

### 7.3.2 Action Plan for reviews and revision of the management scheme

Action for review and revision of management scheme	Type of Action	M	Responsibility	Time Frame						
				00/01	01/02	02/03	03/04	04/05	05/06	
Produce and launch final version of Management Scheme			All RAs		●					
Management Group meetings 2 per year. To include	reporting of compliance monitoring		All RAs and CWP		→	→	→	→	→	→
	report on condition monitoring		EN and EA		→	→	→	→	→	→
Formal review of the action plan	Review		All RAs		→	→	→	→	→	→
Organise meetings and act as secretariat	Liaison		TDC (Leisure and Tourism)		→	→	→	→	→	→
Every other year meeting with wider stakeholders	Liaison		All RAs		●		●			
Review of Management Scheme	Review		All RAs							●

### 7.3.3 Action Plan for survey and monitoring of the condition of the interest features

Feature or subfeatures and attribute to be monitored

Action for feature or subfeatures and attribute to be monitored		Type of Action	M	Responsibility	Time Frame				
					00/01	01/02	02/03	03/04	04/05
<b>cSAC Habitats</b>									
<b>Intertidal Habitats</b>									
Extent of intertidal reef, mudflats (roosting golden plover and feeding turnstone), sand and chalk shores (roosting and feeding turnstone), and shingle (roosting turnstone and breeding little tern)	Aerial photography survey at equinoxal tide, digitisation and analysis	Survey		English Nature (Kent County Council and Environment Agency)	●				
Water density, temperature and salinity	Investigate the feasibility and benefits of monitoring parameters and develop an appropriate monitoring programme	Monitoring		Environment Agency with English Nature via the water quality group	●	●			
<b>Reef</b>									
Distribution of intertidal reef communities	baseline survey	Survey		English Nature	●				
	monitoring	Monitoring		English Nature			●		
Extent of subtidal reef	baseline survey	Survey		English Nature		●			
	monitoring	Monitoring		English Nature					
Species composition of subtidal reef (Surveyed In 1999)	monitoring	Monitoring		English Nature		●			
<b>Sea caves</b>									
Number and character of sea caves	baseline survey	Survey		English Nature		●			
	monitoring	Monitoring		English Nature					●
Extent and distribution of cave communities	baseline survey	Survey		English Nature		●			
	monitoring	Monitoring		English Nature				●	
<b>SPA bird species</b>									
Little Tern	baseline survey of feeding and breeding habitats and disturbance levels and factors	Survey		English Nature with KWT	●				
	monitoring	Monitoring		English Nature with KWT					●
Golden Plover	survey of roosting habitat	Survey		English Nature with KWT		●			
	monitoring	Monitoring		English Nature with KWT					●
Turnstone	survey/research on feeding and roosting habitat and disturbance factors and levels	Survey/ Research		English Nature via Turnstone PhD	●	●	●	●	
	monitoring	Monitoring		English Nature via Turnstone PhD	●	●	●		

# Appendix



# Appendix

## Appendix A Glossary

This glossary has been compiled for the purposes of fostering understanding of this management scheme and therefore should not be taken as definitive.

<b>Abstraction</b>	Taking water from rivers or ground water.
<b>Algae</b>	Marine plants including green, red or brown seaweeds and microscopic organisms.
<b>Algal bloom</b>	A massive reproduction and growth of marine algae, usually free floating, in response to the presence of higher than normal level of nutrients.
<b>Algal mats</b>	Where an algal growth has become interwoven to form a mat. When a mat forms it can smother other algae.
<b>Annex I habitat type(s)</b>	A natural habitat type listed in Annex I of the Habitats Directive for which Special Areas of Conservation can be selected.
<b>Biodiversity</b>	The total variety of life on earth. This includes diversity within species, between species and of ecosystems.
<b>Biomass</b>	The total living or dry weight of biological life either occupying a level in the food chain, inhabiting a particular area, or in a particular population - depending on the context.
<b>Biota</b>	All the biological life (plants and animals) inhabiting a particular site, area, or period.
<b>Biotope</b>	The physical habitat with its biological community; a term which refers to the combination of physical environment and its distinctive assemblage of conspicuous species.
<b>Chalk aquifer</b>	A geological formation which holds an underground reservoir of water.
<b>Coastal Habitat Management Plan</b>	(CHaMP) These plans will provide a framework for managing European (and Ramsar) sites that are located on or adjacent to dynamic coastlines in fulfilment of obligations under the Habitats and Birds Directive (and the Ramsar convention) to avoid damage and deterioration at these sites particularly in relation to coastal defence issues.
<b>Characteristic species</b>	Special to or especially abundant in a particular situation or biotope. Characteristic species should be immediately conspicuous and easily identified.
<b>Citation</b>	The official note describing the reasons a site has been selected for a particular designation. (Eg cSAC, SPA, SSSI)
<b>Community</b>	Any naturally occurring group of organisms occupying a common environment.
<b>Competent authority</b>	Any Minister, government department, public or statutory undertaker, public person or person holding a public office that exercises legislative powers.
<b>Conservation objective</b>	A statement of the nature conservation aspirations for a site, expressed in terms of the favourable condition required for the habitats and/or species for which the site has been selected.
<b>Crustacean</b>	A class of invertebrates including crabs, shrimps and barnacles.
<b>Dessication</b>	Drying out by the sun and wind.
<b>Dune slack</b>	A hollow between dunes which has a high water table (ie the ground water is close to, at or above the ground surface).
<b>Dune feed sediments</b>	The sands which are moved onto the shore as a result of wave action and which are then built up by the wind to form dunes.
<b>Encrusting animals</b>	Marine animals which form colonies - like crusts - on hard surfaces.
<b>Energy budget</b>	The expenditure of energy in relation to its accumulation. In this context a bird which has been disturbed is using up energy to fly away which it may otherwise have used to lay down reserve fat in preparation for migration.
<b>European marine site</b>	A European site - SAC or SPA - which consists of, or in so far as it consists of, areas covered intermittently or continuously by seawater.
<b>Favourable conservation status</b>	A range of conditions for a natural habitat or species at which the sum of the influences acting upon it are not adversely affecting its distribution, abundance, structure or function throughout the biogeographic region.
<b>Favourable condition</b>	A range of conditions for a natural habitat or species at which the sum of the influences acting upon it are not adversely affecting its distribution, abundance, structure or function within an individual Natura 2000 site.
<b>Flood Defence Strategy</b>	A strategy which identifies options for defending sections of the coast.
<b>Food chain</b>	Plants or animals which are linked together in a sequence as one organism eats another and food energy is passed along.
<b>Foreshore</b>	The part of the shore which lies between normal high and low water marks.
<b>Fry</b>	Newly hatched or very young fish.
<b>Geomorphology</b>	The study of the formation and development of the land surface and its physical features.
<b>Grazers</b>	Marine animals which feed by scraping off microalgae from rocks and other surfaces.

<b>Habitat</b>	An environment defined by specific biological and non-biological factors in which the species lives at any stage of its life cycle.
<b>Habitats Directive</b>	The abbreviated term for <i>Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora</i> . It is the aim of this Directive to promote the conservation of certain habitats and species within the European Union.
<b>Habituate</b>	A decrease in the level of response over time to the same level of stimulation ie getting used to something.
<b>Hydrography</b>	The scientific study of seas, lakes and rivers.
<b>Hypertrophication</b>	Excessive level of nutrients (plant food).
<b>Interest feature</b>	A natural or semi-natural feature for which a European site has been selected. This includes any Habitats Directive Annex I habitat or Annex II species and any population of a bird species for which a site has been selected under the Birds Directive (see also sub-feature).
<b>Intertidal</b>	The area of the shore between the highest and lowest tides.
<b>Lichen</b>	An organism which is composed of algae and fungus.
<b>Maintain</b>	The action required for an interest feature when it is considered to be in favourable condition.
<b>Management scheme</b>	The framework established by the relevant authorities under Regulation 34 at a European marine site under which their functions are exercised to secure compliance with the Habitats Directive in relation to that site.
<b>Microalgal</b>	Microscopic marine plants - when grouped together they are visible as a coloured zone on e.g. cliff faces.
<b>Microbial pathogens</b>	A minute living being which can cause disease.
<b>Microtopography</b>	The small scale and detailed natural surface features of an area.
<b>Migratory</b>	Species of animals that move regularly between areas - often movements are between breeding and wintering feeding grounds.
<b>Molluscs</b>	Soft bodied unsegmented animals usually with shells e.g. limpets, periwinkles, whelks, cockles, muscles, oysters and piddocks.
<b>National Nature Reserve</b>	A designation given to Sites of Special Scientific Interest that are amongst the finest wildlife and earth heritage sites in England, containing examples of a wide range of ecosystems, habitats, communities and species, and of geological and geomorphological features and formations.
<b>Nationally scarce/rare</b>	For marine purposes, these are regarded as species or biotopes of limited national occurrence.
<b>Natural change</b>	Change which is attributable to natural causes rather than those which result from human activities.
<b>Natura 2000 series</b>	The European network of protected sites established under the Birds Directive and the Habitats Directive.
<b>Nutrient enrichment</b>	When a water body has an extra input of plant nutrients such as nitrates or phosphates, which under the right conditions cause excessive plant growth and can reduce the oxygen content of the water.
<b>Objective 2</b>	'Objective 2' is one of the objectives for European Union structural funds. This objective is for areas which have been subject to industrial decline or long term structural economic problems. If an area is identified as an Objective 2 area it has access to funding through the European Regional Development Fund and the EU Social Fund.
<b>Operations which may cause deterioration or disturbance</b>	Any activity or operation taking place within, adjacent to, or remote from a European marine site that has the potential to cause deterioration or disturbance to the habitats or species for which the site has been designated.
<b>Organic enrichment</b>	When a water body has an extra input of small particles of organic material. These are broken down by micro organisms to become plant nutrients contributing to nutrient enrichment.
<b>Particulate</b>	In the form of many tiny separate particles.
<b>PCB'S</b>	Polychlorinated Byphenyls, chemicals which have been used in the electronics industry. They can build up in the food chain and are poisonous.
<b>Piddocks</b>	A type of bivalve mollusc.
<b>Plan or project</b>	Any proposed development that is within a relevant authority's function to control, or over which a competent authority has a statutory function to decide on applications for consents, authorisations, licences or permissions.
<b>Predation</b>	The natural preying of one animal on another.
<b>Prey species</b>	A species which is the food source for a another.
<b>Reef</b>	Marine rocky surfaces colonized by biological life.
<b>Refracted</b>	The way water is deflected off a hard surface at a certain angle having hit it from a different angle.
<b>Relevant authority</b>	A body which has powers or functions which have or could have an impact on the marine environment within a European marine site.

<b>Roost</b>	A place where birds regularly settle to sleep.
<b>SAC</b>	Special Area of Conservation. A site of Community importance designated by the Member States where the necessary conservation measures are applied for the maintenance of restoration, at a favourable conservation status, of the habitats and/or species for which the site is designated. A candidate SAC is a SAC formally submitted to the European Commission, but yet to be adopted by the Commission and designated as a SAC.
<b>Scour</b>	A process of abrasion of surfaces caused by the action of sandy particles carried in moving water. Usually occurs as a result of tidal water movement or, in shallower areas, by wave action.
<b>Sensitivity</b>	The level of intolerance of a habitat, community or individual to damage or disturbance from an external factor.
<b>Shoreline Management Plan</b>	Plans which identify appropriate lines for coast defence based on land use and coastal processes.
<b>SPA</b>	Special Protection Area - a European designation for the protection of birds and their habitats.
<b>Spawning</b>	The activity of producing eggs.
<b>Spore</b>	(Of algae) microscopic reproductive cells produced in vast numbers.
<b>Sub feature</b>	An ecologically important component of the interest feature.
<b>Subtidal</b>	Zone of the sea below low water.
<b>Surge</b>	A swell of waves moving powerfully forward.
<b>SSSI</b>	A Site of Special Scientific Importance. A designation given to sites considered to be of nature conservation and/or geological importance in a National context.
<b>Synthetic compounds /non-synthetic compounds</b>	In this context synthetic compounds are chemicals created by chemical processing and that do not occur naturally. Non synthetic compounds are those compounds which can occur naturally but not in the concentrations resulting from chemical processing .
<b>Territorial</b>	The behaviour involved in occupying and then defending a division of space.
<b>TBT</b>	A chemical, tributyltin, which is toxic to marine life and which is used as an anti-fouling paint on large vessels.
<b>Thermal regime</b>	Regularly changing patterns in the temperature of the sea.
<b>Toxic contamination</b>	Pollute with poisonous chemicals.
<b>Toxins</b>	Chemicals which are poisonous.
<b>Turbid</b>	Waters that contain high levels of particulate matter through which light penetration is poor.
<b>Type locality</b>	The locality from which the original specimens used to describe a new species were taken.
<b>Typical species</b>	A species that is considered to be a typical component of a feature or sub feature.
<b>Upper Cretaceous</b>	Chalk rocks formed from small sea creatures deposited during the Cretaceous period - a period in time usually dated as 135-136 million years before present and lasting about 70 million years.
<b>Vulnerability</b>	The likelihood of a habitat, community or individual of being exposed to an external factor to which it is sensitive.
<b>Wintering</b>	A species which has migrated to the area to find adequate food during the winter months.
<b>Zonation</b>	In a planning context this means: areas which are designated for particular use. In a natural context this means: the natural division of the habitat into particular communities.

---

## Appendix B Acronyms

<b>CCC</b>	Canterbury City Council	<b>NEKEms</b>	North East Kent European marine sites
<b>CWP</b>	Coastal Wildlife Project	<b>NFSA</b>	National Federation of Sea Anglers
<b>DETR</b>	Department of the Environment Transport & the Regions	<b>NNR</b>	National Nature Reserve
<b>EA</b>	Environment Agency	<b>PCB</b>	Polychlorinated biphenyl
<b>EC</b>	European Commission	<b>SAC</b>	Special Area of Conservation
<b>EU</b>	European Union	<b>SCI</b>	Site of Community Importance
<b>FCO</b>	Foreign & Commonwealth Office	<b>SFC</b>	Sea Fisheries Committee
<b>FEPA</b>	Food & Environment Protection Act	<b>SPA</b>	Special Protection Area
<b>GIS</b>	Geographical Information Unit	<b>SSSI</b>	Site of Special Scientific Interest
<b>HSE</b>	Health & Safety Executive	<b>SWS</b>	Southern Water Services
<b>KCC</b>	Kent County Council	<b>TBT</b>	Tributyl tin
<b>KWT</b>	Kent Wildlife Trust	<b>TDC</b>	Thanet District Council
<b>MAFF</b>	Ministry of Agriculture Fisheries & Food	<b>UWWTR</b>	Urban Waste Water Treatment
<b>MCA</b>	Marine Conservation Association	<b>WRA</b>	Water Resources Act

**Kent and Sussex Sea Fisheries Committee**

The Ice House  
Military Road  
Ramsgate  
Kent CT11 9LG

**Environment Agency**

Orchard House  
Endeavour Park  
London Road  
West Malling, Kent ME19 5SH

**Thanet District Council**

Council Offices  
PO Box 9  
Cecil Street  
Margate  
Kent CT9 1XZ

**Southern Water**

Corporate Strategy  
Southern House  
Yeoman Road  
Worthing BN13 3NX

**Kent County Council**

Strategic Planning Directorate  
Invicta House  
County Hall  
Maidstone  
Kent ME14 1XX

**Sandwich Port and Haven Commissioners**

Guildhall  
Cattle Market  
Sandwich  
Kent CT13 9AH

**Dover District Council**

White Cliffs Business Park  
Dover  
Kent CT16 3PG

**Canterbury City Council**

Planning Department  
Military Road  
Canterbury  
Kent CT1 1YW

**English Nature**

The Countryside Management Centre  
Coldharbour Farm  
Wye  
Ashford  
Kent TN25 5DB



## Appendix D List of Participants

**Bait Digger**  
**Bass Fishing Club**  
**Beach Concessionaire**  
**Birchington Parish Council**  
Broadstairs Active Retirement Association  
**Broadstairs and St. Peters Sea Angling Association**  
**Broadstairs and St. Peters Town Council**  
Broadstairs Hoteliers Association  
**Broadstairs Sailing Club**  
**Canterbury Christ Church University College**  
**Canterbury City Council\***  
Caravan Park Owners  
**Church Commissioners**  
Clay Pigeon Shooting  
Cliffsend Residents Association  
Cluttons  
Commercial Bait Diggers  
**Council for Protection of Rural England**  
Countryside Commission  
Countryside Landowners Association  
**Crown Estate, The**  
**Dane Court Grammar School**  
Disabled  
**Dover District Council\***  
**Durrell Institute for Conservation Ecology**  
East Kent Maritime Trust  
Ecclesiastic Commissioners  
Elderly  
English Heritage  
**English Nature\***  
English Sports Council  
**Environment Agency\***  
**Foreness Point Action Group**  
**Foreness Water Ski Club**  
Friends of the Earth (Thanet)  
Geologist Club  
Green Tourism Specialist  
Horse Rider  
**Hovercraft Club**  
**Joss Bay Surf Club**  
Kent & Sussex British Marine Industries Federation  
**Kent County Council\***  
**Kent Land Sailing Club**  
**Kent Marine Group**  
**Kent Ornithological Society**  
**Kent Wildlife Trust**  
Lido Properties Ltd  
**Local Agenda 21 (Thanet)**  
**Local Farmer**  
**Local Geologist**  
**Local Scientists**  
Ministry of Agriculture, Fisheries & Food

**Margate Civic Society**  
**Margate Hoteliers Association**  
Margate Pier & Harbour Company\*  
**Margate Yacht Club**  
**Marine Ecologist**  
Minnis Bay Windsurfing Club  
National Farmers Union  
National Sports Council  
**National Trust, The**  
**Natural History Museum, The**  
**Pegwell & District Association**  
Personal Watercraft User  
**Pfizer Ltd**  
**Police Community Liaison Officer**  
Port Ramsgate Ltd  
Princes Golf Club  
Ramblers Association  
**Ramsgate & Broadstairs Civic Society**  
Ramsgate Hoteliers Association  
**Readers Digest Beach Watch Campaign**  
**Royal Society for the Protection of Birds**  
**Royal Temple Yachting Association**  
**Sandwich Bay Bird Observatory**  
Sandwich Bay Sailing and Water Ski Club  
**Sandwich Port & Haven Commissioners\***  
Sandwich Sailing and Motor Boat Club  
**Sea Fisheries Committee\***  
Serco (Beach Cleaners)  
**Small Boat Angler**  
South East Tourist Board  
**Southern Water Services\***  
Sub-Aqua Club  
**Swimmer**  
Tapp A R (Farmer)  
Thanet Chamber Of Commerce  
Thanet Countryside Trust  
**Thanet Cycling Club**  
**Thanet & District Sports Association for Disabilities**  
**Thanet District Council\***  
Thanet Dog Owners Association  
**Thanet Fishermen's Association**  
**Thanet Local Production for Local Needs**  
Thanet Road Runners Club  
**Thanet Sports Council**  
**Thanet Sub-aqua**  
**Thanet Waste Reduction & Resourcefulness Group**  
Training Agencies  
**Trust for Thanet Archaeology**  
Trustees of Simmons Charity  
**Westgate & Westbrook Residents Association**  
**World Wildlife Fund**  
Youth Groups

N.B

\* Relevant Authorities

Emboldened names denote that a representative attended at least one of the four workshops.

## Appendix E List of Southern Water outfalls around the Thanet Coast

OUTFALLS	DETAILS/LOCATIONS	EXISTING SCENARIO	FUTURE IMPROVEMENTS
Margate MTW Long Sea Outfall	1.9km length, with diffusers TR 3885 7346	Discharge of preliminary treated effluent	Enhanced primary, secondary and UV disinfection to be provided subject to securing the necessary permissions
Margate MTW Storm Outfall	2 in number storm outfalls approx 530m length TR 3885 7212 (parallel)	Flows pass through storm screens	New scheme to provide finer storm screens
Margate MTW Emergency Outfall	Located in the sea wall TR 3843 7163	Only used in emergency situations	Only used in emergency situations
Broadstairs MTW Long Sea Outfall	3.6km length, with diffusers TR 4334 7121	Discharge of preliminary treated effluent	Flows to be pumped to the new Margate WTW for primary, secondary and UV disinfection. Storm flows to pass through preliminary treatment and discharge via LSO
Broadstairs MTW Storm Outfall	2 in number storm outfalls approx 475m length TR 4062 6987	Flows pass through storm screens	Storm outfalls will only be used to discharge screened storm flows greater than the capacity of Broadstairs LSO and flows occurring in the unlikely event of an emergency. Therefore storm flows discharging via the storm outfalls will reduce. Improved finer screens to be installed.
Roxburgh Road CSO	Sea Road Outfall TR 3228 7049	CSO removed in 1998 be re-routing to a relief sewer, thereby eliminating spills to the environment.	Only used in emergency situations
St Mildred's Bay CSO	St Mildred's Bay Outfall TR 3277 7043	Additional storage and improved pass forward flow provided in 1998 by upsizing sewers. New screens also installed	Only used in emergency situations
Sea View Terrace CSO	Westbrook Outfall TR 3433 7087	Improved screen installed in 1998	
Marine Terrace CSO	Tivoli Brook Outfall TR 3516 7098	Additional storage and improved pass forward rate provided in 1998 to reduce spills to the environment	
Herne May WTW (Maystreet Outfalls)	TR 2117 6753 TR 2375 6320	Constructed WTW for provision of secondary treated effluent discharge to Hogwell Sewer and River Great Stour in 1995	
Herne Bay WTW (Maystreet) Storm Outfall	TR 2111 6752	Discharge of settled storm sewage to Hogwell Sewer associated with new Herne Bay WTW at Maystreet	
Kingshall WPS Outfalls	TR 1889 6914 TR 1851 6844 (Herne Bay)	Discharge of screened storm/emergency sewage associated with Herne Bay WTW at Maystreet	
Weatherlees WTW Outfall	TR 3284 6237	Construction of new WTW in 1995 for provision of secondary treatment, discharges to River Great Stour	

OUTFALLS	DETAILS/LOCATIONS	EXISTING SCENARIO	FUTURE IMPROVEMENTS
Sandwich Bulwark WPS	TR 3355 5815 (Weatherlees WTW catchment)	Improvements to WPS for discharge of screened storm/emergency sewage in 1995	
North Deal WPS	TR 3815 5460 (Weatherlees WTW catchment)	Improvements to WPS for the discharge of screened storm/emergency sewage and provision of flow balancing and storm water storage facility in 1995	
Westcliff WPS	TR 3787 6376 (Ramsgate Hbr Outfall) TR 3775 6377 (Ramsgate Storm Outfall) Weatherlees WTW catchment	Improvements to WPS for screened storm/emergency sewage and provision of flow balancing and storm water storage in 1995	
Winterstoke WPS	TR 3921 6504 (Weatherlees catchment)	Improvements to WPS for discharge of screened storm sewage and provision of flow balancing and storm water storage in 1995	
Swalecliffe LSO	2.7km length, with diffusers TR 1415 6953	Provision of enhanced primary treatment and preliminary treated storm flows in 1998	Secondary treatment and UV disinfection to be completed in 2001
Swalecliffe Storm Outfall	TR 1350 6815	Settled and screened storm flows and storm water storage facility provided in 1998	
Diamond Road (Reservoir Road) CSO	TR 1088 6750 (Whitstable)	Fine screening and monitoring/telemetry equipment installed.	
Tankerton Circus CSO	TR 1156 6739 (Whitstable)	Fine screening and monitoring/telemetry equipment installed. Access improved in 1998	
Northwood Road No. 1 CSO	TR 1156 6739 (Whitstable)	New replacement CSO constructed with additional storage, fine screens and monitoring/telemetry installed in 1998	
Northwood Road No. 2 CSO	TR 1156 6739 (Whitstable)	Fine screens monitoring/telemetry installed in 1998	
Brook Road WPS (New)	TR 6135 1675 (Swalecliffe)	WPS and CSO replaced with additional storage and monitoring/telemetry in 1998	
Loop Street CSO/WPS (Sandwich)	TR 3273 5827	Fine screens and enhanced control/telemetry installed in 1998	

MTW = Marine Treatment Works    CSO = Combined Sewer Overflow    WTW = Wastewater Treatment Works    WPS = Wastewater Pumping Station    LSO = Long Sea Outfall

**Appendix F**

## List of the legislation affecting the water industry

<b>Legislation</b>	<b>Explanation</b>
Water Resources Act 1991	Established responsibilities of the National River Authority (NRA)
Environment Act 1995	Established responsibilities of the Environment Agency (EA) in 1995 to replace NRA.
EU Urban Wastewater Treatment Directive (UWWTD)	Lays down minimum requirements for the treatment of municipal waste water (depending on discharge size and sensitivity of receiving waters) and disposal of sludge.
EU Bathing Water Directive (BWD)	Aims to protect the environment and public health by reducing pollution and protecting designated bathing waters.
EU Dangerous Substances Directive	Control of substances that are of concern as they are usually toxic to aquatic life at low concentrations, persistent and bioaccumulate in the food chain. Subsequent EU Directives lay down standards for specific 'dangerous' substances entering inland and coastal waters.
EU Habitats Directive	Gives Europe-wide protection to certain rare and endangered habitats and species in terrestrial and marine environments.
EU Use of Sewerage in Agriculture Directive	Aimed at regulating use of sewerage sludge in agriculture to prevent harmful effects on soil vegetation, animals and man, while encouraging its correct use. Controls are implemented through statutes and codes of good practice.
EU Environmental Assessment Directive	Requires an Environmental Statement to be prepared on all proposed developments that might have a significant effect on the environment.

**Thanet Coast  
candidate Special Area of Conservation (cSAC)**

**Reasons for recommendation as a possible Special Area of Conservation**

---

Area Name: **Thanet Coast**

County/District: **Kent**

Component SSSI: **Thanet Coast  
Sandwich Bay & Hacklinge Marshes**

The area is being considered as a possible Special Area Conservation (SAC) because it contains habitat types and/or species which are rare or threatened within a European context. The SSSI citation describes the special interests for which the site was notified in the British context. [NB Not for marine interests below mean low water mark]. The interests for which the site was selected as SSSI may differ from the interests selected in a European context.

The habitats and/or species for which this area has been proposed as a possible SAC are listed below. The reasons for their selection are listed, together with a brief description of the habitats and species as they typically occur across the UK. This area contains the interests described although it may not contain all the typical features. (Please see the accompanying Natura 2000 booklet for further information on the approach to site selection.)

The area supports the following interest(s).

**European interest(s):**

**1. Reefs.†**

- **for which this is considered to be one of the best areas in the United Kingdom.**

†Reefs: These are areas of subtidal rock which may extend onto the shore, or some types of biological reefs. These form the habitat for a variety of biological communities such as those characterised by encrusting animals and attached seaweeds.

**2. Sea caves.†**

- **for which this is considered to be one of the best areas in the United Kingdom.**

†Submerged or partly submerged sea caves: These are tunnels or caverns on the shore or below the sea surface in which vertical or overhanging rock surfaces form the main habitat.

**For agency use only:**

**Date compiled:** 17 Mar 1995

**Reference number or date of map:** 31 Oct 1994

## FURTHER INFORMATION

<b>Site name</b>	<b>Thanet</b>
Country	England (Kent)
Boundary	See map. The recommended landward boundary is the cliff top to properly encompass the chalk habitat within which the numerous caves are found and which is a continuum of the subtidal reef complex

### Reasons for recommendation of site

The site contributes to the essential range and variation of sea caves as the best example of chalk caves, and of reefs as the best example of south-east chalk reefs, in Britain.

Marine habitats for which selected	Extent
Reefs	Extensive sublittoral chalk reefs, covering most of the nearshore area and extending into the littoral
Submerged or partly submerged sea caves	Extensive occurrence of partly-submerged caves and tunnels in the intertidal zone

### Site description

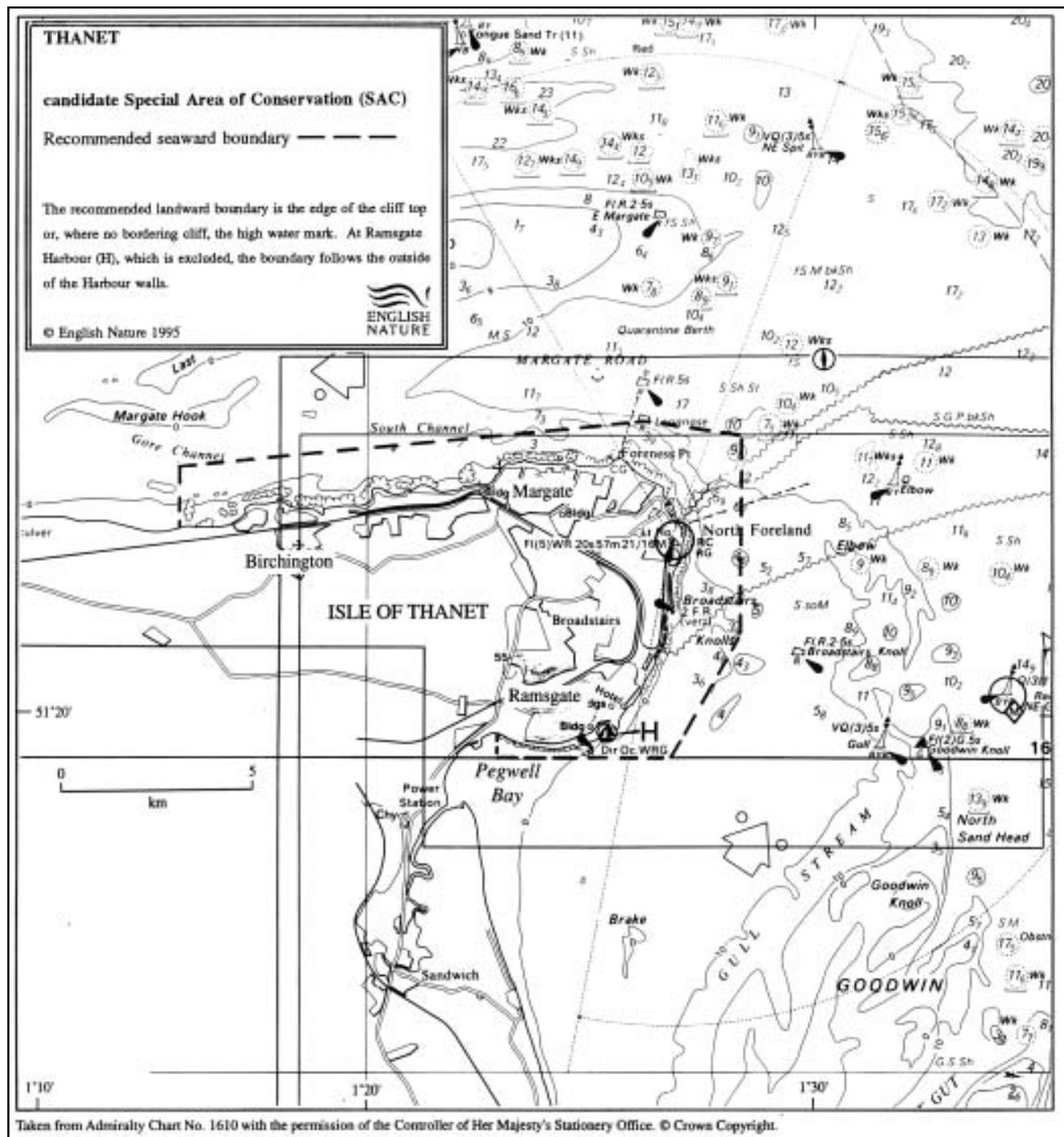
Thanet is located on the eastern corner of Kent, just below the greater Thames estuary and within one of the most turbid areas of the southern North Sea and Channel. It is the eastern-most outcrop of chalk in Europe, with the exception of an area in northern Denmark.

Bordered by about 23 km of chalk cliffs with many caves and stack and arch formations, Thanet is the longest continuous stretch of coastal chalk in Britain, representing about 20% of UK coastal chalk and 12% of the coastal chalk exposure in Europe. The chalk cliff face, cave and tunnel habitats and communities here are very uncommon in Europe and considered to be the best examples of their kind and of the highest international nature conservation importance.

The soft nature of the Upper Chalk on the Thanet coast is characterised by a unique range of marine algal and lichen communities and some species have not been recorded elsewhere. The full range of these communities is confined to very restricted habitats on soft, shaded chalk cliff faces and inside partly submerged chalk caves and tunnels. Thanet is of international importance for these soft, Upper Chalk coastal exposures, as the type locality for two genera and seven species of algae, and for the exceptional recorded history and continuity of marine research undertaken here.

Although about 75% of the chalk cliff has been modified by the construction of coastal protection works at the top of the shore, large areas of high marine nature conservation importance remain undisturbed. Thanet still has a wide range of examples of unprotected north, east, south and west-facing cliffs, caves and tunnels where marine research is continuing.

Thanet is also of marine conservation interest for its characteristic sublittoral (extending into the littoral) chalk platforms, which extend into deep water in a series of steps dissected by gullies. Chalk reef species include an unusually rich intertidal algal flora for the region, but infralittoral kelp forests are characteristically absent due to the high turbidity of the Channel water. The range of species present on these reefs is considered unusual in the southern North Sea.



## Thanet Coast and Sandwich Bay Special Protection Area (SPA)

EC Directive 79/409 on the conservation of Wild Birds:  
Special Protection Area (SPA)

### Thanet Coast and Sandwich Bay (Kent)

The Thanet Coast and Sandwich Bay Special Protection Area includes a wide variety of coastal habitats including areas of chalk cliff, rocky shore, shingle, sand and mudflats, saltmarsh and sand dunes. As well as its value for breeding and wintering birds, the site supports outstanding communities of terrestrial and marine plant species, a significant number of rare invertebrate species, and is of considerable geological importance.

The Thanet Coast qualifies under Article 4.1 by supporting, in summer, a nationally important breeding population of little tern *Sterna albifrons* (30 pairs - over 1% of the British population).

The site also qualifies under Article 4.1 by supporting a nationally important wintering population of golden plover *Pluvialis apricaria*. During the five-year period 1985/86-1989/90, an average peak count of 1,980 golden plover was recorded, representing 1% of the British wintering population.

The site qualifies under Article 4.2 by regularly supporting an internationally important wintering population of turnstone *Arenaria interpres*. In the five-year period 1986/87-1990/91, an average peak count of 1,300 turnstone was recorded, representing 2% of the East Atlantic Flyway population and 3% of the British wintering population. The site also supports nationally important wintering populations of a further four species (average peak counts over the five-year period 1986/7-1990/1): 370 ringed plover *Charadrius hiaticula* (over 1% of the British wintering population), 530 grey plover *Pluvialis squatarola* (over 2% of British), 700 sanderling *Calidris alba* (over 5% of British), and 40 Lapland bunting *Calcarius lapponicus* (about 11% of British). In addition large numbers of migratory passerine birds pass through the site during the spring and autumn migration periods. These migratory birds have been monitored since 1952 by the Sandwich Bay Bird Observatory.

SPA citation  
HTR/DAS June 1992



Thanet Coast and Sandwich Bay  
Ramsar citation

**RAMSAR CONVENTION ON WETLANDS OF INTERNATIONAL IMPORTANCE  
ESPECIALLY AS WATERFOWL HABITAT**

**Thanet Coast and Sandwich Bay (Kent)**

The Thanet Coast and Sandwich Bay Ramsar site includes a wide variety of coastal habitats including areas of chalk cliff, rocky shore, shingle, sand and mudflats, saltmarsh and sand dunes. As well as its value for breeding and wintering birds, the site supports outstanding communities of terrestrial and marine plant species, a significant number of rare invertebrate species, and is of considerable geological importance.

The site qualifies under Criterion 2a by supporting a very large number of rare species of wetland invertebrates. A total of at least 15 Red Data Book species associated with wetlands have been recorded. These comprise three species listed as endangered: the weevil *Lixus vilis*, the moth *Stigmella repentiella*, and the beetle *Bagous nodulosus*. Two species listed as vulnerable: the silver barred moth *Deltote bankiana*, the dancefly *Poecilobothrus ducalis*. Ten species listed as rare: the groundbugs *Emblethis verbasci* and *Pionosomus varius*, the damsel bug *Nabis brevis*, the dung beetle *Euheptaulacus sus*, the click beetle *Melanotus punctolineatus*, the moth the dotted footman *Pelosia muscerda*, the only British population of the woodlouse *Eluma purpurescens*, two digger wasps *Ectemnius ruficornis* and *Alysson lunicornis*, the plantbug *Orthotylus rubidus*. A significant number of non-wetland Red Data Book invertebrates occur, as well as a large number of other notable and scarce wetland invertebrate species.

The site qualifies under Criterion 3c by regularly supporting an internationally important wintering population of turnstone *Arenaria interpres*. In the five year period 1986/87-1990/91, an average peak count of 1,300 turnstone was recorded, representing 2% of the East Atlantic Flyway population and 3% of the British wintering population.

Notable also are a nationally important breeding population of little tern *Sterna albifrons* (30 pairs - 1% of the British population); and nationally important wintering populations of the following species (average peak counts over the five year period 1986/7-1990/91): ringed plover *Charadrius hiaticula* (370 - over 1% of the British wintering population), grey plover *Pluvialis squatarola* (530 - over 2% of British) and sanderling *Calidris alba* (700 - over 5% of British). In addition large numbers of migratory passerine birds pass through the site during the spring and autumn migration periods. These migratory birds have been monitored since 1952 by the Sandwich Bay Bird Observatory.

Ramsar citation (Montreux 1990 Criteria)  
HTR/DAS June 1992

## Sandwich Bay Special Area of Conservation (cSAC)

### Reasons for recommendation as a candidate Special Area of Conservation (incorporating possible amendments)

---

Area name:               **Sandwich Bay**

Administrative area:   **Kent**

Component SSSI:       **Sandwich Bay and Hacklinge Marshes**

This area has been recommended as a candidate Special Area of Conservation (SAC) because it contains habitat types and/or species which are rare or threatened within a European context. In addition, an amendment to the candidate SAC is being considered based upon further habitat or species considerations. The SSSI citation describes the special interests for which the site was notified in the British context. [NB: not for marine interests below mean low water mark]. The interests for which the site was selected as SSSI may differ from the interests selected in a European context.

The habitats and/or species for which the area has previously been recommended as a candidate SAC are listed below, together with proposed additional interests (where applicable). The reasons for their selection are listed, together with a brief description of the habitats and species as they typically occur across the UK. This area contains the interests described although it may not contain all the typical features. In some cases, amendments to the boundary of the candidate SAC are also being considered.

#### Interest(s) previously submitted to the European Commission

##### European priority interest(s):

**1. Fixed dunes with herbaceous vegetation ("grey dunes")**

- **for which this is considered to be one of the best areas in the United Kingdom.**

Dune grassland. This species-rich habitat includes a broad range of dune grasslands where the dunes are stable. The exact nature of the vegetation depends on grazing, the degree of stability, and the amount of lime in the sand. Species commonly found include sand sedge *Carex arenaria*, red fescue *Festuca rubra*, and lady's bedstraw *Galium verum*.

##### European interest(s):

**2. Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)**

- **which is considered to be rare as its total extent in the United Kingdom is estimated to be less than 1000 hectares.**
- **for which this is considered to be one of the best areas in the United Kingdom.**

Dunes with creeping willow. Seasonally wet hollows in dune systems, known as slacks, in which creeping willow *Salix repens* ssp. *argentea* is abundant. On some drier dune slacks creeping willow occurs with many grasses and herbs growing beneath it, such as Yorkshire fog *Holcus*

---

**Sandwich Bay**

Date compiled: 18/05/00

Page 1 of 2

*lanatus*, common bird's-foot trefoil *Lotus corniculatus*, red fescue *Festuca rubra* and glaucous sedge *Carex flacca*.

### 3. Embryonic shifting dunes

- which is considered to be rare as its total extent in the United Kingdom is estimated to be less than 1000 hectares.
- for which this is considered to be one of the best areas in the United Kingdom.

Shifting dunes. These are low dunes that develop along the upper shore above the high tide line. Only a few plant species are able to survive in these conditions, such as sand couch *Elymus farctus*, lyme-grass *Leymus arenarius*, sea sandwort *Honckenya peploides* and sea rocket *Cakile maritima*.

### 4. Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")

- for which this is considered to be one of the best areas in the United Kingdom.

Shifting dunes with marram. These are actively-building or growing dunes, found in areas receiving large quantities of blown sand. Continual burying by sand restricts the number of plants that can survive but provides ideal conditions for the growth of sand-binding marram *Ammophila arenaria*. A small number of other specialised dune plants can also tolerate these conditions.

## Additional proposed interest(s)

### European interest(s):

#### 5. Humid dune slacks

- for which the area is considered to support a significant presence.

Humid dune slacks. These are seasonally wet hollows in dune systems. The vegetation forms a short turf in which mosses and liverworts are often abundant, with small grasses, herbs and sedges. This habitat can also include some more permanently wet areas that support wet heath and swamp vegetation. Dune slacks are a rare habitat and may support rare species, such as variegated horsetail *Equisetum variegatum* and fen orchid *Liparis loeselii*. Humid dune slacks are found more frequently in northern and western parts of the UK.

For agency use only:

Date issued: \_\_\_\_\_

Reference number or date of map: \_\_\_\_\_

---

Sandwich Bay

Date compiled: 18/05/00

Page 2 of 2

**Thanet Coast  
Site of Specific Scientific Interest (SSSI)**

File Reference: TR/36-5

COUNTY: KENT

SITE NAME: THANET COAST

DISTRICT: CANTERBURY; THANET

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981.

Local Planning Authority: Canterbury City Council; Thanet District Council

National Grid Reference: TR 132675-TR 394656 Area: 818.7 ha (2023.0 acres)

Ordnance Survey Sheet 1:50,000: 179 1:10,000: TR 16 NE, NW; TR 26 NE, NW;  
TR 36 NE, NW; TR 37 SE, SW

Date Notified (Under 1949 Act): 1981 (part)

Date Notified (Under 1981 Act): 1984 (part) Date of last Revision: 1990  
1987 (part)  
1989 (part)

Other Information: Thanet Coast amalgamates four SSSIs: Bishopstone Cliffs, Plumpudding Island and North Thanet Coast previously notified under the 1981 Act, and North Cliff Broadstairs notified under the 1949 Act. The site incorporates large extensions, and part is managed by Canterbury City Council as a Country Park. Parts of this site will also be noted in 'A Geological Conservation Review'.

**Reasons for Notification**

This site, extending almost uninterrupted from Swalecliffe to Ramsgate, comprises mainly unstable cliff and foreshore (including shingle, sand and mudflats), with smaller areas of saltmarsh, coastal lagoons, coastal gill woodland and cliff-top grassland. There are a number of biological, geological and geomorphological features of interest within the site.

**Biological Interest**

The Thanet Coast is particularly noted for its bird populations, supporting both internationally and nationally important numbers of wintering birds, with one species breeding in nationally important numbers. Associated with the various constituent habitats of the site are outstanding assemblages of both terrestrial and marine plant species, including communities of marine algae that are of limited occurrence elsewhere in the British Isles. Invertebrates are also of interest and there are recent records of three nationally rare\*\* and one nationally scarce\* species.

The ornithological interest of the Thanet Coast is centred on the large numbers of waders and wildfowl which use the area in winter and the many species of birds that feed and rest during the spring and autumn passage. Turnstones Arenaria interpres regularly overwinter in numbers of international importance, whilst sanderlings Calidris alba and ringed plovers Charadrius hiaticula and grey plovers Pluvialis squatarola are present in nationally important numbers. A colony of little terns Sterna albifrons, a species specially protected by law and listed on Schedule 1 of the 1981 Wildlife and Countryside Act, breed in nationally important numbers at Plumpudding Island.

The cliff section at Epple Bay is of considerable historic scientific interest, since it is the type locality for one genus and six species of algae. It forms part of the survey area where chalk cliff algal communities were first studied in Britain, and the remaining natural cliff exemplifies this type of vegetation. Botany Bay and White Ness exhibit a variety of geomorphological features such as stacks, promontories, caves and a tunnel and arch formation which are no longer common on Thanet, and which also support a variety of cliff algal communities. Of particular interest are the cave communities

of algae of the group Chrysophyceae; these communities are not known from the caves in the harder rocks of western Britain. The North Thanet cliff algal communities are complementary to those of the chalk cliffs at Pegwell Bay, within the Sandwich Bay and Hacklinge Marshes SSSI, the only other notable site for chalk cliff algal communities in south-east England.

The littoral and subtidal plant and animal communities of Kent are generally impoverished compared with other parts of Britain; this is principally attributed to the extremes of sea and air temperatures, the turbid sea water and the soft, unstable substrates which are prevalent. However, the foreshore at Pulsam Rock is clean and silt-free, and supports a diverse fauna on the lower shore especially in the laminarian zone, which has a well developed crevice fauna. The algal flora is well developed, and includes species which have not been recorded elsewhere in Kent, such as Chondria dasyphylla, Hecatonema maculans and Griffordia secunda.

The shingle substrate occupying part of the foreshore has given rise, in places, to a distinctive flora with species including yellow horned poppy Glaucium flavum, viper's bugloss Echium vulgare and the nationally scarce\* plants sea kale Crambe maritima and sea pea Lathyrus japonica. The nationally rare\*\* hogs fennel Peucedanum officinale has also been recorded from the shingle at Swalecliffe. Small areas of saltmarsh are dominated by sea purslane Halimione portulacoides with sea aster Aster tripolium and sea wormwood Artemisia maritima also present, whilst at Plumpudding Island the western coastal lagoon contains abundant growth of the nationally scarce\* aquatic plant, spiral tassel-weed Ruppia cirrhosa.

The exposed cliffs themselves are of interest for terrestrial plants, supporting populations of the nationally rare\*\* hoary stock Matthiola incana and sea stock Matthiola sinuata as well as the nationally scarce\* wild cabbage Brassica oleracea and sea heath Frankenia laevis.

Bishopstone Glen is a short steep-sided valley cut through the clays and sands of Bishopstone and is the only feature of its kind on the North Kent Coast. The sheltered head of the Glen is dominated by ash Fraxinus excelsior and field maple Acer campestre woodland which is replaced further down the valley by hawthorn Crataegus monogyna and blackthorn Prunus spinosa scrub. Young smooth-leaved elm Ulmus minor is abundant throughout.

The exposed cliff top east of Bishopstone supports a large area of coastal grassland. It is mown for hay and contains a wide range of species including early hair grass Aira praecox, barren fescue Vulpia bromoides, meadow vetchling Lathyrus pratensis, bulbous buttercup Ranunculus bulbosus and thrift Armeria maritima.

Within this site strips of grassland along the seawalls are dominated by couches Elymus species and fescues Festuca species. Other flowering plants include the nationally rare\*\* hog's fennel, found along the seawall at Plumpudding Island, and some nationally scarce\* species such as slender hare's ear Bupleurum tenuissimum and sea clover Trifolium squamosum. Some of the more common species recorded include spiny restharrow Ononis spinosa and grass vetchling Lathyrus nissolia.

The drift line debris in the vicinity of Swalecliffe supports the only population of the nationally rare\*\* isopod (woodlouse) Eluma purpurescens on mainland Britain, and the cliffs around Bishopstone support two nationally rare\*\* digger wasps Ectemnius ruficornis and Alysson lunicornis. It is likely that further survey may reveal additional rare or scarce invertebrate species in the site. These particular cliffs also support one of the two largest sand martin Riparia riparia colonies in Kent.

#### Geological Interest

The section of coast between Beltinge and Reculver exposes the Thanet Formation, the Woolwich and Reading Beds Formation, the Oldhaven Formation and the London Clay Formation. It is the key on-land Palaeocene site in the London Basin, and is one of Britain's most important palaeobotanical localities.

The Thanet Beds contain a range of plant organs including as-yet-undescribed fruits and seeds. In addition, this section is the only locality to yield determined wood from the Woolwich Beds and one of only two sites to have yielded plant material from the Oldhaven Beds.

The clays here contain a substantial assemblage with two families, six genera and numerous species unique to this site in the London Clay flora. Three genera Palaeobruquier (mangrove), Shrubsolea (Rutaceae) and Jenkinsella (Ceridiphyllaceae) are unique to this site.

A rich invertebrate and vertebrate fossil fauna also occurs within the site and the section has been extensively studied over many years. The best exposures currently occur on the foreshore, and many of the best are towards the Spring tide and Low Water mark.

The stretch of coastline between Epple Bay and Ramsgate is the national reference locality for the Santonian stage of the Upper Cretaceous chalk in Britain.

The exposed sections at North Cliff together with the nearby Pegwell Bay complement the Folkestone Warren and Dover to Kingsdown Cliffs SSSIs and include several stratigraphically important marker beds such as Bedwell's Columnar Band and Whitaker's Three Inch Band. The top parts of the Santonian stage are very fossiliferous and the Marsupites zone contains a distinctive and famous band of the pyramidal-shaped sea urchin Echinocorys.

The North Cliff is also important for Quaternary studies. It provides lithostratigraphic and biostratigraphic evidence for environmental changes during the Middle and late Devensian in SE England. The sequence of sediments exposed in the cliff overlies frost-disturbed chalk and comprises: 1) Middle Devensian Solifluction deposits; 2) Late Devensian loess and brickearths; 3) a series of Late-glacial Solifluction deposits separated by fossil soil horizons considered to represent the Bolling and Allerod Interstadials; 4) Postglacial hillwash.

Foreness Point is a key site for coastal geomorphology and an essential member of the suite of chalk coastal sites. It is a classic cliff-shore platform system and contains the most extensive intertidal chalk shore platform in Britain. It has been studied in greater detail than most other cliff-platform sites and demonstrates particularly well the links between cliff and platform erosion and beach development. Cliff recession, historically at a rate of 0.3m per year, contributes flint and chalk pebbles to the beaches, which also contain locally important accumulations of sand, much of it organic in origin. The cliffs and platform also show interesting relationships with bedrock structure.

The cliffs at Walpole Bay and Grenham Bay consist of Upper Chalk, cut by a swarm of closely-spaced, vertical extension joints, striking NW-SE. The joints, which are well-developed here, are oblique to the main Thanet fold trend (E-W). They are particularly good examples of fractures formed in the 'Late Cenozoic Stress Domain', that is, structures formed as a result of extension related to late Alpine plate collision.

\*Nationally scarce species are those which occur in 16-100 10 km squares in Great Britain.  
\*\*Nationally rare species are those which occur in 1-15 10 km squares in Great Britain.

## EXPLANATORY GEOLOGICAL NOTE

The purpose of this note is to describe the nature and importance of the site, avoiding specialist terms, for the site owner and/or occupier. This note does not form part of the formal notification documents.

### THANET COAST, KENT

This site consists of rock exposed along the shore and cliff between the Downs (Beltinge) and Reculver in the west, and Birchington and North Cliff, Broadstairs in the east. The seaward boundary is defined by low tide level and to the landward by tracks, road, paths and promenades.

The cliff between Downs and Reculver is composed of sandstones and clays, rich in fossils which were laid down in a shallow sea some 60 million years ago (see diagram below) and these rocks date from part of the period of geological time, known as the Palaeogene.

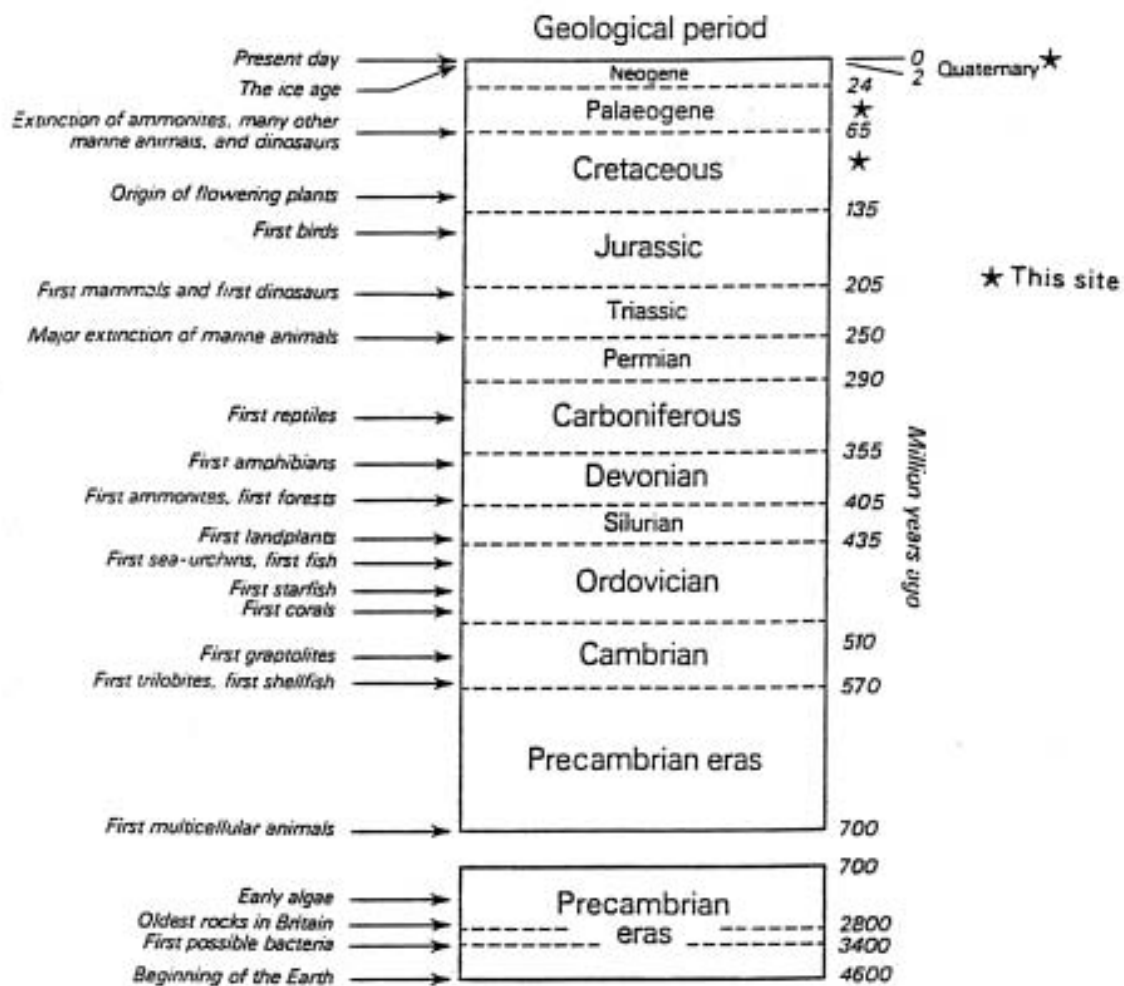
These rocks are of special research and educational importance as they are recognised as a standard section against which rocks of this age from this country and abroad are compared. They contain an unrivalled assemblage of fossil plants which enables geologists to recreate environments which existed 60 million years ago.

The cliff and foreshore exposed between Birchington and Westbrook are composed of chalk containing characteristic sea-urchin fossils (Marsupites and Echinocorys), which formed some 85 million years ago during the Santonian Stage of the Cretaceous Period. These cliffs contain layers of flint known as marker beds which are used to compare this cliff with other exposures of chalk. The chalk cliffs at this site are nationally and internationally important for rocks of Santonian age allowing geologists to study the conditions and life which existed in this period of the Earth's history.

The chalk cliffs at Walpole Bay and Grenham Bay are cut by a series of closely-spaced fractures (joints) which trend NW-SE. These are formed by stretching of the strata at this point, and are interesting because they cut across the direction of a major fold in the rocks at Thanet. These joints are of special scientific interest as they were formed while the Alps were being created, and allow geologists to study the cause and effects of such mountain building episodes..

North Cliff, Broadstairs is also important for Ice Age (Quaternary) studies. The different layers of deposits exposed in the cliff show very detailed evidence that allows scientists to reconstruct the climate and conditions of south-east England during the last 50,000 years or so. In particular, the site shows very detailed evidence for the last main glacial phase of the Ice Age when glaciers covered much of northern and upland Britain but failed to reach this area.

Finally, the cliffs and shoreline at Forness Point form a classic site for the study of coastal landforms. In particular, the site exhibits one of the most extensive shore platforms (a rock surface planed off by the action of the sea) cut across chalk anywhere in Britain. Detailed studies at the site have allowed scientists to piece together the mechanisms and rates at which the sea erodes the local cliffs, thereby lending much insight as to how the extensive shore platform formed and the manner in which local beach deposits accumulated.



**Geological timescale**

This chart shows the time of formation of features at the site in relation to major events in the Earth's history



**Sandwich Bay and Hacklinge Marshes  
Site of Specific Scientific Interest (SSSI)**

File Ref: TR/35-4

COUNTY: KENT SITE NAME: SANDWICH BAY AND HACKLINGE MARSHES  
DISTRICTS: THANET/DOVER  
Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981  
Local Planning Authority: Thanet District Council/Dover District Council  
National Grid Reference: TR 353 585 Area: 1756.6 ha  
4340.5 ac  
Ordnance Survey Sheet: 1:50,000: 179 1:10,000 TR 35 NE, NW, SE, SW;  
TR 36 SW, SE.  
Date Notified (Under 1949 Act): 1951 Date of last Revision: 1981  
Date Notified (Under 1981 Act): 1984 (part)  
1985 (part) Date of last Revision: 1990

Other Information

Parts of the site are listed in 'A Nature Conservation Review'<sup>1</sup> and in 'A Geological Conservation Review'<sup>2</sup>. The nature reserve at Sandwich Bay is owned jointly by the Kent Trust for Nature Conservation, National Trust and Royal Society for the Protection of Birds. The site has been extended to include a Kent Trust designated Site of Nature Conservation Interest known as Richborough Pasture and there are several other small amendments.

Reasons for Notification

This site contains the most important sand dune system and sandy coastal grassland in South East England and also includes a wide range of other habitats such as mudflats, saltmarsh, chalk cliffs, freshwater grazing marsh, scrub and woodland. Associated with the various constituent habitats of the site are outstanding assemblages of both terrestrial and marine plants with over 30 nationally rare and nationally scarce species, having been recorded. Invertebrates are also of interest with recent records including 19 nationally rare<sup>3</sup> and 149 nationally scarce<sup>4</sup> species. These areas provide an important landfall for migrating birds and also support large wintering populations of waders, some of which regularly reach levels of national importance<sup>5</sup>. The cliffs at Pegwell Bay are also of geological interest.

Biological Interest

- 
- 1 'A Nature Conservation Review': edited by D A Ratcliffe. Cambridge University Press 1979.
  - 2 A Geological Conservation Review: in preparation
  - 3 Species regarded as 'rare' in Britain (recorded from 1-15 10 x 10 km squares) and listed in British Red Data Books
  - 4 Species regarded as 'scarce' in Britain (recorded from 16-100 10 x 10 km squares)
  - 5 Wildfowl and Wader Counts 1988-1989. D G Salmon et al, Wildfowl Trust 1989

The sand dunes which stretch from the mouth of the River Stour to Deal comprise the most outstanding botanical habitat within the site. The dunes and associated dune slacks and coastal grassland support a distinctive flora with species including crown garlic *Allium vineale*, viper's bugloss *Echium vulgare*, sea holly *Eryngium maritimum* and restharrow *Ononis repens*, whilst the nationally rare<sup>3</sup> lizard orchid *Himantoglossum hircinum* and bedstraw broomrape *Orobanche caryophyllacea* have their largest British colonies here. Many continental species have been recorded from the dunes and the dune grassland also support a high diversity of clover *Trifolium* species and many other leguminous plants.

The dunes support a diversity of invertebrates many of which are associated with warm dry conditions and include the nationally rare<sup>3</sup> carthusian snail *Monacha cartusiana* and the nationally scarce<sup>4</sup> grey bush cricket *Platycleis albopunctata*. The nationally rare<sup>3</sup> moths restharrow *Aplasta ononaria*, pygmy footman *Eilema pygmaeola pygmaeola* and brightwave *Idaea ochrata* have also been recorded, whilst one of the damp hollows supports the only British colony of the moth *Stigmella zelleriella*, the larvae of which mine in leaves of creeping willow *Salix repens* var. *argentea*.

The chalk coastline around Pegwell Bay comprises a considerable diversity of cliff and cave habitats which support a range of marine algal communities. The area is the type locality for one algal genus and three species new to science (*Chrysonema*, *C. littorale*; *Chrysotila lamellosa*, *Chrysotila stipitata*) and is one of the sites where Anand (1937) undertook pioneer ecological investigations. Typical chalk-cliff zonation comprises a 'Chrysophyte' zone (mainly *Apistonema carterae*) at supralittoral levels. *Enteromorpha* spp. and other green algae and the lichen *Arthrogyrenia halodites* at upper littoral levels; a turf of small filamentous red, brown and green algae is predominant at lower levels. The caves contain 'Chrysophyte' communities with species such as *Chrysonema littorale* and *Thallochrysis littoralis*, together with other typical cave species such as *Pilinia rimosa* and *Pseudendoclonium submarinum*.

Foreshore algal communities are typical of wave-washed shores, low in species diversity, although a unique feature (not seen on other chalk platforms in southeast England) of lower littoral levels is the dense population (zone-forming) of the Sand-Mason worm *Lanice conchilega* forming a bank extending for 100m by the Ramsgate Western Esplanade.

The saltmarsh comprises a diversity of characteristic plants dominated by salt-marsh grasses such as *Puccinellia maritima* and common cord-grass *Spartina anglica*. Other abundant species include sea purslane *Halimione portulacoides*, sea aster *Aster tripolium*, sea lavender *Limonium vulgare* and the nationally scarce<sup>4</sup> golden samphire *Inula crithmoides*. South of the River Stour saltmarsh grades into the sand dune system; this is the only Kent site for the long-bracted sedge *Carex extensa*, and also provides suitable conditions for a dense growth of the nationally scarce<sup>4</sup> sharp rush *Juncus acutus*. Below the cliff at Cliffsend Point, where freshwater springs emerge at the foot of the cliff, the saltmarsh grades into a swampy type of vegetation where common reed *Phragmites australis* and common reedmace *Typha latifolia* predominate.

Further inland, the grazing marsh and associated dykes provide suitable conditions for a wide range of plants and animals. The grassland is dominated by grasses such as meadow barley *Hordeum secalinum*, meadow foxtail *Alopecurus pratensis* and crested dog's tail *Cynosurus cristatus*. Some of the more uncommon broadleaved herbs that have been recorded, especially narrow leaf bird's-foot-trefoil *Lotus tenuis*, adder's tongue *Ophioglossum vulgatum*, strawberry clover *Trifolium fragiferum* and

divided sedge *Carex divisa*<sup>4</sup>. A more unusual vegetation type found within the site is the relict fen vegetation. This is found in and around the dykes of the farmland and in the marshes at Hacklinge. Fen plants such as ragged robin *Lychnis flos-cuculi*, bog pimpernel *Anagallis tenella* and greater spearwort *Ranunculus lingua* occur here, most of these are now scarce in Kent. In addition the dykes contain a number of scarce aquatic plants including whorled water-milfoil *Myriophyllum verticillatum*<sup>4</sup>, fen pondweed *Potamogeton coloratus*<sup>4</sup> and river water-dropwort *Oenanthe fluviatilis*<sup>4</sup>. This area is also the only known locality in SE England for least bur-reed *Sparganium minimum*. The wet alder wood at Ham Brooks also contains uncommon plants including great fen-sedge *Cladium mariscus*.

The ornithological interest of Sandwich Bay and Hacklinge Marshes is centred on the large numbers of waders and wildfowl which use the area in winter and during the Spring and Autumn migrations. Dunlin *Calidris alpina* is usually the most common wader present, found particularly on the mudflats where the rich invertebrate fauna also attracts a wide range of other common species such as oystercatcher *Haematopus ostralegus*, curlew *Numenius arquata*, and redshank *Tringa totanus*. Grey plover *Pluvialis squatarola* and sanderling *Calidris alba* both overwinter in nationally important numbers<sup>4</sup>, whilst ringed plover *Charadrius hiaticula* also occurs in nationally important numbers<sup>4</sup> during migration. Wildfowl that occur on the site include mallard *Anas platyrhynchos*, shelduck *Tadorna tadorna* and occasionally brent goose *Branta bernicla*.

Many of the birds use more than one habitat, some for example feed on the mudflats at low tide and then move up to roost on the saltmarsh or grazing marsh.

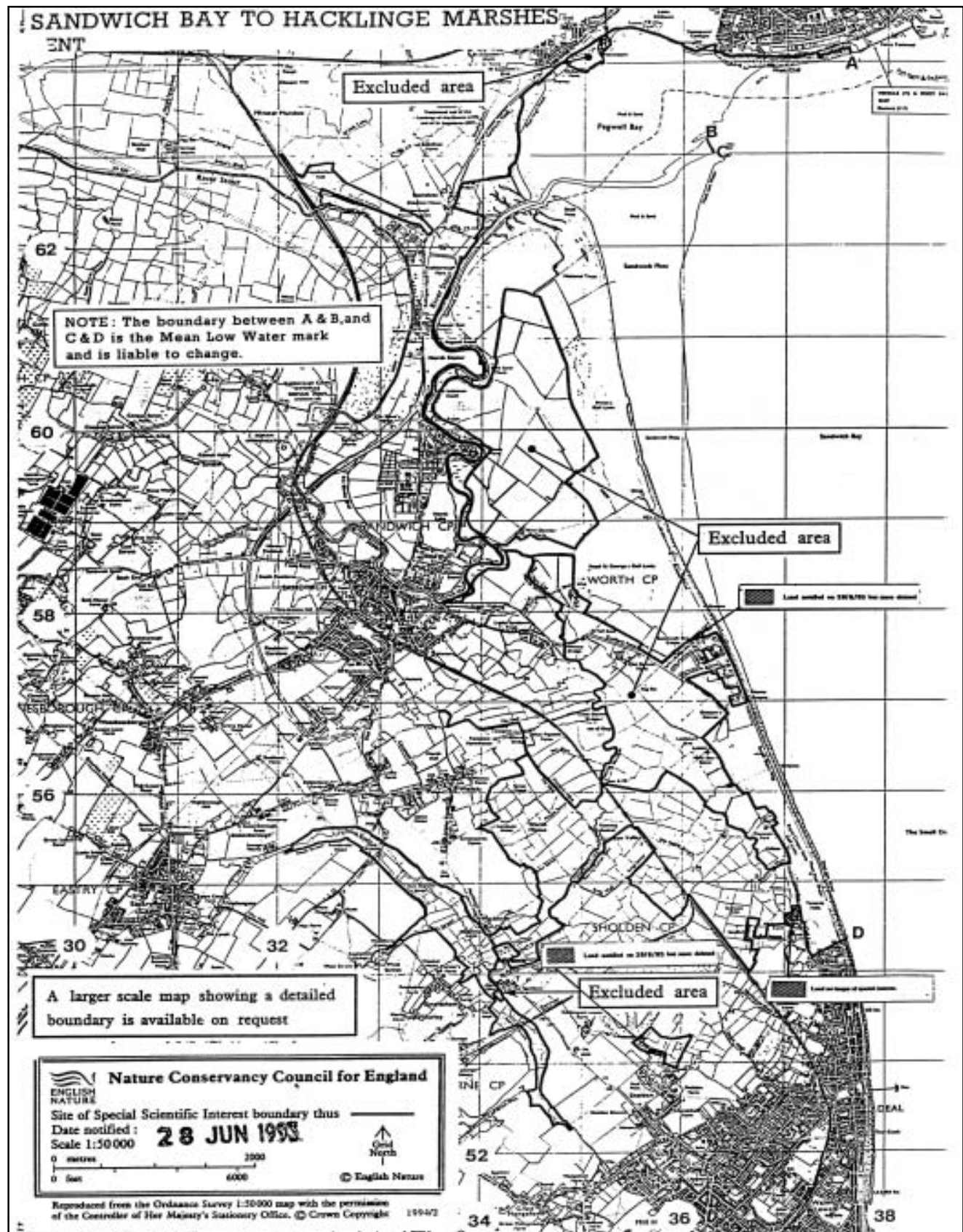
Breeding birds include ringed plover, oystercatcher and little tern *Sterna albifrons*, a species specially protected by law and listed on Schedule 1 of the Wildlife and Countryside Act 1981. Inland areas are also of interest supporting two nationally rare species of breeding birds.

### Geological Interest

Parts of the site are also of geological interest. The 16" shell bed at the base of the Reculver Silts (Thanet Formation) contains an important fish fauna. This is preserved as disarticulated fish debris, including a diversity of identifiable shark teeth. There is no other Thanetian site in Western Europe with this diversity of fauna which includes many, as yet, undescribed species plus the earliest records of other known Tertiary forms. The outcrop has very great significance because it is the only outcrop which shows the bottom living fish assemblage which was subsequently destroyed by the North Sea volcanicity, for the ash falls by these volcanoes brought about an extinction event. Interesting conclusions can be drawn from this local extinction and the later recolonisation of the area; for example unspecialised, bottom living sharks survive across the event, presumably because a stock that was living elsewhere at the time was able to migrate back to this part of the basin and recolonise.

At Pegwell Bay the Upper Chalk is overlain by the basal Tertiary beds of the Thanet Sands. The junction is marked by the celebrated 'Bull-head Bed', an in situ weathering residue of unabraded flint nodules. This is a key section showing a demonstrable and regionally significant unconformity. Pegwell Bay is also the most important site for loess studies in Britain. The section shows up to 4m of Devensian loess overlying Upper Chalk and Thanet Beds. The loess, an accumulation of wind-blown dust produced under periglacial conditions during the Ice Age is probably thicker here than at any other site in Britain, and is certainly the most closely studied example. Although leached in its upper part, the loess is

calcareous below, with rootlet tubes and small concretions. Where the loess rests on the Chalk, there is often a highly frost-shattered zone with well developed involutions. In one part of the section where an infilled channel is cut into the frost-shattered chalk, the loess overlies chalky-flinty gravels and loams produced by solifluction. Pegwell Bay provides the best exposures of true loess deposits in Britain. They are exceptional in having escaped modification by solifluction; no other site provides such useful sections in highly calcareous loess that has not been reworked.



## EXPLANATORY GEOLOGICAL NOTE

The purpose of this note is to describe the nature and importance of the site, avoiding specialist terms, for the site owner and/or occupier. This note does not form part of the formal notification documents.

### PEGWELL BAY; SANDWICH BAY AND HACKLINGE MARSHES SSSI, KENT

The site consists of cliff and foreshore exposures showing several features of geological importance.

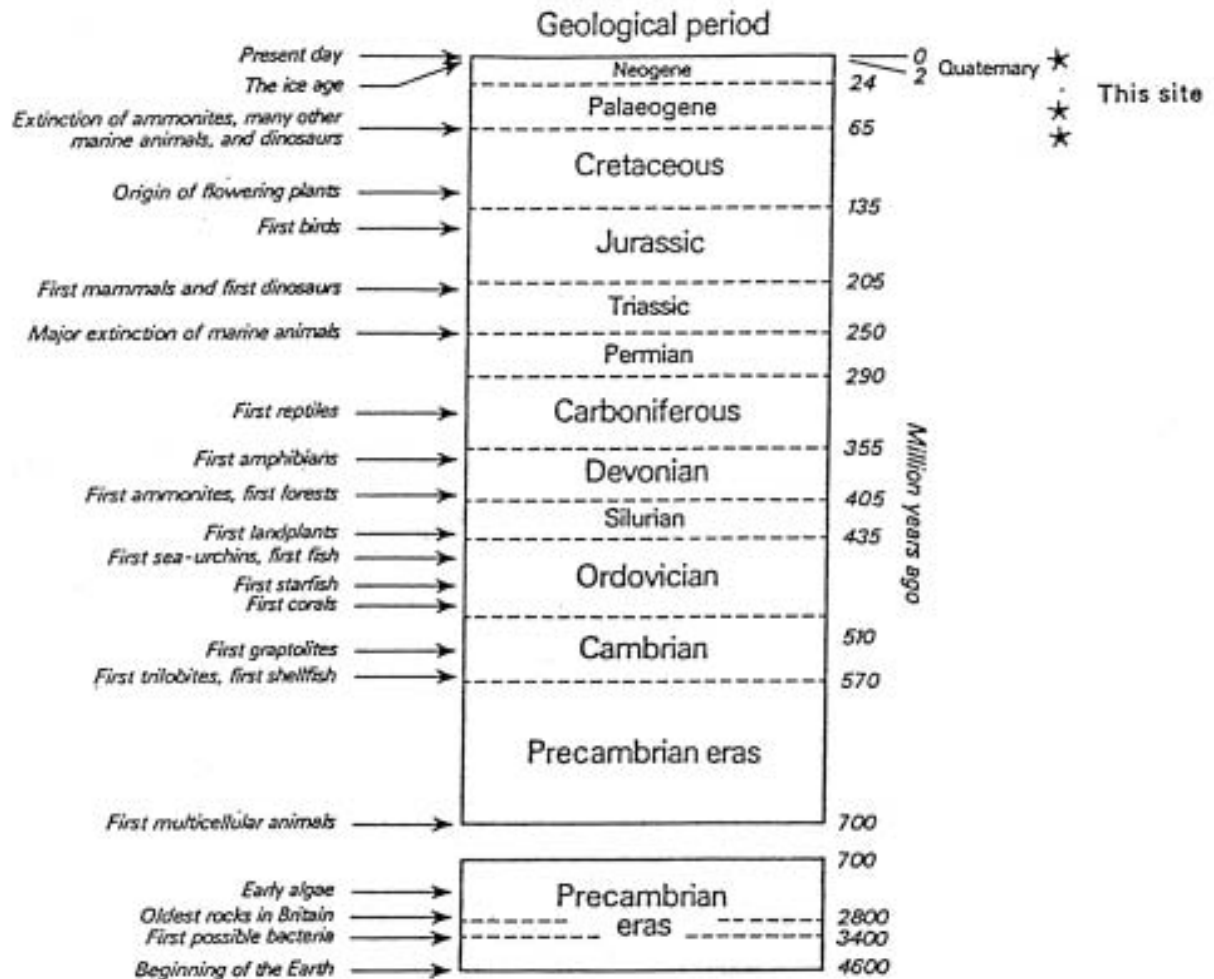
The oldest rocks belong to the Upper Chalk and are well exposed in the eastern part of the bay. This chalk forms part of the national reference section of the Santonian Stage, a division of geological time lying within the Cretaceous Period. Chalk is a soft white limestone formed in tropical seas and largely composed of the remains of microscopic planktonic algae. In Pegwell Bay it contains important fossils such as sponges and sea urchins.

The Chalk is overlain by the sands and clays of the Thanet Formation, which are well exposed in the central part of the bay near Cliffsend. These deposits were formed during the Palaeocene Period and have a very uneven junction with the chalk below. The junction is an unconformity and it suggests that several million years of erosion and also weathering took place prior to the deposition of the Thanet Formation. This feature therefore has great regional significance and is crucial in the study of the geological history of the area.

The upper part of the Thanet Formation contains a bed of fossil shells which has yielded a unique fish fauna, including several species of ancient sharks, some of which belong to species which are new to science.

The Thanet Formation is overlain by a classic deposit of wind-blown dust or loess. This deposit was formed during the last Ice Age and is the best exposure and most exceptional well-preserved development of Ice Age loess known in Britain. Where the deposit directly overlies the chalk, there is a well developed frost-shattered zone.

The variety of geological features makes Pegwell Bay a truly exceptional geological locality with great scientific importance and educational potential.



### Geological timescale

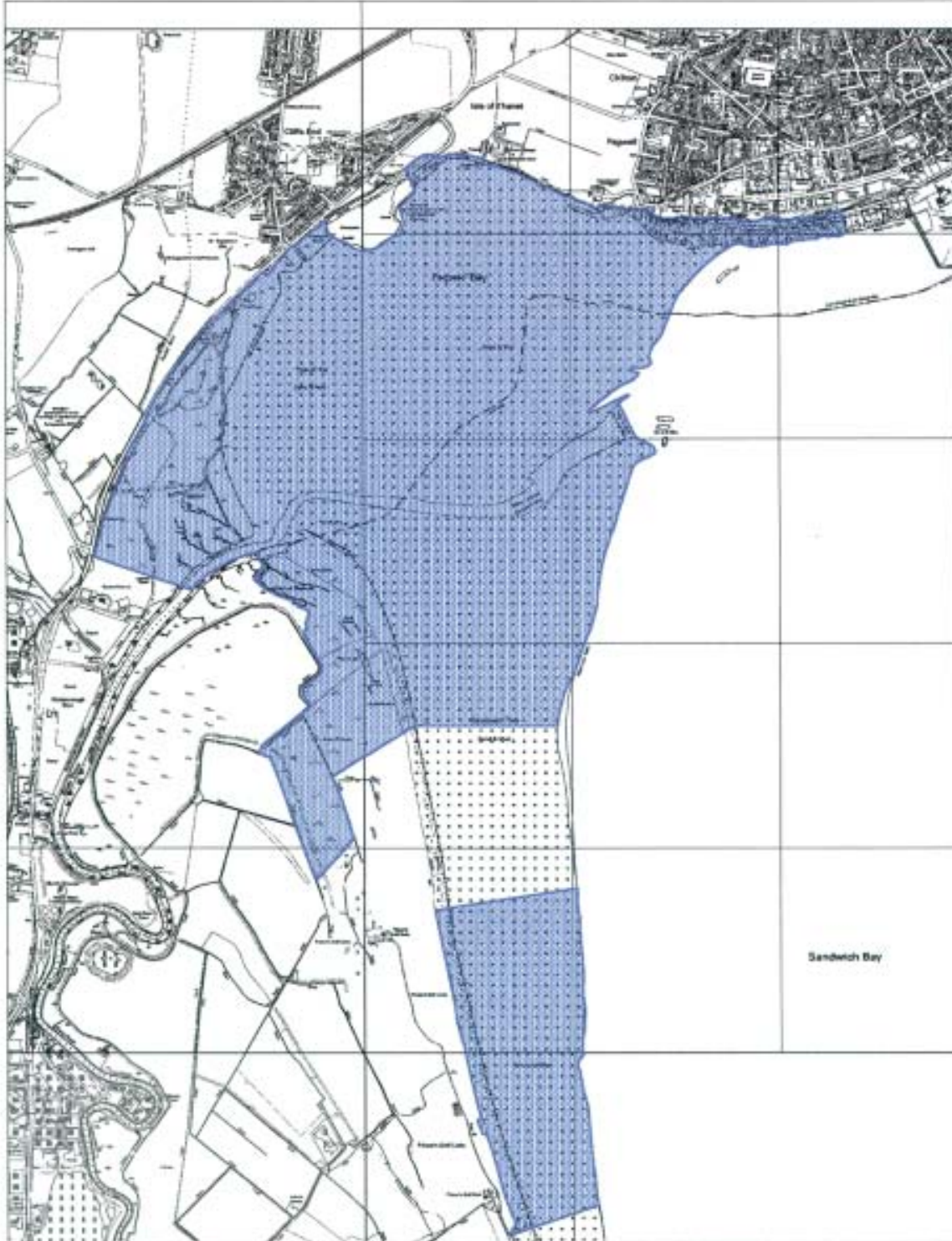
This chart shows the time of formation of features at the site in relation to major events in the Earth's history



**Appendix H**

Sandwich and Pegwell Bay National Nature Reserve

Scale 1:28566



Reproduced from an Ordnance Survey map with the permission of the Controller of HMSO © Crown Copyright. Licence number GD272299.