

An inventory of UK estuaries

Volume 6 Southern England

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ISBN 1 873701 41 1 Vol. 6. Southern England ISBN 1 873701 35 7 Set of seven vols.

5 The estuaries

A.L. Buck



Many parts of estuaries on the south coast, such as here on the Exe Estuary, are intensively used for sailing. (Peter Wakely, English Nature)



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Total area	Intertidal	Shore	Channel	Tidal range	Geomorph.	Human
(ha)	area (ha)	length (km)	length (km)	(m)	type	population
219	101	19.6	7.4	4.2	Coastal plain	36,000

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

Description

The Medina is a long, narrow estuary which flows into the Solent at Cowes on the north coast of the Isle of Wight. The freshwater flow of the River Medina is relatively low and consequently the saline influence of the sea is felt far upstream. Water quality in the estuary has been classified as grade A.

The Medina Estuary has intertidal mudflats flanking both shores, which extend from Newport in its upper reaches to Cowes at the estuary mouth. The mudflats support a predominantly marine invertebrate fauna and in late spring and summer mats of *Enteromorpha* algae develop in the lower reaches of the estuary. The mudflats are feeding grounds for wintering waders and ducks.

On the western shore of the estuary at Werrar there is a

fringe of saltmarsh that is one of the best examples of mature, mixed marsh on the south coast of England. The saltmarsh has developed on fine silt and shows all stages of saltmarsh development, with minimal invasion of cordgrass *Spartina*. There are areas of fringing upper marsh along both sides of the estuary. The saltmarshes are known to support an interesting population of crickets. Immediately inland of the saltmarsh there is a small group of disused clay pits that contain a mosaic of brackish and freshwater marsh.

Near Parkhurst there is a lagoon which was formerly a tidal mill pond, situated in a small valley. The vegetation of the valley is freshwater marsh with brackish influence only along the margins of the estuary, and grades into ancient woodland.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	2011	•					•	NY CE
Area (ha)	118	13	1	88			• = major	habitat	@ = n	ninor habitat

Birds



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
											1					

Additional wildlife features

Three nationally scarce plant species are found on the Medina Estuary, golden samphire *Inula crithmoides*, laxflowered sea lavender *Limonium humile* and divided sedge *Carex divisa*, all on the upper levels of the saltmarsh.

The invertebrate fauna recently recorded on the estuary includes two Notable species of cricket. The lagoon supports three specialist lagoonal species, the snail *Hydrobia ventrosa*, the cockle *Cerastoderma glaucum* and the bug *Sigara stagnalis*.

Conservation status

e = 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
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No.			1				1	1	1	1										1

The upper parts of the estuary lie within the Medina Estuary biological Site of Special Scientific Interest (101 ha), of which part forms Werrar Marshes Local Nature Reserve. The estuary forms part of the proposed Solent Maritime Special Area of Conservation, and the outer parts of the estuary lie within the Solent and Isle of Wight Sensitive Marine Area.

Parts of the SSSI are within the Solent and Southampton Water proposed Ramsar site and Special Protection Area.



Human activities (in 1993)

14	Coast protection & sea defences
•	Linear defences
	Training walls Grownes
3.112	Brushwood fences
	Spartina planting
	Marram grass planting
	Barrage schemes
	Weirs & barrages for river management
	Water storage barrages & bunds
•	Leisure barrages
121	Tidal power barrages
	Power generation
•	Thermal power stations
	Wind-power generation
	Dock, port & harbour facilities
•	Manufacturing industries
	Chemical industries
-	Others
	F
	Exploration
313 350	Production
	Rig & platform construction
	Pipeline installation
112 500	Import/export jetties & single-point moorings
	Oil refineries
	Motionalling of rigs & tankers
	Military activities
	Overflying by military aircraft Others
	W
	Waste discharge
•	Sewage discharge & outfalls
•	Sewage treatment works
	Rubbish tips Industrial & agricultural waste discharge
ě	Thermal discharges (power stations)
13	Dredge spoil
	Accidental discharges
	Waste incinerators
	Others
	Sediment extraction
	Capital dredging
•	Maintenance dredging
	Commercial estuarine aggregates extraction
	Non-commercial aggregates extraction
17 1-1	Hard-rock quarrying
	Transport & communications
•	Airports & helipads
	Tunnels, bridges & aqueducts Conservance & foreit
	Road schemes
•	Ferries
•	Cables
	Urbanisation
• •	Land-claim for housing & car parks
	Education & scientific research
•	Sampling, specimen collection & observation
• •	Seismic studies & geological test drilling
• •	Seismic studies & geological test drilling Marine & terrestrial archaeology

	A DESCRIPTION OF A DESC
	Tourism & recreation
	Infrastructure developments
	Non-marina moorings
	Dinghy & boat parks
	Caravan parks & chalets
	Leisure centres, complexes & piers
	Aquatic-based recreation
	Power-boating & water-skiing
	Sailing
	Sailboarding & wind-surfing
	SCUBA & snorkelling
	Canoeing
	Surfing
	Rowing
	Tourist boat trips/leisure barges
	Angling Other non-commercial fishing
	Bathing & general heach recreation
	Terrestrial & intertidal-based recreation
	Walking, including dog walking
	Bird-watching
	Sand-yachting
	4WD & trial-biking
	Car sand-racing
	Horse-riding
	Rock-climbing
	Clav-nigeon shooting
	Others
	Airborne recreation
	Overflying by light aircraft
	Radio-controlled model aircraft
	Others
	Wildfowling & hunting
	Wildfowling
23	Other hunting-related activities
	Bait-collecting Digging & pumping for lugworms & ragworms Hydraulic dredging for worms Others
	Commercial ficharias
32	Fish-netting & trawling
	Fyke-netting for eels
36	Fish traps & other fixed devices & nets
	Crustacea
	Molluscs - Hand-gathering
	Dredging
	Hydraulic dredging
	Cultivation of living resource
1	Saltmarsh grazing
1	Sand dune grazing
1	Agricultural land-claim
	Fish-farming
	Shellfish farming
-	Bottom & tray cultivation
	Suspended cultivation
	Crustacea farming
	Salicamia picking
	Others
	Management & killing of birds & mammals
	Killing of mammals
	Adult fick entire 1
-	Adult shallfuch anting birds
	Galls
	Geese
-	
	Wildlife habitat management
	Spartina control
	Habitat creation & restoration
	Intertidal
	Terrestrial
	Habitat management
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Features of human use

Leisure activities are numerous, with marinas at Cowes and upstream at Island Harbour. Power-boating is centred on the lower reaches of the estuary, while sailing occurs throughout the estuary. Sailing is very intensive in the summer racing season and centred on Cowes, when there is a massive expansion of population and of people and boats. There is a cyclepath running from Cowes to Newport which is often also used by walkers. The estuary is actively used for shore-based angling competitions.

Industrial activities include harbours at Newport, Cowes and East Cowes, a power station at East Cowes, and a ship-building yard and nine boat-building yards on the western shore at Cowes. There is also a wharf at Dodnor for aggregates. Exploitation of the natural resources includes bait-digging south of the breakwater on the eastern shore of the estuary mouth and the Medina Valley Centre regularly use the estuary for studies. The Isle of Wight Natural History and Archaeological Society operate a Nature Trail around part of the estuary.



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Categories of human use



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NTL = Normal tidal limit	Total area	Intertidal	Shore	Channel	Tidal range	Geomorph.	Human
AS = Along shore	(ha)	area (ha)	length (km)	length (km)	(m)	type	population
= Core site	332	296	120	3.3	2.9	Bar built	<5,000

Description

The shallow waters of the Newtown River and its tributaries drain northward and unite to form the largest estuary on the Isle of Wight. The mouth of the estuary is narrowed between projecting, recurved shingle spits, outside of which an intertidal area of mud and shingle extends along the shore to Gurnard Ledge. Water quality within the estuary has been classified as grade A.

The extensive intertidal flats are a mixture of mud, mudand-shingle, and mud-and-sand. Some areas of mudflat are densely colonised by *Enteromorpha* algae in summer months and locally small beds of *Zostera* eelgrasses occur. The aquatic estuarine communities within the estuary include beds of slipper limpets, and a variable/reduced salinity mud community that is considered to be of national importance.

The saltmarsh within the estuary comprises almost 50% of the total saltmarsh area on the Isle of Wight. The most mature marsh has developed along the banks of the creeks, where there is an extensive range of mid-upper

saltmarsh communities, some of which grade into grassland and ancient woodland. More recently saltmarsh has developed in the central parts of the estuary, which had been claimed as grazing marsh since the seventeenth century. However, in 1954 the sea wall was breached and the marsh reverted to mudflats and saltmarsh. Here there are small areas of pioneer marsh and *Spartina*. At Newtown Quay there is a small lagoon, which has high salinity and supports a diverse fauna which includes several specialist lagoonal species.

The two small shingle spits at the estuary mouth have a flora characteristic of a saltmarsh/sand dune interface and a small patch of sand dune vegetation has developed on the western spit. Along the open coast, the extensive intertidal area is an expanse of sand and shingle which is rich in marine invertebrate life, interspersed with rocky outcrops and their diverse algal flora and fauna. The shore is backed by soft cliffs which display a range of vegetation from pioneer communities to mature woodlands.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	A Sec	•	•	0			•	
Area (ha)	36	120	1	76			• = major	habitat	@ = r	ninor habitat

Aquatic estuarine communities

Soft substrate

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

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

Additional wildlife features

Two nationally scarce plants are found on the shingle/saltmarsh: sea heath *Frankenia laevis* and golden samphire *Inula crithmoides*. The nationally rare benthic bryozoan *Amathia pruvoti* and the nationally rare foxtail stonewort *Lamprothamnium papulosum* are found in Newtown Harbour.

The terrestrial invertebrate fauna recently recorded on the estuary includes the RDB 1 spider Aulonia albimana, the RDB 3 fly *Dorycera gramium* and the RDB 3 lagoon sand shrimp *Gammarus insensibilis*. In addition fifteen Notable species of invertebrate have been recorded on the estuary. Several specialist lagoonal species, including the cockle *Cerastoderma glaucum*, the isopod *Idotea chelipes*, the shrimp *Palaemonetes varians*, have been recorded on the estuary.



Conservation status

e = 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
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lo.	1	3	1		1	1	1	1	1	1	1						3		1	1

The estuary lies within the Newtown Harbour biological Site of Special Scientific Interest (619 ha), which is also a Nature Conservation Review site, and Thorness Bay (86 ha) which is a SSSI for its biological and geological interest. Three Geological Conservation Review sites lie within the latter SSSI: Thorness Bay, which has interest in two localities, and Gurnard. Part of the Newtown Harbour SSSI forms the Newtown Marshes Local Nature Reserve and is a National Nature Reserve.

The estuary lies within the Isle of Wight Area of Outstanding Natural Beauty and the Hamstead Heritage Coast. It is also within the Solent and Isle of Wight Sensitive Marine Area. Newtown Harbour forms part of the Solent and Southampton Water proposed Special Protection Area and proposed Ramsar site, and lies within the the Solent Maritime proposed Special Area of Conservation.

The National Trust own large areas of the estuary, saltmarsh and foreshore of the Newtown River, including Walter's Copse and Town Copse, woodlands adjacent to the estuary.



Human activities (in 1992)

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Indu Dock, Manu Chem Ship & Others	trial, port & related development port & harbour facilities acturing industries		Other non-commercial fishing
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Dock, Manu Chemi Ship & Others	port & related development port & harbour facilities acturing industries cal industries		Terrestrial & intertidal-based recreation
Ship & Others	acturing industries	•	Walking, including dog walking
Chem Ship & Others	cal industries		Bird-watching Sand-wachting
Ship å Others	CHARACTER CONTRACTOR		4WD & trial-biking
Others	boat building/repair		Car sand-racing
and the second se		•	Horse-riding
Contraction of the local division of the loc	and the second se		Rock-climbing
Extra	ction & processing of natural gas & oil		Golf courses
Explor	ation		Clay-pigeon shooting
Produc	tion	•	Others
Rig &	platform construction		Airborne recreation
Pipelin	e installation		Radio controlled model aircraft
Impor	export jetties & single-point moorings		Others
Oil ref	neries		Canada
Mothb	alling of rigs & tankers		Wildfowling & hunting
		•	Wildfowling Other husting a hard state
Milit	ry activities		Other hunting-related activities
Overfi	ving by military aircraft		Bait-collecting
Others		•	Digging & pumping for lugworms & ragworms
	21.2		Hydraulic dredging for worms
Wast	discharge		Others
Domes	tic waste disposal		Commercial fisheries
Sewag	treatment works		Fish-netting & trawling
Rubbi	h tips		Fyke-netting for eels
Industr	ial & agricultural waste discharge		Fish traps & other fixed devices & nets
Therm	l discharges (power stations)		Crustacea
Dredge	spoil		Molluses - Hand-gathering
Accide	ntal discharges		Dredging Hydraulia dradaina
Aerial	rop spraying		Hydraulic dredging
Other	nemerators		Cultivation of living resource
Ouers		•	Saltmarsh grazing
Sodia	ent extraction		Sand dune grazing
Capita	deedging		Agricultural land-claim
Mainte	nance dredging		Shellfish farming
Comm	rcial estuarine aggregates extraction		Bottom & trav cultivation
Comm	ercial terrestrial aggregates extraction		Suspended cultivation
Non-co	mmercial aggregates extraction		Crustacea farming
Hard-r	ck quarrying		Reeds for roofing
-			Salicornia picking
Trans	port & communications		Others
Airport	s & helipads		Management & killing of high 8
Tunnel	, bridges & aqueducts		Killing of mammals
Causey	ays & fords		Killing of birds
Koad s	nemes		Adult fish-eating birds
Cables			Adult shellfish-eating birds
Caures			Gulls
Urbar	isation aim for housing & car parks		Geese Wildlife habitat management
	and the second burns		Spartina control
Educa	tion & scientific research		Habitat creation & restoration
Sampli	ig, specimen collection & observation		Marine
Nature	rails & interpretative facilities		Intertidal
Seismi	studies & geological test drilling		
Marine	& terrestrial archaeology		Terrestrial
Fossil c	allesting	•	Terrestrial Habitat management

Features of human use

Leisure activities are the most numerous form of activity. Sailing is not intensive and is mostly from the moorings out into the Solent. It is a population destination for summer visitors in particular. Beach recreation, walking and horse-riding occur at Thorness Bay, and are low-key. Bird-watching is a feature of the NNR.

Exploitation of the natural resources includes bait-digging

and wildfowling; private wildfowling rights are held but not exercised extensively or frequently.

The only industry on the estuary is a small boatbuilding/repair vard at Shalfleet. Other activities of note include the Territorial Army firing range which borders the harbour and an extensive training area on farmland; both are on the east side of the harbour.



Categories of human use

40

% of total in category

0

Further reading

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Communicative

Industry

Dixon, I.M.T., & Moore, J. 1987. Surveys of harbours, rias and estuaries in southern Britain: the Solent system. Nature Conservancy Council, CSD report, No. 723.

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Description

The estuary of the River Yar is a small, shallow estuary at the north-western extreme of the Isle of Wight, with a fairly low freshwater input. Water quality in the estuary has been classified as grade A.

The tidal channel has many small creeks that are fairly steeply shelving and the intertidal mudflats are a fine silt on clay, with some areas of pebbles and cobbles on mud. The aquatic estuarine communities of the Yar include a rich current-exposed, sheltered rocky shore community that is considered to be of national importance; it is densely colonised by a variety of ascidians, anemones and sponges.

The extensive saltmarsh within the estuary is unlike others within the Solent, for in the Yar there has been only limited invasion of *Spartina* and consequently it has not suffered die-back; however, it is eroding. Historically saltmarsh developed along both banks of the estuary and is cliff-edged in places; today the only active accretion is occurring at the estuary mouth. Close to the cliffed edges narrow bands of pioneer vegetation are backed by extensive low-mid marsh communities and on higher ground there are limited expanses of mid-upper marsh vegetation. In places on the eastern banks the saltmarsh grades naturally to fringing woodland and in the upper reaches of the estuary there are extensive reed beds.

In the saltmarsh close to the Yar bridge there is a lagoon, which is known to support a moderately diverse flora and fauna. A number of uncommon plants occur on Norton Spit.

Wildlife features



Birds



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 benthic fauna includes the nationally rare sponge *Suberites massa*, which has been recorded at only three other sites in Britain. The terrestrial invertebrate fauna recently recorded on the estuary includes the RDB 3 looping snail *Truncatella subcylindrica*, the RDB 3 starlet sea anemone *Nematostella vectensis* and five Notable species. The lagoon supports the shrimps *Corophium volutator* and *Palaemonetes varians*, both specialist lagoonal species.

Otters Lutra lutra have also 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
			•				•	۲	٠		•	178.10								•
No.	1.475.5	1.2017	2				1	1	1	1	1				116.9					1

The estuary lies within the Yar Estuary (132 ha) biological Site of Special Scientific Interest. Adjacent to the upper reaches of the site is Freshwater Marshes (23 ha) SSSI, part of which is a Local Nature Reserve. The estuary lies within the Isle of Wight Area of Outstanding Natural Beauty and the Solent and Isle of Wight Sensitive Marine Area.

The Yar Estuary lies within the Solent Maritime proposed Special Area of Conservation, and is part of the proposed Solent and Southampton Water Ramsar site and Special Protection Area.



Human activities (in 1993)

2

5 60	5*	5 c 2	
	Coast protection & sea defences Linear defences Training walls Groynes Brushwood fences Spartina planting Marram grass planting	:	Tourism & recreation Infrastructure developments Marinas Non-marina moorings Dinghy & boat parks Caravan parks & chalets Leisure centres, complexes & piers
•	Barrage schemes Weirs & barrages for river management Storm surge barrages Water storage barrages & bunds Leisure barrages Tidal power barrages	•	Aquate-based recreation Power-boating & water-skiing Jet-skiing Sailing Sailboarding & wind-surfing SCUBA & snorkelling Canoeing Surfing
	Power generation Thermal power stations Import/export jetties (power generation) Wind-power generation	:	Rowing Tourist boat trips/leisure barges Angling Other non-commercial fishing Bathing & general beach recreation
	Industrial, port & related development Dock, port & harbour facilities Manufacturing industries Chemical industries Ship & boat building/repair Others	:	Terrestrait & intertidal-based recreation Walking, including dog walking Bird-watching Sand-yachting 4WD & trial-biking Car sand-racing Horse-riding Dash director
	Extraction & processing of natural gas & oil Exploration Production Rig & platform construction Pipeline construction Pipeline installation Import/export jetties & single-point moorings		Rock-climbing Golf courses Clay-pigeon shooting Others Airborne recreation Overflying by light aircraft Radio-controlled model aircraft Others
	Ou retineries Mothballing of rigs & tankers		Wildfowling & hunting Wildfowling Other hunting-related activities
	Military activities Overflying by military aircraft Others		Bait-collecting Digging & pumping for lugworms & ragworms Hydraulic dredging for worms
	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 spraving		Others Commercial fisheries Fish-netting & trawling Fyke-netting for cels Fish traps & other fixed devices & nets Crustacea Molluscs - Hand-gathering Dredging Hydraulic dredging
	Waste incinerators Others		Cultivation of living resource Saltmarsh grazing
	Sediment extraction Capital dredging Maintenance dredging Commercial estuarine aggregates extraction Commercial terrestrial aggregates extraction Non-commercial aggregates extraction Hard-rock quarrying		Agricultural land-claim Fish-farming Shellfish farming Bottom & tray cultivation Suspended cultivation Crustacea farming Reeds for roofing Salicornia picking
	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries Cables		Others Management & killing of birds & mammal Killing of mammals Killing of birds Adult fish-eating birds Adult shellfish-eating birds Gulls Geese
	Urbanisation Land-claim for housing & car parks		Wildlife habitat management
	Education & scientific research Sampling, specimen collection & observation Nature trails & interpretative facilities Science at the two enclosing last dellarg		Habitat creation & restoration Marine Intertidal Terrestrial

Features of human use

There are few activities present on the estuary, and the seemingly high proportion of urbanisation/ communications activities are due to the presence of the roads, a ferry and a causeway based at Yarmouth.

Leisure activities are most numerous form of activity with around 400 moorings in the lower reaches of the estuary, from which sail-boats and power-boats move out into the Solent. In summer there are occasional boat-trips up and down the estuary. Industrial activities include the harbour at Yarmouth, where there is a terminal for a car and passenger ferry, and there are two boat-building/repair yards on the western shore at Yarmouth. Exploitation of the natural resources involves saltmarsh studies by the Medina Valley Centre and the Isle of Wight Natural History and Archaeological Society operate the West Yar Nature Trail around part of the estuary. Habitat management includes reed-cutting and scrub clearance within the Local Nature Reserve.



Categories of human use

Freshwater Freshwater Freshwater Crown copyright

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Total area	Intertidal	Shore	Channel	Tidal range	Geomorph.	Human population
(ha)	area (ha)	length (km)	length (km)	(m)	type	
239	122	21.4	6.6	1.2	Bar built	33,000

Description

Christchurch Harbour is the estuary of the Rivers Stour and Avon which converge and enter into a wide, shallow basin. The mouth of the estuary has been almost completely enclosed by two sand and shingle spits. The southern spit is topped with sand and supports dune vegetation.

The intertidal flats range from silty fine sands in more sheltered areas to pebbles and cobbles close to the estuary mouth. At low water the intertidal flats on the north side of the estuary are exposed and are used as a feeding ground by waterfowl. The estuary has substantial areas of saltmarsh which form discrete units. The vegetation is largely upper marsh with extensive reedbeds; the lower saltmarsh contains only small stands of cordgrass *Spartina*. There are transitions to brackish and freshwater grazing marsh and, in places, scrub woodland. There are a number of lagoons adjacent to the estuary. Several small lagoons occur within the grazed saltmarsh at Stanpit Marshes and there is a complex system of pools, channels and a large lagoon within the saltmarsh and shingle at Hengistbury Head. The lagoons support a relatively low diversity of species but the fauna of the lagoons at Hengistbury includes some rare and notable species.

XM = Across mouth = Core site

The upper reaches of the estuary are flanked by floodplains and river terraces and the brackish fields adjacent to the River Stour have interesting communities of marsh plants. The broad floodplain of the Avon is dissected by numerous dykes and rivulets, where there is a variety of wet meadows and dry grassland

Wildlife features

Coastal Lowland Lagoon Other Subtidal Saltmarsh Sandflats Mudflats Sand Rocky Shingle grassland dunes shores habitats 0 . 117 50 72 = major habitat = minor habitat Area (ha)

Aquatic estuarine communities

Soft substrate

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



Birds



Additional wildlife features

Two Red List plant species are found on the estuary: dwarf spike-rush *Eleocharis parvula* and sea knotgrass *Polygonum maritimum*. A further 22 nationally scarce species have been recorded in the vicinity of Christchurch Harbour. A nationally scarce marine benthic species, the tentacled lagoon worm *Alkmaria ronijni*, is found on this site. Other invertebrate fauna recently recorded on the estuary includes the RDB 3 lagoon sand shrimp *Gammarus insensibilis*, seven Notable species and a specialist lagoonal species, the isopod *Sphaeroma hookeri*.

Conservation status

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	•	•	•		•		•		1											•
o.	1	1	1		1		2					1.50		Sec. 1		1	1	12		1

There are two Sites of Special Scientific Interest covering parts of Christchurch Harbour. Christchurch Harbour (353 ha) is a SSSI for its biological and geological interest and Avon Valley (Bickton-Christchurch) (605 ha) is a biological SSSI and a Nature Conservation Review site. Hengistbury is a Geological Conservation Review site and Stanpit Marsh and Hengistbury Head are both Local Nature Reserves.

Christchurch Harbour forms part of the Poole Bay and the Isle of Purbeck Sensitive Marine Area.



Relatively few activities take place in Christchurch Harbour. Leisure activities include moorings in the north of the basin and upriver, and sailing and canoeing occur throughout the site. Windsurfing and SCUBA/snorkelling occur but are not intensive, and some unauthorised powerboating and water-skiing, which are otherwise banned by speed limits, occur from time to time. Beach recreation is focused on the spit south of the estuary mouth, particularly on the seaward side, and bird-watching is centred on

Categories of human use





Stanpit Marsh and Hengistbury Head.

Exploitation of the natural resources includes grazing the saltmarsh on Stanpit Marsh, seine-netting and bag-netting for fish, fyke-netting for eels and bait-digging which occurs mainly in the north of the tidal basin. The only industrial activity on the estuary is a small boat yard and quay at Mudeford which is used by fishing boats.



Human activities (in 1993)

prosent prof	and the second se	Present pre	And a second sec
•••	Coast protection & sea defences Linear defences Training walls Groynes Brushwood fences Spartina planting Marram grass planting		Tourism & recreation Infrastructure developments Marinas Non-marina moorings Dinghy & boat parks Caravan parks & chalets Leisure centres, complexes & piers Aquatic-based recreation
	Barrage schemes Weirs & barrages for river management Storm surge barrages Water storage barrages & bunds Leisure barrages Tidal power barrages		Power-boating & water-skiing Jet-skiing Sailing Sailboarding & wind-surfing SCUBA & snorkelling Canoeing Surfing
	Power generation Thermal power stations Import/export jetties (power generation) Wind-power generation	•	Rowing Tourist boat trips/leisure barges Angling Other non-commercial fishing Bathing & general beach recreation
•	Industrial, port & related development Dock, port & harbour facilities Manufacturing industries Chemical industries Ship & boat building/repair Others	•	Terrestral & intertidal-based recreation Walking Bird-watching Sand-yachting 4WD & trial-biking Car sand-racing Horse-riding
	Extraction & processing of natural gas & oil Exploration Production Rig & platform construction Pipeline construction Pipeline installation Import/export jetties & single-point moorings	-	Rock-climbing Golf courses Clay-pigeon shooting Others Airborne recreation Overflying by light aircraft Radio-controlled model aircraft Others
	Oil refineries Mothballing of rigs & tankers	•	Wildfowling & hunting Wildfowling Other hunting-related activities
	Military activities Overflying by military aircraft Others	•	Bait-collecting Digging & pumping for lugworms & ragworms Hydraulic dredging for worms 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	•	Commercial fisheries Fish-netting & trawling Fyke-netting for cels Fish traps & other fixed devices & nets Crustacea Molluscs – Hand-gathering Dredging Hydraulic dredging
	Actual crop spraying Waste incinerators Others Sediment extraction Capital dredging Maintenance dredging Commercial estuarine aggregates extraction Commercial estrarina aggregates extraction Non-commercial aggregates extraction Hard-rock quarrying	-	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
•	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries Cables		Others Management & killing of birds & mammals Killing of mammals Killing of birds Adult fish-eating birds Adult shellfish-eating birds Gulls Garce
•	Urbanisation Land-claim for housing & car parks		Wildlife habitat management Spartina control
•	Education & scientific research Sampling, specimen collection & observation Nature trails & interpretative facilities Seismic studies & geological test drilling Marine & terrestrial archeeology		Habitat creation & restoration Marine Intertidal Terrestrial Habitat management
•	Fossil collecting		Others

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Review site location



Description

Poole Harbour is the estuary of the rivers Frome and Piddle, which flow into the north-west corner of this large, shallow, tidal basin. The rivers provide little freshwater inflow. Water quality within the estuary has been classified as grade A, except for Holes Bay adjacent to the town of Poole, where it has been classified as grade B.

The northern and central parts of Poole Harbour remain inundated at low tide, but in other localities extensive areas of very soft mudflats are exposed, which support populations of *Zostera* eelgrasses. The numerous muddy creeks and saltmarshes in the west and south of the estuary are relatively undisturbed and the saltmarshes contain some of the oldest *Spartina* marsh in Britain. Around 80% of the present saltmarsh is *Spartina*, with small areas of low-mid marsh communities and mid-upper communities: reedbeds are fairly extensive, and in places the saltmarsh grades landward to freshwater marsh and fen as well as to bog, heathland and woodland.

The mouth of the harbour is restricted by two low-lying sand spits. South of the estuary mouth the Studland peninsula is accreting, with a series of dune ridges dominating the spit and small patches of shell gravels with a sparse flora. Foredune vegetation, slacks and dry heathland are present and support a rich invertebrate fauna and, like most of the western and southern shores of Poole Harbour, the dunes grade into heathland. Littlesea Mere within the Studland spit is of interest, having developed from a brackish creek.

A small lagoon is also associated with Poole Harbour on its north-eastern side. Originally formed by clay extraction and used as salterns but now almost enclosed by a shingle bar, the Blue Lagoon now contains tidal mudflats and supports a moderate species diversity which includes specialist lagoonal species.

Poole Harbour is an estuary with a wide range of habitats and is in close proximity to extensive areas of heath. The site supports a variety of plants and rich populations of invertebrates, and the mudflats, islands and grazing marshes are important roosting and feeding areas for waterfowl. Poole Harbour regularly supports internationally important populations of wintering shelduck and black-tailed godwit and nationally important populations of eight species of waterfowl, together with important breeding colonies of gulls and terns.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	•	•	•	a stand		۲	•	
Area (ha)	1,755	697	1,	353		1. San 1. S	• = major	habitat	● = r	ninor habitat

Aquatic estuarine communities

Soft substrate

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

Hard substrate



Birds



Breeding birds: a large colony of black-headed gull, a moderate-sized colony of common tern and small colonies of Sandwich tern, herring gull and lesser black-backed gull breed on the estuary. Moderate numbers of redshank breed within the saltmarshes.

Additional wildlife features

The marine benthic fauna includes the nationally rare hydroid *Obelia bidentata* and the nationally scarce hydroid *Hartlaubella gelatinosa*; the RDB 3 starlet sea anemone *Nematostella vectensis* was recorded here in 1987 but has not been seen since. Blue Lagoon is known to support three specialist lagoonal species, the cockle *Cerastoderma glaucum*, the snail *Hydrobia ventrosa* and the isopod *Idotea chelipes*.

The terrestrial invertebrate fauna recently recorded on Poole Harbour includes the RDB 2 shorebug *Saldula setulosa*, the RDB 2 fly *Limonia bezzeii*, and the following RDB 3 species: the white spot moth *Hadena albimacula*, the wasp *Cerceris quinquefasciata* and the flies *Atylotus latistriatus* and *Haemoatopota bigoti*. A futher eighteen Notable species have been recorded.

Poole Harbour is a major nursery for sea bass Dicentrarchus labrax.

Conservation status

 \bullet = designated \bullet = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	•	•	•		•	•	•	۲	•		•	•	•	122			•		•	•
No.	2	3	2		1	2	1	1	1		1	1	1				1		1	1

Much of the estuary lies within the Poole Harbour (4,049 ha) biological Site of Special Scientific Interest but parts of the estuary lie within Wareham Meadows (204 ha) biological SSSI and Ham Common (32 ha) which is an SSSI for its biological and geological interest. Two National Nature Reserves cover parts of the estuary, namely Arne and Studland and Godlingston Heaths. Arne and Studland and Godlingston Heaths SSSIs cover areas beyond the estuary, and there are further NNR/SSSI encompassing areas of heathland that are adjacent or in close proximity to the estuary (not shown).

Poole Harbour and Studland and Godlingston Heaths are Nature Conservation Review sites and there are Geological Conservation Review sites at Arne, Lake and South Haven Peninsula. Ham Common is a Local Nature Reserve. Parts of the estuary lies within the Dorset Area of Outstanding Natural Beauty and within the Purbeck Heritage Coast. Poole Harbour is proposed as a Ramsar site and Special Protection Area. Poole Harbour is also part of Poole Bay and Isle of Purbeck Sensitive Marine Area.

Brownsea Island is owned by the National Trust and managed in part by the Dorset Trust for Nature Conservation. The RSPB have a reserve at Arne and Stodborough Heath.



Human activities (in 1993)

Present Pri	Social second	present prof	
•	Coast protection & sea defences Linear defences Training walls Groynes Brushwood fences Spartina planting Marram grass planting	•	Tourism & recreation Infrastructure developments Marinas Non-marina moorings Dinghy & boat parks Caravan parks & chalets Leisure centres, complexes & piers
	Barrage schemes Weirs & barrages for river management Storm surge barrages Water storage barrages & bunds Leisure barrages Tidal power barrages		Aquatic-based recreation Power-boating & water-skiing Jet-skiing Sailboarding & wind-surfing SCUBA & snorkelling Canoeing Surfing
	Power generation Thermal power stations Import/export jetties (power generation) Wind-power generation		Rowing Tourist boat trips/leisure barges Angling Other non-commercial fishing Bathing & general beach recreation
••••	Industrial, port & related development Dock, port & harbour facilities Manufacturing industries Chemical industries Ship & boat building/repair Others		Terrestrial & intertidal-based recreation Walking, including dog walking Bird-watching Sand-yachting 4WD & trial-biking Car sand-racing Horse-riding Basic slimbing
•	Extraction & processing of natural gas & oil Exploration Production Rig & platform construction Pipeline construction Pipeline installation Import/export jetties & single-point moorings	•	Rock-climbing Golf courses Clay-pigeon shooting Others Airborne recreation Overflying by light aircraft Radio-controlled model aircraft Others
	Oil refineries Mothballing of rigs & tankers	•	Wildfowling & hunting Wildfowling Other hunting-related activities
•	Military activities Overflying by military aircraft Others	•	Bait-collecting Digging & pumping for lugworms & ragworms Hydraulic dredging for worms 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		Commercial fisheries Fish-netting & trawling Fyke-netting for cels Fish traps & other fixed devices & nets Crustacea Molluscs - Hand-gathering Dredging Hydraulic dredging
	Aerial crop spraying Waste incinerators Others	•	Cultivation of living resource Saltmarsh grazing Sand dune grazing
•	Sediment extraction Capital dredging Maintenance dredging Commercial estuarine aggregates extraction Commercial terrestrial aggregates extraction Non-commercial aggregates extraction Hard-rock quarrying	•	Agricultural land-claim Fish-farming Shellfish farming Bottom & tray cultivation Suspended cultivation Crustacea farming Reeds for roofing Salicornia picking Othere
•	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries Cables	•	Management & killing of birds & mammals Killing of mammals Killing of birds Adult fish-eating birds Adult shellfish-eating birds Gulls Geese
•	Urbanisation Land-claim for housing & car parks		Wildlife habitat management Spartina control
•	Education & scientific research Sampling, specimen collection & observation Nature trails & interpretative facilities Seismic studies & geological test drilling	:	Habitat creation & restoration Marine Intertidal Terrestrial Habitat management
	Fossil collecting		Others

Features of human use

Leisure activities are numerous, with marinas and large numbers of moorings on the northern shores of the estuary. Sailing occurs around the main channels and up the rivers, and wind-surfing is centred on the north-east of the site. Water-skiers use the Wareham Channel and canoeing occurs from Poole. Beach recreation is most intensive in the north-east of the harbour and at Rockley, and bird-watching occurs widely, but particularly around Brownsea Island, Arne, Studland and Holes Bay. Recreational use is regulated by the Poole Harbour Aquatic Management Plan which delineates zones suitable for specified activities.

Exploitation of the natural resources involves some grazing of the saltmarshes, cutting reeds for roofing (although this has declined in recent years), oyster and mussel cultivation, collecting of cockles from the eastern parts of the site, fishing, fyke-netting for eels, and bait-

Categories of human use



digging along the north and east shores, with some commercial dragging for bait. Wildfowling occurs along the southern shore, with agreement that Arne and Brownsea are not shot.

Industrial activities include the port and a chemical works at Poole, and a large engineering works at Hamworthy. The BP 'gathering station' at Wytch Farm receives oil from wells on Furzey Island and around the southern periphery of the harbour.

In 1993 consent was given to develop a new marina at Parkstone Bay (now constructed) and there are continuing proposals to extend or develop marinas and boat yards operating around the harbour, including a proposed boat haven at Poole Town Quay. There is also a proposal for a long road bridge crossing the southern part of Holes Bay linking parts of Poole.



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77

XM

Human

population

38,000

PORTLAND

Tidal range Geomorph.

type

Bar built

(m)

1.9

Maren B

Channel

16.7

XM

79

78

77



= Core site

Shore

47.5

length (km) length (km)

XM = Across mouth

Intertidal

area (ha)

278

Total area

(ha)

1,617

Description

This site comprises Portland Harbour which is enclosed by four breakwaters, and the Fleet, a long lagoon separated from the sea by the shingle bar of Chesil Bank. Portland Harbour reaches 17 m at its deepest point and there are sand- and mudflats exposed at low tide. Rocky shores occur in the north-west adjacent to Weymouth. The small inner bay at Ferrybridge and the south-eastern parts of the Fleet have more extensive sand and mudflats, which, because of the unusual regime of a double low tide, are exposed for long periods.

The Fleet is the largest tidal lagoon in Britain, dependant upon a free flow of sea water from Portland Harbour through a narrow entrance at Small Mouth. The Fleet is very shallow, becoming less tidal and decreasingly saline north-westwards, and it is extraordinarily rich in wildlife. Over 150 species of algae have been recorded here and the site supports rich and varied marine communities which include numerous molluscs. Aquatic estuarine communities present include extensive beds of slipper limpets, a muddy offshore community that is considered to be of national importance and an unusual variant of a sand/muddy sand community. The Fleet also supports the most extensive population of all three species of *Zostera* and *Ruppia* eelgrasses in Britain, including a good example of the rare *R. cirrhosa*.

Narrow saltmarshes have developed along the northern shore of the Fleet and along the north-facing side of Chesil Bank. The vegetation is largely mid-upper saltmarsh with some pioneer species and there are transitions to maritime grassland and vegetated and bare shingle. The shingle both along Portland Harbour shore and the entire length of Chesil Bank support the full range of vegetated shingle communities. At the extreme north-westerly part of the site, stands of common reed dominate. Chesil Beach, which separates the Fleet from the sea, is one of the five largest shingle beaches in Britain, and is well-vegetated in its westernmost parts.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	•	•		•	•	1	•	
Area (ha)	1,339	51	2	27			• = major	habitat	@ = n	ninor habitat

Aquatic estuarine communities

Soft substrate

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

Hard substrate



Additional wildlife features

Ten nationally rare marine benthic species are found in The Fleet and Portland Harbour: the sponge Suberites massa, the worm anemone Scolanthus callimorphus, the bristle worm Sternapsis cutata, the lagoon sand worm Armandia cirrhosa, DeFolin's lagoon snail Caecum armoricum, the looping snail Truncatella subcylindrica, the lagoon snail Paludinella littorina, the lagoon sea slug Tenellia adspersa, the green alga Cladophora bettersii and the foxtail stonewort Lamprothamnium papulosum. The invertebrate fauna recently recorded on or adjacent to the estuary includes the RDB 1 scaly cricket *Mogoplistes squamiger*, the RDB 2 fly *Limonia bezzii*, the RDB 3 white spot moth *Hadena albimacula*, one proposed RDB species and a further nine Notable species.

The estuary is a major nursery for sea bass *Dicentrarchus labrax* and is an important spawning and nursery area for a number of species of fish.



Conservation status

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
	•	•			•	Sanca.		•			•									•
No.	1	7			2	1000	100	1	1	- E	1		with the		and a		221	1	1	2

Much of the site lies within Sites of Special Scientific Interest. Portland Harbour Shore (30 ha) and Chesil and the Fleet (990 ha) are SSSIs for their biological, geological and geomorphological interest, which include seven Geological Conservation Review sites: Shipmoor Point to Butterstreet Cove, Smallmouth Sands, Sandsfoot, Chesil Beach, Tidmoor Point to East Fleet Coast, East Fleet to Small Mouth, and Lynch Cove. Chesil and The Fleet is also a Nature Conservation Review site.

Chesil Beach and The Fleet has been designated as a Ramsar site and a Special Protection Area, and is a proposed Special Area of Conservation. Part of the estuary lies within the Dorset Area of Outstanding Natural Beauty and in the West Dorset Heritage Coast. Portland and the Fleet is a Sensitive Marine Area and a possible voluntary marine nature reserve. The Fleet Sanctuary is a private nature reserve.



Human activities (in 1991)

de	Constant	Q.C.	Se.	
	Coast protection & sea defences Linear defences Training walls Groynes	•	•	Tourism & recreation Infrastructure developments Marinas Non-marina moorings
	Brushwood fences Spartina planting Marram grass planting	:		Dinghy & boat parks Caravan parks & chalets Leisure centres, complexes & piers Acuatic based reception
	Barrage schemes Weirs & barrages for river management Storm surge barrages		:	Power-boating & water-skiing Jet-skiing Sailing
	Water storage barrages & bunds Leisure barrages Tidal power barrages	:		Sailboarding & wind-surfing SCUBA & snorkelling Canceing Surfing
	Power generation Thermal power stations	:	•	Rowing Tourist boat trips/leisure barges Angling
	Wind-power generation	•		Other non-commercial fishing Bathing & general beach recreation Terrestrial & intertidal-based recreation
•	Dock, port & harbour facilities Manufacturing industries Chemical industries			Walking, including dog walking Bird-watching Sand-yachting 4WD& trial-biking
•	Ship & boat building/repair Others			Car sand-racing Horse-riding Rock-climbing
	Extraction & processing of natural gas & oil Exploration Production Rig & platform construction Pipeline construction			Golf courses Clay-pigeon shooting Others Airborne recreation Overflying by light aircraft
•	Pipeline installation Import/export jetties & single-point moorings Oil refineries Mothelling of circe & tankers			Radio-controlled model aircraft Others Wildfowling & hunting
	Military activities	•		Wildfowling Other hunting-related activities
	Overflying by military aircraft Others	•		Bait-collecting Digging & pumping for lugworms & ragworms Hydraulic dredging for worms 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	:	•	Commercial fisheries Fish-netting & trawling Fyke-netting for cels Fish traps & other fixed devices & nets Crustacea Molluscs – Hand-gathering Dredging Hydraulic dredging
	Aerial crop spraying Waste incinerators Others			Cultivation of living resource Saltmarsh grazing Sand dune grazing
•	Sediment extraction Capital dredging Maintenance dredging Commercial estuarine aggregates extraction Commercial terrestrial aggregates extraction Non-commercial aggregates extraction Hard-rock quarrying	•	•	Agricultural land-claim Fish-farming Shellfish farming Bottom & tray cultivation Suspended cultivation Crustacea farming Reeds for roofing Salicornia picking
	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords	•		Others Management & killing of birds & mamm Killing of mammals Killing of birds
•	Koad schemes Ferries Cables			Adult fish-eating birds Adult shellfish-eating birds Gulls Geese
	Urbanisation Land-claim for housing & car parks			Wildlife habitat management Spartina control
	Education & scientific research Sampling, specimen collection & observation Nature trails & interpretative facilities Seismic studies & geological test drilling	:		Habitat creation & restoration Marine Intertidal Terrestrial Habitat management
	Marine & terrestrial archaeology Fossil collecting	•		Others

Features of human use

Leisure activities are most numerous and there are moorings in the Harbour, at Ferrybridge and in the eastern parts of the Fleet. There is also a dinghy park at the sailing centre and windsurfing school at Sandsfoot Castle. SCUBA-diving and snorkelling occur mainly in the harbour and canoeists use the easternmost parts of the Fleet and northern parts of Portland Harbour. Beach recreation is most intensive along Sandsfoot Cove, Western Ledges and Ham Beach, and bird-watching is most intensive at Ferrybridge and the swannery at Abbotsbury.

Exploitation of the natural resources includes shellfish farming in Portland Harbour, an oyster farm in the Fleet, fyke-netting for eels in the Fleet, bait-digging and reedcutting for thatching. Wildfowling occurs as a private shoot that takes place very occasionally.

The only industrial activity is at the dock in Portland Harbour (recently sold from the MoD to a private port developer); there is a RAF helipad nearby and military exercises are carried out on and adjacent to the Fleet at Charlestown.

In 1991 there were proposals for a road along the western shore of Portland Harbour; to increase production on the fish farm and oyster farm; and to trial Pacific oyster *Crassostrea gigas* farming. Since the departure of the Royal navy in 1995, future industrial uses of Portland Harbour remains uncertain. Recreational use is expected to increase rapidly.





Categories of human use

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Total area	Intertidal	Shore	Channel	Tidal range	Geomorph.	Human
(ha)	area (ha)	length (km)	length (km)	(m)	type	population
79	62	8.1	3.8	3.7	Bar built	6,000
This small estuary of the River Axe discharges into the sea east of Seaton, through a mouth narrowed by a sand and shingle spit. At low tide a narrow channel flows across intertidal mudflats, within which several islands have developed along the western bank. Water quality in the estuary has been classified as grade A.

The intertidal flats are flanked with saltmarshes, which are truncated by the railway to the west and by the road to the east. The saltmarshes of the lower estuary are largely ungrazed and have little pioneer marsh but a predominance of low-mid marsh vegetation. The saltmarsh of the upper estuary is mostly grazed and has mid-upper marsh on both shores with a few saltmarsh pans on the eastern shore. All the saltmarsh within the estuary has cliffed edges, indicating erosion.

On the north and western shores of the estuary there are moderately extensive areas of reedbeds and freshwater marshes.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•		•				•	10.58	
Area (ha)	16	34		28			• = major	habitat	@ = r	ninor habitat

Birds



Aquatic estuarine communities

Information unavailable.

• = 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		1000	1	1	10.				1									1

There are no Sites of Special Scientific Interest covering the estuary itself, but the adjacent Axmouth to Lyme Regis Undercliffs (335 ha) is National Nature Reserve and SSSI for its geological and biological interest. Axmouth to Lyme Regis is a Geological Conservation Review site.

The upper reaches of the eastern shore of the estuary lie within the East Devon Area of Outstanding Natural Beauty, and the lower reaches of the estuary lie within the Lyme Bay Sensitive Marine Area.



In 1991 there were very few activities occurring on the Axe Estuary. Leisure pursuits included moorings around the estuary mouth where sailing is concentrated, and power-boating, bird-watching and angling also occur but are not intensive. Exploitation of the natural resources includes grazing of the saltmarshes on the upper estuary.



Further reading

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Human activities (in 1991)

Proposed Present

0

Coast protection & sea defences		
Linear defences		
Training walls		
Bruchward fances		
Sparting planting		
Marram grass planting	1	
manual grass planting		
Barrage schemes		
Weire & barrages for river management		
Storm surge barrages		
Water storage barrages & hunds		
Leisure harrages		
Tidal power barrages		
tion I out office		
Power generation		
Thermal power stations	Station 1	
Import/export jetties (nower generation)		
Wind-power generation	1.1.1.1	
this power generation		
Industrial nort & related development		
Dock not & barbour facilities		
Manufacturing industries	E. State	
Chemical industries		
Shin & hoat building/renair		
Others		
Extraction & processing of natural and 9 -1		
Exploration	1 .	
Production	1.5	
Pio & platform construction		
Pinaling construction		
Pipeline construction		
Import/export jetties & single point meanings		
Oil refineries	100	
Mothballing of rigs & tankers	12	
mouldaring of figs & tankers		
Military activities		
Overflying by militen eigenft	1.1.1	
Others	1 2 2	
Others		
waste discharge		
Domestic waste disposal	1 S. C. P.	
Sewage discharge & outfalls	1000	
Sewage treatment works		
Rubbish ups	1.	
Thermal discharges (neuror stations)	1.000	
Dradaa spoil		
Accidental discharges		
Aerial crop spraving		
Waste incinerators		
Others		
C IIII		
Sediment extraction		
Capital dredging		
Maintenance dredging		
Commercial estuarine aggregates extraction		
Commercial terrestrial aggregates extraction		
Non-commercial aggregates extraction		
Hard-rock quarrying		
	-	
Transport & communications	1	
Airports & helipads		
Tunnels, bridges & aqueducts	1000	
Causeways & fords		
Road schemes	1	
Ferries	1	
Cables		
	-	
Urbanisation		
Land-claim for housing & car parks		
	-	
Education & scientific research		
Sampling, specimen collection & observation	Contract of the second	
Nature trails & interpretative facilities	1	
Seismic studies & geological test drilling	1.1.1.1	
Marine & terrestrial archaeology	1 1 1	
Fossil collecting		





Review site location



km)	length (km)	(m)	type	population
	1.1	4.1	Bar built	<5,000

Description

19

36

The estuary of the River Otter is small and narrow, bounded by sea embankments to the west and a 10 m high sandstone cliff to the east. Historically the land behind the flood embankments has been subject to land-claim, and today the Otter Estuary is a channel with an intertidal area consisting mostly of saltmarsh. There is a negligible

6.1

extent of intertidal flats. Water quality within the estuary has been classified as grade A.

= Core site

The saltmarshes of the Otter Estuary are unparalleled in Devon, for they have a diverse flora that shows characteristic succession and zonation. The main area of saltmarsh is in the lower reaches of the estuary, where it includes low-mid marsh and small patches of mid-upper marsh communities. In places, creeks and saltmarsh pans have developed in the deep, fine alluvium. Further upstream the saltmarsh grades into reedbeds and to the west the estuary is flanked by freshwater marshes.

The Otter Estuary flows into the sea at Budleigh Salterton, where a sand and shingle spit running eastwards virtually separates the estuary from the sea, leaving a mouth only 5 m wide.

Although small in size and with little intertidal mudflats, the Otter Estuary is of importance for its wintering wildfowl, for it provides an additional feeding station for birds from the nearby Exe Estuary, especially in times of severe weather.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	0	•			•	and the second	14 1923	1
Area (ha)	17	19					• = major	• habitat	@ = r	ninor habitat

Birds



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

Otters are known to use the estuary regularly.

e = 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

The lower estuary lies within the Otter Estuary (33 ha) Site of Special Scientific Interest, which is a SSSI for its biological, geological and geomorphological interest and contains the Otterton Point Geological Conservation Review site. Devon Wildlife Trust has a reserve on the lower estuary.

The Otter Estuary lies within the East Devon Area of Outstanding Natural Beauty, and the outer reaches of the estuary lie within the East Devon Heritage Coast and within the Lyme Bay Sensitive Marine Area.



Features of human use

There are very few activities on the estuary. Leisure pursuits include angling and occasional sailing and canoeing, and the shores are popular for walking. Birdwatching occurs most frequently on the Devon Wildlife Trust reserve and the estuary is used for university fieldwork studies. Wildfowling is known to occur, although very rarely.

Further reading

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- Otter Valley Association. 1985. Otter Estuary. *In: Devon Estuaries*, ed. by G. Wills, 9-14. Newton Abbot, Devon Books.

Human activities (in 1991)



6

Fossil collecting

	Coast protection & sea defences
	Linear defences
	Training walls
	Brochwood fanges
	Sparting 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 & oi
	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 trastmant works
	Rubbish tins
	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
	Aimorts & helinads
	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

Proposol Present **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



Centre grid: SX9883 County: Devon

Districts: East Devon, Exeter, Teignbridge EN area: Devon & Cornwall

Review site location



XM = Across mouth	Total area	Intertidal	Shore	Channel	Tidal range	Geomorph.	Human
	(ha)	area (ha)	length (km)	length (km)	(m)	type	population
= Core site	1,874	1,201	47.8	16.7	4.1	Bar built	116,000

The Exe is one of the largest estuaries on the southwestern peninsula. In its upper reaches the Rivers Exe and Clyst flow past the city of Exeter and its lower reaches are surrounded by road, railway and urban development. Water quality in the estuary has been classified as grade A.

The intertidal flats of the Exe are predominantly silt and mud, but become sandy in the shelter of the sand spit of Dawlish Warren and further out into the mouth. The aquatic estuarine communities present within the estuary are varied, with highly rated examples of a current-swept sand community and a gravel/shell gravel community that is considered to be of national importance. There are mussel beds and patches of *Enteromorpha* alga and *Zostera* eelgrasses and the Exe is one of only two known British localities for the polychaete worm *Ophelia bicornis*.

The Exe Estuary has one of the largest areas of saltmarsh in Devon, most of which has developed in the shelter of Dawlish Warren, with some patches along the inner estuary. In the lower reaches of the estuary the saltmarsh has large areas of cordgrass *Spartina* and low-mid marsh communities grading to sand dune vegetation; further upstream there are patches of pioneer marsh and large stands of long-established reedbeds. In places the estuary is backed by lowland wet grasslands, such as the Exminster Marshes, which support a rich flora and fauna that includes several uncommon species, particularly in the drainage ditches.

The sandy spit of Dawlish Warren shelters much of the estuary. On the spit itself there is a small, lime-rich dune system that supports a very rich flora. The seaward side of the dunes is subject to periods of rapid change, of both erosion and accretion.

The Exe Estuary has a wide range of habitats that support a diverse flora and fauna, which includes nationally important populations of seven species of waterfowl. It is an important winter refuge for waders in particular.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	•	•	•	•		•		
Area (ha)	673	66	1,	135			• = major	habitat	(® = r	ninor habitat

Aquatic estuarine communities

Soft substrate

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

Hard	su	DSI	rat	te
------	----	-----	-----	----

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

Additional wildlife features

Three Red List plants grow adjacent to the estuary: field eryngo *Eryngium campestre*, sand crocus *Romulea columnae* and broad-fruited cornsalad *Valerianella rimosa*. A number of nationally scarce species also grow on or adjacent to the estuary.

The invertebrate fauna recently recorded on the estuary includes the RDB 2 flies *Limonia bezzii* and *Platypalpus*

stabilis, the RDB 3 fly *Dexiopsis minutalis*, the RDB 3 beetle *Octhebius poweri* and the RDB 3 white spot moth *Hadena albimacula*. In addition one proposed RDB species and eighteen Notable species have also been recorded.

The sand lizard *Lacerta agilis* has been successfully reintroduced to Dawlish Warren.



N

e = 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
•	•		•	•	1.5	•	•	•			٠	•			•		0.0		•
1	2		1	2		2	1	1		1.1.1.1.1.1.1	3	1			2				2

Much of the estuary lies within Sites of Special Scientific Interest. The largest is the Exe Estuary (2,182 ha), which is a SSSI for its biological, geomorphological and geological interest and is also a Nature Conservation Review site. Dawlish Warren (207 ha) is a SSSI for its biological and geological interest and Dawlish Cliffs (8.5 ha) is a geological SSSI. Dawlish Warren and Orcombe are Geological Conservation Review sites.

The Exe Estuary has been designated as a Ramsar site and a Special Protection Area. It is also a Sensitive Marine Area. Dawlish Warren and Exmouth are Local Nature Reserves.

Devon Wildlife Trust have three reserves on the Exe Estuary: the Old Sludge Beds, Exe Reed Beds and Dawlish Warren, and the RSPB has a reserve on the Exe Estuary. The National Trust have land at Orcombe Point and Lympstone. In addition, a bird Sanctuary Order covers the western shore of the estuary.



Human activities (in 1991)

		·	`	
	Coast protection & sea defences Linear defences			Tourism & recreation Infrastructure developments
	Training walls		•	Marinas
	Groynes	•	•	Non-marina moorings
	Brushwood fences			Dinghy & boat parks
	Sparina planting Marram grass planting	•		Leisure centres complexes & piers
	Warran grass planning			Aquatic-based recreation
ŝ	Barrage schemes	•	•	Power-boating & water-skiing
	Weirs & harrages for river management			Jet-skiing
	Storm surge barrages	•		Sailing
	Water storage barrages & bunds			Sailboarding & wind-surfing
	Leisure barrages			Canoeing
	Tidal power barrages			Surfing
T	D	•		Rowing
	Power generation	•		Tourist boat trips/leisure barges
1	Import/export jetties (power generation)	•		Angling
	Wind-power generation			Other non-commercial fishing Rathing & general based more tion
- and -				Terrestrial & intertidal-based recreation
	Industrial, port & related development	•		Walking, including dog walking
	Dock, port & harbour facilities			Bird-watching
	Manufacturing industries			Sand-yachting
	Chemical industries			4WD & trial-biking
	Ship & boat building/repair			Car sand-racing
10000	Ould's			Rock-climbing
	Extraction & processing of potunal and & all			Golf courses
	Extraction & processing of natural gas & off			Clay-pigeon shooting
	Production			Others
	Rig & platform construction			Airborne recreation
(and and a	Pipeline construction			Overflying by light aircraft
	Pipeline installation			Kadio-controlled model aircraft
	Import/export jetties & single-point moorings		4	Odicis
	Oil refineries			Wildfowling & hunting
	womoanning of rigs & tankers	•		Wildfowling Other hunting-related activities
	Military activities		+	State numung-related activities
1	Overflying by military aircraft			Bait-collecting
1	Others	•		Digging & pumping for lugworms & ragworms
t	and the second se			Others
	Waste discharge			
1000	Sewage discharge & outfalls			Commercial fisheries
	Sewage treatment works			Fish-netting & trawling
	Rubbish tips			Fish trans & other fixed devices & note
	Industrial & agricultural waste discharge			Crustacea
	Thermal discharges (power stations)	•		Molluscs - Hand-gathering
	Dredge spoil			Dredging
	Accidental discharges			Hydraulic dredging
	Waste incinerators			Cultivation of living resource
	Others			Saltmarsh grazing
				Sand dune grazing
	Sediment extraction			Agricultural land-claim
	Capital dredging			Fish-farming
	Maintenance dredging			Shellfish farming
	Commercial estuarine aggregates extraction	•		Bottom & tray cultivation
	Commercial terrestrial aggregates extraction			Crustacea farming
	Non-commercial aggregates extraction			Reeds for roofing
	Hard-rock quarrying			Salicornia picking
	Transport & accumulations			Others
	Airport & communications			Management & Lilling of Linds P.
	Tunnels bridges & acueducts			Killing of mammale
	Causeways & fords			Killing of birds
	Road schemes			Adult fish-eating birds
	Ferries			Adult shellfish-eating birds
	Cables			Gulls
1	Urbanisation			Geese Wildlife habitat management
	Land-claim for housing & car parks			Spartina control
				Habitat creation & restoration
10000m				Marine
	Education & scientific research		ALC: CONTRACTOR OF	
	Education & scientific research Sampling, specimen collection & observation	_		Intertidal
	Education & scientific research Sampling, specimen collection & observation Nature trails & interpretative facilities Seismic studies & geological test drilling	•		Intertidal Terrestrial Habitat management
1	Education & scientific research Sampling, specimen collection & observation Nature trails & interpretative facilities Seismic studies & geological test drilling Marine & terrestrial archaeology	:		Intertidal Terrestrial Habitat management

Features of human use

Leisure activities are numerous on the Exe Estuary, particularly water-based pursuits. Around 2,500 moorings are based around Topsham, Lympstone, Cockwood and Exmouth, and sailing and power-boating occur throughout the site. Wind-surfing, water-skiing and SCUBA diving take place at Exmouth and Dawlish Warren, and some canoeing is known to occur. Exmouth and Dawlish Warren are the areas where beach recreation and walking is most intensive; the latter also occurs over Exminster Marshes.

Exploitation of the natural resources includes mussel, oyster and clam cultivation, bag-netting for fish, fykenetting for eels, and gathering of mussels and winkles. Various forms of bait-collection occur, including digging for worms, trawling for sand eels, and the use of crab tiles. Wildfowlers shoot over all the estuary, apart from the area of the western shore which is covered by a bird Sanctuary Order.

The only industrial activity present on the Exe includes docks at Exmouth, Exeter and Topsham, and boatbuilding/repair yards.

In 1991 there were proposals for a marina at Exmouth and for an increase in the number of non-marina moorings, and to extend the area for water-skiing northwards to Lympstone. There were also proposals for nature trails and interpretative facilities on Exminster Marshes and the RSPB reserve.





Categories of human use

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The Teign is a relatively undisturbed estuary with a moderate freshwater inflow, that flows into the sea at Babbacombe Bay. The mouth of the estuary is narrowed by Denn Point, a spit extending south-west into the estuary. This narrow entrance, coupled with a sharp bend of the main channel, ensures that the whole estuary experiences a similar degree of shelter from wave action. The water quality of the Teign Estuary has been classified as grade A.

There is a gradient of sediment types on the intertidal flats of the Teign, with coarse-grained sediments at the mouth and an increasing proportion of mud further upstream. At low tide sand and gravel flats are exposed in the central sections of the estuary, greatly dissected by channels, and in the upper reaches of the estuary there are predominantly muddy intertidal flats. Of note in the lower reaches is the sand and shingle scar known as the Salty, which is covered with mussels.

There has been very limited development of saltmarshes along both sides of the estuary, which are bounded by a railway bank and sea wall. The saltmarsh vegetation is formed of small patches of mid-upper marsh communities, with some cordgrass *Spartina*.

In addition there is an area of rocky shore towards the mouth of the estuary.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	•	•	1	۲				
Area (ha)	151	13	2	206			• = major	habitat	() = I	ninor habitat

Birds



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
•	•	•	•	•						10	•	•				

Additional wildlife features

The Red List moss *Tortula cuneifolia* is found on shaded coastal rocks in the Teignmouth area. Two nationally scarce marine species are found in the Teign Estuary, the amphipod *Gammarus chevreuxi* and the brown seaweed *Asperococcus compressus*.

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

= 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
		-				100						•								•
No.												1								1

There are no statutory conservation designations covering the Teign, but the southern shore of the upper parts of the estuary are managed as a sanctuary jointly by the Devon Wildlife Trust and the Devon Wildfowlers' Association.

Features of human use

Leisure activities are the most numerous feature of the estuary, with several dinghy parks and about 1,250 moorings around the site. Sailing is very popular and is centred on Teignmouth, for the upper estuary is very shallow. Water-skiing and windsurfing occur at Coombe Cellars on the southern shore and canoeists use the whole estuary. Beach recreation occurs on Shaldon and Ness beaches.

Exploitation of the natural resources includes seine-netting for salmon, gathering winkles by hand, and extensive cultivation of mussels and oysters. The Teign is the primary shellfish estuary in Devon. In addition various types of bait are collected including worms, sand eels and crabs. Wildfowling rights for the Teign are held by the Devon Wildlife Trust and the Devon Wildfowlers' Association, and shooting occurs over the northern shore.

The only industrial activities are maintenance dredging for the harbour at Teignmouth and gravel extraction in the upper parts of the estuary.

In 1993 there were proposals to expand the harbour, to construct a marina on the Salty/Shaldon shore, and for capital dredging in the upper reaches of the site.





Human activities (in 1993)



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Fossil collecting

8.	
	Coast protection & sea defences
	Linear defences
	Training walls
	Groynes Brushwood fences
	Spartina planting
	Marram grass planting
	Parrage asharras
	Weirs & barrages for river management
	Storm surge barrages
	Water storage barrages & bunds
	Leisure barrages
	fidal power barrages
	Power generation
	Thermal power stations
	Import/export jetties (power generation) Wind-power generation
	T 1
	Industrial, port & related development
•	Manufacturing industries
	Chemical industries
	Ship & boat building/repair
	Others
	Extraction & processing of natural gas & oil
	Exploration
	Production
	Rig & platform 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
	Thermal discharges (power stations)
	Dredge spoil
	Accidental discharges
	Aerial crop spraying
	Others
	the second s
	Sediment extraction
•	Capital dredging Maintenance dredging
	Commercial estuarine aggregates extraction
	Commercial terrestrial aggregates extraction
	Non-commercial aggregates extraction
	man-rock quarrying
	Transport & communications
	Airports & helipads
	Tunnels, bridges & aqueducts
	Road schemes
	Ferries
	Cables
	Urbanisation
	Land-claim for housing & car parks
	Education & scientific research
	Sampling, specimen collection & observation
	Seismic studies & geological test drilling
	Marine & terrestrial archaeology



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Centre grid: SX8753 County: Devon

District: South Hams EN area: Devon & Cornwall

Review site location



NTL = Normal tidal limit	Total area	Intertidal	Shore	Channel	Tidal range	Geomorph.	Human
XM = Across mouth	(ha)	area (ha)	length (km)	length (km)	(m)	type	population
= Core site	863	313	60.5	19.8	4.0	Ria	11,000

The Dart Estuary is a narrow, steeply-sided estuary with many tributaries. Its upper reaches are at Totnes and the estuary flows past the town of Dartmouth to enter the sea in the north of Start Bay. Water quality in the estuary has been classified as grade A.

Much of the estuary is subtidal, with narrow strips of intertidal mudflat upstream of Dartmouth that form significant features only within the small tributaries. The Dart is known to support a variety of aquatic estuarine communities on both hard and soft substrates, which include a variable (reduced) salinity rocky shore community that is considered to be of national importance, and a hydrozoan/bryozoan turf community and a variable/reduced salinity mud community that are considered to be of regional importance. There is relatively little saltmarsh in the estuary, with the most extensive area on the south bank between Totnes and Stoke Gabriel and small areas of fringing saltmarsh within the tributaries. The saltmarsh vegetation is dominated by upper marsh swamps, particularly common reed, and some grazed mid-upper marsh. There are only very small areas of pioneer marsh, for much of the saltmarsh has a cliffed edge which indicates erosion, although the saltmarsh now appears to be stable.

There are several other habitats within the estuary. At Dittisham there is an shingle intertidal beach and at Froward Point east of the estuary mouth coastal slopes up to 100 m high support maritime heathland and grassland. In places woodland flanks the shore: for example, Lords Wood is an oak, hazel and ash woodland overlooking the tidal reaches of the Dart.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•		•		•	۲		1-1-1-	•
Area (ha)	550	25	2	88			• = major	habitat	@ = r	ninor habita

Birds



Aquatic estuarine communities

Soft substrate

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

Hard substrate

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

Additional wildlife features

The Dart Estuary contains the nationally rare bristle worm *Sternaspis scutata* and several nationally scarce marine benthic species: the pink sea fan *Eunicella verrucosa*, the sponge *Axinella damicornis*, the ginger tiny anemone *Isozoanthus sulcatus*, the gold and scarlet star coral *Balanophyllia regia* and the sea squirt *Pycnoclavella aurilucens*.

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

= 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
	-		•		1000						•	•							•	•
No.		1.1.1.	2		1	12					1	2					7		1	1

A very small area of the Dart Estuary lies within Sites of Special Scientific Interest. Froward Point (32 ha) is a biological SSSI and Lords Wood (21 ha) adjacent to the estuary is also a biological SSSI. Devon Wildlife Trust has reserves at Froward Point and The Grange, and the National Trust have land at Crownley Wood, Long Wood, Hoodown Wood, Froward Point, Little Dartmouth, Gallants Bower and Dyer's Hill.

The whole of the Dart Estuary lies within the South Devon Area of Outstanding Natural Beauty and the South Devon Heritage Coast. Parts of the estuary lie within the Torbay to Start Point Sensitive Marine Area.

Features of human use

Leisure activities are numerous and the Dart is a very popular sailing area, with several marinas and around 2,000 moorings which are concentrated at Dartmouth, Totnes, Dittisham and Stoke Gabriel. Power-boating, windsurfing and canoeing also occur and the whole estuary is used by anglers.

Exploitation of the natural resources includes salmon fishing, a mussel farm at Dittisham, periwinkles gathering and the mudflats off Galmpton are used for bait-digging.

There is little industrial activity on the Dart, with port facilities at Totnes and Kingswear, and a boat-building yard at Noss Point. The lower estuary is used extensively for naval exercises.

In 1993 there was a proposal for a deep water port at Noss Point.

Categories of human use







Human activities (in 1993)



	Coast protection & sea defences
	Linear defences
	Training walls
	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
	Mothballing of rigs & tankers
	Mouldaning 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
	Others
	Sediment extraction
	Capital dredging
	Maintenance dredging
	Commercial estuarine aggregates extraction
	Commercial terrestrial aggregates extraction
	Non-commercial aggregates extraction
	nau-rock quarying
	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
COLUMN AND ADDRESS	Mature trails & interpretative facilities

Sampling, specimen collection & observatio Nature trails & interpretative facilities Seismic studies & geological test drilling Marine & terrestrial archaeology Fossil collecting



Further reading

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Salcombe & Kingsbridge Estuary

Centre grid: SX7441 County: Devon

District: South Hams EN area: Devon & Cornwall

Review site location



Total area	Intertidal	Shore	Channel	Tidal range	Geomorph.	Human
(ha)	area (ha)	length (km)	length (km)	(m)	type	population
674	446	48.6	8.3	4.6	Ria	<5,000

This estuary lies between Salcombe and Kingsbridge and is a sheltered inlet, separated from the open sea by a submerged sand bar. The lower estuary is characterised by rocks and sandy bays, while the upper estuary is predominantly intertidal mudflats. The streams flowing into the creek heads are small and marine conditions prevail over the majority of the estuary; as a result many truly marine plants and animals are found here that seldom occur intertidally in estuaries elsewhere. Water quality within the estuary has been classified as grade A.

The slow water flow in the upper parts estuary has left a deep deposit of silt and at low tide many of the tributaries have expanses of intertidal soft sediments which are colonised in parts by *Enteromorpha* algae. Further down the estuary around Salcombe Harbour there are extensive

beds of Zostera eelgrass.

The estuary has a particularly rich intertidal and subtidal flora and fauna and there is a great diversity of aquatic estuarine communities present. These include a number of communities that are considered to be of national importance, such as exposed, moderately exposed, sheltered and variable salinity rocky shore communities. The estuary also has a rich example of a sand/muddy sand community in Mill Bay.

There has been little saltmarsh development in the estuary as steep, grassy hillslopes reach down to the high water mark. Only very small areas of saltmarsh are present at heads of the tributary creeks.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	۲	•	•		•		Stress The		
Area (ha)	228	4	4	42			• = major	habitat	● = I	ninor habitat

Birds



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

Three nationally scarce marine species are recorded from the estuary: the red seaweeds *Gracilaria multipartita* and *Gigartina pistillata* and the tentacled lagoon worm *Alkmaria romijni*.

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

• = 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
		•		•		•		1.24		•						•		•	•
		2		1		1				1						3		1	1

Much of the estuary lies within the Salcombe and Kingsbridge Estuary (652 ha) biological Site of Special Scientific Interest and there are two SSSIs adjacent to the mouth of the estuary: Bolt Head to Bolt Tail (229 ha) biological SSSI and Prawle Point to Start Point (341 ha) which is a SSSI for its geological and biological interest. Salcombe to Kingsbridge is a Local Nature Reserve.

The estuary lies within the South Devon Area of Outstanding Natural Beauty and within the South Devon Heritage Coast. The whole estuary is included within the Start Point to Bolt Tail Sensitive Marine Area.

The National Trust own land between Bolt Head to Bolt Tail, at Snapes Point and from Mill Bay to Prawle Point.





Many of the rias in Southern England, such as the Salcombe & Kingsbridge Estuary, have relatively steep-sided and often wooded shores. (Peter Wakely, English Nature)

Human activities (in 1993)



Coast protection & sea defences Linear defence 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



Clay-pigeon shooting Overflying by light aircraft Radio-controlled model aircraft Wildfowling & hunting

Digging & pumping for lugworms & ragworms

Commercial fisheries Fish-netting & trawling Fish traps & other fixed devices & nets Molluscs - Hand-gathering

Hydraulic dredging

Agricultural land-claim Bottom & tray cultivation Suspended cultivation

Management & killing of birds & mammals Adult shellfish-eating birds Wildlife habitat management Habitat creation & restoration

147.4

Features of human use

Exploitation of the natural resources is the dominant form of activity and includes oyster cultivation, fyke-netting for eels, fish-netting and shrimping. Commercial handgathering of winkles, cockles, mussels and oysters also occurs and very occasionally there is dredging for scallops. Bait-digging is small-scale and sand eels are fished for bait.

Leisure activities are largely water-based, with around 2,000 moorings in the estuary and boating facilities and a dinghy/boat park at Salcombe. Sailing occurs throughout the site and many anglers use the estuary. Beach recreation is most intensive in the lower reaches of the estuary.

The only industrial activities are a harbour at Salcombe and boat-building/repair yards at Lincombe and Goodshelter.

In 1993 there were proposals for capital dredging at the mouth of the estuary; for land-claim for a boat-building yard at Lincombe; for a marina at West Charleton and a leisure island complex at West Charleton Marsh. There is generally considerable pressure for additional moorings/marinas in the estuary.





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The estuary of the River Avon extends from Aveton Gifford to enter the sea at Bigbury-on-Sea. The freshwater inflow from the river is low and at low tide the upper reaches of the estuary are predominantly intertidal mudflats with small saltmarsh islands. Water quality in the estuary has been classified as grade A.

There is some saltmarsh on the estuary between Aveton Gifford and Hexdown, which appears to be accreting probably due to the increase of cordgrass *Spartina* in recent years, which now forms much of the pioneer marsh. There are small areas of low-mid marsh and grazed mid-upper marsh and narrow bands of upper marsh and transition communities.

Towards the mouth of the estuary the intertidal flats become sandy, with rocky shores where the Avon opens out into the bay. In addition there are small areas of sand dune at the mouth of the estuary.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	•	•	0	•		1.200	1.11	
Area (ha)	68	26	1	20		1.20.10	• = major	habitat	@ = r	ninor habitat

Birds



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
		-			2											

Additional wildlife features

The nationally scarce red seaweed *Gracilaria bursapastoris* is found in the estuary. The Avon is a major nursery for sea bass *Dicentrarchus labrax*.

e = 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
	1.11	16.15							1.		•									
No.											1						1		1	

There are no statutory designations on the Avon Estuary, but it lies within the South Devon Area of Outstanding Natural Beauty and the South Devon Heritage Coast. The National Trust own land at Clematon Hill, Bigburyon-Sea.



Features of human use

Leisure activities are numerous, with power-boating, sailing, wind-surfing and water-skiing occurring in the lower reaches of the estuary. Most leisure pursuits are not intensive, although there is a popular bathing beach at Bantham. Exploitation of the natural resources includes saltmarsh grazing, seine-netting for salmon, bait-digging for lugworms, and small-scale collection of crabs and razor shells for bait.





Categories of human use

Human activities (in 1993)



Education & scientific research Sampling, specimen collection & observation Nature trails & interpretative facilities Seismic studies & geological test drilling Marine & terrestrial archaeology Fossil collecting



Further reading

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= Core site

This is a small, secluded estuary which has a low freshwater input from the River Erme. Its upper reaches are narrow and muddy, but towards the mouth there are extensive sandflats which are colonised locally by seaweeds. The estuary has a predominantly steep and rugged shoreline, which is rocky near the mouth. Water quality within the estuary has been classified as grade A.

The upper reaches of the estuary support a stable saltmarsh with even, graded edges. Much of the marsh is dominated by cordgrass *Spartina* which began to invade

10-20 years ago, but stands of low-mid marsh and midupper marsh are also present. On either side of the estuary the saltmarsh grades into woodland and at the head of the estuary there is transition to a series of wet meadows which are subject to varying degrees of flooding and salinity. Such transitions from saltmarsh to woodland and wet grassland are rare in Britain.

The slopes adjacent to the estuary are extensively wooded, with oak and hazel woodlands that support a diverse ground flora.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	•	•	1.00	•	1. C	•	1200	•
Area (ha)	73	21	51				• = major	habitat	() = I	ninor habitat

Birds



Aquatic estuarine communities

Soft substrate

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

Hard substrate

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	1	•						•	•		•		•			

Additional wildlife features

The Red List plant dwarf spike-rush *Eleocharis parvula* and the nationally scarce red seaweed *Gracilaria bursa- pastoris* are recorded in the estuary.

The invertebrate fauna recently recorded on the Erme Estuary includes the RDB 1 weevil *Cathormiocerus attaphilus*, the RDB 2 weevil *Anchonidium unguiculare*, the RDB 3 fly *Ectinocera borealis*, one proposed RDB species and a further twelve Notable species.

The estuary is frequented by otters.
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		10.00						1							222	1	

The estuary lies within the Erme Estuary (431 ha) biological Site of Special Scientific Interest. It is also within the South Devon Heritage Coast and the South Devon Area of Outstanding Natural Beauty.



Features of human use

There are very few activities on the Erme. Leisure pursuits include sailing, power-boating and wind-surfing which occur in the lower reaches of the estuary as far upstream as Wonwell. Beach recreation is limited to the lower reaches of the site. Sand is extracted from the estuary just upstream of Mothecombe, and there is a fish farm present on the estuary.



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Human activities (in 1993)

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Seismic studies & geological test drilling Marine & terrestrial archaeology	20100000000			International Contract
Marine & terrestrial archaeology		Nature trails & interpretative facilities		Terrestrial
		Nature trails & interpretative facilities Seismic studies & geological test drilling		Terrestrial Habitat management



Description

The Yealm Estuary has several small tributaries each with a small freshwater inflow, that combine and enter the sea at Wembury Bay. The estuary has a relatively small proportion of intertidal flats, which are predominantly muddy in the upper reaches, with a mixture of mud and shingle near Bridgend. There are small areas of sandflat towards the mouth, where the shores are predominantly rocky. Water quality in the estuary has been classified as grade A.

There are only very small areas of saltmarsh within the Yealm Estuary, located far upstream at the heads of two of the tributaries. The shore here is mainly rocky with mudflats and very small areas of fringing saltmarsh vegetation which includes small patches of cordgrass *Spartina*, grazed mid-upper marsh, *Phragmites* reed and freshwater transitions. The aquatic estuarine communities of the estuary are of considerable interest, for the rocky shores have numerous rock pools and provide crevices and gullies which shelter delicate organisms. The extensive wave-cut platform of Wembury Point is sheltered from extreme wave action by outlying reefs which have interesting intertidal plant and animal communities. Within the Yealm Estuary there is a *Spisula* variant of the gravel/shell gravel community that is considered to be of national importance and there are sheltered rocky shore, sheltered rock, and variable salinity rock communities present that are considered to be of regional importance.

In the upper reaches towards Yealmpton the estuary is surrounded by woodland.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	0	•	12.1 1.1	•	1. 1. 1. 1. 1.		1	
Area (ha)	292	2	1	52			• = major	habitat	@ = r	ninor habitat

Birds



Aquatic estuarine communities

-	-	-	-	-		-	-	-				-		-	-
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

Three nationally rare marine species have been recorded in the Yealm: the brittlestar *Ophiopsila aranea* which is found on the Mewstone Ledges at Wembury, the amphipod *Microdeutopus stationis* and the red seaweed *Bornetia secundiflora*. A number of nationally scarce marine species have also been recorded: the hydroids *Hartlaubella gelatinosa* and *Laomedea angulata*, the amphipod *Apherusa ovalipes* and the red seaweed *Gigartina pistillata*. The invertebrate fauna recently recorded on the estuary includes the RDB 1 weevil *Cathormiocerus attaphilus* and the RDB 1 bee *Nomada guttulata*, the RDB 2 fly *Xanthandrus comtus* and a further five Notable species.

The Yealm is a major nursery for sea bass *Dicentrarchus labrax*. Otters regularly use the estuary.

Conservation status

e = 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
			•	1		0									-			1.12		•
No.			1								1						2		1	2

Part of northern shore of the estuary lies within the Wembury Point (139 ha) biological Site of Special Scientific Interest. The National Trust own most of the land along the north and south banks of Wembury Bay and the lower Yealm Estuary.

The Yealm lies within the South Devon Heritage Coast and South Devon Area of Outstanding Natural Beauty.

The sea and sea bed around Wembury is a voluntary Marine Nature Reserve and the estuary is within the Plymouth Sound, Tamar, Yealm and Eddystone Sensitive Marine Area.



Human activities (in 1991)





Features of human use

Leisure activities are numerous, although not particularly intensive. There are a large number of moorings at Yealm Pool and Steer Point, although sailing and power-boating occur generally within the estuary. Windsurfers use only the lower reaches of the estuary, and SCUBA diving and snorkelling occur around Wembury. Beach recreation takes place around the mouth of the Yealm, and birdwatching occurs at Wembury Point.

Exploitation of the natural resources includes an oyster farm off Steer Point, seine-netting and gill-netting for fish, and crab potting off Wembury. Bait-digging is known to occur within the estuary.

In 1991 there was a proposal for an interpretative centre at Wembury.



Categories of human use



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Plymouth Sound

Centre grid: SX4356 Counties: Cornwall, Devon Districts: Caradon, West Devon, Plymouth City EN area: Devon & Cornwall

Review site location



Total area	Intertidal	Shore	Channel	Tidal range	Geomorph.	Human
(ha)	area (ha)	length (km)	length (km)	(m)	type	population
3.962	1.809	208.6	34.1	4.7	Ria	260,000

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

Description

Plymouth Sound is the estuary of five tributaries, the Plym, Tavy, Tamar, Lynher and St John's Lake, which discharge through a joint mouth at the wide, rocky entrance of Plymouth Sound. The tributaries are relatively secluded, with the exception of the Plym which is bordered by the city and dockyards of Plymouth. Water quality within the estuary has been classified as grade A, apart from a small section of the upper Plym which is grade B.

At low tide extensive intertidal mudflats are exposed, which become more sandy and gravelly in the outer parts of the Plym and St John's Lake. Around the mouth of the estuary there is only a narrow fringe of sandflats, for the mouth is dominated by rocky shores.

Only relatively small areas of saltmarsh have developed

within the tributaries of the estuary. Within the Tamar much of the saltmarsh has cliffed edges suggesting erosion; a variety of saltmarsh communities is present here but consists mainly of low-mid marsh and grazed midupper marsh. Within the Tavy saltmarsh occurs along the western shore and consists predominantly of *Phragmites* reedbeds; on the northern shore of the Lynher a wider range of saltmarsh communities occurs, from low-mid marsh through mid-upper marsh to freshwater marsh. The saltmarsh on St John's lake is dominated by cordgrass *Spartina*.

In places the estuarine mudflats are bounded by coastal ancient woodlands, for example at Warleigh Point and Hangingcliff Wood. There is also an area of coastal grassland at Western King.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	۲	•		•		12000	۲	۲
Area (ha)	2,153	359	1,	450			• = major	habitat	🏶 = r	ninor habitat

Aquatic estuarine communities

Soft substrate

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

17 18 10 20 21 22 22 24 25 26 27 28	Ha	rd s	ubs	trat	e								
17 18 19 20 21 22 23 24 23 20 27 28 2	17	18	19	20	21	22	23	24	25	26	27	28	29

30 31 32 33

Birds



Additional wildlife features

Britain's only population of the Red List plant triangular club-rush *Schoenoplectus triqueter* grows on the estuary, as well as the Red List shore dock *Rumex rupestris*. A number of nationally rare and scarce terrestrial plants have been recorded from habitats adjacent to Plymouth Sound.

The estuary supports three nationally rare marine benthic species: the fan anemone *Amphianthus dohrnii*, the Weymouth carpet coral *Hoplangia durotrix* and the sunset

coral *Leptopsammia pruvoti*. Dense stands of the nationally scarce pink sea fan *Eunicella verrucosa* are also found in the outer Plymouth Sound area.

The invertebrate fauna recently recorded on the estuary includes six Notable species. The estuary is a nursery area for juvenile Dover sole *Solea solea* and is a major nursery for sea bass *Dicentrarchus labrax*.

Conservation status

e = 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
1.13	•	•	•	•							•		1000	1.043		i presi		12-2	-	•
No.	1	3	3	1	1	-			1	1	1	3				100	2			2

Most upper areas of the estuary lie within Sites of Special Scientific Interest. Biological SSSIs include the Tamar-Tavy Estuary (1,441 ha), and St John's Lake (279 ha) and Lynher Estuary (687 ha) which form a Nature Conservation Review site. Western King (2 ha) is a SSSI for its biological and geological interest and Mount Wise (0.5 ha) is a geological SSSI. There are Geological Conservation Review sites at Western King, Mount Wise and Richmond Walk.

Cornwall Trust for Nature Conservation has a reserve at Cargreen and Devon Wildlife Trust has reserves at Hangingcliff Wood and Warleigh Point Wood. The National Trust own land at Saltram House and Erth Barton and Erth Island. There is a Country Park at Mount Edgcombe.

The upper reaches of the Tamar lie within the Tamar Valley Area of Outstanding Natural Beauty. Plymouth Sound and Estuaries is a proposed Special Protection Area and a candidate Special Area of Conservation, and Plymouth Sound, Tamar and Yealm is a Sensitive Marine Area.



Human activities (in 1992)

resent prof	e ^{cont}	Present Pro	
•	Coast protection & sea defences Linear defences Training walls Groynes Brushwood fences Spartina planting Marram grass planting		Tourism & recreation Infrastructure developments Marinas Non-marina moorings Dinghy & boat parks Caravan parks & chalets Leisure centres, complexes & piers Acutetic based excreation
•	Barrage schemes Weirs & barrages for river management Storm surge barrages Water storage barrages & bunds Leisure barrages Tidal power barrages		Aquate-based recreation Power-boating & water-skiing Jet-skiing Sailboarding & wind-surfing SCUBA & snorkelling Canceing Surfing
•	Power generation Thermal power stations Import/export jetties (power generation) Wind-power generation		Rowing Tourist boat trips/leisure barges Angling Other non-commercial fishing Bathing & general beach recreation
•	Industrial, port & related development Dock, port & harbour facilities Manufacturing industries Chemical industries Ship & boat building/repair Others		Terrestrial & intertidal-based recreation Walking, including dog walking Bird-watching Sand-yachting 4WD & trial-biking Car sand-racing Horse-riding Bock-climbing
	Extraction & processing of natural gas & oil Exploration Production Rig & platform construction Pipeline construction Pipeline installation Import/export jetties & single-point moorings	;	Golf courses Clay-pigeon shooting Others Airborne recreation Overflying by light aircraft Radio-controlled model aircraft Others
	Oil refineries Mothballing of rigs & tankers		Wildfowling & hunting Wildfowling Other hunting-related activities
•	Military activities Overflying by military aircraft Others		Bait-collecting Digging & pumping for lugworms & ragworms Hydraulic dredging for worms 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	:	Commercial fisheries Fish-netting & trawling Fyke-netting for eels Fish traps & other fixed devices & nets Crustacea Molluscs – Hand-gathering Dredging Hydraulic dredging
	Aerial crop spraying Waste incinerators Others	•	Cultivation of living resource Saltmarsh grazing Sand dune grazing
••	Sediment extraction Capital dredging Maintenance dredging Commercial estuarine aggregates extraction Commercial terrestrial aggregates extraction Non-commercial aggregates extraction Hard-rock quarrying		Agricultural land-claim Fish-farming Shellfish farming Bottom & tray cultivation Suspended cultivation Crustacea farming Reeds for roofing Salicornia picking
• •	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries Cables	•	Others Management & killing of birds & mammals Killing of mammals Killing of birds Adult fish-eating birds Adult shellfish-eating birds Gulls Geese
	Urbanisation Land-claim for housing & car parks		Wildlife habitat management Spartina control
: .	Education & scientific research Sampling, specimen collection & observation Nature trails & interpretative facilities Seismic studies & geological test drilling Marine & torrestrial condendary		Habitat creation & restoration Marine Intertidal Terrestrial Habitat management
	Fossil collecting	•	Others

Features of human use

The eastern shore of the lower estuary is dominated by the city of Plymouth and its many docks: the major concentrations of docks are at the Royal Naval Dockyard, Mutton Cove and Cattewater. There is a ship-building yard at the Royal Naval Dock on the Plym and boatbuilding occurs on the Lynher and at Calstock. Other industrial activities include a metal industry at Cattewater and a range of light industry in the urban areas. Activities within the lower estuary are dominated by the naval bases which carry out exercises on St John's Lake.

Exploitation of the natural resources includes netting for fish in the Tamar, Tavy and Lynher, while gill-netting for fish and lobster and crab-potting occur in the lower estuary. In the Tamar mussel-collecting and cockling occur and there is some boulder turning for crabs and baitdigging in the lower estuary. Wildfowlers shoot over St John's Lake, the Tamar and the Lynher.

Leisure facilities include a leisure barrage at Millbrook and there are various moorings and marinas in the estuary. Water sports such as power-boating, sailing, wind-surfing are present throughout Plymouth Sound, but canoeing is mainly contained within the upper reaches of the estuary. SCUBA-diving and snorkelling occur in the lower reaches of Plymouth Sound.

In 1992 there were proposals for leisure barrages at Tamerton Creek and Laira on the Plym; for a marina at Millbrook; and there was a proposal to build a power station at Insworke Point.





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= Core site

Description

This small estuary of the West Looe and East Looe rivers is set in steep-sided and largely wooded valleys and discharges into the sea through a narrow mouth. The estuary is very shallow and the rivers provide a low freshwater inflow, and at low tide the estuary drains almost completely. Water quality has been classified as grade A.

The Looe Estuary has a relatively small area of intertidal flats and very small areas of saltmarsh in its upper reaches. In the upper parts of the East Looe River the edges of the saltmarsh are cliffed, which indicates some erosion. The saltmarshes of both rivers are small and somewhat fragmented but support a variety of saltmarsh vegetation communities.

On either side of the mouth of the estuary there are rocky shores that support communities which are considered to be of national marine biological importance.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	0	•		•	1.000			
Area (ha)	13	6		37		1.200	• = major	habitat	@ = r	ninor habitat

Birds



Aquatic estuarine communities

5 6 7 8

Soft substrate

Hard substrate

.

species.

1

2 3 4

Additional wildlife features The terrestrial invertebrate fauna recorded at Kilminorth Wood adjacent to the estuary includes seven Notable

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

9

10 11 12

13 14

15 16

Conservation status

e = 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
						100	٠							1.351						٠
No.							1											1.52		1

Looe Estuary is a voluntary Marine Nature Reserve. Kilminorth Wood to the west of the estuary is a Local Nature Reserve.



Features of human use

There are very few activities present on the Looe Estuary. There are a small number of moorings and some sailing and canoeing occurs, but water sports are limited as the estuary is shallow and drains almost completely at low tide. Bird-watching is not intensive, and there is a nature trail at Kilminorth Wood.

Looe Harbour is used primarily by a small fishing fleet, and by pleasure craft in summer. A small boatyard is located opposite Trenant Wood in the West Looe.



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Human activities (in 1993)



0

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

Proposed Present **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-vachting 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

0



Total area	Intertidal	Shore	Channel	Tidal range	Geomorph.	Human
(ha)	area (ha)	length (km)	length (km)	(m)	type	population
305	146	39.2	11.1	4.8	Ria	<5,000

Description

The Fowey is a narrow estuary with several small tributaries. Historically the estuary supported a thriving port at Lostwithiel, but the upper reaches of the estuary have gradually become silted and the harbours lower down the estuary at Fowey and Golant now support the large volume of commercial and tourist traffic. Water quality in the estuary has been classified as grade A.

Flowing through steep-sided and largely wooded valleys, the Fowey is a small estuary with mudflats only in its upper parts. North of Golant there are extensive intertidal mud and sandflats which are drained by narrow channels at low water. There are only a few very small and isolated areas of saltmarsh at Milltown, Lerryn, Middle Penpoll and St Winnow, and the vegetation consists of driftline and upper marsh swamps, with a very small area of grazed mid-upper marsh. The edges of the saltmarsh appear to be suffering from slight erosion. At the mouth of the estuary there are areas of rocky shore.

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•		۲	•		0				
Area (ha)	159	3	1	43			• = major	habitat	@ = n	ninor habitat

Birds



Aquatic estuarine communities

Soft substrate



Hard substrate



Additional wildlife features

The terrestrial invertebrate fauna recently recorded on the estuary includes the RDB 2 fly *Erycia furibunda* and one Notable species.

The Fowey Estuary is a major nursery for sea bass Dicentrarchus labrax.

Conservation status

 \blacksquare = designated \circledast = proposed

	NCR	GCR	SSSI (B)	SSSI (G)	SSSI (M)	NNR	LNR	Ramsar	SPA	SAC	AONB	CWT	RSPB	ESA	NP	WWT	NT	NSA	HC	Other
											•						٠		•	•
No.		or in	Sec.								1						6		1	1

There are no statutory conservation designations on the Fowey Estuary. However, the National Trust own large areas of land around the estuary, at Polruan, Pont Pill, Hall Walk, Penpoll Creek, Lerryn Creek and Coombe. Great Wood is owned by the Forestry Commission.

The Fowey Estuary lies within the Cornwall Area of Outstanding Natural Beauty and part of the estuary lies within the Gribbin Head-Polperro Heritage Coast.





Features of human use

Most activities are recreational, which occur in the lower reaches of the estuary where there are up to 1,400 moorings. Leisure pursuits include sailing, occasional wind-surfing, SCUBA diving, beach recreation at Readymoney beach, canoeing and angling.

Exploitation of the natural resources include a commercial salmon and trout farm at Upper Carn Point, and boulder turning for crabs for bait. There is a Field Study Centre at

Lanlivery which uses the estuary as a study site.

Industrial activities include a harbour at Fowey, for the estuary is a very busy commercial waterway and of particular importance for the export of china clay. There are boat-building yards at Lostwithiel and Polruan.

In 1992 there was a proposal for a sewage treatment works adjacent to the estuary.



Categories of human use



Human activities (in 1992)

esent ad	ose a second sec
. 4.	
	Coast protection & sea defences
	Linear defences
	Training walls
	Brushwood fances
	Sparting planting
	Marram grass planting
	- minim gross primaria
	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 next & related development
	Dock port & harbour facilities
	Manufacturing industries
	Chemical industries
	Ship & boat building/renair
	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
	Militare anticities
	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
	maid-fock quarrying
	Transport & communications
	Airports & helinads
	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

Proposed Present 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

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Further reading

- Burd, F. 1986. Saltmarsh survey of Great Britain. County report, Cornwall. Unpublished, Nature Conservancy Council.
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Total area	Intertidal	Shore	Channel	Tidal range	Geomorph.	Human
(ha)	area (ha)	length (km)	length (km)	(m)	type	population
2,482	746	126.8	18.1	5.3	Ria	42,000

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

Description

The estuary at Falmouth lies within a steep-sided river valley and forms a large natural harbour. The estuary has many tributaries, namely the Fal, Tresillian, Truro and Percuil Rivers and Restronguet Creek. Water quality within the estuary has been largely classified as grade A, apart from the upper reaches of the Fal, the Restronguet and the western parts of the estuary mouth which were classified as grade B.

The central parts of the estuary are subtidal and fringed with rocky shore and the estuary supports a wide variety of aquatic estuarine communities. At St Mawes there is a very large maerl bed which covers 150 ha that is considered to be of national importance. There are also variable salinity rocky shore and sheltered rocky shore communities that are considered to be of regional importance.

The intertidal flats exposed at low tide are predominantly within the tributaries of the estuary and strips of shingle fringe the shores of the lower estuary. Small areas of saltmarsh are confined to the head of the tributaries and the cliffed edges to many of the saltmarshes imply a degree of erosion. The saltmarsh within Restronguet Creek has some pioneer and mid-upper marsh vegetation and the Truro River has small clumps of saltmarsh and extensive reedbeds in its upper reaches. The saltmarsh within the Fal/Ruan displays a transition from saltmarsh to carr woodland. Many areas of fringing woodland surround the estuary.

There are several lagoons adjacent to the estuary. Kiggon Pool and Tresemple Pond formed behind a causeway at the edge of the Tresillian River, Trelissick Pool was created at the head of the creek around 1840, and Froe Mill Pond is the only surviving tidal mill pond in Cornwall.

The estuary at Falmouth is also of interest for its wintering shorebirds and it regularly supports nationally important populations of wintering black-tailed godwits.

26 27 28

29 30 31 32 33

Wildlife features

Coastal habitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	•	۲	•		•	۲		•	
Area (ha)	1,736	93	6	53			• = major	habitat	@ = n	ninor habitat

Hard substrate

.

18 19 20 21 22 23 24 25

Aquatic estuarine communities

Soft substrate

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

Birds



Additional wildlife features

The nationally scarce plant Babington's leek Allium ampeloprasum var. babingtonii grows on the estuary.

The Fal supports the nationally rare red seaweed *Gelidiella calcicola* and a number of nationally scarce marine species: maerl *Lithothamnion corallioides*, the tentacled lagoon worm *Alkmaria romijni*, the trumpet anemone *Aiptasia mutabilis* and gold and scarlet star coral *Balanophyllia regia*. The terrestrial invertebrate fauna recently recorded on Falmouth includes three Notable species.

The Fal is a major nursery for sea bass *Dicentrarchus labrax*. Otters are known to frequent the estuary.

Conservation status

e = 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
1	•		•							0	•	٠			1200					•
No.	2	1.10	2				1		1.2	1	1	- 1			1000	1.11	8		1	2

The upper parts of the estuary lie within the Malpas Estuary (73 ha) biological Site of Special Scientific Interest and the Upper Fal Estuary and Woods (1,491 ha) biological SSSI. The latter SSSI overlaps two Nature Conservation Review sites.

Roseland is a voluntary Marine Nature Reserve and the estuary lies within the Dodman Point to the Lizard Sensitive Marine Area. Parts of the estuary lie within the Cornwall Area of Outstanding Natural Beauty and the Roseland Heritage Coast. Fal and Helford is a proposed Special Area of Conservation.

The National Trust own various sites along the estuary including St Anthony's Head, St Anthony In Roseland, Tregassick and Trewicne, St Mawes, St Just In Roseland, Ardevora, Trelonk and Trelissick. The Cornwall Wildlife Trust have a reserve on the Fal-Ruan Estuary.



Human activities (in 1992)

Present prof	ser l		Presont	Propos	Sensitive field in terrorible A
	Coast protection & sea defences Linear defences Training walls Groynes Brushwood fences <i>Spartina</i> planting Marram grass planting		•	•	Tourism & recreation Infrastructure developments Marinas Non-marina moorings Dinghy & boat parks Caravan parks & chalets Leisure centres, complexes & piers Aquatic-based recreation
•	Barrage schemes Weirs & barrages for river management Storm surge barrages Water storage barrages & bunds Leisure barrages Tidal power barrages		•		Power-boating & water-skiing Jet-skiing Sailing Sailboarding & wind-surfing SCUBA & snorkelling Canoeing Surfing
	Power generation Thermal power stations Import/export jetties (power generation) Wind-power generation		•		Rowing Tourist boat trips/leisure barges Angling Other non-commercial fishing Bathing & general beach recreation
•••	Industrial, port & related development Dock, port & harbour facilities Manufacturing industries Chemical industries Ship & boat building/repair Others	_	•		Walking, including dog walking Bird-watching Sand-yachting 4WD & trial-biking Car sand-racing Horse-riding Rock-climbing
	Extraction & processing of natural gas & oil Exploration Production Rig & platform construction Pipeline construction Pipeline installation Import/export jetties & single-point moorings				Golf courses Clay-pigeon shooting Others Airbome recreation Overflying by light aircraft Radio-controlled model aircraft Others
•	Oil refineries Mothballing of rigs & tankers		•		Wildfowling & hunting Wildfowling Other hunting-related activities
•	Military activities Overflying by military aircraft Others	_	•		Bait-collecting Digging & pumping for lugworms & ragworms Hydraulic dredging for worms 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		• • • •		Commercial fisheries Fish-netting & trawling Fyke-netting for cels Fish traps & other fixed devices & nets Crustacea Molluses – Hand-gathering Dredging Hydraulic dredging
	Waste incinerators Others				Cultivation of living resource Saltmarsh grazing Sand dune grazing
:	Sediment extraction Capital dredging Maintenance dredging Commercial estuarine aggregates extraction Commercial terrestrial aggregates extraction Non-commercial aggregates extraction Hard-rock quarrying			•	Agricultural land-claim Fish-farming Shellfish farming Bottom & tray cultivation Suspended cultivation Crustacea farming Reeds for roofing Salicornia picking
•	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries Cables		•		Others Management & killing of birds & mammals Killing of mammals Killing of birds Adult fish-eating birds Adult shellfish-eating birds Gulls Genera
•	Urbanisation Land-claim for housing & car parks				Wildlife habitat management
:	Education & scientific research Sampling, specimen collection & observation Nature trails & interpretative facilities Seismic studies & geological test drilling Marine & terrestrial archaeatory			٠	Habitat creation & restoration Marine Intertidal Terrestrial Habitat management
	Fossil collecting				Others

Features of human use

Industrial activities are not extensive. They include two boat-building/repair yards at Penryn and Falmouth, the latter having recently been upgraded, and dock and port facilities at Falmouth, St Mawes, Penryn, Mylor and Truro.

Leisure and recreation activities are widespread, with four marinas and a number of moorings in most creeks. Sailing and canoeing occur throughout the estuary but power-boating, water-skiing and wind-surfing are centred on Carrick Roads as far upstream as Turnaware Point. Beach recreation is centred on Loe Beach and Flushing.

Exploitation of the natural resources include an oyster

fishery in the Fal River, dredging for oysters in Carrick Roads and experimental farming of Pacific oysters, although the latter is declining. Various forms of nets are used to catch fish and the estuary is an important bass fishery. Lobster- and crab-potting and shrimping also occur. There is some bait-digging around Truro and wildfowling occurs in the upper reaches of the Fal.

In 1992 there were proposals for a container port and ferry terminal and for a flood prevention barrage in Truro River. A marina was proposed for the Truro River with compensatory creation of intertidal flats in the Fal and a proposed fish farm was to be located in the Fal-Ruan.





Categories of human use

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Helford Estuary

Centre grid: SW7626 County: Cornwall District: Kerrier EN area: Devon & Cornwall

Review site location



Description

The Helford Estuary flows through a steeply-sided and largely wooded valley. Several of the woodlands that flank the estuary are ancient oak woodlands. The Helford Estuary has several small tributaries which contribute only a small amount of freshwater to the system. Water quality within the estuary has been classified as grade A.

In its lower reaches much of the estuary is subtidal, fringed with rocky shore and cliffs. The estuary supports a variety of aquatic estuarine communities, which include beds of *Zostera* eelgrasses, maerl, beds of European oysters and slipper limpets, and a rich sand/muddy sand community. The Helford Estuary is considered to be of international marine biological importance for its sediment communities.

In the upper reaches of the Helford there are intertidal mudflats, upon which small areas of saltmarsh have developed which consist of small areas of cordgrass *Spartina* and mid-upper marsh vegetation. Towards the estuary mouth and in the small creeks there are small areas of mud, sand and shingle.

Wildlife features

Coastal nabitats	Subtidal	Saltmarsh	Sandflats	Mudflats	Sand dunes	Rocky shores	Shingle	Lowland grassland	Lagoon	Other
	•	0	0	•		•	0	North N	Cine Co	
Area (ha)	400	5	1	81	1		• = major	habitat	() = 1	ninor habitat

Birds



Aquatic estuarine communities

Sof	t su	bstr	ate												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	•				1	•	•	•	•	•			•	•	

Hard substrate

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

Additional wildlife features

The Red List plant Greek sea-spurrey *Spergularia bocconii* and a number of nationally scarce plants grow on or adjacent to the estuary. The invertebrate fauna recently recorded on Helford includes the RDB 2 leaf-litter weevil *Anchonidium unguiculare* and thirteen Notable species.

The Helford is a major nursery for sea bass *Dicentrarchus labrax*. Otters are also known to be present on the estuary.

Conservation status

e = 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
•	•	•	•	•					۲	•		2123	1111	100					•
1	2	1	1	1	22.14			high.	- 1	1	1					12	1		2

Three Sites of Special Scientific Interest cover parts of the estuary. Merthen Wood (72 ha) is a biological SSSI. Meneage Coastal Section (80 ha) is a geological SSSI and Rosemullion Head (21 ha) which just overlaps the mouth of the estuary is a SSSI for its biological and geological interest. Merthen Wood is also a Nature Conservation Review site and there are Geological Conservation Review sites at Little Dennis-Gillian Harbour-Nare Head-Porthallow and at Rosemullion Head.

The Helford Estuary is a voluntary Marine Nature Reserve and lies within the Dodman Point to the Lizard Sensitive Marine Area. Fal and Helford is a proposed Special Area of Conservation and the estuary also lies within the Cornwall Area of Outstanding Natural Beauty.

The National Trust own many sites around the estuary, including Mawnan Glebe, Bosloe, Glendurgan, Tremayne Woods, Frenchman's Creek, Penarvon Cove, Gillan Creek and Trewarnevas and Coneys Burrow Cove.

Features of human use

Leisure activities are numerous and occur mostly in the lower estuary where there are moorings. Sailing, windsurfing, water-skiing, canoeing and beach recreation are known to occur on the estuary, particularly around Helford. Pleasure boat trips take place along the estuary, and walking occurs on the banks.

Exploitation of the natural resources is prominent and includes the cultivation of oysters, American hard clams and mussels, netting for fish, shrimps and prawns, and

Categories of human use





lobster- and crab-potting. Bait-digging and boulder turning for crabs for bait also occur. The only industrial activity is the small commercial port at Gweek, which is used mainly for landing fish and boat building.

A habitat re-creation project has involved placing shingle on the mudflats to study colonisation and accretion rates.

In 1992 there were proposals to extend the wharfs at Gweek for industrial usage and for capital dredging.



Human activities (in 1992)

	Contant in the second
	Coast protection & sea 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
	Tidal power barrages
	B
	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
	Rig & platform construction
	Pipeline construction
	Pipeline installation
	Import/export jetties & single-point moorings
	Oil refineries Mothalling of sign & taskar
	Mothoaning of rigs & tankers
	Military activities
	Overflying by military aircraft
	Others
	Waste discharge
	Domestic waste disposal
	Sewage discharge & outfalls
	Sewage treatment works
	Rubbish tips
	Thermal discharges (nower stations)
	Dredge spoil
	Accidental discharges
	Aerial crop spraying
	Waste incinerators
	Others
	Sediment extraction
0	Capital dredging
	Maintenance dredging
	Commercial estuarine aggregates extraction
	Non-commercial aggregates extraction
11111	Hard-rock quarrying
	Transport & communications
	Transport & communications Airports & helipads Tunnels, bridges & sourceburge
	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords
	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes
	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries
	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries Cables
	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries Cables Urbanisation
	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries Cables
	Transport & communications Airports & helipads Tunnels, bridges & aqueducts Causeways & fords Road schemes Ferries Cables Urbanisation Land-claim for housing & car parks Education & scientific research
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	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
Ì	Bait-collecting
	Digging & numping 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 recommend
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