

**North Pit – East**  
Prominent infilled solution pipe descending from the top of the Coralline Crag (secateurs at base).



**North Pit**  
July 2013. This is the Coralline Crag pit in front of you which shows medium scale sand waves.



**Chicken Pit**  
January 2007. The pond surface indicates the water table in the Red Crag to be 1 metre above the London Clay.



**Chicken Pit**  
July 2013. The large Coralline Crag boulder (arrowed) is a fallen block buried in the Red Crag beach.



**Bullockyard Pit**  
The gully exposes the wave cut platform and ancient beach which dips southwards at 10 degrees.



**Bullockyard Pit**  
Red Crag overlying Coralline Crag, with boulders of Coralline Crag within the basal Red Crag on the former 'beach' surface. Mussel colonies can be found in the Red Crag above the junction.

# SUTTON KNOLL

Site of Special Scientific Interest

[www.geosuffolk.co.uk](http://www.geosuffolk.co.uk)



## INTRODUCTION

This Earth Heritage site lies within an Area of Outstanding Natural Beauty and takes the form of a small hill composed of approximately 20 metres of hard marine shelly sands called the Coralline Crag, which is surrounded by younger Red Crag sands, and rests unconformably on much older London Clay.

The Coralline Crag is so named because it contains abundant 'fossil' 'corallines', or bryozoans. It is of Pliocene age, some 4.0 million years old and is unique to Suffolk. The main outcrop forms a ridge, some 12 km long, running north-eastwards from Gedgrave to the north of Aldeburgh.

The shelly marine Red Crag is named after its rusty red colour. It is approximately 2.5 million years old and outcrops in coastal Suffolk and northeast Essex.

First described by Charles Lyell in 1839, and later famously studied by Joseph Prestwich in the 1860s, the Knoll has long been known as a 'fossil island' of Coralline Crag once set in Red Crag seas, with striking Coralline Crag sea cliffs and fallen blocks and boulders 'buried' in the Red Crag beach.

At the base of the Crag a pebble bed is often found. Within it have been discovered whale remains, shark teeth, flints, Boxstones (rounded pebbles of late Miocene age, remnants of a sandstone laid down some 8 to 5 million years ago), crustaceans and, importantly, phosphatic nodules derived from older and underlying deposits. Flints and Boxstones from this bed have been used as a building material in the restoration of Sutton and Shottisham churches, as well as barns on the Sutton Hall Estate.

The fossils preserved in the Crag show an increasingly strong affinity to modern day forms. They show that the sea gradually cooled during the Pliocene, culminating in the climatic swings of the Pleistocene Ice Age.

There is evidence to suggest that immediately prior to the Ice Age, about 750,000 years ago, Sutton Knoll was buried by the proto-Thames flood plain. Quartz pebbles found on the summit may be all that is left here of river gravels from this fore-runner of the Thames.

Sutton Knoll SSSI is owned by **Sutton Hall Farms**. Regular site visits are made by scientific study groups which can be joined on enquiry. **GeoSuffolk**, [www.geosuffolk.co.uk](http://www.geosuffolk.co.uk) is a recognised consultant body for the wealth of geological heritage in Suffolk. GeoSuffolk supports ongoing site research and the beneficial management of paths and exposures, and is responsible for the production of this panel. Fossil specimens from the Crag are on display at Ipswich Museum.

## MUSSELS

Colonies of fossil edible mussel, *Mytilus edulis*, occur in the Red Crag in significant numbers near to the Red Crag/Coralline Crag boundary in several places. Mussels are typical of intertidal rocky shores, and were well suited to life around the Coralline Crag island. Barnacles also thrived in this environment.

## 'COPROLITES'

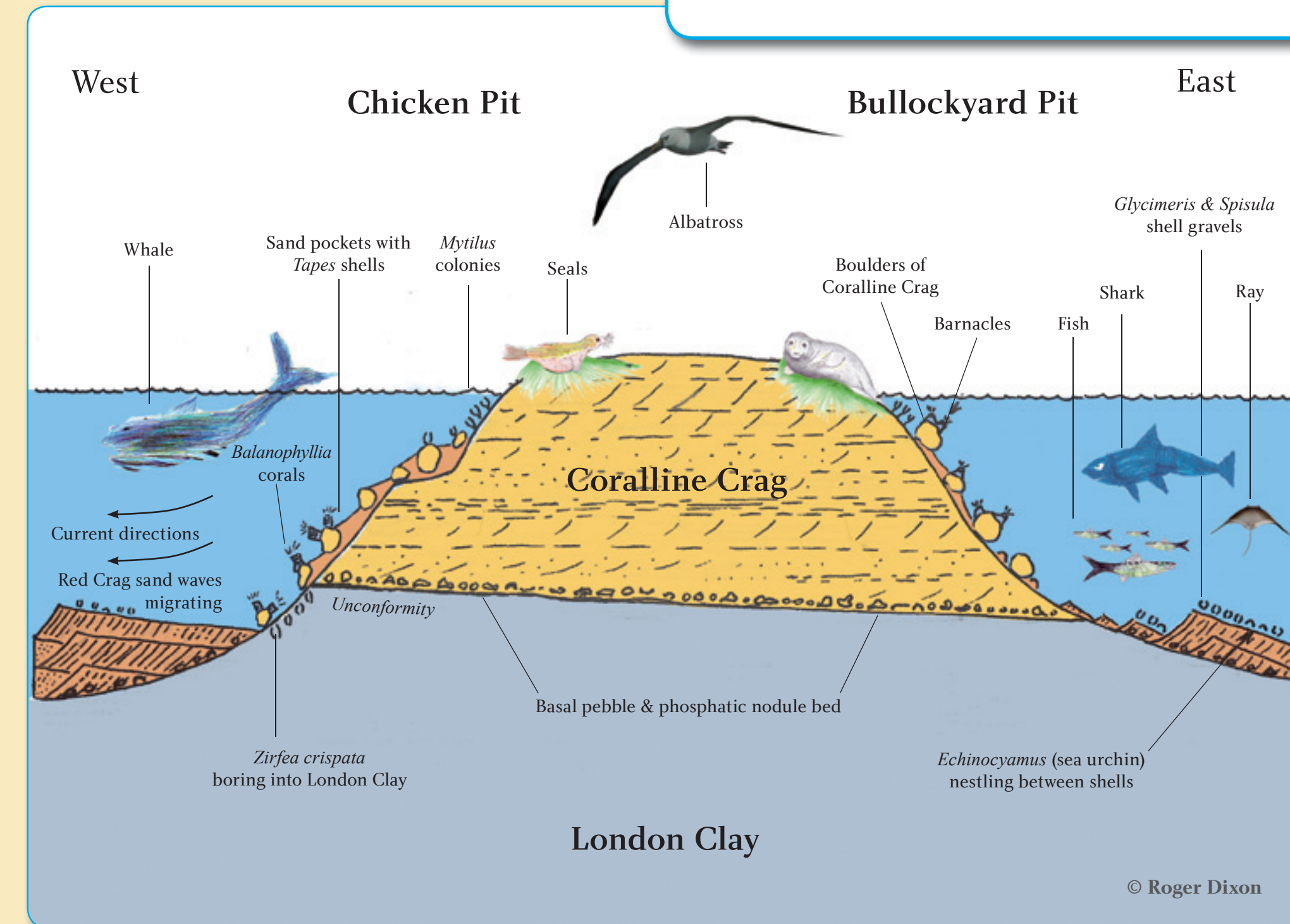
Phosphatic nodules, mistakenly called 'coprolites' (a name usually given to fossil animal droppings which they somewhat resemble), are found at the base of the Crag. They were excavated at Sutton during the mid-nineteenth century for making phosphate fertiliser – needed as agricultural techniques responded to expanding Victorian populations.

## BRYOZOANS

Bryozoans live in colonies of many tiny individual animals, and include the living 'sea mats' and 'sea mosses'. Colonies may be attached to shells, stones or seaweeds and are common in clear waters. There are many different forms, but may be leaf-like, or branching and bush-like, or encrust other objects. Many different fossil species occur in the Coralline Crag and are commonly found.

## PIDDOCKS

Abundant burrows can be found in the London Clay surface in the Chicken Pit. These belong to the oval piddock, *Zirfaea crispata*, whose descendants live today, boring into soft rock and other substrates. This would have been a thriving community living in shallow water less than 10 metres deep before apparently being overwhelmed by sand waves.



Illustrative sketch showing the Coralline Crag island at Sutton during the time of the Red Crag sea and its environments about 2.5 million years ago

## THE RED CRAG

The Red Crag unconformably overlies and abuts the Coralline Crag and London Clay. It is a near-shore deposit formed in a high energy shallowing sea dominated by strong NE-SW trending tidal currents.

Submarine sand waves, up to 2 metres high at Sutton, piled up against the 'island' shoreline. They were produced by currents up to 0.6 m/sec in water up to 20 metres deep. There is evidence of channeling and ebb and flow tidal patterns.

Sea temperatures during Red Crag times are thought to be similar to those found along the Northern Ireland coast today. The Red Crag contains a large fossil mollusc fauna. Recent research has re-exposed the 'fossil' beaches and cliffs first recognised by Joseph Prestwich over 150 years ago and demonstrate that different habitats around the island were colonised by different mollusc communities.

These fossils help us to interpret the environment at the time they were living.

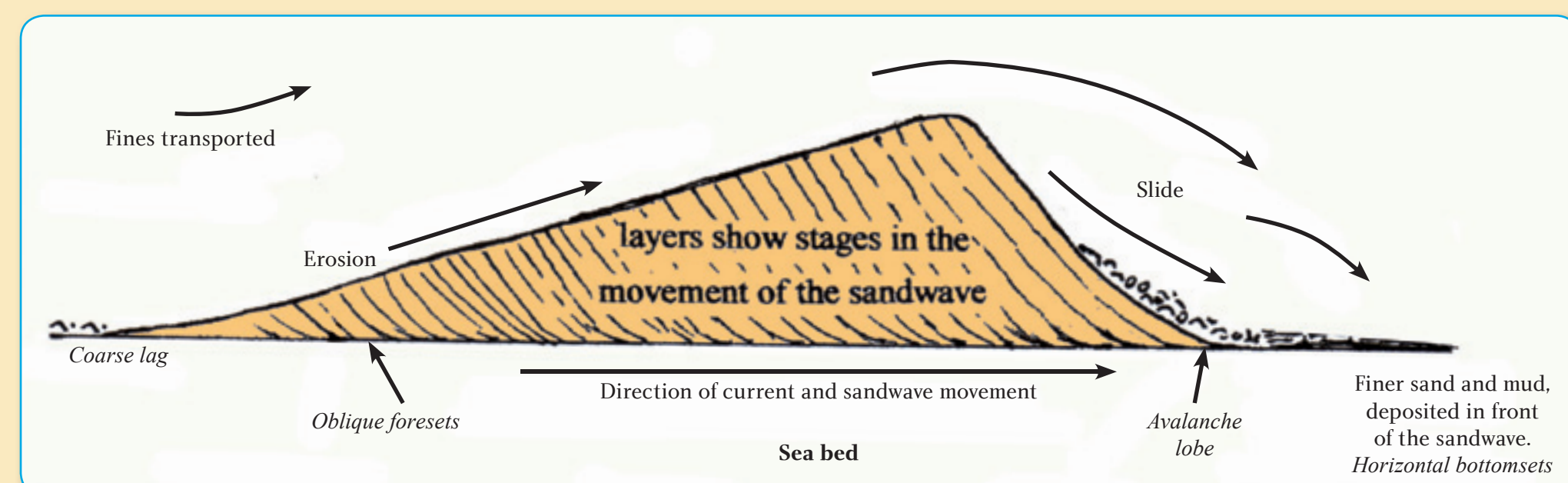
## THE CORALLINE CRAG

The bioclastic and silty sands of the Coralline Crag are seen in the pits in front of you and also in the Bullockyard Pit and Quarry pit.

Mud drapes, small scale ripples and laminations are common, while well developed medium- and large-scale trough cross-bedding is interpreted as storm and tidal sand-waves migrating

## SANDWAVES

Evidence of sandwaves is very common in the Coralline and Red Crag in the form of cross bedding. They were generated by the strong tidal currents of the shallow seas and can help us interpret the features of the past environment, such as water depth, current velocities and current directions.



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