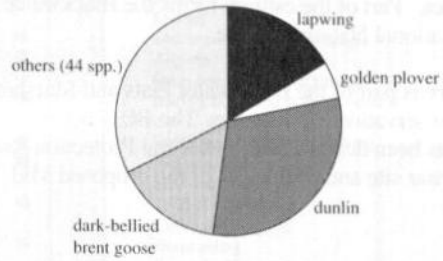
Birds

Wintering birds

1989/90 – 1993/94 data

Total waterfowl: 67,400





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: moderate densities of redshank and low densities of lapwing breed within the saltmarshes and small numbers of oystercatcher, lapwing and snipe breed within the grasslands adjacent to the estuary. In a 1984 survey, moderate numbers of breeding ringed plover were recorded.

Additional wildlife features

Plant species recorded on the Blackwater Estuary include 24 nationally scarce species.

Several species of Red Data Book invertebrate have been recorded on the Blackwater. These include the following RDB 2 species: the fly *Aedes flavescens*, the cranefly *Erioptera bivittata*, the spiders *Trichoptera cito* and *Heliophanus auratus*, the scarce emerald damselfly *Lestes dryas* and the Essex emerald moth *Thetidia smaragdaria*.

RDB 3 species include the ground lackey moth *Malacosoma castrensis*, the bright wave moth *Idaea ochrata*, the spider *Euophrys browningi*, the weevil *Baris scolopacea*, the water beetle *Graptodytes bilineatus*, the beetle *Malachius vulneratus*, the picture-winged fly *Myopites frauenfeldi* and the fly *Campsicnemus magius*.

The estuary is a major nursery for sea bass *Dicentrarchus labrax*.

Conservation status

● = designated ● = proposed

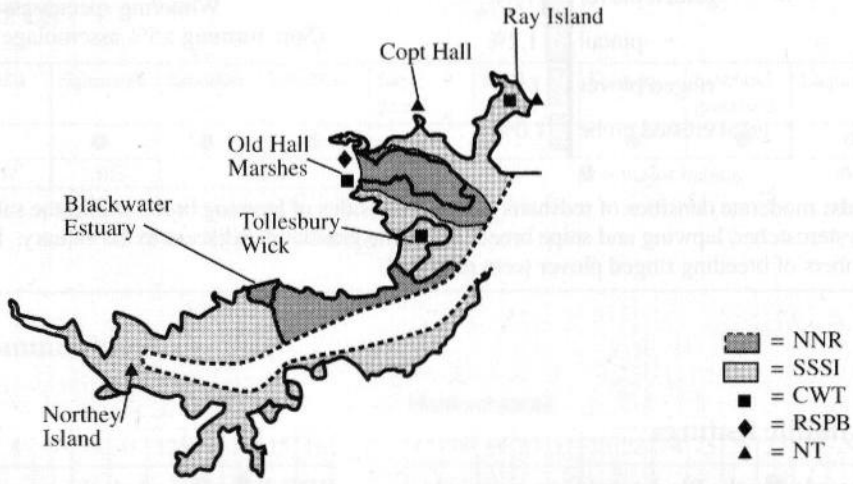
	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●	●			●	●		●	●	●		●	●	●			●			●
No.	1	1			1	1		2	2	1		3	1	1			3			1

Much of the estuary lies within the Blackwater Estuary Site of Scientific Interest (5,738 ha) which has been designated for its biological and geological interest and which contains a Geological Conservation Review site at Maylandsea. Part of the estuary forms the Blackwater Estuary National Nature Reserve.

The estuary is part of the Blackwater Flats and Marshes Nature Conservation Review site. The Blackwater Estuary has been designated as a Special Protection Area and a Ramsar site and forms part of the proposed Mid-Essex Estuaries Special Area of Conservation. Old Hall Marshes has also been designated as a SPA and Ramsar site. The Blackwater is part of the Essex Coast Environmentally Sensitive Area, and forms part of the Colne/Blackwater to Maplin Sands Sensitive Marine Area.

The RSPB has a reserve on Old Hall Marshes and the Essex Wildlife Trust has reserves at Bonner's Saltings, Ray Island and Tollesbury Wick Marshes. The National Trust own land on Ray Island, Northey Island and Copt Hall.

Conservation status



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Human activities (in 1991)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
●	●	Brushwood fences
●		*Spartina* planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
●		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●	●	Dock, port & harbour facilities
●		Manufacturing industries
		Chemical industries
●		Ship & boat building/repair
●		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
●		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
●		Others
		Waste discharge
		Domestic waste disposal
●		Sewage discharge & outfalls
●		Sewage treatment works
●	●	Rubbish tips
●		Industrial & agricultural waste discharge
●		Thermal discharges (power stations)
●	●	Dredge spoil
●		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
	●	Capital dredging
●		Maintenance dredging
		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
●		Airports & helipads
●		Tunnels, bridges & aqueducts
●		Causeways & fords
		Road schemes
		Ferries
●		Cables
		Urbanisation
	●	Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●	●	Nature trails & interpretative facilities
●		Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
●		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●	●	Marinas
●		Non-marina moorings
●		Dinghy & boat parks
●		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●	●	Power-boating & water-skiing
●		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
●		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
●		Tourist boat trips/leisure barges
●		Angling
●		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
●		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
●		Golf courses
●		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
●		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
●		Others
		Commercial fisheries
●		Fish-netting & trawling
●		Fyke-netting for eels
●		Fish traps & other fixed devices & nets
●		Crustacea
●		Molluscs – Hand-gathering
●		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
●		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
●		*Salicornia* picking
●		Others
		Management & killing of birds & mammals
●		Killing of mammals
		Killing of birds
●		Adult fish-eating birds
		Adult shellfish-eating birds
●		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
●	●	Terrestrial
●		Habitat management
		Others

Features of human use

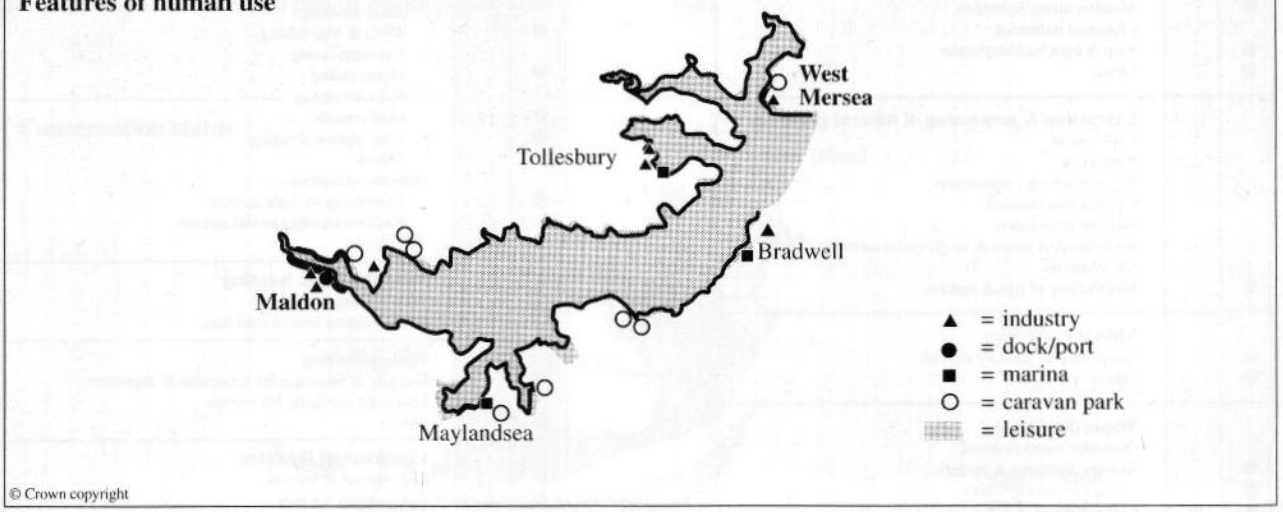
There are a very large number activities occurring on the Blackwater, the greatest proportion of which are leisure pursuits which occur over all the estuary. Aquatic-based activities are widespread with marinas at Bradwell, Tollesbury (Woodrolfe Creek) and Maylandsea, numerous yacht clubs and private sites that provide over 1,000 moorings. Beach recreation occurs on several areas along the shoreline, while walking and bird-watching take place along the sea walls (approximately 95% of the shoreline). Trial-biking occurs on grassland at Maylandsea and the intertidal area at Steeple Creek. Many water sports occur within the estuary, with SCUBA diving or snorkelling occuring only infrequently.

The estuary is not heavily urbanised but communications are good. Industry is limited to boat building/repair yards and small-scale light engineering works. Dredge spoil is regularly discharged from Maldon onto the nearby saltings.

Exploitation of the natural resource by commercial fishing includes fyke-netting for eels, lobster potting, drift-netting for bass and herring, trawling for sole and tangle netting. Bait-digging, collection of peeler crabs, shellfish farming, oyster dredging and saltmarsh grazing also take place. There are seven wildfowling clubs which shoot extensively over the estuary, covering an estimated 40% of the intertidal area and 90% of the grazing marsh.

Since 1989 jet-skiing on the estuary has increased in intensity. Since 1991 Northey Island has been the subject of managed retreat and there is a proposal for a larger managed retreat site on the Blackwater.

Features of human use



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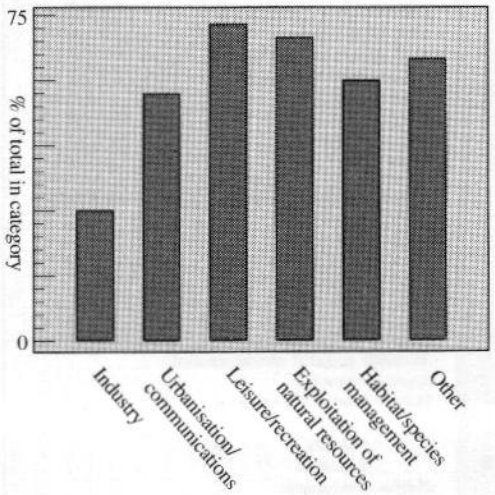
Categories of human use



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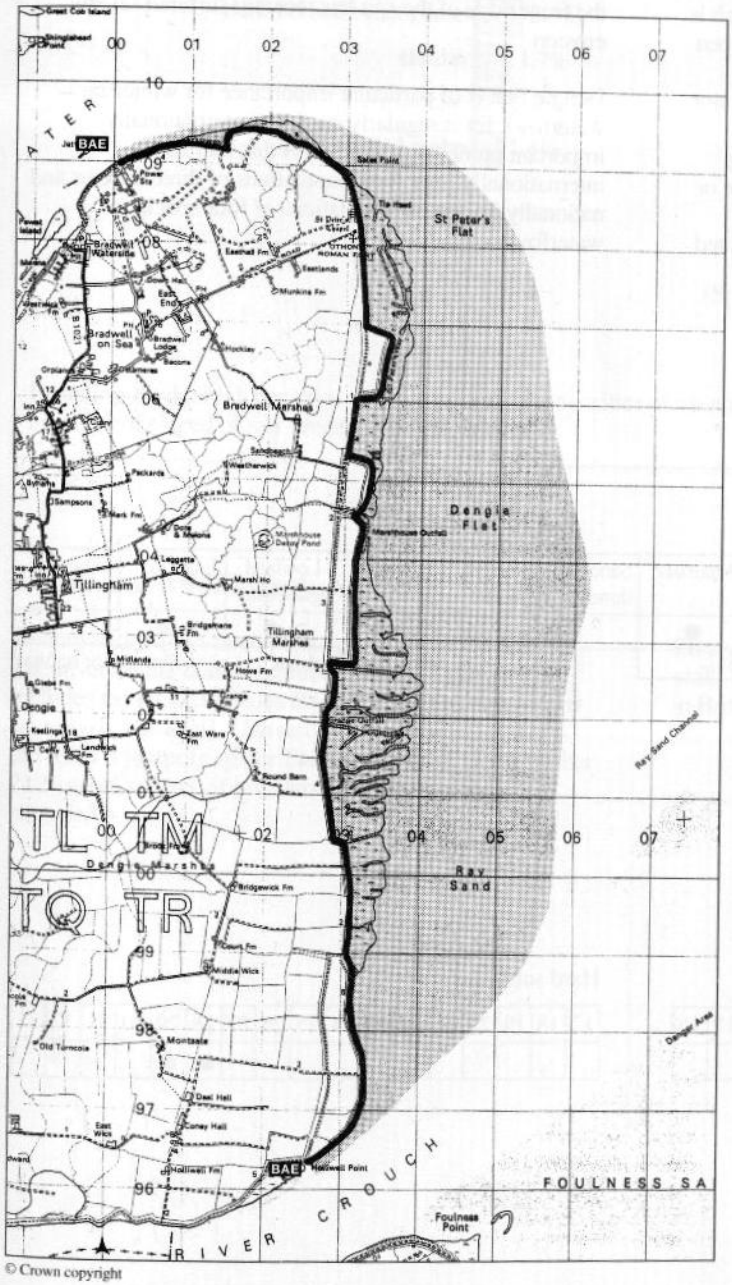
113 Dengie Flat

Centre grid: TM0504
County: Essex

District: Maldon
EN region: East Anglia

Review site location



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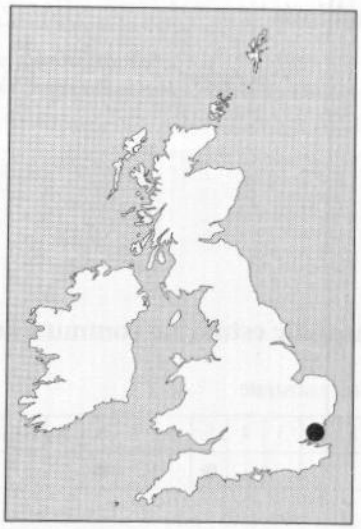


BAE = Boundary with adjacent estuary

= Core site

Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
2,986	2,986	17.5	0	5.0	Linear shore	<5,000

Description

Dengie Flat lies between the Blackwater and Crouch-Roach Estuaries, and comprises a large, remote area of tidal mudflat and saltmarsh at the eastern end of the Dengie peninsula. The foreshore is a continuous mudflat that stretches almost eight miles along the exposed coast. The site supports extensive growths of *Enteromorpha* alga and an abundant fauna of molluscs, marine worms and crustacea.

The transition between the intertidal flats and saltmarsh is marked by mud-mounds with shell-lined gullies between them. The overall mudflat and saltmarsh structure is particularly unusual for an open coast site and is of major coastal geomorphological interest. The saltmarsh is directly exposed to wave action and, apart from being dissected by drainage channels, the vegetation is more or less continuous. There is a small fringe of *Spartina*/ pioneer marsh vegetation, but the saltmarsh is dominated largely by low-mid marsh vegetation. Historically, much of the upper marsh was claimed for agriculture: today Sandbeach Meadows and Bridgewick Marshes are all that remain of the once extensive grazing marshes that lay behind the Dengie coastline.

In the north of the site at Bradwell there is a small sand and shingle spit, with a high shell content. On the crest of the spit there is a narrow strip of shingle vegetation, but the front ridge of the spit has recently suffered severe erosion.

Dengie Flat is of particular importance for wintering waterfowl, for it regularly supports internationally important numbers of waterfowl that include internationally important populations of three species and nationally important populations of four species of waterfowl.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
		●	●	●			●	●	◍	
Area (ha)		405	2,581							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
				●			●					●	●		

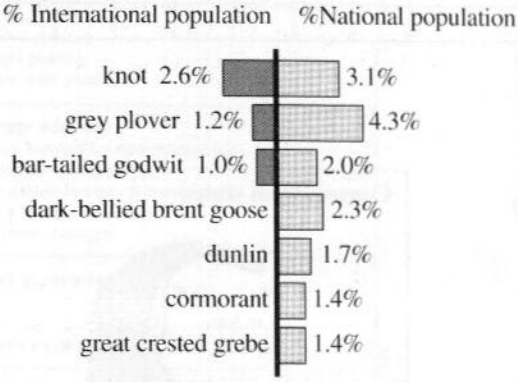
Hard substrate

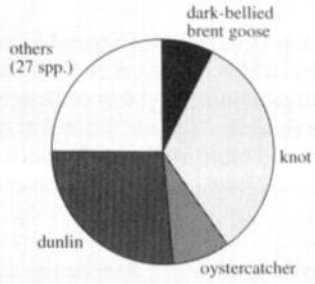
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
											●	●				

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 29,500





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: high densities of redshank and low densities of oystercatcher breed within the saltmarshes. Moderate numbers of ringed plover breed within the estuary.

Additional wildlife features

Twenty nationally scarce plants grow within the estuary. The invertebrate fauna recorded within the estuary includes the RDB 3 beetles *Baris scolopacea* and *Tachys scutellaris*, the RDB 3 horsefly *Atylotus latistriatus* and the RDB 3 jumping spider *Euophrys browningi*. A further 21 Notable species of invertebrate have also been recorded.

Buxey Sands supports a breeding colony of common seals. This is probably the southernmost breeding colony in Britain.

Conservation status

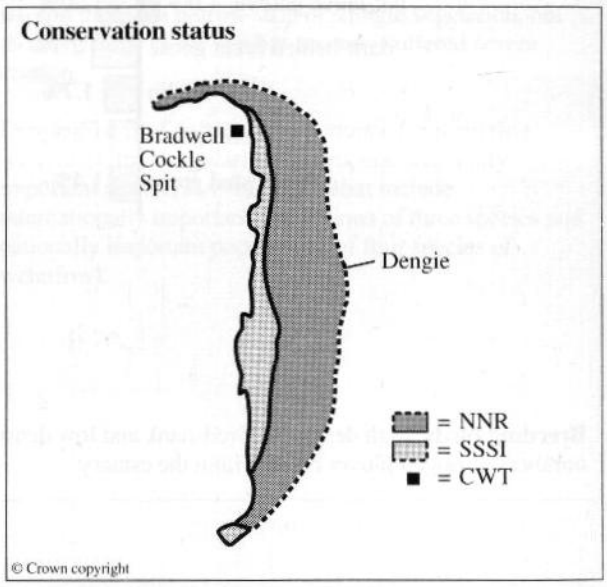
● = designated ◍ = proposed

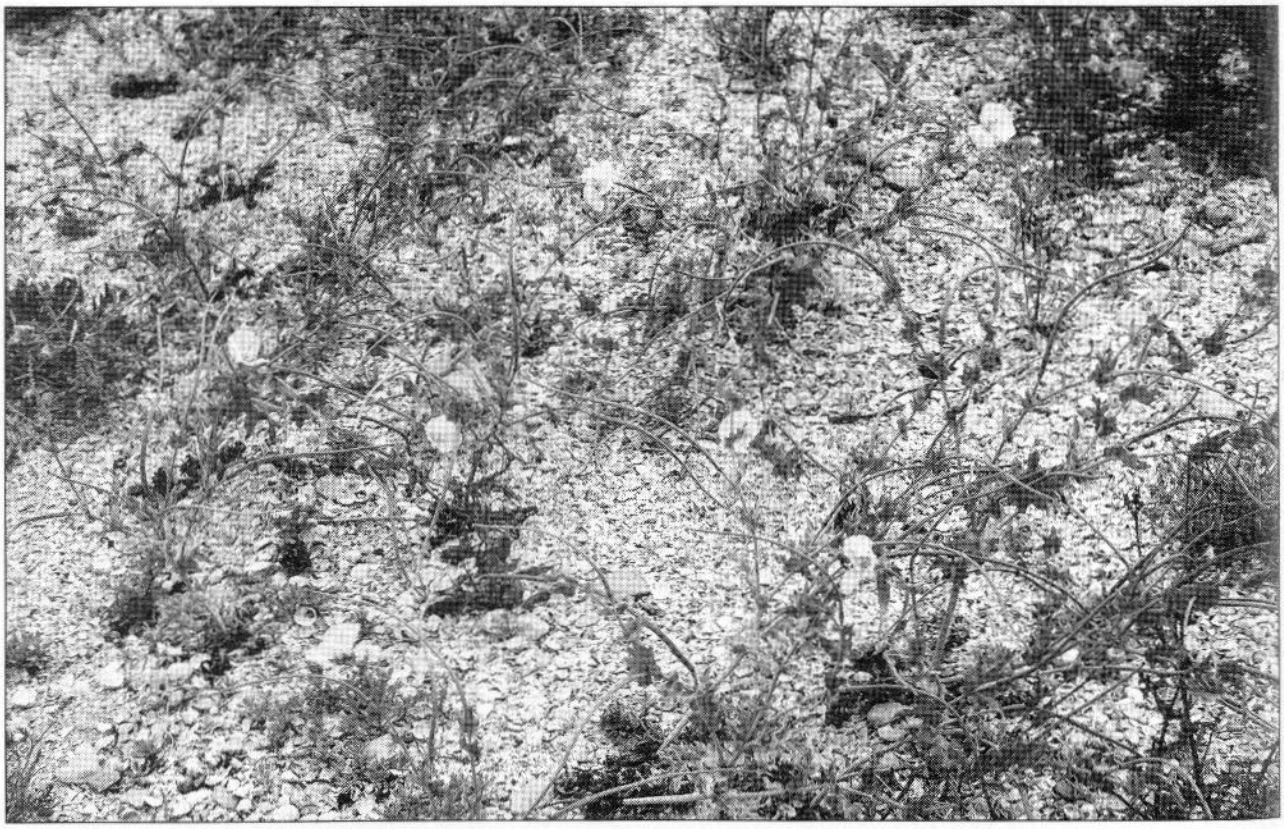
	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●	●			●	●		●	●	◍		●								●
No.	1	1			1	1		1	1	1		1								1

The site lies within Dengie Site of Special Scientific Interest (3,105 ha) which is designated for its biological and geomorphological interest. Most of Dengie is a National Nature Reserve. The site forms part of the Blackwater Flats and Marshes Nature Conservation Review site and the Dengie Geological Conservation Review site.

Dengie has been designated as a Ramsar site and Special Protection Area, and is within the Essex Estuaries proposed Special Area of Conservation. It is also part of the Colne/Blackwater to Maplin Sands Sensitive Marine Area.

The Essex Wildlife Trust have a reserve at Bradwell Cockle Spit.





Yellow-horned poppy on a small spit with a high shell content, Dengie. (Pat Doody, JNCC.)

Human activities (in 1991)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
		Groynes
●		Brushwood fences
●		*Spartina* planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
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		Manufacturing industries
		Chemical industries
		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
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		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
●		Others
		Waste discharge
		Domestic waste disposal
		Sewage discharge & outfalls
		Sewage treatment works
		Rubbish tips
●		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
●		Dredge spoil
		Accidental discharges
●		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
		Capital dredging
		Maintenance dredging
		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
		Tunnels, bridges & aqueducts
		Causeways & fords
		Road schemes
		Ferries
		Cables
		Urbanisation
●		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
		Marinas
		Non-marina moorings
		Dinghy & boat parks
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●		Sailboarding & wind-surfing
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		Surfing
●		Rowing
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		Car sand-racing
●		Horse-riding
		Rock-climbing
		Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
●		Fish-netting & trawling
●		Fyke-netting for eels
		Fish traps & other fixed devices & nets
●		Crustacea
		Molluscs – Hand-gathering
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●		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
●		*Salicornia* picking
		Others
		Management & killing of birds & mammals
●		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
●		Terrestrial
●		Habitat management
		Others

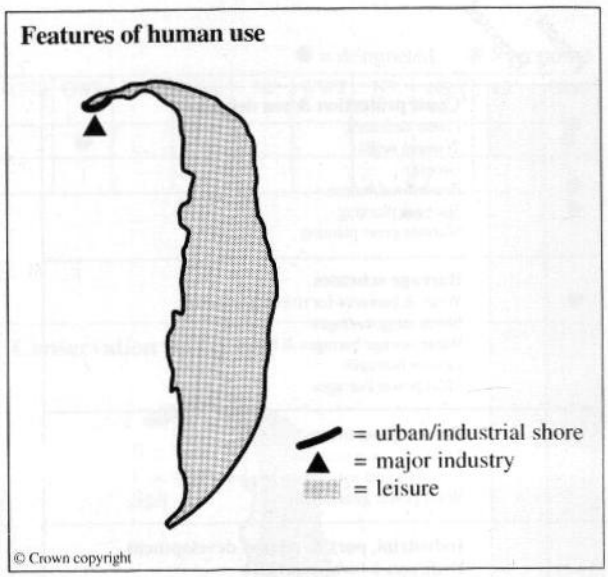
Features of human use

Leisure pursuits are widespread over the estuary but are generally not intensive over the north and south of the site. These actitivies include power-boating, sailing, wind-surfing and water-skiing. All of the sea walls are used by walkers, especially at points of access. Beach recreation occurs in small numbers and bird-watching is centred around Bradwell. There is no industrial activity on Dengie Flat apart from a radar development installation; bordering the northern limit of the estuary there is a nuclear power station.

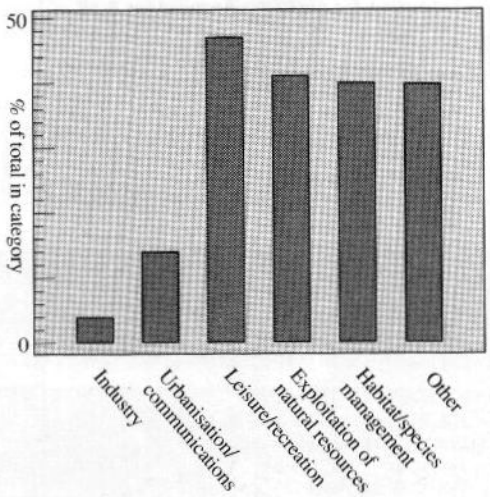
Exploitation of the natural resource includes grazing the upper saltmarsh on the sea walls and commercial bait-digging. There are three wildfowling clubs and private individuals which shoot over the saltmarsh and part of the flats.

Habitat restoration occurs and includes the creation of saltmarsh, using grounded barges at Marsh House and Sales Point and major marsh gripping with polders at Deal Hall. Shingle banks are augmented with gravel whilst various techniques are employed in managing the saltmarsh and shingle by dumping dredge spoil.

Since 1989 jet-skiing has been occuring at the mouth of the Blackwater adjacent to Dengie. Commercial bait-digging is now controlled by a permit system and hydraulic dredging for lugworms was attempted in late 1989 but has now ceased.



Categories of human use



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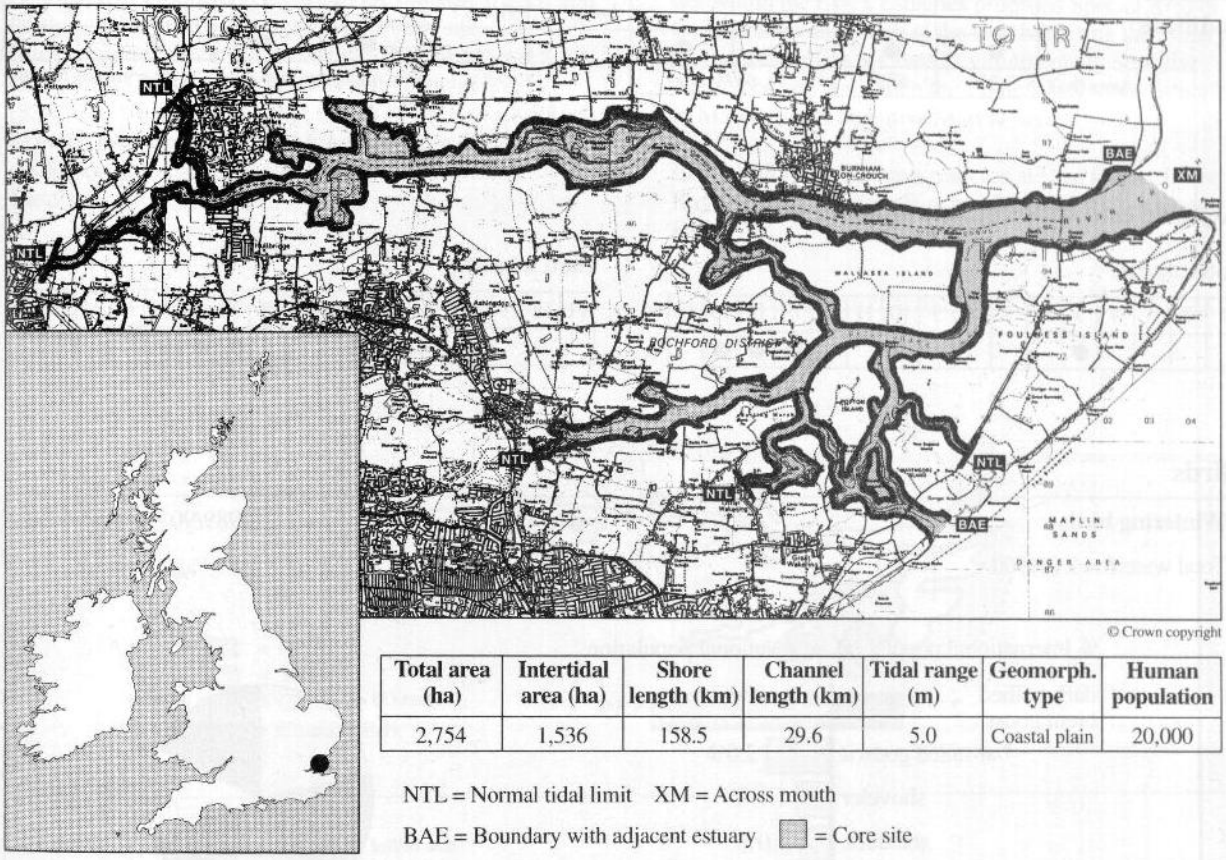
114 Crouch-Roach Estuary

Centre grid: TQ9694
County: Essex

Districts: Basildon, Chelmsford, Maldon, Rochford
EN region: East

Review site location



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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
2,754	1,536	158.5	29.6	5.0	Coastal plain	20,000

NTL = Normal tidal limit XM = Across mouth

BAE = Boundary with adjacent estuary = Core site

Description

This site comprises the estuary of the River Crouch and the River Roach and its tributaries. The Crouch is long and narrow while the Roach takes the form of a number of narrow creeks sheltered by the island of Foulness. One of these creeks is adjacent to the Maplin Sands estuarine site to the south-east. The water quality of the Crouch/Roach has been classified as grade A.

The Crouch has only very narrow intertidal mudflats and its upper reaches are flanked by claimed land and saltmarsh. There are small pockets of saltmarsh in the embayments along its length but the only extensive areas of marsh have developed in its central section at Fambridge and Bridgemarsh Island. Bridgemarsh Island was formerly a claimed marsh, but since 1927 breaches in the sea wall have allowed flooding with seawater. The island has now reverted to saltmarsh with small areas of intertidal mud. Saltmarshes in the upper reaches of the Crouch are unusual in Essex in having upper marsh plant communities with natural transitions to grassland. Small areas of saltmarsh have developed within the creeks of the Roach; despite the presence of a large proportion of *Spartina,* these areas support a good range of saltmarsh communities.

At the northern end of Foulness Island there is a series of wide, shallow borrow dykes that form lagoon-like habitats and these areas support assemblages of breeding birds. Behind the sea walls here are old shell banks, now vegetated in calcareous flora that merge with saltmarsh vegetation.

The wildlife of the Crouch-Roach Estuary has been somewhat limited by the loss of intertidal flats and saltmarsh by land-claim for agriculture. However, the estuary supports wintering waterfowl populations of considerable conservation importance, including internationally important populations of dark-bellied brent goose and nationally important populations of a further three species. The Couch-Roach is an integral part of the network of saltmarshes in this area, for the saltmarshes and adjacent grasslands provide high tide roosts for waterfowl from other nearby estuaries.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●		●			●	●	●	
Area (ha)	1,218	838[1]	698							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
				●								●	●	●	

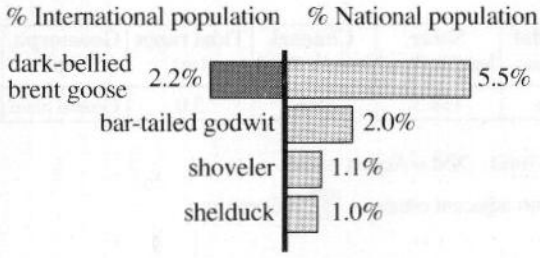
Hard substrate

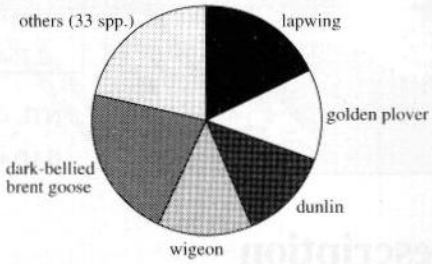
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
										●	●					

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 26,800





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: there is a moderate sized colony of black-headed gull breeding on the estuary. Low numbers of lapwing, oystercatcher, redshank and snipe breed within the grasslands adjacent to the estuary.

Additional wildlife features

The Red Data Book plant annual sea-purslane *Atriplex pedunculata* grows on the estuary and a further 24 nationally scarce plant species have been recorded here.

The invertebrate fauna includes the RDB 2 scarce emerald damselfly *Lestes dryas*, the RDB 3 beetle *Graptodytes bilineatus* the RDB 3 ground lackey moth *Malacosoma castrensis*. In addition 28 Notable species have been recorded.

[1]approximate area from saltmarsh survey, which treated Roach and Foulness as one site. See vol. 1 of *An inventory of UK estuaries* for further details.

Conservation status

● = designated ● = proposed

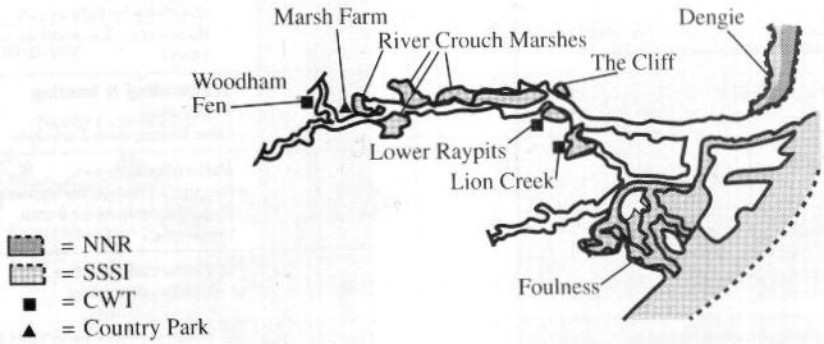
	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●	●	●	●	●	●		●	●	●		●		●						●
No.	1	1	2	1	1	1		1	1	1		3		1						1

Various parts of the estuary have been designated as Sites of Special Scientific Interest. River Crouch Marshes (939 ha) and Foulness (10,702 ha) are biological SSSI and Foulness is a Nature Conservation Review site. The Cliff, Burnham-on-Crouch is a geological SSSI (4 ha) and a Geological Conservation Review site. Dengie SSSI (3,105 ha) which overlaps the mouth of the Crouch-Roach Estuary, has been designated for its biological and geological interest and is partly a National Nature Reserve.

The Crouch Marshes have been designated as a Special Protection Area and as a Ramsar site. Part of the estuary lies within the Essex Estuaries proposed Special Area of Conservation and much of the land bordering the estuary lies within the Essex Coast Environmentally Sensitive Area. The site lies within the Colne/Blackwater Estuaries to Maplin Sands Sensitive Marine Area.

Essex Wildlife Trust have reserves at Lion Creek, Lower Raypits and Woodham Fen, and Marsh Farm is a Country Park.

Conservation status



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Human activities (in 1992)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
●		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
●		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
		Manufacturing industries
		Chemical industries
●		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
		Overflying by military aircraft
●		Others
		Waste discharge
		Domestic waste disposal
●		Sewage discharge & outfalls
		Sewage treatment works
●		Rubbish tips
		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
		Dredge spoil
●		Accidental discharges
●		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
		Capital dredging
●		Maintenance dredging
		Commercial estuarine aggregates extraction
●		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
●	●	Tunnels, bridges & aqueducts
●		Causeways & fords
		Road schemes
●		Ferries
●		Cables
		Urbanisation
	●	Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
●		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●	●	Marinas
●		Non-marina moorings
		Dinghy & boat parks
●		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
		Horse-riding
		Rock-climbing
		Golf courses
●	●	Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
●		Fish-netting & trawling
●		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
●		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
●		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
●		Others
		Management & killing of birds & mammals
●		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
●		Intertidal
●		Terrestrial
		Habitat management
		Others

Features of human use

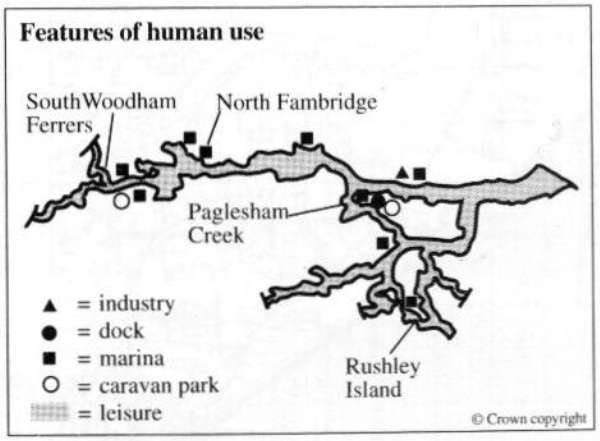
This estuary has a relatively dense network of road and train bridges, causeways, fords and ferry crossing sites. However, it is not particularly urbanised. Most of the site is protected by linear defences (mainly sea walls and embankments).

Leisure activities are extensive, with many marinas and over 200 private or non-marina moorings. Sailing occurs throughout the estuary, power-boating and water-skiing are controlled by by-laws, and wind-surfing and canoeing also occur. Paglesham Creek suffers considerable problems of disturbance from water sports. There is little beach recreation, but walking is widespread along the sea walls and bird-watching is intensive in some areas.

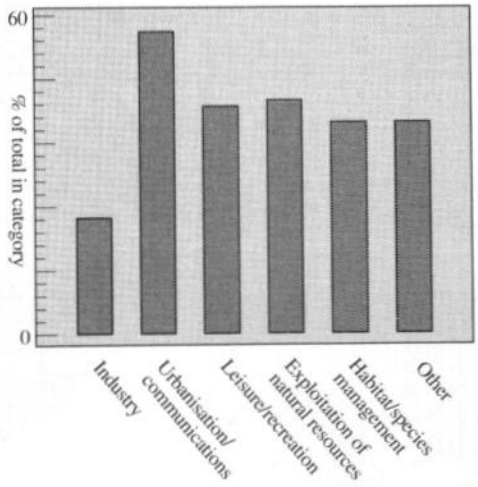
Exploitation of the natural resource includes saltmarsh grazing at North Fambridge, Woodham Ferrers and Paglesham Creek. There is also a shell fishery. Five wildfowling clubs and local owners shoot over 90% of the saltmarsh: Rushley Island is a wildfowl refuge. Habitat management includes creation of high-level mudflats, a brackish lagoon, and restoration of saltmarsh as well as management of grazing marsh for brent geese.

Proposals in 1992 included land-claim for housing; relocation of marina facilities and clay pigeon shooting proposed for Rushley Island. Since 1992 sea walls have been maintained and upgraded and there has been a proposal to realign the sea defences at Great Wakering. There have been housing developments and further proposals around South Woodham Ferrers. There is a proposal for a road improvement that would affect the upper reaches of the estuary and a proposal to rebuild a road bridge to Foulness Island. Jet-skiing now occurs within the waterski zones of the upper Crouch and some alteration of the marina facilities is underway at North Fambridge.

Since 1992 habitat management has included raising water levels over an area of grazing marsh adjacent to the estuary at North Fambridge, and on Foulness two pools have been excavated for waterfowl. Local translocations of annual sea-purslane *Atriplex pendunculata* have been attempted to secure the population but have so far failed through human influence.



Categories of human use



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115 Maplin Sands

Centre grid: TR0087
County: Essex

District: Rochford
EN region: East

Review site location

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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
11,519	9,443	18.2	0	4.6	Linear shore	<5,000

AS = Along shore

BAE = Boundary with adjacent estuary

= Core site

Description

Maplin Sands is predominantly an open coast estuarine site which lies between the Crouch-Roach Estuary to the north and the Southend-on-Sea site to the south. A tributary of the Roach Estuary is adjacent to this site at Haven Point. With rising sea level, the offshore islands are migrating inshore and the outermost part of the site (known as the Bund) is eroding rapidly.

The site is dominated by a very large intertidal flat with some sand and a high silt content. It supports an abundant marine invertebrate fauna and has extensive beds of the *Zostera* eelgrass. In the north at Foulness Point there is a large saltmarsh, which has one of the largest remaining areas of *Spartina maritima* in Europe. There is also a very large cockle bank system here, with shingle flora on its inner banks. Further south-west along the shore the saltmarsh becomes a very narrow fringe, widening only at Havergate Island. The vegetation shows a good range of saltmarsh communities.

At Pig's Bay near Shoeburyness there is a sandy area unique to Essex: this small patch supports a flora and fauna typical of sand dunes and includes several locally rare plants. This sandy influence continues south-west to Shoeburyness, where the intertidal flats become undulating sand and shingle rides, with a particularly deep sandy cover.

With its large intertidal flat and an abundant invertebrate fauna and cockle banks, together with its isolation and relatively little disturbance, Maplin Sands is of prime importance for waterfowl. The islands and creeks of the Crouch-Roach Estuary nearby are an integral part of the system, for they provide high tide roosts for the thousands of waterfowl wintering here. Maplin Sands regularly supports very large numbers of wintering waterfowl, including internationally important populations of five species and populations of a further five species at national importance. Foulness Point is favoured by breeding seabirds.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	◍	●			◍	●		
Area (ha)	2,076	221[1]	9,222							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
			●									●	●	●	

Hard substrate

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

Additional wildlife features

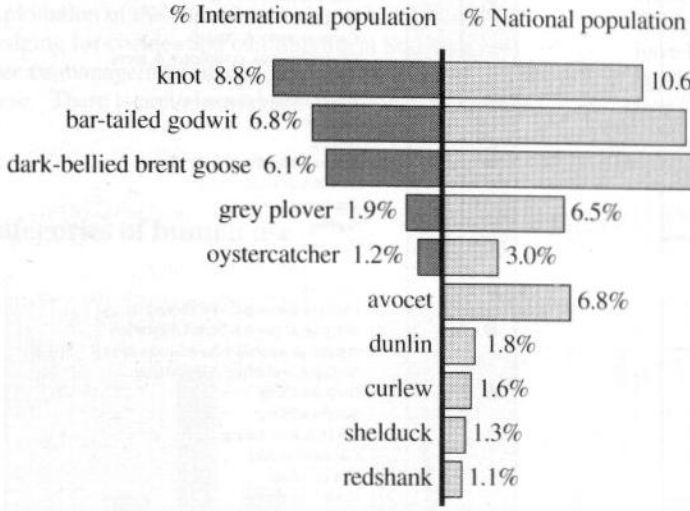
The nationally rare plant Bermuda grass *Cynodon dactylon* and 17 nationally scarce species are found on the estuary. The invertebrate fauna recently recorded from the site includes the RDB 2 scarce emerald damselfly *Lestes dryas*, the RDB 3 beetles *Berosus spinosus* and *Tachys scutellaris* and 34 Notable species.

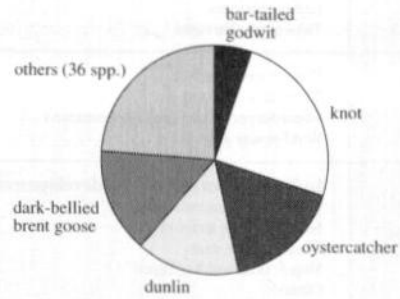
[1]approximate area from saltmarsh survey, which treated Roach and Foulness as one site. See vol. 1 of *An inventory of UK estuaries* for further details.

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 91,900





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: moderate sized colonies of black-headed gull, sandwich tern, common tern and little tern breed on the estuary. Numbers of little tern have declined in recent years as the main seabird breeding site (the Bund) is eroding. Moderate numbers of ringed plover also breed within the estuary.

Conservation status

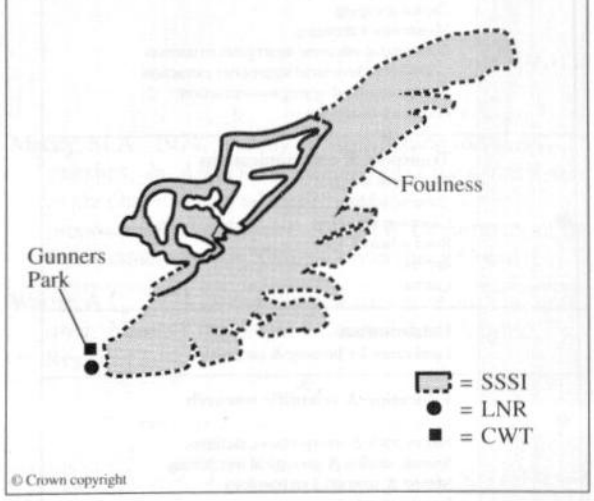
● = designated ● = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●		●				●	●	●	●		●		●						●
No.	1		1				1	1	1	1		1		1						2

The estuary lies within the Foulness biological Site of Special Scientific Interest (10,702 ha) and is part of the Foulness and Maplin Sands Nature Conservation Review site. Foulness has been designated as a Ramsar site and a Special Protection Area, and is part of the Essex Estuaries proposed Special Area of Conservation. The whole site forms parts of the Essex Coast Environmentally Sensitive Area. Maplins Sands is within the Colne/Blackwater Estuaries to Maplin Sands Sensitive Marine Area and much of the site is owned and managed by the Ministry of Defence.

Gunners Park Local Nature Reserve on the south-west edge of the site is managed by the Essex Wildlife Trust.

Conservation status



Human activities (in 1989)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
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		Dock, port & harbour facilities
		Manufacturing industries
		Chemical industries
		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
		Overflying by military aircraft
●		Others
		Waste discharge
		Domestic waste disposal
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		Sewage treatment works
		Rubbish tips
		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
		Dredge spoil
●		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
		Capital dredging
		Maintenance dredging
	●	Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
		Tunnels, bridges & aqueducts
●		Causeways & fords
		Road schemes
		Ferries
		Cables
		Urbanisation
		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
		Marinas
●		Non-marina moorings
		Dinghy & boat parks
		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
		Horse-riding
		Rock-climbing
		Golf courses
●		Clay-pigeon shooting
		Others
		Airborne recreation
		Overflying by light aircraft
●		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
		Fish-netting & trawling
		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
		Molluscs – Hand-gathering
		Dredging
●		Hydraulic dredging
		Cultivation of living resource
		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
		Terrestrial
		Habitat management
		Others

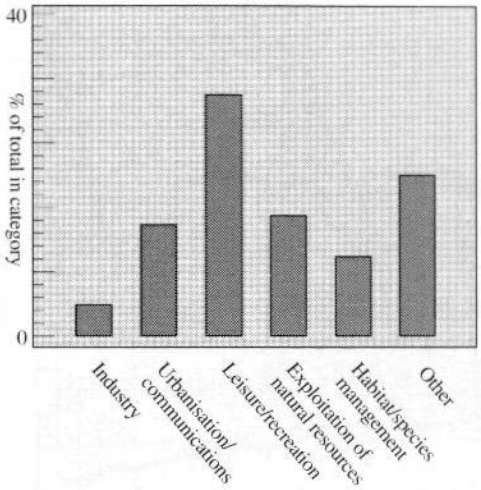
Features of human use

Activities on Maplin Sands are not intensive. There are moorings around Shoeburyness, which is the centre for water-sports, angling, beach recreation and bird-watching on the estuary. Bird-watching also occurs on Foulness Point.

Exploitation of the natural resource includes hydraulic dredging for cockles and bait-digging at Shoeburyness. Species management involves culling and/or scaring geese. There is no industrial activity on the estuary, but the site is dominated by military ownership of much of the land and the site is used for military exercises.

In 1989 there were proposals for a major offshore island airport on the intertidal flats, which would have involved a causeway for road and rail access and a deep water dock. This proposal has since been dropped. Since 1989 there have been applications for trial surveys for further aggregate dredging in the areas immediately below mean low water.

Categories of human use



Further reading

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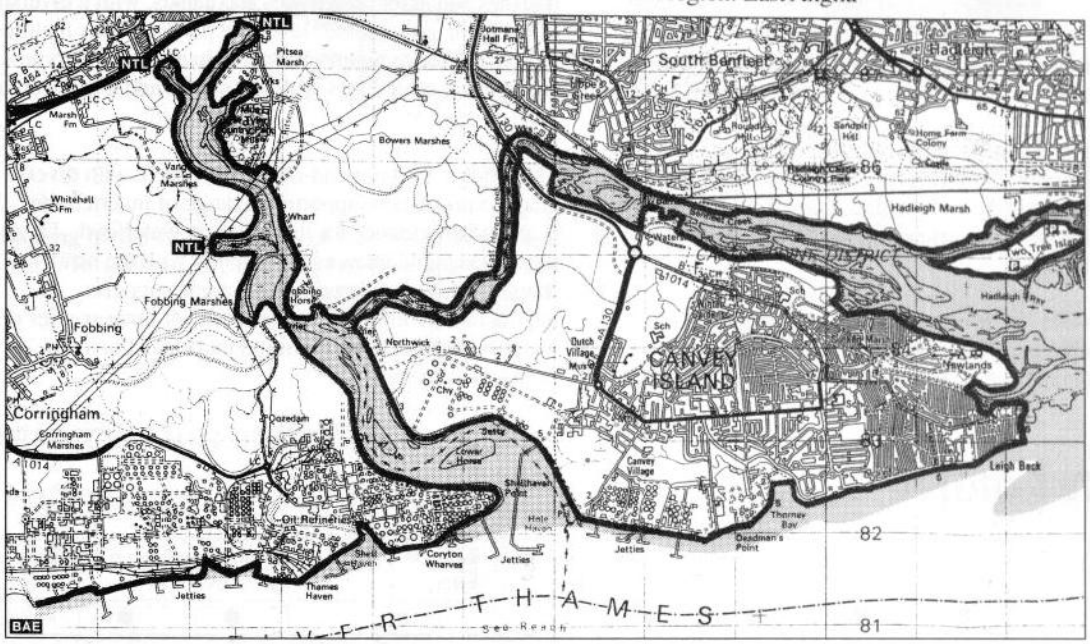
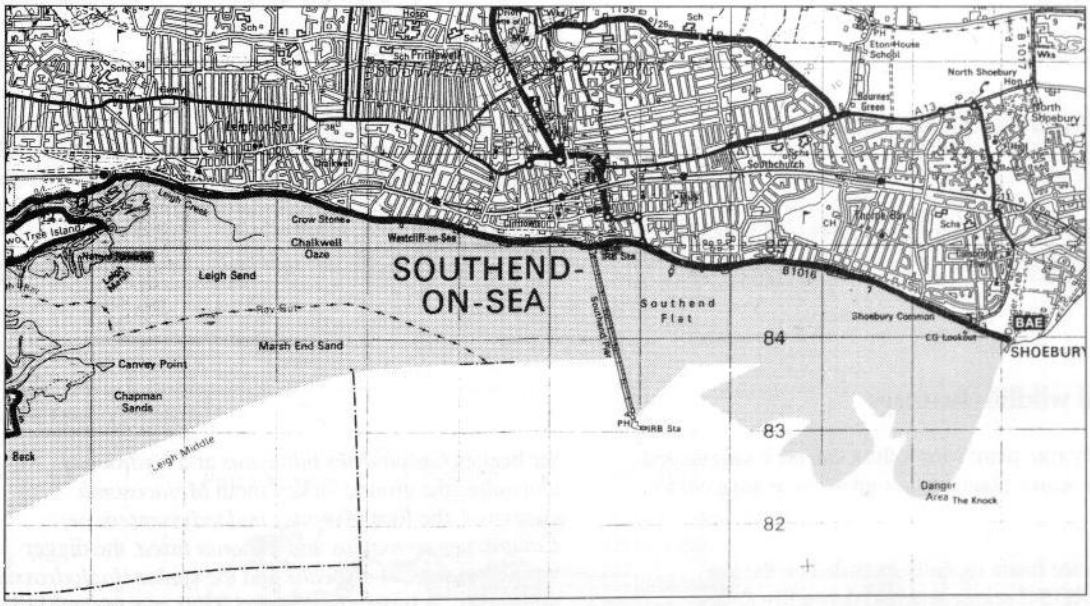
116 Southend-on-Sea

Centre grid: TQ8984
County: Essex

Districts: Basildon, Castle Point, Rochford, Southend-on-Sea
EN region: East Anglia





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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
2,737	2,528	71.7	8.8	5.2	Linear shore	191,000

NTL = Normal tidal limit

BAE = Boundary with adjacent estuary

□ = Core site

Description

This site stretches from Shoeburyness in the east to Coryton in the west, and lies between the Inner Thames and the Maplin Sands estuarine sites. It is also in close proximity to the South Thames Marshes site. Southend-on-Sea encompasses the tidal creeks from Pitsea and those separating Canvey Island and Two Tree Island from the mainland. Water quality in the estuary has been classified as grade A.

Much of the estuary is intertidal mudflat with a high sand content, for it is only between Chapman Sands to Marsh End Sand that the flats become purely sandy. At Leigh the intertidal flats are very wide with a shallow gradient and are dissected by a number of creeks. Here there are very large populations of *Zostera* eelgrasses and dense beds of the algae *Enteromorpha* and the flats support abundant populations of marine invertebrates. There are extensive cockle beds present.

Southend-on-Sea has the most extensive remaining saltmarsh within the Greater Thames Estuary; these have developed behind Canvey Island, outside the sea walls. These saltmarshes have pioneer and low-mid marsh vegetation communities, with some development of upper marsh. They support many scarce and notable invertebrates.

In the upper reaches of the estuary large areas of marsh have been enclosed and claimed by embankments. Today the upper parts are flanked by a mosaic of grazing marshes and associated dykes and canals, with a diversity of maritime grasses and flowering plants. Other features of note are the remnant coastal habitats at Shoeburyness of shell banks, sand dunes with wet slacks and a small area of shell, sand and shingle at Canvey Point.

The wildlife of Southend-on-Sea is varied, with diverse plant communities supporting a range of invertebrates. It is also of importance for its wintering waterfowl. Despite the considerable interchange of birds with the nearby Maplin Sands, Southend-on-Sea alone supports internationally important populations of three species of waterfowl and nationally important populations of a further two species.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	●	●	◍			●	●	
Area (ha)	209	395	2,133							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
			●	●								●	●	●	

Hard substrate

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

Additional wildlife features

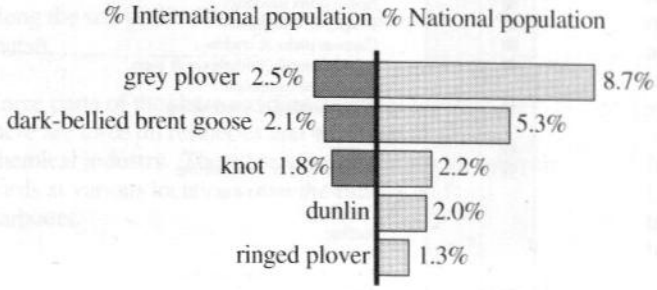
The nationally rare plant least lettuce *Lactuca saligna* and 27 nationally scarce plant species grow on or adjacent to the estuary.

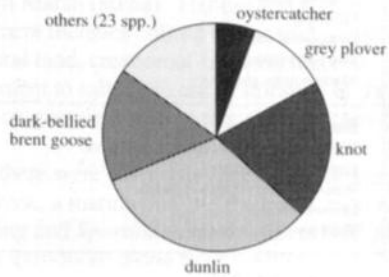
The invertebrate fauna recently recorded on the site includes the RDB 2 scarce emerald damselfly *Lestes dryas*, the RDB 2 flies *Aedes flavescens, Lejops vittata* and *Odontomyia ornata* and the following RDB 3 species: the beetles *Graptodytes bilineatus* and *Hydrochus elongatus*, the ground lackey moth *Malacosoma castrensis*, the flies *Myopites inulaedyssentericae, Campsicnemus magius* and *Phaonia fusca*, the digger wasp *Passaloecus clypealis* and the spider *Haplodrassus umbratilis*. A further 6 proposed RDB species and 118 Notable species have been recorded.

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 31,000





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: small numbers of lapwing, redshank and oystercatcher breed within the grasslands adjacent to the estuary. Ringed plovers also breed on the estuary.

Conservation status

● = designated ● = proposed

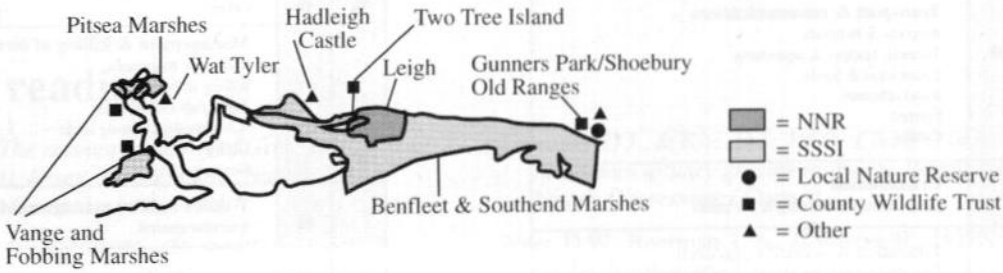
	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●		●			●	●	●	●			●								●
No.	1		3			1	1	1	1			4								3

The estuary lies within three biological Sites of Special Scientific Interest: Vange and Fobbing Marshes (165 ha), Pitsea Marshes (94 ha) and Benfleet and Southend Marshes (2,099 ha), part of which forms Leigh National Nature Reserve and Benfleet and Southend Marshes Nature Conservation Review site.

Benfleet and Southend Marshes have been designated as a Ramsar site and as a Special Protection Area.

Gunners Park is a Local Nature Reserve and there is a proposal to designate the foreshore at Southend as a LNR. Essex Wildlife Trust have reserves at Two Tree Island, Vange Marsh, Fobbing Marsh and Shoebury Old Ranges, which is owned by the Ministry of Defence. Hadleigh Castle and Wat Tyler are Country Parks.

Conservation status



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Human activities (in 1989)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
●		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
●		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
		Manufacturing industries
●		Chemical industries
●		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
●		Import/export jetties & single-point moorings
●	●	Oil refineries
		Mothballing of rigs & tankers
		Military activities
		Overflying by military aircraft
●		Others
		Waste discharge
		Domestic waste disposal
●		Sewage discharge & outfalls
●		Sewage treatment works
●		Rubbish tips
●	●	Industrial & agricultural waste discharge
●	●	Thermal discharges (power stations)
		Dredge spoil
●		Accidental discharges
		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
	●	Capital dredging
●		Maintenance dredging
		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
●	●	Tunnels, bridges & aqueducts
●		Causeways & fords
		Road schemes
		Ferries
●		Cables
		Urbanisation
		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●	●	Marinas
●		Non-marina moorings
●		Dinghy & boat parks
●		Caravan parks & chalets
●		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
●	●	Horse-riding
		Rock-climbing
●		Golf courses
		Clay-pigeon shooting
●		Others
		Airborne recreation
●		Overflying by light aircraft
●		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
		Fish-netting & trawling
●		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
		Molluscs – Hand-gathering
		Dredging
●		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
●		Agricultural land-claim
		Fish-farming
		Shellfish farming
		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
●	●	Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
●		Geese
		Wildlife habitat management
	●	*Spartina* control
		Habitat creation & restoration
		Marine
●		Intertidal
●	●	Terrestrial
		Habitat management
		Others

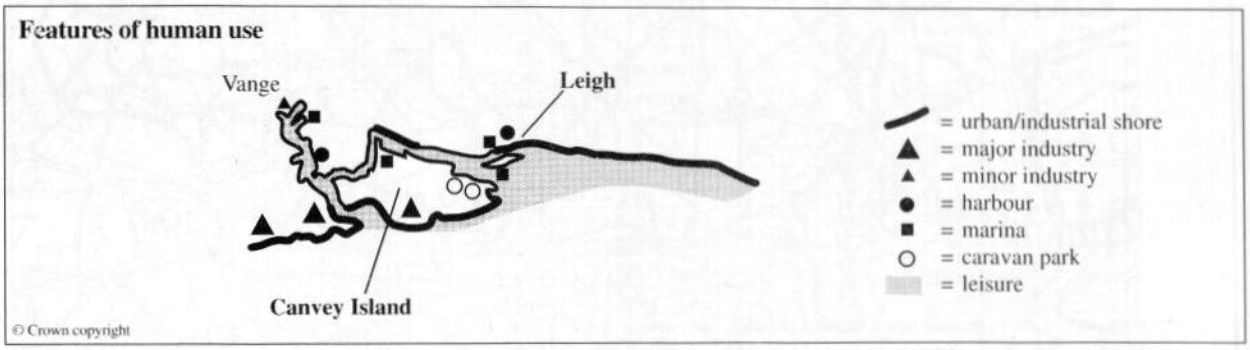
Features of human use

Leisure activities on the estuary are numerous with marinas and a large number of moorings on Southend foreshore. Power-boating and sailing is widespread, but wind-surfing and water-skiing occur mostly in specially designated areas. Beach recreation is extensive around Southend foreshore and walking and bird-watching occur along the sea walls. War games also take place on Vange marsh.

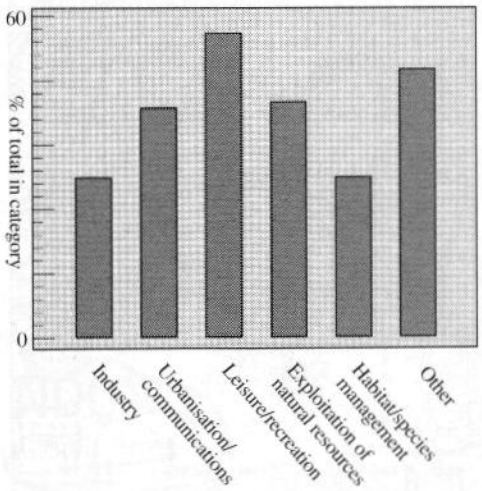
Large parts of the shore are dominated by industry, for there are three oil refineries and at Vange there is a chemical industry. There are several boat-building/repair yards at various locations over the estuary and two harbours.

Exploitation of the natural resource includes saltmarsh grazing at Vange, turf-cutting from grazing marshes, fyke-netting, hand-gathering of winkles and molluscs and bait-digging which is widespread on the intertidal area. Two wildfowling clubs shoot over Canvey (50 ha saltmarsh) and Leigh Marsh (80 ha). Habitat and species management includes culling and scaring of geese from agricultural land, creation of brackish lagoons, improvement to saltmarsh and restoration of the dyke systems on grazing marsh in the upper reaches of the site.

In 1989 there were proposals for capital dredging in Leigh Creek, a marina on Canvey Island, road bridges, turf-cutting and *Spartina* control. Since 1989 jet-skiing has been introduced along the foreshore.



Categories of human use



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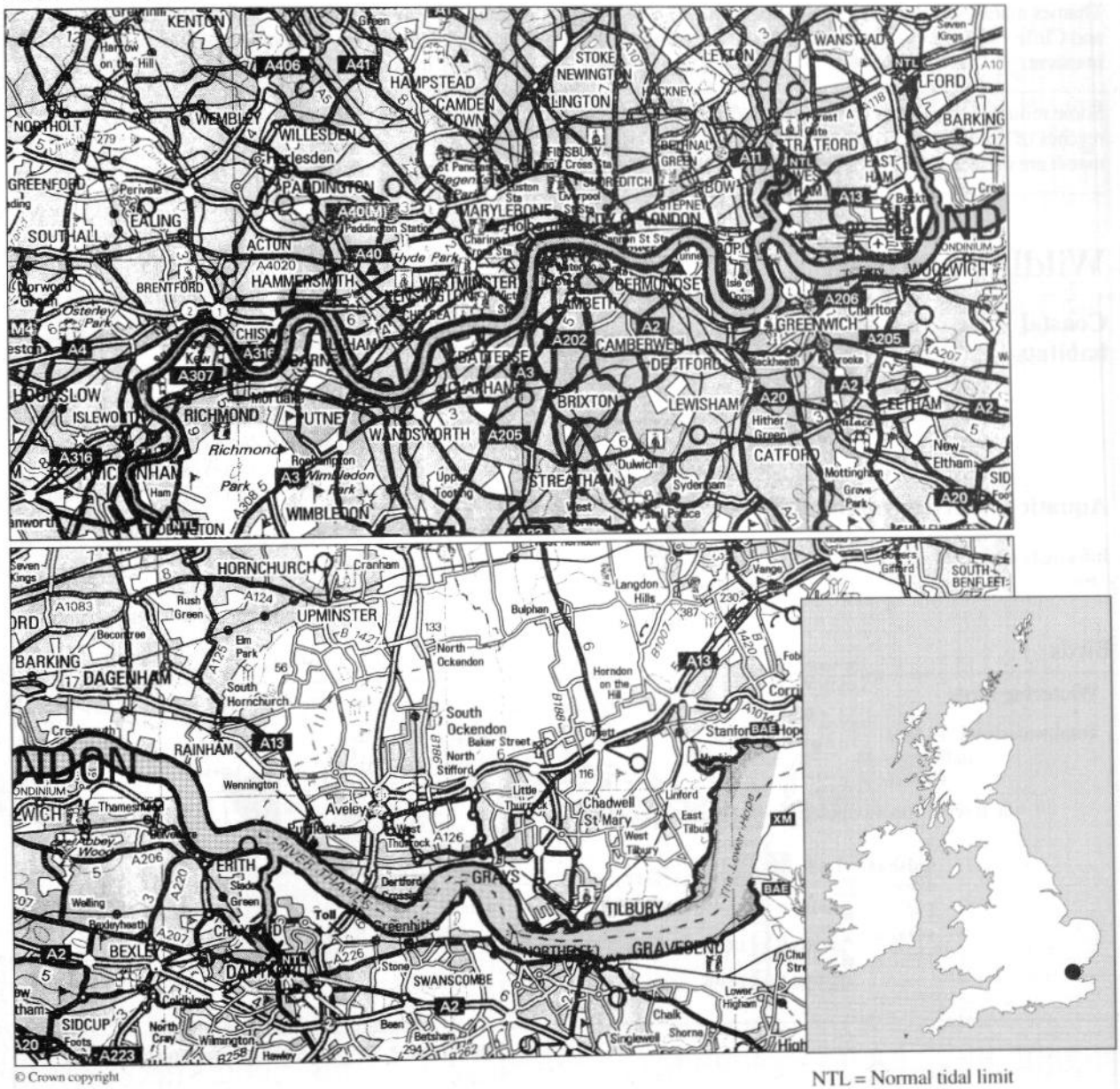
117 Inner Thames Estuary

Centre grid: TQ6675 Counties: London, Essex, Kent

Districts: City of London, Greenwich, Hammersmith & Fulham, Kensington & Chelsea, Lambeth, Lewisham, Southwark, Tower Hamlets, Wandsworth, Westminster, Barking & Dagenham, Bexley, Havering, Hounslow, Newham, Richmond-upon-Thames, Thurrock, Dartford, Gravesham, Rochester upon Medway.

EN Region: Essex/Herts/London, Kent

Review site location



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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
4,745	1,126	232	82.5	6.5	Coastal plain	>1,000,000

NTL = Normal tidal limit

XM = Across mouth

BAE = Boundary with adjacent estuary

= Core site

Description

The Thames is a long, sinuous estuary, flowing past the historic ports and sprawling urban development of Greater London. The outer reaches of this site are adjacent to the Southend-on-Sea and South Thames Marshes Estuary sites. Water quality in the Inner Thames has been classified as grade A in its upper reaches, becoming grade B further downstream.

Much of the original Thames Estuary has been claimed in historic times; today the estuary has very narrow upper sections, with little intertidal flats exposed at low tide. Some saltmarsh survives on the lower reaches of the estuary at Crayford Ness near Dartford, along the Inner Thames marshes at Pearfleet, Coalhouse Fort, Higham and Cliffe. These areas of saltmarsh are discrete and small in extent.

Some remaining expanses of wetland border the upper reaches of the Thames. These relicts of low-lying grazing marsh are dissected by a network of freshwater and brackish drainage ditches. These grazing marshes and other estuarine habitats support nationally scarce and rare floral and faunal species.

At Cliffe Fort on the easternmost point of the southern shore there is a large lagoon. This lagoon covers 40 ha and was formed by the flooding of a gravel/clay pit; today it is isolated from the sea and, despite its low salinity, it is known to support a lagoonal fauna.

With its limited intertidal area this section of the Thames Estuary supports relatively low overall numbers of wintering waterfowl in comparison to other nearby localities. However, the site regularly supports internationally important populations of redshank and nationally important populations of three species of waterfowl. West Thurrock Lagoons and Marshes in particular is used as a roost at high tide.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	◍		●			●	●	●	
Area (ha)	3,619	1,126								

● = major habitat ◍ = minor habitat

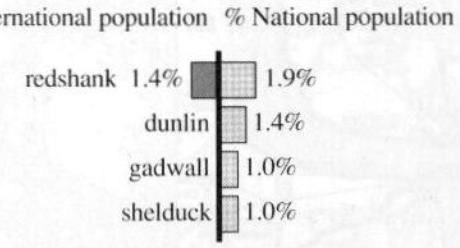
Aquatic estuarine communities

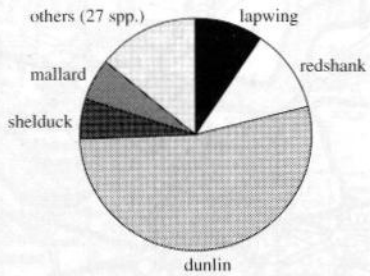
Information unavailable.

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 14,600





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: small numbers of lapwing and redshank breed within the grasslands adjacent to the estuary and small numbers of ringed plover breed within the site.
Other: this estuary supports one of Britain's largest known concentrations of ringed plover on passage.

Additional wildlife features

The Red Data Book plant least lettuce *Lactuca saligna* has been found within the site but is now probably extinct here. Fourteen other nationally scarce plant species have been recorded on or adjacent to the estuary.

The invertebrate fauna recently recorded on or adjacent to the estuary includes several RBD 2 species: the snail *Perforatella rubiginosa*, the scarce emerald damselfly *Lestes dryas*; the beetles *Bagous cylindrus* and *Dromius longiceps* and the fly *Lejops vittata*. RDB 3 species include the snail *Lacinaria biplicata*, the flies *Campscinemus magius*, *Haematopota bigoti* and *Anasymia interpuncta* and the spider *Baryphyma duffeyi*. A further two proposed RDB species and 105 Notable species have been recorded on the estuary.

Conservation status

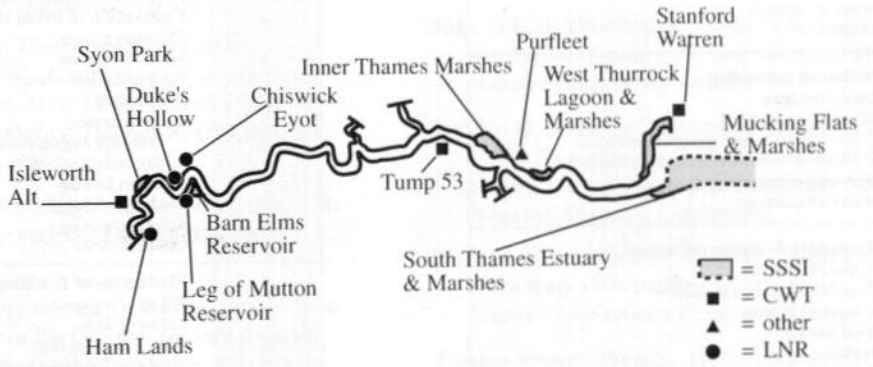
● = designated ● = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
			●				●	●	●			●								●
No.			6				4	1	1			3								1

Small areas on or adjacent to the Inner Thames Estuary have been designated as Sites of Special Scientific Interest for their biological interest. These are Syon Park (21 ha), Barn Elms Reservoir (44 ha), Inner Thames Marshes (479 ha), West Thurrock Lagoon and Marshes (81 ha), Mucking Flats and Marshes (323 ha) and South Thames Estuary and Marshes (5,449 ha) which just overlaps the southern shore of the estuary. Parts of the estuary lie within the proposed Thames Estuary and Marshes Ramsar site and Special Protection Area.

Ham Lands, Duke's Hollow, Chiswick Eyot and Leg of Mutton Reservoir are Local Nature Reserves and Purfleet Ranges adjacent to the estuary is Ministry of Defence land. Essex Wildlife Trust has a reserve at Stanford Warren and London Wildlife Trust have reserves at Tump 53 and Isleworth Alt.

Conservation status



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Human activities (in 1994)

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●		Linear defences
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		Spartina planting
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●		Others
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		Waste incinerators
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		Capital dredging
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		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
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●	●	Road schemes
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●	●	Cables
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		Land-claim for housing & car parks
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●	●	Nature trails & interpretative facilities
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		Infrastructure developments
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●		Non-marina moorings
●		Dinghy & boat parks
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		Horse-riding
		Rock-climbing
		Golf courses
●		Clay-pigeon shooting
		Others
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		Crustacea farming
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		Salicornia picking
		Others
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		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
●		Terrestrial
		Habitat management
		Others

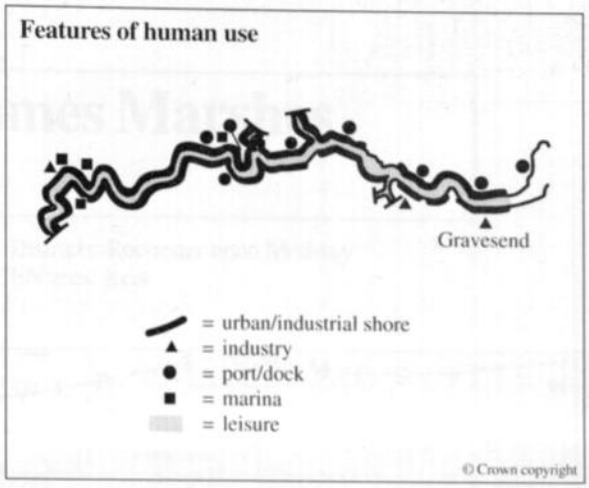
Features of human use

The Thames is a highly urbanised estuary, with an extensive communications network of road and rail bridges. Leisure activities are numerous, with a number of marinas and moorings along the estuary and in the old docks, which are a centre for power-boating, sailing, wind-surfing, water-skiing and canoeing. Walking and bird-watching are extensive along the sea walls and the marshes, and trial-biking occurs over parts of the grazing marshes.

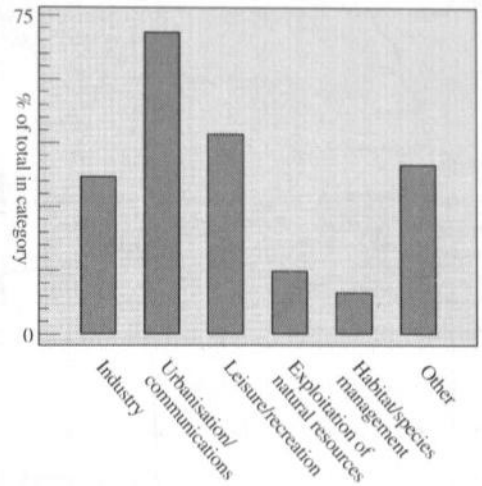
The estuary is highly industrial, with a large number of docks, jetties and wharfs and there are various engineering and manufacturing sites at Gravesend. There are chemical industries at Dartford and Brentford is a centre for boat-building. In 1989 there were power stations at Tilbury, Little Brook, Northfleet and West Thurrock, but since that time West Thurrock Power station has been decomissioned.

There is very little exploitation of the natural resource on the Thames. Wildfowling occurs over 70 ha at Higham Bight and there are nature trails at various localities around the site.

In 1989 there were proposals for rubbish tipping, dredge spoil disposal and development of a theme park on Rainham Marshes, a coal-fired power station at Barking, a wildfowl park at Barn Elms, and housing and leisure developments on the larger mudflats of the upper Thames. There were also various tunnel and road schemes.



Categories of human use



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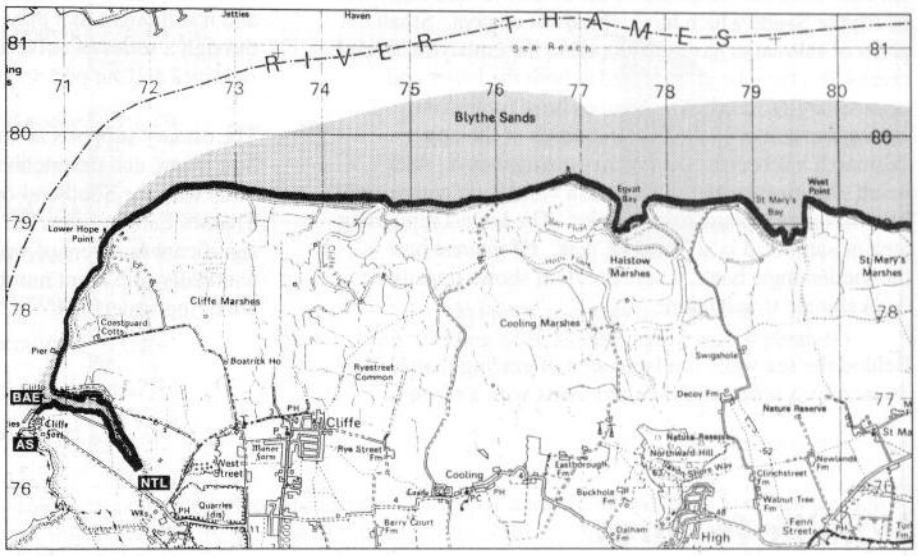
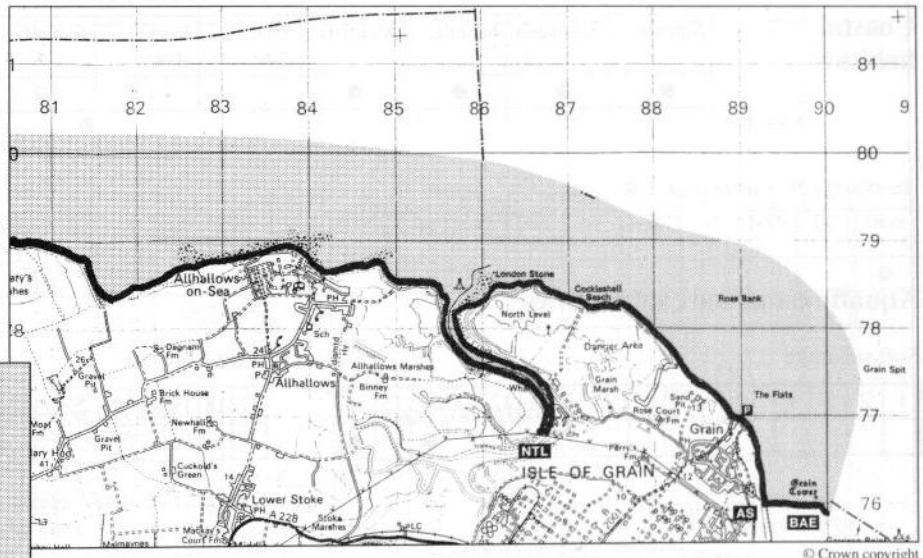
118 South Thames Marshes

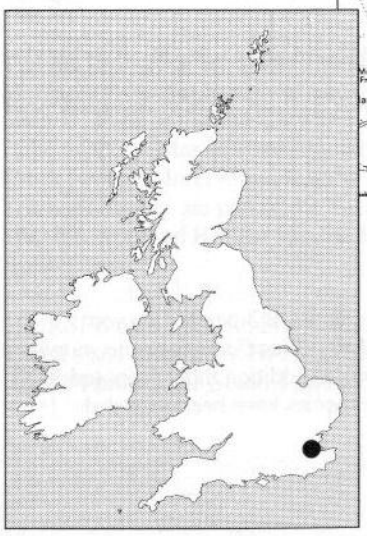
Centre grid: TQ8180
County: Kent

Districts: Rochester upon Medway
EN area: Kent

Review site location







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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
2,487	2,439	30.6	4.7	5.2	Linear shore	<5,000

NTL = Normal tidal limit

BAE = Boundary with adjacent estuary

AS = Along shore

= Core site

Description

The South Thames Marshes lie on the North Kent shore of the Thames, adjacent to the Inner Thames and the Medway Estuary sites. It is also in close proximity to the Southend-on-Sea site on the northern shore of the Thames. Water quality within the South Thames Marshes site has been classified as grade A.

South Thames Marshes has one of the largest intertidal habitats in Kent, composed of the extensive intertidal flats of Blythe Sands which have a high silt content. Small areas of saltmarsh have developed in the embayments and creeks, but have been truncated at both the lower and upper margins; dredging activities have limited the seaward extent of the marsh and much of the upper saltmarsh has been converted to grazing marsh. As a result, the most common saltmarsh vegetation comprises low-mid marsh plant communities. The largest remaining area of saltmarsh is at Yantlet Creek. Of interest here is the sand/shingle bank, where the flora shows transition from shingle to sand dune.

Behind the sea walls is a large area of grazing marsh, drained by a series of dykes and fleets with a range of salinities. These marshes and drainage dykes support a variety of plants, including several nationally scarce plant species, and an invertebrate fauna rich in flies and beetles. Many such areas of grazing marshes have been converted for arable farming.

There are a series of lagoons along the shore from Cliffe to Allhallows. To the west at Cliffe the lagoons were formed by the flooding of a series of gravel and clay pits, and it is thought that they now receive water from the sea through a series of culverts. These lagoons have high salinities and support specialist lagoonal species.

The estuary supports an important and diverse breeding bird fauna, and despite the considerable interchange of birds with the Southend-on Sea, Medway and Inner Thames Estuary sites, the South Thames Marshes support significant numbers of waterfowl. These include nationally important numbers of twelve species of wintering waterfowl.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	●	●			◍	●	●	
Area (ha)	48	78	2,361							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
													●		●

Hard substrate

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

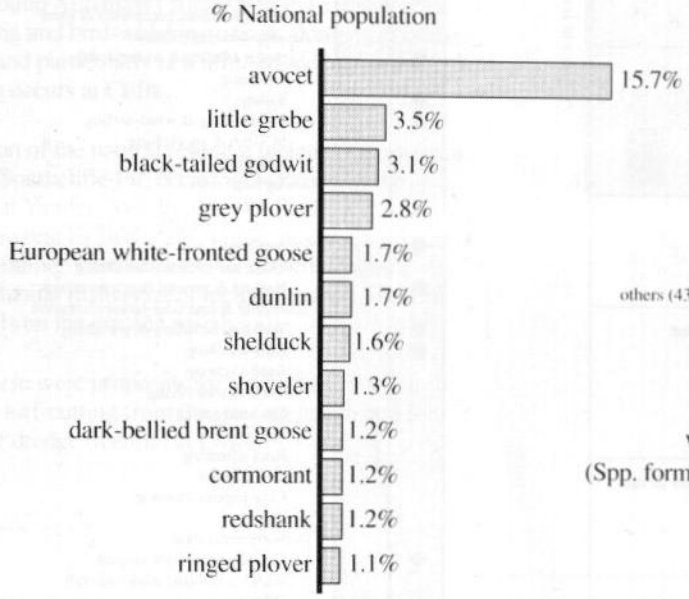
Additional wildlife features

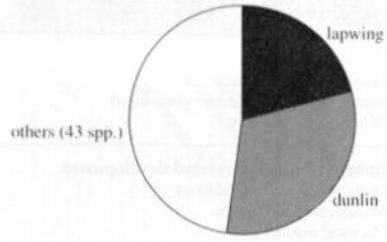
The Red Data Book plant least lettuce *Lactuca saligna* was previously recorded on sea walls on the site and may still be present. The invertebrate fauna recently recorded includes the RDB 2 flies *Eriptera bivittata*, *Lejops vittata* and *Pteromicra leucopeza*; the RDB 2 scarce emerald damselfly *Lestes dryas*; the RDB 3 beetle *Cercyon bifenestratus* and the RDB 3 flies *Campsicnemus magius* and *Haematopota bigoti*. In addition three proposed RDB species and 65 Notable species have been recorded.

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 27,700





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: there is a small colony of common tern on the estuary. Moderate numbers of redshank and lapwing and small numbers of oystercatcher and snipe breed on the grasslands adjacent to the estuary. Moderate numbers of ringed plover also breed within the South Thames Marshes.

Conservation status

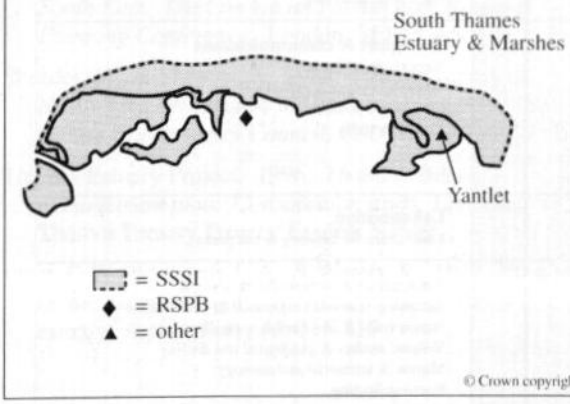
● = designated ● = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●		●					●	●				●	●						●
No.	2		1					1	1				1	1						1

The site lies within the South Thames Estuary and Marshes (5,449 ha) biological Site of Special Scientific Interest. Parts of the site lies within the High Halstow/Cliffe Marshes and Allhallows Marshes/Yantlet Creek Nature Conservation Review sites. The South Thames Marshes are part of the Thames Estuary and Marshes proposed Ramsar site and Special Protection Area.

The RSPB own land within and adjacent to the South Thames and Marshes SSSI and the MoD own an area of land at Yantlet. The South Thames Marshes lies within the North Kent Marshes Environmentally Sensitive Area.

Conservation status



Human activities (in 1989)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
		Dock, port & harbour facilities
		Manufacturing industries
		Chemical industries
		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
●		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
		Overflying by military aircraft
●		Others
		Waste discharge
		Domestic waste disposal
●		Sewage discharge & outfalls
		Sewage treatment works
		Rubbish tips
		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
●		Dredge spoil
		Accidental discharges
●		Aerial crop spraying
		Waste incinerators
		Others
		Sediment extraction
		Capital dredging
		Maintenance dredging
		Commercial estuarine aggregates extraction
●		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
		Tunnels, bridges & aqueducts
		Causeways & fords
		Road schemes
		Ferries
		Cables
		Urbanisation
		Land-claim for housing & car parks
		Education & scientific research
		Sampling, specimen collection & observation
		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
		Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
	●	Marinas
●		Non-marina moorings
		Dinghy & boat parks
●		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
		Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
		Horse-riding
		Rock-climbing
		Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
		Fish-netting & trawling
		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
	●	Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
		Intertidal
		Terrestrial
●		Habitat management
		Others

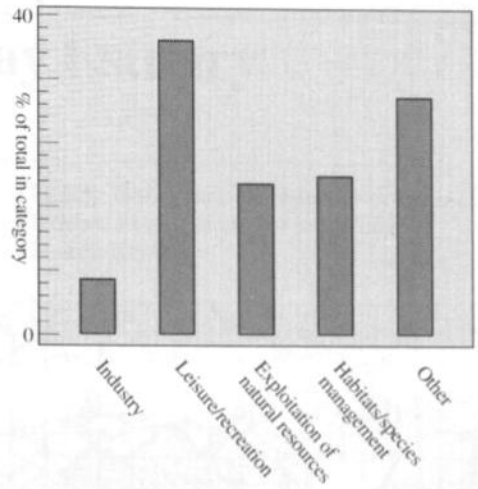
Features of human use

Most activities that occur on this site are not intensive. The only industrial activity on the estuary is gravel extraction from the pits at Grain, oil import/export jetties at Cliffe and chalk extraction from Northcliffe Pit. Leisure pursuits are numerous and include sailing from the moorings in Yantlet Creek and Cliffe Creek into the Thames. Water-skiing occurs at Yantlet. Bathing is centred around Allhallows adjacent to the caravan park and walking and bird-watching occurs along most of the sea walls and particularly at Cliffe. Model aeroplane flying also occurs at Cliffe.

Exploitation of the natural resource includes commercial fishing in Southcliffe Pit, occasional grazing of the saltmarsh at Yantlet, bait-digging at Allhallows and Grain, and wildfowling by two clubs, syndicates and individuals. 70 ha of Cooling Marshes are a wildfowling nature reserve. Habitat management includes management of water levels on the grazing marsh.

In 1989 there were proposals for a marina at Yantlet Creek, for turf-cutting from the grazing marsh and for disposal of dredge material at Cliffe.

Categories of human use



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119 Medway Estuary

Centre grid: TQ8471
County: Kent

Districts: Gillingham, Maidstone, Rochester upon Medway, Swale, Tonbridge & Malling
EN area: Kent

Review site location

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Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
6,441	4,008	143.4	40.9	5.1	Coastal plain	114,000

NTL = Normal tidal limit

BAE = Boundary with adjacent estuary

XM =Across-mouth

= Core site

Description

The Medway Estuary lies on the outer reaches of the Thames Basin, between the South Thames Marshes site to the north and the Swale Estuary to the east. The upper estuary of the Medway is surrounded by the urban development of Rochester, Chatham and Gillingham, while the estuary mouth is dominated by the town of Sheerness and the industry of the Isle of Grain and Kingsnorth.

Predominantly muddy, the Medway has the largest area of intertidal flats on the southern shore of the Greater Thames and has a natural large area of saltmarshes remaining. Large areas of saltmarsh that were previously enclosed within sea walls have since been breached and, with regular flooding with sea-water, are once again reverting to their natural state. Today many of the larger areas of saltmarsh have become isolated and occur principally as islands. Pioneer vegetation communities are evident within the reverted marsh, while mid-upper marsh communities are more frequently found seaward of the old sea walls. Many of the saltmarshes are showing signs of erosion, but this is particularly evident on the Stoke Saltings which have lost much of their area and become highly dissected over the years.

Behind the remaining sea walls there are extensive brackish grazing marshes which are intersected by dykes and fleets. These areas are a complex habitat of pasture, sea walls and counterwalls, dykes and fleets, each with its own characteristic plants and animals. These marshes have a particularly rich invertebrate fauna. There are also four lagoons on the margins of Stoke Marshes. These have developed from a series of old dykes behind a sea wall, which have become isolated into distinct pools. Salinity varies from one lagoon to the next: sea water enters one by a sluiced culvert and percolates into the others. All four lagoons support specialist lagoonal species.

The Medway Estuary is an important area in North Kent for wildfowl and waders, and support internationally important numbers of wintering waterfowl. The area supports internationally important populations of seven species and nationally important numbers of a further eleven species. The Medway Estuary is also an important breeding area for waterfowl and terns.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●		●				●	●	
Area (ha)	2,433	754	3,254							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
												●	●	●	

Hard substrate

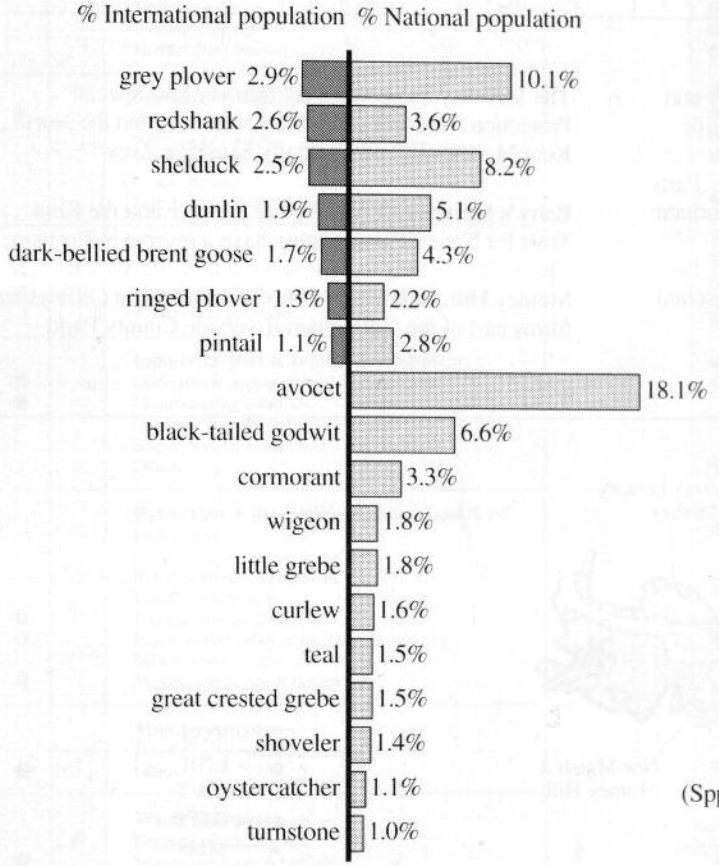
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

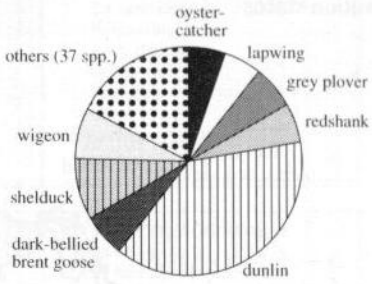
Birds

Wintering birds

1989/90 – 1993/94 data

Total waterfowl: 70,000





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: there is a large colony of black-headed gulls, a moderate-sized colony of common terns and a small colony of little terns breeding on the estuary. Moderate numbers of redshank and lapwing and small numbers of oystercatcher and snipe breed within the grasslands adjacent to the Medway. Moderate numbers of ringed plover breed within the estuary.

Additional wildlife features

The invertebrate fauna includes the RDB 2 fly *Cephalops perspicuus*, the RDB 3 beetles *Aphodius lividus, A. subterraneus, Baris scolopacea, Berosus spinosus, Malachius vulneratus* and *Stenus calcaratus*; the RDB 3 fly *Helina concolor* and the RDB 3 marsh mallow moth *Hydraecia osseola*. In addition five proposed RDB species and 121 Notable species have been recorded.

The estuary is a major nursery for sea bass *Dicentrarchus labrax*, and the allis shad *Alosa alosa* has recently been recorded.

Conservation status

● = designated ◍ = proposed

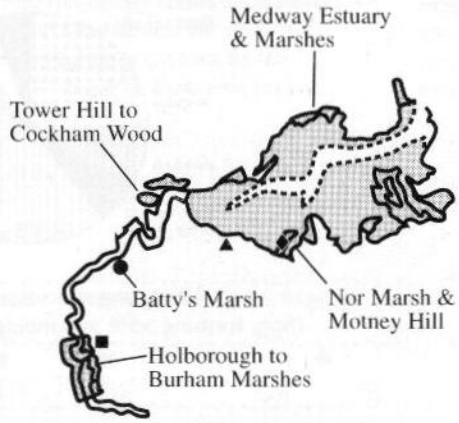
	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●	●	●		●		●	●	●			●	●	●						●
No.	1	1	2		1		1	1	1			1	1	1						2

Much of the estuary lies within the Medway Estuary and Marshes (6,840 ha) biological Site of Special Scientific Interest, part of which forms the Burntwick Island/ Chetney Marshes Nature Conservation Review site. Parts of the upper estuary lie within the Holborough to Burham Marshes biological SSSI (149 ha) and Tower Hill to Cockham Wood SSSI (47 ha) adjacent to the estuary has been notified for its biological and geological interest and is a Geological Conservation Review site.

The Medway Estuary is a Ramsar site and Special Protection Area and parts of the site lie within the North Kent Marshes Environmentally Sensitive Area.

Batty's Marsh is a Local Nature Reserve and the Kent Trust for Nature Conservation have a reserve at Burham Marsh. The RSPB has a reserve at Nor Marsh and Motney Hill, and much of the estuary shore at Gillingham forms part of the Gillingham Riverside County Park.

Conservation status



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Human activities (in 1992)

Present	Proposed	
		Coast protection & sea defences
●	●	Linear defences
		Training walls
		Groynes
		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
●		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
●	●	Thermal power stations
●		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
●		Manufacturing industries
		Chemical industries
		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
●		Pipeline installation
●		Import/export jetties & single-point moorings
		Oil refineries
●		Mothballing of rigs & tankers
		Military activities
		Overflying by military aircraft
●		Others
		Waste discharge
	●	Domestic waste disposal
●		Sewage discharge & outfalls
●		Sewage treatment works
●	●	Rubbish tips
●		Industrial & agricultural waste discharge
●		Thermal discharges (power stations)
●		Dredge spoil
		Accidental discharges
●		Aerial crop spraying
	●	Waste incinerators
		Others
		Sediment extraction
●	●	Capital dredging
●		Maintenance dredging
		Commercial estuarine aggregates extraction
		Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
●	●	Tunnels, bridges & aqueducts
●		Causeways & fords
	●	Road schemes
●		Ferries
●		Cables
		Urbanisation
●		Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
●		Seismic studies & geological test drilling
	●	Marine & terrestrial archaeology
		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●	●	Marinas
●	●	Non-marina moorings
●		Dinghy & boat parks
●		Caravan parks & chalets
●		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
●	●	Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
●		Canoeing
		Surfing
		Rowing
●		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
		Golf courses
●		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
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		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
●		Fish-netting & trawling
●		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
●		Molluscs – Hand-gathering
		Dredging
		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
		Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
●	●	Others
		Management & killing of birds & mammals
●		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
●		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
●		Intertidal
●		Terrestrial
●		Habitat management
		Others

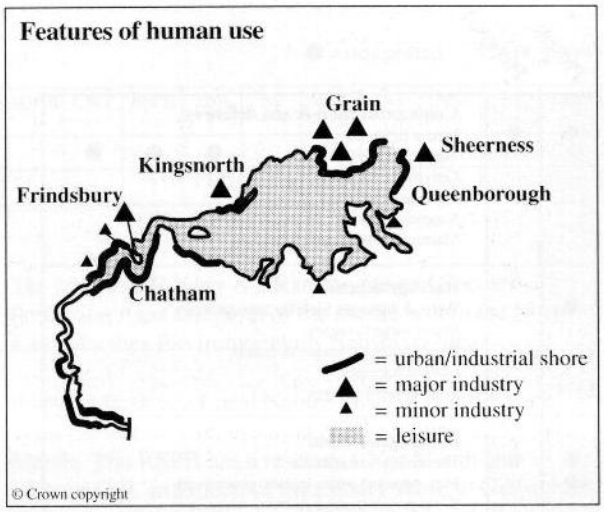
Features of human use

The Medway has an extensive communications network particularly in its upper reaches, with tunnels, road bridges and causeways. Industrial activity includes five docks including the major docks at Chatham, Grain and Sheerness. In 1989 two further docks had been consented at Lappel Bank and at Grain. There is an industrial estate at Frindsbury, power stations at Grain and Kingsnorth and two defunct oil refineries at Grain.

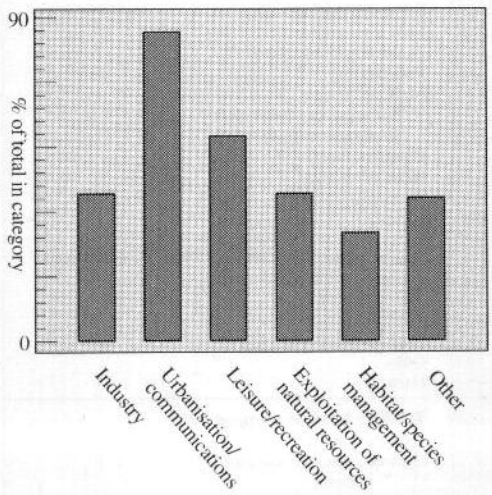
Leisure activities include around 800 moorings and two dinghy/boat parks; water-based sports are extensive over the whole estuary and include power-boating, water-skiing, jet-skiing and sailing. Canoeing is more localised and wind-surfing is concentrated at Bedlam's Bottom. Walking and bird-watching occur along the sea walls and shoreline, and there is a clay-pigeon shooting area at Kingsnorth.

Exploitation of the natural resource includes saltmarsh grazing, commercial fisheries for bass and sea fish, fyke-netting at Queenborough and the adjacent creeks, and bait-digging which, although not intensive, occurs over an area of around 1,110 ha. There are two wildfowling clubs which shoot over 90% of the intertidal area; there are no formal refuges but around 600 ha of the estuary are not shot over.

In 1992 there were proposals for renewal of some sea defences; two rubbish tips; capital dredging; a rail link for the Channel Tunnel; five marinas; and a proposal for a second coal-fired power station at Kingsnorth. Since that time, a tunnel has been built at Lower Upnor for a road bypass. In 1996, there were extant permissions for disposal of dredged material; the mudflats at Lappel Bank had recently been claimed for port operations and there were proposals for a second Swale crossing and a marina at Chatham.



Categories of human use



Further reading

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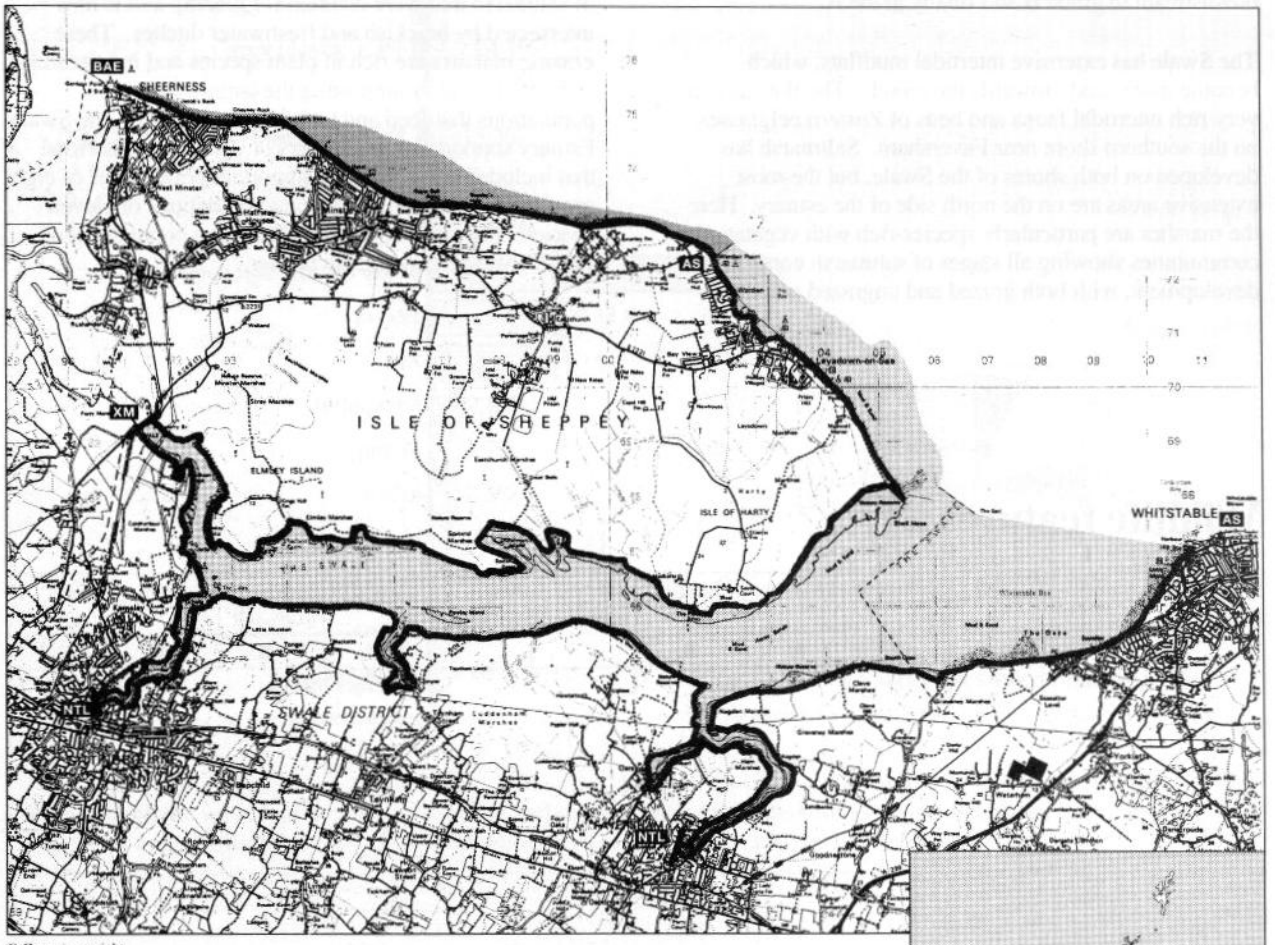
120 Swale Estuary

Centre grid: TR0066
County: Kent

Districts: Canterbury, Swale
EN area: Kent

Review site location



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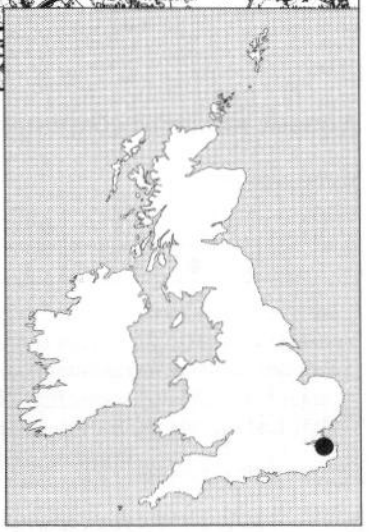
Total area (ha)	Intertidal area (ha)	Shore length (km)	Channel length (km)	Tidal range (m)	Geomorph. type	Human population
3,283	2,696 (244)*	79.3 (12.3)*	18.4	4.9	Coastal plain	89,000

* = associated intertidal/shoreline



NTL = Normal tidal limit

AS = Along shore

BAE = Boundary with adjacent estuary

= Core site

= Associated intertidal

Description

The Swale Estuary, adjacent to the Medway Estuary to the north, separates the Isle of Sheppey from the mainland. In addition to the core estuary there is an associated intertidal area which extends from Warden Point north-westwards along the coast of Sheppey, where it abuts the mouth of the Medway. Water quality varies along the Swale Estuary; the upper reaches of the channel have been classified as grade B but become grade C downstream of Faversham; the water quality improves further downstream to grade B and finally grade A.

The Swale has extensive intertidal mudflats, which become more sandy towards the mouth. The flats have a very rich intertidal fauna and beds of *Zostera* eelgrasses on the southern shore near Faversham. Saltmarsh has developed on both shores of the Swale, but the most extensive areas are on the north side of the estuary. Here the marshes are particularly species-rich with vegetation communities showing all stages of saltmarsh community development, with both grazed and ungrazed marshes.

At Shell Ness there is a sand and shingle spit behind which saltmarsh has developed that grades into grassland. At Leysdown on the older part of the spit there is an open, sandy, saltmarsh flora. On Minster Marshes and at Sheerness there are a series of lagoons in close proximity to the associated intertidal area, which support a number of specialist lagoonal species.

The Swale Estuary is backed by several hundred hectares of saltmarsh that were claimed for grazing and is now intersected by brackish and freshwater ditches. These grazing marshes are rich in plant species and invertebrates and are integral in supporting the large waterfowl populations that feed and breed on the estuary. The Swale Estuary supports large numbers of wintering waterfowl that includes internationally important populations of eight species and nationally important populations of eleven species. The site also supports breeding populations of waterfowl, terns and marsh harrier.

Wildlife features

Coastal habitats

	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	●	●	●	●			◍	●	●	
Area (ha)	547	414	2,282							

● = major habitat ◍ = minor habitat

Aquatic estuarine communities

Soft substrate

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
				●								●	●	●	

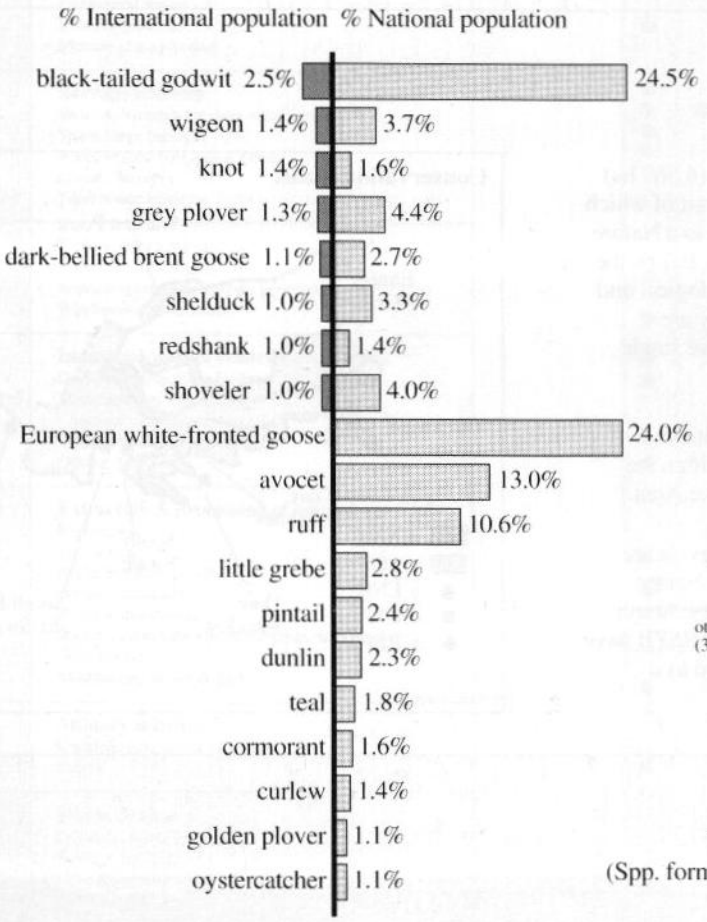
Hard substrate

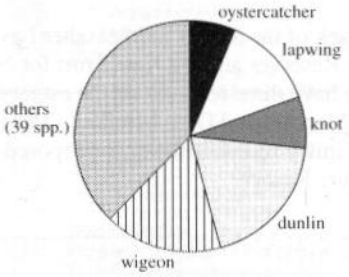
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
		●														

Birds

Wintering birds 1989/90 – 1993/94 data

Total waterfowl: 58,000





Wintering species assemblage
(Spp. forming >5% assemblage shown separately)

Breeding birds: very large numbers of lapwing and redshank and moderate numbers of oystercatcher breed on the grasslands adjacent to the estuary. Moderate numbers of ringed plover breed on the Swale Estuary.

Additional wildlife features

An extremely rich invertebrate fauna has been recorded from the estuary and the surrounding grazing marshes. Species recorded recently include the RDB 2 flies *Erioptera bivittata, Lejops vittata, Poecilobothrus ducalis* and *Stratiomys longicornis*; the RDB 3 bug *Micronecta minutissima*, the beetles *Baris scolopacea* and *Malachius vulneratus*, the pygmy footman moth *Eilema pygmaeola* and the ground lackey moth *Malacosoma castrensis*, the RDB 3 flies *Campsicnemus magius, Elachiptera rufifrons, Myopites eximia, Myopites inulaedyssentericae* and *Psila luteola* and the wasps *Passaloecus clypealis* and *Psenulus schencki*. In addition 6 proposed RDB species and 165 Notable species have been recorded.

Conservation status

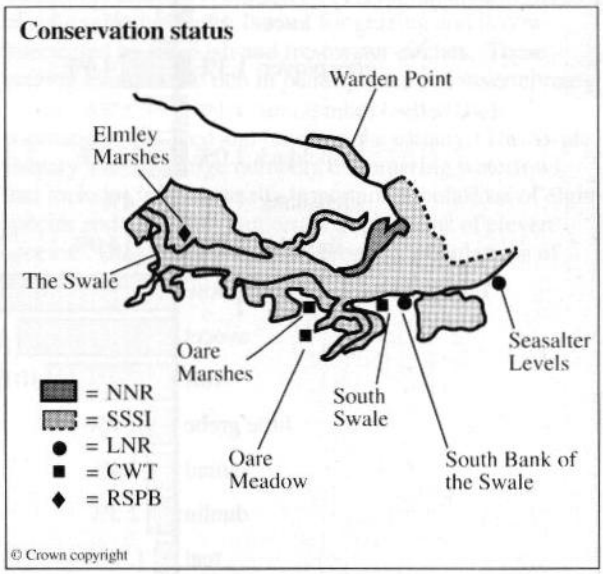
● = designated ● = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	●	●	●		●	●	●	●	●			●	●	●						
No.	1	5	1		1	1	2	1	1			3	1	1						

Much of the estuary is covered by The Swale (6,569 ha) biological Site of Special Scientific Interest, part of which is a National Nature Reserve. The Swale is also a Nature Conservation Review site. Warden Point (107 ha) on the associated intertidal area is an SSSI for its biological and geological interest; Warden Point and Sheppey are Geological Conservation Review sites with five single interest localities.

The Swale has been designated as a Ramsar site and Special Protection Area and the estuary lies within the North Kent Marshes Environmentally Sensitive Area.

The South Bank of the Swale and Seasalter Levels are Local Nature Reserves and the Kent Trust for Nature Conservation have three reserves on the estuary: South Swale, Oare Marshes and Oare Meadow. The RSPB have a reserve at Elmley Marshes which is proposed as a National Nature Reserve.



The Swale Estuary supports areas of particularly species-rich saltmarsh communities; here near Conyer Creek, the marshes are ungrazed. (Pat Doody, JNCC.)

Human activities (in 1992)

Present	Proposed	
		Coast protection & sea defences
●		Linear defences
		Training walls
●		Groynes
		Brushwood fences
		Spartina planting
		Marram grass planting
		Barrage schemes
		Weirs & barrages for river management
		Storm surge barrages
		Water storage barrages & bunds
		Leisure barrages
		Tidal power barrages
		Power generation
●		Thermal power stations
		Import/export jetties (power generation)
		Wind-power generation
		Industrial, port & related development
●		Dock, port & harbour facilities
		Manufacturing industries
●		Chemical industries
●		Ship & boat building/repair
		Others
		Extraction & processing of natural gas & oil
		Exploration
		Production
		Rig & platform construction
		Pipeline construction
		Pipeline installation
		Import/export jetties & single-point moorings
		Oil refineries
		Mothballing of rigs & tankers
		Military activities
●		Overflying by military aircraft
		Others
		Waste discharge
		Domestic waste disposal
		Sewage discharge & outfalls
		Sewage treatment works
●		Rubbish tips
●		Industrial & agricultural waste discharge
		Thermal discharges (power stations)
		Dredge spoil
		Accidental discharges
●		Aerial crop spraying
	●	Waste incinerators
		Others
		Sediment extraction
●		Capital dredging
●		Maintenance dredging
	●	Commercial estuarine aggregates extraction
	●	Commercial terrestrial aggregates extraction
		Non-commercial aggregates extraction
		Hard-rock quarrying
		Transport & communications
		Airports & helipads
●	●	Tunnels, bridges & aqueducts
		Causeways & fords
	●	Road schemes
		Ferries
●		Cables
		Urbanisation
	●	Land-claim for housing & car parks
		Education & scientific research
●		Sampling, specimen collection & observation
●		Nature trails & interpretative facilities
		Seismic studies & geological test drilling
●		Marine & terrestrial archaeology
●		Fossil collecting

Present	Proposed	
		Tourism & recreation
		Infrastructure developments
●	●	Marinas
●	●	Non-marina moorings
		Dinghy & boat parks
●		Caravan parks & chalets
		Leisure centres, complexes & piers
		Aquatic-based recreation
●		Power-boating & water-skiing
●	●	Jet-skiing
●		Sailing
●		Sailboarding & wind-surfing
		SCUBA & snorkelling
		Canoeing
		Surfing
		Rowing
		Tourist boat trips/leisure barges
●		Angling
		Other non-commercial fishing
●		Bathing & general beach recreation
		Terrestrial & intertidal-based recreation
●		Walking, including dog walking
●		Bird-watching
		Sand-yachting
		4WD & trial-biking
		Car sand-racing
●		Horse-riding
		Rock-climbing
		Golf courses
		Clay-pigeon shooting
		Others
		Airborne recreation
●		Overflying by light aircraft
		Radio-controlled model aircraft
		Others
		Wildfowling & hunting
●		Wildfowling
●		Other hunting-related activities
		Bait-collecting
●		Digging & pumping for lugworms & ragworms
		Hydraulic dredging for worms
		Others
		Commercial fisheries
●		Fish-netting & trawling
●		Fyke-netting for eels
		Fish traps & other fixed devices & nets
		Crustacea
●		Molluscs – Hand-gathering
		Dredging
●		Hydraulic dredging
		Cultivation of living resource
●		Saltmarsh grazing
		Sand dune grazing
		Agricultural land-claim
		Fish-farming
		Shellfish farming
●	●	Bottom & tray cultivation
		Suspended cultivation
		Crustacea farming
		Reeds for roofing
		Salicornia picking
●		Others
		Management & killing of birds & mammals
		Killing of mammals
		Killing of birds
		Adult fish-eating birds
		Adult shellfish-eating birds
		Gulls
●		Geese
		Wildlife habitat management
		Spartina control
		Habitat creation & restoration
		Marine
●		Intertidal
●		Terrestrial
	●	Habitat management
		Others

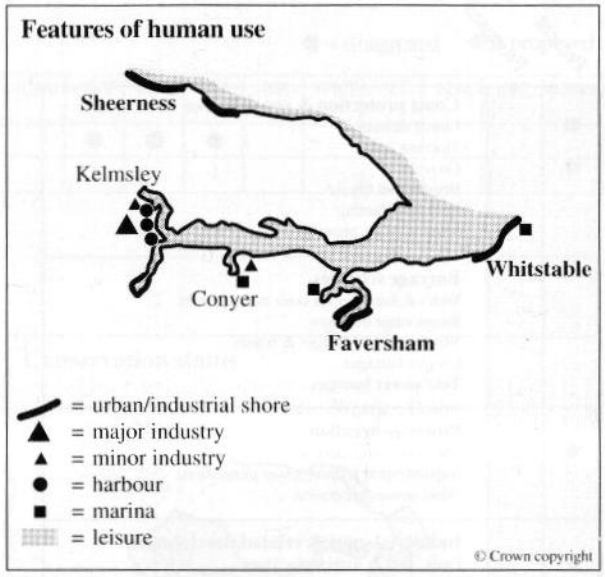
Features of human use

Exploitation of the natural resource is a dominant feature, with saltmarsh and grassland grazing at Conyer Creek, Oare Creek and Elmley; oysterfisheries; trawling for fish; fyke-netting for eels; and hand-gathering and hydraulic dredging for cockles. A large number of wildfowlers shoot over the estuary, with one wildfowling club and many small syndicates. Around 80% of the core estuary site is shot over, plus grazing marsh. Around 400 ha around Whitstable is not shot over.

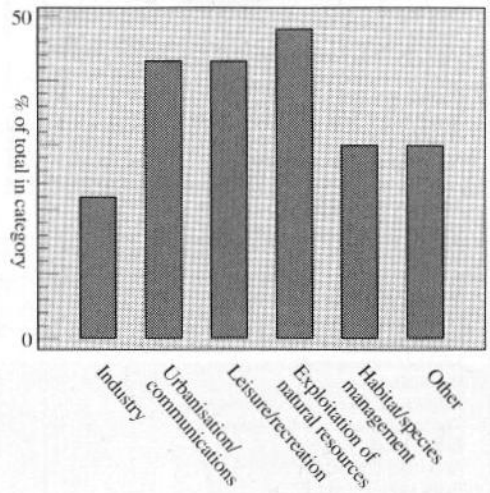
Leisure activities include three marinas and 300 moorings and the whole estuary is a very popular site for sailing. Power-boating and water-skiers use the Swale channel and wind-surfing occurs on the associated intertidal area. Walkers and bird-watchers use the sea walls.

There is limited industrial activity on the estuary, which includes four port/harbour facilities, a very large paper mill at Kemsley and a boat-building yard at Conyer Creek.

In 1992 there were proposals to upgrade the cargo docks at Ridham; for estuarine sediment and gravel extraction; for oyster cultivation; to establish a second Swale crossing; and to upgrade or build anew three marinas. More recently improvements to the A249 road were agreed that will lead to the loss of some grazing marsh.



Categories of human use



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