# Timescale of the Ice Age in Essex (not to scale)

GeoEssex Promoting the geology and landscape of Essex

| Geological period | Age in years | Marine isotope stages | Climate | Selected geological sites in Essex and North East London | Archaeology (Evidence of human occupation in Essex and elsewhere) |
|---|---|---|---|---|---|
| Holocene | | 1 | **Flandrian stage** *(Present interglacial stage)* | Modern river alluvium and river meanders. Peat beds at **Tilbury** and elsewhere. Submerged forests at **Rainham** & **Purfleet**. Recent coastal deposits such as cockle spits, shingle spits and salt marsh. Landslips. | Neolithic period<br>Mesolithic Period (first farming) |
| Pleistocene | 10,000 | 2-5d | **Devensian glacial stage** *(ice extends as far south as Norfolk)* | **River Lea** terrace deposits. ***Lea Valley Arctic Bed*** at **Nazeing** and **Ponders End**.<br>**Great Totham** (mammoths etc.). Ice wedge polygons (revealed as cropmarks).<br>***East Tilbury Marshes Upper Gravel*** | End of the Palaeolithic period. Modern humans (*Homo sapiens*) arrive in Britain (remains and tools have been found at **Kents Cavern** in Devon and **Cheddar** in Somerset).<br>Neanderthal flint hand-axes at **East Tilbury** etc. |
| | 120,000 | 5e | **Ipswichian Interglacial stage** | **East Mersea** 'hippo gravels' (Cudmore Grove Channel & Restaurant Site). **Chelmsford** (Moulsham fauna).<br>**Trafalgar Square** (Classic hippo & elephant fauna). **Walton-on-the Naze** (elephants etc. from foreshore). | Humans absent from Britain during the Ipswichian stage. |
| | 150,000 | 6 | **Glacial stage*** *(extent of ice sheet not known)* | ***East Tilbury Marshes Lower Gravel***<br>**West Thurrock** (Lion Pit Tramway Cutting). **Aveley** (Sandy Lane Pit – Romford Road End)<br>***Mucking Upper Gravel*** | Long and severe cold stage.<br>No evidence of humans in Essex |
| | 200,000 | 7 | **'Aveley' interglacial stage*** | **Aveley** (Aveley elephants at Sandy Lane Pit, Aveley A13 road cutting). **Ilford** mammoths (Uphall Pit).<br>**Lexden** interglacial deposits. **West Thurrock** (Lion Pit Tramway Cutting).<br>**Grays?** (classic brickearth with elephants). **Wrabness** (elephants & mammoths in brickearth). | Acheulian flint tools (hand-axes) at **Aveley**<br>'Levallois' flint tools at **West Thurrock** (Lion Pit Tramway Cutting) |
| | 250,000 | 8 | **Glacial stage*** *(ice sheet extends as far south as Peterborough)* | ***Mucking Lower Gravel*** †<br>**West Thurrock** (Lion Pit Tramway Cutting). **Barling** (mammoth in ***Barling Gravel***). **Aveley** (Belhus Park).<br>**Purfleet** (Greenlands Quarry - top gravel). **East Mersea** (Mersea Island Gravel at Cudmore Grove).<br>***Corbets Tey Upper Gravel*** † | Acheulian flint tools (hand-axes) at **Barling** |
| | 300,000 | 9 | **'Purfleet' interglacial stage*** | **Grays** and **Little Thurrock** brickearth (elephants etc.). **Great Yeldham** (brickearth with fossils).<br>**Purfleet** (Greenlands Quarry - interglacial deposits). **Barling** (channel deposits). **Aveley** (Belhus Park).<br>**Ilford** mammoths (Cauliflower Pit, Seven Kings). **East Mersea** (Cudmore Grove channel deposits). | 'Clactonian' flint tools at **Little Thurrock** (Globe Pit).<br>'Clactonian', 'Acheulian' and 'Levallois' flint tools at **Purfleet**.<br>'Acheulian' flint hand-axes at **South Woodford** and **Aveley** (Belhus Park). Butchered bones at **Great Yeldham** and **Grays**. |
| | 350,000 | 10 | **Glacial stage*** *(extent of ice sheet not known)* | ***Corbets Tey Lower Gravel***<br>**Purfleet** (Greenlands Quarry - basal gravel). **Aveley** (Belhus Park). **Little Thurrock**?<br>***Orsett Heath Upper Gravel*** | No evidence of humans in Essex? |
| | 400,000 | 11 | **Hoxnian interglacial stage** | **Clacton** and **Jaywick** channel deposits (***'Clacton elephant bed'***). **Marks Tey** (lake deposits). **Copford** (elephant etc). | 'Clactonian' flint tools at **Clacton** (first undisputed evidence of humans in Essex). Human skull found at **Swanscombe** (Kent).<br>Interglacial named after **Hoxne** (Suffolk) where flint tools found. |
| | 450,000 | 12 | **Anglian glacial stage**<br>*(ice sheet extends as far south as Hornchurch)* | ***Orsett Heath Lower Gravel*** (oldest gravel of the modern, post-diversion, Thames and overlying the till at **Hornchurch** Railway Cutting) (called Black Park Gravel/Boyn Hill Gravel on geol. maps).<br>***Low Level East Essex Gravel*** (Thames-Medway gravels between **Rayleigh** and **Clacton**)<br>Ice sheet extends across almost all of the UK as far south as Essex depositing ***Anglian till*** (boulder clay) which forms a plateau across much of north Essex and lying on top of the Kesgrave Sands and Gravels. River Thames diverted. The furthest southerly exposures of till are at **Hornchurch** and **Upminster**.<br>In north-east Essex the ***Upper St.Osyth Gravel*** is outwash gravel from the ice sheet (seen at **Fingringhoe Wick**), which downstream combines with the gravel of the River Medway to form the ***Upper Holland Gravel***. These gravels lie directly on ***Lower St.Osyth/Lower Holland Gravel***, which was laid down by the Thames and the combined Thames-Medway rivers respectively. The junction between the two (at **St.Osyth** and **Holland-on-Sea**) marks the moment of the diversion of the Thames. | No evidence of humans in Essex during the Anglian stage.<br>*Note: Any humans in Britain at this time would almost certainly have been Homo heidelbergensis, the ancestor of Neanderthals. The name of this species comes from the site of the first discovery near Heidelberg in Germany. Evidence of this species in Britain prior to the Anglian glaciation has recently been found at several places in England (see below). After the Anglian stage Homo heidelbergensis is thought to have slowly evolved into Homo neanderthalensis, the evidence for this being the Swanscombe skull (see above), which has Neanderthal features.* |
| | 500,000 | 13 - 21 | **'Cromerian Complex'** (approx. four cold stages separated by interglacials) | ***Kesgrave Sands and Gravels*** (laid down by the 'pre-diversion' Thames and covering most of north and central Essex. These sands and gravels are beneath the Anglian till and are exposed in modern river valleys.<br>***High Level East Essex Gravel*** (ancient Medway gravels between **Rayleigh** and **Clacton**).<br>Important interglacial deposits at **Wivenhoe**, **Ardleigh**, and **Little Oakley** (about the same age as the Cromer Forest Bed in Norfolk). | Classic Acheulian hand-axes and human bones at **Boxgrove** (Sussex), which is dated at about 500,000 years.<br>Possible worked flint flakes from **Wivenhoe** (age uncertain).<br>A flint flake from **Westcliff**, with evidence of human workmanship, is claimed to be the earliest record of humans so far found in Essex and may be as much as 600,000 years old. |
| Base of Pleistocene 2.6 million years | 800,000<br>? | pre - 21 | **Climate of early Pleistocene stages uncertain** | ***Kesgrave Sands and Gravels*** (Pre-diversion Thames deposits)<br>***Pebble gravel*** (high level gravels capping high ground at **Langdon Hills**, **High Beach**, **South Weald**, **Warley**, **Havering-atte-Bower**, **Hainault Forest**, etc. – thought to be from tributaries flowing north into the ancient 'pre-diversion' Thames) (called Stanmore Gravel on geol. Maps).<br>***Chillesford Sand*** (part of the Norwich Crag formation) at **Elsenham** etc. | The earliest evidence of humans north of the Alps is at **Pakefield** (Suffolk), which is dated at about 700,000 years and **Happisburgh** (Norfolk), which is dated at 800,000 years.<br>Earth's magnetic field reverses (780,000 years ago).<br>First use of fire (by *Homo erectus*) in Africa 1.6 million years ago? |
| Pliocene | 3 million | | **Cool** | ***Red Crag*** at **Walton-on-the-Naze**, **Little Oakley**, **Beaumont**, **Dovercourt**, **Elsenham** etc. | Claims for flints showing human workmanship ('eoliths') from the Red Crag basement bed in Essex & Suffolk are now discredited. |

** Marine isotope stages 10 to 6 were previously thought to be one glacial stage known as the Wolstonian.* † *BGS geological maps show an additional terrace (the Hackney Gravel) between the Corbets Tey Gravel terrace and the Mucking Gravel terrace.*