WILDLIFE ON YOUR PATCH

FRESHWATER EAST
TREWENT CLIFFS (SSSI)
FRESHWATER EAST DUNES (LNR)

14 JUNE 2007

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Map Produced Using The Planning GIS.
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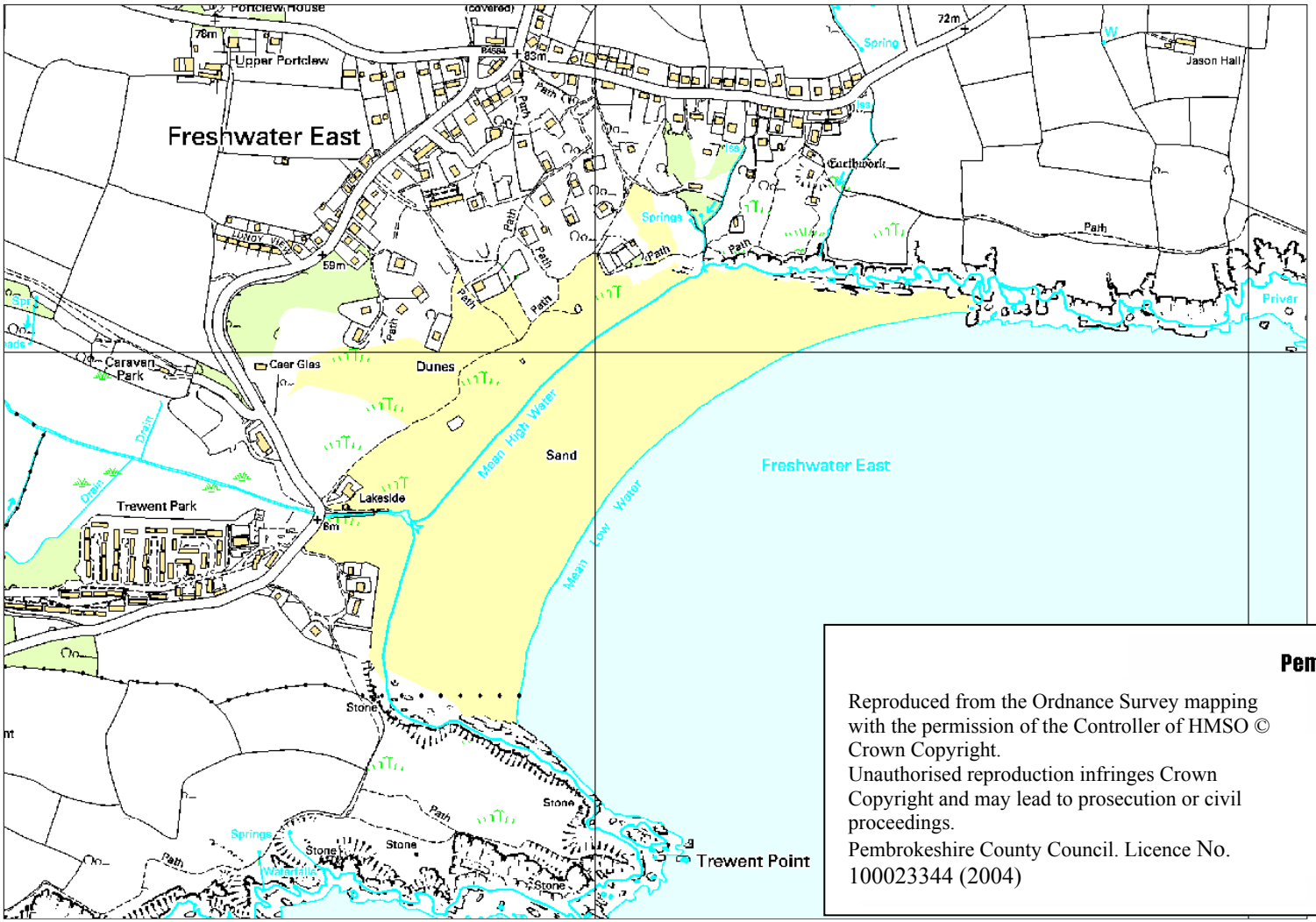

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1. Introduction

We spent an evening on the beach and dunes at Freshwater East, observing and recording the local geology and a variety of birds, plants and insects and their habitats. This short report highlights some of the more obvious, interesting or rare rocks and species that we found and looks at the main types of habitats you have in your community.

2. Geology of Freshwater East

Geology and scenery at Freshwater East Bay: a brief outline
by Sid Howells

Freshwater East Bay and the valley extending inland towards Maidenwells have been formed by erosion of soft rocks in the core of an anticline (upfold). The soft black shales are not exposed at the surface but have been seen in excavations. They are mostly covered by marshland and sand dune.

The oldest rocks that can be seen are the green sandstones and siltstones in the cliffs at the south-west corner of the bay. These rocks are also exposed at the steps at the north-east end of the bay (to the west of the waterfall and stream) and in the foreshore reefs further east. They contain thin lenses packed with fossils* of brachiopods, gastropods, tusk shells and occasional trilobites and this shows that the sediments accumulated in a marine environment. Using a variety of techniques, including study of remnant magnetism, geologists are able to show that the rocks at Freshwater East were formed over 400 million years ago from sediments deposited in shallow seas about 30 degrees south of the Equator . All the rocks of Pembrokeshire have moved to their present position through the process known as 'continental drift' (movement of the plates that make up the Earth's crust) and 'collision' of continents caused folding and faulting (buckling and fracturing) of the rock layers.

The Old Red Sandstone (ORS) rocks at Freshwater East consist of a sequence of bright red mudstones and siltstones together with red, purple and green sandstones. The 'lowest' rocks in this ORS sequence are conglomerates formed from white and green pebbly sand.

The ORS rocks form the cliffs at Trewent Point and along the north side of the bay. Prominent gullies in the cliffs have been formed by erosion along faults. The fracturing of the rocks along these faults made them more susceptible to marine erosion. If you compare the rock layers on either side of these gullies you will see that the faults have caused displacements ranging from a few centimetres to tens of metres.

The ORS rocks show evidence of deposition by braided rivers with intermittent water flow in a monsoon-like climate. Nodular soils formed by evaporation from waterlogged sediment. This was an important time for evolution as plants were just beginning to colonise the margins of the land. Fossil plants* at Freshwater East consist of thin stems with filamentous roots and rounded tops which released spores – these are very hard to find as they are smaller than a pin. Fish scales and tracks of a water scorpion* have also been found.

On the inaccessible south side of Trewent Point there is a several metre thick layer of tuff (rock formed from ash) representing products of distant volcanic eruptions.

The pebbles on the beach at Freshwater East include many rock types which do not match any of those in the cliffs. Most notable are flints and igneous rocks. These were carried to the bay by an ice sheet during the 'Ice Age' and have subsequently been rounded by wave action. Other evidence of former cold climate is provided by the clay with aligned stones exposed at the waterfall. These materials moved downslope in times of thaw when the ground beneath remained frozen.

***please note that rocks and fossils at Freshwater East are protected by Site of Special Scientific Interest legislation – a substantial fine may result if you damage or remove features of scientific importance. They are there for everyone to enjoy and/or study. Take photos instead of collecting.**

Pebble identification

Old red sandstone – made up of lots of different rock types, hot conditions oxidised iron which makes it red. :- bright red mudstones which erode easily and found near the cliffs, green sandstone, the green rocks are older than red.
Mineral Veins Pebbles– strong forces cause 'pressure solution' which flows into cracks leaving mineral veins (like quarts).
Black Shiny Pebbles – Cherts – nodules in limestone.
Grey Limestone – from Lamphey, contains marine fossils.
Flint – formed in County Atrium 360 million years ago.
Quartz – veins found in other rocks.
Gritty Sandstone – near Druidstone
Igneous rock – brought by ice from glaciers in Scotland.
Agates – from larva in Swanlake Bay **, Jasper** North Pembs.
Holy pebbles - Pebbles with holes in could be caused by the boring piddock (sponge). Microscope alge called endolithic algae live in rocks.

3. Sand dunes formation

The sand dunes and burrows at Freshwater East are part of a more extensive deposit of wind-blown sand (climbing dune system) which has accumulated since the end of the Ice Age (10,000 years ago) with substantial additions during historic times (as evidenced by records from other coastal areas of Wales). The sand naturally develops into ridges and hollows similar to those you see in deserts. However in our cooler damper climate the sand is quickly colonised by plants which help hold the dunes together and stabilise them, otherwise the action of the wind would carry on rolling the sand inland up the hill.

3.1 Sand dunes – embryo dunes

The first dunes to form are the embryo dunes right above the standline along the top of the beach. Embryo dunes are not stable and they can be washed away by high tides before they are stabilised by plants. These dunes are colonised by very specialist plants such as sea couch grass, lyme grass and sea rocket which can cope with the very harsh conditions of heat, drought salt and sometimes trampling.

Sea Rocket

3.2 Sand dunes – fore dunes

Marram Grass

As the vegetation grows, it traps more wind blown sand the plants grow taller in relation to the amount of sand, which is deposited. The embryo dunes are less frequently covered by the tide and waves and subsequently more plant species are able to grow. As the dune height increases the vegetation changes and the embryo dune becomes a fore dune and new embryo dunes will form in front of them. The fore dunes are characterised by marram grass and are the most susceptible to damage by people as the marram although a tough survivor of dry shifting sand cannot cope with trampling at all. The fore dunes can grow very tall as new sand is constantly added to them from the beach. The plant diversity on fore dunes is still low with there only being a few species adapted to survive in these harsh conditions.

3.3 Sand dunes – Grey dunes

Further inland from the fore dunes conditions become more stable. The action of the marram grass and other colonising plant species slowly adds organic matter to the soil and allows a bit more moisture to be retained allowing a greater diversity of plant species to survive. These dunes are known as grey dunes and can contain a great number of species and they are completely covered by vegetation; marram grass is replaced by other grasses like red fescue. Some of the plants in flower were pyramidal orchids, restharrow, burnet rose, and biting stonecrop. As you progress inland scrub begins to creep in and the whole area gradually becomes woodland.

Restharrow

Burnet Rose

Biting stonecrop

Pyramidal Orchid

6. Moth & Bat information – sorry it was too dark to write but you can find out more about Pembrokeshire Lepidoptera at http://myweb.tiscali.co.uk/pembsleps/ and Pembrokeshire Bats at http://www.pembsbats.org.uk/

Or national charity websites:
Butterfly Conservation: http://www.butterfly-conservation.org/index.php (also covers moths) and the Bat Conservation Trust: http://www.bats.org.uk/

8. Conclusion
Many species of animal and plant are unable to travel over large areas of intensely managed countryside. These areas tend to lack food and shelter from predators, or are simply too large for small creatures to find their way across. Therefore, many species may become confined to small 'islands' of habitat. If these islands become unsuitable for a species, the population may die out and. If the next nearest population is too far away, local extinctions result.

The interlinked habitats at Freshwater East, provide excellent opportunities for species to move from one place to another, and create new colonies both within and along the coast, helping avoid local extinctions. This connectivity of habitats helps maintain the richness and diversity of our wildlife at both local and national levels; Communities such as yours can play an important role in this.

Report produced by: Bethan Cox (Pembrokeshire Biodiversity Partnership)

Plants Recorded

Common Name	Scientific Name
Ash	Fraxinus excelsior L.
Biting stonecrop	Sedum acre L.
Blackthorn	Prunus spinosa L.
Bracken	Pteridium aquilinum (L.) Kuhn
Bugloss	Anchusa arvensis (L.) M. Bieb.
Burnet Rose	Rosa pimpinellifolia
Burnet-saxifrage	Pimpinella saxifraga L.
Cat's-ear	Hypochaeris radicata L.
Chamomile	Chamaemelum nobile (L.) All.
Cleavers	Galium aparine L.
Cock's-foot	Dactylis glomerata L.
Common bird's-foot-trefoil	Lotus corniculatus L.
Common evening-primrose	Oenothera biennis L.
Common nettle	Urtica dioica L.
Common ragwort	Senecio jacobaea L.
Common restharrow	Ononis repens L.
Common sorrel	Rumex acetosa L.
Common storksbill	Erodium cicutarium (L.) L'Hér.
Cow parsley	Anthriscus sylvestris (L.) Hoffm.
Creeping thistle	Cirsium arvense (L.) Scop.
Daisy	Bellis perennis L.
Dewberry	Rubus caesius L.
Dune fescue	Vulpia fasciculata (Forssk.) Fritsch
Elder	Sambucus nigra L.
False-brome	Brachypodium sylvaticum (Huds.) P. Beauv.
Field bindweed	Convolvulus arvensis L.
Field forgetmenot	Myosotis arvensis (L.) Hill
Frosted orache	Atriplex laciniata L.
Germander speedwell	Veronica chamaedrys L.
Goat's-beard	Tragopogon pratensis L.
Heath speedwell	Veronica officinalis L.
Hemlock water-dropwort	Oenanthe crocata L.
Herb-robert	Geranium robertianum L.
Hogweed	Heracleum sphondylium L.
Honeysuckle	Lonicera periclymenum L.
Hop trefoil	Trifolium campestre Schreb.
Italian rye-grass	Lolium multiflorum Lam.
Ivy	Hedera helix L.
Kidney vetch	Anthyllis vulneraria L.
Lady's bedstraw	Galium verum L.
Lesser trefoil	Trifolium dubium Sibth.
Lyme grass	Chortodes elymi (Treitschke, 1825)
Marram grass	Ammophila arenaria (L.) Link
Marsh woundwort	Stachys palustris L.
Moss	syntrichia ruraliformis
Narrow leaved everlasting pea	Lathyrus sylvestris L.
Navelwort	Umbilicus rupestris (Salisb.) Dandy
Oxeye daisy	Leucanthemum vulgare Lam.
Pyramidal orchid	Anacamptis pyramidalis (L.) Rich.
Red valerian	Centranthus ruber (L.) DC.
Ribwort plantain	Plantago lanceolata L.
Rock samphire	Crithmum maritimum L.
Salad burnet	Sanguisorba minor subsp. minor Scop.
Sand sedge	Carex arenaria L.
Scurvy grass	Cochlearia officinalis
Sea beet	Beta vulgaris subsp. maritima (L.) Arcang.

Sea bindweed	Calystegia soldanella (L.) R. Br.
Sea buckthorn	Hippophae rhamnoides L.
Sea couch	Elytrigia atherica (Link) Kerguélen
Sea holly	Eryngium maritimum L.
Sea radish	Raphanus raphanistrum subsp. maritimus (Sm.) Thell.
Sea rocket	Cakile maritima Scop.
Sea sandwort	Honckenya peploides (L.) Ehrh.
Sea stock	Matthiola sinuata (L.) W.T. Aiton
Spear leaved orchae	Atriplex prostrata Boucher ex DC.
Sycamore	Acer pseudoplatanus L.
Traveller's joy (old man's beard)	Clematis vitalba L.
Viper's bugloss	Echium vulgare L.
White clover	Trifolium repens L.
Wild privet	Ligustrum vulgare L.
Wild radish	Raphanus raphanistrum subsp. raphanistrum L.
Wild turnip	Brassica rapa
Winter heliotrope	Petasites fragrans (Vill.) C. Presl
Wood sage	Teucrium scorodonia L.
Yarrow	Achillea millefolium L.
Yorkshire-fog	Holcus lanatus L.

Additional plants not identified to species level.

Wild geranium	Geranium sp.
Hawkweed	Pilosella sp.
Buttercup	Ranunculus sp.
Smooth sowthistle (though it could have been rough sowthistle - difficult to distinguish)	Sonchus L.
Dandelion	Taraxacum sp.

Animals

Blackbird	Blue jellyfish on beach
Dunnock	
Herring gull	Small bumble bee (with ginger head
Magpie	Cepea nemoralis (banded snail)
Oystercatcher	Helix aspersa (garden snail)
Pied wagtail	Chorthippus bruneus (field grasshopper)
Robin	
Song-thrush	Dark bush cricket
Starling	
Wren	Fox (tracks)
House martin	
Cormorant	Common pipistrelle
Lesser black-backed gull	

Moths Recorded

Field Obs.:
SS 01618 97796; *Platyptilia gonodactyla*
SS 01603 97796; Burnet moth (pupa)

Trap 1: 125W MV; SS 01635 97849; Species List:
Brimstone Moth
Small Angle Shades
Heart & Dart
Brown Silver-lines
Flame Shoulder
Common Emerald
Dark Arches
Phlyctaenia coronata
Setaceous Hebrew Character
Sharp-angled Peacock
Agapeta zoegana
Flame
Bright-line Brown-eye

Trap 2: 160W MVB; SS01644 97887; Species List:
Barred Yellow
Green Carpet
Flame Shoulder
Common Emerald
Large Yellow Underwing
Marbled Minor agg.
Green Pug
Snout
Platyptilia gonodactyla

Trap 3: 40W Actinic; SS 01632 97828
Species List
Brown Silver-lines
Barred Yellow
Chrysoteuchia culmella
Flame
Common Footman
Mottled Beauty
Marbled Minor agg.
Common Pug
Brimstone Moth
Small Emerald
Heart & Dart

WILDLIFE ON YOUR PATCH
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