THE BRIGHTLINGSEA ENVIRONMENT and BIODIVERSITY PROJECT (2021-2025)

Exploring the potential for nature recovery and citizen science within the locality

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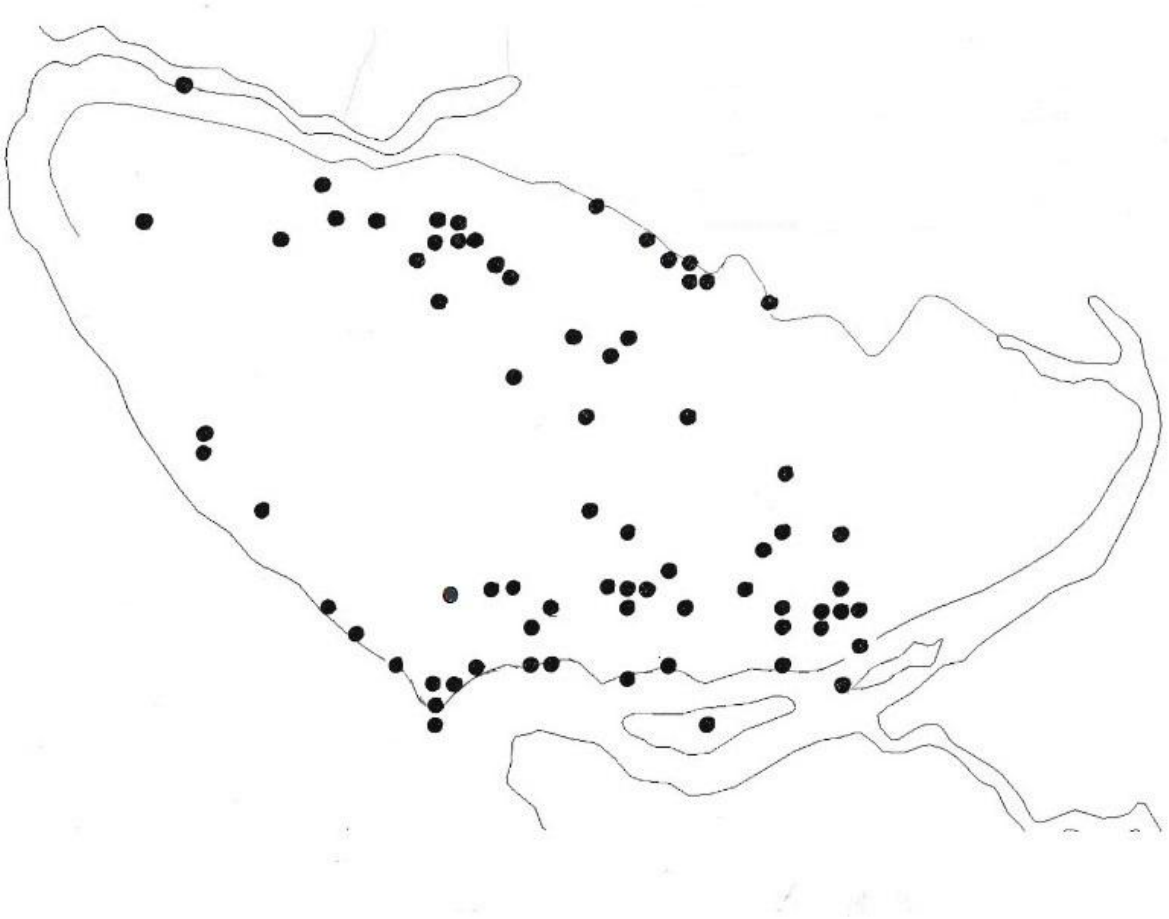
Version 5i
18.01.26

Contents

Main sites providing data for the Brightlingsea Environment and Biodiversity Project



See Appendix 3 for list of surveyed sites and their locations.

The Brightlingsea Environment and Biodiversity Project (2021 – 2025).

Introduction

The Earth has always been subjected to disruptive natural forces and events that cause change. The impact that events have on the environment and its biodiversity, and the duration of these events, may be short or long term and on occasions ongoing or permanent. This is especially so if the event is significant, such as that which caused the catastrophic extinction of the dinosaurs or the violent eruption of Krakatoa that destroyed life on that island and affected global weather patterns for many years. Less abrupt, not so dramatic, but equally devastating is the increasing impact of human activity on the environment that is manifest in competition for resources, pollution and climate change. Lack of effective control over the ongoing deterioration of land and sea has long been recognised by scientists and politicians and many attempts to implement mitigating legislations have been made. The need has been accepted globally by agreements made at conventions such as the Conference of the Parties (COP), which adopted the Global Biodiversity Framework (GBF) and nationally by the introduction of legislation such as the Wild Life and Countryside Act 1981. Many agreements and legislation aimed at environmental recovery have followed.

Current nature recovery activity is driven initially by the Environment Act 2021, introduced to satisfy the need for legislation to replace that of the European Union. Under the Act targets must be set for improvements to air quality, biodiversity, water and waste, and for habitats. There is also the concept of Biodiversity Net Gain (BNG) and Local Nature Recovery Strategies (LNRS) to support a Nature Recovery Network. A critical evaluation of the 2021 Act is given by Williams (2023).

Evidence that the abundance of UK species has declined by 19% since 1970 is shown in the 2023 State of Nature (SON) report, with nearly 1 in 6 species (16.1%) now threatened with extinction. The key word here is evidence. For biodiversity, the empirical evidence for abundance and distribution is collated from the results of observations and surveys recorded in global databases. Within the UK, this may be through broad stroke information gathering, including that in the SON report, whilst other databases are maintained by County Recorders and similar bodies. The sentiment expressed in the SON report echoes my view that as individuals we are only aware of decline during our lifetime, we cannot envisage the extensive losses before then. Neither can we accurately extrapolate losses to both the environment and its biodiversity to give an accurate vision of the future.

But these losses are not necessarily spread evenly across the country, nor within its counties, and the resulting decline may not be easily recognised in the short term. Moreover, supportive environments and their constraints can vary considerably, both geographically and with time. This suggests that a mosaic of local geographical areas exists, each with its own environment and biodiversity, both being subjected to diverse, sometimes unique, constraints and risks. Focussed local baselines, such as that provided by the Brightlingsea Environment and Biodiversity Project (BEBP) are therefor essential to provide and inform local objectives and targets. An example of a recent local baselining exercise is that of Norwich City Council's Biodiversity Baseline Study (2024).
Currently, many local nature recovery activities and initiatives exist, but some may be more accurately termed nature enhancement and although nature recovery, nature enhancement and nature conservation may be considered to be three points on the same trident, they differ
True nature recovery requires the identification and correction of malignant events and deficiencies thus allowing nature to return to a previous state of excellence.

Almost all current and ongoing degradation of the environment and its biodiversity is the result of human activity, the impact being exacerbated by an increasing global human population. Historic habitats such as woodlands and marshes may make way for reservoirs, roads, houses and amenities, whilst farming efficiency requires the removal of hedgerows and the use of fertilisers and pesticides. The local environment is further stressed by unauthorised large scale rubbish dumping, vandalism, road kill, pollution, industrialisation, and general habitat disturbance. It is highly probable that habitat loss and the resulting impact on biodiversity is proportional to the size of the associated human population and its activities, both of which have geographical variation and historical increases. If the human population continues to increase with no change in patterns of activity, then we must seek mitigation for the loss of biodiversity by some other means, assuming this is still possible.

If human needs are given absolute priority over nature and coupled with political dogma, the core concepts of nature recovery will be debased and the future of the natural world placed at even greater risk. But to argue for recovery the state of local nature must be known before it can be protected or improved. Then deficiencies can be acted upon at every level to reduce degradation. The ability and will of the government and administration to fulfil their commitments at all levels will determine national outcomes. And we will be well aware that government policy, objectives, legislation and the resulting impact on the environment and its biodiversity can all change. Building twelve new towns, as declared by the current (2025) government, must produce a conflict of ideals leading to a detrimental, but probably socially necessary, impact on the environment.

Although human activity may reduce both the number and range of viable species and the geographical area that contains them, biodiversity outwith human influence is already subject to natural pressures. There are fluctuations in the sizes of wildlife populations due to variations in fecundity and fertility, inter and intra specific competition, local environmental variations in atmospheric temperature, flood, famine, drought etc. resulting in changes in the carrying capacity of any particular ecosystem. Superimposed on these natural pressures are the unnatural and overriding consequences of global warming and climate change. Gradual reductions in land quality, land area and the biodiversity that it contains may be both invisible and unmeasurable if local data is absorbed within national averages. But the most obvious local losses are those due to building works such as new housing estates, industrial units, or amenities. I have seen some very thorough and meaningful professional environmental risk assessments carried out by, or for, companies such as building firms where the impact on biodiversity of the proposed building work is assessed and the resulting document and Biodiversity Net Gain (BNG) assessments used to support planning applications. (BNG is discussed later in the text).

Biodiversity is both versatile and adaptable. Given time, it will take advantage of, and gravitate to, whatever environments allow maximum viability. Many species of plants and animals not only utilise the urban environment, they thrive in novel niches. However both the climate and available space will change over time and although there will be an interim shuffling of adaptation, in the long term the potential for such adaption and evolution of activity is limited, as is the availability of niches. Without recognition and ownership of the risks, and a suitable mitigation programme, there will be gradual degradation of both urban and rural wildlife leading to catastrophic loss.

Local citizen scientists and organisations have conducted valuable nature recovery projects but risk assessments do not always appear to have been part of the process. The average unqualified naturalist, perhaps acting on available information, impulse, perceived need or a 'good idea' may not always produce strictly scientific outcomes, but often they are very beneficial. However in the absence of a risk or impact assessment negative effects resulting from environmental change will not be obvious. Thought should be given to maintaining stability and preventing future deterioration, whilst increasing the environmental carrying capacity of the area. Within the BEBP, in addition to identifying current needs by survey, it is proposed that at least one future survey is conducted from which overall local change will be measurable. Combined with a risk assessment, a programme of mitigation might be implemented. However, no amount of evidence and good intention will be of use unless there is cooperation and the capacity, drive and appetite to improve both nature and the environment at public, local and national government levels. Currently, many local nature recovery activities and initiatives exist, including groups conducting citizen science projects. Essex County Council (Soon to be reformed as The Greater Essex Combined County Authority (GECCA) and Mayoral Combined County Authority (MCCA)) is the local authority responsible for providing the lead on a Local Nature Recovery Strategy and ultimately to deliver a Nature Recovery Network. This responsibility includes assessing priorities, and proposing action plans for nature recovery at all levels.

Woodlands and agricultural fields are characteristic of the Brightlingsea area and there are many worked out gravel pits, some are flooded, others have been infilled. Using Ordnance Survey maps to compare current wooded areas with the same areas - say one hundred years ago – I note that the many infilled gravel workings are now mature wooded areas, greatly increasing overall woodland cover. This suggests that although local citizen driven projects such as the planting of trees or hedges can be regarded as a 'good thing', and should not be discouraged, these projects are generally dwarfed by official programmes. Moreover, such projects are unlikely to be true nature recovery, rather they are more likely nature enhancement.

The BEBP commenced in 2021 as the Brightlingsea Biodiversity Project, a citizen science venture that assumed although a decline in local biodiversity is a reality, wide-area national statistics are less meaningful in describing decline in smaller local areas. The project attempts to provide a local assessment through the evaluation of eight core objectives and a series of risk assessments. It is mainly an information gathering document that has several discrete sections including those centred on the environment and the biodiversity that it supports. It tabulates the findings of surveys of over eighty sites and incorporates some recent data from the surveys of several other reputable individuals or groups. From these data I have compiled two baselines, the first being that of environmental features, the second being that of biodiversity. It should also be obvious that baselines only represent the state of the environment and its biodiversity during a single period of time and whilst we need to know what we have, we also need to know what is happening to what we have. In order to assess such change, further baselining exercises are needed to gather data on trends. But great change can occur between baselining exercises following the initial survey and I assume a detrimental environmental event has an adverse impact on biodiversity. To pursue this line of thinking, I have risk assessed thirteen randomly selected sites for potential detrimental change and impact manifest in instability.
The monitoring of the selected sites would also serve as local area stability indicators. The risk assessment process is discussed in greater detail later in the text and the process should give some idea of which sites are at greatest

risk of detrimental change and within each site, which threat should be given priority for mitigation. It should not be a major task to visit each site on a rolling priority basis within (say) a six year period for interim reviews to appraise environmental improvement or otherwise by simple observation. Table 1 shows a possible plan. This is a simple review of the environment only, it does not involve a biodiversity survey. Its need and its effectiveness may be considered and assessed in accordance with the discretion and judgements of the local surveying bodies.

Table 1. Possible interim survey plan. Each year at least two sites are observed for change and to consider mitigation. At year 6 all sites will have been observed for change at least once.

Baseline at year 0 includes data from the 13 selected risk assessed sites	Potential intervening observation period					A new Baseline is set at year 6 if no cause to repeat it earlier
	Year 1 observation	Year 2 observation	Year 3 observation	Year 4 observation	Year 5 observation	

Being a local survey for local people the BEBP results may be useful to inform the decision making process of local government or other smaller organisations should they so choose. Projects such as the planting of new hedgerows and trees have been introduced locally on the assumption that doing so is a good thing and an improvement to biodiversity must result. Within the BEBP I do not make such assumptions. The objective is to provide empirical data to support any related decision making processes and to provide a source of information for any interested party. Generally, projects such as the planting of trees and hedges on a large scale would be under the guidance of organisations such as the Woodland Trust or the Forestry Commission, which has comprehensive information on its website, or from a local authority each of which may provide advice. (See section on Hedges and hedgerows). If the environment is altered as in the general example of tree or hedge planting, then the impact on the surrounding biodiversity should be risk assessed. And if the objective is nature recovery, we need to know what is wrong with local nature that prompts the need for a local recovery project.

Objectives

In summary, the BEBP is a survey of the Brightlingsea Town Council (BTC) administrative area and seeks to provide current data on both the environment and its biodiversity. It is against these two baselines that future improvement or deterioration of both quality and quantity can be measured and the objectives listed below can be pursued. Risk analysis, resulting in risk assessments for a sample of sites, is introduced as an integral part of baselining. The objectives are:

1. To increase public awareness and appreciation of the local environment and its biodiversity.
2. To provide a baseline of environmental features (topography) against which change can be measured.
3. To provide a baseline of biodiversity against which change can be measured.
4. To advocate the use of risk analysis through the risk assessment process in nature recovery and periodically risk assess a sample of sites, the risks being detrimental change to both environmental stability and biological degradation. Remedial action plans should be an integral part of the risk assessment process.
5. To provide data that may inform local decision-making processes and provide evidence to strengthen arguments for retention and enhancement of important sites of biodiversity that are otherwise not protected.
6. To revisit the baselines in (say) six years' time to measure change and consider possible mitigation where change is detrimental.
7. To appraise the methodology – has it done what was intended it should do?
8. To appraise the effectiveness of citizen science by analysing the interest, participation, cooperation and data received or requested from individuals and organisations within this study.

The Brightlingsea district in summary

Brightlingsea is a small town situated on the Essex coast within the Tendring administrative district. It has a current (2024) population of 8680 (City Population). The town name is a derivation or corruption of its original name 'Brihtric's island' or 'Beorhtric's island' and the area was a true island until the 16th Century. The area has seen a growth in the number of housing developments with a corresponding increase in traffic along the single road leading to and from the town. In common with most recent buildings, a high proportion of houses are centrally heated, thus adding to atmospheric warming.

The Brightlingsea district is not quite an island and the town effectively bisects the current Brightlingsea Town Council administrative area, resulting in open spaces to the east and west. Most open space is given over to agriculture with arable and fallow fields, these being punctuated by small areas of woodland and, to a lesser degree, gravel pits many of which are flooded. These gravel pits have great, and possibly undervalued, potential for biodiversity. Livestock farming includes the rearing of sheep and cattle. There are no rivers or major streams

and few ponds and springs. The Roman Brook, a small spring fed stream, flows from Springmead Gardens to the coastal marshland.
Parts of the area are protected, with designations such as Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Special Area of Conservation (SAC), part of the Colne Estuary Ramsar site, Marine Conservation Zone (MCZ), and a National Nature Reserve, whilst part of the coastal area is an RSPB Important Bird Area. It also holds the title of Coastal Protection Belt (CPB). But these designations are no protection against climate change, nor the rising sea levels that may eventually return Brightlingsea to its historical island state. Summer rainfall is below the national average and mean local air temperature is assumed to align with the current mean Essex temperature. A continuation of current weather trends could result in a climate similar to that of the modern-day Mediterranean area.
The following sections illustrate some earlier local and national initiatives and legislation to restore nature and the environmental against which the objectives of the BEBP might be compared.

Nature Recovery and the Environment – A variety of historical legislation, plans, objectives, reports and opinions

Declining biodiversity, failing ecosystems and a general deterioration of the environment over the past several decades is recognised by governments and the public, and the drive to improve both the environment and its biodiversity has resulting in assorted legislation, plans, objectives and reports. From a general scrutiny of many of these I quickly gained the impression that there is an overall lack of clarity and cohesion and I was unable to easily find a 'single source' of guidance covering all aspects. In fact the phrase 'all words and no action' came to mind. The following items illustrate the range of different attempts made to address the problem. More recent significant legislation includes the Natural Environment and Rural Communities Act 2006 and Environment Act 2021. Given sufficient drive, the implementation of the recent Local Nature Recovery Strategies may, or may not, make meaningful improvements. The list below is not thought to be exhaustive.

The UK Biodiversity Action Plan (UKBAP) 1994

In 1992, the UK signed up to the Convention on Biological Diversity (CBD) in Rio de Janeiro. The UK Biodiversity Action Plan (UKBAP) of 1994 was the UK government's response to the CBD and prompted the development and enforcement of national strategies with action plans potentially leading to the conservation, protection and enhancement of biodiversity (JNCC UK BAP). Although National Biodiversity Action Plans served their purpose at the time, the more species-centric focus was gradually replaced by a more habitat related conservation ethos, although some national forums that resulted from the UKBAP do still exist for certain species. For instance, the UK Water Vole Steering Group, which was able to get legal protection for water voles in the UK in 2008, is still in existence (Group Chaired by Darren Tansley for England, Scotland and Wales). But Species Conservation Strategies are now being planned under the Environment Act 2021, which will allow for certain key, usually declining, species (e.g. dormice, bats, certain reptiles.) to have their own conservation strategies.

The Essex Biodiversity Action Plan (EBAP)

At a more local level, the ‘Essex Biodiversity Action Plan’ (EBAP) was set up as part of the UK Government’s response to the CBD. All signatories agreed to pull together National BAPs which then needed to be devolved to a county or regional level. Local BAPs such as that of Essex will only have been effective where a partner organisation was able to commit to working for certain selected species, but for many years the EBAP, funded at County Level and hosted by Essex Wildlife Trust employed two staff to oversee some of the habitat and species work to underpin some of these species. With the dropping of BAPs as a tool for conservation the EBAP ended in the mid-2010s.

Quantity, quality and connectivity of habitat

Although the 1990s focus on the protection of some key species did help, it is now recognised that combining habitat quantity, quality and connectivity is the most important tool for allowing species to survive. BAPS did of course cover several habitat action plans (HAPs) as it progressed. Apart from any on-going national forums, the Essex BAP (EBAP) and its outcome(s) appear to have been both neglected and disregarded.
Disregard in particular is something that the BEBP must avoid. Other BAPs have been undertaken by many other organisations. Examples include those of the London Borough of Redbridge and of Thurrock with their Biodiversity Action Plan 2007–2012. Both were set up to comply with the requirements of the Natural Environment and Rural Communities Act 2006 (NERC), which extends the Countryside and Rights of Way Act 2000 (CROW) biodiversity duty to both public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity. Other private bodies, such as water companies have also set up BAPs to secure compliance with legislation.

The Natural Environment and Rural Communities Act 2006

Section 40(2A) of the Natural Environment and Rural Communities Act 2006 (duty to conserve biodiversity) makes provisions about the duties of public authorities in relation to local nature recovery strategies.

For the purposes of this section 'the general biodiversity objective' is the conservation and enhancement of biodiversity in England through the exercise of functions in relation to England.'

(1) A public authority which has any functions exercisable in relation to England must from time to time consider what action the authority can properly take, consistently with the proper exercise of its functions, to further the general biodiversity objective.

(1A) After that consideration the authority must (unless it concludes there is no new action it can properly take)

(a) determine such policies and specific objectives as it considers appropriate for taking action to further the general biodiversity objective, and

(b) take such action as it considers appropriate, in the light of those policies and objectives, to further that objective.

The Secretary of State must, as respects England, publish a list of the living organisms and types of habitat which in the Secretary of State's opinion are of principal importance for the purpose of conserving or enhancing biodiversity. (The need to publish a biodiversity report does not apply to Parish Councils)

The Tendring District Council Conservation Area Review (2006)

In the Tendring District Council Conservation Area Review 2006, Brightlingsea Conservation Area was described as a Conservation Area Character Appraisal. Although the review was focussed on buildings, by recognising the importance of conserving these buildings it also serves to conserve any associated wildlife, such as bats. Moreover, the conservation of older buildings removes the disruption to the environment that accompanies the construction of new buildings.

The UK National Ecosystem Assessment (NEA)

The NEA arose from findings of the 2005 global Millennium Ecosystem Assessment (MA)**,** which not only demonstrated the importance of ecosystem services to human well-being, but also showed that at global scales, many key services are being degraded and lost. As a result, in 2007 the House of Commons Environmental Audit recommended that the Government should conduct a full MA-type assessment for the UK to enable the identification and development of effective policy responses to ecosystem service degradation. The UK NEA was intended to enable better decisions on matters that impact on the UK's ecosystems to ensure long-term support for ecosystems for the benefit of UK citizens, thereby complying with Defra's *Action Plan for Embedding an Ecosystems Approach* (2007). This was later updated by Defra in their *Securing a healthy natural environment: An action plan for embedding an ecosystems approach*' (2010).

Delivering a healthy natural environment. An update to 'Securing a healthy natural environment: An action plan for embedding an ecosystems approach' (2010). This updated Defra's Action Plan for Embedding an Ecosystems Approach (2007).

The Climate Change Act 2008

This is presented as 'An Act to set a target for the year 2050 for the reduction of targeted greenhouse gas emissions; to provide for a system of carbon budgeting; to establish a Committee on Climate Change; to confer powers to establish trading schemes for the purpose of limiting greenhouse gas emissions or encouraging activities that reduce such emissions or remove greenhouse gas from the atmosphere; to make provision about adaptation to climate change; to confer powers to make schemes for providing financial incentives to produce less domestic waste and to recycle more of what is produced; to make provision about the collection of household waste; to confer powers to make provision about charging for single use carrier bags; to amend the provisions of the Energy Act 2004 about renewable transport fuel obligations; to make provision about carbon emissions reduction targets; to make other provision about climate change; and for connected purposes.'

Making space for nature: a review of England's wildlife sites (2010)

Led by Professor Sir John Lawton, an independent review of England's wildlife sites and their connectivity entitled 'Making space for nature: a review of England's wildlife sites' was published on 24 September 2010. The practicality of implementing Lawton's recommendations was subsequently investigated by many organisations, including the Wildlife Trusts, who focussed on more localised and better-connected wildlife sites, which they termed 'nature recovery networks.'

The Natural Choice (2011)

In response to the global commitments to halt the decline in biodiversity, made at Nagoya, Japan, the UK Government published 'The Natural Choice' (2011), the first Natural Environment White Paper for 20 years. It outlined the Government's vision for the natural environment, shifting the emphasis from piecemeal conservation action towards a more integrated holistic approach.

Biodiversity 2020 (2011)
On 19 August 2011, Defra published 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' to halt overall biodiversity loss, support healthy, well-functioning ecosystems and, by 2020, to establish coherent ecological networks, with more and better places for nature, thus benefiting both wildlife and people. The objectives were to adopt a more integrated large-scale approach to conservation on land and at sea, putting people at the heart of biodiversity policy, reducing environmental pressures and improving our knowledge.

The 25 Year Environment Plan (2018)
The 25 Year Environment Plan, published somewhat belatedly in 2018, sets out Lawson's 2010 steer (bigger, better and more connected) as a national objective: that is, the earlier focus on conservation was shifted to one of recovery via a single Nature Recovery Network (NRN). The NRN's purpose is to address biodiversity loss, climate change and public health, through improved connectivity and access to nature. Localised landscape-scale delivery of nature recovery networks, or nature networks, feeds into this national objective. Defra have published details of the ten environmental goals and the apex goal of improving nature. More recent legislation has placed much emphasis on drawing together existing information on the state of nature and the environment in the strategy area, to agree what the strategy is trying to achieve and to identify practical actions that could achieve them. One of the objectives of the Environment Act 2021 is to improve the environment thence enhance biodiversity.

Conservation of Habitats and Species Regulations 2017 (as amended)
and **The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019**
The 2017 Regulations have created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK. The national site network includes:

- existing SACs and SPAs
- new SACs and SPAs designated under these Regulations
- Ramsar sites

The objectives are to maintain or, where appropriate, restore habitats and species listed in Annexes I and II of the Habitats Directive to a favourable conservation status (FCS), contribute to ensuring, in their area of distribution, the survival and reproduction of wild birds and securing compliance with the overarching aims of the Wild Birds Directive. The definition of the abbreviations SAC and SPA are given under the heading on Page 31 under the heading Areas with special designations to the West of Brightlingsea.

Local Nature Recovery Strategies
Responsibility for plans to improve the environment is at County level via Local Nature Recovery Strategies (LNRS). These drive more coordinated, practical, and focussed action to help nature. They form an important part of a national Nature Recovery Network, which includes protected sites like SSSIs but extends well beyond them. LNRS should identify locations that can be created or enhanced for the greatest benefit to nature and to the environment.

Local nature recovery strategy statutory guidance
More detailed guidance is contained in the *Local nature recovery strategy statutory guidance*. (Presented to Parliament pursuant to Section 106(5) of the Environment Act 2021). There are other sources of information, guidance and objectives such as the Convention on Biological Diversity (CBD): the Global Biodiversity Framework, and the State of Nature Partnership's 2023 Report. Additional legislation and guidance may be added in time, especially with any potential policy changes introduced by any new Government.

Pledge for Nature
On the first anniversary of the leaders of 'Pledge for Nature', which is a collaboration between the Joint Nature Conservation Committee (JNCC), Natural England, Natural Resources Wales, NatureScot and the Northern Ireland Environment Agency, two reports were produced. These were a Summary Report and an Evidence Report, both being published in September 2021 under the overarching heading 'Nature Positive 2030'. Following this, the joint statement 'Nature Recovery for Our Survival, Prosperity and Wellbeing' was issued by the UK's Statutory Nature Conservation Bodies highlighting their role in nature recovery and emphasising the role of nature recovery in human survival, prosperity and wellbeing.

Blueprint for Halting and Reversing Biodiversity Loss: National Biodiversity Strategy and Action Plan 2030 (NBSAP) and the National Biodiversity Strategy and Action Plan
The United Kingdom has published its Blueprint for Halting and Reversing Biodiversity Loss: the UK's National Biodiversity Strategy and Action Plan for 2030. The UK NBSAP for 2030 draws on the commitments made by the UK and the UK Overseas Territories and Crown Dependencies to summarise and emphasise a collective ambition and determination to work together to address biodiversity loss. The UK NBSAP commits the UK to achieving all 23 of the GBF targets at home. These targets are shown at Appendix 2.

Nature Recovery Networks

A Nature Recovery Network (NRN) is not an organisation, it is a geographical feature variously described as:

1 A network of wild-life rich places stretching from our cities to countryside, mountains to coast' (Defra)

2. A joined-up system of places needed to allow nature to recover and thrive' (Essex Wildlife Trust).

3. A connected network of habitats designed to support biodiversity ecosystem resilience, facilitating species viability.

4. An ecological network with a number of core, well-connected, high-quality areas of well-functioning ecosystems, together with those parts of the intervening landscape that are 'wildlife-friendly' and which, collectively, allow wildlife to thrive. (Natural England Research Reports. NERR 0891 and NERR 082)

It might be asked why there is not a common definition. I have my own personal opinion. As well as having a primary role of supporting abundant wildlife, a nature network should also enhance natural beauty and conserve geodiversity. Opportunities should be taken to deliver benefits for people, such as flood alleviation, recreational opportunities and climate change adaptation and mitigation. These are summarised in NRN's 10 key principles.

The Nature Networks Evidence Handbook (Crick *et al.* 2020)

The Handbook was published to support localised action that contributes towards the national NRN. Creation of these local nature networks is supported by identifying design principles and describing the evidence that underpins desirable features. The handbook builds on 'Making Space for Nature' (Gov.UK 2010), outlining some of the practical aspects of implementing a nature network plan, as well as available tools to aid decision making. The Small Sites Metric calculation tool gives an insight of how the data in this report might be useful in planning considerations. (I have used this tool. It takes practice).

State of Nature (2023)

Another recent report titled *State of Nature* (Natural England 2023) (SON) gives some details of the decrease in biodiversity over the last fifty years and advises that two significant causes for the decline are climate change and the way that we manage our farmland. There are 943 species and subspecies in the priority list for England whose viability is of concern, including some that are suffering a rapid population decline.

The Roman River Valley Living Landscapes

The Roman River Valley Living Landscapes (RRVLL) survey published in 2019 was another important local (Essex) baselining exercise that followed an earlier work in 1983. The aim of the 2019 survey was to identify any significant changes and provide the data required to best decide how to manage and enhance the environment for the future. The earlier report provided a baseline against which changes revealed by the 2019 report could be measured. The BEBP report uses the RRVLL as a source of guidance and inspiration for its objectives, but does not echo its format. The report is biased towards biodiversity with only limited reference to the environment including sections on woodland and water quality. This report prompted my two papers on the biodiversity and hydromorphology of the Roman River in Friday Wood, which I hope are complimentary to the original.

Additional relevant legislation and bodies

1. The Essex Local Nature Partnership. Available at: https://www.essexclimate.org.uk/essex-local-nature-partnership (Accessed: 20.02.22)
2. The Natural Environment & Rural Communities Act 2006. Available at https://www.legislation.gov.uk/ukpga/2006/16/contents (Accessed: 20.02.22)
3. The Climate Change & Sustainable Energy Act 2006. Available at: https://www.legislation.gov.uk/ukpga/2006/19/contents (Accessed: 03.03.22)

A personal observation on legislation and the shuffling of species within a community

Although current legislation has the good intention of improving the environment to allow nature to thrive, it may be thwarted by factors beyond the control of government and individuals. Improving the environment and making space for nature in itself is not a 'single source' solution. It may be insufficient to simply make additional space materialise (how?) in the hope that biodiversity will take advantage. Some parts of the local biodiversity will take advantage, others may not, or may not take advantage within an acceptable timescale, whatever that might be. Superimposed on this is the natural variation in biodiversity that occurs over time. The number of species, the size of their populations and the ratio of this size to the size of all other species within a community is in a state of variable flux or 'shuffling'. All species are shuffling to take maximum advantage of the available resources and any change in topography and the environment results in a reshuffle, where some species might gain at the expense of others. Inevitably some species will be unable to adapt and will become unviable. When shuffling becomes minimal, we have stability and equilibrium. The main threat is the reduction, by whatever means, of suitable, unpolluted space and other resources that are essential for a viable biodiversity. Questions to be answered are:

1. What has the long and incomplete list of legislations and reports shown above achieved?
2. Is a different outcome probable or possible with the 2021 Environment Act?

3. Will the 2021 Act overcome the failure to notice gradual changes that lead to negative consequences?
4. Where exactly is the suitable space that nature needs in order to 'recover'?

The abandonment of European farm land

In *The Great Retreat* (an article in the December 2025issue of Geographical, the magazine of the Royal Geographical Society it is stated that abandoned or unused land in the European Union has increased by 58720 km^2, which is almost 10%. The percentage change per country (and my understanding of the causes) is as follows. (Data source for National Geographical was *Our World in Data*).

1. Luxembourg	148%	Building plots are not built on due to hoarding and extremely high prices
2. Lithuania.	46%	A shrinking population
3. Romania	39%	
4. Bulgaria	35%	Political change has resulted in highly fragmented small plots.
5. Sweden	35%	
6. Italy	34%	
7. Portugal	26%	Abandonment and lack of husbandry has increased the risk of fire
8. Greece	17%	
9. Finland	13%	
10. Hungary	12%	
11. Cyprus	12%	Constant water stress and arid conditions have resulted in agricultural decline
12. Belgium	- 27%	
13. Netherlands	-32%	

For the UK the amount of unused land fell by about 1.5 % between 2012 and 2018. The figures for Belgium and the Netherlands also show a large loss of available land. Whilst it might be assumed that the overall reduction in farmed land is advantageous for wildlife, the reasons for land becoming unused is neither universal nor simple.

Nature Recovery in practice

Nature recovery may be termed 'Efforts aimed at restoring and enhancing natural habitats and ecosystem to increase biodiversity, improve ecosystem services and strengthen ecological resilience'. The Leverhulme Centre for Nature Recovery says that 'Nature Recovery is the activity of helping life on Earth to thrive by repairing human relationships with the rest of the natural world'. Hampshire County Council (HCC) say that 'Nature recovery is all about how we restore habitats, protect wildlife and combat climate change through collective action'. I think we have grasped what nature is, but 'nature recovery' is something that needs clarification. Perhaps it means that humans should stop destroying the earth, decide on a vision of what we want the earth to look like, then take action to achieve that vision. Incorporating words such as 'efforts' into a definition implies possible failure. Repairing human relationships is nebulous and HCC's definition is interesting.

The Local Government Association Planning Advisory Service (PAS) advises that environment improvement plans should include the target to protect 30% of our land and sea for nature through the Nature Recovery Network by 2030 and restore or create more than 500,000 hectares of wildlife-rich habitats outside protected sites by 2042. It also seeks to halt the decline in species abundance by the end of 2030 and increase it to above 2022 levels by 2042.

Other sources advise that the overarching administrative objectives are:

1. To restore 75% of protected sites on land (including freshwaters) to favourable condition so nature can thrive
2. Create or restore 500,000 hectares of additional wildlife-rich habitat outside of protected sites
3. Recover threatened and iconic animal and plant species by providing more, diverse and better-connected habitats
4. Support work to increase woodland cover
5. Achieve a range of environmental, economic and social benefits, such as carbon capture, flood management, clean water, pollination and recreation

Defra's assessment (data extracted from their 2024 National Statistics) shows:

1. The total extent of land and sea protected in England through national and international protected areas increased from 1.3 million to 3.5 million hectares between 2005 and 2023; an increase of 170%.
2. This total includes 1 million hectares of terrestrial and freshwater areas, representing about 8% of the land area of England. Also contained in the total is 2.4 million hectares of marine sites (within the 12 nautical mile limit), representing 49% of inshore waters around England.
3. The area of terrestrial and freshwater sites has remained relatively stable since 2005, whereas the area of marine sites has increased substantially. Over the most recent 5 years to 2023 it has increased by 45%.

The creation or restoration of 500,000 Ha of additional wildlife-rich habitat outside of protected sites (being about 2.05 % of the UK land area) might be challenging. Unlike most of Europe, in the UK there is no obvious abandoned farm land. Neither are there any obvious areas of the country that are not already protected or occupied by existing habitats or man-made structures, which means this extra land has be found from somewhere. At the same time there is at 2024 the need for an estimated 300,000 new homes (houses) each year (see *Homes England Fact Sheet One* available at Gov.uk). In Tendring the number built in the year to March 2024 was 838, covering 6.44 ha excluding amenities, which if built in Brightlingsea at this rate, would completely cover the area in 12 years. The state of flux emerging from more recent government ambitions is illustrated by the document *'Blueprint for Halting and Reversing Biodiversity Loss*: *the UK's National Biodiversity Strategy and Action Plan for 2030'.* Page seven of the document states: 'The UK NBSAP for 2030 draws on the commitments made by the UK and the UKOTs and CDs to summarise and emphasise our collective ambition and determination to work together to address biodiversity loss. The UK NBSAP commits the UK to achieving all 23 of the Global Biodiversity Framework (GBF) targets at home'. The 23 GBF targets are shown at Appendix 2 of the BEBP report.

I draw attention to the perhaps nebulous PAS advice that seeks to halt the decline in species abundance by the end of 2030 and increase it to above 2022 levels by 2042. Surely, to do so requires baseline data on what species exist at 2022, details of those species lost after 2022, and then reintroduction of those lost species or other species in order to achieve recovery by 2042. But amongst other things, we also need to know why these species have been lost. And remember that 'extinct' means no longer in existence so an extinct animal or plant by definition cannot be reintroduced so we must distinguish between extinct and locally extinct.

My view is that a form of nature recovery can be driven in two distinct ways. Neither is a perfect solution.
1. *Passive recovery* is simply returning or rewilding the environment to a previously healthy state and allowing the natural colonisation or recolonisation of plants and animals to occur in due course. This may be by allowing a ploughed field to become permanently fallow or allowing an area of previously drained wetland to become water logged again.
2. *Active recovery* includes the deliberate remodelling of the environment and the introduction and reintroduction of plants and animals that are known to have become locally extinct or threatened in or at a particular location at a particular time. Remodelling the environment would include the planting of woodland, the draining or flooding of wetlands and marshes and the creation of ponds and reservoirs. It is debatable whether this action is better defined as wide scale gardening or perhaps just interference, or perhaps more accurately described as pseudo nature recovery. A major consideration must be an assessment of the site's biodiversity carrying capacity together with an assessment of the impact of the reintroduction of extant species on other species.

The careful setting of objectives, with associated action plans and risk assessments, is essential, especially when considering the reintroduction of species that are naturally extinct or those subjected to extirpation. I use the word extinct to mean no longer present due to natural causes and extirpation to mean those species that have been deliberately made extinct by humans. How we manage species reintroduction may differ depending on the causes of loss. Examples of recent recovery by reintroduction include the European/Eurasian Beaver (*Castor fiber*) in various locations and under various conditions, and the White-Tailed Eagle (*Haliaeetus albicilla*) to the Isle of Wight. Reintroduction may be selective in that plants and animals that may be beneficial to nature but not beneficial to humans may be less favoured. Examples might include a keystone extirpated species such as the Grey or Eurasian Wolf (*Canis lupus lupus*). Hagan (2025) discusses the potential reintroduction of the Cougar (*Puma concolor*) to parts of its previous North American habitats and refers to English debates on the reintroduction of the Lynx (*Lynx lynx*).

All of which raises yet again the fundamental problem - at what point in time is the Golden Age for which we are targeting and modelling our nature recovery? Are we looking for a new Garden of Eden? That which needs to be done with parts of the environment, including depleted wooded areas, is generally understood (although perhaps contentious) but with animals it may be more complicated. Do we encourage growth of our small reintroduced population of Wild Boar (*Sus scrofa*), which in England originally became extinct around 1400 AD? What about the reintroduction of the European Bison (*Bison bonasus*), which in Britain originally became extinct around 6000 years ago and now has a population of around a half a dozen in woodland near Canterbury. If we reintroduce the Beaver (*Castor fiber*) as discussed later in the text should we also reintroduce the Eurasian Wolf (*Canis lupus lupus*) and the Eurasian Brown Bear (*Ursus arctos arctos*)? Is the environment and its biodiversity as it existed in 1970 really the baseline of our target and are we being selective in our recovery objectives. Does the scale of these initiatives reduce them to the status of open air zoos?

If we try to reconstruct the environment of an earlier period, which period do we choose and how do we know what it was like? Are we ignoring the law of unintended consequences? What are, or were, the pros and cons of the flooding of land in the construction of Abberton Reservoir (area 25 Ha)? I suggest that there can be no perfect

primeval nature recovery baseline and the best we can do is to baseline what we have now as a precursor to attempts to prevent further decline and more importantly make genuine improvements. If there is potential for future decline, then we can compute a compensation target. Is 'nature recovery' compatible with an increasing human population or can we do no more than simply reduce the rate of decline? The pragmatic reality is that humans are in competition with the rest of nature and there will be gains and losses. Can we predict a winner?

Providing a baseline of biodiversity is a major exercise that requires resources in the form of expertise, dedication and time. The baseline can never be perfect or complete but still sets a standard against which change can be measured. The base hypothesis is that under the pressures of human activity (i) local biodiversity, in terms of the number of viable species in a geographical area, may fluctuate and decline slowly over time and (ii) the environment's quality and available space is reducing. Without stocktaking, as is the intention of this project, this reduction and decline may be invisible and impossible to quantify. Following baselining, at least one further and duplicate baseline survey is essential to gauge overall change, with intermediate observations or risk assessments to gauge change between baselines. And of course it is important that we do not confuse nature recovery with nature enhancement or nature conservation.
In this text:

1. Nature recovery seeks to return the current state of nature to a former healthy and thriving condition
2. Nature conservation means to keep and protect that which we currently have.
3. Nature enhancement is a progression on conservation and means to improve what we currently have.

I suggest that nature recovery objectives and plans should be:

1. Evidence based
2. Physically possible
3. Financially viable
4. Driven by the necessary appetite
5. Risk assessed for adverse impact

If any of the above are absent, recovery will be at best uncertain and at worst impossible.
The process of nature recovery requires the responsible bodies to have the necessary drive, opportunity and ability. For a species to repopulate naturally, it also must have the necessary drive, opportunity and ability.

The Brightlingsea Environment and Biodiversity Project

The information contained in the BEBP has been collated from many sources. Geographical and topographical data sources include government websites such as those maintained by Defra, the National Library of Scotland, and Ordnance Survey. These show the locations of cultivated agricultural areas, gravel pits, woodland, and marshes. Also, of great value have been on-line computer websites such as Magic Maps, Grid Reference Finder and Elevation Finder. Several individuals have contributed to the biodiversity data used to populate the tables. These individuals share an obvious passion for the protection of wildlife and the environment and their input is much appreciated. Biodiversity data is recorded on Microsoft Excel spreadsheets, which inform the various tables in this text and will provide a useful means of further analysis in due course.

I renamed the original 2021/22 Brightlingsea Biodiversity Project as the Brightlingsea Environment and Biodiversity Project in recognition of the dependence that biodiversity has on its environment. The current project concentrates on the identification of the different types of environment and the biodiversity that each supports. Surveys provide what I hope to be as close as possible to a representative sample of flora and fauna for the area. Subsequently, I have conducted more intensive surveys and assessments of the risk of instability through environmental and biological degradation for a small but hopefully representative selection of sites and their populations. Because no survey can ever be fully comprehensive or up to date, I expect that this report and its follow-ups will be living documents, subject to ongoing modification and change in the light of increased observations, corrections and experience. Several constraints have become increasingly obvious. Firstly, the ability to obtain sufficient meaningful data is limited by available resources, particularly the lack of ongoing support in conducting the surveys. Secondly, identifying the vast range of animals and plants to be included in this data requires a level of expertise that is unlikely to be held by a single individual such as myself, and although great care is taken, I accept that misidentification is a possibility. To mitigate this possibility I place great emphasis on checking the accuracy of data and the relevant experience of anyone submitting it. If the identity of a species is in doubt, it is revisited and where necessary requests for opinions made to the relevant expert domain. If a high confidence level is not possible, the sample is either not recorded or its uncertainty is noted accordingly. The correct identification of some tabulated species has been queried by experts on the grounds that these species are unlikely to be present locally, but unless the species in doubt have been specifically named their inclusion cannot be reconsidered. The Large Tortoiseshell (*Nymphalis polychloros*) that I positively identified in 2022 (Table 20) is said to be extinct in the UK but quite obviously is not.

As a further example, a Small Red Damselfly (*Ceriagrion tenellum*) was thought to have been observed in a local pond and the photographic images and description and size in particular matched well with on line videos and images. However, a local expert advised that it was not a Small Red since specimens are extremely rare in the East of England and completely absent in Essex. This was confirmed by an internet search. Since it will continue to be absent so long as the experts deem it to be so, the observation was consequently not included in the BEBP. An additional potential constraint is that the more difficult a location is to access, the less likely that a representative sample will be obtained. This difficulty is less one of physical access, more of obtaining the necessary permissions from landowners. It might be asked why I have not used on-line databases to extract data. There are arguments for and against doing so but there is a suspicion that input to a particular on-line database by citizen scientists may be biased as users tend to specialise, rarely making observations of the same species twice. (Di Cecco *et al.* 2021).

Several on-line computer programs proved invaluable in assisting the identification of plant species from photographs, thus providing some welcome mitigation to my general lack of expertise in this area. Garden plants have been included because, as has been pointed out to me, they are a major part of the urban landscape and contain a rich assortment of species. This overcame my earlier thought that they are not representative since they are artificially introduced and artificially maintained so would not exist without human intervention. But as was also pointed out to me by a much wiser colleague, almost the whole of the British landscape has been subjected to some form of intervention over time and locally many non-native garden plants are now thriving in the wild. The data produced by the BEBP is intended to have a wider meaning to allow it to inform local planning decisions or feed into actions arising from those organisers that control the implementation of Local Nature Recovery Networks and Strategies i.e. pushing from the bottom up to meet pressure from the top down. It may also provide a useful document for those interested in nature or, as with other reports, it may simply be ignored, forgotten, or discarded as having no value. The only certain thing is that the future is uncertain and it must be remembered that enhancing an environment does not mean that it will lead to an increase in biodiversity: that is, the envisaged link between an enhanced environment and an enhanced biodiversity is neither immediate nor is it certain.

Baselining Brightlingsea's topography and environment

The environment may be considered as a mixture of the 'biotic', which include all living things, and the 'abiotic' comprising all non-living things. Almost universally both exist side by side in variable proportions, and in common usage the environment is the container for biodiversity. Topography has an influence on the general environment and the distribution of species, which tend to exist where the environment is most suited to their viability. A major objective of this project is to map the Brightlingsea area by identifying woodland, fields, standing waters, coastal features and urban areas. The various crops grown in agricultural areas have not been linked to specific geographical locations, crop rotation may in any case make this impractical. Changes to topography may occur gradually, resulting in some quite significant losses of biodiversity, which are unlikely to be noted without an initial baseline for comparison. But this slow change can be punctuated by periods of rapid and significant change such as the construction of a new housing estate. In either case, a baseline contributes towards the recognition of recent change, the rate of change, and perhaps gives some idea of the cost to nature.

The historical environment

The National Library of Scotland's website provides historical maps of England that allow a comparison of current topographical details with those of over a hundred years ago. Population increase dictates that built up areas are now far larger and more numerous than in the past. The large Manor Estate and its park and lakes are replaced by the Manor housing estate and further housing estates have been built near the old Maltings Farm and beside Robinson Road. Much of the current recreational beach area, including the boating lake and skateboard park, was originally salting with numerous oyster pits, this being reflected in the naming of Oyster Tank Road. Oyster pits were also numerous in other tidal areas, in particular Rope Walk and its vicinity. The high-water mark of ordinary tides (HWMOT) extended over much of the current sea-side recreational area, with its beach huts, skateboard park, swimming pool and boating lake, to reach the embankment on which ran the now removed Brightlingsea branch of the Great Eastern Railway with its link to Colchester. Current high tides do not reach the embankment unless there are exceptionally extreme weather conditions, such as those produced by storm Ciara in 2020. Rising sea levels may have a greater overall impact, with increased frequency, in future. Other gradual changes, although noticeable in the short term, quickly fade from group memory.

New buildings inevitably result in less space available for wildlife although some wildlife is opportunist in that it has always utilised suitable man-made structures (the House Mouse *Mus musculus*, House Martins *Delichon urbicum*, bats such as the Soprano Pipistrelle *Pipistrellus pygmaeus* in churches). But such gains are assumed to be far exceeded by losses in other areas. By comparing maps of the Ordnance Survey six-inch series, (in particular that of 1888 – 1915) with current maps, or on-line satellite maps, we know that in the Brightlingsea area flooded gravel pits have replaced historic ponds as dominant still-water features. These pits now provide a water surface area and volume many times that of lost ponds. Other gravel workings that are refilled with soil are effectively

rewilded, allowing the growth of scrub and leading to new trees and wooded areas, either by natural incursion or deliberate and planned plantations. This is discussed in more detail later in the text.

The modern environment

From maps of the Brightlingsea Town Council district, I identified geographical areas by type as in the topographical groups shown in Tables 2 to 9. The coastline is a major topographical feature, but because of its relatively uniform nature, it is not possible to conveniently subdivide it into discrete areas or types as is done in most of the following tables. It is, for example, included as item 4 in Table 3 but considered in far more detail later in the text.

Table 2. Topographical types in order of % cover

Topographical type and description		Approximate % cover
1	Arable and fallow land including grazing	60
2	Built up areas including housing, private gardens, and business use.	15
3	Marshland	12
4	Woodland or wooded areas	10
5	Water bodies including springs, flooded gravel pits, ponds, and drains	3
6	Recreational open lands and public gardens	< 1.0
7	(Mudflats exposed at low tide)	(7%)

Although the small area of mudflats exposed at low tide is shown in Table 2, I have not included it in the total land area used to calculate the other topographical types, where the land area is taken to be that area not submerged at high tide. The total dry land area I calculate to be 975 ha (9.75 km2).

Table 3. Topographical feature groupings

Topographical features	
1	Drains, ditches and springs
2	Main ponds and other small enclosed water bodies
3	Main flooded gravel pits, lakes and reservoirs
4	Coastline and creeks
5	Main wooded areas
6	Fields and other agricultural areas East
7	Fields and other agricultural areas West
8	Other coastal considerations, including salinity and sewage discharge

Table 4. Drains, ditches and springs

Description		Grid reference	Elevation (m)
1	The Borrow Dykes inshore of the seawalls.	Various	Approx. 3.0
2	The Great Divide, various parallel drains northwards	TM07321706	1.0
3	Misc. Drains Numerous un-named drains & small ditches	Various	-
4	Section of drain marking Brightlingsea N boundary	TM08901855	3.0
5	Morses Wood/Barker's Grove spring and stream	TM08811819	15.0
6	Spring in Springmead Gardens. Roman Brook source	TM08441718	13.0
7	Moverons Gardens. Two springs	TM06761875	18.0

Table 5. Main ponds and other small enclosed water bodies

	Description	Grid reference	Elevation (m)
1	Off Moverons. Possibly lost	TM06551893	16.0
2	Moverons Gardens. (*Two spring fed ponds)*	TM06761875	18.0
3	Small pond S of Wapping	TM06771787	6.0
4	Small water body in Queech Wood	TM07511774	18.0
5	N. of Little Clump	TM07541901	11.0
6	Brightlingsea Hall 1 *(Small reservoir)*	TM07981875	14.0
7	Brightlingsea Hall 2 *(Small reservoir)*	TM08021869	14.0
8	The Lozenge. Drying up, but possible spring nearby.	TM08151675	2.0
9	Brightlingsea Boating Lake	TM08241639	1.0
10	Springmead Garden Pond - spring fed	TM08441718	13.0
11	Morses Farm 1 (location nv) *(May dry up in hot summers)*	TM08761833	15.0
12	Morses Farm 2 (location nv) *(May dry up in hot summers)*	TM08763832	15.0
13	North of Morses Farm	TM08991843	0.0
14	Small Pond near Swallow Barn	TM09031844	0.0
15	Overspill pond N. of Mill Street 'Lagoon'	TM09531672	13.0
16	Mill Street Pond *(May dry up in hot summers)*	TM09621670	9.0

Table 6. Main flooded gravel pits.

	Description	Grid reference	Elevation (m)
1	Leg of Mutton/Mowing Marsh/Noah's Ark	TM06131873	4.0
2	SW of Moveron's Lodge	TM06491855	11.0
3	SW of Moveron's Lodge	TM06531857	11.0
4	Far N of Brightlingsea	TM06521938	3.0
5	Near Moverons Lodge	TM06731854	18.0
6	Near Moverons Lodge	TM06751857	18.0
7	Near Moverons Lodge	TM06761860	18.0
8	NW Ford Farmhouse	TM07111872	20.0
9	Closely situated & W. of Hall Farm Bungalow	TM07231835	24.0
10	Closely situated & W. of Hall Farm Bungalow	TM07231834	24.0
11	W of Long Plantation	TM07241819	19.0
12	Large Pit E Long Plantation	TM07471803	23.0
13	S of Hall Farm Bungalow	TM07561832	24.0
14	West of Army Cadet Force Hut	TM08001681	2.0
15	Warren's Pond in Morses Wood	TM08761822	15.0
16	Robinson Park main lake	TM09411743	19.0
17	Robinson Park 'Horseshoe'	TM09911702	10.0
18	Robinson Park middle-lower	TM09681725	16.0
19	Robinson Park middle-middle	TM09731738	14.0
20	Robinson Park middle-upper	TM09881753	14.0
21	Marsh Farm House large. Stoney Lane	TM09691766	16.0
22	Marsh Farm House small. Stoney Lane	TM09761770	14.0

23	Freelands	TM09991673	14.0
24	N of Lower Farm	TM10401769	4.0
25	N of Lower Farm	TM10401787	0.0
26	Lower Farm Lane	TM10521692	2.0
27	Fred's Hard	TM10971710	0.0

Note. Flooded gravel pits are discussed in detail later in this text. The condition of these pits varies over time and some that are shown as flooded at some stage of their evolution may subsequently become dry or earth filled. It is also difficult to define the visible differences between a small flooded pit and a large pond or lake and some misnaming is possible. Confirmation can only be obtained by survey. Generally, a pond will be natural and/or associated with a current or historic farm. Note also the variable heights above sea level.

Table 7. Main wooded areas

Description or name		Notes and approximate location	Grid reference & current status	
1	Leg of Mutton Wood	Next to Mowing Marsh Lake	TM05941882	R
2	The Leach	S of Little Wapping Hill	TM06321803	I
3	Moverons Group	Four wooded areas that surround Moverons Farm of which TM06631831 was originally shown as divided in to (i) Big Wapping Hill TM06631830 and (ii) Little Wapping Hill TM06611833	TM06531873	N
4			TM06531855	N
5			TM06631831	N
6			TM06781857	N
7	Unnamed	W of sewerage works	TM06821784	N
8	Lower Wedge		TM06941811	H
9	The Belt	Long strip of woodland	TM07091849	N
10	Thicks Wood	***Ancient/replaced woodland***	TM07051899	H
11	Long Plantation	Long strip of trees between flooded pits	TM07291802	H
12	Queech	E of sewerage works	TM07451778	H
13	W of All Saints Church	Partly bordered by Moverons Lane	TM07481851	N
14	Gravesend	Moverons Lane near Hall Farm	TM07501849	H
15	Wick's Wood	***Ancient/semi natural woodland***	TM07611743	H
16	Little Clump	N Brightlingsea	TM07551892	H
17	Big Clump	N Brightlingsea	TM07651895	H
18	Lodge Wood	***Ancient/semi natural woodland***	TM07931764	I
19	Road Clump	Near Brightlingsea Road	TM07911905	H
20	The Grove	Near Church Road	TM08011825	H
21	The Lozenge	Council Maintained	TM08161674	N
22	Gatehouse	Near Gate House Brightlingsea Road	TM08331888	N
23	Manor Wood	Opposite Colne Community College	TM08381768	N
24	Oakwood Copse	Off Samsons Road	TM08381827	N
25	Morses Wood	Historically known as Barker's Grove	TM08851821	I
26	Unnamed	North of Red Barn Road	TM09131776	N
27	N of Stoney Lane	Near Marsh Farm House	TM09431769	N
28	S of Mill Street	East End Green	TM09551662	N

29	Gravel Field	East End Green	TM09621680	N
30	Mowing Marsh Bushes		TM05951844	L
31	Lower Mowing Marsh	S of Leg of Mutton Lake	TM05601864	L
32	Oulers		TM06661740	L
33	Upper Wedge		TM06971829	L
34	The Link	Was an extension of Long Plantation	TM07381832	L
35	Unnamed		TM07691718	L
36	Furze Hill	Much reduced wooded area, effectively lost	TM07891663	L
37	Unnamed		TM08201696	L

Key to Reference Status. Baseline Reference (BR) is from OS Maps period 1888 - 1913
H = historic i.e. present on BR
I = woodland area has increased since BR
N = woodland area has been planted since BR
R = woodland area has decreased since BR
L = lost i.e. shown on BR but no longer on current OS maps
See Table 14 for comparison of current and historic woodland

Table 8. Fields and other agricultural areas East

	Fields to the East	Grid reference
1	Swallows Barn, Folkards Lane. Marshland.	TM091180
2	Near All Saints Church. Uncultivated grassland.	TM076189
3	East of Sewage Works. Cultivated crops.	TM073176
4	To the East of location 3 above. Cultivated crops.	TM075175
5	First field to the West of Elm Drive. Cultivated crops.	TM078172
6	Second field to the West of Elm Drive. Cultivated crops.	TM077174
7	To the West of Planton Way. Cultivated crops.	TM077170
8	To the West of Marennes Crescent. Uncultivated grassland.	TM079175
9	Moverons Lane. Uncultivated grassland.	TM074179
10	Fairview, Church Road. Cultivated crops.	TM077178
11	Fairview, Church Road. Sports/recreational field.	TM077880
12	Woodcroft, Church Road. Cultivated crops.	TM078183
13	Brightlingsea Hall, Church Road. Cultivated crops.	TM078185
14	East of Brightlingsea Road. Grassland. Sheep. Cattle	TM080189
15	North of Samsons Road. Grassland. Sheep. Cattle	TM082185
16	Second Field North of Samsons Road. Uncultivated grassland.	TM085186
17	Gatehouse Farm. Cultivated crops.	TM082187
18	Morses Farm. Uncultivated grassland.	TM086186
19	Morses Farm. Grassland. Cattle	TM087185
20	Morses Farm. Uncultivated grassland.	TM089183
21	Morses Lane (R. Carter & Sons) Uncultivated grassland.	TM086182
22	Morses Lane (R. Carter & Sons) Uncultivated grassland.	TM088181

23	South of Thorrington Cross. Cultivated crops.	TM095184
24	Lower Marsh Farm. Cultivated crops.	TM092181
25	Folkards Lane. Uncultivated grassland.	TM089181
26	Brightlingsea Boarding Kennels. Uncultivated grassland.	TM090180
27	Nr. Campernell Close. Grassland. Sheep.	TM089180
28	Stoney Lane. Cultivated crops.	TM097180
29	Stoney Lane. Cultivated crops.	TM096178
30	Stoney Lane. Cultivated crops.	TM099181
31	Fred's Hard. Cultivated crops.	TM108173
32	Fred's Hard. Cultivated crops.	TM108176
33	Lower Farm. Cultivated crops.	TM101175
34	Lower Farm Lane. Cultivated crops.	TM105173
35	The Saltings Nr. Bentley Country Park. Cultivated crops.	TM111174
36	Lower Farm Lane. Cultivated crops.	TM107170
37	Lower farm Lane. Cultivated crops.	TM107174
38	Lower Farm Lane. Cultivated crops.	TM105177
39	Lower Farm Lane. Cultivated crops.	TM102180
40	Lower Farm Lane. Uncultivated grassland.	TM104179

Table 9. Fields and other agricultural areas West

Fields to the West		Grid reference
1	Ford Lane. Cultivated crops.	TM062194
2	Ford Lane. Uncultivated grassland.	TM064192
3	Ford Lane. Cultivated crops.	TM067191
4	Ford Lane. Cultivated crops.	TM062191
5	Ford Lane. Cultivated crops.	TM064191
6	Ford Lane. Uncultivated grassland.	TM067189
7	Ford Lane. Cultivated crops.	TM062189
8	Ford Lane. Uncultivated grassland.	TM067188
9	Ford Lane. Cultivated crops.	TM064187
10	Brightlingsea Beach. Uncultivated grassland.	TM060192
11	Brightlingsea Beach. Uncultivated grassland.	TM060191
12	Brightlingsea Beach. Cultivated crops.	TM060184
13	Brightlingsea Beach. Cultivated crops.	TM060182
14	Brightlingsea Beach. Cultivated crops.	TM064178
15	Brightlingsea Beach. Cultivated crops.	TM067177
16	Brightlingsea Beach. Cultivated crops.	TM067175
17	Moverons Lane. Cultivated crops.	TM070185
18	Moverons Farm. Cultivated crops.	TM064184
19	Wapping Lane. Cultivated crops.	TM067184

20	Wapping Lane. Cultivated crops.	TM068182
21	Wapping Lane. Cultivated crops.	TM068181
22	Next to sewage works. Cultivated crops.	TM070178
23	Nature Reserve. Grazing marshland	TM078166

Notes

1. Some land usage may change over time, for example with crop rotation.
2. Cultivated land was generally identified from the presence of plough furrows, visible when field is viewed in Google Earth or similar, or by survey.
3. Some fields along Ford Lane are planted with seed crops specifically to providing winter food for birds.

Crops in the Brightlingsea area

Figure 1 under shows the variation in the crops grown in the Brightlingsea area at a particular date and is extracted from the Defra Spatial Data Download. (To see which crops are indicated by particular colours, go to the Defra Spatial Data Download) More detailed data requires the use of a Geographical Information System viewer. The area to the west of the town encloses part of the Colne Estuary (Brightlingsea Marsh) National Nature Reserve at TM078166, approximately from the sewage treatment works to the Great Divide. Wooded areas are shown in dark green. The estuary areas to the east of Brightlingsea from TM058184 to TM060965, and from TM070169 to TM063177 consist of mud flats. Magic Maps shows details of SSSIs, SACs, SPAs etc. An ArcGIS site map for Greater Essex Local Nature Recovery Strategy has recently been added online and the original. (Magic Maps is renamed MAGIC at https://magic.defra.gov.uk/MagicMap.html. This should be noted in any future references to the application.)

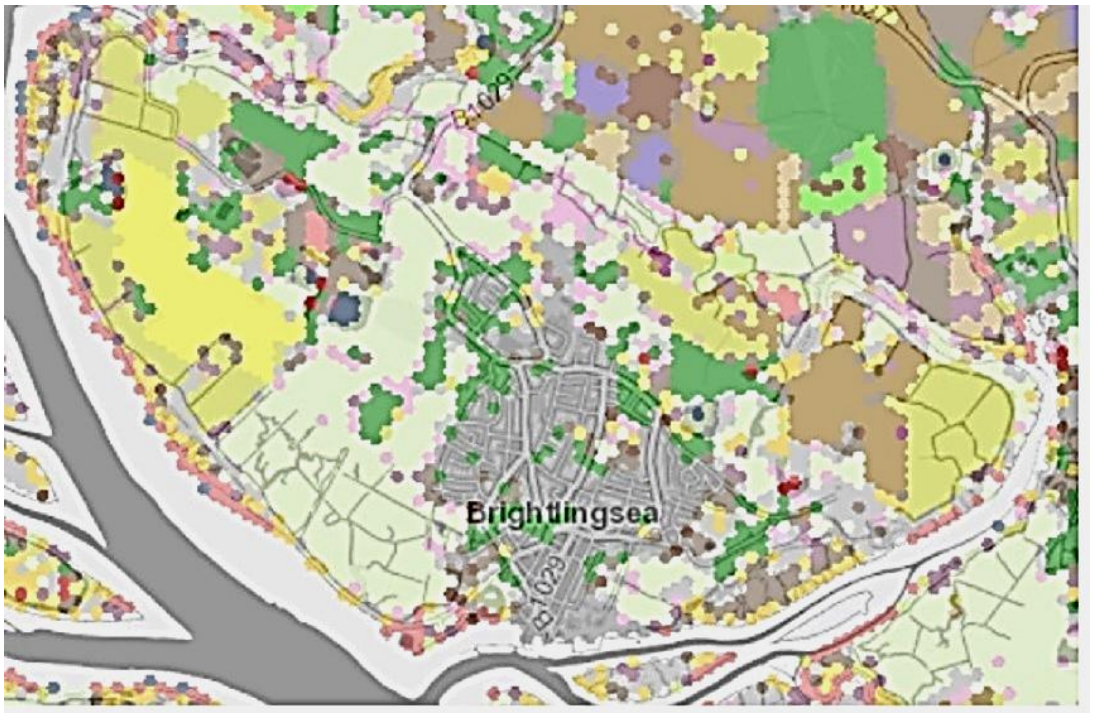


Figure 1. Brightlingsea area showing crops colour coded by type from the Defra Spatial Data Download Map reproduced under Open Government Licence V. 3.

Coastal considerations including salinity and sewage discharge

Sea water quality and salinity is assessed by the Environment Agency (EA). Figure 2 and Table 10 are compiled from EA data (obtained under Open Government Licence v 3)

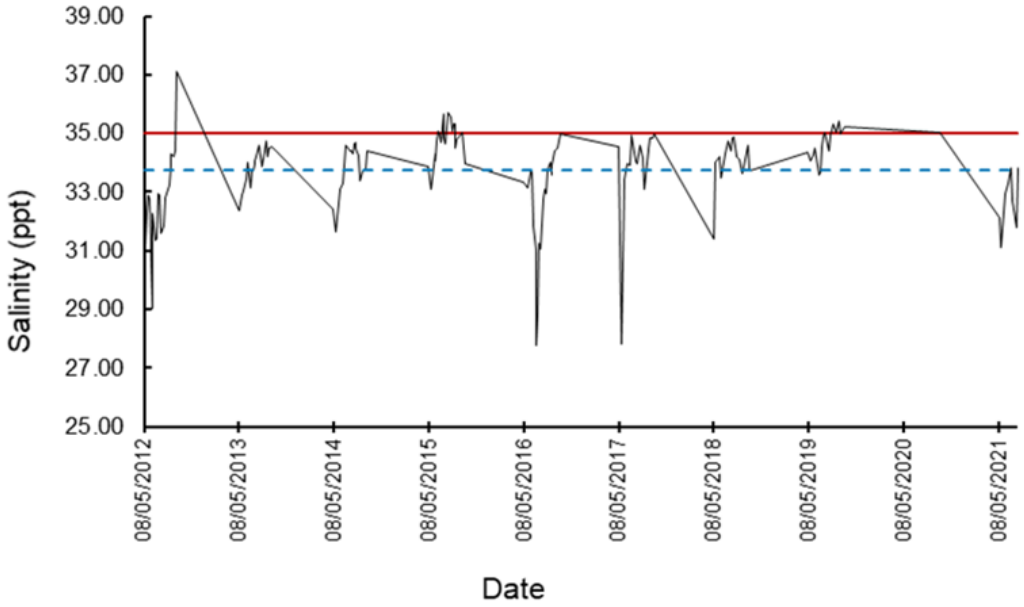


Figure 2. Variation of sea salinity off Bateman's Tower from 2012 to 2021. The red datum line represents open water salinity. The blue dotted line is mean salinity. Based on EA data. (Graph from Thorn 2021)

The data from Defra sampling point 11700 in Table 10 (Bateman's Tower) was extracted during 2023. This data has since been updated. The variation from open sea salinity (normally 35 ppt) is due to freshwater discharges from the River Colne but this variation should have negligible impact on most biodiversity. More detailed data that includes determinands such as water temperature, salinity and dissolved oxygen is obtainable from sample ID AN-E04 but is limited to the period 2000 – 2018. Brightlingsea Sewage Treatment Works (STW) discharges to the Colne estuary and in 2013 was upgraded to include disinfection to protect shellfish in the local waters. It was also intended to enhance bathing water quality.

Table 10. Saline water quality 2021 measured at Bateman's Tower

Data relevant to EA Sample Point 11700 (Bateman's Tower) 2021 sample Point ID AN-NE0450									
Determinand	Units	Date of sample							
		01.07	14.07	21.07	31.07	05.08	12.08	24.08	4.09
Escherichia coli	No/100/ml	<10	27	18	73	<10	73	27	<10
Enterococci intestinal	cfu/0.1l*	<10	18	<10	27	<10	36	36	18
Sewage debris	garber c**	0	0	0	0	0	0	0	0
Tarry residues	Pres/nf***	0	0	0	0	0	0	0	0
Salinity	ppt	32.70	31.80	33.81	32.62	33.73	32.90	33.91	34.46

** Colony Forming Units per 0.1 Litre ** Garber Survey Assessment Scale Code ***Present/not found*

Table 11. Location of main sewage treatment sample points

Site Name	Location and description	Grid reference
1. Sewage inlet to treatment plant	STW* Inlet ID AN-BTLINSEI. Monitored for Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD)	TM07191777
2. Sewage discharge from treatment plant	STW* Outlet ID AB-BTLINSE. Monitored for Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Temperature	TM07181777

**Sewage Treatment Works*

Sewage discharge into the Colne Estuary is usually well controlled and treated but on 13.05.22 the Environment Agency issued a warning to swimmers that an abnormal situation had arisen. Brightlingsea Sailing Club members had also noted a brown scum on the water. (See Brightlingsea Info.) There are no known later similar reports and the overall impact on biodiversity is current negligible but with high potential risk

Geographical cross-sections of the Brightlingsea area

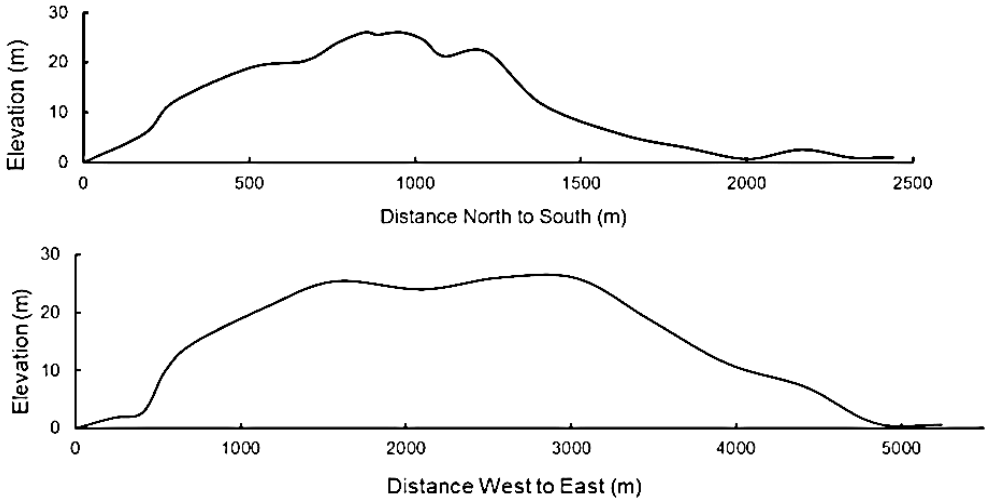


Figure 3. Much simplified cross-section of the Brightlingsea area. Top - North to South, bottom- West to East. The profiles will vary depending on the orientation of the cross sections.

Ponds

Historical maps dating from 1888 show twenty-nine ponds in the Brightlingsea area. Some are shown as closely associated with farm houses, which may indicate that they were constructed specifically for farm use, others are found randomly scattered with many being situated on the boundaries of fields. Farming efficiencies seem to have resulted in the infilling of many ponds that were previously located within ploughed fields so their number has reduced over time. Only sixteen ponds exist today of which three are recent additions. To counter this only five gravel or sand pits are shown on historical maps, none of which are shown as flooded, whereas there are twenty-seven flooded gravel pits that have been constructed more recently. In addition to an increased number of water bodies, this gives a statistically meaningful increase in water volume and surface area. Biodiversity net gain is almost certain as a result, although the range of biodiversity may differ between and within the two types of water body. A risk that so far has received little attention, and which applies to all enclosed water bodies, is that of contamination by blue green algae in particular *Anabaena* and *Chroococcales* species. This risk, which increases with the effects of increased exposure to sunlight and of global warming, applies to ponds but may also apply to flooded gravel pits. Further details are given in the section relating to Brightlingsea Boating Lake. The historic pond data is included in the EWT lost ponds project along with some Essex lost pond data submitted by myself.

Flooded gravel pits (quarries)

Gravel pits, or quarries, are non-natural holes in the ground that are common in the Brightlingsea area, though the majority are no longer worked (i.e. now classified as ceased). Table 6 lists the main pits, which occupy roughly 3% by area of the Brightlingsea topography. New gravel pits may be excavated at any time and older flooded pits may be reclaimed, for example by being. earth-filled and replanted or allowed to rewild. In the long term the situation is dynamic and any interpretation of data in the tables must take this into account. It is not known if any hazardous substances are involved but it is assumed that sites used for gravel extraction do not require remediation when worked out.

Figure 3 should help to explain why the Brightlingsea area does not possess rivers such as are common to many other geographical areas. The absence of rivers means that the water filled gravel pit is potentially an extremely important water based local environment that contributes greatly to biodiversity and supports many associated species. Although an established flooded pit that is no longer worked may be a flourishing centre of wildlife, this wildlife is at risk if that pit is subsequently earth-filled or commercialised, for example for housing or leisure.
At this stage, from a biodiversity perspective, a pit's proposed future may present a dilemma and here the concept of BNG is relevant. On the one hand a mature water filled pit may represent a net loss to existing aquatic biodiversity if it is filled. On the other hand, if that pit is effectively returned to its original state by filling, the loss to aquatic biodiversity simply represents a gift that has been taken away to be replaced by a different but perhaps

equally valuable 'dry' alternative. But if the site is commercialised e.g. developed for housing, then the loss to biodiversity may be absolute unless there is a tangible and measurable BNG elsewhere.

Some of Brightlingsea's twenty-seven distinct water containing pits or parts of pits, i.e. non-connected enclosed bodies of water, may be in tight groups sharing a collective name. (Table 6). Of these, only a few pits are currently extracting gravel and the topography will be dynamic whilst the pit is operating and any wildlife will have to adapt to the operating conditions. The elevation of all pits is shown in Table 12. The mix of elevations and the fact that each contains water (and is therefore probably below the local water table) may have several explanations for which will require more data to resolve. Some pits may be flooded by rainwater rather than groundwater.

Table 12. The elevation above sea level of ponds and flooded gravel pits

Elevation (m)	24	23	20	19	18	16	15	14	13	11	10	9	6	4	3	2	1	0
Number of gravel pits	3	1	1	2	3	2	1	4	0	2	1	0	0	2	1	2	0	2
Number of ponds	0	0	0	0	2	1	2	2	2	1	0	1	1	0	0	1	1	2

By observation, the morphological characteristics of pits can be broadly grouped as five types.

1. Dry, possibly shallow, pits with a depth that does not reach the water table aquifer over its entire area.
2. Pits with a depth that in places reaches the water table aquifer and therefor have one or more water bodies.
3. Pits that reach the water table aquifer over its entire area and form a single water body.
4. Pits that are water filled entirely by precipitation.
5. Redundant pits that have been filled, possibly by land fill, and now support scrubby or woodland areas.

A comprehensive list of gravel pits is likely to include pits of all five types. It was difficult to differentiate them by type at the initial identification stage, which was by inspection of various maps including computer programs such as Google Earth, Elevation Finder, Grid Reference Finder, Magic Maps etc. Since only a fraction of the area covered by a particular gravel pit may be filled with water, its British Geological Survey official identifying grid reference may not centre on that water filled area. In this study, the identifying grid reference is that which is closest to the centre of the water body. Nationally, where pits are operative it is also probable that the geomorphology of working pits is dynamic and their characteristics, including the water filled areas, will change over time as existing pits expand, new pits are dug and old ones filled.

Table 13. Gravel Pits that are known to have been landfilled

Site Name	HLD Ref	Site Ref.	Waste Type	Grid ref.	Possible period in Use
Kiln Farm East End Green	EAHLD00546	TEN028	Ind. C. H.	TM09601677	31.12.57 - 31.12.74
Oyster Tank Road	EAHLD00547	TEN029	C. H.	TM08301640	31.12.60 – 31.12.65
Oyster Tank Road	EAHLD00548	TEN030	C. H.	TM08301630	31.12.67 – 31.12.74
Western Prominade Tip	EAHLD31113		Ind. C.	TM07801630	31.12.30 – N/K
Robinson Road	EAHLD34706		I	TM09601740	N/K

*Waste type. I = Inert. Ind = Industrial. C = Commercial. H = Household

Notes.

1. *HLD = Historic Landfill Site reference.*
2. *The original EN references have been converted to Grid References*
3. *Oyster Tank Road references correspond closely to Brightlingsea Boating Lake and the Skate Park*
4. *Historical Landfill Sites data and after care of mineral sites conditions are published by the EA*
5. *Contains Environment Agency information © Environment Agency and/or database right.*

Gravel pits that have ceased working and are completely soil or waste filled and, in some cases wooded, may be visually identified by the flat and level surface and possibly a vent pipe for exhausting methane and carbon dioxide resulting from the microbial degradation of waste matter. Known local gravel pits that have been entirely or partially filled as landfill sites are shown in Table 13. Environment Agency information on landfill oxidation techniques are published in the document 'Evidence. Landfill methane oxidation techniques'

The Robinson Road filled workings covered an extensive area that stretched from Robinson Road to and north of Stoney Lane. Currently, this area includes four water- containing pit complexes in Robinson Road with a fifth being adjacent to Stoney Lane.

Apart from the Robinson Road site, information suggests that all local sites were permitted/licensed to and operated by the then Brightlingsea Urban District Council. It is hoped that any existing water filled pits will not be subjected to land fill, housing or commercial development because of the advantages to biodiversity already expressed. Only two of the twenty-seven pits have been selected for personal survey in this project due to limited resources. Some aspects of other pits have been included, the results being considered as a representative sample.

Enhancing the biodiversity and environment of worked out gravel pits.
Although an undisturbed and unpolluted pit will naturally 'rewild' in time, this rewilding can be considerably accelerated by an enhancement plan. When gravel pits cease extraction, restoration is considered in local mineral plans and follows discussions between the minerals operator and the Mineral Planning Authority. Local minerals plans should include policies to ensure the reclamation of worked land as soon as possible, and that restoration and the aftercare is of a high standard.
The responsibility for this action lies with the operator, or in the case of default, with the landowner. Given sufficient information on the terms of the initial planning permissions and responsibilities, and any plans for enhancement of the worked area following cessation of extraction, it may be possible to ascribe a suitable biodiversity risk rating i.e. rating the risk of instability through environmental and biological degradation for a specific period. Before considering that possibility, attention must be given to Schedule 5 of the Town and Country Planning Act 1990, which sets out the conditions relating to restoration. (But see later text regarding any changes resulting from implementation of the 2021 Environment Act.)

Generally, under the 1990 Act, where a development has the appropriate conditions attached to a permission to excavate, the site may need to be restored to its original state or 'restoration condition' i.e. agriculture, forestry or amenity. This is an aftercare condition that requires the adoption of an aftercare scheme for a period of five years as approved by the Mineral Planning Authority.
After the expiry of the five-year aftercare period, any aftercare conditions would appear to expire. This would suggest that any gravel pit containing water would then be at risk of infilling which may restore the site to its original agriculture, forestry or amenity condition. In such a case, any enhanced biodiversity resulting from a water-filled excavation would be lost. All water filled pits would therefore be at high risk unless it is known for certain that the water-filled part of the workings is to be retained indefinitely. (See General Notes under for applicable responsibilities for new workings from 2024).
Below I show two examples that would suggest that infilling is not a universal condition and may not apply to the whole area of a particular working.

Example 1. The following three paragraphs form a redacted extract from a Biodiversity Mitigation and Enhancement Plan.
Condition 47 of the planning consent includes the provision that a Biodiversity Mitigation and Enhancement Plan shall be approved by the Mineral Planning Authority and should include provision for habitat creation and management during the course of development and for a five-year aftercare period of that habitat.
Reason: To make appropriate provision for conserving and enhancing the natural environment within the approved development in the interests of biodiversity and in accordance with MLP policy MLP13, WLP policy W10E and TDLP policy EN6.

The overarching aim of the proposed mitigation and enhancement is to ensure that, following the completion of quarrying activities on the site, the site supports a rich and diverse floral and faunal interest such that the legacy of quarrying is to have enhanced the overall biodiversity of the site. In addition to the specifics of condition 47, this is consistent with paragraph 118 of the prevailing NPPF1* at the time the consent was granted, which set that development should aim to conserve and enhance biodiversity. This policy has been continued through to the revised NPPF2* at paragraph 175 section D.

2.1.2. In order to meet this overarching aim the following key objectives have been set
(i) Allow natural processes to guide the development of the habitats on the steeper embankments such that they are not fixed but be allowed to evolve over time
(ii) Create reedbeds within the waterbodies
(iii) Provide nesting opportunities for sand martins
(iv) Create flower rich grassland
(v) Maintain an area of sweet chestnut coppice
(vi) Ensure that invasive species do not establish'

The NPPF is the National Planning Policy Framework (*n.b. Reference to NPPF1 and NPPF2 above may not correlate with revised versions of the document).

The topography of the site has been dynamic as shown by reference to programs that use aerial photography such as Google Earth, Grid Reference Finder and Elevation Finder. Since the photographs used in these programs were taken at different times, they show different stages of the development. Currently it is not known how enforcement of an enhancement liability is policed.

Example 2. I have not seen the plans so cannot vouch for the following. The proposed development at the site known as 'Robinson Park' beside Robinson Road (ranging from approximately TM094174 to TM099170) contains a land-filled area and three flooded gravel pits, one of which is known to anglers as the 'horseshoe' due to its shape. These were historically used by local angling clubs but at the time of writing, a proposal was made to develop the site as a leisure centre involving the construction of 104 holiday lodges with up to four bedrooms, 36 retirement apartments, glamping areas, a club house, play areas and five detached houses. The lakes would be used for sailing, canoeing and fishing (Brightlingsea Info., 2020 and 2022).
The plans included a nature conservation corridor. At the time of writing, it is understood that the proposal is to be modified and replaced with plans for housing.
From personal observations, the site is known to host the introduced Muntjac deer (*Muntiacus reevesi*) and is well known as a summer breeding location or stop-off for large flocks of Canada Geese (*Branta canadensis*) and Greylag Geese (*Anser anser*). (See the section on Geese). The lakes contain several fish species including Common Carp (*Cyprinus carpio*). A five-year aftercare agreement would have expired many years ago and the subsequent planned use of the site as either a leisure complex or for housing would perhaps have made such an agreement pointless. Currently the risk to biodiversity at this site is High. The whole Robinson Road complex extends to the north of Stoney Lane and includes further water filled pits that are not included in the proposed leisure centre. Any plans may be revised on an on-going basis.

The following partial report is extracted from the Tendring District Website and included to supplement the Example 2.
'Plans for a new mixed-use holiday and residential development at a former quarry in Brightlingsea have been backed by councillors, subject to further consultation.
Artemis (Brightlingsea) Ltd.'s bid to develop the former gravel workings at Lower Farm, East End Green were unanimously backed by Tendring District Council's (TDC) Planning Committee at a meeting on Tuesday, 5 November. The project aims to transform the 81-acre site into a mixed-use tourist and residential development of retirement living lodges, detached farmstead houses, and holiday lodges along with separate communal buildings providing dining, leisure and recreation facilities. The development is set to include 104 holiday lodges, 36 retirement units, and five market dwellings'.

The following extracts are from the document *Mineral Site Restoration for Biodiversity Supplementary Planning Guidance. June 2016* published by Essex County Council (ECC).

'The Nature After Minerals Programme is a partnership between Natural England and the RSPB, with support from the Mineral Products Association and the British Aggregates Association. The organisations work with mineral planners and industry to help nature during and after minerals extraction.'

'Mineral extraction sites shall provide biodiversity gain following restoration, demonstrating their contribution to Priority Habitat Creation and integration with local ecological networks.'
(Policy S12 of the MLP 'Mineral Site Restoration and After-Use')

This is an extract from *Essex Minerals Local Plan. Essex County Council 2014.* Para. 3.1 H Restoration and After-Use
'Mineral workings are temporary in nature. Restoration and after-use schemes will continue to be integral to site selection and the consideration of planning applications, with progressive working and restoration schemes expected. The focus of after-use will shift from purely agricultural uses, important though they remain, towards enhancement of the local environment by means of increased provision for biodiversity, geodiversity, climate change adaptation and outdoor recreation, including Public Rights of Way'

As suggested earlier, the pits at Robinson 'Park' described above and those of local angling club waters contain a stock of course fish (data obtained from angling club secretaries) that will have probably have been introduced by the resident or past angling club(s). Hence not only will the environment be modified by the gravel working, and therefore be technically artificial, some of the biodiversity such as fish stocks will not have arrived by natural means. Fish and other animal species will in time be introduced to flooded pits by a natural rewilding process. Carp (*Cyprinus carpio*) have been observed in other gravel pits where there is no record of rewilding nor of the introduction of fish by an angling club. In one case these fish were observed from a pathway using binoculars, since the pit is entirely fenced off from the public.

General notes on gravel pits
The following three sections summarise information gratefully received from Essex County Council Planning and from Natural England.

(a) Existing gravel pits
A condition attached to planning permission would be biodiversity enhancement within an agreed restoration strategy with development management officers periodically monitoring progress and compliance of both form and timescale. Currently (2023) it is assumed that aftercare and maintenance is required for a period of five years to ensure the land is capable of sustainable and appropriate after-use.

Restoration scheme details for each quarry application should be recorded on the application files, together with aftercare reports for more recently restored sites. Whilst more recently permitted sites do include areas of biodiversity, historically this was not a requirement unless there was a legal agreement to do so and this can only be established by a search of the records. Although ECC records date back to 1947, they are only digitised from 2011 and information provided suggests that a search through the paper archives prior to this would be impractical. It is possible that although restoration of biodiversity at a site might have initially been required, once the aftercare period has expired there is no requirement to maintain the biodiversity after use, unless there is a legal agreement.

(b) The development of new gravel pits from early 2024.
Defra are developing a metric to demonstrate biodiversity net gain, which under the Environment Act 2021 is mandatory for developments permitted from early 2024 but is not to be applied retrospectively. Once in place net-gain must be secured for a period of not less than 30 years, but net gain can be credited from another site, although it is preferred to credit on-site net gain in the first instance. Descriptions of this process are available from several web sites that expand on this, for example *The Biodiversity Metric 3.0 and Minerals* (AggNet 2021). See also Gov.UK's Minerals website.

From early 2024, any development seeking permission must complete the Defra biodiversity net-gain metric to provide a baseline against which net gain will be demonstrated. The ecological value already created through the restoration of old mineral sites would be taken into account. Before 2024, the impact on ecology of any development would have been assessed against the Development Plan, which for Brightlingsea is primarily set out in the extant Tendring Local Plan, as well as the conformity of the application with the National Planning Policy Framework (NPPF). How planning matters factored into the Tendring District Council decision will be set out in the officer's report/ Decision Notice.

(c) Natural England advice
Natural England's advice is that **s**ite restoration/after use is usually addressed and considered on a site-by-site basis (following discussions between the minerals operator and the Mineral Planning Authority) and in local Minerals Plans, which should include policies to ensure worked land is reclaimed at the earliest opportunity and that the restoration and aftercare of mineral sites is of a high standard.

Are the risks of instability through environmental and biological degradation mitigated by gravel pit aftercare?
I do not have detailed information covering the planning permissions and restoration obligations for each site in the Brightlingsea area. Consequently, the risk of environmental degradation and instability in respect of older water filled pits must be considered high and particularly so once any mandatory five-year maintenance period has expired. This risk is to be reviewed when and if further information is held. However, apart from those for the Robinson Road/Robinson Park complex, no plans to commercialise or infill existing non-working water filled pits are known to me. Since new pits where extraction commences after early 2024 are subject to later legislation with a possible thirty-year aftercare period, the relevant risks for such pits will consequently be low. Of interest is that Colchester Archaeological Trust excavated Brightlingsea Quarry in Moverons Lane in 2019. (CAT Report 1458).

Historical Gravel Pits
As shown in the earlier section on ponds, historical maps show only five gravel or sand pits in the Brightlingsea area, none of which is flooded. Effectively in the last hundred years, we have gained 27 new fresh-water bodies from gravel workings.

Main wooded areas
The main wooded areas are shown in Table 6 and listed in greater detail in Tables 14 and 15. The list is not exhaustive. Some wooded areas are uniquely named and others are named after local landmarks, while others are either unnamed or their local name is not known or has changed. The area of Brightlingsea's woodland, including small clumps but excluding single trees and mature trees in hedges, is 97.72 ha. For the whole United Kingdom,

the Woodland Trust advise that woodland cover is 3.25 million ha or 13.2% of land area, up from 12% in 1998, but for England, this figure stands at 10.00%. Of this a half consists of native tree species while the remainder are conifer plantations. Other data for England shows that approximately 4.3% of land area (565 000 ha) is covered by trees that are outside of these woodlands. Forestry England advise that their latest relevant statistics show that the area of woodland in England was 1,323,000 hectares at 31 March 2022 (10.2% of the land area of England). Ancient woodland now covers approximately 2.5% of the UK's land area, indicating how woodland has been subjected to massive changes over the centuries and in particular how little of the original woodland remains.

Wooded areas that are primarily Oak (*Quercus robur*) different from conifer wooded areas of (say) Douglas Fir (*Pseudotsuga menziesiis*), which has been a favourite for some more recent commercial woodlands. The Oak can be very long lived and supports a very large range of biodiversity including many insect species, whereas fir trees are a more limited general food sources, although pine cones do provide a food source for Pine Martens (*Martes martes*) and Grey Squirrels (*Sciurus carolinensis*). Grid Reference Finder was used to calculate areas occupied by each local wood and the means of three separate calculations were used to populate the tables. Note also that some woods are more densely populated than others, whilst others have unclear or 'fuzzy' boundaries.

The area of the Brightlingsea district is approximately 975 ha of which about 73 ha is main woodland whilst 25 ha is smaller clumps. This gives a total coverage of 10.05% of the Brightlingsea district, but this figure excludes isolated trees for example in gardens or hedge rows, which may add up to a further 4% to these figures. Brightlingsea therefore has tree cover of 14% equalling or exceeding the UK average and is well above the average for England. Moreover, many areas are currently scrubland with the potential for further tree growth. It is here that proposed tree enhancement should be concentrated, rather than randomly planting trees on the basis of a 'good idea'. All local woodland and scrub should be treated as an important asset that must be preserved. As with all comparisons of gain, the empirical value of any recovery depends entirely on the date of the historical values with which the current values are being compared.

Where a wood contains or encloses a flooded pit or other space, this is taken into account in the calculations. An estimate of the percentage of the woodland canopy or tree cover within the overall area is shown in the tables below. The elevation is shown as height above sea level and was obtained from the application Elevation Finder. When a gravel pit is worked out it may be reclaimed and fresh tree growth encouraged as shown in pits at TM0685218933, TM0678018890 and TM0686618825. Clearly the position is dynamic and pits, both dry and water filled may be earth filled and replaced by woodland in a matter of a few decades.

Historical wooded areas

Tables 14 and 15 summarise details of the main wooded areas. Table 14 shows the location of woodlands covered by the Woodland Grant Scheme (WGS), which provided incentives for people to create and manage woodlands. The Forestry Commission paid grants for establishing and looking after woodlands and forests. To qualify, applicants had to meet the standards of environmental protection and practice set out in the Forestry Commission's guidelines. WGS3 was operative from October 1994 until its closure to new applications in June 2004.

Included in Table 15 is a comparison of the historical wooded area (1888 – 1913) with the current wooded area. As shown earlier, the current area occupied by woodland is calculated as 97.72 ha. The National Library of Scotland's Map Finder shows that for the earlier period is 45.03 ha. This shows that Brightlingsea has seen a statistically significant increase of about 117 %% in its main wooded areas in the last hundred years, and more than this if all tree cover is considered. Much of this is conifer plantations, often planted to provide tree coverage to infilled gravel pits. Woodland England advise that wooded areas have doubled in the past one hundred years. Recognition of this increased cover should not influence any plans to plant further trees and hedges, and neither should it serve as a reason for trees to be removed. The use of wooded areas as wildlife corridors is discussed below under the wildlife corridor heading. A felling licence is required for some wooded areas.

The baseline for wooded areas in Table 15 provides a reference for stability and gives direction for the enhancement of those areas where woodland can be increased. It is known that several trees have been donated to the area including a European Nettle Tree (*Celtis australis*). This small number will not significantly increase the area of tree cover and any efforts would be more effective if directed at maintaining existing woodland and scrub.

Table 14. Areas under Woodland Grant Schemes

Description of Wooded area		Location	Scheme Type	Grid. Ref.
1	Folkards	Nr Marsh Farm	2	TM092177
2	Thicks Wood	Moverons lane	2	TM071187
3	Part of copse N. W. Moverons Lodge	Moverons Lodge	3	TM065187
4	Part of copse S. W. Moverons Lodge	Moverons Farm	3	TM066184
5	Part of copse S. E. Moverons Lodge	Moverons Lodge	3	TM067185
6	W. end of Robinson Park complex	Robinson Road	3	TM095172

Table 15. Main wooded areas shown in Table 7. Historical data from National Library of Scotland

Description of Wooded area		Grid Reference	Area (Ha)	Historical Area (Ha)	Elevation (m)	Main tree species if known and notes regarding area
1	Leg of Mutton Wood	TM05921883	1.31	3.50	3	Tree cover much depleted
2	The Leach	TM06321803	2.47	1.23	3	Felling licence required
3	Moverons Group (surrounding Moverons Farm)	TM06531873	0.86	0.00	17	
4		TM06531855	1.99	0.00	11	
5		TM06631831	1.73	0.00	23	Felling licence required
6		TM06781857	3.56	0.00	18	
7	Un-named	TM06821784	0.93	0.00	6	
8	Lower Wedge	TM06941811	0..54	0.87	20	Felling licence required
9	The Belt	TM07091849	1.66	0.00	25	
1	Thicks Wood	TM07051899	12.71	13.52	22	
1	Long Plantation	TM07291801	1.58	1.88	23	Sweet Chestnut *Castanea sativa*
1	Queech	TM07451778	1.02	1.56	18	
1	Gravesend	TM07501849	3.29	3.47	28	
1	Wick's Wood	TM07611743	5.33	5.62	17	
1	Little Clump	TM07551892	0.42	0.44	11	
1	Big Clump	TM07651895	0.63	0.67	11	
1	Lodge Wood	TM07931764	4.21	4.37	19	
1	Road Clump	TM07911905	1.06	1.06	3	
2	The Grove	TM08011825	0.75	0.57	23	
2	The Lozenge	TM08161674	0.79	0.00	2	Various
2	Gatehouse	TM08331888	4.64	4.27	7	
2	Manor Wood	TM08381768	0.66	0.00	28	
2	Oakwood Copse	TM08381827	1.88	2.00	21	Oak *Quercus robur*
2	Morses Wood	TM08851821	2.39	0.00	15	Sycamore *Acer pseudoplatanus*
2	Folkards Lane	TM09131776	2.56	0.00	19	Marsh Farmhouse
2	N of Stoney Lane	TM09431769	11.38	0.00	13	
2	S of Mill Street	TM09551660	1.0	0.00	9	
2	Gravel Field	TM09621680	1.70	0.00	16	
Area covered by listed major woodlands (ha)			73.21	45.03		
Area covered by minor woodlands (ha)			24.51	-		
Total wooded area (ha)			97.72	45.03		

Hedges and hedgerows

A hedge is a row of small trees or shrubs that may include hawthorn, blackthorn, oak, ash and hazel, and which is unbroken except for gates. The mix may vary as older trees die to be replaced by new growth from natural import or by hedge husbandry. A hedgerow includes associated features such as a retaining bank and any incorporated mature trees, fences or gates but for convenience the components are referred to as hedges in this document. Managed hedges are usually maintained or controlled by cutting to a predetermined height and width, otherwise they become relic.

A managed hedge in my garden is aged at least forty years and originated as wholly hawthorn but is now dominated by at least three species. Hedges mark the boundaries of many fields but may also border some country public footpaths. Although their use as biodiversity/wildlife corridors may be limited because of a lack of connectivity and continuation, they provide a very important and rich biodiversity resource. In private gardens, hedges are uncommon, but those that have matured do sustain a range of biodiversity and can provide a nesting site and refuge for birds. Under the Hedgerows Regulations 1997 owners and managers must obtain local authority permission before removing a hedgerow.

Some hedgerows in Brightlingsea are regularly maintained, others tend to be wild or relic and contain fully grown trees. Many ancient hedges have been lost and all that may remain is a disparate line of a few mature trees. In the centre of one field the remains of an ancient hedgerow is marked by a single oak tree. It is reported that a hedge at Gravel Field was removed contrary to planning permission, indicating their ongoing fragility. The location and length of most hedges can be seen from aerial or satellite photographs from which a very rough estimate of the total length of local continuous hedging is 7.77 km. A programme to bridge gaps within and between hedges by new planting should be considered. However, any new planting does not guarantee success.

The planting of new hedges has been attempted at several local sites on various occasions from 6 March 2020. In particular, on or about 3 December 2020, 420 saplings (whips), including hawthorn, blackthorn, wild cherry, hazel, goat willow, rowan and crab apple were planted along Morses Lane TM08641814. These are thought to have been donated via The Woodland Trust's free trees for schools and communities' scheme. On 13 April 2023, saplings intended to form a hedge were planted in the field near to All Saints Church TM07821863 and running besides Church Road. On 18 September 2023 I noted that the planted strip along Church Road did not display the number of viable plants that would have arisen from the number of whips planted, so in October 2023 I decided to survey the earlier, and perhaps better established, hedge plantation at Morses Lane.

There were two planted strips in this area, the first running parallel to the steel fence separating the field from Morses Industrial Estate, the second running parallel to Morses Lane. Both areas showed a very rich variety of newly established plants, details of which are not yet recorded in this survey, but the vast majority of these plants were not hedge-forming species and the number of hedge-forming trees counted was far fewer than the number said to have been planted. The number of 'empty' canes and those canes supporting saplings were estimated as under.

Morses Industrial Estate Fence	28 viable saplings, 32 empty canes
Morses Lane	18 viable saplings, multiple empty canes

If the number of saplings planted was 420 (as reported on the British Naturalists' Association website) the viability is 10.95% and several hundred canes are missing. Note that the far end of the Industrial Estate fence is heavily overgrown with native plants such as bramble and the current state of the whole planted area is not recorded. Assuming the estimates shown above are correct, some research into the causes of the low viability is recommended. Although this exercise has not yet resulted in recognisable new hedgerows, the biodiversity in the area where soil was disturbed has been greatly enhanced as shown by the variety of plant species now springing from the existing dormant seed bank. This natural nature recovery enhancement may be applied to other sites simply by digging and turning over the earth. It is probable that any failure in the growth of the saplings was due to drought and that with sufficient after care the hedges would have been viable.

This is a summary of ECC advice related to their planting schemes.

'When supporting the planting of trees, ECC will always carry out site visits to the planting areas to assess its suitability for trees or hedging and work with the landowner to ascertain the site's previous usage/management. They will also tend not to plant on any designated sites unless they can ensure the trees will improve the designation rather than hinder it. With any larger planting areas (2 ha or larger) they will involve the Forestry Commission for their Environmental Impact Assessment (EIA) input, but they often only require a formal agreement on sites over 4 ha unless they are neighbouring a SSSI or similar'.

Of interest is the enhancement of a roadside hedgerow in nearby Thorrington. Supplementary planting of several tree species has increased the width of the existing hedgerow by many times, creating what is effectively a long narrow woodland corridor, an example that could be followed in other locations.

The risk of fire to hedges, fields and woodland

Because of increasing summer temperatures and the fact that this area of Essex is one of the driest in England, the risk of hedge, field and woodland fires and all the catastrophic consequences must be considered. Various bodies including the Royal Society of Biology (RSB), Essex Wildlife Trust, Essex County Council, Natural England and Essex Fire Brigade were contacted for any information that would enable the risk to be assessed.

The RSB Senior Science Policy Officer advised that the Society had not carried out research for this specific risk area so could not provide direct information, but recognised this interesting and important research, referring to various websites for further information. The Forest Research UK website is one of the sources of information given by the RSB, and this advises that the UK suffers relatively little fire damage compared with the Mediterranean area but fires do occur, especially where grassland and heathland and other open areas have seasonal flammable vegetation and are close to woodland. The Forestry Commission examined data from the Fire and Rescue Services which showed that there were between 2550 and 9000 woodland fires reported each year between 2009/10 and 2015/16, although most were small compared to the more frequent grassland fires. The total areas of woodland fires in these periods varied between 400 ha and 8700 ha each year. Countryside fires spread in a different way to domestic fires, mainly by direct contact or by aerial embers. The material feeding the fire is therefore relevant. Other causes of fire spread such as flashover and backdraught apply more to fires in buildings.

Natural England provided links to many documents relating to fire risk. Of interest is the document *The causes and prevention of wildfire on heathlands and peatlands in England* (NEER014). Of particular interest is Appendix 7: 'Forestry Commission wildfire management planning guidance Wildfire risk assessment'. In standard risk assessment terms, the risk is estimated as a product of the probability of a fire breaking out and its impact i.e. the degree of damage caused. Their formula *Risk = Likelihood* x *Severity* is roughly equivalent to my formula *Risk = Probability* x *Impact.* Note that here 'risk' is a relative term that can only exist as the product of Probability and Impact.

Both likelihood or probability and impact are variables that need to be assessed for any wooded or grassland area. Likelihood will depend on many factors: in particular temperature, humidity, wind speed and human presence. Impact will be an assessment of damage and whether damage can effectively be repaired or replaced. Defra commissioned the Uplands Management Group to develop guidance that sets out the requirements for a risk assessment approach to planning and preparing for wildfire incidents and includes a wildfire management plan template and associated guidance. This is obtainable from their website.

Forestry Commission information is contained within their operations note 040 obtainable from their website. There is much data on forest and grassland fires but the prediction of woodland and grassland fires is a complex and uncertain process. Wooded areas around Brightlingsea are generally well spaced, reducing the risk of fire spreading directly from one area to another. However, many woods are next to fields that may or may not support grass crops, in themselves at risk of fire and thus increasing the risk of fire spreading to the wooded areas. The possibility that a wildlife corridor may also be a means of spreading fires between wooded areas must also be considered. Note that nothing above addresses the practicalities of minimising impact by the early extinguishing of grassland and woodland fires, which is inbuilt to the severity element.

In response to an email from myself ECC advised that 'possibly signage about fire risk level might help, as well as promoting an understanding about the causes of fires (BBQs, bottles and cigarettes). As a community organisation, you (BTC/BEBP) may want to talk to the fire service about implementing some of the low impact approaches regardless of the fire risk'. Brightlingsea Town Council staff advise that portable BBQs are becoming a problem and have caused small grass fires that have burnt plastic picnic tables and seats. They also advise that existing policy only applies to fires lit on allotments.

The Essex Fire and Rescue Service were asked for any information regarding the risk of fire to the local environment. Records for 2023 show only 10 fires in the area, of which two were field/woodland fires. The fire service has off-road vehicles and 20 litre hand pump back-pack sprayers to deal with fires in the remoter areas. In other areas, the service has no means of controlling or managing risk of domestic fires unless a complaint was received, in which case the service would work with environmental health services to manage. Having attended an incident, the impact on the environment is considered and an environmental risk assessment conducted.

Data on incidents to which the Essex County Fire and Rescue Service are called can be found on line by searching Essex County Fire & Rescue Services Incident data. Their website allows access to data showing the number and

type of incident to which the Fire and Rescue Service have been called (including a huge number of false alarms.) Figure 4 is my interpretation of data obtained from the website. This data is for fires of all types not just woodland and grassland. Since data on the Fire and Rescue Service website is shown for financial years, I have adjusted the data to align with calendar years. Figure 5 shows maximum day and night air temperatures. There is a crude correlation between air temperature, minimum rainfall and number of fires but insufficient data to ascribe a more positive causal relationship. It was suggested that when planting hedges, consideration be given to leaving gaps that would allow access for the fire services. The risk of fire damage to woodland and hedges is currently considered to be low but will increase with any increase in mean summer air temperatures especially when coupled with periods of more intensive drought. The impact of progression to a near Mediterranean climate will also be proportionately higher, making outbreaks of fire the greatest potential risk to both the environment and its biodiversity.

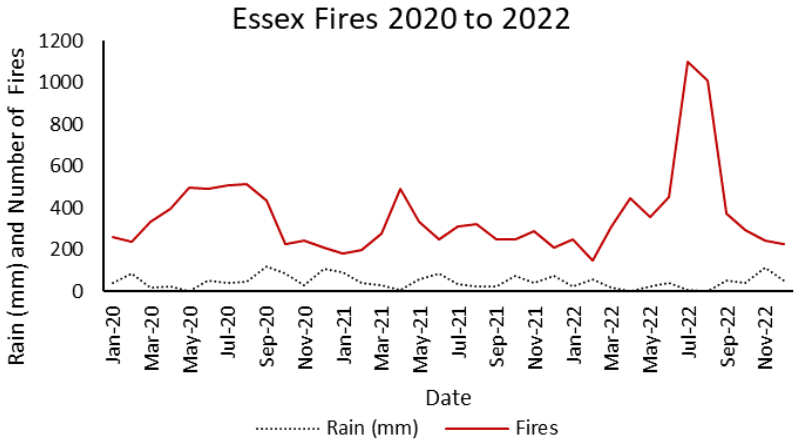


Figure 4. Fires attended by the Essex Fire and rescue Service 2020 to 2022

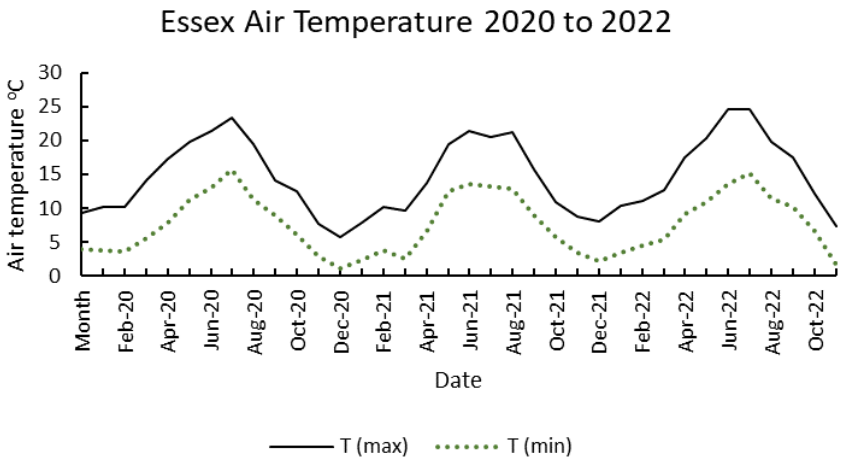


Figure 5. Day and night maximum air temperatures for Essex 2020 to 2022.
(See also Figure 6: Rainfall Essex)

Other risks to wooded areas

Severe gales may cause trees to fall as illustrated by those in Morses Wood (Barker's Grove) blown down by the 1985 gale. Interestingly, the fallen trees of some species morphed branches into vertical trunks, but over time these trees have died. Climate change is likely to increase both the number and severity of gales. The are no known major disease risks.

Areas with special designations to the West of Brightlingsea

The following information is provided to explain some of the terms relating to areas with special designations. Where species are shown to be present, their details have been obtained from the various websites giving information on the designations. These species may not have been observed personally by any recorders providing data for this paper.

SSSI (Site of Special Scientific Interest)
The formal SSSI conservation designation indicates a site that has a high interest value because it contains rare flora and /or fauna or is of high geological interest. Certain obligations are placed on the land owners, usually to preserve and protect the site through good management. Consent from Natural England is required for certain operations on the site. In our case the lowland grassland and some insect species are of particular interest.
To inform the following section, some local data was gratefully extracted from Natural England's website.

Colne Estuary National Nature Reserve (NNR)
Ordnance Survey Map 184 shows the Colne Estuary National Nature Reserve at TM07541670.
The total area of the SSSI is 2986.4 Ha. Natural England (NE) does not normally manage SSSI land but under the Wildlife and Countryside Act (as amended) has regulatory powers over what happens on it, and provides advice to the land owners/occupiers on its management. Brightlingsea Marsh within the Colne Estuary National Nature Reserve (NNR) is an exception. NE leases the area from ECC and manages it, with a tenant farmer providing the grazing. To minimise disturbance to wintering and nesting birds, and to the livestock, there is no public access to this grazing marsh. If granted, access is by permit only. Brightlingsea Marsh is discussed in more detail later .

Ramsar site (UNESCO)
The UNESCO *Ramsar Convention on Wetlands of International Importance* is relevant here, especially as Waterfowl Habitat Protective measures apply to this part of the Colne Estuary. The Ramsar website advises that The Convention on Wetlands is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Colne Estuary is included in the List of Wetlands of International Importance

Special Protection Area (SPA)
A Special Protection Area is land originally designated under the European Union *Directive on the Conservation of Birds 79/409*. Amended in 2009, it became Directive 2009/147/EC. Legislation covering SPAs includes the *Conservation of Habitats and Species Regulations 2017* (as amended) in England and Wales (including the adjacent territorial sea) and the *Conservation of Offshore Marine Habitats and Species Regulations 2017* (as amended) in the UK offshore area. The Brightlingsea SPA is part of the Colne Estuary SPA situate at TM058134.

Marine Protected Areas (MPA)
An MPA is a legally recognised geographical area the objective of which is the achievement of long-term conservation its natural wealth and the value of its ecology and biodiversity.
The various types of MPA combine to form a network of sites, which together form a network that contributes to conservation and sustainability of the marine environment. The areas include Marine Conservation Zones.

Marine Conservation Zone (MCZ)
Marine Conservation Zones are areas that protect a range of nationally important, rare or threatened habitats and species. Information for Brightlingsea can be obtained via the JNCC Marine Protected Area Mapper, found on the JNCC website. The area is approximately 27 km^2 and part of the Blackwater, Crouch, Roach and Colne Estuaries MCZ. The area is rich in invertebrates, and particularly the Native Oyster *Ostrea edulis*.

The following is extracted from Kent and Essex Inshore Fisheries and Conservation Authority (KEIFCA) Website. 'Marine Conservation Zones (MCZs) are a relatively new MPA designation, created under the Marine and Coastal Access Act (2009). These sites are created to protect wildlife, habitats, geology and geomorphology of national importance. They aim to conserve the diversity of nationally rare, threatened and representative habitats and species around the English coast. MCZs also contribute to a network of MPAs across the North-east Atlantic agreed under the Oslo Paris (OSPAR) Convention and other international commitments to which the UK is signatory'.

Special Areas of Conservation (SACs)
In England and Wales, the *Conservation of Habitats and Species Regulations 2017* and the *Conservation of Offshore Marine Habitats and Species Regulations 2017* require that government bodies establish a network of conservation sites. The objectives are to conserve the biodiversity of listed species that are at most risk. These species are listed in the European Council Directive 92/43/EEC Annex 1 and Annex 2.

Brightlingsea Marsh
Brightlingsea Marsh or Grazing Marsh, part of the Colne Estuary SSSI, is an extensive area of uncultivated, ancient grazing grassland that runs from the inland section of the sea wall (Promenade Way Caravan Park) to The Great Divide. Its full title is the Colne Estuary (Brightlingsea Marshes) National Nature Reserve. Grazing marsh is defined by Natural England as periodically inundated pasture or meadow, typically with ditches or rills

containing standing brackish or fresh water. There are four distinct monitoring areas but for recording purposes, I focus on Brightlingsea Marsh National Nature Reserve (NNR), Brightlingsea Marsh North (mainly sediment) and Brightlingsea Marsh West. The latter two are not NNRs. I give a summary of findings, but not a risk assessment, later in the text.

Climate change and global warming.

Climate change is multidimensional (González-Trujillo *et al.* 2023) and can be described in several ways but in common usage refers to long-term shifts in temperatures and weather patterns that impact on the environment. These may be natural or attributed to human activities. Natural changes have occurred for billions of years, but the human population's use of natural (but polluting) resources is the current cause of recent increases in the rate of climate change. An increasing human population must inevitably accelerate this change unless the heat and by-products from its combustible energy sources (coal, gas, wood, oil, petroleum) is reduced or contained. Changes caused by human activity are controllable given sufficient motivation, but are not necessarily reversible. Adverse weather patterns are becoming more frequent, longer and more extreme, although extremes can be hidden in statistical means. For example, an unusually high period of summer temperatures can be smoothed by an unusually low period of winter temperatures, but within this cycle, prolonged periods with temperatures of above (say) 45 ºC or below (say) -20 ºC could be locally catastrophic.

Although trends can be calculated, applying mathematical models must include uncertainties. Effectively, although trends to a current date can be calculated, extrapolation may prove to be highly unreliable with variable predictions. Consequently, long term climate change forecasts are a 'best guess' based on available evidence. Global climate change can work in both directions: for example the ice sheets of Greenland are recent in geological time and ice ages come and go. In periods of warming the melt from the ice sheets, those of Greenland and Antarctica in particular, and glaciers generally, are the main source of water contributing to rising sea levels, which further increases as it warms due to thermal expansion. (The coefficient of thermal expansion is neither constant nor linear so calculating by how much salt water expands when it warms is a complex process). Increased warmth increases the energy held by the atmosphere resulting in more extreme and less predictable weather, especially in the form of hurricanes, typhoons, tornados and heavy rainfall.

Heavy flooding may be followed by extreme drought and *vice versa*. Recently, local ponds have been cleared of rubbish and new hedgerows planted to encourage biodiversity. The effect of increased summer temperatures over a prolonged period is to cause some of these ponds to dry out and for many of the newly planted hedge plants to die, thus reducing the effectiveness of these efforts. Tests of some seasonal pond water and sediment have shown that there is no obvious aquatic 'seed bank' from which life can regenerate when and if the pond refills. Although plants will be opportunists with seed germination prompted by whatever is their appropriate environment, only those pond animals that are seasonal immigrants or able to resist the interim effect of increased chemical concentrations and ultimate dehydration will survive.

From a conservation perspective, it may be essential for the future of biodiversity in general to anticipate those species that are likely to be adversely affected by climate change and those that are not. The choices then are to artificially enhance the environment to the benefit of existing species, thus minimising population collapse, or to allow the introduction or adaptation of existing species that tolerate the ongoing changes. Global warming has been given much attention with a focus on summer air temperatures, but important associated effects are extremes within weather patterns i.e. extreme weather events. Winter storms with increased rain and snow, flooding and unusually low temperatures can impact biodiversity and the environment as much as high summer temperatures. This is discussed in greater detail later in the text.

In time, the rising sea levels resulting from climate change and the related global warming, will result in Brightlingsea becoming a true island, as it was in the sixteenth century. In addition to the thermal expansion of seawater due to increased temperature, the amount by which sea levels rise is related to ice-melt over land masses which is part of the general reduction in the cryosphere. The impact on biodiversity of an island Brightlingsea is currently unquantifiable, and the many threats, known or unknown, resulting from climate change are unlikely to be overcome by any local action. A factor not always taken into account is that global warming statistics are averages and there are regional variations. I expect an increase in mean local air temperature of + 1.1 ºC by 2050 and + 2.27 ºC by 2075.

The United Nations Framework Convention on Climate Change (UNFCCC) COPs

COPs draw together governments to negotiate the most effective way of addressing climate change, to consider the needs of countries so affected and to consider how these needs might be addressed. The meetings also highlight in particular the problems of global warming and reinforce the need for awareness within all social sectors and all nations, from government and the civil service, through industry and commerce to individual members of the

public. At the time of writing, the latest COP was COP29 (COP 30 results pending). which took place in November 2024 in Baku, Azerbaijan. The relevant website advises that 'The ultimate objective of the Convention is to stabilize greenhouse gas concentrations at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system.' It states that 'such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner.'

Can an endangered species adapt to, or relocate to more suitable environments?
Much emphasis has been rightly placed on the negative impact of climate change although some changes may result in more favourable conditions for some species. However, the majority may be forced to undertake a population shift, whereby plants and animals simply gravitate to the most suitable environment. For example, if weather patterns shift such that increased rainfall over the Sahara and other deserts enables more fertile regions of vegetation, animal populations will follow. The important point is that any advantageous changes must be sufficiently quick to allow migration before unfavourable local conditions cause the extinction of the affected species. This point is also particularly relevant in calculations surrounding biodiversity net gain. To repopulate an area naturally there must be other populations within the vicinity with the necessary drive, opportunity and ability.

If the environment is changed by removing a previously established and stable environment such as a woodland to build a housing estate, the allocation of a larger replacement environment area does not immediately replace the lost biodiversity, which may have evolved over decades or centuries and may be lost forever. If humans absorb resources, including space, at a rate greater than biodiversity can adapt, or leaves no place for biodiversity to go, then decline is inevitable. Existing or planned wildlife corridors will have an unpredictable advantage for migration under these circumstances. The current rates of climate change, in particular increased maximums in temperature, are such that evolution is almost certainly not a process that will overcome any negative impacts.

Is the Brightlingsea area becoming drier?
Although analysis of weather trends is a separate issue and beyond the scope of this discussion, East Anglia, and particularly the Brightlingsea area, is accepted as the driest part of the country. This is simply a statement of fact, and Met Office data shows the mean rainfall for England is 869.59 mm, that for East Anglia is 626.91 mm. This deficit is compounded because Brightlingsea also has a below average rainfall compared with the whole of East Anglia. Is the area becoming drier and if so, what impact does this have on biodiversity?

Again, taken from Met Office data, figure 6 shows that annual precipitation (including snow) of East Anglia in the short term is not reducing within the timeframe shown. There is in fact a slight trend for increased rainfall. The graph shows only the annual mean and not the extremes within each year. The overall trend therefore is for mean annual rainfall volumes to be fairly constant but for extremes to occur as drought and flooding, and these extremes can be problematic for both biodiversity and humanity. Tangible consequences include the drying up of ponds, with catastrophic losses of biodiversity and failure for the pond to regenerate when normal water volumes return. It is assumed that the pond levels are influenced by precipitation and evaporation rates and/or water table levels.

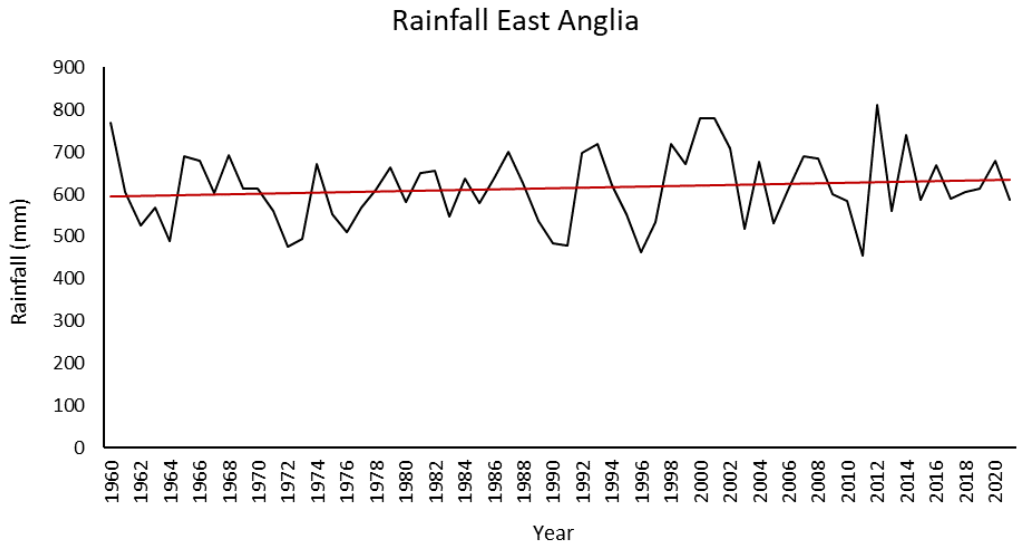


Figure 6. Variation in rainfall in East Anglia from 1960 to 2021

Is the Brightlingsea area becoming warmer?
Mean maximum daytime air temperature appears to be increasing as shown in Figure 7 under. The trend calculated in an earlier paper (Thorn 2021) based on summer data for the same period is for an increase of +0.0418 ° C per annum (i.e. approximately plus one degree in twenty-five years). This assumes any increase is linear and the assumption may be incorrect. Revised data used to compose Figure 7 gives an approximate increase of between +0.0429 ºC and +0.0454 ºC per annum for the period 1986 to 2021. However, mean maximum day temperatures for the East Anglia area from 1921 to 2020 show a trend of +0.0136 ° C, whilst mean maximum day temperatures for the area from 1921 to 1985, surprisingly, show a downward trend of -0.0051 ° C per year. In summary, East Anglia now appears to be warming at a mean rate of 0.0441 ºC per annum or 0.441 ° C per decade.

What the graphs do not show are extremes within each year, which can be far more devastating to biodiversity. . Moreover, the trends can vary depending on the period over which the trend is calculated and warming may not be at the same rate for each geographical location in England.
From this data the conclusion is that whilst East Anglia overall is becoming warmer (but may not be becoming dryer in the long term) the small coastal area of Brightlingsea has the disadvantage of also being more dry than other inland areas. A combination of long periods of drought, and hotter summers makes the impact of these extremes more noticeable, effectively leading to a Mediterranean type climate. Rather than the rise in mean temperature, this combination of extremes is the main threat to wildlife in its current mix of species. Means may therefore be considered less important than extremes. What appears more likely is that the Mediterranean climate will apply to summer whilst the winter months will be subjected to more frequent floods.

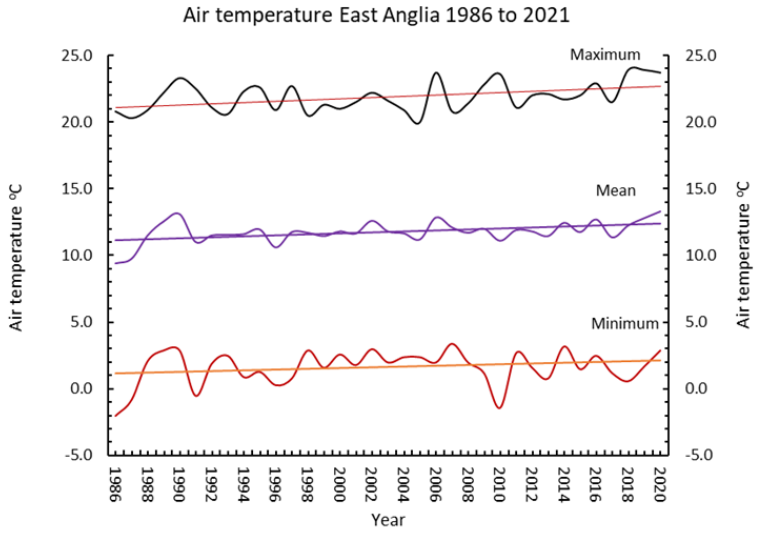


Figure 7. Maximum, minimum and mean air temperature East Anglia 1986 to 2021

An example of the impact on biodiversity of prolonged periods of drought (say over four weeks?) and high day temperatures is that trees may conserve water by allowing fruit and nuts to ripen too early thus not reaching maximum size, and dropping prematurely as a result. This means a reduced fruit biomass and soft fruit may rot earlier. Fruit is therefore unavailable later in the year when a good food supply is essential for some animals to build up reserves for the winter. High air temperatures mean that water evaporates more quickly and if it is associated with low rainfall, ponds, streams and springs may dry up and some gravel pits may become depleted if the water table drops.

Food for animals, such as Song Thrushes (*Turdus philomelos*) that eat insects or molluscs, will be hard to find and of course the insects and molluscs will dehydrate and overheat in exceptional conditions. Earthworms (*Lumbricus terrestris*) will go deeper under baked earth. Both worms and snails may become immobile in a state of aestivation, thus removing a food source for birds, Hedgehogs (*Erinaceus europaeus*) and Badgers (*Meles meles*). Effectively, the whole food chain is disrupted with consequences for current and future generations. (See West, 2022). A further possible consequence of general weather changes is that the breeding seasons of animals that rely on certain plants for food become out of phase with seasonal new growth. If leaf growth occurs too early due to climate change, the new growth is not available to larvae that arrive at the usual time, so they will have missed their food source. If the birth of young animals becomes unsynchronised with their food source the consequences could be catastrophic, since evolution cannot work on such short timescales. Hot weather may also be linked to population explosions for example swarms of Seven Spot Ladybirds (*Coccinella septempunctata)*

seen on Brightlingsea seaside during July 2025. These 'explosions' are reported to have happened in England every fifteen years until the 1970s.

The International Journal of Climatology (ICJ) expands on the effects of climate change. To repeat concerns expressed in earlier sections, (in particular that headed 'The Risk of Fire to Hedges, Fields and Woodland'), the risk of fire, and all the catastrophic consequences, must be at least considered because of increased summer temperatures and the fact that this area of Essex is one of the driest in England. It is my impression that the Brightlingsea area has very few recent electrical storms i.e. rain accompanied by thunder and lightning.

Air Quality

The Essex Air Quality website shows measurements at Brightlingsea Quay and Church Road. Both indicate low pollution levels.

Biodiversity/ Wildlife corridors

There are several definitions of a wildlife corridor but essentially it is an area of land that links two or more otherwise insulated or isolated stretches of land and allows for the free movement of biodiversity between them. (Water corridors may also link bodies of water). Wildlife corridors may also be called habitat or green corridors and can be natural or artificial. New artificial or constructed wildlife corridors, or parts of corridors, are introduced positively by deliberately rewilding certain areas or negatively by simply abandoning areas containing human activity or artifacts e.g., allowing a ploughed field to become fallow. If a new corridor is planned, careful thought must be given to the impact of any changes that result, including risk assessments to existing biodiversity. The risk of giving a route for fire to spread between areas must also be considered.

The emphasis on the provision of new corridors should also be accompanied by consideration of the maintenance of existing corridors. Preventing the obstruction or removal of existing corridors should hold equal priority with those of constructing new corridors when plans for construction or change of use are reviewed. The construction of a new road or building or even a fence could obstruct an existing corridor with potentially disastrous results.

The effectiveness of a corridor varies according to the species that use it. For example, most birds are less likely to utilise land corridors as a means of population shift than mice. Higher animals may not use what may seem to be an effective corridor if they sense an increased threat by doing so, or if it contradicts an existing pattern of migration. There is also the risk that a corridor may introduce instability by allowing the introduction of a previously isolated threat of predation or disease, for example in the case of Grey Squirrels (*Sciurus carolinensis*) entering the domain of Red Squirrels (*Sciurus vulgaris*) by means of a new corridor thus subjecting them to the deadly squirrel pox, competing for resources and destroying areas of woodland by stripping the bark from trees that were previously untouched. (RSF 2021). Brightlingsea shares some of the geographical characteristics of the nearby Mersea Island, where an introduced colony of Red Squirrels has taken advantage of relative isolation from the mainland.

In the Brightlingsea district, woodlands are relatively small in area. They are fragmented and isolated such that they cannot form part of a wildlife corridor. I considered the possibility of bridging the gaps between copses by hedge planting or increasing woodland by planting new copses with long stretches of trees similar to The Belt, Long Plantation and The Link. Whilst this might seem to be a good idea, the pragmatic reality is that liaison between and with landowners and convincing them that this would enhance nature would be difficult. An argument backed by meaningful data and acceptable costing would be needed. Planning considerations should include risk assessments of the impact of disruption to existing corridors. From the above it is apparent that both existing and potential corridors between woodlands are limited and made worse by the fact that Brightlingsea Town effectively splits the geographical area into two. This sort of situation is likely to be problematic on a national scale and likely hinder the concept of unbroken nature networks.

The coastal borrow dykes and their reed beds along with the old railway line embankment do give some local connectivity but another realistic consideration is that as Brightlingsea is nearly an island the advantages and necessity of new, meaningful corridors linking Brightlingsea to the rest of Essex would be have to be researched. The main road and its vicinity does offer a rather dangerous link but traffic is almost certainly both a constraint and a deterrent. Aquatic corridors such as new ditches may link some other local water bodies but these are limited to relatively flat areas. Since there are no readily available statistics on the mechanics and use of local wildlife corridors, this is being researched separately. Risk assessments to analyse the threats of introducing wildlife corridors should be an integral part of the process. Although much has been discussed about the provision of corridors, the loss of corridors seems to have attracted less attention. Certainly, if rising sea levels tend to further isolate Brightlingsea, there will be greater restrictions on migration with as yet unquantifiable impact on biodiversity.

Motivational corridors

Wildlife corridors serve to overcome the constraints on freedom of movement between locations. I would redefine them as land or water links that minimise the restriction of biological free movement. I have assumed that Alresford Creek, Brightlingsea Creek and the ditches that link them form a barrier that restricts (but probably does not prevent) the free movement of much terrestrial biodiversity to and from the Brightlingsea area, but this is unquantified. Water oriented biodiversity is of course generally free to move along these water corridors.

I suggest that the volume of biodiversity movement is proportional to (i) the pressures driving that movement and (ii) the constraints on that movement. Different species will have different pressures and constraints. For Brightlingsea, we do not know what these pressures and constraints are but they may be seasonal and species specific. Where a corridor is used by biodiversity for a definite and advantageous purpose I would suggest that these be termed *motivational corridors*.

The importance of wildlife corridors that enable the migration of established temperate species from a warming south to a cooler north should be factored in to nature recovery considerations. The need for the necessary drive, opportunity and ability is essential.

Baselining Brightlingsea's biodiversity

Almost all animals are protected in law in one way or another, and in particular many species are named within various legislations such as schedules 5 and 9 of the Wildlife and Countryside Act 1981, the Wild Mammals (Protection) Act 1996, the Animal Welfare Act 2006, and other specific legislations such as the Deer Act 1991and the various Protection of Badgers Acts (see later notes on Badgers). Protected plants are listed under schedule 8 of the 1981 Act. Some species may be categorised as a priority species i.e., species that were identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP), which includes the statement 'Even in a well-studied country such as the UK there is no comprehensive catalogue of our resident plants and animals. Species new to science (hitherto undescribed) and species new to the UK (previously described elsewhere) are discovered every year'. This statement should be noted if the contents of the Tables under are queried. For birds, under the Birds of Conservation Concern 4: the Red List for Birds (Eaton *et al.*, 2015), a traffic light system is used to shown the degree to which each species is threatened but this system is not used here, neither is data obtained during this project, and related to the above, subjected to a full analysis.

The Brightlingsea baseline is constructed in two ways. The first is a general spread of casual or chance observations for example those taken whilst proceeding down a long country lane or by noting the presence of an overhead Falcon, or a Squirrel crossing a road. Details of sightings by other observers may be included in this category. Site surveys however are planned and therefore more organised and require targeted observations. Many of these sites are also subjected to a risk assessment. Examples include surveys of Brightlingsea Boating Lake or of a resident's garden plants or moths trapped in my own garden over a single continuous period of four months. In all cases, the National Grid reference is recorded, which may indicate if a species is likely to be common or uncommon. The Tables will give a crude measure of this but a more concise analysis is conducted separately via MS Excel spreadsheets.

Observations are recorded on the spreadsheets by site/location with subsections for plants and animals. These records are easily interrogated for comparative data such as numbers of species identified at each site and are a meaningful source of information outwith this document. Data is recorded on a 'present or not present' basis for 2022, 2023, 2024 and 2025, rather than numbers at a specific location on a specific date. I have decided not to use databases such as iNaturalist or iRecord, nor to provide data to County recorders for various reasons. The possibility of observer bias in iRecord is noted (Di Cecco *et al.* 2021).

Together with the spreadsheets held on my Personal Computer, the following tables, with any supplementary notes, form the primary backbone of the Biodiversity Baseline. Site surveys are recorded later in the text.

In the tables I have generally listed the plant or animal in alphabetical order by common name and usage rather than by scientific or proper name since this will be more meaningful to the general audience. This is not unusual and is used by various organisations such as the British Trust for Ornithology's Bird Facts and the RSPB. As an example in the Tables the European Hedgehog is simply listed as Hedgehog, and Eurasian Teal is listed as Teal.

Table 16. Mammals (Land)

Common name	Generic	Specific	Sample locations		
Badger	*Meles*	*meles*			**Note 1*
Bank Vole	*Myodes*	*glareolus*	TM087183	TM088185	
Brown Hare	*Lepus*	*europaeus*	TM075185	TM076163	TM064176

Brown Long-eared Bat	*Plecotus*	*auritus*	TM077187		
Brown Rat	*Rattus*	*norvegicus*	TM094170 TM086172	TM082167 TM099170	TM094174 TM093169
Cat (feral)	*Felis*	*catus*	TM089167	TM083182	
Chinese Muntjac	*Muntiacus*	*reevesi*	TM097168 TM092168 TM084177	TM098168 TM099170 TM096167	TM082167 TM094174
Common Pipistrelle	*Pipistrellus*	*pipistrellus*	TM077187	TM084171	
Fallow Deer	*Dama*	*dama*	TM094185		*Note 2*
Fox	*Vulpes*	*vulpes*	TM077188 TM074187	TM086172	TM082167
Grey Squirrel	*Sciurus*	*carolinensis*	TM088169 TM092168 TM084171	TM098168 TM086178 TM096167	TM086171 TM089167 TM082168
Mole	*Talpa*	*europaea*	TM077187		
Hedgehog	*Erinaceus*	*europaeus*	TM094170 TM086172 TM083182	TM086167 TM082167	TM093169 TM089167
House Mouse	*Mus*	*musculus*	TM083182	TM086172	TM094170
Natterer's Bat	*Myotis*	*nattereri*	TM077187		
Noctule Bat	*Nyctalus*	*noctula*	TM077187		
Polecat	*Mustela*	*putorius*	TM077163		
Pygmy Shrew	*Sorex*	*minutus*	TM088185	TM087183	TM082167
Rabbit	*Oryctolagus*	*cuniculus*	TM087183		
Red Deer	*Cervus*	*elaphas*	TM091180		*Note 2*
Short-tailed Field Vole	*Microtus*	*agrestis*	TM088185	TM089167	
Shrew	*Sorex*	*araneus*	TM082167	TM089167	
Soprano Pipistrelle	*Pipistrellus*	*pygmaeus*	TM077187		
Stoat	*Mustela*	*erminea*	TM077188 TM077186	TM076186	TM077185
Water Shrew	*Neomys*	*fodiens*	TM082167		
Water Vole	*Arvicola*	*amphibius*	*Not verified*		
Wood Mouse	*Apodemus*	*sylvaticus*	TM083182 TM097168 TM096167	TM098168 TM074164 TM064176	TM094170 TM089167
Weasel	*Mustela*	*nivalis*	TM063195		
Yellow-necked Mouse	*Apodemus*	*flavicollis*	TM083182		
Domesticated animals (excludes pets)					
Cattle	*Bos*	*taurus*	TM088185	TM075167	
Horse	*Equs*	*ferus caballus*	TM086181		
Sheep	*Ovis*	*aries*	TM079186		

Notes on the species.

1. The presence of badgers was confirmed by their characteristic access tunnel in the foliage and digging in the earth in the general area. Trail cams were used to film their movements. The observers are unwilling to give the location of the badger setts to ensure they are not disturbed.
2. The presence of Fallow and Red Deer is unusual. Fallow deer are reported have been seen on Brightlingsea Marsh.

Table 17. Reptiles and Amphibians

Common name	Generic	Specific	Sample locations		
Adder	*Vipera*	*berus*	unspecified		
Frog	*Rana*	*temporaria*	TM083182 TM089167	TM086172 TM089173	TM083182
Grass Snake	*Natrix*	*helvetica*	unspecified		
Lizard	*Zootoca*	*vivipara*	TM094170		
Slowworm	*Anguis*	*fragilis*	TM090162 TM094171	TM082167	TM092162
Smooth Newt	*Lissotriton*	*vulgaris*	TM086172	TM089167	TM083182

Table 18. Aves

Common Name	Generic	Specific	Sample locations		
Avocet	*Recurvirostra*	*avosetta*	TM091160 TM082164 TM094168	TM064176 TM092162 TM094166	TM071168 TM084163
Bar-tailed Godwit	*Limosa*	*lapponica*	TM080164 TM075167	TM082164	TM084163
Black-headed Gull	*Chroicocephalus*	*ridibundas*	TM071187 TM092162 TM094170	TM084163 TM091161 TM086172	TM094166 TM083182
Blackbird	*Turdus*	*merula*	TM075167 TM083182 TM094164 TM089185 TM098168	TM094170 TM086172 TM095166 TM084163 TM078163	TM084171 TM082167 TM089167 TM094166
Blackcap	*Sylvia*	*atricapilla*	TM094164 TM086172	TM095166 TM086171	TM082167 TM098168
Black Redstart	*Phoenicurus*	*ochruros*	TM082164	TM094170	
Black-tailed Godwit	*Limosa*	*limosa*	TM091160 TM092162	TM077163 TM084163	TM082164 TM094166
Blue Tit	*Cyanistes*	*caeruleus*	TM086172 TM089167 TM084163 TM078163	TM083182 TM064176 TM094166	TM084177 TM071168 TM075167
Brent Goose	*Branta*	*bernicla*	TM091160 TM092162 TM075167	TM082164 TM084163	TM063195 TM094166
Brent Goose (Dark Bellied)	*Branta*	*bernicla bernilca*	TM084163	TM094166	
Bullfinch	*Pyrrhula*	*pyrrhula*	TM089167		
Canada Goose	*Branta*	*canadensis*	TM080164 TM084163 TM075167	TM099170 TM084163	TM094174 TM075167
Cattle Egret	*Bubulcus*	*ibis*	TM077162	TM078163	TM077163
Carrion Crow	*Corvus*	*corone*	TM091160 TM089167 TM084163 TM075167	TM083182 TM099167 TM094166 TM080164	TM086172 TM092162 TM098168 TM082167
Cetti's Warbler	*Cettia*	*cetti*	TM078163 TM084163 TM080164	TM064176 TM094166	TM081165 TM098168
Chaffinch	*Fringilla*	*coelebs*	TM086172 TM089167	TM095166 TM098168	TM086171 TM084163

Chiffchaff	*Phylloscopus*	*collybita*	TM084171 TM080164	TM094164 TM082167	TM084163
Coal Tit	*Periparus*	*ater*	TM089167		
Collared Dove	*Streptopelia*	*decaocto*	TM086172 TM092162 TM094166	TM094170 TM083182	TM089167 TM084163
Common Gull	*Larus*	*canus*	TM091161 TM083182 TM094166	TM086172 TM071187	TM092162 TM084163
Common Tern	*Sterna*	*hirundo*	TM077163		
Coot	*Fulica*	*atra*	TM080164 TM071187	TM098168 TM084163	TM096167
Cormorant	*Phalacrocorax*	*carbo*	TM076161 TM075167 TM064176	TM078163 TM076163 TM094166	TM077163 TM084163
Cuckoo	*Cuculus*	*canorus*	TM078163	TM087183	TM098168
Curlew	*Numenius*	*arquata*	TM096171 TM094174 TM092162	TM077163 TM084163 TM075167	TM082164 TM094166 TM075167
Curlew Sandpiper	*Calidris*	*ferruginea*	TM071168		
Dunlin	*Calidris*	*alpina*	TM076163 TM084163	TM082164 TM094166	TM082164
Dunnock	*Prunella*	*modularis*	TM083182 TM094170 TM075167	TM086172 TM084171	TM089167 TM084163
Egyptian Goose	*Alopochen*	*aegyptiaca*	TM080164 TM094166	TM082164	TM084163
Feral Pigeon	*Columba*	*livia*	TM085168 TM084163	TM086172	TM089167
Fieldfare	*Turdis*	*pilaris*	TM089185	TM084163	TM084163
Garden Warbler	*Sylvia*	*borin*	TM089177	TM082167	
Goldcrest	*Regulus*	*regulus*	TM080168	TM082167	
Golden Plover	*Pluvialis*	*apricaria*	TM066191		
Goldfinch	*Carduelis*	*carduelis*	TM091160 TM071168 TM092162 TM078163	TM089167 TM084163 TM075167	TM064176 TM094166 TM075167
Great Black-backed Gull	*Larus*	*marinus*	TM076163 TM084163	TM086172 TM075167	TM078163
Great Crested Grebe	*Podiceps*	*cristatus*	TM091160 TM092162	TM071187	TM084163
Great Spotted Woodpecker	*Dendrocopos*	*major*	TM086172	TM089185	TM094166
Great Tit	*Parus*	*major*	TM080164 TM094166	TM083182	TM089167
Green Woodpecker	*Picus*	*viridus*	TM085180 TM096167 TM075167	TM082167 TM094166	TM098168
Greenshank	*Tringa*	*nebularia*	TM084163		
Greenfinch	*Chloris*	*chloris*	TM084171 TM095166 TM094166	TM086170 TM094170	TM094164 TM098168
Grey Heron	*Ardea*	*cinerea*	TM080164 TM084163	TM083182 TM094166	TM092162 TM075167
Grey Partridge	*Perdix*	*perdix*	TM073164	TM074164	TM067117

			TM084163		
Grey Plover	*Pluvialis*	*squatarola*	TM084163	TM094166	
Grey Wagtail	*Motacilla*	*cinerea*	TM078163		
Greylag Goose	*Anser*	*anser*	TM080164 TM075167	TM099170	TM094174
Herring Gull	*Larus*	*argentatus*	TM091161 TM079161 TM084163	TM094170 TM086172 TM094166	TM081165 TM094166 TM092162
House Martin	*Delichon*	*urbicum*	TM089177	TM084163	TM075167
House Sparrow	*Passer*	*domesticus*	TM084171 TM083182 TM094166	TM094170 TM086172 TM080164	TM089167 TM084163 TM078163
Jackdaw	*Corvus*	*monedula*	TM086172 TM084163	TM089167 TM094166	TM083182
Jay	*Garrulus*	*glandarius*	TM098168	TM076186	TM083182
Kingfisher	*Alcedo*	*atthis*	TM071187	TM075167	TM064176
Lapwing	*Vanellus*	*vanellus*	TM086181 TM091161 TM092162	TM087183 TM088185	TM084163 TM094166
Lesser Black-backed Gull	*Larus*	*fuscus*	TM082164 TM084163	TM086172 TM094166	TM081165
Lesser spotted Woodpecker	*Dryobates*	*minor*	TM089177		
Linnet	*Linaria*	*cannabina*	TM064176	TM075167	
Little Egret	*Egretta*	*carzetta*	TM091160 TM095166 TM082164 TM098166 TM094166	TM094164 TM077187 TM099167 TM098168 TM075167	TM071168 TM076163 TM092162 TM084163
Little Grebe	*Tachybaptus*	*ruficollis*	TM091161 TM092162	TM071187	TM084163
Long-tailed Tit	*Aegithalos*	*caudatus*	TM086171 TM084163 TM075167	TM083182 TM094166	TM089167 TM098168
Magpie	*Pica*	*pica*	TM080164 TM087183 TM096167 TM083182	TM086172 TM071187 TM084163	TM082167 TM089185 TM094166
Mallard	*Anas*	*platyrhynchos*	TM080164 TM083182 TM077187 TM084163	TM082164 TM091160 TM071187 TM094166	TM086172 TM098168 TM096167 TM092162
Meadow Pipit	*Anthus*	*pratensis*	TM064176		
Mediterranean Gull	*Larus*	*melanocephalus*	TM082164	TM084163	
Mistle Thrush	*Turdus*	*viscivorus*	TM076186	TM077187	
Moorhen	*Gallinula*	*chloropus*	TM089185 TM084163	TM071187 TM094166	TM092162
Mute Swan	*Cygnus*	*olor*	TM082164 TM094166	TM071168	TM084163
Nightingale	*Luscinia*	*megarhynchos*	TM080164		
Oystercatcher	*Haematopus*	*ostralegus*	TM091161 TM082164 TM084163	TM064176 TM099167 TM094166	TM071168 TM098166 TM092162
Peacock (Peafowl)	*Pavo*	*cristatus*	TM097168	TM083182	

Pheasant	*Phasianus*	*colchicus*	TM082183 TM071187 TM094166	TM089167 TM096167 TM075167	TM092162 TM084163 TM083182
Pied Wagtail	*Motacilla*	*alba*	TM086172	TM084163	TM094166
Rock Pipit	*Anthus*	*petrosus*	TM074164	TM067117	
Raven	*Corvus*	*corax*	TM076183		
Red Backed Shrike	*Lanius*	*collurio*	TM078163		
Red-legged Partridge	*Alectoris*	*rufa*	TM086181		
Redshank	*Tringa*	*totanus*	TM091161 TM082164 TM094166	TM064176 TM092162 TM075167	TM071168 TM084163
Redwing	*Turdus*	*iliacus*	TM076186		
Reed Bunting	*Emberiza*	*schoeniclus*	TM071168 TM075167	TM067117	TM094166
Reed Warbler	*Acrocephalus*	*scirpaceus*	TM072166 TM078163 TM064176 TM098168	TM095166 TM071168 TM081165 TM084163	TM074164 TM094164 TM081165
Ringed Plover	*Charadrius*	*hiaticula*	TM089177	TM084163	
Robin	*Erithacus*	*rubecula*	TM086172 TM083182 TM077187 TM096167 TM075167	TM094170 TM089167 TM071187 TM084163 TM080164	TM098168 TM082167 TM092162 TM094166 TM078163
Rock Dove	*Columba*	*livia*	TM084163		
Rook	*Corvus*	*frugilegus*	TM080179 TM087183 TM089182	TM084177 TM077187	TM083182 TM094166
Sanderling	*Calidris*	*alba*	TM089177	TM076161	TM084163
Shelduck	*Tadorna*	*tadorna*	TM080168	TM094166	TM075167
Shoveler	*Spatula*	*clypeata*	TM094166		
Skylark	*Alauda*	*arvensis*	TM089185 TM099167 TM098166 TM078163	TM072166 TM081165 TM094166	TM074164 TM094164
Snipe	*Gallinago*	*gallinago*	TM075167		
Song Thrush	*Turdus*	*philomelos*	TM080164	TM084171	
Starling	*Sturnus*	*vulgaris*	TM091160 TM080164 TM084163	TM083182 TM086172 TM094166	TM094170 TM089167 TM092162
Stock Dove	*Columba*	*oenas*	TM089185		
Stonechat	*Saxicola*	*rubicola*	TM067172 TM094166	TM064176	TM084163
Swallow	*Hirundo*	*rustica*	TM078163 TM084163	TM099167 TM094166	TM098166 TM075167
Swift	*Apus*	*apus*	TM086172	TM084163	
Teal	*Anas*	*crecca*	TM082164		
Treecreeper	*Certhia*	*familiaris*	TM084188		
Tufted Duck	*Aythya*	*fuligula*	TM082164	TM084163	TM094166
Turnstone	*Arenaria*	*interpres*	TM091161	TM082164	TM092162

			TM084163	TM094166	TM075167
Wheatear	*Oenanthe*	*oenanthe*	TM089185		
White Fronted Goose	*Anser*	*albifrons*	TM089177		
Whitethroat	*Curruca*	*communis*	TM078163 TM099167 TM098168	TM095166 TM094164 TM084163	TM064176 TM098166 TM078163
Wigeon	*Anas*	*penelope*	TM089177	TM075167	
Woodcock	*Scolopax*	*rusticola*	TM099177	TM089177	
Woodpigeon	*Columba*	*palumbus*	TM086172 TM083182 TM092162 TM082167 TM080164	TM094170 TM087183 TM071187 TM098168 TM084163	TM084177 TM089167 TM094166
Wren	*Troglodytes*	*troglodytes*	TM083182 TM091160 TM094166 TM080164	TM094170 TM086172 TM092162	TM084171 TM089167 TM075167
Yellowhammer	*Emberiza*	*citrinella*	TM082164		

Table 19. Raptors

Common Name	Generic	Specific	Sample locations		
Barn Owl	*Tyto*	*alba*	TM074187 TM084163	TM087183	TM086181
Buzzard	*Buteo*	*buteo*	TM086181 TM083182 TM077187	TM071190 TM087183 TM094166	TM084163
Hen Harrier	*Circus*	*cyaneus*	TM089177	TM094166	TM075167
Hobby	*Falco*	*subbuteo*	TM071168 TM064176	TM068186	TM064175
Kestrel	*Falco*	*tinnunculus*	TM086181 TM091160 TM084163 TM092162 TM077188	TM078186 TM087183 TM094166 TM077187	TM063195 TM089167 TM064176 TM075167
Little Owl	*Athene*	*noctua*	TM091180		
Marsh Harrier	*Circus*	*aeruginosus*	TM064176 TM089185 TM075167	TM072166 TM074164	TM094166 TM074166
Osprey	*Pandion*	*haliaetus*	TM094166		
Peregrine Falcon	*Falco*	*peregrinus*	TM086181	TM087183	
Red Kite	*Milvus*	*milvus*	TM076183 TM094166	TM086172	TM094170
Sparrowhawk	*Accipiter*	*nisus*	TM086171	TM083182	TM094166
Tawny Owl	*Strix*	*aluco*	TM099167 TM098166	TM089167	TM083182

Notes on Tables 17 and 19.
1. All birds are protected by The Wildlife and Countryside Act 1981.
2. Conservation status may be obtained from RSPB website
3. Grid reference locations do not show the locations of nesting sites such as those of Owls. Rather, they record a bird in flight or at rest.
4. Buzzards are common in groups of two or more over TM083182.

5. I noted that Rooks, Jackdaws and Crows may arrive at, and leave a bird feeder simultaneously as a group, indicating that the three species may coordinate, integrate and cooperate in their feeding methods.
6. A two-year study of birds attracted to feeders at TM083182 has been conducted during 2024/25 (Appx. 4).

Figure 8. Buzzard *Buteo buteo* and Kestrel *Falco tinnunculus*
Photos © Ed Thorn

Table 20. Insects. Butterflies

Common name	Generic	Specific	Sample locations		
Brimstone	*Gomepteryx*	*rhamni*	TM088185		
Comma	*Polygonia*	*c-album*	TM088185	TM086171	TM089167
Common Blue ♂	*Polyommatus*	*icarus*	TM088185	TM089167	
Essex Skipper	*Thymelicus*	*lineola*	TM076163 TM098168	TM074164 TM096167	TM095168 TM094164
Gatekeeper /Hedge Brown	*Pyronia*	*tithonus*	TM082167 TM089167	TM086172	TM086171
Green Hairstreak	*Callophrys*	*rubi*	TM078163		
Holly Blue ♂ ♀	*Celastrina*	*argiolus*	TM086172 TM089167	TM083182 TM098168	TM077187
Large White	*Pieris*	*brassicae*	TM089185 TM098168 TM083182 TM094166	TM086172 TM089167 TM080164	TM087183 TM078163
Meadow Brown	*Maniola*	*jurtina*	TM077187 TM088185 TM098168	TM086172 TM086171 TM089167	TM082167 TM077186
Orange Tip	*Anthocharis*	*cardamines*	TM086172	TM089167	
Painted Lady	*Vanessa*	*cardui*	TM077187	TM089167	
Peacock	*Aglais*	*io*	TM087183 TM098168 TM083182 TM089167	TM095166 TM094164 TM078169	TM086172 TM098168
Red Admiral	*Vanessa*	*atlanta*	TM077187 TM094164 TM077188 TM076186	TM086172 TM086171 TM098168 TM078163	TM095166 TM097168 TM089167
Ringlet	*Aphantopus*	*hyperantus*	TM098168 TM095166	TM082167 TM087183	TM094164

Small Copper	*Lycaena*	*phlaeas*	TM095168	TM089167	
Small Heath	*Coenonympha*	*pamphilus*	TM094164 TM098168	TM099167	TM098166
Small White	*Pieris*	*rapae*	TM083182 TM089167	TM086171 TM083182	TM086172
Small Skipper	*Thymelicus*	*sylvestris*	TM076163	TM074164	TM089167
Speckled Wood	*Parage*	*aegeria*	TM098168	TM092162	TM082167
Tortoiseshell Large *	*Nymphalis*	*polychloros*	TM083182	TM077187	
Tortoiseshell Small	*Aglais*	*urticae*	TM098168 TM086181 TM078169	TM095166 TM077187 TM083182	TM094164 TM089167
White Admiral	*Limenitis*	*camilla*	TM082167		
White Green-veined	*Pieris*	*napi*	TM088185 TM078163	TM095166	TM098168

* Note. The initial sighting of the Large Tortoiseshell (*Nymphalis polychloros*) was of a single specimen within a group of Small Tortoiseshells (*Aglais urticae*) on a Buddleia plant (*Buddleja davidii*) in July 2022. Its size was approximately 25% larger than the majority. A second sighting occurred on 5 August 2022 near All Saints Church. No photographic record is held and it is thought that this might have been a chance immigrant. However, although said to be technically extinct in the UK other sightings have been recorded in Essex including Brightlingsea.

Table 21. Insects – Moths

Common name	Generic	Specific	Sample locations	
Angle Shades	*Phlogophora*	*meticulosa*	TM083182	TM087168
Archer's Dart	*Agrotis*	*vestigialis*	TM083182	
Barred Yellow	*Cidaria*	*fulvata*	TM083182	
Beaded Chestnut	*Agrochola*	*lychnidis*	TM083182	
Birch Marble	*Apotomis*	*betuletana*	TM083182	
Black Arches	*Lymantria*	*monacha*	TM083182	
Black Rustic	*Aporophyla*	*nigra*	TM083182	
Blotched Emerald	*Comibaena*	*bajularia*	TM083182	
Bordered Pug	*Eupithecia*	*succenturatia*	TM083182	
Box-tree/Boxworm Moth	*Cydalima*	*perspectalis*	TM084171	TM084171
Brimstone	*Opisthograptis*	*luteolata*	TM083182	
Brindled Flat-body	*Agonopterix*	*arenella*	TM083182	
Brindled Pug	*Eupithecia*	*abbreviata*	TM083182	
Brindled Whitespot	*Parectropis*	*similaria*	TM083182	
Broad-bordered Bee Hawk-moth	*Hermaris*	*fuciformis*	TM083182	
Broad-bordered Yellow Underwing	*Noctua*	*fimbriata*	TM083182	TM084171
Brown House-moth	*Hofmannophila*	*pseudospretella*	TM083182	
Brown Rustic	*Rusina*	*ferruginea*	TM083182	
Brown-tail	*Euproctis*	*chrysorrhoea*	TM083182	
Buff-tip	*Phalera*	*bucephala*	TM083182	
Buff Ermine	*Spilosoma*	*luteum*	TM083182	
Buff Footman	*Eilema*	*depresso*	TM083182	
Buff Longhorn	*Nematopogon*	*metaxella*	TM083182	
Chinese Character	*Cilix*	*glaucata*	TM083182	

Chocolate-tip	*Clostera*	*curtula*	TM083182	
Cinnabar	*Tyria*	*jacobaeae*	TM083182 TM099167	TM094164 TM098168
Clay Triple-lines	*Cyclophora*	*linaria*	TM083182	
Clouded Border	*Lomaspilis*	*marginata*	TM083182	
Clouded Silver	*Lomographa*	*temerata*	TM083182	
Common Carpet Moth	*Epirrhoe*	*alternata*	TM083182	
Common Footman	*Eilema*	*lurideola*	TM083182	
Common Grass-veneer	*Agriphila*	*tristella*	TM083182	
Common Marbled Carpet	*Chloroclysta*	*truncata*	TM083182	
Common Plume	*Emmerlina*	*monodactyla*	TM083182	
Common Pug	*Eupithecia*	*vulgata*	TM083182	
Common Quaker	*Orthosia*	*cerasi*	TM083182	
Common Rustic	*Mesapamea*	*secalis*	TM083182	
Common Yellow Conch	*Agapeta*	*hamana*	TM083182	
Confused	*Aparnea*	*furva*	TM083182	
Convolvulus Hawk-moth	*Agrius*	*convolvuli*	TM083182	
Copper Ermel	*Roeslerstammia*	*erxlebella*	TM083182	
Copper Underwing	*Amphipyra*	*pyramidea*	TM083182	
Coronet	*Craniophora*	*ligustri*	TM083182	
Coxcomb Prominent	*Ptilodon*	*capucina*	TM083182	
Cream-spot Tiger	*Arctia*	*villica*	TM095166 TM094164	TM099167
Cream Wave	*Scopula*	*floslactata*	TM083182	
Current Pug	*Eupithecia*	*assimilata*	TM083182	
Cypress Carpet	*Thera*	*cupressata*	TM083182	
Dark Arches	*Apamea*	*monoglypha*	TM083182	
Dark Chestnut	*Conistra*	*ligula*	TM083182	
Death’s Head Hawk-moth	*Acherontia*	*atropos*	TM083182	
Double-striped Pug	*Gymnoscelis*	*rufifusciata*	TM083182	
Dusky Peacock	*Macaria*	*signaria*	TM083182	
Dusky Sallow	*Eremobia*	*ochroleuca*	TM083182	
Dwarf Pug	*Eupithecia*	*tantillaria*	TM083182	
Early Grey	*Xylocampa*	*areola*	TM083182	TM084171
Elephant Hawk-moth	*Deilephila*	*elpenor*	TM083182	
Feathered Footman	*Coscinia*	*striata*	TM083182	
Feathered Ranunculus	*Polymixis*	*lichenea*	TM083182	TM084171
Fern Smut	*Psychoides*	*filicivora*	TM083182	
Flame (The)	*Axylia*	*putris*	TM083182	
Fox Moth	*Macrothylacia*	*rubi*	TM083182	
Freyer's Pug	*Eupithecia*	*intricata*	TM083182	
Gallium Carpet	*Epirrhoe*	*galiata*	TM083182	
Garden Carpet	*Xanthorhoe*	*fluctuata*	TM083182	
Garden Rose Tortrix	*Acleris*	*variegana*	TM083182	

Great Oak Beauty ♂	*Hypomercis*	*roboraria*	TM083182	
Green Carpet	*Colostygia*	*pectinataria*	TM083182	
Green Oak Tortix	*Tortrix*	*viridana*	TM083182	
Grey Dagger	*Acronicta*	*psi*	TM077187 TM095166	TM076186
Grey Pug	*Eupithecia*	*subfuscata*	TM083182	
Ground Lackey	*Malacosoma*	*castrensis*	TM095166	
Hawthorn Cosmet	*Blastodacna*	*hellerella*	TM083182	
Hawthorn Moth	*Scythropia*	*crataegella*	TM083182	
Heart and Club	*Agrotis*	*clavis*	TM083182	
Heart and Dart	*Agrotis*	*exclamatiionis*	TM083182	
Hebrew Character	*Orthosia*	*gothica*	TM083182	
Hook-streak Grass-veneer	*Crambus*	*lathoniellus*	TM083182	
Hummingbird Hawk-moth	*Macroglossum*	*stellatarum*	TM083182	
Ingrailed Clay	*Diarsia*	*mendica*	TM083182	
Juniper Carpet	*Thera*	*juniperata*	TM083182	
Juniper Pug	*Eupithecia*	*pusillata*	TM083182	
Knot Grass	*Acronicta*	*rumicis*	TM083182	
Larch Pug	*Eupithecia*	*lariciata*	TM083182	
Large Yellow Underwing	*Noctua*	*pronuba*	TM083182	TM084171
Latticed Heath	*Chiasmia*	*clathrata*	TM083182	
Leopard Moth	*Zeuzera*	*pyrina*	TM083182	
Lesser Swallow Prominent	*Pheosia*	*gnoma*	TM083182	
Lesser Yellow Underwing	*Noctua*	*comes*	TM083182	
Light Arches	*Apamea*	*lithoxylaea*	TM083182	
Light Brown Apple-Moth	*Epiphylas*	*postvittana*	TM083182	
Light Emerald	*Campaea*	*margaritaria*	TM083182	
Lime Hawk-moth ♂	*Mimas*	*tiliae*	TM083182	TM094170
Lime-speck Pug	*Eupithecia*	*centaureta*	TM083182	
Lobster Moth	*Stauropus*	*fagi*	TM083182	
Lunar Marbled Brown	*Drymonia*	*ruficornis*	TM083182	
Lunar Yellow Underwing	*Noctua*	*orbona*	TM083182	
Magpie (The)	*Anania*	*hortulata*	TM083182	
Maiden's Blush	*Cyclophora*	*punctaria*	TM083182	
Marbled Brown	*Drymonia*	*dodonaea*	TM083182	
Marbled Minor	*Oligia*	*strigilis*	TM083182	
Meal Moth	*Pyralis*	*farinalis*	TM083182	
Micro Moth (no common name)	*Batia*	*unitella*	TM083182	
Micro Moth (no common name)	*Coleophora*	*alcyonipennella*	TM083182	
Micro Moth (no common name)	*Crambus*	*lathoniellus*	TM083182	
Morning-glory Plume Moth	*Emmelina*	*monodactyla*	TM083182	
Mother of Pearl	*Pleuroptya*	*ruralis*	TM083182	
Mottled Pug	*Eupithecia*	*exiguata*	TM083182	
Mottled Rustic	*Caradrina*	*morpheus*	TM083182	

Mouse Moth	*Amphipyra*	*tragopoginis*	TM083182	
Muslin Moth ♂♀	*Diaphora*	*mendica*	TM083182	
Oak Hook-tip	*Watsonalla*	*binaria*	TM083182	
Oak Nycteoline	*Nycteola*	*revayana*	TM083182	
Pale November Moth	*Epirrita*	*christyi*	TM083182	
Pale Oak Beauty	*Hypomecis*	*punctinalis*	TM083182	
Pale-shouldered Brocade	*Lacanobia*	*thalassina*	TM083182	
Pale Tussock	*Calliteara*	*pudibunda*	TM083182	
Peach Blossom	*Thyatira*	*batis*	TM083182	
Pebble Hook-tip	*Drepana*	*f. falcataria*	TM083182	
Pebble Prominent	*Notodonta*	*ziczac*	TM083182	
Peppered Moth	*Biston*	*betularia*	TM083182	
Pine Beauty	*Panolis*	*flammea*	TM083182	
Pine Carpet	*Thera*	*firmata*	TM083182	
Plain Golden Y	*Autographa*	*jota*	TM083182	
Plain Pug	*Eupithecia*	*simpliciata*	TM083182	
Plain Wave	*Idaea*	*straminata*	TM083182	
Poplar Grey	*Subacronicta*	*megacephala*	TM083182	
Poplar Hawk-moth	*Laothoe*	*populi*	TM083182	
Powdered Quaker	*Orthosia*	*gracilis*	TM083182	
Purple Clay	*Diarsia*	*brunnea*	TM083182	
Puss-moth	*Cerura*	*vinula*	TM083182	
Red-barred Tortrix	*Ditula*	*angustiorana*	TM083182	
Red Sword-grass	*Xylena*	*vestusa*	TM083182	
Riband Wave	*Idaea*	*aversata*	TM083182	
Rosy Wave	*Scopula*	*ternata*	TM083182	
Ruby Tiger	*Phragmatobia*	*fuliginosa*	TM083182	
Rustic	*Hoplodrina*	*blanda*	TM083182	
Satin Grass-veneer	*Crambus*	*perlella*	TM083182	
Scarce Footman	*Eilema*	*complana*	TM083182	
Scorched Carpet	*Ligdia*	*adustata*	TM083182	
Scorched Wing	*Plagodis*	*dolabraria*	TM083182	
Setaceous Hebrew Character	*Xestia*	*c-nigrum*	TM083182	
Shaded Broad	*Scotopteryx*	*chenopodiata*	TM083182	
Sharp-angled Peacock	*Macaria*	*alternata*	TM083182	
Short Cloaked Moth	*Nola*	*cucullatela*	TM083182	
Shoulder-striped Wainscot	*Leucania*	*comma*	TM083182	
Shuttle-shaped Dart	*Agrotis*	*puta puta*	TM083182	
Silver Y	*Autographa*	*gamma*	TM083182	
Single Dotted Wave	*Idaea*	*dimidiata*	TM083182	
Sloe Carpet	*Aleucis*	*distinctata*	TM083182	
Small Dusty Wave	*Idaea*	*seriata*	TM083182	
Small Elephant Hawk-moth	*Deilephila*	*porcellus*	TM083182	

Small Magpie	*Anania*	*hortulata*	TM083182	
Small Mottled Willow	*Spodoptera*	*exigua*	TM083182	
Small Waved Umber	*Horisme*	*vitalbata*	TM083182	
Splendid Brocade	*Lacanobia*	*oleracea*	TM083182	
Spruce Carpet	*Thera*	*brittanica*	TM083182	
Swallow-tailed Moth	*Ourapteryx*	*sambucaria*	TM083182	
Tawny Speckled Pug	*Eupithecia*	*icterata*	TM083182	
The Fern	*Horisme*	*tersata*	TM083182	
The Rustic	*Hoplodrina*	*blanda*	TM083182	
The Snout	*Hypena*	*proboscidalis*	TM083182	
Toadflax Pug	*Eupithecia*	*linariata*	TM083182	
Treble Line	*Charanyca*	*trigrammica*	TM083182	
Triple Spotted Clay	*Xestia*	*ditrapezium*	TM083182	
Triple Spotted Pug	*Eupithecia*	*trisignaria*	TM083182	
Turnip Moth	*Agrotis*	*segeturn*	TM083182	
Twenty-plume	*Alucita*	*hexadactyla*	TM083182	
Twin-spot Honey Moth	*Lamoria*	*zelleri*	TM083182	
Uncertain	*Hoplodrina*	*octogenaria*	TM083182	
Vine's Rustic	*Hoplodrina*	*ambigua*	TM083182	
Waved Umber ♂	*Menophra*	*abruptaria*	TM083182	
Wax Moth	*Hypochalcia*	*ahenella*	TM083182	
White Ermine	*Spilosoma*	*lubricipeda*	TM083182	
White Point	*Mythimna*	*albipuncta*	TM083182	
White Satin Moth	*Leucoma*	*salicis*	TM083182	
White-shouldered House-Moth	*Endrosis*	*sarcitrella*	TM083182	
White Spotted Pug	*Eupithecia*	*tripunctaria*	TM083182	
Willow Beauty (i)	*Peribatodes*	*rhomboidaria*	TM083182	
Willow Beauty (ii)	*Peribatodes*	*rhomboidaria*	TM083182	
Wormwood Pug	*Eupithecia*	*absinthiata*	TM083182	
Yellow-barred Long-horn	*Nemophora*	*degeerella*	TM083182	

Figure 9. Hummingbird Hawk-moth Macroglossum stellatarum and Box-tree Moth Cydalima perspectalis
Photos © Ed Thorn and © Tony Thorn resp.

Notes on Table 21.
1. Moths were trapped using a 40W Rigid Watkins and Doncaster moth trap, unavoidably situated near (but not within) an area with LED street lighting. Both LED and sodium street lighting are known to impact on moth numbers (Boyes *et al.* 2021). Species richness and abundance per night are mainly influenced by night temperature, humidity and lamp type according to Jonason *et al*. (2014). Moths were released to a safe environment after identification.
2. Small moths, especially the *Eupithecia* sp. (Pugs) are very difficult for a non-expert to identify unaided, not just because of their small size but also because there are colour variations within the species. Many look 'washed out' and lack defining patterns, whilst a few appear to show differences in the patterns between left and right wings. Wing position at rest may also be variable. This problem is partly overcome by using low powered microscopy and microphotography with focus stacking. Correct lighting is critical. The identifications above should therefore be treated with caution. Twenty-one *Eupithecia* sp. and one *Gymnoscelis* sp. were identified.
3. Moth data was collected during the months of April to July inclusive. Further sessions were conducted at the end of September including a short session at Springmead Gardens by another trapper. Only seven species were observed in the September main local trap and only six species at Springmead were observed.
4. Several species recorded in the original list were queried as possibly misidentified. Consequently they have been removed from the earlier table.

Table 22. Other Insects and Arachnids

Common name	Generic	Specific	Sample locations	
Azure Damselfly ♂	*Coenagrion*	*puella*	TM083182	
Banded Burdock Fly	*Terellia*	*tussilaginis*	TM078163	
Banded Demoiselle	*Calopteryx*	*splendens*	TM083182	
Beetle	*Ecnochrus*	*bicolor*	TM082164	
Oak Jewel/Common Malachite Beetle	*Agrilus*	*biguttatus*	TM077187	
Bishops Mitre Shieldbug	*Aelia*	*acuminata*	TM077187	
Black Garden Ant	*Lasius*	*niger*	TM083182	
Black-headed Cardinal Beetle	*Pyrochroa*	*coccinea*	TM083182	
Bluebottle (Blue-arsed fly)	*Protophormia*	*terraenovae*	TM083182	
Bluebottle	*Calliphora*	*vomitoria*	TM083182	
Bluebottle	*Calliphora*	*vicina*	TM083182	
Bramble Sawfly	*Arge*	*cyanocrocea*	TM081165	
Bright-spotted Groundbug	*Rhyparochromus*	*vulgaris*	TM084171	
Broad Centurian Soldierfly	*Chloromyia*	*formosa*	TM095166	
Bronze Shieldbug	*Troilus*	*luridus*	TM083182	
Buff Tailed Bumble Bee	*Bombus*	*terrestris*	TM084171	TM078169
Bug Forest (Red legged shield bug)	*Pentatoma*	*rufipes*	TM077187	TM077186
Bug	*Rhyparochromus*	*vulgaris*	TM084171	
Caddisfly	*Limnephilus*	*centralis*	TM083182	
Caddisfly	*Mystacides*	*longicornis*	TM083182	
Caddisfly	*Trichostegia*	*minor*	TM083182	
Caddisfly Land	*Enoicyla*	*pusilla*	TM076183	
Canada Thistle Gall Fly	*Urophora*	*cardui*	TM098168	
Carpet Beetle	*Anthrenus*	*verbasci*	TM083182	
Cinnamon Sedge	*Limnephilus*	*lunatus*	TM083182	
Cockchafer	*Melolontha*	*melonontha*	TM083182	

Common Blue Damselfly	*Enallagma*	*cyathigerum*	TM095166	
Common Centipede	*Lithobius*	*forficatus*	TM083182	
Common Darter	*Sympetrum*	*striolatum*	TM075167	
Common Earwig	*Forficula*	*auricularia*	TM083182	
Common Field Grasshopper	*Chorthippus*	*brunneus*	TM076163	TM074164
Common Froghopper	*Philaenus*	*spumarius*	TM078162	TM095168
Common Green Shieldbug	*Palomena*	*prasina*	TM082166 TM081165	TM095166 TM098168
Common House Fly	*Musca*	*domestica*	TM083182	
Common Nettle Bug	*Liocoris*	*tripustulatus*	TM076183	
Common Red Soldier Beetle	*Rhagonycha*	*fulva*	TM083182	
Common Social Wasp	*Vespula*	*vulgaris*	TM083182	TM082167
Crab Spider	*Misumena*	*vatia*	TM083182	
Cranefly♂	*Tipula*	*pagana*	TM083182	
Cranefly	*Tipula*	*oleracea*	TM083182	
Cranefly (Daddy Longlegs)	*Tipula*	*paludosa*	TM083182	
Daddy Longlegs Spider	*Pholcus*	*phalangioides*	TM083182	
Dark Bush Cricket	*Pholidoptera*	*griseoaptera*	TM095166	TM076186
Dark-edged Bee-fly	*Bombylius*	*major*	TM083182	
Delphacid Bug (Planthopper)	*Asiraca*	*clavicornis*	TM086181	TM095166
Devils Coachhorse	*Ocypus*	*olens*	TM083182	TM077186
Dock Bug	*Coreus*	*marginatus*	TM082167 TM094164	TM095166 TM098168
Elm Zig-zag Sawfly	*Aproceros*	*leucopoda*	TM076186	
Face Fly	*Musca*	*autumnalis*	TM078163	
Field Cuckoo Bee	*Bombus*	*campestris*	TM082167	TM077187
Firebug	*Pyrrhocoris*	*apterus*	TM077187	
Five Spot Ladybird	*Coccinella*	*quinquepunctata*	TM083182	TM086181
Flat-backed Millipede	*Polydesmus*	*angustus*	TM083182	
Flower Crab Spider	*Misumena*	*vatia*	TM083182	
Fly (No common name)	*Argyra*	*diaphana*	TM082166	
Fly (No common name)	*Exorista*	*larvarum*	TM083182	
Fly (No common name)	*Empis*	*digramma*	TM082167	
Fly (No common name)	*Palloptera*	*umbellatarum*	TM095168	
Fly (No common name)	*Eriothrix*	*rufomaculata*	TM078163	
Forest Bug (Red legged shield bug)	*Pentatoma*	*rufipes*	TM077187	TM077186
Forteen Spot Ladybird	*Propylea*	*quattuordecimpunctata*	TM095166 TM098168	TM094164
Fruit Fly	*Campiglossa*	*plantaginis*	TM095168	
Fruit Fly	*Drosophila*	Various Spp.	TM083182	
Fruit Fly	*Drosophila*	*obscura*	TM083182	
Garden Spider	*Araneus*	*diadematus*	TM080164	TM074164

Great Green Bush Cricket	*Tettigonia*	*viridissima*	TM082167	
Green Dock Beetle	*Gastrophysa*	*viridula*	TM095166	
Green Lacewing	*Chrysoperla*	*carnea*	TM083182	
Green Nettle Weevil	*Phyllobius*	*pomaceus*	TM088185	
Green Sawfly	*Rhogogaster*	*viridis*	TM077187	
Green Tortoise Beetle	*Cassida*	*viridis*	TM081165	
Greenbottle	*Lucilia*	*sericata*	TM083182	
Green-eyed Flower Bee	*Anthophora*	*bimaculata*	TM095168	
Greenfly	*Macrosiphum*	*rosae*	TM083182	
Grey-banded Mining Bee	*Andrena*	*deticulata*	TM076163	TM074164
Hairy Footed Flower Bee	*Anthophora*	*plumipes*	TM084171	
Harlequin Ladybird	*Harmonia*	*axyridis*	TM095166 TM098168	TM094164
Harlequin Ladybird (Larva)	*Harmonia*	*axyridis*	TM083182	
Harvestman	*Phalangium*	*opilio*	TM077187	
Hoglouse	*Asellus*	*aquaticus*	TM096167	
Honey Bee	*Apis*	*mellifera*	TM083182	
Hornet	*Vespa*	*crabro*	TM077187	
Hornet Mimic Hoverfly	*Volucella*	*zonaria*	TM083182	
House Spider	*Tegenaria*	Various Spp.	TM083182	
Hoverfly	*Syrphus*	*ribesii*	TM083182	
Ichneumon wasp.	*Netelia*	*testacea*	TM083182	
Issid Planthopper	*Issus*	*coleoptratus*	TM089185	
Jumping Spider	*Salticus*	*scenicus*	TM083182	
Hoverfly Tiger	*Helophilus*	*pendulus*	TM095166	TM098168
Land Caddisfly	*Enoicyla*	*pusilla*	TM076183	
Large Elm Bark Beetle	*Scolytus*	*scolytus*	TM077187 TM095166	TM094164
Large Red Damselfly	*Pyrrhosoma*	*nymphula*	TM083182	TM082164
Large Velvet Ant (*wasp*)	*Mutilla*	*europaea*	TM082167	TM081165
Leaf / Bronze Beetle	*Chrysolina*	*banksii*	TM081166	
Leaf Hopper	*Linnavuoriana*	*decempuncta*	TM095168	
Lesser House Fly	*Fannia*	*canicularis*	TM083182	
Lesser Marsh Grasshopper	*Chorthippus*	*albomarginatus*	TM076163	TM074164
Lesser Stag Beetle	*Dorcus*	*parallelipipedus*	TM083182	TM086168
Long Legged Fly	*Poecilobothrus*	*nobilatutus*	TM095166	
Long Legged Fly	*Argyra*	*diaphana*	TM081165	
Long-winged Conehead Cricket	*Conocephalus*	*discolor*	TM074164	
Malachite Beetle	*Malachius*	*bipustulatus*	TM098168	
Marmalade Hoverfly	*Episyrphus*	*balteatus*	TM077187	
Meadow Grasshopper	*Chorthippus*	*parallelus*	TM082167	TM074164

Midge ♀	*Chironomus*	*luridus*	TM083182	
White-legged Snake Millipede	*Tachypodoiulus*	*niger*	TM083182	
Mirid Bug	*Plagiognathus*	*arbustorum*	TM078163	
Mirid Bug	*Liparus*	*coronatus*	TM094164 TM095168	TM095166
Mite *On N. vespilliodes*	*Poecilochirus*	*carabi*	TM083182	
Mosquito	*Culiseta*	*annulata*	TM082164	TM096167
Mosquito	*Culex*	*pipiens*	TM082164	
Moss Carder Bee	*Bombus*	*muscorum*	TM084171	
Mouse Spider	*Scotophaeus*	*blackwalli*	TM083182	
Narcissus Fly	*Merodon*	*equestris*	TM077187	
Nursery-web Spider	*Pisaura*	*mirabilis*	TM082166	
Oak Bush Cricket	*Meconema*	*thalassinum*	TM082167	
Oak Gall Knopper Wasp	*Andricus*	*quercuscalicis*	TM084177	TM071187
Oak Jewel/Common Malachite Beetle	*Agrilus*	*biguttatus*	TM077187	
Oak Jumping Spider	*Ballus*	*chalybeius*	TM095166	
Ornate Shieldbug	*Eurydema*	*ornata*	TM077187	
Parent Bug	*Elasmucha*	*grisea*	TM082167	
Pea Leaf Weevil	*Sitona*	*Lineatus*	TM083182	
Plumehorn Hoverfly Wasp	*Volucella*	*inanis*	TM082167	
Purse-Web Spider	*Atypuss*	*affinis*	TM071168	
Red Bug	*Deraeocoris*	*ruber*	TM086181	
Red House Spider	*Nesticodes*	*rufipes*	TM083182	
Red-and-Black Froghopper	*Cercopis*	*vulnerata*	TM083182	
Red-headed Cardinal Beetle	*Pyrochroa*	*serraticornis*	TM095166	TM088185
Red Tip Bumble Bee	*Bombus*	*lapidarius*	TM077188	TM083181
Rhopalid Bug	*Chorosoma*	*schillingi*	TM095168	
Robberfly	*Machimus*	*atricapillus*	TM083182	
Striped Slender Robberfly	*Leptogaster*	*cylindrica*	TM095166 TM098168	TM099167
Roesel's Bush Cricket	*Roeseliana*	*roeselii*	TM095166	
Rufous-shouldered Longhorn Beetle	*Anaglyptus*	*mysticus*	TM089185	
Sailor/Soldier Beetle	*Cantharis*	*rustica*	TM086181	TM081165
Schilling's Rhopalid	*Chorosoma*	*schillingi*	TM098168	TM096167
Sawfly Bramble	*Arge*	*cyanocrocea*	TM081166	
Seven Spot Ladybird	*Coccinella*	*septempunctata*	TM081166 TM080164 TM098168	TM077186 TM081165
Sexton Beetle	*Nicrophorus*	*vespilliodes*	TM083182	
Short-winged Conehead Cricket	*Conocephalus*	*dorsalis*	TM082167	
Shore Sexton Beetle	*Necrodes*	*littoralis*	TM087183 TM092162	TM092162

Silver Stretch Spider	*Tetragnatha*	*montana*	TM081165	
Sixteen Spot Ladybird	*Tytthaspis*	*sedecimpunctata*	TM077187	
Soldier Beetle	*Tillus*	*elongatus*	TM095166	TM074164
Soldier Beetle	*Silis*	*ruficollis*	TM076563	
Southern Hawker	*Aeshna*	*cyanea*	TM075167	
Spear Thistle Lacebug	*Tingis*	*cardui*	TM095166	
Speckled Bush Cricket	*Leptophyes*	*punctatissima*	TM077187	
Spotted Cranefly	*Nephrotoma*	*appendiculata*	TM083182	
Square-headed Wasp	*Ectemnius*	*continuus*	TM083182	TM064175
Stretch/Orb-weaving Spider	*Tetragnatha*	*extensa*	TM081166	TM083182
Striped Slender Robberfly	*Leptogaster*	*cylindrica*	TM095166 TM098168	TM099167 TM094164
Swollen/Thick-thighed Beetle	*Oedemera*	*nobilis*	TM095166	TM077186
Tiger Hoverfly	*Helophilus*	*pendulus*	TM095166	TM098168
Twenty-two Spot Ladybird	*Psyllobora*	*vigintiduopunctata*	TM078163	
Varied Carpet Beetle	*Anthrenus*	*verbasci*	TM083182	
Viburnam Beetle	*Pyrrhalta*	*viburni*	TM083182	
Wasp Beetle	*Clytus*	*arietis*	TM095166	
Wasp Spider	*Argiope*	*bruennichi*	TM099170	TM095168
Wasp	*Netelia*	*testacea*	TM083182	
Wasp	*Vespula*	*vulgaris*	TM081165	
Weevil	*Cuculio*	*venosus*	TM095166	
Weevil	*Liparus*	*coronatus*	TM095166 TM099167	TM098168
White-legged Snake Millipede	*Tachypodoiulus*	*niger*	TM083182	
White Tail Bumble Bee	*Bombus*	*lucorum*	TM083182	
Willow Emerald Damselfly	*Chalcolestes*	*viridis*	TM077187	TM076186
Winter Cranefly	*Trichocera*	*annulata*	TM083182	
Winter Gnat	*Trichocera*	*annulata*	TM083182	
Wolf Spider	*Pardosa*	*amentata*	TM083182	
Woodlouse	*Oniscus*	*asellus*	TM083182	
Woundwort Shieldbug	*Eysarcoris*	*venustissimus*	TM082166 TM098168	TM095166
Yellow Meadow Ant	*Lasius*	*flavus*	TM095168	
Yellow-face(d) Bee	*Hylaeus*	*communis*	TM077187	
Yellow-legged Mining Bee	*Andrena*	*flavipes*	TM076183	
Zebra Spider	*Salticus*	*scenicus*	TM083182	
Zig-Zag Elm Sawfly	*Aproceros*	*leucopoda*	TM077187 TM076186	TM095166

Figure 10. Crab spider *Misumena vatia*
Photo © Ed Thorn Photography

Table 23. Freshwater Aquatic Insects, moliuscs and crustacea

Common name	Generic	Specific	Sample locations	
Cyclops*	*Cyclopoidea*	Spp.	TM096167	
Diving Beetle	*Colymbetes*	*fuscus*	TM083182 TM098168	TM096167 TM098168
Duck Mussel*	*Anodonta*	*anatina*	TM095175	
Great Diving Beetle	*Dytiscus*	*marginalis*	TM096167	
Great Pond Snail	*Lymnaea*	*stagnalis*	TM089167	
Great Ramshorn Snail	*Planorbarius*	corneus	TM089167	
Great Silver Water Beetle	*Hydrophilus*	*piceus*	TM083182	
Hoglouse	*Asellus*	*aquaticus*	TM096167	
Fairy Shrimps	*Anostraca*	Spp.	TM096167	TM075167
Lesser Water Boatman	*Corixa*	*punctata*	TM082164	
Mosquito Larvae*	*Culicidae*	Spp.	TM096167	
Ostracod*	Unidentified		TM096167	
Swan Mussel*	*Anodonta*	*cygnea*	TM089182	Shells only
Tubifex*	*Tubifex*	*tubifex*	TM096167	

** Location or species not clearly defined*

Figure 11. Swan mussel *Anodonta cygnea*. The shells of several large specimens were found in a dried up stream
Photo © Tony Thorn

Table 24. Terrestrial Molluscs

Common name	Generic	Specific	Sample locations	
Banded Snail (morph 1)	*Cepaea*	*nemoralis*	TM083182	
Brown Lipped Snail (morph 2)	*Cepaea*	*nemoralis*	TM083182	TM089167
Common Garden Slug	*Arion*	*distinctus*	TM083182	
Garden Snail	*Cornu*	*aspersum*	TM083182	TM089167
Girdled Snail	*Hygromia*	*cinctella*	TM089167	
Green Cellar Slug	*Limacus*	*maculatus*	TM089167	
Green-soled Slug	*Arion*	*flagellus*	TM089167	TM083182
Grey Field / Netted Field Slug	*Deroceras*	*reticulatum*	TM071187	TM089167
Large Black Slug	*Arion*	*ater*	TM089167	
Large Red Slug	*Arion*	*rufus*	TM080184	TM089167
Lapidary Snail	*Helicigona*	*lapicid*	TM082167	
Strawberry Snail	*Trichia*	*striolata*	TM086181	
White Lipped Snail	*Cepaea*	*hortensis*	TM083182	

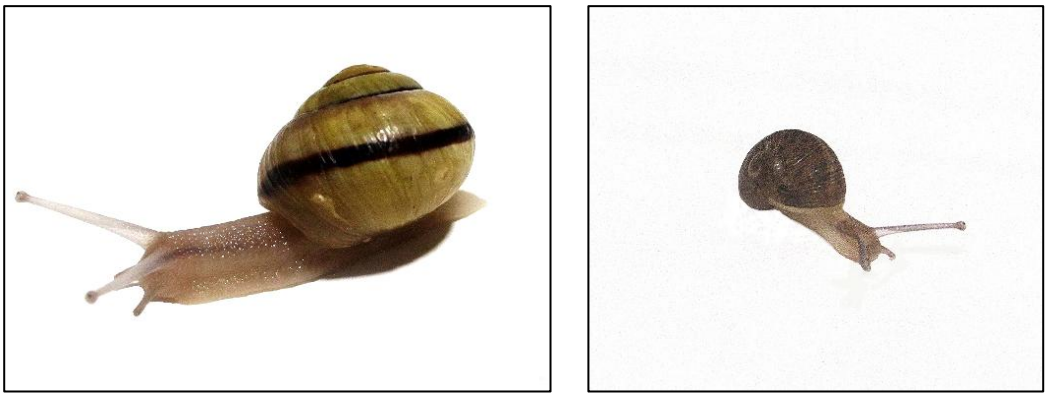


Figure 12. Adult and young Banded Snail *Cepaea nemoralis*. The species shows a wide shell pattern variation.
Photos © Tony Thorn

Table 25. Worms

Common name	Generic	Specific	Sample locations	
Brandling	*Eisenia*	*fetida*	TM083182	
Lob Worm	*Lumbricus*	*terrestris*	Common	
Planarian flatworm	*unidentified*		TM083182	
Redworm	*Lumbricus*	*rubellus*	Common	

Table 26. Freshwater Fish

Common name	Generic	Specific	Sample locations		
Bream	*Abramis*	*brama*	TM071187		
Common Carp	*Cyprinus*	*carpio*	TM071187	TM094174	TM099170
Eel	*Anguilla*	*anguilla*	TM082164		
Goldfish	*Carassius*	*auratus*	TM083182		
Gudgeon	*Gobio*	*gobio*	TM071187		

Perch	*Perca*	*fluviatilis*	TM071187		
Pike	*Esox*	*lucius*	TM071187	TM094174	TM099170
Roach	*Rutilus*	*rutilus*	TM071187		
Rudd	*Scardinius*	*erythrophthalmus*	TM071187	TM094174	TM099170
Stickleback 3 Spined	*Gasterosteus*	*aculeatus*	TM082164		
Tench	*Tinca*	*tinca*	TM094174		
Trout	*Salmo*	*trutta*	TM080168		
Wels catfish*	*Silurus*	*glanis*	TM094174		

Notes. 1. Information in the Table was obtained in respect of two of the pits shown in Table 5 and confirmed by officers of the relevant angling clubs using these waters. There were no responses to requests for data from the owners of other sites but the available data is considered representative.
2. Common carp (*Cyprinus carpio*) have been observed in Long Plantation Pit 1.
3. Goldfish (*Carassius auratus*) are locally common in garden and municipal ponds.
4. There are unverified reports that Grass Carp (*Ctenopharyngodon idella*) are now found in the reservoir at TM08011869 Brightlingsea Hall
5. *Although Wels Catfish (*Silurus glanis*) are reported to be present in this pit, I have no record of any being sighted or caught.

Table 27 Marine Shellfish

Common name	Generic	Specific	Sample locations	
Baltic Tellin	*Macoma*	*balthica*	TM076163	TM074164
Cockle	*Cerastoderma*	*edule/glaucum*	TM076163 TM100164	TM082164 TM074164
Common Limpet	*Patella*	*vulgata*	TM076163 TM100164	TM074164
Common Mussel	*Mytilus*	*edulis*	TM076163	TM074164
Common Whelk	*Buccinum*	*undatum*	TM076163 TM100164	TM074164
Dog Whelk	*Nucella*	*lapillus*	TM076163 TM100164	TM074164
Grey Topshell	*Steromphala*	*cineraria*	TM076163	
Hard Clam	*Mercenaria*	*mercenaria*	TM076163	
Larva Spire Snail	*Hydrobia*	*ulvae*	TM076163 TM100164	TM074164
Manila Clam	*Ruditapes*	*philippinarum*	TM076163	TM074164
Netted Dog Whelk	*Hinia*	*reticulata*	TM076163	TM074164
New Zealand Mud Snail	*Potamopyrgus*	*antipodarum*	TM076163	TM100164
Northern Quahog	*Mercenaria*	*mercenaria*	TM076163	TM074164
Oyster Native	*Ostrea*	*edulus*	TM076163 TM100164	TM074164
Oyster Pacific	*Crassostrea*	*gigus*	TM076163 TM100164	TM074164
Painted Topshell	*Calliostoma*	*zizyphinum*	TM076163 TM100164	TM074164
Peppery Furrow	*Scrobicularia*	*plana*	TM076163	TM074164
Periwinkle	*Littorina*	*littorea*	TM076163	TM074164
Periwinkle Flat	*Littorina*	*obtusata*	TM076163	TM074164
Sandgaper	*Mya*	*arenaria*	TM076163	TM074164
Slipper Limpet	*Crepidula*	*fornicata*	TM076163 TM100164	TM074164

Note. Essex Native Oyster Restoration Initiative (ENORI) advise that oysters are vulnerable to the boat anti-fouling toxin Tributyltin and the parasite *Bonamia ostreae*

Figure 13. Grey Topshell *Steromphala cineraria* and Hard Clam *Mercenaria mercenaria*
Photos © Tony Thorn

Table 28. Other marine species including mammals

Common name	Generic	Specific	Sample locations	
Blue Fire Jellyfish	*Cyanea*	*lamarckii*	TM076162	
Brown Shrimp	*Crangon*	*crangon*	TM082164	TM074164
Common Goby	*Pomatoschistus*	*minutus*	TM100164	
Common/Harbour Seal**	*Phoca*	*vitulina*	TM076161	
Common Prawn	*Palaemon*	*serratus*	TM076163	
European Eel	*Anguilla*	*anguilla*	TM082164	
Grey Seal*	*Halichoerus*	*grypus*	TM071168	TM074164
Green Shore Crab	*Carcinus*	*maenas*	TM076163	TM074164
Harbour Porpoise	*Phocoena*	*phocoena*	TM076161	TM074164
Isopod	*Idotea*	*baltica*	TM082164	TM074164
Lugworm	*Arenicola*	*marina*	TM076163	TM074164
Moon Jellyfish	*Aurelia*	*aurita*	TM076163	TM074164
Ragworm	*Hediste*	*diversicolor*	TM076163	TM100164
Nemertine Ribbon Worm	*Lineus*	*ruber*	TM082164	
Sea Slug (Royal Flush)*	*Akera*	*bullata*	TM074164	
Sea Spider	*Nyphon*	*gracile*	TM100164	
Sea Squirt	*Ascidiella*	*aspersa*	TM100164	
Skeleton/Ghost Shrimp	*Caprella*	*Linearis*	TM100164	
Star Ascidian	*Botryllus*	*schoserri*	TM100164	
Stickleback 3 Spined	*Gasterosteus*	*aculeatus*	TM082164	
Thornback Ray***	*Raja*	*clavata*	TM100164	
Winged Thecacera	*Thecacera*	*pennigera*	TM100164	

Notes

1.* Deceased sample 2022 **Also observed with binoculars *** Mermaids Purse

2. In May 2021 a pod of White-beaked Dolphins (*Lagenorhyncos albirostris*) was observed from a boat operating out of Mersea Island (Dobson 2021) but the precise location of the sighting is not recorded.

Table 29. Marine plants and algae

Common name	Generic	Specific	Sample locations	
Gutweed	*Enteromorphis*	*intestinalis*	TM100164	TM074164
Japanese Wireweed	*Sargassum*	*muticum*	TM076163	TM074164
Sea/Dwarf Eel Grass	*Zostera*	*noltei*	TM076161	TM074164
Sea Lettuce	*Ulva*	*lactuca*	TM100164	
Wrack Knotted	*Ascophyllum*	*nodosum*	TM074164	TM100164
Wrack Spiral	*Fucus*	*spiralis*	TM074164	TM100164

Table 30. Plants (including freshwater aquatic)

Common name	Generic	Specific	Sample locations		
Adam's Needle	*Yucca*	*flaccida*	TM084171		
African Lily	*Agapanthus*	*praecox*	TM084171		
Alexanders	*Smyrnium*	*olusatrum*	TM081166 TM085180 TM077187 TM079172 TM094166	TM083182 TM081165 TM077186 TM078163	TM074164 TM092162 TM072166 TM080164
Alice Eastwood's Fleabane	*Erigeron*	*alicea*	TM084171		
Alpine Wood Fern	*Dryoteris*	*wallichiana*	TM084171		
Alter Lily	*Zantedeschia*	*aethiopica*	TM084171		
Annual Mercury	*Mercurialis*	*annua*	TM071187		
Annual Sea-blite	*Suaeda*	*maratima*	TM086160		
Australian Swamp Stonewort	*Crassula*	*helmsii*	TM075167		
Autumn Hawkbit	*Leontodon*	*autumnalis*	TM078187	TM075167	
Autumn Sage	*Salvia*	*gregii*	TM084171		
Barleria	*Barleria*	*obtusa*	TM077187		
Barren Brome	*Bromus*	*sterilis*	TM077187		
Beaked Hawk's Beard	*Crepis*	*versicaria*	TM086181		
Bearded Iris	*Iris*	*pseudacarus*	TM097168	TM097168	
Beech Plum	*Prunus*	*maritima*	TM097167		
Belladona	*Atropia*	*Bella-dona*	TM097167		
Bilbao's Fleabane	*Erigeron*	*floribundus*	TM083182		
Birds'-foot-trefoil	*Lotus*	*cornicutatus*	TM077187	TM097168	TM097167
Biting Stonecrop	*Sedum*	*acre*	TM088169		
Bittersweet (Woody nightshade)	*Solanum*	*dulcamara*	TM078163 TM078163 TM092162	TM098168 TM097168 TM092162	TM094164 TM095166 TM096167
Black-eyed Susan	*Rudbeckia*	*hirta*	TM084171		
Blackthorn	*Prunus*	*spinosa*	TM083182	TM079172	
Black Horehound	*Ballota*	*nigra*	TM084177 TM092162	TM086181 TM095166	TM094166
Black Medic	*Medicago*	*lupulina*	TM086181	TM077186	

Black Nightshade	*Solanum*	*nigrum*	TM094174		
Blue Comfrey	*Viola*	*riviana*	TM096167		
Bluebell	*Hyacinthoides*	*non-scripta*	TM077187 TM084171 TM078163	TM075185 TM089182 TM078188	TM079177 TM082167
Bluebell Spanish	*Hyacinthoides*	*hispanica*	TM077187	TM078188	TM094166
Borage	*Borago*	*officinalis*	TM086181		
Bracken	*Pteridium*	*aquilinum*	TM095166	TM094166	
Brackish Water Crowfoot	*Ranunculus*	*baudotii*	TM075167		
Bramble (Blackberry)	*Rubus*	*fruticosus agg*	TM084177 TM071187 TM089185 TM087183 TM071187 TM094166 TM078163	TM077187 TM082167 TM095166 TM098168 TM060186 TM079172 TM080164	TM074164 TM083182 TM089167 TM097168 TM072166 TM078169
Bramble	*Rubus*	*echinatus*	TM089185	TM064176	TM094166
Bramble Elmleaf	*Rubus*	*umiffolius*	TM089185		
Bristly Oxtongue	*Helminthotheca*	*echioides*	TM077188 TM077186 TM086181 TM074164 TM064176	TM082167 TM063195 TM092162 TM095166 TM067172	TM077187 TM082167 TM096167 TM097168 TM071168
Broadleaved Dock	*Rumex*	*obtusifolius*	TM077187	TM094166	TM094166
Broadleaved Plantain	*Plantago*	*major*	TM077188	TM072166	
Broad-leaved Sedge	*Carex*	*siderostica*	TM097167		
Brown Bent	*Agrostis*	*vinealis*	TM097167		
Buck's Horn Plantain	*Plantago*	*coronopus*	TM081166	TM067172	TM071168
Buddleia (butterfly bush)	*Buddleja*	*davidii*	TM095168	TM094166	TM083182
Bugle	*Ajuga*	*reptans*	TM097168	TM084171	
Bugloss	*Anchusa*	*arvensis*	TM063195		
Bur Chervil	*Anthriscus*	*caucalis*	TM082166 TM071168	TM081165	TM067172
Burdock Greater	*Arctium*	*lappa*	TM077187	TM077186	TM080164
Burdock Lesser	*Arctium*	*minus*	TM086181 TM095166	TM098168	TM095167
Buttercup	*Ranunculus*	*polyanthemos*	TM097167		
Cabbage-palm	*Cordyline*	*australis*	TM083182	TM084171	
Californian Fescue	*Festuca*	*californica*	TM084171		
Californian Poppy	*Eschscholzia*	*californica*	TM077187		
Cat's-ear	*Hypochaeris*	*radicata*	TM077187	TM084171	
Cat-mint	*Nepeta*	*cataria*	TM084171		
Caucasian Barrenwort	*Epimedium*	*pinnatum*	TM084171		
Caucasian Cranesbill	*Geranium*	*renardii*	TM084171		
Caucasian Cumfrey	*Symphytum*	*caucasicum*	TM092162		
Celery-leaved Buttercup	*Ranunculus*	*scleratus*	TM075167		

Charlock	*Sinapis*	*arvensis*	TM086181	TM072166	
Chickweed	*Stellaria*	*media*	TM083182	TM079172	
Chicory	*Cichorium*	*intybus*	TM095166 TM098168	TM097168	TM083182
Chinese Holly	*Ilex*	*cornuta*	TM083182		
Chinese Mustard	*Brassica*	*juncea*	TM074164		
Cleavers (Goosegrass Stickywilly)	*Galium*	*aparine*	TM084177 TM063195 TM094166	TM072187 TM092162	TM077187 TM080164
Coastal Mugwort	*Artemisis*	*suksdorfii*	TM084171		
Cock's-foot	*Dactylis*	*glomerata*	TM077187 TM094166	TM095168	TM072166
Common Bird's-foot-trefoil	*Lotus*	*corniculatus*	TM097168	TM075167	
Common Blue Sow Thistle	*Cicerbita*	*macrophylla*	TM083182		
Common Centaury	*Centaurium*	*erythraea*	TM077188		
Common Comfrey	*Symphytum*	*officinale*	TM087183	TM086181	
Common Dog Violet	*Viola*	*riviniana*	TM084177 TM07718	TM097168 TM077187	TM096167
Common Duckweed	*Lemna*	*minor*	TM084171	TM089186	TM075167
Common Field-speedwell	*Veronica*	*persica*	TM086181	TM078187	
Common Fleabane	*Pulicaria*	*dysenterica*	TM098168		
Common Glasswort	*Salicornia*	*europaea*	TM092162	TM097167	
Common Ivy (bushes)	*Hedera*	*helix*	TM077187 TM097167 TM084171 TM078188	TM085180 TM092162 TN084177 TM094166	TM063195 TM077186 TM079172
Common Knapweed	*Centaurea*	*nigra*	TM077187	TM082167	
Common Mallow	*Malva*	*sylvestris*	TM094155 TM077186 TM082167 TM094166 TM071168 TM067172	TM094162 TM085180 TM089185 TM098166 TM064176 TM072166	TM074164 TM063195 TM099167 TM063195 TM094166
Common Milk Thistle	*Sonchus*	*oleraceus*	TM094166		
Common Mouse-ear	*Cerastium*	*fontanum*	TM075167		
Common Mullen	*Verbascum*	*thapsus*	TM084171		
Common Myrtle	*Myrtus*	*communis*	TM084171		
Common Orache	*Atriplex*	*patula*	TM063195		
Common Plantain	*Plantago*	*major*	TM086181	TM071168	
Common Ragwort	*Senecio*	*jacobaea*	TM094660 TM089185 TM082167 TM098168	TM077187 TM086181 TM094166 TM097167	TM063195 TM084171 TM078163
Common Sea Lavender	*Limonium*	*vulgare*	TM095166 TM092162	TM094162 TM098166	TM092162 TM074164
Common Sorrel	*Rumex*	*acetosa*	TM077187	TM092162	
Common Storksbill	*Erodium*	*cicutarium*	TM083166	TM081165	
Common Toadflax	*Linaria*	*vulgaris*	TM086181		

Common Vetch	*Vicia*	*sativa*	TM 086181 TM098166	TM077187	TM060186
Cornflower	*Contaurea*	*cyanus*	TM083182		
Cotton Thistle	*Onopordum*	*acanthium*	TM086181		
Cow Parsley	*Anthriscus*	*sylvestris*	TM084177 TM082167 TM094166 TM071168	TM077187 TM089185 TM067172 TM079172	TM074164 TM081165 TM064176 TM080164
Cranesbill	*Geranium*	*maculatum*	TM078187		
Creeping Bent	*Agrostis*	*stolonifera*	TM077187 TM075167	TM060186	TM071187
Creeping Buttercup	*Ranunculus*	*repens*	TM077187	TM074164	TM071168
Creeping Cinquefoil	*Potentilla*	*reptans*	TM077187	TM071168	
Creeping Lily Turf	*Liriope*	*spicata*	TM084171		
Creeping Thistle	*Cirsium*	*arvense*	TM097168 TM077186 TM071168	TM077187 TM063195 TM075167	TM074164 TM096167
Creeping Thyme	*Thymus*	*praecox*	TM084171		
Creeping Woodsorrel	*Oxalis*	*corniculata*	TM083182		
Crested Dog's Tail	*Cynosurus*	*cristatus*	TM075167		
Crimson River Lily	*Schizostylus*	*coccinea*	TM084171		
Crow Garlic / Wild Onion	*Allium*	*vineale*	TM095166	TM097168	TM092162
Crocus	*Crocus*	*vernus*	TM077187	TM082167	tM084172
Crow Garlic / Wild Onion	*Allium*	*vineale*	TM095166 TM092162	TM094162 TM097168	TM099167
Curled Dock	*Rumex*	*crispus*	TM071168	TM075167	
Cut-leaved Cranes-bill	*Geranium*	*dissectum*	TM077187	TM086181	
Cut-leaved Dead-nettle	*Lamium*	*hybridium*	TM094166		
Daffodil	*Narcisssu*	*pseudonarcissus*	TM084177 TM078169	TM077187	TM084171
Daisy	*Bellis*	*perennis*	TM077187 TM078163	TM077186 TM094166	TM082167
Dandelion	*Taraxacum*	*officinale*	TM077187 TM072166	TM071187 TM080164	TM071168 TM094166
Darnel	*Lolium*	*temulentum*	TM063195		
Didier's Tulip	*Tulipa*	*gesneriana*	TM077187		
Dittander	*Lepidium*	*latifolium*	TM082167		
Dog Rose	*Risa*	*canina*	TM077187	TM074164	TM063195
Doves-Foot Cranes-bill	*Geranium*	*molle*	TM077187		
Duke of Argyles Tea-plant	*Lycium*	*barbarum*	TM081165 TM098166	TM095166	TM099167
Dwarf Catmint	*Nepeta*	*racemosa*	TM084171		
Dwarf Mallow	*Malva*	*neglecta*	TM086181		
Dwarf Thistle	*Cirsium*	*acaule*	TM095168	TM074164	
Echium	*Echium*	*vulgare*	TM083182		
English Cinquefoil	*Potentilla*	*anglica*	TM067172		

Euphorbia	*Euphorbia*	*wulfenii*	TM084171		
Evergreen Clematis	*Clematis*	*armandii*	TM085180		
Evening Primrose	*Oenothera*	*biennis*	TM071190		
False Fox-Sedge	*Carex*	*otrubae*	TM095166 TM092162	TM094162 TM098166	TM099167 TM075167
Fan-leaved Water-crowfoot	*Ranunculus*	*circinatus*	TM078169		
Fat Hen	*Chenopodium*	*album*	TM087183	TM063195	
Fennel	*Forniculum*	*vulgare*	TM083182	TM072166	TM094166
Feverfew	*Tanacetum*	*parthenium*	TM097168		
Fiddle Dock	*Rumex*	*pulcher*	TM084171 TM064176	TM092162	TM067172
Field Bindweed	*Convolvulus*	*arvensis*	TM077187	TM082167	TM097167
Field Forget-me-not	*Myosotis*	*arvensis*	TM077187		
Field Scabious	*Knautia*	*arvensis*	TM081165		
Field Wood Rush	*Luzula*	*campestris*	TM077187		
Flaky Juniper	*Juniperus*	*squamata*	TM083182		
Fools Water Cress	*Helosciadium*	*nodiflorum*	TM092162		
Fortune's Spindle	*Euonymus*	*fortunei*	TM084171		
Foxglove	*Digitalis*	*purpurea*	TM077187	TM071187	TM084171
Fragrant Hellebore	*Helleborus*	*odorus*	TM084171		
Fraser's Photinia	*Photinia*	*fraseri*	TM078163		
French/Bull Mallow	*Malva*	*nicaeensis*	TM083182		
Gallant Soldier	*Galinsoga*	*parviflora*	TM087183		
Garden Cat-mint	*Nepeta*	*x faassenii*	TM084171		
Garden Chervil	*Anthriscus*	*cerefolium*	TM084167		
Garden Lavendar	*Lavandula*	*angistifolia*	TM084171	TM083182	TM084171
Garden Sisal	*Agave*	*vivipara*	TM084171		
Garden Speedwell	*Veronica*	*longifolia*	TM084171		
Garlic Mustard	*Alliaria*	*petiolata*	TM084177	TM078188	TM077187
Germander Speedwell	*Veronica*	*chamaedrys*	TM077187		
Giant Hogweed	*Heraceum*	*mantgazzianum*	TM097168		
Giant Montbretia	*Crocosmia*	*masoniorum*	TM083182		
Giant Rhubarb	*Gunnera*	*tinctoria*	TM084171		
Goat's Beard	*Tragapogon*	*pratensis*	TM077187		
Goat's-rue	*Galega*	*officinalis*	TM063195		
Gold Dust Dracaena	*Dracaena*	*surculose*	TM084171		
Golden Samphire	*Inula*	*crithmoides*	TM095166 TM099167 TM097167	TM094162 TM092162	TM077163 TM098166
Golden Saxifrage	*Chrysosplenium*	*americanum*	TM084171		
Good King Henry	*Chenopodium*	*bonus-henricus*	TM091180		
Gorse	*Ulex*	*europaeus*	TM081166 TM071187	TM060186 TM080164	TM063195

Grass-leaved Orach	*Atriplex*	*littoralis*	TM077163		
Grass Vetchling	*Lathyrus*	*nissolia*	TM095168		
Great Lettuce	*Lactuca*	*virosa*	TM071187		
Great Mullein	*Verbascum*	*thapsus*	TM071187		
Great Water Dock	*Rumex*	*hydrolapathum*	TM075167		
Great Willow Herb	*Epilobium*	*hirsutum*	TM098168 TM096167	TM097168 TM094166	TM071187
Greater Burdock	*Arctium*	*lappa*	TM077187	TM080164	
Greater Celandine	*Chelidonium*	*majus*	TM088165	TM094166	
Greater Plantain	*Plantago*	*major*	TM077187	TM077186	TM087183
Greater Sea-spurrey	*Sperularia*	*media*	TM094164	TM075167	
Greater Stitchwort	*Stellaria*	*holostea*	TM077187 TM094166	TM094165	TM079172
Greater Periwinkle	*Vinca*	*major*	TM071187		
Green Alkanet	*Pentaglottis*	*sempervirens*	TM097168 TM096167 TM078163	TM077187 TM087183 TM080164	TM084171 TM094166
Groundsel	*Senecio*	*vulgaris*	TM077187		
Ground Ivy	*Glechoma*	*hederacea*	TM 096167	TM077187	TM077186
Guelda Rose	*Viburnum*	*opulus*	TM082167		
Guernsey Lily	*Nerine*	*bowdenii*	TM084171		
Gunnera	*Gunnera*	*manicata*	TM084171		
Gypsophila	*Gypsophila*	*paniculata*	TM083182		
Gypsywort	*Lycopus*	*europaeus*	TM071187	TM075167	
Heavenly Bamboo	*Nandia*	*domestica*	TM083182		
Hairy Bindweed	*Calystegia*	*pulchra*	TM099167 TM095166	TM098166	TM088185
Hairy Buttercup	*Ranunculus*	*sardous*	TM099167	TM098166	
Hairy Chervil	*Chaerophyllum*	*hirsutum*	TM080164		
Hairy Tare	*Vicia*	*hirsuta*	TM086181		
Harebell	*Campanula*	*rotundifolia*	TM077187		
Hawksbeard	*Crepis*	*capillaris*	TM078187		
Heart-leaf Nettle	*Urtica*	*chamaedryoides*	TM084171		
Heart-leaved Bergenia	*Bergenia*	*cordiflolia*	TM084171		
Hedge Bedstraw	*Gallium*	*mollugo*	TM077187		
Hedge Bindweed	*Calystegia*	*sepium*	TM094660 TM098168	TM088185 TM097168	TM082167 TM097167
Hedge Mustard	*Sisymbrium*	*officinale*	TM098168	TM094162	TM099167
Hedge Woundwart	*Stachys*	*sylvatica*	TM060186 TM094166	TM071187	TM081165
Hemlock (Poison)	*Conium*	*maculatum*	TM083167 TM081165 TM072166 TM077186	TM078187 TM063195 TM092162 TM079172	TM074164 TM084171 TM086181 TM080164
Henbit Dead-nettle	*Lamium*	*amplexicaule*	TM077187	TM082167	

Herb Robert	*Geranium*	*robertianum*	TM098168	TM094166	
Heucheria	*Heucheria*	*micrantha*	TM083182		
Hoary Mustard	*Hirschfeldia*	*incana*	TM092162		
Hoary Willowherb	*Epilobium*	*parviflorum*	TM071187		
Holly	*Ilex*	*aquifolium*	TM083182 TM086181	TM063195	TM084171
Holly-leaved Barberry	*Barbaris*	*aquifolium*	TM084171		
Honesty	*Lunaria*	*annua*	TM098168		
Honeysuckle	*Lonicera*	*periclymenum*	TM084177	TM085180	TM094166
Hop	*Humulus*	*lupulus*	TM098168		
Hop Trefoil	*Trifolium*	*campestre*	TM077188	TM077186	
Hydrangea	*Hydrangea*	*macrophylla*	TM084171	TM083182	
Indian Pokeweed	*Phytolacca*	*acinosa*	TM098168	TM097167	
Indian Rhubarb	*Darmera*	*peltata*	TM084171		
Italian Lords and Ladies / Arum	*Arum*	*italicum*	TM084171 TM082167	TM077187	
Ivy Leaved Cyclamen	*Cyclamen*	*hederifolium*	TM077187	TM077188	
Ivy-leaved Pelagonium	*Pelagonium*	*peltatum*	TM084171		
Japanese Anemone	*Anemone*	*x hybrida*	TM084171		
Japanese Honeysuckle	*Lonicera*	*japonica*	TM084171		
Japanese Thimbleweed	*Anemone*	*hupehensis*	TM084171		
Jonquil	*Narcissus*	*jonquilla*	TM077187		
Kaffir Lily	*Schizostylis*	*coccinea*	TM084171		
Knotted Cranesbill	*Geranium*	*nodosum*	TM084171		
Ladies Bedstraw	*Gallium*	*verum*	TM077187	TM082167	
Large/Greater Bindweed	*Calystegia*	*silvatica*	TM091168 TM097168 TM080164	TM086181 TM097167	TM098168 TM094166
Laurestinus	*Viburnum*	*tinus*	TM083182		
Lavender-cotton	*Santolina*	*chamaecyparissus*	TM084171		
Least Lettuce	*Lactuca*	*saligna*	TM071190		
Lesser Calamint	*Calamintha*	*nepeta*	TM077187	TM078187	
Lesser Sea Spurrey	*Spergularia*	*marina*	TM081166	TM077163	
Lesser Stitchwort	*Stellaria*	*graminea*	TM077187		
Lesser Water-parsnip	*Berula*	*erecta*	TM092162		
Lords and Ladies	*Arum*	*maculatum*	TM084177 TM079172 TM077187	TM095168 TM078188	TM094166
Lucerne	*Medicago*	*satvia*	TM098168		
Lupin	*Lupinus*	*Sp.*	TM077187		
Mahonia	*Mahonia*	*aquifolium*	TM084171		
Mahonia Japanese	*Mahonia*	*japonica*	TM084171		
Many Seeded Goosefoot	*Chenopodium*	*polyspermum*	TM089185		

Mare's Tail	*Hippuris*	*vulgaris*	TM098168		
Marsh Ragwort	*Senecio*	*aquaticus*	TM098168		
Marram	*Ammophila*	*arenaria*	TM074164		
Marsh Samphire	*Salicornia*	*europaea*	TM077163	TM075185	
Marsh Woundwort	*Stachys*	*palustris*	TM098168	TM094162	
Meadow Buttercup	*Ranunculus*	*acris*	TM093166	TM071187	
Meadow Thistle	*Cirsium*	*dissectum*	TM071187		
Meadow Vetchling	*Lathyrus*	*pratensis*	TM071190		
Mediterranean Spurge	*Euphorbia*	*characias*	TM084171	TM079172	
Mediterranean Woundwort	*Stachys*	*cretia*	TM084171		
Mexican Orange Blossom	*Choisya*	*ternata*	TM083182		
Milk Thistle	*Silybum*	*marianum*	TM098168	TM094162	TM095166
Michaelmas Daisy	*Symphyotrichum*	*x salignum*	TM072166		
Morning Glory	*Convolvulus*	*arvesis*	TM094166		
Mouse-ear	*Cerastium*	*fontanum*	TM077187	TM071190	
Mugwort	*Artemisia*	*vulgaris*	TM097168 TM089185 TM094166	TM077186 TM086181	TM082167 TM096167
Nandina	*Nandina*	*domestica*	TM083182		
Narrow-leaf Plantain	*Plantago*	*lanceolata*	TM094166		
Nettle	*Urtica*	*urens*	TM070184 TM077187	TM077188 TM075167	TM096167 TM080164
Northern Hawks-beard	*Crepis*	*mollis*	TM074164		
Nipplewort	*Lapsana*	*communis*	TM077187		
Oakleaf Hydrangea	*Hydrangea*	*quercifolia*	TM084171		
Orange Daylily	*Hemerocallis*	*fulva*	TM084171		
Orleander	*Nerium*	*orleander*	TM083182		
Oxeye Daisy	*Leucanthemum*	*vulgare*	TM077187 TM094166	TM071187	TM095166
Pacific Blackberry	*Rubus*	*ursinus*	TM084171		
Pale Willowherb	*Epilobium*	*roseum*	TM095168		
Pellitory-of-the-wall	*Parietaria*	*judaica*	TM077188		
Pendulous Sedge	*Carex*	*pendula*	TM098168	TM097167	TM094166
Perforate St. Johns Wort	*Hypericum*	*perforatum*	TM082167		
Perriwinkle	*Vinca*	*major*	TM071187		
Persian Catmint	*Nepeta*	*racemosa*	TM084171		
Peruvian Lily	*Alstroemeria*	*aurea*	TM084171		
Pink Sorrel	*Oxalis*	*articulata*	TM077187	TM085168	TM078163
Pheasant's Eye Daffodill	*Narcissus*	*poeticus*	TM077187		
Pineapple Weed	*Matricaria*	*discoidea*	TM094166		
Pittosporum	*Pittosporaceae*		TM084171		

Poinsettia	*Euphorbia*	*pulcherrima*	Native of Mexico. An indoor plant.		
Poppy Californian	*Eschscholziz*	*californica*	TM077187		
Poppy Common/Field	*Papaver*	*rhoeas*	TM083182	TM077187	TM086181
Poppy Opium	*Papaver*	*somniferum*	TM077187	TM095166	
Pot Marigold	*Calendula*	*officinalis*	TM084171		
Prickly Lettuce	*Lactuca*	*Serriola*	TM086181	TM078188	TM077187
Prickly Ox Tongue	*Picris*	*echiodes*	TM097168		
Prickly Sowthistle	*Sonchus*	*asper*	TM077187		
Primrose	*Primula*	*vulgaris*	TM077187	TM084171	
Procumbent Yellow Sorrel	*Oxalis*	*corniculata*	TM083182		
Purple Milk Thistle	*Galactites*	*tomentosus*	TM084171		
Purple/Red Dead Nettle	*Lamium*	*purpureum*	TM077187 TM078163	TM084171	TM079172
Purple-stem Cat's tail	*Phleum*	*phleoides*	TM074164		
Purple Salsify	*Tragopogon*	*porrifolius*	TM084171	TM074164	
Pyramid(al) Orchid	*Anacamptis*	*pyramidalis*	TM098168 TM074164	TM092162 TM094164	
Ragged Robin	*Silene*	*Flos-cuculi*	TM077187		
Red Bartsia	*Odontites*	*vernus*	TM098168		
Red Campion	*Silene*	*dioica*	TM077187		
Red Clover	*Trifolium*	*pratense*	TM086181	TM063195	
Red Dead-nettle	*Lamium*	*purpureum*	TM077187 TM082167	TM077186	TM084171
Red Fescue	*Festuca*	*ruba*	TM077187		
Red Valerian	*Centranthis*	*ruba*	TM083182		
Redshank	*Persicaria*	*maculosa*	TM095168		
Rhododendron	*Rhododendron*	*ponticum*	TM083182		
Ribwort Plantain	*Plantago*	*lanceolata*	TM077187 TM083182 TM071168	TM098168 TM089167 TM072166	TM074164 TM096167
Rock Crane's-bill	*Geranium*	*macrorrhizum*	TM084171		
Rosebay Willowherb	*Chamerion*	*augustifolium*	TM098168		
Rosemary	*Rosmarinus*	*officinalis*	TM084171		
Rose French	*Rosa*	*gallica*	TM094166		
Rough Hawbit	*Leontodon*	*hispidus*	TM095168		
Rough Chervil	*Chaerophyllum*	*temulum*	TM074164		
Round-leaved Cranesbill	*Geranium*	*rotundifolium*	TM094166		
Sage /Salvia	*Salvia*	*officinalis*	TM084171		
Salsify	*Tragopogon*	*porrifolius*	TM098168 TM081165	TM081165 TM097168	TM084171
Samphire Golden	*Limbarda*	*crithmoides*	TM077163		
Samphire Marsh	*Salicornia*	*europaea*	TM075185		
Scarlet Pimpernel	*Anagallis*	*arvensis*	TM098168	TM071187	

Scentless Mayweed	*Tripleurospermum*	*inodorum*	TM080164		
Sea Arrowgrass	*Triglochin*	*maritima*	TM077163		
Sea Aster	*Aster*	*Tripolium*	TM098168 TM097167	TM094162	TM086160
Sea Beet	*Beta*	*vulgaris*	TM098168 TM092162	TM097168 TM074164	TM092162
Sea Bindweed	*Calystegia*	*soldamella*	TM082167		
Sea Buckthorn	*Hippophae*	*rhamnoides*	TM082167		
Sea Couch	*Elymuus*	*pungens*	TM072166		
Sea Lavender	*Limonium*	*vulgare*	TM098168 TM097167	TM094162	TM099167
Sea-milkwort	*Glaux*	*maritima*	TM077163		
Sea Purslane	*Halimione*	*portulacoides*	TM098168 TM063195 TM099167 TM097167	TM094162 TM092162	TM094164 TM098166
Sea Sandwort	*Honckenya*	*peploides*	TM078163	TM092162	TM092162
Sea Wormwood	*Seriphidium*	*maritmum*	TM098168 TM098166	TM067173 TM097167	TM099167 TM074164
Sheep's Sorrel	*Rumex*	*acetosella*	TM060186	TM071187	TM075167
Shepherd’s Purse	*Capsella*	*bursa-pastoris*	TM086181		
Shrubby Germander	*Teucrium*	*fruticans*	TM084171		
Shrubby Sea-blite	*Suaeda*	*vera*	TM098168 TM092162 TM067172	TM094162 TM098166 TM064176	TM097167 TM099167 TM071168
Silver Knapweed	*Centaurea*	*cineraria*	TM083182		
Slender Palm Lily	*Cordyline*	*stricta*	TM084171		
Slender Sweet-flag	*Acorus*	*gramineus*	TM084171		
Small Blue-convolvus	*Convolvus*	*siculus*	TM084171		
Small-flowered Cranesbill	*Geranium*	*pusillum*	TM083166	TM081165	
Smooth Hawks-beard	*Crepis*	*capillaris*	TM087183	TM077186	TM071168
Smooth Sow-thistle	*Sonchus*	*oleraceus*	TM077187 TM083182	TM094164	TM063195
Snakeshead Fritillary	*Fritillaria*	*meleagris*	TM084171		
Snapdragon	*Antirrhinum*	*majus*	TM063195		
Snow-in-summer	*Cerastium*	*tomentosum*	TM084171		
Snowberry	*Symphoricarpos*	*albus*	TM084171		
Snowdrop	*Galanthus*	*nivalis*	TM077187 TM084171	TM083877 TM084177	TM082167
Southern Marsh Orchid	*Dactylorhiza*	*praetissima*	TM077163		
Sowbread	*Cyclamen*	*hederifolium*	TM077187		
Soft Brome	*Bromus*	*hordeaceus*	TM077187	TM060186	TM071187
Spanish Brome	*Spartium*	*junceum*	TM071187		
Spear Thistle	*Cirsium*	*vulgare*	TM098168 TM086181 TM067172 TM078169	TM077187 TM092162 TM071168 TM075167	TM071187 TM097167 TM075167 TM078188

Spear-leaved Orache	*Atiplex*	*prostrata*	TM081166	TM063195	TM081165
Spiny Restharrow	*Ononis*	*spinosa*	TM075167		
Spotted Medic	*Medicago*	*arabica*	TM086181		
Springbeauty	*Claytonia*	*sibirica*	TM075185		
Square-stalked Willow Herb	*Epilobium*	*tetragonum*	TM077186		
Sticky Groundsel	*Scenecio*	*viscosus*	TM077187		
Stinging Nettle	*Urtica*	*dioica*	TM077187 TM071187 TM096167 TM071168 TM080164	TM097162 TM082167 TM067172 TM075167	TM063195 TM092162 TM079172 TM078169
Stinking Iris	*Iris*	*foetidissima*	TM098168 TM082167	TM097168 TM096167	TM084171
Stone Parsley	*Sison*	*amomum*	TM082167		
Strawberry Clover	*Trifolium*	*fragiferum*	TM075167	TM078163	
Subterranean Clover	*Trifolium*	*subterraneum*	TM083166	TM081165	
Sweet Briar	*Rosa*	*rubiginosa*	TM074164		
Sweet Cicerly	*Myrrhis*	*odorata*	TM084177		
Sweet Violet	*Viola*	*odorata*	TM083182		
Swiss Chard	*Beta*	*vulgaris*	TM063195 TM064176	TM097167 TM079172	TM067172
Tail Yarrow	*Achillea*	*X roseoalba*	TM094166		
Tall Flatsedge	*Cyperus*	*eragrotis*	TM083182		
Tall Fleabane	*Erigeron*	*annuas*	TM083182		
Tawhiwhi	*Pittosporum*	*tenuifolium*	TM084171		
Teasel	*Dipsacus*	*fullonum*	TM098168 TM082167	TM097168 TM094166	TM095168
Common Milk Thistle	*Sonchus*	*oleraceus*	TM094166		
Thorn-apple	*Datura*	*stramonium*	TM094162		
Three Cornered Leek	*Allium*	*triquetrun*	TM084177 TM079172	TM086196 TM078163	TM098168 TM080164
Thrift	*Armeria*	*maritima*	TM094164		
Timothy	*Phleum*	*pratense*	TM077187		
Tree Mallow	*Lavatera*	*maritima*	TM084177		
Trefoil Clover	*Trifolium*	*medium*	TM072166		
Various-leaved Fescue	*Festuca*	*heterophylla*	TM095168		
Verbena	*Verbena*	*x hybrid*	TM084171		
Volga Fescue	*Festuca*	*valesiaca*	TM084171		
Vipers-bugloss	*Hadena*	*irregularis*	TM074187		
Walter's Violet	*Viola*	*walteri*	TM084171		
Water-crowfoot	*Ranunculus*	*aquatilis*	TM061188	TM071187	
Water Lily (Red)	*Nymphoea sp.*	*(var. Sirius?)*	TM071187		
Water Lily (White)	*Nymphoea*	*alba*	TM083182	TM071187	
Water Lily (Yellow)	*Nuphar*	*lutea*	TM071187		

Water Plantain	*Alisma*	*plantago*	TM075167		
Water Starwort	*Callitriche*	*stagnali*	TM075167	TM078169	
Weld	*Reseda*	*luteola*	TM098168	TM077186	
White Angelica	*Angelica*	*sylvestris*	TM092162		
White Bryony	*Bryonia*	*dioica*	TM077187		
White Campion	*Siline*	*latifolia*	TM086181 TM194166	TM077187	TM077186
White Clover	*Trifolium*	*repens*	TM077187	TM071168	
White Comfrey	*Symphytum*	*orientate*	TM092162	TM097167	TM094166
White Dead-nettle	*Lamium*	*album*	TM077187 TM094166	TM078188	TM080164
White Melilot	*Melilotus*	*albus*	TM071187		
White Ramping Fumitory	*Fumaria*	*capreolata*	TM081166	TM082166	
Wild Candytuft	*Ibcris*	*amara*	TM086181		
Wild Cyclamen	*Cyclamen*	*hederifolium*	TM076187		
Wild Carrot	*Daucus*	*carota*	TM060186 TM097167	TM071187	TM082167
Wild Mignonette	*Reseda*	*lutea*	TM084177 TM077186	TM077188	TM077187
Wild Onion	*Allium*	*vineale*	TM098166		
Winter Jasmine	*Jasminum*	*nudiflorum*	TM084171	TN074164	
Wood Avens	*Geum*	*urbanum*	TM098168	TM086181	TM087183
Wood Dock	*Rumex*	*sanguineus*	TM077187		
Woody Nightshade	*Solanum*	*dulcamara*	TM096167	TM098168	
Yarrow/Common Yarrow	*Achilea*	*millefolium*	TM077187 TM082167 TM098166 TM071168 TM075167	TM097168 TM096167 TM063195 TM072166	TM063195 TM095166 TM067172 TM094166
Yellow Corydalis	*Pseudofumaria*	*lutea*	TM086167		
Yellow Flag Iris	*Iris*	*pseudacorus*	TM084171	TM071187	TM096167
Yellow Rattle	*Rhinanthus*	*minor*	TM077187		

Notes.
1. Many of these plants have multiple common names and synonyms.
2. Many are prefixed 'Common', which may not be in universal use. Check both options.
3. Gardens contain many non-native species and many will have spread into the wild.
4. Identification of plant species was aided by the online app. Pl@ntNet which was awarded an accuracy of 88.2 per cent in tests conducted by New Scientist.

Table 31. Garden Plants (including freshwater aquatic) in a private garden

Common name	Generic	Specific	Sample location (approximate)
African Marigold	*Tagetes*	*erecta*	TM08*16*
Argentinian Vervain	*Verbena*	*bonariensis*	TM08*16*
Aubretia	*Aubrieta*	*deltoidea*	TM08*16*
Bay	*Laurus*	*nobilis*	TM08*16*
Bearded Iris	*Iris*	*germanica*	TM08*16*

Blackcurrant	*Ribes*	*nigrum*	TM08*16*
Blackthorn	*Prunus*	*spinosa*	TM08*16*
Blue Passionflower	*Passiflora*	*caerulea*	TM08*16*
Blueberry	*Vaccinium*	*corymbosum*	TM08*16*
Bluebrush	*Ceanothus*	*thyrsiflorus*	TM08*16*
Bramble	*Rubus*	*fruticosus agg.*	TM08*16*
Brooklime	*Veronica*	*beccabunga*	TM08*16*
Bulbous Buttercup	*Ranunculus*	*bulbosus*	TM08*16*
Butterfly-bush (Buddleia)	*Buddleja*	*davidii*	TM08*16*
Castor-oil-plant	*Ricinus*	*communis*	TM08*16*
Chinese Lantern	*Physalis*	*alkekengi*	TM08*16*
Chives	*Allium*	*schoenoprasum*	TM08*16*
Columbine	*Aquilegia*	*vulgaris*	TM08*16*
Common Bird's-foot-trefoil	*Lotus*	*corniculatus*	TM08*16*
Common Duckweed	*Lemna*	*minor*	TM08*16*
Common Evening-primrose	*Oenothera*	*biennis*	TM08*16*
Common Dog-violet	*Viola*	*riviniana*	TM08*16*
Common Nettle	*Urtica*	*dioica*	TM08*16*
Common Poppy	*Papaver*	*rhoeas*	TM08*16*
Common Toadflax	*Linaria*	*vulgaris*	TM08*16*
Common Valerian	*Valeriana*	*officinalis*	TM08*16*
Common Water-starwort	*Callitriche*	*stagnalis*	TM08*16*
Corncockle	*Agrostemma*	*githago*	TM08*16*
Cornflower	*Centaurea*	*cyanus*	TM08*16*
Creeping-Jenny	*Lysimachia*	*nummularia*	TM08*16*
Daffodil	*Narcissus*	*pseudonarcissus*	TM08*16*
Daisy	*Bellis*	*perennis*	TM08*16*
Dandelion	*Taraxacum*	*officinale*	TM08*16*
Dogwood	*Cornus*	*sanguinea*	TM08*16*
Early Crocus	*Crocus*	*tommasinianus*	TM08*16*
Elder	*Sambucus*	*nigra*	TM08*16*
Fennel	*Foeniculum*	*vulgare*	TM08*16*
Fig	*Ficus*	*carica*	TM08*16*
Firethorn	*Pyracantha*	*coccinea*	TM08*16*
Flowering Currant	*Ribes*	*sanguineum*	TM08*16*
Foxglove	*Digitalis*	*purpurea*	TM08*16*
Frogbit	*Hydrocharis*	*morsus-ranae*	TM08*16*
Fuchsia	*Fuchsia*	*magellanica*	TM08*16*
Garden Lavender	*Lavandula*	*angustifolia*	TM08*16*
Garden Thyme	*Thymus*	*vulgaris*	TM08*16*

Germander Speedwell	*Veronica*	*chamaedrys*	TM08*16*
Gooseberry	*Ribes*	*uva-crispa*	TM08*16*
Granny's Bonnets	*Aquilegia*	*vulgaris*	TM08*16*
Grape-hyacinth	*Muscari*	*neglectum*	TM08*16*
Greater Celandine	*Chelidonium*	*majus*	TM08*16*
Green Alkanet	*Pentaglottis*	*sempervirens*	TM08*16*
Hare's-foot Clover	*Trifolium*	*arvense*	TM08*16*
Hazel	*Corylus*	*avellana*	TM08*16*
Himalayan Clematis	*Clematis*	*montana*	TM08*16*
Holly	*Ilex*	*aquifolium*	TM08*16*
Hollyhock	*Alcea*	*rosea*	TM08*16*
Honesty	*Lunaria*	*annua*	TM08*16*
Honeysuckle	*Lonicera*	*periclymenum*	TM08*16*
Hyacinth	*Hyacinthus*	*orientalis*	TM08*16*
Ivy	*Hedera*	*helix agg*	TM08*16*
Japanese Anemone	*Anemone*	*Hupehensis var.japonica*	TM08*16*
Japanese Lily	*Rohdea*	*japonica*	TM08*16*
Japanese Maple	*Acer*	*palmatum*	TM08*16*
Japanese Wisteria	*Wisteria*	*floribunda*	TM08*16*
Kerria	*Kerria*	*japonica*	TM08*16*
Lady Fern	*Athyrium*	*filix-femina*	TM08*16*
Lavender	*Lavandula*	*angustifolia*	TM08*16*
Lesser Celladine	*Ficaria*	*verna*	TM08*16*
Lesser Spearwort	*Ranunculus*	*flammula*	TM08*16*
Lesser Water-plantain	*Baldellia*	*ranunculoides*	TM08*16*
Lilac	*Syringa*	*vulgaris*	TM08*16*
Lily of the valley	*Convallaria*	*majalis*	TM08*16*
Lords and Ladies	*Arum*	*maculatum*	TM08*16*
Male-fern	*Dryopteris*	*filix-mas*	TM08*16*
Mallow / Common Mallow	*Larentia*	*clavaria*	TM08*16*
Marsh Marigold	*Caltha*	*palustris*	TM08*16*
Marsh St. John’s Wort	*Hypericum*	*virginicum*	TM08*16*
Old Man’s Beard	*Clematis*	*vitalba*	TM08*16*
Opium Poppy	*Papaver*	*somniferum*	TM08*16*
Oxeye Daisy	*Leucanthemum*	*vulgare*	TM08*16*
Poached Egg Plant	*Limnanthes*	*douglasii*	TM08*16*
Pond Water-starwort	*Callitriche*	*stagnalis*	TM08*16*
Primrose	*Primula*	*vulgaris*	TM08*16*
Purple Loosestrife	*Lythrum*	*salicaria*	TM08*16*
Purple Toadflax	*Linaria*	*purpurea*	TM08*16*

Purple-loosestrife	*Lythrum*	*salicaria*	TM08*16*
Pyrenean Lily	*Lilium*	*pyrenaicum*	TM08*16*
Raspberry	*Rubus*	*idaeus*	TM08*16*
Red Dead-nettle	*Lamium*	*purpureum*	TM08*16*
Rigid Hornwort	*Ceratophyllum*	*demersum*	TM08*16*
Rosemary	*Rosmarinus*	*officinalis*	TM08*16*
Sage	*Salvia*	*officinalis*	TM08*16*
Smooth Japanese-maple	*Acer*	*palmatum*	TM08*16*
Snapdragon	*Antirrhinum*	*majus*	TM08*16*
Snowdrop	*Galanthus*	*nivalis*	TM08*16*
Snow-in-summer	*Cerastium*	*tomentosum*	TM08*16*
Sowbread	*Cyclamen*	*hederifolium*	TM08*16*
Spanish Bluebell	*Hyacinthoides*	*hispanica*	TM08*16*
Spearmint	*Mentha*	*spicata*	TM08*16*
Spotted-laurel	*Aucuba*	*japonica*	TM08*16*
Stinking Iris	*Iris*	*foetidissima*	TM08*16*
Sweet Violet	*Viola*	*odorata*	TM08*16*
Sweet-William	*Dianthus*	*barbatus*	TM08*16*
Sword-leaved Rush	*Juncus*	*ensifolius*	TM08*16*
Sycamore	*Acer*	*pseudoplatanus*	TM08*16*
Tarragon	*Artemisia*	*dracunculus*	TM08*16*
Three-cornered Garlic	*Allium*	*triquetrum*	TM08*16*
Thrift	*Armeria*	*maritima*	TM08*16*
Tree-of-heaven	*Ailanthus*	*altissima*	TM08*16*
Wallflower	*Erysimum*	*cheiri*	TM08*16*
Water Forget-me-not	*Myosotis*	*scorpioides*	TM08*16*
Water-violet	*Hottonia*	*palustris*	TM08*16*
Welsh Poppy	*Meconopsis*	*cambrica*	TM08*16*
White Clover	*Trifolium*	*repens*	TM08*16*
White Dead-nettle	*Lamium*	*album*	TM08*16*
Wild Marjoram	*Origanum*	*vulgare*	TM08*16*
Wild Strawberry	*Fragaria*	*vesca*	TM08*16*
Winter Jasmine	*Jasminum*	*nudiflorum*	TM08*16*
Wood-sorrel	*Oxalis*	*acetosella*	TM08*16*
Yellow Archangel	*Lamiastrum*	*galeobdolon*	TM08*16*
Yellow Flag Iris	*Iris*	*pseudacorus*	TM08*16*

Notes.

1. Many of these plants have multiple common names and synonyms.
2. Plants from a single garden/location allow changes over time to be mapped.

Table 32. Trees and Shrubs

Common name	Generic	Specific	Sample locations		
Alder	*Alnus*	*glutinosa*	TM077188 TM084171	TM075185	TM071187
Almond Leaf Willow	*Salix*	*triandra*	TM078163		
Ash	*Fraxinus*	*excelsior*	TM077187 TM063195	TM079177 TM084171	TM092162
Ashleaf Maple	*Acer*	*Negundo*	TM084171		
Aspen	*Populus*	*tremula*	TM095166	TM077187	TM098168
Atlantic Cedar	*Cedrus*	*atlantica*	TM092162		
Bay (Leaf)	*Laurus*	*nobilis*	TM077187		
Bay Willow	*Salix*	*pentandra*	TM081767	TM082167	
Beech	*Fagus*	*sylvatica*	TM077187	TM094166	
Black Poplar	*Populus*	*nigra*	TM101169		
Blackthorn	*Prunus*	*spinosa*	TM077187 TM083182 TM060186 TM079172 TM094166	TM079177 TM063195 TM064176 TM078169	TM089185 TM082167 TM072166 TM080164
Buckthorn	*Rhamnus*	*cathartica*	TM082167		
Cherry Laurel	*Prunus*	*laurocerasus*	TM084171		
Cherry Plum	*Prunus*	*cerasifera*	TM083181	TM077186	
Chinese Juniper	*Juniperus*	*chinensis*	TM083182	TM084171	
Crab Apple	*Malus*	*sylvestris*	TM074164 TM080164	TM077186	TM078163
Crack Willow	*Salix*	*euxina*	TM074164 TM080164	TM071187	TM078163
Dappled Willow	*Salix*	*integra*	TM084171		
Dog-rose	*Rosa*	*canina*	TM077187	TM092162	
Dogwood	*Cornus*	*sanguinea*	TM089167	TM084171	
Eastern Red Cedar	*Juniperus*	*virginiana*	TM092162		
Elder	*Sambucus*	*nigra*	TM063195 TM080164	TM079177	TM076186
Elm	*Ulmus*	*procera*	TM084206 TM085180	TM077188 TM079177	TM094166
English/Pendunculate Oak	*Quercus*	*robur*	TM071187 TM095168 TM063195	TM077187 TM082167 TM086181	TM079177 TM087183 TM071168
Eucalyptus	*Eucalyptus*	*gunnii*	TM077188	TM075185	TM076186
Field Maple	*Acer*	*campestre*	TM077187	TM079177	TM082167
Goat/Pussy Willow	*Salix*	*caprea*	TM 089185	TM077187	TM07187
Hawthorn	*Crataegus*	*monogyna*	TM084177 TM074164 TM067172 TM078163	TM077187 TM082166 TM064176 TM080164	TM082167 TM081165 TM072166
Hazel	*Corylus*	*avellana*	TM084177 TM077186	TM071190 TM084171	TM063195
Holm Oak	*Quercus*	*ilex*	TM075185 TM064176	TM071187 TM071168	TM067172

Hornbeam	*Carpinus*	*betulus*	TM077187		
Horse Chestnut	*Aesculus*	*hippocastanum*	TM084177	TM077187	
Japanese Cherry	*Prunus*	*serrulata*	TM085180		
Juniper	*Juniprus*	*communis*	TM064176		
Leyland Cypress	*Cupressus*	*x leylandii*	TM080164		
Lime	*Tilia*	*x europaea*	TM077187		
Mongolian Dwarf Cherry	*Prunus*	*fruticosa*	TM084171		
Montery Pine	*Pinus*	*radiata*	TM084177		
Mountain Spruce (Xmas Tree)	*Pica*	*engelmannii*	TM084171		
Norway Maple	*Acer*	*platanoides*	TM084177	TM084171	
Purging Buckthorn	*Rhamnus*	*cathartica*	TM082167		
Poplar	*Populus*	*alba*	TM082167		
Purple Beach	*Fagus*	*sylvatica*	TM077187		
Rowan	*Sorbus*	*aucuparia*	TM083182	TM084171	
Salt Cedar	*Tamarix*	*ramosissima*	TM080164		
Scots Pine	*Pinus*	*sylvestris*	TM071190	TM080164	
Sessile Oak	*Quercus*	*petraea*	TM063195		
Silver Birch	*Betula*	*pendula*	TM083182 TM071187	TM077187 TM080164	TM082167
Small leaved Elm	*Ulmus*	*minor*	TM063195		
Spindle Tree	*Euonymus*	*europaeus*	n/k		
Spindle Evergreen	*Euonymus*		TM083182		
Swedish Whitebeam	*Sorbus*	*intermedia*	n/k		
Sweet Chestnut	*Castanea*	*sativa*	TM077187	TM071187	
Sycamore	*Acer*	*pseudoplatanus*	TM077187 TM071187	TM089182	TM086181
Tamarisk /Salt Cedar	*Tamarix*	*ramosissima*	TM081166 TM064176	TM082166 TM071168	TM074164 TM072166
Turkey Oak	*Quercus*	*cerris*	TM082167		
Weeping Willow	*Salix*	*babylonica*	TM096167	TM071187	TM087183
White Willow	*Salix*	*alba*	TM078163	TM080164	
Whitebeam	*Sorbus*	*aria*	TM077187		
Wild Cherry	*Prunus*	*avium*	TM077187 TM082167 TM080164	TM097168 TM077186	TM096167 TM078163
Yew	*Taxus*	*baccata*	TM077182	TM077187	TM076186

Table 33. Grasses, Sedges and Reeds

Common name	Generic	Specific	Sample locations		
Annual Meadow-grass	*Poa*	*annua*	TM083182		
Argentine Needle Grass	*Nassella*	*tenuissima*	TM084171		
Bearded Fescue	*Vulpia*	*ambigua*	TM088185	TM078187	
Branched Bur-reed	*Sparganium*	*erectum*	TM075167		

Bush Grass	*Calamagrostis*	*epigejos*	TM088185		
Chinese Silver-grass	*Miscanthus*	*sinensis*	TM084171		
Cock's-foot	*Dactylis*	*glomerata*	TM088185 TM079172	TM095168	TM084171
Common Bent Grass	*Agrostis*	*gigantea*	TM095167	TM095168	
Common Cord Grass	*Spartina*	*anglica*	TM060186 TM063195	TM071187 TM067172	TM072166 TM064176
Common Couch Grass	*Elymus*	*repens*	TM088185 TM063195 TM097167	TM060186 TM071187 TM075167	TM092162 TM060186
Common Reed	*Phragmites*	*communis*	TM089185 TM092162 TM072166	TM088185 TM063195 TM067172	TM096167 TM064176
Common Reed	*Phragmites*	*australis*	TM097168 TM063195	TM074164 TM063195	TM094166
Creeping Bent-grass	*Agrostis*	*stolonifera*	TM077187 TM095168	TM060186 TM075167	TM071187
Creeping Soft Grass	*Holcus*	*mollis*	TM095168		
Crested Dog's Tail	*Cynosurus*	*cristatus*	TM075167		
Curved Hard Grass	*Parapholis*	*incurva*	TM075167		
Divided Sedge	*Carex*	*divisa*	TM075167		
English Scurvygrass	*Cochlearia*	*anglica*	TM078169		
False Oat-grass	*Arrhenatherum*	*elatius*	TM077187	TM088185	
Fescue Red	*Festuca*	*rubra*	TM077187		
Fescue Tall	*Festuca*	*arundinacea*	TM088185		
Fountain Grass	*Cenchrus*	*alopecuroides*	TM084171		
Greater Pond Sedge	*Carex*	*riparia*	TM075167		
Greater Tussock Sedge	*Carex*	*paniculata*	TM078169		
Hairy Oat-grass	*Helictotrichon*	*pubescens*	TM088185	TM095167	TM095168
Hard Rush	*Juncus*	*inflexus*	TM060186 TM075167	TM077187 TM078169	TM071187
Heath-grass	*Danthonia*	*decumbens*	TM074164		
Italian Rye-grass	*Lolium*	*multiflorum*	TM088185	TM095167	TM095168
Lady's Bedstraw	*Galium*	*verum*	TM075167	TM078169	
Lesser Reedmace	*Typha*	*augustifolia*	TM075167		
Marsh Foxtail	*Alopecurus*	*geniculatus*	TM075167		
Meadow Barley	*Hordeum*	*marinum*	TM075167		
Meadow Fox-tail	*Alopecurus*	*pratensis*	TM077187	TM088185	
Narrow-leaved Meadow-grass	*Poa*	*angustifolia*	TM088185		
Meadow Oat Grass	*Avenula*	*pratensis*	TM094166		
New Zealand Hair Sedge	*Carex*	*comans*	TM084171		
Orchard Grass	*Dactylus*	*glomerata*	TM078163	TM080164	
Pendulus Sedge	*Carex*	*pendula*	TM095168	TM094166	

Perennial Ryegrass	*Lolium*	*perenne*	TM088185 TM094166	TM092162	TM075167
Purple Moor-grass	*Molinia*	*caerulea*	TM088185		
Purple Small-reed	*Calamagrostis*	*conescens*	TM088185		
Purple-stem Cat's Tail	*Phleum*	*phleoides*	TM074164		
Reed	*Phragmites*	*australis*	TM060186 TM078169	TM089185	TM071187
Reed Canary- grass	*Phalaris*	*arundinacea*	TM060186	TM071187	
Reedmace / Bulrush	*Typha*	*latifolia*	TM089185 TM082167	TM082167 TM094166	
Reed Grass	*Phalaris*	*arundinacea*	TM088185		
Reed Sweet-grass	*Glyceria*	*maxima*	TM074164	TM075167	
Rough Meadow-grass	*Poa*	*trivialis*	TM077187		
Round-head Club-rush	*Scirpoides*	*holoschoenus*	TM089185		
Saltmarsh Rush	*Juncus*	*geradi*	TM077163	TM075167	TM075167
Scandinavian Small-reed	*Calamagrostis*	*purpurea*	TM074164		
Sea Arrowgrass	*Triglochin*	*maritima*	TM077163		
Sea Barley	*Hordeum*	*marinum*	TM075167		
Sharp Rush	*Juncus*	*avutus*	TM078169		
Small Cat's-tail	*Phleum*	*bertolonii*	TM088185 TM095168	TM095167	
Small Cord-grass	*Spartina*	*maritimus*	TM072166		
Small-leaved Timothy Grass	*Phleum*	*bertolonii*	TM075167		
Soft Brome	*Bromus*	*hordeaceus*	TM077187		
Soft Rush	*Juncus*	*effusus*	TM089185	TM075167	
Squirrel-tail Fescue	*Vulpia*	*bromoides*	TM060186	TM071187	
Sweet-flag	*Acorus*	*calamus*	TM071187		
Timothy	*Phleum*	*pratense*	TM077187		
Various-leaved Fescue	*Festuca*	*heterophylla*	TM095168		
Velvet Bent	*Agrostis*	*canina*	TM095168		
Volga Fescue	*Festuca*	*valesiaca*	TM084171		
Wall Barley	*Hordeum*	*murinum*	TM077187 TM098166	TM088185 TM094166	TM099167
Wild Oat	*Avena*	*fatua*	TM088185		
Winter Wild Oat	*Avena*	*ludoviciana*	TM095168		
Wood Meadow-grass	*Poa*	*nemoralis*	TM063195		
Yellow Bristle Grass	*Setaria*	*pumila*	TM095168		
Yellow Oat-grass	*Trisetum*	*flavescens*	TM088185		
Yorkshire Fog	*Holcus*	*lanatus*	TM077187	TM063195	TM094166

Table 34. Mosses

Common name	Generic	Specific	Sample locations	
Green Shield-moss	*Buxbaumia*	*virdis*	TM080165	
Haircap Moss	*Polytrichum*	*commune*	TM083182	
Redshank	*Ceratodon*	*purpureus*	TM095167	
Silky Forklet	*Dicranella*	*heteromalla*	TM076183	
Wall Screw-moss	*Tortula*	*muralis*	TM081165	

Table 35. Lichens

Common name	Generic	Specific	Sample locations	
Black	*Caloplaqca*	*citrina*	Sea wall	
Black Shield	*Lecanora*	*atra*		
Candleflame	*Candelaria*	*concolor*	TM077188	
Chewing gum	*Lecanora*	*muralis*		
Lichen	*Amandinea*	*punctata*		
Lichen	*Lecanora*	*albescens*		
Lichen	*Lecanora*	*chlarotera*		
Sunburst	*Xanthoria*	*parietina*	TM077187 TM072166	TM077188 TM083182

Table 36. Ferns

Common name	Generic	Specific	Sample locations	
Hart's-tonge Fern	*Asplenium*	*sclopendrium*	TM084171	
Male Fern	*Dryopteris*	*filix-mas*	TM088185	TM084171
Shuttle(cock)/Ostrich Fern	*Matteuccia*	*struthiopteris*	TM084171	

Table 37. Galls

Common Name	Parasytic species of origin (Agent)		Sample locations	
Blister	*Albubo*	*candida*	TM097168	TM096167
Marble on Oak/ Oak Marble	*Andricus*	*kollari*	TM097168	
Oak knopper gall	*Andricus*	*quercuscalicis,*	TM098168	TM074164

Table 38. Fungi

Common Name	Generic	Specific	Sample locations	
Black Eyed Parasol	*Lepiota*	*atrodisca*	TM084177	
Blister (on brassica)	*Albugo*	*candida*	TM084177	
Blushing Bracket	*Daedaleopsis*	*confragosa*	TM084171	
Brittle Cinder	*Kretzschmaria*	*deusta*	TM084177	
Cushion Bracket	*Phellinus*	*pomaceus*	TM071187	
Dead Man's Fingers	*Xylaria*	*polymorpha*	TM082167.	
False Saffron Milkcap	*Lactarius*	*deterrimus*	TM098168	
Field Mushroom	*Agaricus*	*campestris*	TM098168	

Jelly Ear	*Auricularia*	*auricula-judae*	TM096167	
Magpie Inkcap	*Coprinopsis*	*picacea*	TM078188	
Pink Slime Mould	*Lycogala*	*epidendrum*	TM084177	
Sulphur Tuft Mushroom	*Hypholoma*	*fasciculare*	TM063195	TM084171
Tawny Funnel Cap	*Lepista*	*flaccida*	TM084177	
Tawny Grosette	*Amanita*	*fulva*	TM095168	
Puffball	*Lycoperdon*	*perlatum*	TM095168	
Wavey Caps	*Psilocybe*	*cyanescens*	TM084177	
White Slime Mould	*Mucilago*	*crustacea*	TM084177	
White Pored Chicken of the Woods	*Laetiporus*	*sulphureus*	TM094164	
Wine Coloured Agaricus	*Agaricus*	*subrutilescens*	TM084177	

Table 39. List of plants and animals of concern. (Extracted from Essex Local Nature Recovery Strategy)

Common name	Generic	Specific	Concern	Identified in Brightlingsea ?
Adder / Viper	*Vipera*	*berus*	3	N
Lapwing	*Vanellus*	*Vanellus*	6	Y
Marsh Tit	*Poecile*	*palustris*	6	N
Nightingale	*Luscinia*	*megarhynchos*	6	Y
Ringed Plover	*Charadrius*	*hiaticula*	6	Y
Swift	*Apus*	*apus*	3	Y
Turtle Dove*	*Streptopelia*	*turtur*	1	N
Digger Wasp	*Ectemnius*	*continuus*	?	Y
Distinguished Jumping Spider	*Attulus*	*distinguendus*	1	N
Fancy Legged Fly	*Campsicnemus*	*magius*	2	N
Fishers Esturine Moth	*Gortyna*	*borelii*	7	N
Four Banded Weevil Wasp	*Cerceris*	*quadricincta*	6	N
Glow Worm	*Lampyris*	*noctiluca*	6	N
Grizzled Skipper	*Pyrgus*	*malvae*	6	N
Heath Fritilary	*Melitaea*	*athalia*	3	N
Shrill Carder Bee	*Bombus*	*sylvarum*	9	N
Stag Beetle	*Lucanus*	*cervus*	4	Y
Yellow Loosestrife Bee	*Macropis*	*europaea*	6	N
Native Oyster	*Ostrea*	*edulis*	6	Y
Common Eel Grass	*Zostera*	*marina*	7	Y
Crested Cow Wheat	*Melampyrum*	*cristatum*	3	N
Green Winged Orchid	*Anacamptis*	*morio*	6	N
Least Lettuce	*Lactuca*	*saligna*	3	Y
Lesser Calamint	*Calamintha*	*nepeta*	8	Y
Sulphur Clover	*Trifolium*	*ochroleucon*	9	N
Hazel Dormouse	*Muscardinus*	*avellanarius*	6	N
Water Vole	*Arvicola*	*amphibius*	3	N
Western Barbastelle Bat	*Barbastella*	*barbastellus*	5	N
Western/European Hedgehog	*Erinaceus*	*europaeus*	6	Y

Key to Levels of concern

1. JNCC Critically endangered
2. IUCN Red line: endangered
3. JNCC Endangered
4. Rare
5. Vulnerable
6. Priority
7. Threatened
8. Nationally Scarce
9. Nationally Rare

The species listed in Table 39 are extracted from the list of 436 species of local significance published in the Essex LNRS. * Reports of a Turtle Dove *Streptopelia turtur* have not been confirmed to me by the observer.

Risk Analysis and Risk Assessments

Risk Analysis as a tool for nature recovery

Risk assessments are common in industry, although the objectives may be more aligned to operational benefits, including the need to retain reputation and gain the acceptance of local communities. Assessments of environmental and biological degradation, with the state of the planet as a priority and with no financial implications, are less common. In particular they are rarely compiled at the citizen science level. Within the BEBP, such assessments help to provide a sharper focus on the environments of the local sites examined but the process can be used on any site where there are concerns for environmental and biological stability and degradation .

In this document I make reference to nature recovery, nature enhancement and nature conservation as being three points on the same objective trident. The risks of detrimental change to environmental stability and of biological degradation and the need to mitigate those risks may broadly be applied to each. Whilst it could be argued that these risks are more aligned to maintaining the status quo than producing tangible improvements, conservation in the form of a protected environment can lead to enhanced biodiversity and recovery by natural processes. This is not the same as BNG which was mentioned earlier. BNG is applicable to developments such as the building of housing estates and is intended to ensure that habitats impacted by a development are left in a measurably better condition than before that development took place. The process is complex but involves an ecologist measuring the biodiversity value of the land and providing advice on the enhancement or habitat creation needed to provide a ten percent BNG, or in some locations such as Uttlesford, twenty percent BNG. This gain may be obtained on site or off site but if this is not possible the developer must buy the necessary statutory biodiversity credits from the government. Some further aspects of BNG are discussed in more detail later in then text

Created habitats must be maintained for thirty years under a legal agreement. This may involve the completion of a habitat management plan to improve biodiversity. Some developments are exempt, including minor works but also exempt currently are the high speed rail transport network, urgent crown developments and developments that are granted planning permission by a development order (including permitted development rights). However, from early 2024 mineral extraction sites must show BNG following restoration. I must stress that the law and Government policy may change any of the current measures taken to enhance biodiversity and the environment and their proposed time scales.

It is not just building development and mineral extraction that need to be considered. Any deliberate changes to the environment with the intention of enhancing biodiversity should be planned and should include risk assessments of the impact and consequences. As an example, the random planting of trees and hedges is popular, but the law of unintended consequences may apply in many cases and it must not be assumed that such planting is always a good thing. Any change to the environment impacts on the existing biodiversity and risk assessments of the consequences should be considered. Land that is not disturbed will eventually become naturalised, that is it will be subjected to the ecological process by which a species integrates into that environment. Effectively, those species that have the most opportunity and the greatest survival capacity will randomly gravitate to those areas without human intervention and over time a process of rewilding will occur where the land was previously managed .

According to the *Farmers Weekly* website one third of farm land is owned by the aristocracy, the remainder is owned by large corporations, tycoons and the public sector. Some land is owned by the Crown Estate, the Church of England Church Commissioners, and charities. Other land owners include local government, the Forestry Commission, the Ministry of Defence with 342,000 ha under the control of the Defence Infrastructure Organisation (DIO) (locally contracted to a company called Landmarc). DIO is responsible for maintaining local training areas such as Colchester's Friday Wood and nationally maintains and protects woodlands on the UK Defence Training Estate.

From these examples it will be seen that because most of the countryside is privately owned and maintained, it is not obviously governed by the statutory controls needed to aid nature recovery. On private property there is no compulsion to adhere to any recovery plan unless there is a legal or contractual obligation to do so and the owner's cooperation will be needed. Examples of where there is compulsion might include the after-care plans for mineral workings or for any new proposed building works that require ecological surveys before planning permission is granted. In any case, a risk assessment is only an indicator based on available information and the assessor's interpretation of that information. And with all aspects of nature recovery, the provision of information has no value if it is not used.

Although risk assessments are of limited immediate practical value where there is no voluntary or mandatory compliance with recommendations, they can inform the 'bigger picture', which may then prompt intervention. In particular, assessments of the risk of detrimental change can be used if proposals are made to change the use of an existing area of biological interest that is not already designated as such and therefore already protected. Changes of use may include the building of a recreational complex on a flooded gravel pit or the building of a new housing estate on a meadow. These are abrupt and obvious changes. Risk analysis may also be used to consider the potential impact of slower and less obvious detrimental changes over time from whatever cause.

Much of the following I have considered and in part extracted from an earlier paper on the use of risk analysis in citizen science projects (Thorn 2025). The overall risk is one of instability, potentially leading to detrimental change to the environment, and the impact of such change on the whole range of biodiversity that the environment supports. Natural change may include climate changes to weather and temperature and in particular in extreme changes. The impact of these extremes is likely to increase with time. In addition, there is the possibility of chemical pollution and physical change in the environment. At the heart of many of these factors is human activity.

A conventional basic risk assessment consists of several elements. I have used the following. but this may not be a universal methodology.

1. Define the hazard or risk within or to the system.
2. Estimate the probability or likelihood of the hazard or risk materialising as an event.
3. Assess the impact should the hazard or risk event materialise.
4. Identify existing constraints, controls and their adequacy. Note that controls may already mitigate risk.
5. Mitigate by introducing additional measures and controls to enhance any already in place.
5. Consider long term stability. Any single future event may impact on the strength and validity of the whole risk assessment.
6. Calculate a relative risk value, this being the product of the estimated values of probability and impact.

Grading the risks may provide the means of identifying or allocating priorities by

1. Ranking the calculated values of individual risks within a single site
2. Comparing the values of the rankings of individual risks between sites

Make a note of

1. Any endangered species or species of note or interest that make the site 'special'.
2. The main potential single event concern.

Then consider the potential for overall enhancement of the site i.e. can it be improved such that risks are reduced and positive enhancement occurs, possibly leading to an action plan. An identified risk may or may not already have effective controls in place but mitigation may add further controls or enhance existing controls.

In 2011, Defra and Cranfield University produced an explanatory document *Guidelines for Environmental Risk Assessment and Management. Green Leaves III* but I have not used it as a basis for risk assessment in this document. I have worked from first principles and used my own experiences of the process. Environmental risk assessments may be complex because of the many different scenarios that might arise, some of which may be unforeseen or unavoidable and therefor almost impossible to mitigate. Hence each risk assessment discussed in this document is a starting point that may need some form of modification when revisited. In fact some modification to the methodology is almost certain to be needed, in particular for the sections dealing with mitigation, constraints and controls. The headings in the risk assessments tables that appear later in the text are simplified for illustrative purposes and if each is dealt with as a separate study a more complex and comprehensive version will almost certainly be needed. Although thirteen sites have initially been selected for assessment this number may increase or a selected site may be rejected in favour of another where deemed beneficial.

Risk of instability through environmental and biological degradation

Risk analysis is the process by which risk assessments are conducted and made meaningful. Variations include Disaster Risk Reduction (DRR), an extension of the process that provides early warning of hazards, which I would term events, and which have an impact. Without additional resources, it would not be possible to risk-assess every site surveyed in the Brightlingsea area, but by doing so for a selection of sites it sets a pattern that could be applied to any other site where its use might be beneficial. Using this methodology, I am attempting to identify the probability of a detrimental event or hazard occurring, its consequences and how the impact of these events might be mitigated. (See earlier text relating to the risk of fire to hedges, fields and woodland). The main hazards identified are listed later in the text. Not all will apply to every site because obviously the characteristics of each site and hence the associated risks to the system will differ, although many sites have common characteristics. They are not listed in order of priority as the impact on each site may be variable and some sites will have unique risks, such as risks to bat habitats and, by extension, to the bats themselves. 'Risk' is usually a description of an adverse event e.g. the risk of the occurrence of distemper in foxes, whilst 'impact' describes its detremental magnitude should the risk materialise e.g. high, medium, or low. The following paragraph is a modified extract from my earlier 2025 paper *The use of risk analysis in citizen science projects* (Thorn, 2025).

To clarify my use of the term 'system', the relationships between the environment and the biodiversity that it contains is termed an environmental system and includes biotic and abiotic components that interact. Generally, a system could have several meanings. It may be a group of actions or events that come together to produce an outcome, or it may be populations of cohabiting plants and animals resident within the same environment. In some cases there may be symbiotic relationships. A stable system is one that is not subject to change either because there are no forces to cause disruption or these forces are absorbed by the system and stability is not affected. That is to say outcomes are predictable. Over time the individual systems within a biosystem tend to run in parallel such that the ecosystem is the sum of the individual systems. But one system may impact on another to cause instability, and instability is manifest in change. The diversification of form and the relationships of life over time may be grouped under the heading Systematics.

An event is an occurrence that impacts on the stability of a system and causes changes that may be minor and have little or no impact on stability or catastrophic to the point that the system is no longer viable. The event is the cause, impact is the effect. Although events in this text are generally hazardous events, for simplicity I will just call them events.

An ecological network is a system or unit with connected or internal subunits. Beneficial interactions within and between units and subunits may be disrupted by adverse events or by non-beneficial interactions. Nature is subjected to many pressures, including human induced external pressures, which tend to impact the stability and ultimately the viability of networks and systems. Effectively, nature and many of the systems that it contains are in a state of flux in an ongoing evolutionary struggle for stability against the impact of adverse events. The effective management of ecosystems and the biodiversity they contain should reduce the risk of instability that occurs through environmental and/or biological degradation. The risk assessment methodology provides a tool to aid management of this objective.

Events manifest at a particular site may include most or all of the following or derivatives thereof.

1. Dumping of rubbish. Commercial;
2. Dumping of rubbish. Public
3. General contamination and pollution of land
4. General contamination and pollution of water body
5. Excessive air temperature
6. Excessive water temperature
7. Drought impacting land body
8. Drought impacting water body
9. Cyclic drying out of water body
10. Reduced oxygen levels in water body
11. Adverse algal growth e.g. *Anabaena* sp.
12. Fire
13. Vandalism
14. Detrimental disturbance of plants
15. Detrimental disturbance of animals
16. Detrimental disturbance of nesting birds
17. Diseases of plants and animals
18. Adverse impact caused by presence of dogs

19. Invasive species
20. Pests (A pest is any organism harmful to humans or human concerns)
21. Industrialisation and new build
22. Lack of maintenance
23. General habitat loss

These events will not necessarily correspond with the numbers shown in the risk assessment sheets, neither will every risk be applicable to every site. Many will be site specific and there may be some in addition to those listed. Dumping of rubbish may be on a commercial scale involving many hundreds of tonnes with knock-on impacts such as contamination and pollution. The assessment will include notes and comments on the overall risk, details of any endangered species, a site score and overall risk rating with potential for enhancement where applicable.

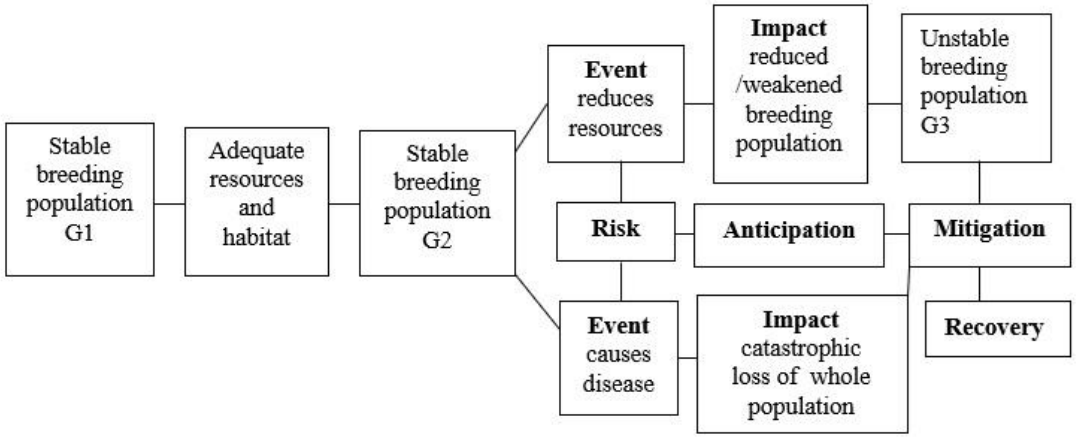


Figure 14. Much simplified illustration of stability, risk, event and impact.

Figure 14 illustrates a hypothetical system, in this case a rabbit population. The system is initially stable as there are no adverse forces acting against equilibrium. The estimated risk of an adverse event is then materialised as two concurrent events. The first event is a loss of resources due to environmental degradation, which weakens individuals and reduces resistance to disease. The second is a population-wide infection of myxomatosis, a disease caused by the myxoma virus. There is a rapid reduction in the population size at best or loss of the whole population at worse. When a risk is identified, mitigation would seek to (i) reduce the risk of the events occurring by anticipating the event and/or (ii) reduce the adverse impact. The objective then is to regain stability by a nature recovery programme. Anticipation may allow prevention of the event or an enhanced mitigation of its effects, but each would rely on the early identification of the relevant indicators - and this may not be possible.
Figure 14 is much simplified in that it does not include reference to the likelihood or probability of an event actually occurring, which is an additional dimension that is expanded in the following text.

		Impact		
	Risk Score	L	M	H
Probability	L	1	2	3
	M	2	4	6
	H	3	6	9

Figure 15. Probability and impact risk matrix

In the sample risk assessments that are shown later, the matrix shown in Figure 15 is used.
Risk (R) = Probability (P) x Impact (I)
Values for R are calculated as Low = (1 x 1) = 1, Medium = (2 x 2) = 4 and High (3 x 3) = 9.
The score for the whole site is the mean of all such scores rounded to the closest of the H, M and L boundaries e.g. a mean score of 6.4 is just closer to 4 than to 9 so the site rating is Medium.

Mitigation is an important consideration at this stage but in some cases it may not be possible because it assumes the ability to influence or control. Often there are no controls for certain events, for example where a pond is at high risk of drying out due to drought, or trees losing leaves in a so-called false autumn. In these cases, a High rating will still be allocated but meaningful recommendations could not be given. This simple approach avoids complications such as uncertainty and fuzziness that would add little to the assessments. In other cases there may already be existing controls in place. Mitigation would include a strengthening of these controls and/or the addition of further controls.

Impact may cause confusion where an event is unlikely and is therefore rated Low. Impact is scored on the 'what if' basis of the result actually happening. For example the probability of an event such as a giant hailstone crashing through your roof is Low (rated as 1) but the impact should it ever happen is high (rated as 3). If there is no potential impact, then there is no risk, and if there is no risk no event can be recorded.

It is a hoped that by examining the risks associated with all sites, any common detrimental environmental events and common causations can also be identified and considered for mitigation.
From the more than 80 sites surveyed, I conducted risk assessments on a sample as listed below.
The selected sites are:

1. All Saints Church and nearby area. This includes the churchyard and adjacent verges and woodland.
2. Manor Wood (School Copse) at the junction of Batemans Road and Church Road.
3. Mill Street Pond
4. Field above Mill Street Pond, and 'the Lagoon'
5. Hurst Green, and Mill Street to East End Green
6. Gravel Field
7. Gravel Pits (Flooded Quarries)
8. Springmead Garden
9. The Coastline. Various locations including sea wall, beach and borrow dykes.
10. Brightlingsea Boating Lake
11. The Lozenge Nature Area
12. Morses Lane and Morses Farm area. Grassland, wood and public footpath
13. Drain at end of Morses Lane on Boundary of Brightlingsea District

It will be a given that site surveys precede the risk assessments and the results of these surveys are recorded within the general text. Within the preamble text leading to the specific assessments listed above, it has been necessary to include subheadings, where for example there have been multiple surveys for sites along a particular coastline. I have dealt with coast lines as a single composite geographical risk area that is as one assessment within the thirteen selected sites Generally, an eight figure National Grid reference is used for identification. An indication of the risk level allocated for each site is given in its associated risk assessment table. These are provisional assessments that may change over time with increasing data. It is also hoped to increase the number of risk assessments to cover more of the surveyed sites, possibly as a supplement to this document. The reader is welcome to dispute any of the assessments or add to those already held. This will be a welcome test of the methodology but it is unlikely that any two assessors will arrive at identical results since opinions will vary. This may happen even on a review of a reassessment by the same assessor if circumstances change. The main thing is for different sites to be assessed by the same person to ensure consistency of application when making comparisons.

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1. All Saints Churchyard and nearby area centred on TM07701871
The nearby wooded area consists of trees of mixed species but is notable for its large Eucalyptus trees believed to be *Eucalyptus gunii*. Brightlingsea has several Eucalyptus trees and at least one is also reported to be in Brightlingsea Churchyard. These are said to date back to 1887. Kestrels nest in the church tower.
The wall to the churchyard is the boundary of the grass verge and a small triangular grassed area formed by the intersection of the roads contains a boat planter maintained by the local 'Brightlingsea in Bloom' volunteer group. Data from the results of three separate major surveys and one specific survey are recorded here. The main survey was conducted by an environmental consultancy (Greenlight Environmental Consultancy for J. M. Environmental) who gave written permission for use of their data. The next was a walkover scoping survey by the author on 7 February 2022. This was followed by a survey of the main verge and grassed triangular verge by a local nature group on 5 July 2022 to assess the impact of mowing by comparison of mown to non-mown grass inhabitants. A survey for the rare Lesser Calamint (*Calamintha nepeta*) was conducted by members of the British Naturalists' Association including myself on 16 September 2023. The church is host to several bat species and the results of a survey of bats inhabiting the church, conducted by Essex Bat Group, is included. During the survey of 16 September 2023 large amounts of droppings were observed indication a thriving bat population. There have

been several sightings of Stoat (*Mustela erminea*) near the church. Permission to survey was given by the Activities Coordinator of All Saints Church and permission to use data given by J.M. Environmental (East Anglia) Ltd.

(A) Plant and Tree Survey 24 June 2021

Smith (2021) of Greenlight Environmental Consultancy conducted a botanical survey of the All Saints area for J. M. Environmental on 24 June 2021 with the resulting report dated 12 August 2021. A comprehensive list of plants and animals identified at this site is contained in their report. The data extracted from their report is listed below with their permission.

All Saints Churchyard TM07701871 (Smith 2021)

Plants

1. Barren Brome *Bromus sterilis* syn. *Anisantha sterilis*
2. Bluebell *Hyacinthoides non-scripta*
3. Bramble Rubus *fruticosus agg*.
4. Bristly Oxtongue *Helminthotheca echioides*
5. Broad Leaved Dock *Rumex obtusifolius*
6. California Poppy *Eschscholzia californica*
7. Cat's-ear *Hypochaeris radicata*
8. Cider Gum *Eucalyptus gunii*
9. Cleavers *Galium aparine*
10. Cock's-foot *Dactylis glomerata*
11. Common Birds-foot Trefoil *Lotus corniculatus*
12. Common Ivy *Hedera helix*
13. Common Knapweed *Centaurea nigra*
14. Common Mouse-ear *Cerastium fontanum*
15. Common Nettle *Urtica doica*
16. Common Ragwort *Senecio jacobae*
17. Common Sorrel *Rumex acetosa*
18. Common Vetch *Vicia sativa*
19. Cow Parsley *Anthriscus sylvestris*
20. Creeping Bent *Agrostis stolonifera*
21. Creeping Buttercup *Ranunculus repens*
22. Creeping Cinquefoil *Potentilla reptans*
23. Creeping Thistle *Cirsium arvense*
24. Cut Leaved Crane's Bill *Geranium dissectum*
25. Daffodil *Narcissus pseudonarcissus*
26. Daisy *Bellis perennis*
27. Dandelion *Taraxacum agg. Sp.*
28. Dog Rose *Rosa canina*
29. Dove's-foot Crane's-bill *Geranium molle*
30. Evergreen Oak *Quercus ilex*
31. False Oat Grass *Arrhenatherum elatius*
32. Field Bindweed *Convolvulus arvensis*
33. Field Forget-me-not *Myosotis arvensis*
34. Field Wood Rush *Luzula campestris*
35. Foxglove *Digitalis purpurea*
36. Garden Lupin *Lupinus polyphyllus*
37. Germander Speedwell *Veronica chamaedrys*
38. Goat's-beard *Tragopogon pratensis*
39. Greater Burdock *Arctium lappa*
40. Greater Plantain *Plantago major*
41. Greater Stitchwort *Rabelera holostea*
42. Green Alkanet *Pentaglottis sempervirens*
43. Ground Ivy *Glechoma hederacea*
44. Hard Rush *Juncus inflexus*
45. Harebell *Campanula rotundifolia*
46. Hawthorn *Crataegus monogyna*
47. Hedge Bedstraw *Galium mollugo*
48. Henbit Dead-nettle *Lamium amplexicaule*

49. Ladies Bedstraw *Galium verum*
50. Lesser Calamint *Clinopodium nepeta* (syn. *Calamintha nepeta*)
51. Lesser Stitchwort *Stellaria graminea*
52. Meadow Foxtail *Alopecurus pratensis*
53. Mouse Ear *Cerastium fontanum*
54. Nipplewort *Lapsana communis*
55. Opium Poppy *Papaver somniferum*
56. Oxeye Daisy *Leucanthemum vulgare*
57. Pink Sorrel *Oxalis articulata*
58. Prickly Sowthistle *Sonchus asper*
59. Primrose *Primula vulgaris*
60. Ragged Robin *Silene flos-cuculi*
61. Red Campion *Silene dioica*
62. Red Dead-nettle *Lamium purpureum*
63. Red Fescue *Festuca rubra*
64. Ribwort Plantain *Plantago lanceolata*
65. Rough Meadow Grass *Poa trivialis*
66. Smooth Sowthistle *Sonchus oleraceus*
67. Snowdrop *Galanthus sp.*
68. Soft Brome *Bromus hordeaceus*
69. Sowbread *Cyclamen hederifolium*
70. Spear Thistle *Cirsium vulgare*
71. Sticky Groundsel *Senecio viscosus*
72. Timothy *Phleum pratense*
73. Wall Barley *Hordeum murinum*
74. White Bryony *Bryonia alba*
75. White Campion *Silene latifolia*
76. White Clover *Trifolium repens*
77. White Dead-nettle *Lamium album*
78. Wild Mignonette *Reseda lutea*
79. Wood Dock *Rumex sanguineus*
80. Yarrow *Achillea millefolium*
81. Yellow Rattle *Rhinanthus minor*
82. Yorkshire Fog *Holcus lanatus*

Trees

1. Alder *Alnus glutinosa*
2. Ash *Fraxinus excelsior*
3. Aspen *Populus tremula*
4. Blackthorn *Prunus spinosa*
5. Field Maple *Acer campestre*
6. Horse Chestnut *Aesculus hippocastanum*
7. Lime *Tilia x europaea*
8. Hawthorn *Crataegus monogyna*
9. Oak *Quercus robur*
10. Purple Beech *Fagus sylvatica*
11. Purpurea, plum and cherry *Prunus sp*.
12. Silver Birch *Betula pendula*
13. Sweet Chestnut *Castanea sativa*
14. Sycamore *Acer pseudoplatanus*
15. Whitebeam *Sorbus aria*
16. Yew *Taxus baccata*

Animals in Church **TM07721873**

1. Bat Soprano Pipistrelle *Pipistrellus pygmaeus* (this is the dominant species)
2. Bat Common Pipistrelle *Pipistrellus pipistrellus*

Data on bat species is supplemented with data from an Essex Bat Group survey by Wiltshire *et al.* (2019)

1. Bat Natterer's *Myotis nattereri*
2. Bat Noctule *Nyctalus noctula*
3. Bat Brown *Long-eared Plecotus auritus*

(B) Combined data from a visit in September 2021 and walkover surveys of 7 February 2022, 6 April 2024 and 27 April 2025. (Thorn and Thorn 2021 to 2025)

The September 2021 survey of the churchyard was conducted prior to the regular mowing of the churchyard, the reason for which is self-explanatory. The data was obtained from walkover surveys of the general area, including a stretch of the wooded area along Moverons Lane viewed partly from the road, and the field beyond. Also included was a stretch of the nearby cycle path part of which follows the road to Thorrington. It includes some data from reliable blogs.

(i) Moveron's Lane near Churchyard TM07641856

Animals

1. Dark Bush Cricket *Pholidoptera griseoaptera*
2. Devil's Coach-horse *Staphylinus olens*
3. Elm Zig Zag Sawfly *Aproceros leucopoda*
4. Grey Dagger *Acronicta psi*
5. Jay *Garrulus glandarius*
6. Mistle Thrush *Turdus viscivorus*
7. Red Admiral *Vanessa atalanta*
8. Redwing *Turdus iliacus*
9. Stoat *Mustela erminea*
10. Willow Emerald/Green Emerald Damselfly *Chalcolestes viridis*

Plants

1. Cider Gum/Eucalyptus *Eucalyptus gunnii*
2. Elder *Sambucus nigra*
3. Yew *Taxus baccata*

(ii) Field behind All Saints Church TM07661880

Plants

1. Common Yarrow *Achillea millefolium*

Animals

1. Blackbird *Turdus merula*
2. European Mole *Taipa europaea* (from molehills)
3. Five spot Ladybird *Colcclinella quinquepunetata*
4. Fox *Vulpes*
5. Jackdaw *Turdus monedula*
6. Kestrel *Falco tinnunculus*
7. Pheasant *Phasianus colchicus*
8. Red Admiral *Vanessa atalanta*
9. Rook *Corvus frugilegus*
10. Sheep *Ovis aries*
11. Stoat *Mustela erminea*

(iii) Churchyard TM07701871

Plants

1. Alder *Alnus glutinosa*
2. Alexanders *Smyrnium olusatrum*
3. Ash *Fraxinus excelsior*
4. Barleria *Barleria obtusa*
5. Bay Leaf *Laurus nobilis*
6. Beech *Fagus sylvatica*
7. Birch *Betula pendula*
8. Bluebell *Hyacinthoides non-scripta*
9. Bramble *Rubus fruticosus*
10. Broad Leaf Dock *Rumex obtusifolius*
11. Common Dog Violet *Viola riviniana*
12. Common ivy *Hedera helix* covers the trunks of some trees and ground
13. Common Ragwort *Senecio jacobaea*
14. Cow Parsley *Anthriscus sylvestris*
15. Daffodil *Narcissus pseudonarcissus*
16. Dandelion *Taraxacum officinale*
17. Didier's Tulip *Tulipa gesneriana*
18. Elm *Ulmus procera*

19. Eucalyptus *Eucalyptus gunnii* and *E. glaucescens*
20. European Hornbeam *Carpinus betulus*
21. Evergreen (Holm) oak *Quercus ilex*
22. Groundsel *Senecio vulgaris*
23. Hawthorn *Crataegus monogyna*
24. Horse Chestnut *Aesculus hippocastanum*
25. Ivy leaved Cyclamen *hederifolium*
26. Jonquil *Narcissus jonquilla*
27. Lesser Calamint *Clinopodium nepeta*
28. Lords and Ladies *Arum maculatum*
29. Nettle *Urtica dioica, U. urens*
30. Pheasant's Eye Daffodil *Narcissus poeticus*
31. Snowdrop *Galanthus nivalis*
32. Primrose *Primula vulgaris*
33. Red Deadnettle *Lamium purpureum*
34. Sunburst Lichen *Xanthoria parietina*
35. White Dead-nettle *Lamium album*
36. Wild Mignonette *Reseda lutea*
37. Willow Goat/Pussy *Salix carea*
38. Yew *Taxus baccata*

Animals

1. Bat Soprano Pipistrelle *Pipistrellus pygmaeus*
2. Common Harvestman *Phalangium opilio*
3. Dark Bush-cricket *Pholidoptera griseoaptera*
4. Devils Coach-horse *Staphylinus olens*
5. Green Sawfly *Rhogogaster viridis*
6. Grey Dagger Moth *Acronicta psi*
7. Hornet *Vespa crabro*
8. Mistle Thrush *Turdus viscivorus*
9. Oak Jewel Beetle / Common Malachite *Agrilus biguttatus*
10. Painted Lady *Vanessa cardui*
11. Red Admiral *Vanessa atalanta*
12. Robin *Erithacus rubecula*
13. Rook *Corvus frugilegus*
14. Speckled Bush Cricket *Leptophyes punctatissima*
15. Willow Emerald Damselfly *Chalcolestes viridis*

(iv) All Saints Verges and Bike Track from TM07771876

Plants

1. Alexanders *Smyrnium olusatrum*
2. Bluebell *Hyacynthoides non-scripta*
3. Cherry plum *Prunus cerasifera*
4. Crab Apple *Malus sylvestris*
5. Garlic Mustard *Alliaria petiolata*
6. Great Burdock *Aretium lappa*
7. Ground Ivy *Glechoma hederacea*
8. Hazel *Corylus avellana*
9. Ivy *Hedera helix*
10. Lords and Ladies *Arum maculata*
11. Prickly Lettuce *Lactuca serriola*
12. Spanish Bluebell *Hyacinthoides hispanica*
13. Spear Thistle *Cirsium vulgare*
14. Square-stalked Willow Herb *Epilobium tetragonum*
15. White Dead-nettle *Lamium alba*
16. Wild Cherry *Prunus avium*

(C) Brightlingsea Nature Network (5 July 2022)

A survey conducted by a local nature group on 5 July 2022 on the main verge of All Saints Church and the grassed triangular verge. The objective was to compare biodiversity on mown and unmown areas. It listed the following.

(i) Short mown triangular verge TM07761868

Plants

1. Autumn Hawkbit *Leontodon autumnalis*
2. Broadleaved Plantain *Plantago major*
3. Common Daisy *Bellis perennis*
4. Common Field-speedwell *Veronic persica*
5. Cranesbill *Geranium maculatum*
6. Hawksbeard *Crepis capillaris*

(ii) Main verge TM07751872

Plants

1. Black Medic *Medicago lupulina*
2. Bristly Oxtongue *Helminthotheca echioides*
3. Cleavers *Galium aparine*
4. Common Daisy *Bellis perennis*
5. Common Mallow *Malva sylvestris*
6. Creeping Thistle *Cirsium arvense*
7. Field Poppy *Papaver rhoes*
8. Greater Plantain *Plantago major*
9. Hawksbeard *Crepis capillaris*
10. Hemlock *Conium maculatum*
11. Hop Trefoil *Trifolium campestre*
12. Mugwort *Artemisia vulgaris*
13. Purple/Red Dead Nettle *Lamium purpureum*
14. Spear Thistle *Cirsium arvense*
15. Weld *Reseda luteola*
16. White Campion *Silene latifolia*
17. Wild Mignonette *Reseda lutea*

Animals

1. Banded Demoiselle *Calopteryx splendens*
2. Forest Bug *Pentatoma rufipes*
3. Marmalade Hoverfly *Episyrphus balteatus*
4. Meadow Brown Butterfly *Maniola jurtina*
5. Mole *Talpa europaea* (from recent and current molehills)
6. Seven Spot Ladybird *Coccinella septempunctata*
7. Thick Legged Flower Beetle *Oedemera no*
8. Yellow Faced Bee *Hylaeus* sp.

(D) Other surveys

On 16 September 2023 a survey was conducted by members of the British Naturalists' Association mapping the locations of the relatively rare perennial shrub *Calamintha nepeta* (Lesser Calamint)*.

Plants Churchyard TM07631871 British Naturalis's Association 2023

1. Lesser Calamint *Calamintha nepeta*
2. Common Orange Lichen *Xanthria parietina*
3. Wild Cyclamen *Cyclamen hederifolium* (These have been recorded earlier as Ivy-leaved Cyclamen)

* Although said to be a rare species Lesser Calamint (*Clinopodium nepeta*) seeds and plants are advertised as readily available from garden centres or on-line. There are several subspecies.

Risk Assessment # 1	Risk of instability through environmental and biological degradation. Brightlingsea All Saints Church, churchyard, verges and nearby grove
System site description summary as at 2025	Brightlingsea All Saints Church churchyard, roadside verge and grove centred on TM077187 and TM075185. Elevation 24 m. The associated small wooded area consists of trees of mixed species. The church was built around 1250 AD and is host to several bat species. The wall to the churchyard is the boundary of the grass verge, whilst a small triangular grassed area formed by the intersection of the roads contains a boat planter maintained by a local volunteer group. Kestrels nest in the tower and have been observed in nearby fields. Parts of the grassy areas are regularly mown.

Event to which risk applies as at 2025		Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Notes including those on long term stability and probability (P)	Risk *P* x *I*
1	Dumping of rubbish Commercial	**Medium**	**Low** in church area but Medium in adjacent wooded area where small amount of rubbish observed.	BTC staff monitor church area when emptying rubbish bins. No known controls for wooded area.	No historical evidence of rubbish or litter in church area, but some commercial waste observed in wooded area.	2
2	Dumping of rubbish Public	**Low**	**Low** Observed litter volume is minimal	Site rubbish bins controlled by BTC. No other controls	No historical evidence of major rubbish or litter deposited	1
3	General contamination and pollution	**Low**	**Low** Internments can pollute groundwater with negligible impact	No obvious controls nor sources of other contamination or pollution	Internments will increase over time but will not impact on stability	1
4	Excessive air temperature for long periods	**Medium**	**Medium** Will impact summer plant growth. Increased fire risk	No controls or mitigation possible	Global warming and higher summer temperatures becoming more common	4
5	Drought	**Low**	**Medium** Increased risk of plant dehydration	General area will be maintained by volunteer garden groups and public.	Drought does not affect plants maintained in planters but will affect other plants	2
6	Fire	**Low**	**Medium** Normally **High** but grass fire is estimated to have limited spread capacity	Grass is mown in summer. General area observed by volunteer groups and the public	No historical record of fire. Wooded areas are at greatest risk of fire damage.	2
7	Vandalism	**Low**	**Low** depending on degree of vandalism	Church area not formally policed but is locked at discretion of minister	No evidence of recent vandalism	1
8	Detrimental disturbance of plants	**Low**	**Low** Grave digging will impact plants but established areas are stable	Mowing truncates plants late in the season. Lesser Calamint beside paths/ headstones is protected but spread restricted	Restricted to new graves and grass mowing. Established pattern of mowing.	1
9	Detrimental disturbance of animals	**Low**	**Medium** depending on source and type of disturbance	Clergy have high awareness of the presence of bats and their vulnerability.	Recent repair work produced no evidence of long or short term stress. Resident bats are not disturbed	1
10	Detrimental disturbance of nesting birds	**Low**	**Medium** Public presence is limited. Bird nesting sites also limited.	Public presence is limited. Bird nesting sites also limited. Kestrels nest in the tower	Relatively few visitors, so disturbance is minimal. Kestrels are not disturbed	2

11	Diseases of plants or animals	**Low**	**Low** Local flora not particularly susceptible to infections	None required	No record of disease on this site	1
12	Adverse impact caused by presence of dogs	**Medium**	**Medium** Some contamination if dog faeces not binned. Dog urine may provide excessive plant nutrients	Council staff empty bins and have challenged irresponsible dog owners	Although unlikely to cause major damage, dog scent discourages the presence of other wildlife	4
13	Invasive species	**Low**	**Low** Few potentially invasive species will trigger major decline	No evidence of invasive species impacting on biodiversity	No invasive species found on survey	1
14	Pests	**Low**	**Low** Few pest species will trigger major decline	No evidence of pest species impacting on biodiversity	No reports or evidence of pest damage to this site	1
15	Industrialisation and new build	**Low**	**Medium** Any new build will fully take biodiversity into account	Clergy are keen to protect biodiversity	Toilet extension block recently built had no obvious impact on biodiversity	1
16	Lack of maintenance	**Low**	**Low** Lack of maintenance may be good for biodiversity	Does not impact greatly on biodiversity	If mowing ceased it may encourage the growth of more/different plant species	1
17	General habitat loss	**Low**	**High** In particular in wooded area	No historical or potential habitat loss apart from regular mowing of verges	If mowing ceased it may encourage the growth of more/different plant species	3

Comments. Brightlingsea has several Eucalyptus trees and at least one is reported to be in or near Brightlingsea Churchyard, a fine example is reported to be in the adjacent wooded area and another in Church Road. These are said to date back to 1887 and it is not known whether preservation orders are in force.

In the wooded area beside the church, but outside the churchyard and within its area of maintenance, dog faeces in bags, beer cans and an asbestos water tank were observed from Morses Lane in 2022.

Mowing the graveyard area has a negative impact on plant species, for example Lesser Calamint *Calamintha nepeta* grows only on unmown land immediately adjacent to gravestones and paths. Thus, some risk to existing plant species exists due to normal maintenance. Members of the British Naturalists' Association mapped the locations of several Lesser Calamint *Clinopodium nepeta* specimens in September 2023.

For the whole area, risks are those of public use, but public use also serves as a monitoring service. On a smaller scale there is the possibility of an increase in the area of the verge that is mown. The churchyard is well maintained but if the volume of rubbish in the adjacent wooded area is seen to increase and spread, the risk may be re-rated. Some members of the public walk dogs in the churchyard and owners with up to six dogs on leads have been observed.

Mowing of grass includes summer flowering plant species. There is no record of fire, damage or deterioration during period of survey apart from falling tree branches. Trees were uprooted with consequences for the graveyard as a result of the great storm of 1987 but there has been no recent similar event. Several species of Bats roost in the church buildings and Kestrels *Falco tinnunculus* nest in the tower.

Endangered species and species of particular note or interest.

Kestrel (*Falco tinnunculus*) UK Conservation status: Amber

Lesser Calamint (*Clinopoium calamintha*) *syn Clinopodium calamintha, Thymus minor* and *Calamintha nepeta.* Populations in the wild are more clustered around Essex with scattered populations in other parts of

the UK. Although said to be rare and endangered in the wild it is readily available from garden centres as *C. nepeta*.

Bats. All bat species, their breeding sites and resting places are protected by law. In particular Regulation 43 of the Conservation of Habitats and Species Regulations 2017 (as amended) applies. Of the 18 UK species, the following species have been identified as resident in All Saints Church. The IUCN (International Union for Conservation of Nature) classification of each is least concern. None is known to be threatened in its current location.
Bat Soprano Pipistrelle *Pipistrellus pygmaeus*
Bat Common Pipistrelle *Pipistrellus pipistrellus*
Bat Natterer's *Myotis nattereri*
Bat Noctule *Nyctalus noctula*
Bat Brown Long-eared *Plecotus auritus*

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9** respectively
Site score = sum of individual scores/number of risk areas = 29/17 = 1.71 **rounded to 2**
Overall risk rating. From the site score, the overall risk to biodiversity and of environmental degradation for the area and the impact of adverse events is rated **Low**
Main potential single event concern. Fire in adjacent wooded area and presence of dogs.

Potential for enhancement
Consideration may be given to measures in the churchyard including

- the provision of bird boxes situated in the trees
- setting aside a small area with plant species that encourage wildlife e.g. buddleia, holly
- provision of bird baths and feeders
- Notices asking dog walkers to act responsibly may assist.

These require the agreement of the Church authorities and possibly input from a dedicated individual or team to maintain them.

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2. Manor Wood (School Copse) at junction of Batemans Road and Church Road. TM08381768
A primary survey of this small triangular copse was made on 20 February 2022. Few plants and animals were identified. The results are incorporated into those of a more productive secondary survey on 8 November 2022 as listed under. Formal permission to survey could not be obtained as the owners of the land are unknown.

Plants

1. Black Horehound *Ballota nigra*
2. Bramble *Rubus fruticosus*
3. Cleavers *Galium aparine*
4. Common Dog Violet *Viola rivinana*
5. Common Ivy *Hedera helix*
6. Cow Parsley *Anthriscus sylvestris*
7. Daffodil *Narcissus pseudonarcissus*
8. English Elm *Ulmus procera*
9. Garlic Mustard *Alliaria petiolata*
10. Hawthorn *Crataegus monogyna*
11. Hazel *Corylus avellana*
12. Honeysuckle *Lonicera periclymenum*
13. Horse Chestnut *Aesculus hippocastanum*
14. Lords and Ladies *Arum maculatum*
15. Monterey Pine *Pinus radiata*
16. Norway Maple *Acer platanoides*
17. Snowdrop *Galanthus nivalis*
18. Stone Pine *Pinus pinea* (introduced sp?)
19. Sweet Cicerly *Myrrhis odorata*
20. Sweet Violet *Viola odorata*
21. Three Cornered Leek/Garlic *Allium triquetrum*
22. Tree Mallow *Lavatera maritima*

Moulds and Fungi

1. Black Eyed Parasol *Lepiota atrodisca*
2. Brittle Cinder *Kretzschmaria deusta*
3. Pink Slime Mould *Lycogala epidendrum*

4. Tawney Funnel Cap *Lepista flaccida*
5. Wavey Caps *Psilocybe cyanescens*
6. White Slime Mould *Mucilago crustacea*
7. Wine Coloured Agaricus *Agaricus subrutilescens*

Animals

1. Blue Tit *Cyanistes caeruleus*
2. Rook *Corvus frugilegus*
3. Wood Pigeon *Columba palumbus*
4. Muntjac Deer *Muntiacus reevesi*

Figure 16. The condition of this tree may not be indicative of the age of the whole wooded area
Photo © Tony Thorn

Figure 17. Damage to tree bark, possibly partly caused by Muntjac Deer *Muntiacus reevesi.* However some debarking extends above the normal reach of this species
Photo © Tony Thorn

Risk Assessment # 2		Risk of instability through environmental and biological degradation. Manor Wood (School Copse)				
System site description summary as at 2025		Manor Wood TM083176 Elevation 28.7m This is a small triangular shaped wooded area with permanent trodden earthen paths. Situated opposite the Colne Community College, the site consists of mature trees including Elm, Hazel and Monterey Pine with undergrowth of several plant species. Although the public have unrestricted access and there is a school nearby, there is little casual rubbish e.g. sweet wrappers, cans etc. Several bird boxes are situated in the tree canopy. Mature trees suggest the woodland is old but the 1885 – 1900 OS 1 inch map shows the site to have been open field. Owners are unknown and there is no obvious maintenance carried out.				
Event to which risk applies as at 2025		Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Additional notes including those on long term stability and probability	Risk *P* x *I*
1	Dumping of rubbish Commercial	**Low**	**Medium** Only major dumping would have significant impact	Near main road and public observation would deter major dumping	No evidence of rubbish, litter, or general disturbance. Dumping could occur at night	2
2	Dumping of rubbish Domestic	**Low**	**Low** Minimal observed litter and only low volumes likely	No known controls or potential mitigation. Site owner unknown	No evidence of major rubbish or minor litter e.g. sweet wrappers and cans	1
3	General contamination and pollution	**Low**	**Low** Established wood with relatively few forest floor plant species	No known controls or potential mitigation. Site owner unknown	No evidence of major contamination or pollution	1
4	Excessive air temperature for long periods	**Medium**	**Medium** Will impact summer plant growth and pollination	No controls or mitigation possible. Tree canopy shades low growing plants	Unpredictable impact of global warming. Higher summer temperatures becoming normal	4
5	Drought	**Medium**	**Medium** but impact varies with species	No controls or mitigation possible	No historical evidence of major deterioration during recent drought	4
6	Fire	**Medium**	**High** Risk also of uncontrolled fire spreading to nearby buildings	Fire unlikely to be caused by nature or by accident but no known controls	No evidence or record of major fire. Risk increases with increased air temperature and drought	6
7	Vandalism	**Low**	**Low** depending on degree and type of vandalism	Area not policed but overlooked near main road. Vandalism would be obvious. No other controls	No evidence of recent vandalism Future vandalism unlikely. Limited scope for damage	1
8	Detrimental disturbance of plants	**Low**	**Low** Established woodland with relatively low number of plant species	No controls or mitigation possible	No evidence of recent disturbance. No known development plans. Relatively low human footfall	1

9	Detrimental disturbance of animals	**Low**	**Low** Any large animals are nocturnal and in transit	No controls or mitigation possible	Low human footfall No evidence of disturbance. No known plans to change the area	1
10	Detrimental disturbance of nesting birds	**Low**	**Low** Few birds/ bird species observed. Human/animal footfall is low	Several bird boxes are set very high in tree branches	Disturbance is not excessive. No known plans to change the area.	1
11	Diseases of plants or animals	**Low**	**Medium** In respect of e.g. Avian Flu and Dothistroma needle blight	No controls or mitigation possible. Few birds / bird species observed.	No signs of disease. No evidence/history of e.g. Avian flu AIPZ or Dothistroma needle blight (*D. septosporum)*.	2
12	Invasive species	**Low**	**Low** Depends on species and numbers	No controls or mitigation possible	No evidence or record of any invasive species on this site	1
13	Pests	**Low**	**Low** No pests identified	No controls or mitigation possible	No evidence or record of pests in any form. Munjac deer may debark some trees.	1
14	Industrialisation and new build	**Low**	**High** Could be catastrophic	Controls would be via planning applications	No known plans for new build and owners are said to be unknown	3
15	Adverse impact caused by presence of dogs	**Low**	**Medium** Some contamination if owners do not bin dog faeces	No dog waste bins currently but no faeces or bags observed. No monitoring in place	Although major damage unlikely, dog scent discourages the presence of other wildlife	2
16	Lack of maintenance	**Low**	**Low** Lack of disruptive maintenance limits disturbance	No controls or mitigation possible	Lack of maintenance retains the natural status quo	1
17	General habitat loss	**Low**	**Medium** Depends on degree and type of loss	No known historical controls or potential habitat loss	Potential prime building site but owners are not known	2

Comments. For this small wooded area the main risks are those associated with climate extremes. Mitigation of risks is difficult because, on available information, the owners of the site are not known. The risk of fire is mainly linked to the risk of high air temperature, drought and possible vandalism. The impact of this would also depend on the time for any fire appliances to reach the site. Public use may serve as a monitoring service, for example in reporting fires timeously. Overall control and the potential to enhance the site or rectify deficiencies are both absent. There is no information to suggest major deterioration in the past or future.

Endangered species or species of note or interest.
None recorded

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9** respectively
Site score = sum of individual scores/number of risk areas = 34/17 = 2.0 **rounded to 2**
Overall risk rating. From the site score, the overall risk to biodiversity and of environmental degradation for the area and the impact of adverse events is rated **Low** but an increase in the score for any event would raise it to Medium
Main potential single event concern. Fire

Potential for enhancement
If the owners of this site are not known, enhancement may not be possible, but no enhancement needs are apparent and the site should not be disturbed. It is not known who placed the bird boxes.

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3. Mill Street Pond area TM09631672. Elevation 11.4 m
The primary biodiversity sample was obtained from a walkover survey on 29 January 2022 as part of an exercise by a local nature group to clear the pond area of rubbish.

Figure 18. Mill Street Pond in winter. In summer it may dry completely

I estimated approximately 20 volunteers attended, including representatives of the British Naturalist's Association, which was supporting the exercise. I recorded the team's biodiversity samples. There was little spring time plant growth, which made the identification of such species difficult or impossible so I planned a further survey for later in the year. There was some evidence of oil contamination from discarded oil cans.

Two samples of water and pond mud were taken in the primary survey for future observation. The results are shown under the heading 'In sample pots obtained by scooping the pond bed'. I conducted a secondary survey on 6 September 2022 by observation from the road when the pond had lost all water due to evaporation. The general area was again surveyed from the road on 20.06.24 as part of a walkover survey within Chris Gibson's group 'Wildlife Walk' of the area. The initial formal permission to survey the pond was obtained by members of the local nature group.

(A) Primary Survey 29.01.22 in conjunction with Brightlingsea Nature Network.

Plants
1. Common Reed *Phragmites australis*
2. Dog Violet *Viola riviniana*
3. Green alkanet *Pentaglottis sempervirens*

Animals
1. Diving Beetle *Colymbetes fuscus*
2. Great Diving Beetle *Dytiscus marginalis*
3. Green woodpecker *Picus viridis*
4. Hoglouse *Asellus aquaticus*
5. Mallard duck *Anas platyrhynchos* ephemeral visits
6. Mosquito larvae *Culicidae sp*.

In sample pots obtained by scooping the pond bed
1. Cyclops *Cyclopoidea sp.*
2. Diving beetle *Colymbetes fuscus*

3. Fairy Shrimp *Chirocephalus diamphanus*
4. Mosquito larvae *Culicidae sp.*
5. Ostracod of undetermined sp.
6. Unidentified small darting animals visible only under microscope

Fungi

1. Jelly/Jew's Ear *Auricularia Auricula-judae*

(B) Secondary Survey 6 September 2022 when pond area was dry. Viewed from the road.

Plants

1. Bittersweet *Solanum dulcamara*
2. Blister Gall (Agent: *Albugo candida*)
3. Blue Comfrey *Symphytum caucasicum*
4. Bristly Oxtongue *Helminthotheca echioides*
5. Common Mugwort *Artemisia vulgaris*
6. Common Reed *Phragmites australis*
7. Creeping Thistle *Cirsium arvense*
8. Green Alkanet *Pentaglottis sempervirens*
9. Great Willow Herb *Epilobium Hirsutum*
10. Marble Gall (Agent: *Andricus kollari*)
11. Nettle *Urtica dioica*
12. Ribwort Plantain (Narrow Leaf Plantain) *Plantago lanceolata*
13. Stinking Iris *Iris foetidissima*
14. Yarrow *Achillea millefolium*
15. Yellow Flag Iris *Iris pseudacorus*
16. (Yellow) Bristly Oxtongue *Helminthotheca echioides*
17. Weeping Willow *Salix babylonica*
18. Wild Cherry *Prunus avium*
19. Woody Nightshade *Solanum dulcamara*

Animals

1. Coot *Fulica atra*
2. Essex Skipper *Thymelicus lineola*
3. Grey Squirrel *Sciurus carolinensis*
4. Magpie *Pica pica*
5. Muntjack *Muntiacus reevesi*
6. Pheasant *Phasianus colchicus*
7. Robin *Erithacus rubecula*
8. Schilling's Rhopalid *Chorosoma schillingi*
9. Wood Mouse *Apodemus sylvaticus*

Risk assessment #3		Risk of instability through environmental and biological degradation. Mill Street Pond				
System site description summary as at 2025		Mill Street Pond TM096167. Elevation 11.4 m The pond is adjacent to a road. It and its surrounding area has at times been visually attractive with great potential for water dependent wildlife. It became a dumping ground for rubbish until it was cleared in 2022. The pond has recently been subjected to periodic drying out and it is therefore currently inhabited by ephemeral biodiversity, e.g. water beetles and fairy shrimps.				
Event to which risk applies as at 2025		Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Notes including those on long term stability	Risk *P* x *I*
1	Dumping of rubbish Commercial	**High**	**Medium** Items dumped are mainly inert, therefore mainly 'eyesores' rather than damaging	Visitors tend to be local drivers or dog walkers who would report day time events	No effective control over level of rubbish dumped. Pond cleared of rubbish in 2022	6

2	Dumping of rubbish Domestic	**High**	**Medium** Depends on nature of items dumped	Visitors mainly locals or dog walkers who would report day time event	No effective control over any rubbish dumped nor of its amount	6
3	General contamination and pollution of land	**Low**	**Medium** Pollution depends on nature of pollutant e.g. harmful liquids soaking into ground	Limited mitigation as any chemical pollution may not be obvious leading to hidden soil contamination	Lack of controls but site history suggests little polluting waste when pond is dry	2
4	General contamination and pollution of water body	**Low**	**Medium** depending on degree and nature of pollutant	Lack of controls means that pollution could occur at any time in the future	Dumping of leaking oil cans and other chemical containers is rare	2
5	Excessive air temperature for long periods	**Medium**	**High** Increased evaporation rate leads to water loss	No controls or mitigation possible	Higher mean and extreme summer temperatures becoming more common	6
6	Excessive water temperature when pond not dried out	**Medium**	**Medium** Likely to impact all ephemeral aquatic biodiversity.	Unstable. No aeration or other mitigation possible	Water temperature and volume impacted by global warming	4
7	Drought impacting land body	**Medium**	**High** Dehydration adversely impacts biodiversity in the pond area and its surrounds	No mitigation or controls possible unless water can be transferred from another nearby pond	Unstable and variable area No control over soil moisture nor. global warming	6
8	Drought impacting water body	**High**	**High** Reduces range of water dependent species. Leads eventually to pond drying out	No mitigation possible, no control over weather and its consequences	Drying out cannot be controlled. Drought initially allows terrestrial plant growth	9
9	Cyclic drying out	**High**	**High** Plants are drowned or dehydrated depending on state of pond	None possible unless water can be transferred e.g. from another nearby pond	Unstable in the long term due to cyclic nature of water levels. See also 'Drought'	9
10	Reduced oxygen levels in water body	**Medium**	**Medium** Affects only aquatic animals when pond is water filled	No controls or mitigation possible. Aeration not practical	Unstable in the long term due to cyclic nature of water levels.	4
11	Adverse algal grow (e.g. Anabaena sp.)	**Medium**	Potentially **High** due to production of neurotoxins and low water volume	Neurotoxins adversely impact animals but can only be fully mitigated by water change/aeration	No practical mitigation possible Pond tends to stagnate in hot dry weather	6
12	Fire (When pond area dry)	**Low**	**Medium** Would only impact plants that have grown on dried out pond or pond surround	No practical mitigation. Any fire more likely to be caused deliberately	Applies mainly to plants on dried out area that have become completely dehydrated e.g. grass/straw	2

13	Vandalism	**Low**	**High** Depends on method e.g. liquid soap would kill most biodiversity	No controls possible. Event can be neither predicted nor prevented	Liquid soap has been placed in other local water bodies	3
14	Industrialisation and new build	**Low**	**High** Pond would have to be permanently filled for new build	No practical mitigation.	No known plans for new build or industrialisation Reassess if plans become known	3
15	Lack of maintenance	**Low**	**Medium** Rubbish found on earlier clearance included leaking oil can	General observation and reporting to site owner if concerns raised, leading to clearance	Earlier maintenance by Brightlingsea Nature Network effective. Future input is unknown	2
16	General habitat loss	**Medium**	**High** but varies with state of site i.e. if water filled or dry	None possible for evaporation unless water can be transferred from another nearby pond	Habitat varies with water content which varies with weather. Linked to cyclic drying out	6

Comments
This small pond is close to the road and the basis of this report is a survey carried out with the owners permission, on 29 January 2022. The survey was part of restoration/clearance by a working party consisting of local enthusiasts under the direction and control of the conservation groups Brightlingsea Nature Network (BNN) and the British Naturalist's Association (BNA). Rubbish was removed in this restoration effort. Later complementary surveys did not access the pond area and data was obtained by observations from the road. Although unverified, the pond's feeder source may have been intercepted and now seems to serve a holding pond uphill so that, subject to weather conditions, Mill Street Pond may periodically dry up. This could only be confirmed by a dedicated ground survey. During the 2022 survey, BNA obtained samples of pond water that were taken to assess biodiversity potential from the possible seedbank of eggs and larvae that may eventually emerge. Following an initial algal 'bloom,' the sample pots produced no fresh biodiversity in the following weeks, except for further algae, suggesting that apart from the existing reeds, no substantial aquatic seedbank exists and consequently a regeneration of aquatic biodiversity is unlikely. If the pond continues to be cyclic then apart from ephemeral insects such as water beetles, aquatic biodiversity will be unable to colonise or adapt to the resulting conditions and only terrestrial plants may thrive in this area as and when the pond is dry. Current climate conditions mean that maintaining a constant water level and keeping the pond clear of rubbish to encourage permanent populations of aquatic plants and animals, would be challenging. Both BNN and the BNA may be able to offer further advice and support in this respect and also conduct further surveys.

Endangered species or species of note or interest.
None recorded

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9 respectively**.
Site score = sum of individual scores/number of risk areas = 76/16 = 4.75 rounded to 5
Overall risk rating. From the site score, the overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated **Medium**
Main potential single event concern. Drought leading to cyclic drying out

Potential for enhancement
At the owner's discretion, enhancements may include researching/confirming the causes of water loss, maintaining a constant water level and keeping the pond clear of rubbish. If a constant water level could be maintained the potential for wildlife will increase and could be enhanced by the introduction of fish and water dependent plants.

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4. Field above Mill Street Pond TM09541674 and 'the Lagoon' TM09531672. Elevation 14.7 m
Although the holding pond here referred to as the Lagoon was void of plants three years ago, it is now surrounded by rich vegetation. (Compare Figure 19 with Figure 20). Because this vegetation includes mature plants such as Great Reedmace *Typha latifo* or a similar species it may be assumed that these are not natural immigrants and have been planted. The plants in the pond need to be identified in greater detail by future survey. It is not known

what animal life is present currently. The pond was constructed by or for the building company Hopkins Homes, from which permission to survey was given.

The field next to the pond and which is adjacent to Gravel Field is mature grassland. In late summer 2023, a short test sweep net session (seven paces) yielded approximately 200 flies spiders and other small insects. All were returned unharmed and without identification. Also noted were several species of butterfly, two dragonfly species and several rooks. Samples of the grasses and the results of another sweep net session along the path shortly after were photographed and gave data as in the table. Permission to survey was obtained from Hopkins Homes.

Previous ecology survey of the area

The area now occupied by the housing estate was surveyed on behalf of Hopkins Homes in the form of an ecological assessment by Southern Ecological Solutions Ltd. (SES), their report being dated 1 August 2017. Although this report is not within the period covered by the BEBP and may therefore be considered historic, its comprehensive data does give an insight to the potential current biodiversity of the area. Permission to use the data has been given.

The 2017 survey considers a zone of influence of 2 km for records of notable and protected species and 8 km for protected sites, with impact and mitigation considerations. Surveys were recommended for Bats – roosting (including emergence) and activity; breeding birds; invertebrates; reptiles presence / likely absence; and small and medium-sized mammals. As well as mitigation, enhancement and residual impact assessments, the report contains extensive and comprehensive data.

Since the report is dated 2017 no data is included in the BEBP tables, but the report is considered to have considerable historical significance. Apologies for any errors or omissions.

Figure 19. The 'Lagoon' soon after construction. This pond is thought to be taking overspill from the Robinson Road housing development
Photo © Ed Thorn

Bats
Five species of bat were recorded, these being mainly the Common Pipistrel *Pipistrellus pipistrellus* being most common, with the Soprano Pipistrelle *Pipistrellus pygmaeus* being less abundant. Other species were far less common.

Birds
There were twenty-seven species recorded, twenty two breeding and five foraging. These included Starlings, *Sturnus vulgaris*, Linnet *Linaria cannabina*, House Sparrow *Passer domesticus*, Mistle Thrush *Turdus viscivorus*, Song Thrush *Turdus philomelos*, Reed Bunting *Emberiza schoeniclus* and Dunnock *Prunella modularis*.

Reptiles
Slow Worm *Anguis fragilis* and Common Lizard *Zootoca vivipara* were recorded as 'good' populations

Mammals
No mammals were recorded, although the site had potential for European Hedgehogs *Erinaceus europaeus* and Harvest Mice *Micromys minutus*.
A recommendation is for the provision of 13cm x 13 cm holes in fences to permit free movement between gardens. The recent presence of breeding Hedgehogs in gardens has been confirmed by at least one residents.

Plants
Reference is made to the Pyramidal Orchid *Anacamptis pyramidalis*, the continuing local presence of which has been confirmed by BEBP surveys.

Habitats
The development has resulted in the loss of semi-natural grassland, which is mitigated by the retention of the open space to the south of the development. This is retained as semi-improved grassland and cut as a hay meadow.
Mown pathways through the site mitigate disturbance of the general meadow area.
Disturbances caused by dogs and domestic cats is recognised. Sensitive street lighting was recommended to assist bats.

Figure 20. The 'Lagoon' three years later
Photo © Tony Thorn

Biodiversity survey by Thorn and Thorn 2023 in the nearby field area

The edge of the foot path running though the adjacent field
Plants and grasses

1. Buddleia (Butterfly Bush) *Buddleja davidii*
2. Cocks-foot *Dactylis glomerata*
3. Common/Black Bent grass *Agrostis gigantea*
4. Creeping Bent *Agrostis stolonifera*
5. Creeping Soft Grass *Holcus mollis*
6. Dwarf Thistle *Cirsium acaule*
7. Field Scabious *Knautia arvensis*
8. Grass Vetching *Lathyrus nissolia*
9. Hairy/Downy Oat Grass *Helictotrichon pubescens (Avenula pubescens)*
10. Italian Rye Grass *Lolium multiflrum*
11. Lords and Ladies *Arum maculatum*
12. Pedunculate Oak *Quercus robur*
13. Pendulous Sedge *Carex pendulous*
14. Pyramidal Orchid *Anacamptis pyramidalis* (one plant only)
15. Redshank *Persicaria maculosa*
16. Rough Hawbit *Leontodon hispidus*
17. Smaller Cat's-Tail *Phleum bertolonii*
18. Teasel *Dipsacus fullonum*
19. Various-leaved Fescue *Festuca heterophylla*
20. Velvet Bent *Agrostis canina*
21. Winter Wild Oat *Avena sterilsi subsp. Ludoviciana*
22. Yellow Bristlegrass *Setaria pumila*

Fungi

1. Puffball *Lycoperdon perlatum*
2. Tawny grisette *Amanita fulva*

Animals

1. Common Frog Hopper *Philaenus spumarius*
2. Essex Skipper *Thymelicus lineola*
3. Fly *Campiglosa plantaginis*
4. Fly *Palloptera umbellatarum*
5. Leaf Hopper *Linnavuoriana decempuncta*
6. Rhopalid Bug *Chorosoma schillingi*
7. Small Copper butterfly *Lycaena phlaeas*
8. Wasp Spider *Argiope bruennichi*
9. Yellow Meadow Ant *Lasius flavus*

Figure 21. Wasp Spider *Argiope bruennichi* scoop netted in the field
Photo © Tony Thorn

Figure 22. Hopkins Homes Wildflower Meadow sign located near Pannell Place (TM0952716857)
Photo © Tony Thorn

The 'Lagoon'
Plants

1. Bulrush *Typha latifolia*
2. Butterfly Bush *Buddleja davidii*
3. Common Mallow *Malva sylestris*
4. Common Ragwort *Senecio jacobaea*
5. Common Teasel *Dipsacus fullonum*
6. Cow Parsley *Anthriscus sylvestris*
7. Garden Chervil *Anthriscus cerefolium*
8. Great Willowherb *Epilobium hirsutum*
9. Hedge Woundwort *Stachys sylvatica*
10. Lords-and- Ladies *Arum maculatum*
11. Mugwort *Artemisia vulgaris*

Several species of butterfly and dragonfly/damselfly were observed in flight but identification was not possible.
Note: These plants were initially identified from photographs taken from the nearby footpath before the owner's permission to survey the site was obtained. Formal permission was obtained in 2024 in addition to the 2017 survey data. A more comprehensive survey would almost certainly add to the number of species recorded.

Risk assessment # 4	Risk of instability through environmental and biological degradation. The 'Lagoon' and the nearby field above Mill Street Pond				
System site description summary as at 2025	The 'Lagoon' TM09531672 elevation 9.0 m is a pond believed to have been constructed in connection with the nearby Hopkins Homes housing estate and designed to hold excess drainage water from that estate. It abuts an open field area that is effectively a meadow of interest. The pond surround has an abundance of plant growth, most appearing over the past three years, whilst in summer the grassland holds a huge range of spiders and insects, including many species of very small flies that were difficult to identify. Part of the area is maintained by agents of Hopkins Homes.				
Event to which risk applies as at 2025	Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Additional notes including those on long term stability and probability	Risk *P* x *I*

1	Dumping of rubbish. Commercial	**Low**	**Medium** Depends on nature and volume of any rubbish	Pond is remote and fenced. Commercial dumping in field unlikely as area is not close to road	No historical evidence of dumping. Any event is more likely at night	2
2	Dumping of rubbish. Domestic	**Low**	**Medium** Depends on nature and volume of any rubbish	Pond is remote and fenced. Visitors to the field keep to maintained footpaths	No historical evidence of dumping. Any event is more likely at night	2
3	General contamination and pollution of land	**Low**	**Medium** Depends on nature of pollutant e.g. harmful liquids soaking into ground	No obvious controls and remoteness means that pollution may lead to hidden soil contamination.	No historical evidence of chemical contamination or other pollution	2
4	General contamination and pollution of water body	**Low**	**High** Depends on nature and volume of any pollutant e.g. detergent, oil etc.	Pond is fenced and rarely visited. Thus few controls and mitigation	No historical evidence of pollution. See also Vandalism at 13	3
5	Excessive air temperature for long periods for the land area	**Medium**	**Low** Will impact summer plant growth and pollination.	No controls or mitigation possible.	Global warming will have unpredictable impact	2
6	Excessive water temperature for the water body	**Medium**	**Medium** High water temperature may impact adversely on inhabitants	None possible. Water temperature varies with air temperature	No control over water temperature No practical means of reducing sunlight	4
7	Reduced oxygen levels in water body	**Medium**	**Medium** Not known which animals might be affected	No practical mitigation but aeration has worked well on other water bodies	Unpredictable. Associated with high water temperature	4
8	Excessive algal growth	**Medium**	**High** but varies with algal species	Limited. Identification would need to be followed by rectification	No obvious controls or monitoring. No record of algal blooms	6
9	Adverse algal growth (e.g. *Anabaena* sp.)	**Medium**	Potentially **High** due to production of neurotoxins	Neurotoxins adversely impact animals. Get advice from Environment Agency	No record of adverse algal growth	6
10	Drought impacting pond surround and field	**Low**	**Medium** but impact varies with species	No controls or mitigation possible. Irrigation impractical	No evidence of major deterioration in recent drought conditions	2
11	Drought impacting water body	**Low**	**High** Reduced water levels, increased water temperature	No obvious practical mitigation possible	No record of pond drying out when its sister Mill Street pond has done so	3
12	Fire in surrounding field	**Medium**	**High** Uncontrolled fire may spread. Large range of insect species in field	Prompt notification to Fire Service likely due to observations from nearby housing estate	Likely to be caused by arson No recent fires in this field or nearby	6

13	Vandalism	**Low**	**Medium** depending on type e.g. fire for field, pollution for pond	Limited mitigation. Pollution may be unobserved. Fire would be obvious	Vandalism would be deliberate and difficult to prevent	2
14	Detrimental disturbance of plants	**Low**	**Medium** Impact mitigated by regenerative plant properties. Many plants self seed and regenerate	Pond area remote Public tend to keep to paths in the field	No historical record of disturbance or public access to the area See also Vandalism	2
15	Detrimental disturbance of animals	**Low**	**Medium** No animals observed in pond area. Insects in field unlikely to be disturbed	Pond area remote Public tend to keep to paths in the field	No historical record of disturbance or public access to the area See also Vandalism	2
16	Detrimental disturbance of nesting birds	**Low**	**Medium** No nesting birds observed	Pond area remote Public tend to keep to paths in the field	No nest sites or breeding birds or waterfowl observed	2
17	Diseases of plants and animals	**Low**	**Medium** Area shows no sign of current or historical diseases	No controls or mitigation possible No known dedicated monitoring in place	Main risk may be Avian 'Flu. No known plant diseases	2
18	Pests on land areas	**Low**	**Low** No pests identified that might impact on biodiversity	No controls or mitigation possible	No evidence or record of pests in any form impacting plants or animals	1
19	Industrialisation and new build	**Low**	**High** New build potentially damaging to field	Owners have good nature protection policy. No known development plans	Stable. No known plans for further change or development	3
20	Adverse impact caused by presence of dogs	**Low**	**Medium** Dogs may produce waste and disturbance but few dogs in general area and none near pond	Visitors to field keep to maintained footpaths but dog walkers may walk on field. No obvious concerns	Presence of dogs may impact resident higher mammals or birds No dogs observed swimming in pond	2
21	Lack of maintenance	**Low**	**Low**. Plants tend to spring from dormant seedbank so area is self regulating	Area partly maintained by agents of Hopkins Homes Lack of maintenance possibly beneficial	Lack of maintenance may lead to stable environment unless detrimental changes occur	1
22	General habitat loss	**Low**	**Medium** No known changes natural or planned	No record of pond drying out, field fires nor any other threat to stability	Relatively stable environment	2

Comments. Part of the area is maintained by agents of Hopkins Homes. (See Survey Report for details).
<u>The Lagoon pond</u>
As illustrated by Figure 20, the small pond, known locally as the Lagoon, is surrounded by a diverse range of thriving terrestrial plants, many of which will originate from the natural seed bank over a period of several years. Some of the aquatic plants, for examples rushes, may have been artificially introduced. The pond may initially have been maintained by Hopkins Homes, the company that built the nearby housing estate, but is not known what current maintenance obligations are placed on the contractors. The highest risks would be of the pond drying up in summer droughts. This is thought to be far less than that to the nearby Mill Street pond, which has dried up

in summer, probably because it is deprived of the run-off water now feeding the Lagoon. Algal growth may also be a problem but currently there are no signs of an immediate problem.

The nearby field area

The overall risk of environmental degradation and instability based on current information is dependent on how the field area is treated or maintained in the future. For example, it is not known if and when the area has been mown (although this is very likely seasonal) nor what future use the land will be put to. There was no sign of rubbish. Any grass fire would be quickly noticed from the nearby hosing estate and there is good access for fire vehicles. Part of the area is maintained by agents of Hopkins Homes.

Samples from the edge of the open field close to the pond are recognised as only a fraction of the biodiversity to be found in this area and a further survey within the field rather than from the footpath would be valuable. The earlier intensive survey by Southern Ecological Solutions Ltd. prior to the house building programme, gives an indication of the huge range of local biodiversity.

Endangered species or species of note or interest.

One specimen of the Pyramidal Orchid *Anacamptis pyramidalis* observed, though this species is more common in adjacent fields.

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9** respectively

Site score = sum of individual scores/number of risk areas = 61/22 = 2.77 rounded to 3

Overall risk rating The overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated **Medium**

Main potential single event concerns. For field. Fire. For pond. Adverse algal growth, drying up.

Potential for enhancement

There is little need for enhancement and the area is best retained 'as is' with emphasis placed on preservation and general maintenance.

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5. Hurst Green and Mill Street to East End Green. Various locations (elevation 11.0 m to 14.4 m)

Sample of biodiversity obtained from walkover surveys and third-party input. The sample sites are along the roadside or other areas to which the public have unrestricted access.

(A) Hurst Green TM09141678

Plants

1. Aspen *Populus tremula*
2. Chicory *Cichorium intybus*
3. Hedge Bindweed *Calystegia sepium*
4. Large Bindweed *Calystegia silvatica*
5. Ragwort *Senecio jacobaea*

Animals

1. Grey Squirrel *Sciurus carolinensis*

(B) Upper Mill Street TM09411661

Plants

1. Beech *Fagus sylvatica*
2. Black Horehound *Balolata nigra*
3. Bracken *Pteridium aquilinum*
4. Bramble *Rubus fruticosus*
5. Cocksfoot Grass *Dacttylis glomerata*
6. Common Mallow *Malva sylvstris*
7. Common Milk Thistle *Sonchus oleraceus*
8. Elm *Ulmus minor*
9. Fennel *Foeniculum vulgare*
10. French Rose *Rosa Gallica*
11. Geater Bindweed *Calystegia silvatica*
12. Green Alkanet *Pentaglottis sempervirens*
13. Hedge Woundwort *Stachys sylvatica*
14. Honeysuckle *Lonicera periclymenum*
15. Morning Glory *Convolvulus arvesis*
16. Narrow-leaf Plantain *Plantago lanceolata*
17. Oat Grass *Avenula pratensis*
18. Oxeye Daisy *Lecanthemum discoidea*
19. Pineapple Weed *Matricaria discoidea*

20. Wall Barley *Hordeum murinum*
21. White Campion *Silene latifolia*
22. Yarrow *Achillea Millifolium*
23. Yorkshire Fog *Holcus lanatus*

Animals (Bird data courtesy of Lea Mercer)

1. Avocet *Recurvirostra avosetta*
2. Blackbird *Turdus merula*
3. Black-headed Gull *Chroicocephalus ridibundas*
4. Black-tailed Godwit *Limosa limosa*
5. Blue Tit *Cyanistes caeruleus*
6. Brent Goose *Branta bernicla*
7. Brent Goose (Dark-bellied) *Branta bernicla bernicla*
8. Buzzard *Buteo buteo*
9. Carrion Crow *Corvus corone*
10. Cetti's Warbler *Cettia cetti*
11. Collared Dove *Streptopelia decaocto*
12. Common Gull *Larus canus*
13. Cormorant *Phalacrocorax carbo*
14. Curlew *Numenius arquata*
15. Dark Bush Cricket *Pholidoptera griseoaptera*
16. Dunlin *Calidris alpina*
17. Elm Zig-Zag Sawfly *Aproceros leucopda*
18. Egyptian Goose *Alopochen aegyptiaca*
19. Goldfinch *Carduelis carduelis*
20. Great Spotted Woodpecker *Dendrocopos major*
21. Great Tit *Parus major*
22. Green Woodpecker *Picus viridis*
23. Greenfinch *Chloris chloris*
24. Grey Heron *Acronicta psi*
25. Grey Plover *Pluvialis squatarola*
26. Hen Harrier *Circus cyaneus*
27. Herring Gull *Larus argentatus*
28. House Sparrow *Passer domesticus*
29. Jackdaw *Coloeus monedula*
30. Kestrel *Falco tinnunculus*
31. Lapwing *Vanellus vanellus*
32. Lesser Black-backed Gull *Larus fuscus*
33. Little Egret *Egretta garzetta*
34. Long-tailed Tit *Aegithalos caudatus*
35. Magpie *Pica pica*
36. Mallard *Anas platyrhynchos*
37. Marsh Harrier *Circus aeruginosus*
38. Moorhen *Gallinula chloropus*
39. Mute Swan *Cygnus olor*
40. Osprey *Pandion haliaetus*
41. Oystercatcher *Haematopus ostralegus*
42. Pheasant *Phasianus colchicus*
43. Pied/White Wagtail *Motacilla alba*
44. Red Kite *Milvus milvus*
45. Redshank *Tringa totanus*
46. Reed Bunting *Emberiza schoeniclus*
47. Robin *Erithacus rubecula*
48. Rook *Corvus frugilegus*
49. Shelduck *Tadorna tadorna*
50. Shoveler *Spatula clypeata*
51. Skylark *Alauda arvensis*
52. Sparrowhawk *Accipiter nisus*
53. Starling *Sturnus vulgaris*
54. Stonechat *Saxicola rubicola*
55. Swallow *Hirundo rustica*
56. Tufted Duck *Aythya fuligula*

57. Turnstone *Arenaria interpres*
58. Woodpigeon *Columba palumbus*
59. Wren *Troglodytes troglodytes*

(C) Mill Street East TM09791681

Plants

1. Creeping Thistle *Circium arvense*
2. Great Willowherb *Epilobium hirsutum*
3. Herb Robert *Geranium robertianum*
4. Honesty *Lunaria annua*
5. Hop *Humulus lupulus*
6. Lucerne *Medicago satvia*
7. Marsh Ragwort *Senecio aquaticus*
8. Mare's Tail *Hippuris vulgaris*
9. Pendulous Sedge *Carex pendulus*
10. Ribwort Plantain *Plantago lanceolata*
11. Salsify *Tragopogon porrifolius*
12. Scarlet Pimpernel *Anagallis arvesis*
13. Stinking Iris *Iris foetidissima*
14. Three Cornered Leek *Allium triquetrum*
15. Weld *Roseda luteola*
16. Wood Avens *Geum urbanum*

Animals

1. Jay *Garrulus glandarius*
2. Muntjac Deer *Muntjac reevesi*
3. Wood mouse *Apodemus sylvaticas*
4. Ringlet Butterfly *Aphantopus hyperantus*

(D) Mill Street West TM09491663

Plants

1. Aspen *Populus tremula*

Animals

1. Blackcap *Sylvia atricapilla*
2. Blackbird *Turdis merula*
3. Chaffinch *Fringilla coelebs*
4. Cream-spot Tiger moth *Arctica villica*
5. Greenfinch *Chloris chloris*
6. Green-veined White *Pieris napi*
7. Grey Dagger *Acronicta psi*
8. Little Egret *Egretta carzetta*
9. Peacock Butterfly *Aglais io*
10. Reed Warbler *Acrocephalus scirpaceus*
11. Small Tortoiseshell *Aglais urticae*
12. Whitethroat *Carruca communis*

(E) East End Green (1) TM09751679 and (2) TM09811683

Plants (1)

1. Bearded Iris *Iris germanica*
2. Bird's-foot Trefoil *Lotus corniculatus*
3. Bittersweet *Solanum dulcamara*
4. Bristly Oxtongue *Helminthotheca echioides*
5. Chicory *Cichorium intybus*
6. Common Dog-violet *Viola riviniana*
7. Creeping Thistle *Cirsium arvense*
8. Feverfew *Tanacetum parthenium*
9. Great Willowherb *Epilobium hirsutum*
10. Green Alkanet *Pentaglottis sempervirens*
11. Hedge B*indweed Calystegia sepium*
12. Large Bindweed *Calystegia silvatica*
13. Mugwort *Artemisia vulgaris*
14. Salsify *Tragopogon porrifolius*

15. Stinking Iris *Iris foetidissima*
16. Wild Onion *Allium vineale*
17. Wild Teasel *Dipsacus fullonum*
18. Yarrow *Achillea millefolium*

Plants (2)

1. Aspen *Populus tremula*
2. Blackthorn *Prunus spinosa*
3. Bramble *Rubus friticosa*
4. Chicory *Cichorium intybus*
5. Cock's Foot Grass *Dactylis glomerata*
6. Common Fleabane *Pulicaria dysenterica*
7. Common Ragwort *Senecio jacobaea*
8. Common Sea-lavender *Limonium vulgare*
9. Crow Garlic *Alium vineale*
10. Cut-leaved Crane's-bill *Geranium dissectum*
11. Hedge Bindweed *Calystegia silvatica*
12. Large Bindweed *Calystegia sepium*
13. Oxeye Daisy *Leucanthemum vulgare*
14. Perforate St. John's-wort *Hypericum perforatum*
15. Pyramidal Orchid *Anacamptis pryramidalis*
16. Red Clover *Trifolium pratense*
17. Rowan *Sorbus aucuparia*
18. Salsify *Tragopogon porrifolius*
19. Sea Beet *Beta vulgaris*
20. Sea Wormwood *Artemisia maritima*
21. Wild Fennel *Foeniculum vulgare*
22. Wild Teasel *Dipsacus fullonum*
23. Woody Nightshade *Solanum dulcamara*
24. Yorkshire Fog *Holcus lanatus*

Animals (1)

1. Muntjac Deer *Muntiacus reevesi*
2. Red Admiral *Vanessa atalanta*
3. Speckled wood *Pararge aegeria*
4. Wood Mouse *Apodemus sylvaticus*

Animals (2)

1. Blackbird *Turdus merula*
2. Blackcap *Sylvia atricapilla*
3. Canada Thistle Gall Fly *Urophorus cardui*
4. Carrot Weevil *Liparus coronatus*
5. Cett's warbler *Cettia cetti*
6. Chiffchaff *Phylloscopus collybita*
7. Cinnabar Moth *Tyria jacobaeae*
8. Common Green Shieldbug *Palomena prasina*
9. Cuckoo *Cuculus canorus*
10. Cucumber Spider *Araniella cucurbitina*
11. Dock Bug *Coreus marginatus*
12. Essex Skipper *Thymelicus lineola*
13. Forteen-spot Ladybird *Propylea quattuordecimpunctata*
14. Greenfinch *Chloris chloris*
15. Green-veined White *Pieris napi*
16. Holly Blue *Celastrina argiolus*
17. Harlequin Ladybird *Harmonia axyridis*
18. Little Egret *Egretta garzetta*
19. Long-tailed tit *Aegithalos caudatus*
20. Malachite Beetle *(Two-Spot)Malachius bipustulatus*
21. Meadow Brown *Maniola jurtina*
22. Peacock *Aglais io*
23. Red Admiral *Vanessa atalanta*
24. Reed Warbler *Acrocephalus scirpaceus*
25. Ringlet *Aphantopus hyperantus*
26. Seven Spot Ladybird *Coccinella septempunctata*

27. Slender Striped Robber Fly *Leptogaster cylindrica*
28. Small Heath *Coenonympha pamphilus*
29. Small Tortoiseshell *Aglais urticae*
30. Speckled Wood *Pararge aegeria*
31. Tiger Hoverfly *Helophilus pendulus*
32. Whitethroat *Sylvia communis*
33. Woodpigeon *Columba palumbus*
34. Woundwort Shieldbug *Eysarcoris venustissimus*

Risk Assessment # 5		Risk of instability through environmental and biological degradation. Hurst Green and Mill Street to East End Green				
System site description summary as at 2025		The overall geographical length of the surveyed area was approximately 900 metres, (elevation 13 m various locations), and extended from Hurst Green via Mill Street to East End Green. The assessment considers risks to areas on either side of Mill Street, in particular the verges, and parts of nearby fields. The BTC maintained Gravel Field is assessed separately and under but is an integral part of this assessment area. Samples of biodiversity were obtained by observation and photography from walkover surveys and third-party input. Some blurring of boundaries exists, for example East End Green (part) overlaps east Mill Street.				
System site description summary as at 2025		Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Notes including those on long term stability	Risk *P* x *I*
1	Dumping of rubbish Commercial	**Low**	**Medium** Depends on type and volume of rubbish. Builders rubble most probable	Rubbish would be highly visible but not easily policed or prevented. No known recent incidents	Length of area about 900 meters Mill Street pond assessed separately Stable area	2
2	Dumping of rubbish Domestic	**Low**	**Low** Depends on type and volume of rubbish	Casual dumping not easily policed or prevented but no known recent incidents	Local historical rubbish dumping restricted to Mill Street pond. Stable area	1
3	General contamination and pollution	**Low**	**Medium** Depends on nature of pollutant e.g. harmful liquids soaking into the ground	No obvious controls Remoteness means that pollution may lead to hidden soil contamination.	No historical evidence of chemical contamination or other pollution	2
4	Excessive air temperature for long periods	**Medium**	**Medium** Impacts summer plant growth and pollination Essex is becoming warmer. .	No controls or mitigation possible. Some tree canopy shades low growing plants	Warming will have unpredictable impact such as out of phase leaf growth/loss	4
5	Drought	**Low**	**Medium** Will impact summer plant viability, growth and pollination	No controls or mitigation possible. Drought may last many weeks.	Summer rainfall is below national average but no great variation year on year	2
6	Fire	**Medium**	**High** Roadside verges trees and shrubs especially vulnerable during drought	No controls or mitigation possible. Drought may last many weeks Local residents would raise alarm	Fire appliances have good access to most of this area	6

7	Vandalism	**Medium**	**Low** Depends on type e.g. arson, rubbish dumping, tree damage etc.	Limited mitigation Minor damage may be unobserved.	No major changes envisaged	2
8	Detrimental disturbance of plants	**Low**	**Low** Would have to be major disturbance for higher rating	Disturbance is unlikely unless associated with (say) amenities maintenance or newbuild	Unlikely that disturbances will occur	1
9	Detrimental disturbance of animals	**Low**	Low Depending on source and type of disturbance	Disturbance is unlikely unless associated with (say) amenities maintenance or newbuild	Unlikely that disturbances will occur	1
10	Detrimental disturbance of nesting birds	**Low**	**Low** Would have to be extensive for higher rating	Disturbance is unlikely because generally nesting birds will avoid areas of high activity	Unlikely that disturbances will occur	1
11	Diseases of plants and animals	**Low**	**Low** No record of typical plant or animal diseases on this site or specific vulnerabilities	No obvious controls nor need for controls	No record of viral diseases or threats in hedgehogs, hares carrion crows etc	1
12	Invasive species	**Low**	**Low** Only one invasive species identified and this is not malignant	No obvious controls. Need for controls is debatable	Alexanders *Smyrnium olusatrum* is present as a benign invasive species	1
13	Pests	**Low**	**Medium** Depends on pest definition and species impacted	Without defined pest and details of species impacted, controls impossible	Pests are here defined as detrimental to the environment	2
14	Industrial and new builds	**Low**	**Low** No known plans for building works in area	No known protected areas	Reassess if any building plans or changes of use become known	1
15	Adverse impact on wildlife caused by presence of dogs	**Medium**	**Medium** Some contamination if dog faeces are left in situ	No controls or mitigation possible	Although unlikely to cause major damage, dog scent discourages the presence of other wildlife	4
16	Lack of maintenance	**Low**	**Low** Maintenance would be restricted to ensuring road is clear	No controls or mitigation needed	Lack of maintenance not really applicable minimal disturbance is beneficial	1

17	General habitat loss	**Low**	**High**	No historical or potential habitat loss envisaged	Habitat loss may be associated with new build but no known plans	3

Comments. Sample of biodiversity obtained from walkover surveys and third-party input. This is a relatively stable area with a large and variable bird population. The sample sites are mainly along the verges of Mill Street. There is some blurring of boundaries, for example East End Green 2 overlaps Mill Street East. Surveys were generally conducted from the roadside or public footpaths hence no formal permission to survey was required. This area is rich in biodiversity and in particular many bird species have been observed.
The risk assessment for Gravel Field, which is accessed via Mill Street, is appended as Risk Assessment 5a.

Endangered species or species of note or interest.
None recorded at this location but a Black Poplar ♂(*Populus nigra*) is situate at TM101169. Alexanders is an invasive species but common and benign.
Peafowl are kept at a farm in the area of East End Green 1.

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9 respectively**.
Site score = sum of individual scores/number of risk areas = 35/17 = 2.06 rounded to 2+
Overall risk rating. From the site score, the overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated **Medium**
Main potential single event concern. Fire

Potential for enhancement
There is little obvious potential for enhancement. Efforts should be targeted to conservation.

6. Gravel Field TM096168
Gravel field is accessed from Mill Street or from Robinson Road. It is maintained by Brightlingsea Town Council staff and was constructed originally as a small woodland with several different tree species on a gravel rich area. Over recent years, the tree canopy and the density of vegetation has increased. Gravel Field is advertised on the internet as a fantastic dog-friendly park, which may have a negative impact on biodiversity and some vandalism has occurred, for example the recent (2025) smashing of the hand made Gravel Field sign.

Plants
1. Black Mustard *Brassica nigra*
2. Buddleia *Buddleja davidii*
3. Common Burdock *Arctium minus*
4. Hawthorn *Crataegus monogyna*
5. Oak *Quercus robur*
6. Oak Apple Gall (= Gall Wasp *Biorhiza pallida*)
7. Perforate St. John's-wort *Hypericum perforatum*
8. White Deadnettle *Lamium album*
9. Wild Fennel *Foeniculum vulgre*

Animals
1. Goldfinch *Carduelis carduelis*
2. Seven Spot Ladybird *Coccinella septempunctata*

Risk Assessment # 6	Risk of instability through environmental and biological degradation. Gravel Field				
System site description summary as at 2025	The BTC maintained Gravel Field TM096168 elevation 16m is accessed from Mill Street and Robinson Road. Samples of biodiversity were obtained from walkover surveys and third-party input. The area was constructed initially as a semi woodland as the name suggests on a gravel rich field. The density of the woodland has increased over recent years and the area is popular with dog walkers.				
Event to which risk applies as at 2025	Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Notes including those on long term stability	Risk *P* x *I*

1	Dumping of rubbish Commercial	**Low**	**Medium** Depending on type and volume of any rubbish	The condition of Gravel Field is monitored by BTC staff but not continuously	Historical local rubbish dumping restricted to the Mill Street pond area	2
2	Dumping of rubbish Public	**Low**	**Medium** Dependant on type and volume of any rubbish	The condition of Gravel Field is monitored by BTC staff but not continuously	Historical local rubbish dumping restricted to the Mill Street pond area	2
3	General contamination and pollution	**Low**	**Low** Negligible impact	No known sources of contamination and pollution	Contamination by dumping or any other source unlikely	1
4	Excessive air temperature for long periods	**Medium**	**Medium** Impacts summer plant growth and pollination Essex is becoming warmer	No controls or mitigation possible but tree canopy shades low growing plants	Global warming will have unpredictable impact. False Autumns may cause leaf drop	2
5	Drought	**Medium**	**Medium** Impacts shallow rooted plants more than trees	No controls or mitigation possible. No readily available water source	Global warming may cause unpredictable future droughts	1
6	Fire	**Medium**	**High** Increasing summer temperatures and drought increases rate and range of destruction	No controls or mitigation possible. No readily available water source	Reasonable access to site by Fire Services. Potential vandalism may include arson	6
7	Vandalism	**High**	**Medium** Damage. Signs broken, seats pulled from their base, tree branches broken	BTC maintained but mainly for recovery rather than prevention	No major change envisaged. Constant policing of site not possible	6
8	Detrimental disturbance of plants	**Low**	**Low** Would have to be major disturbance for higher rating	Disturbance is unlikely except as part of any maintenance programme	Unlikely that disturbances will occur	1
9	Detrimental disturbance of animals	**Low**	Low Depending on source and type of disturbance	Disturbance is unlikely except as part of any maintenance programme	Unlikely that disturbances will occur	1
10	Detrimental disturbance of nesting birds	**Low**	**Low** Would have to be extensive for higher rating	Disturbance is unlikely because generally nesting birds will avoid areas of high activity	Unlikely that disturbances will occur	1
11	Diseases of plants and animals	**Low**	**Low** No record of typical plant or animal diseases on this site or specific vulnerabilities	No obvious controls nor need for controls	No record of viral diseases or threats in hedgehogs, hares carrion crows etc	1

12	Invasive species	**Low**	**Low** No invasive species identified	No obvious controls. Need for controls is debatable	No record of any invasive species	1
13	Pests	**Low**	**Low** No pests identified	No obvious controls. Need for controls is debatable	No record of any pest species	1
14	Industrial and new builds	**Low**	**Low** No known plans for building works in area	No known protected areas	Reassess if any building plans or changes of use become known	1
15	Adverse impact on wildlife caused by presence of dogs.	**Medium**	**Medium** Dog odour/faeces can deter wildlife. Less concentrated in general areas. Some owners do not 'pick up'	Gravel field is maintained by Brightlingsea Town Council and described as dog friendly	Although unlikely to cause major damage, dog scent discourages the presence of other wildlife	4
16	Lack of maintenance	**Low**	**Medium** Lack of maintenance generally advantageous but is needed to counter vandalism	Gravel field is maintained by Brightlingsea Town Council	Reassess if vandalism or neglect increases	2
17	General habitat loss	**Low**	**High** Any reduction in the site area or of habitat would detract from the objectives of the site	Gravel field maintained by B TC Any area loss would be subject to planning conditions.	Reassess if site size or biodiversity losses are planned or noted	3

Comments. Brightlingsea Town Council own Gravel Field and it is maintained by the ground maintenance staff. It was originally inspected regularly, perhaps a few times a week but information is that this has decreased. Some vandalism has occurred with signs broken, seats pulled from their base and tree branches broken. It has also been reported that someone was anonymously pruning trees without authorisation At times the area can be covered in dog excrement because it is a dog 'of lead' area despite the presence of two dog waste bins, one at the entrance on Robinson Road, the other at Mill Street. Note the potential adverse impact on wildlife of the presence of dogs as discussed in the main text. There have been community clear-ups for example that advertised for 25.07.20. These events indicate that the site may not be respected as it should.
The area used to be well maintained with quite regular mowing and pruning but is now left more to its own devices and only mowed occasionally. Although originally it was not exceptionally popular, following the covid outbreak its popularity has increased.
The body of a whale that was washed up on the beach over fifty years ago is said to be buried here. Despite any constraints, the area has a reputation for a wide range of wildlife including adders, muntjac, kestrels, woodpeckers and dragon flies.
Gravel Field is set against a quiet country road, against which is Mill Street Pond (see separate assessment). Local nature enthusiasts tend to visited the area effectively monitoring its condition.
Grass fires are a possibility. The overall risk to biodiversity and of environmental degradation is **Medium**

Endangered species or species of note or interest
None

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9 respectively.**
Site score = sum of individual scores/number of risk areas = 36/17 = 2.1 rounded up to 4
Overall risk rating. From the site score, the overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated **Medium**
Main potential single event concern. Fire

Potential for enhancement
Rolling programme of enhancement should be included with maintenance. In depth biodiversity survey required

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7. Gravel Pits (Flooded Quarries) including TM07111872 and TM06121874
Various locations including an unnamed pit used by an angling club at TM071118712 (elevation 17.7 m) and Noah's Ark Pit centred on TM06121874 (elevation 2.1 m). Data for this latter pit was mainly extracted from a document kindly donated by J. M. Environmental Ltd. (Smith 2021). This data is marked with an asterisk (*) indicating that a plant species was found at Noah's Ark Pit, but which may also be found at other flooded gravel pits. Flooded gravel pits are an extremely important feature of the Brightlingsea area and are discussed in greater detail earlier in the text. Data from several pits have been obtained from general sources including observation. At least three non-working flooded gravel pit are currently used for recreational fishing. A typical pit may be surrounded by a thin band of vegetation, including trees, and partly or entirely set in agricultural land.

The data on fish species was supplied by angling club representatives but permission for a full survey at one pit, including samples for eDNA, was refused. However, permission was granted if the 'survey' was incorporated with a fishing session as a club member, this to avoid complications with public liability insurance. Consequently, for gravel pits in general, only a small sample of biodiversity is recorded, this being obtained from existing data, remote observations, photography during legitimate access and third-party input.
The most common fish species is Common Carp (*Cyprinus carpio*) numbers of which many can be observed on the surface of several pits on hot sunny days. Grass Carp (*Ctenopharyngodon idella*) are said to have been introduced to one water body, but this is yet to be confirmed. One lake is said to hold Wels cat fish (*Silurus glanis*) but data is not held to verify this. The data listed under is pooled data from several typical pits. A pit was revisited in June 2024. Water level was high and biodiversity confirmed to be thriving. Limited permission to survey was obtained from the owners via the angling club Secretary.

Figure 23. A flooded gravel pit.
Photo © Tony Thorn

Plants

1. Alder *Alnus glutinosa*
2. Bramble *Rubus fruticosus**
3. Blackthorn *Prunus spinosa**
4. Cat's-ear *Hypochaeris radicata*
5. Cock's-foot *Dactylis glomerata*
6. Common Cord-grass *Spartina anglica**
7. Common Couch *Elytrigia repens**
8. Common Dog Violet *Viola rivinana*
9. Common Reed *Phragmites australis**
10. Common Vetch Vicia sativa*
11. Common Water-crowfoot *Ranunculus aquatilis**
12. Couch Grass *Elymus repens*
13. Crack Willow *Salix euxina*
14. Creeping Bent *Agrostis stolonifera**
15. Dandelion *Taraxacum officinale*
16. Evergreen (Holm) *Oak Quercus ilex*
17. Foxglove *Digitalis purpurea*
18. Goat Willow *Salix caprea*
19. Gorse *Ulex europaeus**
20. Great Lettuce *Lactuca virosa*
21. Great Mullein *Verbascum thapsus*
22. Great Willowherb *Epilobium hirsutum*
23. Greater Birds-foot Trefoil *Lotus uliginosus**
24. Gypsywort *Lycopus europaeus*
25. Hard Rush *Juncus inflexus**
26. Hawthorn *Crataegus monogyna**
27. Hedge Woundwort *Stachys sylvatica**
28. Hoary Willowherb *Epilobium parviflorum*
29. Meadow Buttercup *Ranunculus acris*
30. Meadow Thistle *Cirsium dissectum*
31. Nettle *Urtica dioica*
32. Oak *Quercus robur**
33. Oak *Quercus ilex*
34. Oxeye Daisy *Levecanthemun vulgare*
35. Perriwinkle *Vinca major* and *Vinca minor*
36. Reed Canary-grass *Phalaris arundinacea**
37. Scarlet Pimpernel *Anagallis arvensis*
38. Sheep's Sorrel *Rumex acetosella**
39. Silver Birch *Betula pendula*
40. Soft-brome *Bromus hordeaceus**
41. Spanish Broom *Spartium junceum*
42. Spear Thistle *Cirsium vulgare*
43. Squirreltail Fescue *Vulpia bromoides**
44. Sweet Chestnut *Castanea sativa*
45. Sweet Flag *Acorus calamus*
46. Sycamore *Acer pseudoplatanus*
47. Tamarisk *Tamarix gallica**
48. Water Crowfoot *Ranunculus sp.**
49. Water lily (White) *Nymphaea alba*
50. Water lily (Red) *Nymphaea sp.* (var. Sirius?)
51. Weeping Willow *Salix babylonica*
52. White Melilot *Melilotus albus*
53. Wild Carrot *Daucus carota* subsp. *Carota**
54. Yellow Iris *Iris pseudacorus*

Fungi

1. Cushion Bracket *Phellinus pomaceus*

Animals

1. Black-headed Gull *Chroicocephalus ridibundas*
2. Bream *Abramis brama*
3. Common Carp *Cyprinus carpio*

4. Common Gull *Larus canus*
5. Coot *Fulica atra*
6. Curlew *Numenius arquata*
7. Great Crested Grebe *Podiceps cristatus*
8. Gudgeon *Gobio gobio*
9. Kingfisher *Alcedo atthis*
10. Little Grebe *Tachybaptus ruficollis*
11. Long-tailed tit *Aegithalos caudatus*
12. Magpie *Pica pica*
13. Mallard Duck *Anas platyrhynchos* m and f
14. Moorhen *Gallinula chloropus*
15. Netted Field Slug *Deroceras reticulatum*
16. Oak Gall Knopper Wasp *Andricus quercuscorticis*
17. Perch *Perca fluviatilis*
18. Pheasant *Phasianus colchicus*
19. Pike *Esox lucius*
20. Roach *Rutilus rutilus*
21. Robin *Erithacus rubecula*
22. Rudd *Scardinius erythrophalmus*
23. Woodpigeon *Columba palumbus*

Risk Assessment # 7		Risk of instability through environmental and biological degradation. Gravel Pits				
System site description summary as at 2025		Sample pits have been observed at TM06121875, TM07101876, TM09421742, TM0971740 and TM109911703. Various elevations. Brightlingsea geology is a mainly gravelly strata over London Clay, hence most worked-out pits tend to be water filled. Many are old and nature has been allowed to flourish especially where public access is difficult or where a pit owner has permitted use by anglers. Pits are havens for wildlife and need to be monitored and cherished. Of interest is that these pits are randomly scattered and retain water whatever their height above sea level. This suggests that the water table and the layer of impervious London Clay on which it sits, is bowed and thus follows the contours of the surface. This is a generic assessment relating to worked out pits. Live pits are assumed to be both dynamic and relatively secure.				
Event to which risk applies as at 2025		Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Notes including those on long term stability	Risk *P x I*
1	General contamination and pollution caused by dumping of rubbish	**Low**	**High** Depending on the nature of rubbish and any enduring after care programme	Most observed pits are either monitored via angling clubs or are remote with little public access	All pits were required to maintain an aftercare programme for 5 years after closure. This is now after 30 years as from 2023	3
2	General contamination and pollution caused by other means e.g. agricultural runoff	**Low**	**High** depending on nature of runoff and any enduring after care programme	Observation and remedial action on pits run by angling clubs, Mitigation is unlikely on others	Pollution must be recognised and a means of reporting it known i.e. contact with owner and EA	3
3	Excessive temperature	**Medium**	**High** Precursor to low oxygen content, algae and drying out	Air temperature affects water temperature and neither can be controlled	Expected to be a more frequent problem with climate change	6

4	Drying out	**Low**	**High** Catastrophic if pit dries out completely	Most pits retain water independent of their height above sea level	Various bodies such as the EA would assist struggling fish stock if notified	3
5	Algal blooms of Green or Filamentous algae (*Chlorophyta*)	**Medium**	**Medium** Non-toxic but can reduce oxygen content	Seasonal risk increases with higher summer temperatures and more sunlight hours	No practical intervention possible	4
6	Adverse algal growth such as cyanobacteria (e.g. *Anabaena* sp.)	**Medium**	**High** Excess causes production of neurotoxins	Neurotoxins adversely impact many higher animal species but few are present	No practical intervention possible Aeration has produced good results in local boating lake	6
7	Disease including various fish diseases	**Low**	**High** Depends on disease type and severity. Could be catastrophic	No record of fish diseases in local pits	Various bodies such as the EA would assist if the need is correctly identified	3
8	Threats to birds especially breeding waterfowl	**Low**	**High** Some pits commercialised. Impact depends on any aftercare plan	Most pits are undisturbed but have unknown futures. Anglers tend to respect wildlife.	Undisturbed pits are havens for waterfowl and may be enhanced via aftercare plans (see items 1 and 8)	3
9	Threats to wildlife surrounding water filled pit	**Low**	**High** Some pits commercialised Impact depends on aftercare plan	Most pits are undisturbed but have unknown futures. Anglers tend to respect wildlife.	Areas surrounding pits may be maintained via aftercare plans (see items 1 and 8)	3
10	Reduced Oxygen levels	**Medium**	**High** In extreme cases could be catastrophic	Once recognised, water can be aerated by owners assisted by EA or other expert domains	Expected to be a more frequent problem. Solution may be financially unviable except on fishing club waters	6
11	Vandalism	**Low**	**Medium** Depends on type and degree of vandalism	Gravel pits tend to be frequently monitored by anglers or are difficult to access	Unpredictable risk with little mitigation possible except to restrict access	3
12	Industrialisation of mature pits including infill for waste or anticipation of new build	**Low**	**High** Infilling destroys aquatic biodiversity	Legislation to protect biodiversity following cessation of extraction	All pits required to maintain an aftercare programme for 5 years after closure of workings. From 2023 this is 30 years	3
13	Lack of maintenance	**Low**	**Medium** Ongoing maintenance may be a condition of any aftercare plan	No mitigation necessary in most cases. Lack of maintenance may benefit biodiversity	Pits left to rewild need little maintenance but may need remedial care e.g. following vandalism	1

14	General habitat loss	**Low**	**Medium** Depends on conditions of aftercare programme	No mitigation necessary in most cases.	Pits may need remedial care e.g. following vandalism	2

Comments. Worked out water-filled gravel pits fall into two risk areas, those used for angling clubs, which are regularly visited, and those that are not. Angling clubs have a vested interest in maintaining club waters which are monitored by anglers on a regular basis. These waters are well maintained with little risk to residential or seasonal wild life. The risk to fish is dependent on club members adhering strictly to club and National rules, which are both well monitored for compliance, and by the restriction of access to the general public. This is not so for other water-filled pits. The risk of pollution is low.
Other pits do not afford easy access to the public and are generally left for nature to repopulate when mining ceases. One pit has received varying planning permission for the building hoses or a holiday complex, with risks to migrating geese populations. No work has commenced as at 2025. Plans for a new mixed-use holiday and residential development at a former quarry in Brightlingsea have been backed by councillors, subject to further consultation. The latest data held is November 2024. Artemis (Brightlingsea) Ltd.'s bid to develop the former gravel workings at Lower Farm, East End Green were unanimously backed by Tendring District Council's (TDC) Planning Committee at a meeting on Tuesday, 5 November 2024. The project aims to transform the 81 acre site into a mixed-use tourist and residential development of retirement living lodges, detached farmstead houses, and holiday lodges along with separate communal buildings providing dining, leisure and recreation facilities. It includes 104 holiday lodges, 36 retirement units, and five market dwellings.

There is always a common risk that any water filled pit may be filled following a successful planning application. The provision of aftercare is discussed earlier in this document.

Endangered species or species of note or interest
Carp (*Cyprinus carpio*) are the dominant species. Many pits support Kingfishers (*Alcedo atthis*) and breeding colonies of geese, especially Greylag (*Anser anser*)

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9** respectively
Site score = sum of individual scores/number of risk areas = 50/14 = 3.6 rounded to 4
Overall risk rating The overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated **Medium**
Main potential single event concerns. Excessive temperature, algal blooms and reduced oxygen levels.

Potential for enhancement
Without identification of a specific deficiency, little potential for enhancement exists.

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8. Springmead Garden TM08441719 Elevation 15.1 m
This Charitable Trust (Reg 218049), one-acre mature garden is noted for its spring, natural brook and bog area. It holds many species of plants including Gunnera and Echiums. Wood piles, bug hotels and pots provide a habitat for hedgehogs, amphibians and a wide variety of insects. There are bird feeders, roosting and nesting boxes. The following is just a sample of the extensive range of species.

No survey of wildlife was made on visits during early 2022. However, in September 2022 a biodiversity meeting to identify moths and bats recorded several animals, and further birds and insects were recorded during 2023. Birds are attracted to the garden. Permission to survey was given by the head gardener and also discussed with a Trustee. In April 2023 a brief survey of spring flowering plants was followed on 23 November 2023 by an intensive survey of plants, noting that a high proportion of the plant species were non-native. It was also noted that when identifying the species there were many cases of multiple common names and synonyms. Many plants were still in flower. Numerous non-native permanent plants have been introduced but an unspecified number of plants may be changed at the discretion of the gardeners. The following is just a sample of the extensive range of species.

Plants
1. Adam's Needle *Yucca flaccida*
2. African Lily *Agapanthus praecox*
3. Alice Eastwood's Fleabane *Erigeron aliceae*
4. Alpine Wood Fern *Dryoteris wallichiana*
5. Alter Lily *Zantedeschia aethiopia*
6. Argentine Needle-grass *Nassella tenuissima*
7. Autumn Sage *Salvia gregii*
8. Black-eyed Susan *Rudbeckia hirta*

9. Bluebell *Hyacinthoides non-scripta*
10. Bugle *Ajuga reptans*
11. Bugle-lily *Watsonia borbonica*
12. Cabbage-palm *Cordyline australis*
13. Californian Fescue *Festuca californica*
14. Cat-mint *Nepeta cataria*
15. Caucasian Barrenwort *Epimedium pinnatum*
16. Chinese Silver-grass *Miscanthus sinensis*
17. Coastal Mugwort *Artemisis suksdorfii*
18. Common Duckweed *Lemna minor*
19. Common Ivy *Hedera helix*
20. Common Male Fern *Dryopteris filix-mas agg*.
21. Common Mullen *Verbascum thapsus*
22. Common Myrtle *Myrtus communis*
23. Common Ragwort *Senecio jacobaea*
24. Cranesbill/Caucasian Cranesbill *Geranium renardii*
25. Creeping Lily Turf *Liriope spicata*
26. Creeping Thyme *Thymus praecox*
27. Crimson River Lily *Schizostylus coccinea*
28. Crocus *Crocus sp.*
29. Daffodil *Narcissus pseudonarcissus*
30. Dwarf Catnip *Nepeta racemosa*
31. Fiddle Dock *Rumex pulcher*
32. Fortune's Spindle *Euonymus fortunei*
33. Fountain Grass *Cenchrus alopecuroides*
34. Foxglove *Digitalis purpurea*
35. Fragrant Hellebore *Helleborus odorus*
36. Fritillary *Fritillaria melagris*
37. Garden Cat-mint *Nepeta x faassenii*
38. Garden Lavendar *Lavandula angustifolia*
39. Garden Sisal *Agave vivipara*
40. Garden Speedwell *Veronica longifolia*
41. Giant Rhubarb *Gunnera tinctoria*
42. Gold dust dracaena/Japanese Bamboo *Dracaena surculose*
43. Golden Saxifrage *Chrysosplenium americanum*
44. Green Alkanet *Pentaglottis sempervirens*
45. Guernsey Lily *Nerine bowdenii*
46. Hart's-tongue Fern *Asplenium scolopendrium*
47. Heart-leaf Nettle *Urtica chamaedryoides*
48. Heart-leaved Bergenia *Bergenia cordifolia*
49. Hemlock (Poison) *Conium maculatum*
50. Holly *Ilex aquifolium*
51. Holly-leaved Barberry *Berbaris aquifolium*
52. Hydrangea *Hydrangea macrophylla*
53. Italian Lords and Ladies / Arum *Arum Italicum*
54. Ivy-leaved Pelargonium *Pelargonium peltatum*
55. Japanese Anemone *Anemone x hybrida*
56. Japanese Honeysuckle *Lonicera japonica*
57. Kaffir Lily *Schizostylis coccinea*
58. Knotted Crane's-bill *Geranium nodosum*
59. Lavender-cotton *Santolina chamaecyparissus*
60. Japanese Mahonia *Mahonia japonica*
61. Japanese Thimbleweed *Anemone hupehensis*
62. Mediterranean Spurge *Euphorbia characias subsp. wulfenii*
63. Mediterranean Woundwart *Stachys cretica*
64. New Zealand Hair-sedge *Carex comans*
65. Oakleaf Hydrangea *Hydrangea quercifolia*
66. Orange Daylily *Hemerocallis fulva*
67. Ostrich / Shuttle Fern *Matteuccia struthiopteris*
68. Pacific Blackberry *Rubus ursinus*
69. Persian Catmint *Nepeta racemosa*

70. Peruvian Lily *Alstroemeria aurea*
71. Pittosporum spp. *Pittosporaceae*
72. Poinsettia *Euphorbia pulcherrima*
73. Pot Marigold *Calendula officinalis*
74. Primrose *Primula vulgaris*
75. Purple Milk Thistle *Galactites tomentosus*
76. Purple **S**alsify *Tragopogon porrifolius*
77. Red Dead-nettle *Lamium purpureum*
78. Rock Crane's-bill *Geranium macrorrhizum*
79. Rosemary *Rosmarinus officinalis*
80. Sage/Salvia/Purple Sage *Salvia officinalis*
81. Salsify *Tragopogon porrifolius*
82. Shrubby Germander *Teucrium fruticans*
83. Shuttle Fern *Matteuccia struthiopteris*
84. Slender Palm Lily *Cordyline stricta*
85. Slender Sweet-flag *Acorus gramineus*
86. Small Blue-convolvulus *Convolvulus siculus*
87. Snakeshead Fritillary *Fritillaria meleagris*
88. Snowberry *Symphoricarpos albus*
89. Snowdrop *Galanthus nivalis*
90. Snow-in-summer *Cerastium tomentosum*
91. Stinking Iris *Iris foetidissima*
92. Sweet Violet *Viola odorata*
93. Tawhiwhi *Pittosporum tenuifolium*
94. Verbena *Verbena x hybrida*
95. Volga Fescue *Festuca valesiaca*
96. Walter's Violet *Viola walteri*
97. Winter Jasmine *Jasminum nudiflorum*
98. Yellow Flag Iris *Iris pseudacorus*

Trees

1. Ash *Fraxinus excelsior*
2. Ashleaf Maple *Acer Negundo*
3. Cherry Laurel *Prunus laurocerasus*
4. Chinese Juniper *Juniperus chinensis*
5. Dappled Willow *Salix integra*
6. Dogwood *Cornus sanguinea*
7. Hazel *Corylus avellana*
8. Mongolian / European Dwarf Cherry *Prunus fruticosa*
9. Mountain Spruce (Christmas Tree) *Pica engelmannii*
10. Norway Maple *Acer platanoides*
11. Rowan (Mountain Ash) *Sorbus aucuparia*

Fungi

1. Blushing Bracket *Daedaleopsis confragosa* (subject to confirmation)
2. Sulphur Tuft *Hypholoma fasciculare var. fasciculare*

Animals

1. Blackbird *Turdus merula*
2. Box-tree moth *Cydalima perspectalils*
3. Broad-bordered Yellow Underwing Moth *Noctua fimbriata*
4. Bug *Rhyparochromus vulgaris*
5. Chiffchaff *Phylloscopus collybita*
6. Common Pipistrel *Pipistrellus pipistrellus*
7. Cross Orb Weaver Spider *Araneus diadematus*
8. Dunnock *Prunella modularis*
9. Early Grey Moth *Xylocampa areola*
10. Feathered Ranunculus moth *Polymixis lichenea*
11. Grey Squirrel *Sciurus carolinensis*
12. Cross Orb Weaver Spider *Araneus diadematus*
13. Greenfinch *Chloris chloris*

14. Hairy footed Flower Bee *Anthophora plumipes*
15. House Sparrow *Passer domesticus*
16. Large Yellow Underwing moth *Noctua pronuba*
17. Robin *Erithacus rubecula*
18. Song Thrush *Turdus philomelos*
19. Wren *Troglodytes troglodytes*

The Spring and Roman Brook

The following are preliminary observations by the former Essex Wildlife Trust's Wilder Rivers Officer with the objective of producing an action plan for a full survey.

1. The pond is covered in a pondweed species (likely duckweed), and is described as being in such a state year-round. Evidently this is an issue for the pond ecosystem as it will be limiting oxygen and light availability to other aquatic biodiversity. Duckweed thrives in high nutrient (ammonia, nitrates, phosphorous) waters – road run-off and excess sunlight are potential explanations for this excess but will require further examination. Removing duckweed is relatively straightforward and can be composted – I noticed a few compost bins in the gardens so that might be easiest.

2. The pond should be surveyed, eDNA ideally, to provide information on pond residents. Moving forwards, the pond – when functioning properly – could represent an excellent community engagement point. There is a school nearby and surveying could take place to engage the school children with the aquatic environment.

3. The Roman Brook is the only flowing waterbody in Brightlingsea, and therefore necessarily carries significance to the local area. The brook itself is in relatively good condition, with a visible flow and a gravelly bed. Potential actions might be to create some diversity in the channel itself by planting vegetation, which would create greater habitat diversity. This could also mitigate potential risks of bank collapse – as highlighted in the visit, the brook is undercutting the rock banks in places.

4. Both the brook and pond have yet to be surveyed in any significant detail. As the only flowing waterbody in the area, it would appear necessary to understand the biodiversity present. Further to that, surveys on temperature and salinity have been suggested. Future discussions on what surveys to focus on are needed.

5. The course of the brook is unclear and runs through several private properties. Discussions with relevant landowners and mapping the course of the brook are essential actions even if further down the line.

Figure 24. A small part of Springmead Gardens
Photo © Tony Thorn

Adding to the points above it would be of interest to determine the geology of the area in particular the distribution of any springs and the form of the gravel/London Clay interface. In particular the h.a.s.l. of flooded gravel pits varies from 24 m to 0 m and assuming they remain flooded due to an impervious boundary layer of London Clay it may be worth considering whether the strata is bowed and that all pits share a common boundary interface. See also Figure 3.

Risk Assessment # 8		Risk of instability through environmental and biological degradation. Springmead Garden				
System site description summary as at 2025		Springmead Garden (TM08441719, elevation 13m) is a Charitable Trust in central Brightlingsea and the grounds are open to the public during the day. It contains many species of plants both native and introduced with a spring fed pond from which the diminutive Roman Brook emerges. There are bug-houses and other wildlife friendly articles. It is regularly and efficiently maintained by Trust volunteer gardeners.				
Event to which risk applies as at 2025		Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Notes including those on long term stability	Risk *P x I*
1	Contamination and pollution of spring, pond and stream	**Low**	**Medium** Low impact. Water body represents a minor part of whole site biodiversity	Effective management and overview of whole site	No history of contamination. Potential sources road drainage and water table	2
2	Algal blooms (*Chlorophyta*) in pond	**Low**	**Medium** Non-toxic but can reduce oxygen content impacting on aquatic biodiversity	Seasonal risk increases with higher summer temperatures and more sunlight hours	No practical intervention possible. High duckweed density limited blooms	2
3	Adverse algal growth such as cyanobacteria (e.g. *Anabaena* sp.) in pond and stream	**Low**	**Medium** Excess causes production of neurotoxins impacting on aquatic biodiversity	Neurotoxins adversely impact many higher animal species especially by drinking but few are present.	No practical intervention possible Aeration has produced good results in local boating lake	2
4	Excessive water temperature in pond and stream	**Low**	**Medium** Precursor to low oxygen content, algae and drying out	Air temperature affects water temperature and neither can be controlled	Expected to be a more frequent problem with climate change	2
5	Drying out of spring, pond and stream	**Low**	**High** Catastrophic if spring dries out completely	No controls possible	Spring has not dried out to date but future flow is not certain	3
6	Dumping of rubbish and litter	**Low**	**Medium** Depends on type and location of material	Premises are fenced and locked at night. Supervised by volunteer staff for much of the day	Locked at night supervised during day	2
7	Drought	**Low**	**Medium** Many plants are drought resistant	Garden would be watered as required by ground staff	No other practical intervention possible	2
8	Contamination and pollution of Garden	**Low**	**Medium** Possibly limited to rain water runoff from road	Garden monitored as required by ground staff as normal maintenance	No practical intervention possible	2

9	Excessive air temperature for long periods	**Low**	**Medium** Depends on tolerance of individual species. See also drought	Air temperature cannot be controlled. No alternative controls	Expected to be a more frequent problem with climate change	2
10	Diseases of plants and animals	**Low**	**Low** Individual plant species are hardy and have species specific diseases	Expert monitoring, maintenance by experienced and dedicated gardeners	No record of any disease outbreak and tolerances of individual species is unknown	1
11	Pests	**Low**	**Low** Generally individual plant species have species specific pests. Squirrels	Expert observation and remedial action by gardeners. Regular maintenance of grounds	No record of any pest outbreak and tolerances of individual species is unknown	1
12	Invasive species	**Low**	**Low** Invasive species are non-native and most plants here are not detrimental to others	Expert management and control	No record of detrimental species apart from Grey Squirrels *Sciurus carolinensis*	1
13	Detrimental disturbance of plants and animals	**Low**	**Low** Disturbance unlikely and would have to be by third party as for vandalism. Little impact	Plant locations and security controlled by ground staff. Few animals Expert management and control	No record of disturbances caused by unauthorised bodies	1
14	Excessive rainfall	**Low**	**Low** Little impact and excessive rainfall is not likely in this geographical area	Additional suitable drainage can be introduced if and when it proves necessary	Expected to be a more frequent occurrence.. Some runoff from nearby roads	1
15	Fire	**Low**	**Low** Most of the area would not be damaged/impacted	Area would not be allowed to dry sufficiently to present a risk	Risk of fire damage further mitigated by closeness of fire services	1
16	Vandalism	**Low**	**Medium** Area supervised by ground staff and gate locked at night. Impact would be mainly on fencing otherwise unpredictable	In summer, garden may be frequented by school children but no evidence or reason to suggest problems	Unpredictable risk with little mitigation possible except to restrict access	2
17	Industrial and new build	**Low**	**Low** No plans or permission to build	Charitable Trust status may preclude any permissions to build	Assumed to be stable with no predictable changes.	1
18	Lack of maintenance	**Low**	**High** Without regular maintenance many non-native plant species would be overwhelmed by native species	Mitigated by a highly effective team of experts	Regular maintenance ensures stability	3

19	General habitat loss	**Low**	**High**	Mitigated by a highly effective team of experts	Regular maintenance ensures retention of habitat	3

Comments. Springmead Gardens Charitable Trust runs Springmead Gardens in central Brightlingsea and the grounds are open to the public during the day. It contains many species of plants and a spring fed pond flowing into the Roman Brook. It is regularly maintained by Trust volunteer gardeners. The garden is effectively a wildlife and plant island that retains its integrity by regular and efficient maintenance. Many of the plants are introduced species from the southern United States and other temperate zones, but have obviously tolerated the local microclimate well. There are bug-houses and other wildlife friendly articles.

The gardens are open to the public and may be frequented by local schoolchildren in the summer. The gardens are regularly and exceptionally well maintained by the groundkeepers and the entrances are locked overnight. Without the expert maintenance currently provided, the huge range of plants would be at risk of depletion or of being overwhelmed by native species.

The spring is not at risk of interference and has never been known to dry up, but recent summer temperatures have been unusually high and rainfall low, so there is always the risk of the spring drying up in future. Because the spring provides a regular flow of clear water, the presence of algae in the water column, although possible is very unlikely to occur. Nor is it likely to produce any negative events. Moreover, Duckweed *Lemna minor*, gives almost 100% surface cover, limiting light available for sub surface algal photosynthesis.

Information from the Archaeological Data Service shows that in 1994 four trenches were excavated but no archaeological features were located as the area had been heavily disturbed by modern activity. Project was funded by Springmead Trust. (https://archaeologydataservice.ac.uk/archsearch/record.xhtml).

A proposed survey of the Roman Brook was suspended due to the loss of the Essex Wildlife Trust's Wilder Rivers Officer post in early 2024. It is not known if sufficient resources will eventually be made available for it to be conducted in the future.

Endangered species or species of note or interest
There are too many plant species, many of which are non-native, to record here.

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9** respectively
Site score = sum of individual scores/number of risk areas = 34/19 = 1.8 rounded down to 1
Overall risk rating. From the site score, the overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated **Low**
Main potential single event concerns. Drying out of spring

Potential for enhancement
Without identification of a specific deficiency, little potential for enhancement exists. The grounds are already maintained to a very high standard, such that no improvements can be suggested.

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9. The Coastline (Variable elevations depending on feature)
The beach that abuts the sea wall immediately to the West of Bateman's Tower consists of three zones. The first is mud flats, which are largely horizontal; the second is a sloping shingle beach, and the third zone comprises the seawall defences, the rocks of which are covered with wrack up to the high tide mark. In places gutweed attaches to larger rocks on the shingle beach. There are few, if any, rock pools or large rocks in this zone that would hold small biodiversity communities. Oyster shells litter the beach and local beachcombers search for live oysters. The horizontal top of the seawall is a path that follows the route of the old railway line, whilst a secondary path, the seawall tack, runs parallel to the seawall on its landward side.

Along much of the northern part of this seawall ran the Brightlingsea to Wivenhoe railway line (the 'Crab and Winkle') that was axed in the mid-1960s as a result the Beeching Report. It is an area generally disturbed only by recreational walkers and cyclists. To the north-west is the Colne Estuary, whilst to the extreme north is Alresford Creek. The seawall is accompanied by water filled borrow dykes, that run parallel with it and support dense reed beds along the margins. The risk-assessed area reported in this project includes the site of the old railway line and is divided into sections as described below, but although areas to the north have also been surveyed, they are not risk-assessed within this document due to lack of resources. In particular, the area near to the northern coastline includes several fields that are designated as conservation areas and which are effectively wild flower meadows.

Figure 25. Mudflats near the northern seawall
Photo © Tony Thorn

Also in that area is the commercially managed Moverons Farm that supports wildlife habitats in the form of suitable wild bird ground cover alongside its crops. These mixed crops are intended to produce seeds specifically to sustain several species of birds during the winter, and when exhausted, the landowners provide supplementary feed. This is particularly beneficial to Turtle Doves (*Streptopelia turtur*). The beach to the immediate west of Bateman's Tower was surveyed by Thorn (2021) for mollusc and macroalgae data, with more general surveys conducted during 2023 and 2024. Other data was obtained from local experts and historic information from the British Naturalist's Association and casual walks in 2022.

Figure 26. Part of the seawall at its northern section showing the reed lined borrow dyke (left), the seawall (centre), and the tidal River Colne (far right) Photo © Ed Thorn

Figure 27. An area of the marshland flooded in an attempt to increase biodiversity potential.
Photo © Ed Thorn

The Borrow Dykes

Much of the northern and western coastline is dominated by the borrow dykes as shown in Figure 26. When the seawall was constructed, earth from the interior area was moved to construct the wall and the resulting depression or ditch that runs parallel to the wall eventually filled with fresh or brackish water. This water runs naturally from the inland marshes. Running parallel to the borrow dykes at the water's edge are extensive rows of Common Reed *Phragmites australis.*

Constructing new marshland habitats

An area of land at TM06101821 is being prepared for flooding to create a new habitat. (Figure 27) This is inland of the borrow dyke.

The Northern and Western Coastline including the seawall and borrow dykes

The most frequently observed animals observed at all locations are birds. Along the seawall and associated pathways, the plants species tend to be common to all locations (Subareas B to E inclusive) i.e. we would not expect a great difference in the range of species. These sub areas are shown in Figure 28 with locations centred on an eight-figure grid reference as under. (Sub-area G is not shown here as it will be considered separately)

A	TM06321930	Ford Lane including coastal end
B	TM06371760	Upper Coastline West area 1
C	TM06711722	Upper Coastline West area 2
D	TM07101680	Upper Coastline West area 3
E	TM07241664	Upper Coastline West area 4
F	TM07431644	Lower Coastline West

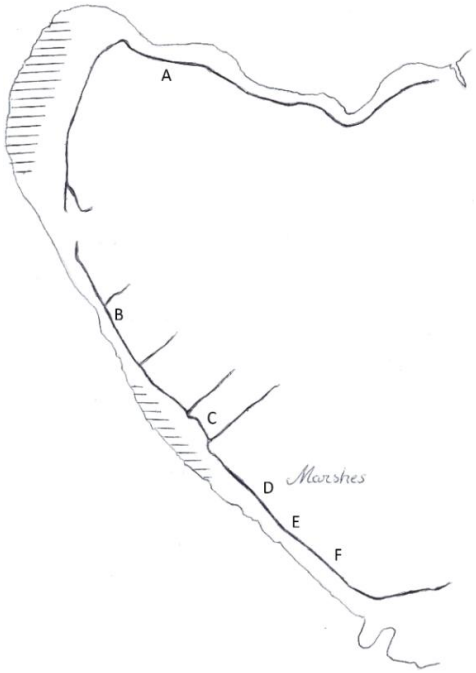

Figure 28. Brightlingsea Coastline showing the Borrow Dykes that run parallel and inland of the sea wall. This area includes Ford lane, Upper Coastline West and Lower Coastline West sub-areas. Shaded areas are main mudflats.

Sub area A. TM06321930 Ford Lane Elevation 2 m
Plants

1. Ash *Fraxinus excelsior*
2. Blackthorn *Prunus spinosa*
3. Bristly Oxtongue *Helminthotheca echioides*
4. Bugloss *Anchusa arvensis*
5. Cleavers *Galium aparine*
6. Common Couch *Elytrigia repens*
7. Common Cord-grass *Spartina anglica*
8. Common Ivy *Hedera helix*
9. Common Nettle *Urtica dioica*
10. Common Orache *Atriplex patula*
11. Common Ragwort *Senecio jacobaea*
12. Common Reed *Phragmites australis*
13. Common Mallow *Larentia clavaria*
14. Creeping Thistle *Cirsium arvense*
15. Darnel *Lolium temulentum*
16. Dog-rose *Rosa canina*
17. Elder *Sambucus nigra*
18. Fat-hen *Chenopodium album*
19. Goat's-rue *Galega officinalis*
20. Gorse *Ulex europaeus*
21. Hazel *Corylus avellana*
22. Hemlock *Conium maculatum*
23. Holly *Ilex aquifolium*
24. Magellan Ragwort *Senecio smithii*
25. English or Pedunculate Oak *Quercus robur*
26. Red Clover *Trifolium pratense*
27. Sea-purslane *Atriplex portulacoides*
28. Sessile Oak *Quercus petraea*
29. Small-leaved Elm (sensu Stace) *Ulmus minor*
30. Smooth Sow-thistle *Sonchus oleraceus*
31. Snapdragon *Antirrhinum majus*

32. Swiss Chard *Beta vulgaris subsp. cicla var. flavescens*
33. Wood Meadow-grass *Poa nemoralis*
34. Yarrow *Achillea millefolium*
35. Yorkshire-fog *Holcus lanatus*

Animals

1. Kestrel *Falco tinnunculus*
2. Weasel *Mustela nivalis*

Fungi

1. Sulphur Tuft Mushroom *Hypholoma fasciculare*

Sub Area A_1 TM06301948 Ford Lane coastal end Elevation 0 m

Plants

1. Common Reed *Phragmites australis*
2. Sea Purslane *Atriplex portulacoides*
3. Yarrow *Achillea millefolium*

Animals

1. Brent Geese *Branta bernicla*
2. Mallow (moth) *Larentia clavaria*

Sub area B. TM06371760 Upper Coastline West area 1 Elevation 2 m

Plants

1. Bristly Oxtongue *Helminthotheca echoides*
2. Blackthorn *Prunus spinosa*
3. Bramble (Blackberry) *Rubus fruticosus*
4. Common Cord Grass *Sporobolus anglicus*
5. Common Juniper *Juniprus communis*
6. Common Mallow *Malva sylvestris*
7. Common Reed *Phragmites australis*
8. Cow Parsley *Anthriscus sylvestris*
9. Fiddle Dock *Rumex pulcher*
10. Hawthorn *Crataegus monogyna*
11. Holm Oak *Quercus ilex*
12. Shrubby Sea Blite *Suaeda vera*
13. Swiss Chard *Beta vulgaris*
14. Tamarisk *Tamarix gallica*

Animals

1. Avocet *Recurvirostra avosetta*
2. Bar-tailed Godwit *Limosa lapponica*
3. Black headed Gull *Chroicocephalus ridibundus*
4. Blue Tit *Cyanistes caeruleus*
5. Brent Goose *Branta bernicla*
6. Brown Hare *Lepus europaeus*
7. Cetti's Warbler *Cettia cetti*
8. Cormorant *Phalacrocorax carbo*
9. Curlew *Numenius arquata*
10. Digger Wasp *Ectemnius continuus*
11. Dunnock *Prunella modularis*
12. Eurasian Widgeon *Mareca penelope*
13. Goldfinch *Carduelis carduelis*
14. Great Black-backed gull *Larus marinus*
15. Green Woodpecker *Picus viridis*
16. Grey Heron *Ardea cinerea*
17. Greylag Goose *Anser anser*
18. Hobby *Falco subbuteo*
19. Kestrel *Falco tinnunculus*
20. Kingfisher *Alcedo atthis*
21. Linnet *Linaria cannabina*
22. Little Egret *Egretta garzetta*
23. Marsh Harrier *Linaria cannabina*
24. Meadow Pipit *Anthus pratensis*
25. Oystercatcher *Haematopus ostralegus*

26. Redshank *Tringa totanus*
27. Reed Warbler *Acrocephalus scirpaceus*
28. Shelduck *Tadorna tadorna*
29. Skylark *Alauda arvensis*
30. Square Headed /Digger Wasp *Ectemnius continuus*
31. Stonechat *Saxicola rubicola*
32. Turnstone *Arenaria interpres*
33. Whitethroat *Sylvia communis*
34. Wood Mouse *Apodemus sylvaticus*
35. Wood Pigeon *Columba palumbus*
36. Wren *Troglodytes troglodytes*

Sub area C. TM06711722 Upper Coastline West area 2 Elevation 2 m

Plants

1. Common Cord-grass *Spartina anglica*
2. Common Reed *Phragmites australis*
3. Common Mallow *Malva sylestris*
4. Bristly Oxtongue *Helminthotheca echioides*
5. Buck's Horn Plantain *Plantago coronopus*
6. Bur Chervil *Anthriscus caucalis*
7. Cow Parsley *Anthriscus sylvestris*
8. English Cinquefoil *Potentilla anglica*
9. Fiddle Dock *Rumex pulcher*
10. Hawthorn *Crataegus monogyna*
11. Holm oak *Quercus ilex*
12. Shrubby Sea Blite *Suaeda vera*
13. Spear Thistle *Cirsium vulgare*
14. Stinging nettle *Urtica dioica*
15. Swiss Chard *Beta vulgaris*

Animals

1. Blackbird *Turdus merula*
2. Grey Partridge *Perdix perdix*
3. Long-tailed Tit *Aegithalos caudatus*
4. Reed Bunting *Emberiza schoeniclus*
5. Rock Pipit *Anthus petrosus*
6. Stonechat *Saxicola rubicola*

Sub area D. TM07101680 Upper Coastline West area 3 Elevation 2 m

Plants

1. Bristly Oxtongue *Helminthotheca echioides*
2. Buck's Horn Plantain *Plantago coronopus*
3. Bur Chervil *Anthriscus caucalis*
4. Common Dandelion *Taraxacum officinale*
5. Common Mallow *Malva sylvestris*
6. Common Plantain *Plantago major*
7. Cow Parsley *Anthriscus sylvestris*
8. Creeping Buttercup *Ranunculus repens*
9. Creeping Cinquefoil *Potentilla reptans*
10. Creeping Thistle *Cirsium arvense*
11. Curled Dock *Rumex crispus*
12. English or Pedunculate Oak *Quercus robur*
13. Holm Oak *Quercus ilex*
14. Ribwort Plantain *Plantago lanceolata*
15. Shrubby Seablite *Suaeda vera*
16. Smooth Hawks-beard *Crepis capillaris*
17. Spear Thistle *Cirsium vulgare*
18. Stinging Nettle *Urtica dioica*
19. Tamarisk *Tamarix gallica*
20. White Clover *Trifolium repens*
21. Yarrow *Achillea millefolium*

Animals

1. Avocet *Recurvirostra avosetta*
2. Blue Tit *Cyanistes caeruleus*
3. Carrion Crow *Corvus corone*
4. Curlew Sandpiper *Calidris ferruginea*
5. Goldfinch *Carduelis carduelis*
6. Grey Seal *Halichoerus grypus*
7. Hobby *Falco subbuteo*
8. Little Egret *Egretta garzetta*
9. Mute Swan *Cygnus olor*
10. Oystercatcher *Haematopus ostralegus*
11. Purse Web Spider *Atypus affinis*
12. Redshank *Tringa totanus*
13. Reed Bunting *Emberiza schoeniclus*
14. Reed Warbler *Acrocephalus scirpaceus*
15. Robin *Erithacus rubecula*

Sub area E. TM07241664 Upper Coastline West area 4 Elevation 0 m

Plants

1. Alexanders *Smyrnium olusatrum*
2. Blackthorn *Prunus spinosa*
3. Bramble *Robus fruticosus*
4. Broadleaved Plantain *Plantago major*
5. Charlock *Sinnapsis arvense*
6. Clover Trefoil *Trifolium medium*
7. Cock's Foot *Dactylis glomerata*
8. Common Cord-grass *Spartina anglica*
9. Common Dandelion *Taraxacum officinale*
10. Common Mallow *Malva sylestris*
11. Common Reed *Phragmites australis*
12. Fennel *Foeniculum vulgare*
13. Hawthorn *Crataegus monogyna*
14. Hemlock (Poison) *Conium maculatum*
15. Michaelmas Daisy *Symphyotrichum x salignum*
16. Ribwort Plantain *Plantago lanceolata*
17. Sea Couch *Elymus pungens*
18. Small Cord-grass *Spartina maritimus*
19. Tamarisk *Tamarix gallica*
20. Yarrow *Achillea millefolium*

Lichen

1. Sunburst lichen *Xanthoria parietina*

Animals

1. Carrion Crow *Corvus corone*
2. Curlew *Numenius arquata*
3. Magpie *Pica*
4. Marsh Harrier *Circus aeruginosus*
5. Pheasant *Phasianus colchicus*
6. Reed Warbler *Acrocephalus scirpaceus*
7. Robin *Erithacus rubecula*
8. Skylark *Alauda arvensis*

Sub Area F. TM07431644 Lower Coastline West Elevation 0 m

Plants on the Beach

No terrestrial plants were observed on the beach area.

Plants on the sea wall

1. Common Sea-lavender *Limonium vulgare*
2. Creeping Buttercup *Ranunculus repens*
3. Pyramidal Orchid *Anacamptis pyramidalis*
4. Salsify *Tragopogan porrifolius*
5. Sea Beet *Beta vulgaris*
6. Sea Wormwood *Artemisia maritima*

7. Wild Onion *Allium vinwale*

Plants beside seawall track

1. Alexanders *Smyrnium olusatrum*
2. Bramble *Rubus fruticosus agg.*
3. Bristly Oxtongue *Helminthotheca echioides*
4. Chinese Mustard *Brassica juncea*
5. Common Mallow *Malva sylvestris*
6. Common Reed *Phragmites australis*
7. Cow Parsley *Anthriscus sylvestris*
8. Crab Apple *Malus sylvestris*
9. Crack Willow *Salix euxina*
10. Creeping Thistle *Cirsium arvense*
11. Dog-rose *Rosa canina*
12. Hawthorn *Crataegus monogyna*
13. Heath-grass *Danthonia decumbens*
14. Hemlock *Conium maculatum*
15. Marram *Ammophila arenaria*
16. Northern Hawk's-beard *Crepis mollis*
17. Purple-stem Cats Tail *Phleum phleoides*
18. Reed Sweet-grass *Glyceria maxima*
19. Rough Chervil *Chaerophyllum temulum*
20. Ribwort Plantain *Plantago lanceolata*
21. Scandinavian Small-reed *Calamagrostis purpurea*
22. Sweet Briar *Rosa rubiginosa*
23. Tamarisk *Tamarix gallica*

Animals on the beach

1. Baltic Tellin *Limecola balthica (*syn. *Macoma balthica)*
2. Common Cockle *Cerastoderma edulis*
3. Common Limpet *Patella vulgata*
4. Common Mussel *Mytilus edulis*
5. Dog Whelk *Nucella lapillus*
6. Manila Clam *Ruditapes phillippinarum*
7. Native Oyster *Ostrea edulis*
8. Netted Dog Whelk *Hinia reticulata*
9. Pacific (Portuguese) Oyster *Crassosotrea gigas*
10. Peppery Furrow Shell *Scrobicularia plana*
11. Periwinkle *Littorina littorina*
12. Periwinkle *Flat Littorina obtusata*
13. Northern Quahog *Mercenaria mercenaria*
14. Sand Gaper *Mya arenaria*
15. Sea Slug 'Royal Flush' *Akera bullata* (deceased)
16. Slipper Limpet *Crepidula fornicata*

Animals in the sea

1. Brown Shrimp *Crangon crangon*
2. Common (Harbour) Seal *Phoca vitulina (3 deceased washed up on the marshes 2023)*
3. Eel *Anguilla anguilla*
4. Green Shore Crab *Carcinus maenas*
5. Grey Seal *Halichoerus grypus* (observed with binoculars)
6. Harbour Porpoise *Phocoena phocoena* (observed with binoculars 2022 & Facebook 2023)
7. Isopod *Idotea baltica*
8. Lugworm *Aurelia aurita*
9. Moon Jellyfish *Aurelia aurita*
10. Thornback Ray *Raja clavata* (Deceased juvenile, but also identified from egg sacs mermaid's purse)

Aquatic macroalgae in the sea or on the beach

1. Dwarf Eelgrass *Zostera noltei*
2. Egg/Knotted Wrack *Ascophyllum nodosum*
3. Gutweed *Enteromorpha intestinalis*
4. Japanese Wireweed *Sargassum muticum*
5. Spiral Wrack *Fucus spiralis*

Animals on the sea wall

1. Soldier Beetle *Tillus elongatus*
2. Common Field Grasshopper *Chorthippus brunneus*
3. Essex Skipper *Thymelicus lineola*
4. Garden / Orbweb / Cross Orbweaver Spider *Araneus diadematus*
5. Grey-banded Mining Bee *Andrena denticulata*
6. Lesser Marsh Grasshopper *Chorthippus albomarginatus*
7. Long-winged Conehead Cricket *Conocephalus discolor*
8. Marsh Harrier *Circus aeruginosus*
9. Meadow Grasshopper *Chorthippus parallelus*
10. Reed Warbler *Acrocephalus scirpaceus*
11. Rock Pipit *Anthus petrosus*
12. Skylark *Alauda arvensis*
13. Small Skipper *Thymelicus sylvestris*

(ii) The central and eastern coastline

The central coastal area includes the general area near Bateman's Tower and the beaches that are popular during the summer, which area I term the Seafront. Progressing eastwards, the beach huts give way to the Brightlingsea Town seafront and from there via the Shipyard Industrial Estate and Harker's Yard to the eastern coastline with its wilder areas of Rope Walk and the riverbank.

Here the coastline consists of the tidal mudflats of Brightlingsea Creek and Flag Creek with two marshy islands, Cindery and Pincushion. From 2017, the area and especially the south channel is said to have been dredged under the Harbour Dredging and Salt Marsh Restoration Programme (Dredging Today, 2017). Mud and sediment were used to partially restore Cindery Island and the local intertidal mudflats. Dredging would of course not been beneficial for most biodiversity. This dredging initiative was conducted by companies BHC and Exo Environment and, as this falls with a designated area, with the co-operation and wildlife monitoring of bodies such as RSPB and Natural England.

The far east of the coastline is private property and this is evident from a barbed wire fence at the end of the coastline footpath. Privacy has been respected, and it is assumed that the general biodiversity, in particular plant species, continues uniformly from this point eastwards.

The observations from which the lists are compiled were made by several naturalists. Initially, some early data on bird species were recorded from the creek bank by a local ornithologist, this being supplemented by more recent surveys by a local expert. Areas along the coastline footpath were surveyed and where access was possible showed a general pattern of salt-resistant species amongst those plants recorded. It was also noted that beside the footpath approaching the coastline several non-native plants and trees are found in local gardens, some of which have spread to nearby land as 'garden escapees'.

Some creek marine biodiversity data was obtained by dredging and netting surveys aboard the restored Trinity House launch 'Trinity' on 29 August 2022 and 23 September 2022. These concentrated on the estuary area off Shipyard Estate and off Cindery and Pincushion islands, centred on the approximate vicinity of TM100164. The river bed here is typical of Essex estuaries, being soft mud, probably anoxic, with no evidence of plant life in the trawled specimens. Some of the oyster shells showed evidence of predation in that they had small holes drilled into them. Although the parasite cannot be identified, on the evidence held it is suspected that it might be a small sea snail, the American Oyster Drill *Urosalpinx cinerea.*

Visual surveys within the BEBP project showed no obvious signs of pollution or plastics in the water or on the banks. There is some local concern that sediments and water may be contaminated by antifouling paint released from the hulls of boats.

Originally, paints incorporating copper were used to reduce the adhesion of, for example, barnacles and mussels, these being supplemented with superior paints containing the biocide tributyltin (TBT) Research into more biodiversity-friendly antifouling paint continues, but there is no known local evidence that this is a particular problem in Brightlingsea waters. The UK Marine SAC's Project describes the potential effects of antifouling paints. Water traffic is subjected to speed limits to reduce bank erosion and this is well advertised by the Brightlingsea Sailing Club Web site

As with the upper coastline, the most frequently observed animals observed at these locations are birds.

Similarly, along the seawall and associated pathways, the plants species tend to be common to all locations (Subareas H to Q inclusive) and. we would not expect a great difference in the range of species. These sub areas are shown in Figure 29 below, with locations centred on an eight-figure grid reference as under.

H	TM07671624	Sea off Bateman's Tower
I	TM0781563	Seafront area 1
J	TM08031643	Seafront area 2
K	TM08551605	Sea off Harker's Yard
L	TM09221626	Coastline East area 1
M	TM09101599	Cindery Island
N	TM09411639	Coastline East area 2
O	TM10041640	Sea Area off Pincushion Island
P	TM09901670	Coastline East area 3
Q	TM09741666	Coastline East area 4

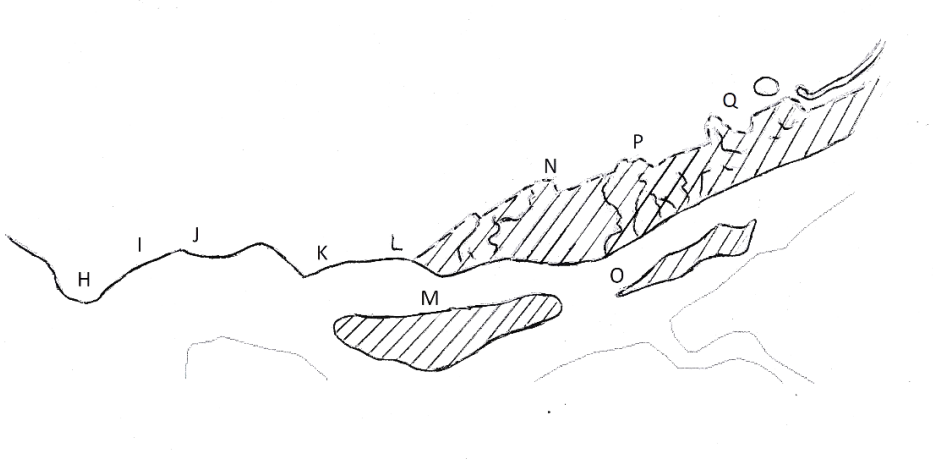

Figure 29. Brightlingsea Coastline East. Shaded areas are main mudflats

The Central and Eastern Coastline consists of the areas shown in Figure 29 and as listed under

Subarea H is further subdivided as under in respect of the area near Bateman's Tower

H (i) Sea area off Bateman's Tower centred on TM07601610
H (ii) Beach area centred on TM07711622
H (iii) Area inland of Bateman's Tower centred on TM07721631
H (iv) Seawall behind Brightlingsea Leisure Village TM08071648

H (i) TM07601610 The sea area off Bateman's Tower Elevation 0 m
Plants

1. Japanese Wireweed/Japweed *Sargassum muticum*

Animals

1. Common Seal *Phoca vitulina*
2. Cormorant *Phalacrocorax carbo*
3. Harbour Porpoise *Phocoena phocoena*

H (ii) TM07711622 Beach near Bateman's Tower Elevation 0 m
Plants

1. Lesser Sea-spurrey *Spergularia marina*
2. Saltmarsh Rush *Juncus gerardi*
3. Sea Arrowgrass *Triglochin maritima*
4. Sea-milkwort *Glaux maritima*

Animals (aquatic)

1. Baltic Tellin *Macoma balthica*
2. Cockle Common *Cerastoderma edule*

3. Cockle Lagoon *Cerastoderma glaucum*
4. Common Limpet *Patella vulgata*
5. Common Mussel *Mytilus edulis*
6. Common or Edible Winkle *Littorina littorea*
7. Common Prawn *Palaemon serratus*
8. Common Whelk *Buccinum undatum*
9. Dog Whelk *Nucella lapillus*
10. Flat Winkle *Littorina obtusata*
11. Lug Worm/Blow Lug *Arenicola marina*
12. Manila Clam *Ruditapes philippinarum*
13. Moon Jellyfish *Aurelia aurita*
14. Native Oyster *Ostrea edulis*
15. Netted Dog whelk *Hinia reticulata*
16. Pacific/Portuguese oyster *Crassostrea gigas*
17. Painted Top Shell *Calliostoma zizyphinum*
18. Peppery Furrow shell *Scrobicularia plana*
19. Quahog *Mercenaria mercenaria*
20. Ragworm *Hediste diversicolor*
21. Sand Gaper *Mya arenaria*
22. Shore Crab *Carcinus maenas*
23. Slipper Limpet *Crepidula fornicata*

Animals

1. Black-tailed Godwit *Limosa limosa*
2. Cattle Egret *Bubulcus ibis*
3. Common Tern *Sterna hirundo*
4. Cormorant *Phalacrocorax carbo*
5. Curlew *Numenius arquata*
6. Dunlin *Calidris alpina*
7. Essex Skipper *Thymelicus lineoli*
8. European (Brown) Hare *Lepus europaeus*
9. Great Black-backed Gull *Larus marinus*
10. Little Egret *Egretta garzetta*
11. Sanderling *Calidris alba*
12. Small Skipper *Thymelicus sylvestris*
13. Western Polecat *Mustela putorius*

H (iii) TM07721631 Area inland of Bateman's Tower Elevation 1 m

Plants

1. Common Glasswort *Salicornia europaea*
2. Golden-samphire *Inula crithmoides*
3. Grass-leaved *Orache Atriplex littoralis*
4. Lesser Sea-spurrey *Spergularia marina*
5. Meadow Vetchling *Lathyrus pratensis*
6. Saltmarsh Rush *Juncus gerardi*
7. Sea Arrowgrass *Triglochin maritima*
8. Sea-milkwort *Glaux maritima*
9. Southern Marsh-orchid *Dactylorhiza praetermissa*

Animals

1. Black-tailed Godwit *Limosa limosa*
2. Common Tern *Sterna hirundo*
3. Cattle Egret *Bubulcus ibis*
4. Cormorant *Phalacrocorax carbo*
5. Curlew *Numenius arquata*

H (iv**) TM08071648 Seawall behind Brightlingsea Leisure Village** Elevation 2 m

Plants

1. Alexanders *Smyrnium olusatrum*
2. Bur Churvil *Anthriscus caucalis*
3. Common Stork's-bill *Erodium cicutarium agg.*
4. Cow Parsley *Anthriscus sylvestris*
5. Duke of Argyles Tea-plant *Lycium barbarum*
6. Field Scabious *Knautia arvensis*

7. Green Shield-moss *Buxbaumia viridis*
8. Hawthorn *Crataegus monogyna*
9. Hedge Woundwort *Stachys sylvatica*
10. Hemlock *Conium maculatum*
11. Salsify *Tragopogon porrifolius*
12. Small-flowered Cranesbill *Geranium pusillum*
13. Spear-leaved Orache *Atriplex prostrata*
14. Subterranean Clover *Trifolium subterraneum*
15. Tamarisk *Tamarix gallica*
16. White Ramping-fumitory *Fumaria capreolata*

Animals

1. Bronze Beetle *Chrysolina banksii*
2. Bramble Sawfly *Arge cyanocrocea*
3. Common Green Shieldbug *Palomena prasina*
4. Cetti's Warbler *Cettia cetti*
5. Green Tortoise Beetle *Cassida viridis*
6. Herring Gull *Larus argentatus*
7. Ladybird 7 Spot *Coccinella septempunctata*
8. Large Velvet Ant *Mutilla europaea*
9. Lesser Black-backed Gull *Larus fuscus*
10. Long-legged fly *Argyra diaphana*
11. Reed Warbler *Acrocephalus scirpaceus*
12. Silver Stretch Spider? *Tetragnatha montana*
13. Skylark *Alauda arvensis*
14. Soldier Beetle *Cantharis rustica*

Seafront areas 1 and 2 are characterised by sandy beaches, and beach huts with much public activity in summer. They include the general coast and much of the inland area including the skate park and are close to Brightlingsea Boating Lake. The sandy beach area is unsuitable for all but very specialised salt tolerant plants. The northern parts of these areas include part of the seawall and border the south eastern part of Brightlingsea Marsh.

I. TM07811634

Seafront area 1 Elevation 1 m

Plants

1. Alexanders *Smyrnium olusatrum*
2. Almond Leaf Willow *Salix triandra*
3. Bittersweet *Solanum dulcamara*
4. Bluebell *Hyacinthoides non-scripta*
5. Bramble *Rubus camptostachys*
6. Common Ragwort *Senecio jacobaea*
7. Crab Apple *Malus sylvestris*
8. Crack Willow *Salix fragilis*
9. Daisy *Bellis perennis*
10. Fraser's Photinia *Photinia fraseri*
11. Green Alkanet *Pentaglottis sempervirens*
12. Hawthorn *Crataegus monogyna*
13. Orchard Grass *Dactylus glomerata*
14. Pink Sorrel *Oxalis articulata*
15. Purple Deadnettle *Lamium purpureum*
16. Sea Sandwort *Honckenya peploides*
17. Three Cornered Leek *Allium triquetrum*
18. White Willow *Salix alba*
19. Wild Cherry *Prunus avium*

Animals

1. Blackbird *Turdus merula*
2. Blue tit *Cyanistes caeruleus*
3. Cattle Egret *Bubulcus ibis*
4. Cetti's warbler *Cettia cetti*
5. Common Froghopper *Philaenus spumarius*
6. Cormorant *Phalacrocorax carbo*
7. Cuckoo *Culculus canorus*

8. Face Fly *Musca autumnalis*
9. Gall fly or picture-winged fly *Cerajocera tussilaginis*
10. Goldfinch *Carduelis carduelis*
11. Great Black-backed Gull *Larus marinus*
12. Green Hairstreak *Callophrys rubi*
13. Grey Wagtail *Motacilla cinera*
14. House Sparrow *Passer domesticus*
15. Ladybird 22 Spot *Psyllobora vigintiduopunctata*
16. Lesser Whitethroat *Sylvia curruca carruca*
17. Mirid Bug *Plagiognathus arbustorum*
18. Pied Wagtail *Motacilla alba*
19. Red Admiral *Vanessa atalanta*
20. Red-backed Shrike *Lanius collurio*
21. Red Spotted Parasite Fly *Eriothrix rufomaculata*
22. Reed Warbler *Acrocephalus scirpaceus*
23. Robin *Erithacus rubecula*
24. Skylark *Alauda arvensis*
25. Swallow *Hirundo rustica*
26. Whitethroat *Sylvia communis*

J. TM08031643 Seafront area 2 Elevation 0 m

Plants

1. Alexanders *Smyrnium olusatrum*
2. Birch *Betula pendula*
3. Blackthorn *Prunus spinosa*
4. Bramble *Rubus fruticosus*
5. Cow Parsley *Anthriscus sylvestris*
6. Crab Apple *Malus sylvestris*
7. Crack Willow *Salix fragilis*
8. Dandelion *Taraxacum officinale*
9. Elder *Sambucus nigra*
10. Gorse *Ulex europaeus*
11. Great Bindweed *Calystregia silvatica*
12. Greater Burdock *Arctium lappa*
13. Green Alkanet *Pentaglottis sempervirens*
14. Hairy Chervil *Chaerophyllum hirsutum*
15. Hawthorn *Crataegus monogyna*
16. Leyland Cypress *Cupressus x leylandii*
17. Nettle *Urtica dioica*
18. Orchard Grass *Dactylus glomerata*
19. Poison Hemlock *Conium maculatum*
20. Salt Cedar/Tamarisk *Tamarix ramosissima*
21. Scentless Mayweed *Tripleurospermum indorum*
22. Scots Pine *Pinus sylvestris*
23. Stickywilly/cleavers/goosegrass *Stickywilly/cleavers/goosegrass*
24. Three Cornered Leek *Allium triquetrum*
25. White Deadnettle *Lamium album*
26. White Willow *Salix alba*
27. Wild Cherry *Prunus avium*

Animals

1. Bar-tailed Godwit *Limosa lapponica*
2. Canada Goose *Branta canadensis*
3. Carrion Crow *Corvus corone*
4. Cetti's Warbler *Cettia cetti*
5. Chiffchaff *Phylloscopus collybita*
6. Coot *Fulica atra*
7. Egyptian Goose and goslings *Alopochen aegyptiaca*
8. Garden Spider *Araneus diadematus*
9. Great Tit *Parus major*
10. Greylag Goose *Anser anser*
11. Grey Heron *Ardea cinera*

12. House Sparrow *Passer domesticus*
13. Ladybird 7 Spot *Coccinella septempunctata*
14. Large White *Pieris brassicae*
15. Magpie *Pica pica*
16. Mallard *Anas platyrhynchos*
17. Nightingale *Luscinia megarhynchos*
18. Robin *Erithacus rubecula*
19. Song Thrush *Turdus philomelos*
20. Starling *Sturnus vulgaris*
21. Woodpigeon *Columba palumbus*
22. Wren *Troglodytes troglodytes*

K. TM08551605 Harker's Yard/Waterside area Elevation 0 m

Plants
1. Annual Sea-blite *Suaeda maritima*
2. Equal-leaved Knotgrass *Polygonum arenastrum*
3. Sea Aster *Aster tripolium*

Animals
1. Jenkins' Spire Snail *Potamopyrgus antipodarum*
2. Laver Spire Snail *Hydrobia ulvae*
3. Thornback Ray *Raja clavata*
4. Winged Thecacera *Thecacera pennigera*
5. Pacific/Portuguese oyster *Crassostrea gigas*

L. TM09221626 Coastline East area 1 Elevation 0 m

Plants (including some in private gardens* and ditches)
1. Alexanders *Smyrnium olusatrum*
2. Atlantic Cedar *Cedrus atlantica**
3. Ash *Fraxinus excelsior*
4. Bittersweet *Solanum dulcamara*
5. Black Horehound *Ballota nigra*
6. Bristly Oxtongue *Picris echioides*
7. Cleavers / Catchweed Bedstraw / Sticky Willy *Galium aparine*
8. Caucasian Cumfrey *Symphytum caucasicum*
9. Common Couch *Elytrigia repens*
10. Common Glasswort *Salicornia europaea*
11. Common Reed *Phragmites australis*
12. Common Sea Lavender *Limonium vulgare*
13. Common Sorrel *Rumex acetosa*
14. Dog Rose *Rosa canina*
15. Eastern Red Cedar *Juniperus virginiana**
16. False Fox Sedge *Carex otrubae*
17. Fiddle Dock *Rumex Pulcher*
18. Fools Water Cress *Heliosciadium nodiflorum*
19. Golden samphire *Limbardo crithmoides* (needs verification)
20. Hoary Mustard *Hirschfeldia incana*
21. Ivy *Hedera helix*
22. Lesser Water Parsnip *Berula erecta*
23. Perennial Ryegr*ass Lolium perenne*
24. Poison Hemlock *Conium maculatum*
25. Pyramid Orchid *Anacamptis pyramidalis*
26. Sea Beet *Beta vulgaris subsp. Maritima*
27. Sea Purslane *Atriplex portulcoides*
28. Sea Sandwort *Honckenya peploides*
29. Sea Beet *Beta vulgaris subsp. Maritima*
30. Shrubby Sea Blite *Suaeda vera*
31. Spear Thistle *Cirsium vulgare*
32. Stinging nettle *Urtica dioica*
33. White Comfrey *Symphytum orientate*

34. Wild Angelica *Angelica sylvestris*
35. Wild Onion / Crow Garlic *Allium vineale*

Animals

1. Avocet *Recurvirostra avosetta*
2. Black-headed Gull *Chroicocephalus ridibundus*
3. Black-tailed Godwit *Limosa limosa*
4. Brent Goose *Branta bernicla*
5. Carrion Crow *Corvus corone*
6. Collared Dove *Streptopelia decaocto*
7. Common Gull *Larus canus*
8. Curlew *Numenius arquata*
9. Goldfinch *Carduelis carduelis*
10. Great Crested Grebe *Podiceps cristatus*
11. Grey Heron *Ardea cinerea*
12. Herring Gull *Larus argentatus*
13. Kestrel *Falco tinnunculus*
14. Lapwing *Vanellus vanellus*
15. Little Egret *Egretta garzetta*
16. Little Grebe *Tachybaptus ruficollis*
17. Mallard *Anas platyrhynchos*
18. Moorhen *Gallinula chloropus*
19. Oyster Catcher *Haematopus ostralegus*
20. Pheasant *Phasianus colchicus*
21. Redshank *Tringa totanus*
22. Robin *Erithacus rubecula*
23. Shore Sexton Beetle *Necrodes littoralis*
24. Slow worm *Anguis fragilis*
25. Speckled Wood *Parage aegeria*
26. Starling *Sturnus vulgaris*
27. Turnstone *Arenaria interpres*
28. Wood Pigeon *Columba palumbus*
29. Wren *Troglodytes troglodytes*

M. TM09101599 Cindery Island Elevation 2 m (Advised observed with land based binoculars and from boat. Includes some birds flying over river)

Plants (none observed)

Animals

1. Avocet *Recurvirostra avosetta*
2. Black-headed Gull *Chroicocephalus ridibundus*
3. Black-tailed Godwit *Limosa limosa islandica*
4. Brent Goose *Branta bernicla*
5. Carrion Crow *Corvus corone*
6. Common Gull *Larus canus*
7. Curlew *Numenius arquata*
8. Goldfinch *Carduelis carduelis*
9. Great Crested Grebe *Podiceps cristatus*
10. Herring Gull *Larus argentatus*
11. Kestrel *Falco tinnunculus*
12. Lapwing *Vanellus vanellus*
13. Little Egret *Egretta garzetta*
14. Little Grebe *Tachybaptus ruficollis*
15. Mallard *Anas platyrhynchos*
16. Oystercatcher *Haematopus ostralegus*
17. Redshank *Tringa totanus*
18. Starling *Sturnus vulgaris*
19. Turnstone *Arenaria interpres*
20. Wren *Troglodytes troglodytes*

N. TM09411639 Coastline East area 2 (Includes Rope Walk and Creek). Elevation 2 m

Plants

1. Alpine Blue-sow-thistle *Cicerbita alpina*
2. Aspen *Populus tremula*
3. Bittersweet *Solanum dulcamara*
4. Chicory *Cichorium intybus*
5. Common Mallow *Malva sylvestris*
6. Common Ragwort *Senecio jacobaea*
7. Common Sea-lavender *Limonium vulgare*
8. Duke of Argyll's Tea Tree *Lycium barbarum*
9. False Fox-sedge *Carex otrubae*
10. Golden samphire *Inula crithmoides*
11. Greater Sea-spurrey *Spergularia media*
12. Hairy Bindweed *Calystegia pulchra*
13. Hairy Buttercup *Ranunculus sardous*
14. Hedge Bindweed *Calystegia sepium*
15. Hedge Mustard *Calystegia sepium*
16. Large Bindweed *Calystegia silvatica*
17. Pyramidal Orchid *Anacamptis pyramidalis*
18. Ragwort *Senecio jacobaea*
19. Salsify *Tragopogon porrifolius*
20. Sea Beet *Beta vulgaris*
21. Sea Lavender *Limonium vulgare*
22. Sea Purslane *Atriplex portulacoides*
23. Sea Wormwood *Artemisis maritima*
24. Shrubby Sea-blite *Suaeda vera*
25. Thrift *Armeria maritima*
26. Wall Barley *Hordeum murinum*
27. Wild Onion *Allium vineale*
28. Wild Teasel *Dipsacus fullonum*

Fungi

1. White Pored Chicken of the Wood*s Laetiporus sulphureus*

Animals

1. Blackbird *Turdus merula*
2. Blackcap *Sylvia atricapilla*
3. Chiffchaff *Phylloscopus collybita*
4. Cinnabar *Tyria jacobaeae*
5. Common Green Shieldbug *Palomena prasina*
6. Cream Spot Tiger Moth *Arctica villica*
7. Crow *Corvus carone*
8. Dock Bug *Coreus marginatus*
9. Essex Skipper *Thymelicus lineola*
10. Forteen Spot Ladybird *Propylea quattuordecimpunctata*
11. Green-veined White *Pieris napi*
12. Greenfinch *Chloris chloris*
13. Ground Lackey *Malacosoma castrense*
14. Harlequin Ladybird *Harmonia axyridis*
15. Hoverfly *Helophilus pendulus*
16. Large Elm Bark Beetle *Scolytus scolytus*
17. Little Egret *Egretta garzetta*
18. Malachite Beetle *Malachius bipustulatus*
19. Oyster Catcher *Haematopus ostralegus*
20. Peacock *Aglais io*
21. Red Admiral *Vanessa atalanta*
22. Reed Warbler *Acrocephalus scirpaceus*
23. Ringlet *Aphantopus hyperantus*
24. Robber Fly *Leptogaster cylindrica*
25. Skylark *Alauda arvensis*
26. Small Heath *Coenonympha pamphilus*
27. Small Tortoiseshell *Aglais urticae*

28. Sawfly *Aproceros leucopoda*
29. Small Tortoiseshell *Aglais urticae*
30. Snout Beetle *Liparus coronatus*
31. Swallow *Hirundo rustica*
32. Speckled Wood *Pararge aegeria*
33. Whitethroat *Sylvia communis*
34. Woundwort Shieldbug *Eysarcoris venustissimus*

O. TM10041640 Sea area off Pincushion Island Elevation 0 m

Seaweeds (Mainly floating on the tide)

1. Gutweed *Enteromorphis intestinalis*
2. Red and green sea weeds coexisting and growing on the boat pontoon - Unidentified species
3. Sea Lettuce *Ulva lactuca*
4. Wrack Knotted *Ascophyllum nodosum*
5. Wrack Spiral *Fucus spiralis*

Animals in the sea

1. Common Goby *Pomatoschistus minutus*
2. Estuary Ragworm *Hediste diversicolor*
3. Ghost Shrimp *Caprella linearis*
4. Isopod *Idotea linearis*
5. Mud Snail/Laver Spire Snail *Hydrobia ulvae*
6. New Zealand Mud Snail/Jenkins' Spire Snail *Potamopyrgus antipodarum*
7. Oyster (Native) *Ostrea edulus*
8. Oyster (Pacific) *Crassostrea gigus*
9. Ragworm *Nereis diversicolor*
10. Sea Spider *Nyphon gracile*
11. Sea Squirt *Ascidiella aspersa*
12. Slipper Limpet *Crepidula fornicata*
13. Sponge - Unidentified species
14. Star Ascidian *Botryllus schlosseri*
15. Thornback Ray 'Mermaid's Purse' *Raja clavata*
16. Winged Thecacera *Thecacera pennigera*

Figure 30. Examining specimens aboard the restored Trinity House launch 'Trinity'
Picture © Tony Thorn

P. TM09901670 Coastline East area 3 Elevation 4 m

Plants

1. Common Vetch *Vicia sativa*
2. Common Mallow *Malva sylvestris*
3. Common Sea-lavender *Limonium vulgare*
4. Common Yarrow *Achilea millefolium*
5. Duke of Argyll's Tea plant/Tea-tree *Lycium barbarum*
6. False Fox-sedge *Carex otrubae*
7. Golden-samphire *Inula crithmoides*
8. Hairy Bindweed *Calystegia pulchra*
9. Hairy Buttercup *Ranunculus sardous*
10. Hedge Mustard *Sisymbrium officinale*
11. Sea Wormwood *Artemisia maritima*
12. Sea-purslane *Atriplex portulacoides*
13. Shrubby Sea-blite *Suaeda vera*
14. Wall Barley *Hordeum murinum*
15. Wild Onion / Crow Garlic *Allium vineale*

Animals

1. Carrion Crow *Corvus corone*
2. Cinnabar *Tyria jacobaeae*
3. Cream-spot Tiger *Arctia villica*
4. Little Egret *Egretta garzetta*
5. Oystercatcher *Haematopus ostralegus*
6. Skylark *Alauda arvensis*
7. Small Heath *Coenonympha pamphilus*
8. Snout Beetle (True Weevil*) Liparus coronatus*
9. Striped Slender Robberfly *Leptogaster cylindrica*
10. Swallow *Hirundo rustica*
11. Tawny Owl *Strix aluco*
12. Whitethroat *Sylvia communis*

Q. **TM09741666 Coastline East area 4** (Lynch Creek area)
Access path contains several non-native species) Elevation 8 m

Plants

1. English Ivy *Hedera helix*
2. Beach Plum *Prunus maritima*
3. Belladona/Deadly Nightshade *Atropia bella-dona*
4. Birds-foot-trefoil *Lotus corniculatus*
5. Broad-leaved Sedge *Carex siderostica*
6. Brown Bent *Agrostis vinealis*
7. Buttercup *Ranunculus polyanthemos*
8. Common Glasswort *Salicornia europaea*
9. Common Sea Lavender *Limonium vulgaris*
10. Couch Grass *Elymus repens*
11. Field Bindweed *Convolvulus arvensis*
12. Golden Samphire *Limbarda crithmoides*
13. Great Bindweed *Calystegia silvatica*
14. Hedge Bindweed *Calystegia sepium*
15. Indian Pokeweed *Phytolacca acinosa*
16. Pendulous Sedge *Carex pendula*
17. Sea Purslane *Atriplex portulacoides*
18. Sea Wormwood *Artemisia maritima*
19. Shrubby Sea Blite *Suaeda vera*
20. Spear Thistle *Cirsium vulgare*
21. Sweet Violet *Viola adorata*
22. Swiss Chart/Beetroot *Beta vulgaris*
23. White Comfrey *Symphytum orientale*
24. Wild Carrot *Daucus carota*

Risk Assessment # 9		Risk of instability through environmental and biological degradation. Coastline				
System site description summary as at 2025		The coastline is considered within the extremes of approximately TM056192 to approximately TM111173 Various elevations. West of the town the coastline consists mainly of sandy gravel and mudflats with the seawall the dominant feature. This wall is flat and level because the Brightlingsea to Wivenhoe trainline ran along it until the service was cut in the mid 1960's. It is an area only lightly disturbed by walkers/dog walkers and the occasional cyclist. East of the town the coastline extends to the tidal mudflats of Brightlingsea Creek and Flag Creek with the marshy Cindery and Pincushion Islands. Part of the lower coast is private property whist any accessible parts are punctuated by historic oyster pits.				
Event to which risk applies as at 2025		Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Notes including those on long term stability	Risk *P x I*
1	Pollution including sewerage discharge	**Medium**	**High** Impacts on all biodiversity especially shellfish and eels. Also bathers	Input and discharges of sewerage are monitored by the EA	Sewerage discharges are disinfected to protect shellfish and bathers	6
2	Adverse variation in sea water salinity	**Medium**	**Medium** Salinity varies between 28 and 37 ppt, mean 33.6 ppt Hence biodiversity is usually not greatly impacted	No effective controls. Salinity varies with weather, tides and fresh water input from River Colne	River Colne flows fresh water into this coastal area and species such as the lagoon cockle have adapted to this	4
3	Contamination and pollution of beach area	**Low**	**Medium** No major incidents of rubbish or oil slicks but water quality in beach area impacted 2022	Monitored by Environment Agency	On 13.05.22 EA issued a warning to swimmers that an abnormal situation had arisen. (See 1)	2
4	Contamination and pollution of sea walls	**Low**	**Low** No records or evidence to suggest an adverse event	Sea walls are unlikely to receive deliberate or accidental harmful deposits	Sea walls are frequented by dog walkers and grass banks maintained by EA	1
12	Pollution from boats and ships	**Low**	**Medium** Flaking antifouling paint (AFP) endangers wildlife No record of other pollutants e.g. Oil or sewerage from ships	The amount of AFP and other chemicals or pollutants in local waters is likely to be insignificant	Current trends are towards Teflon AFP but residual deposits of other types may remain indefinitely and may be released by dredging	2
5	Dumping of rubbish and litter	**Low**	**Low** No evidence of deliberate dumping and negligible litter	TDC and local litter pickers may remove offending items.	Occasional fishing nets and cord washed ashore	1
6	Diseases of plants and animals	**Low**	**Medium** Diseases are species specific. Birds most likely to be affected	General monitoring by various bodies	Avian flu' possible Colne is within Oyster herpesvirus control area	2
7	Invasive species	**Low**	**Medium** Large volumes of Japanese wireweed reduce light	Volumes so far observed have been low and mainly in clumps floating	Japanese wireweed *Sargassum muticumis* is an invasive species that	2

			penetration, attach to oysters, compete with macroalga e.g. eelgrass	mid channel. Precise origin not known	is increasing its distribution range	
8	Excessive temperature in coastal waters	**Medium**	**Medium** Biodiversity and temperate species are moving northwards	No mitigation or controls possible	Species evolved to local moderate temperature may be stressed	4
9	Coastal erosion caused by speeding traffic	**Medium**	**Medium** Speeding traffic causes wash that erodes banks.	Speed limits of 4 knots in the Creek and 8 knots in the Colne controlled by enforcement agencies patrols	Motor boats and other powered recreational vehicles more common in summer	4
10	Increasingly high tides	**Low**	**Low** Negligible impact currently	No mitigation possible	Global warming. Caused by coefficient of cubical expansion of water	1
11	Detrimental disturbance of nesting birds	**Low**	**Medium** Few species nest on coastline but some do on local islands (Cindery and Pincushion). These may be disturbed by boat traffic	No practical mitigation or controls possible apart from speed restrictions	Motor boats and other powered vehicles common in summer but most may not coincide with breeding seasons	2
12	Damage to biodiversity caused by boats and ships	**Low**	**Medium** Several cases of seals and porpoises injured or killed by boats	No practical mitigation or controls. Could boat owners be made aware of risks by Harbour Master?	Main damage is caused by propellors	2
13	Detrimental disturbance of animals in the sea	**Low**	**Low** In practice this is likely to be limited to seals and porpoises	No practical mitigation or controls. Could boat owners be made aware of risks by Harbour Master?	Impact of any disturbance is not quantified but linked with damage caused by speeding traffic & propellors	1
14	Algal blooms (e.g. C*hlorophyta*)	**Low**	**Low** Non-toxic species unlikely to adversely impact the coastal environment	No practical intervention possible. Blooms are unlikely in water that is not stagnant	May increases with higher summer temperatures and more sunlight hours but only in stagnant areas such as pools	1
15	Detrimental disturbance of plants and animals on shore	**Low**	**Low** Disturbance unlikely but if occurring it will have little impact	Visitors tend to keep to footpaths	No record of disturbances caused by unauthorised bodies	1
16	Fire	**Low**	**Medium** Most of the area would not be damaged/impacted except in exceptionally dry hot weather	As for vandalism, might apply to beach huts. Dried grassy areas of pathways vulnerable	Risk of fire damage exacerbated by distance of fire service	2

17	Vandalism	**Low**	**Medium** In practice limited to man made objects such as beach huts	Only a small proportion of the coastline is built up.	Natural areas have limited scope for fire except dry grassy areas	2
18	Potential Industrial and new build	**Low**	**Medium** No known plans or permission to build	Few suitable building sites along most of the coastal area	Coastline assumed to be stable with no predictable changes.	2
19	General habitat loss	**Low**	**Medium** As for new build but also bank erosion may occur in areas subject to heavy boat traffic	Limited mitigation possible	Currently no positive evidence of habitat loss but monitoring required	2

Comments. The western seawall is very popular but people restrict their activities to the pathways on top of the seawall or that running beside it. There is no evidence that this causes any environmental deterioration nor is there litter and discarded dog faeces bags.
The beach area surveyed was also clear of plastics and other rubbish with no evidence of pollution. Japanese wireweed poses a potential risk when present in large volumes as it can restrict the penetration of light and competes with other macroalgae for resources. It may also fix itself to the shells of locally farmed oysters but can provide shelter for the young of other species. Porpoises are at risk from boat propellors and at least one case of death has been reported. Three dead seals were found on the marshes in February 2023 with no known cause of death. The transient eel population is believed to be threatened *en route* to the upper River Colne but less so to the Roman River (Thorn 2020) and are found in Brightlingsea Boating Lake. Sewerage influxes appear well controlled, but there have been occasional spills. The Environment Agency monitors water quality, in particular for bathers' safety, and in 2013 the STW was upgraded to include disinfectant to protect shellfish.

The eastern non-industrial land area adjacent to Brightlingsea and Flag Creeks is relatively remote with little human activity except at the Shipyard Estate. Visitors to the river bank may include dog-walkers and ornithologists. Cindery and Pincushion islands have limited accessibility and are seldom visited, which is very favourable for bird life. However, the surrounding sea in summer is very popular, with boat traffic of all types from kayaks to jet skis to sailing barges, travelling up and down the creek. There is some evidence of bank erosion from several causes despite enforced speed limits of 4 or 6 knots, depending on location. Limits are imposed to prevent anti-social behaviour, which includes speeding, disturbing vessels, disrupting commercial operations, generating excessive wake near moorings, disturbing Nature Reserves, and damaging the saltmarsh. A fine of up to £2000 is possible on conviction.

The environmental impact of biocidal and non-biocidal antifouling paints has been researched by Essex University in collaboration with Brightlingsea Harbour (see website for more information https://www.brightlingseaharbour.org/blog/antifouling-practice-update---panel-deployment--24042025/)

Recent dredging of creek channels, in particular the main southern channel, has raised concerns that harmful deposits, including those from antifouling paint, might be released into the water column. Any impact caused by these dredgings will have already impacted biodiversity in that area.
Rising sea levels and increased temperatures may have an impact in the future, on the saltmarshes.

Endangered species or species of note or interest
Japanese wireweed.

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9** respectively
Site score = sum of individual scores/number of risk areas = 44/19 = 2.32 rounded up to 4
Overall risk rating. From the site score, the overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated **Medium**
Main potential single event concerns. Pollution caused by sewerage discharge

Potential for enhancement
Limited enhancement is possible and efforts can only be targeted at mitigating possible general degradation

10. Brightlingsea Boating Lake TM08221639 Elevation 1.0 m

The man-made boating lake is situated close to Brightlingsea beach and the water is brackish. Three small islands offer some refuge for wildlife. Its location corresponds closely to the site of the old Oyster Tank Road land fill site. The lake is maintained by BTC staff and boating is organised by a local scout group. The lake is used by the model boat club for part of the week.

Although there is no public access to the islands, there may be some disruption caused by pleasure row boat traffic in summer. Boating in 2022 was suspended due to the earlier Coronavirus epidemic. The lake was surveyed in 1969 but it is not known how the survey results are still valid today. I was unable to obtain the results of that survey. Later permission to survey was given by Brightlingsea Town Council.

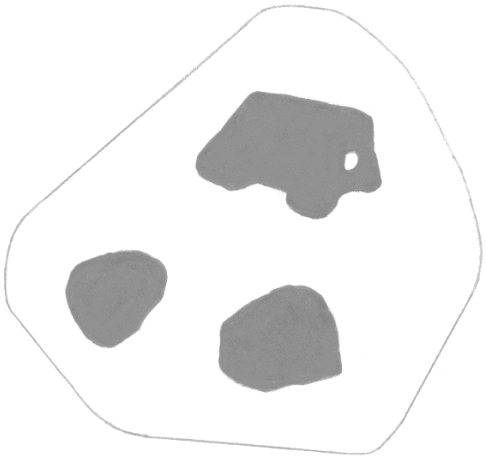

Figure 31. Plan view of Brightlingsea Boating Lake showing the location and relative sizes of the three islands

Salinity

Brackish water is partially exchanged to the sea via sluices and the lake is known to support brackish tolerant species such as sticklebacks. It is assumed that, allowing for evaporation and rain dilution, the salinity will approximate that shown in Figure 2 and Table 10, i.e. approximately 33.07 ppt. However, recent tests have given salinity levels below this level at 30.0 ppt and the levels of phosphate/nitrate may also differ, increasing the risk of algal blooms.

The lake islands

The three islands appear to have been isolated for some years and may have developed a unique biodiversity. Therefore, when considering a survey of the islands, a balance must be struck between the gathering of data and the impact of disturbing what may be a unique isolated community. It is recommended that a professional survey be considered or at least advice obtained. Some of the island's retaining wooden boards at the water line are bowed and rotted, but are not the main bank support.

Survey history.

Council staff advise that the islands were subject to a biodiversity survey by BNA in or around 2007 but I was unable to obtain any details of that survey or other information from that organisation nor the name of the surveyor.

Some earlier survey work was done by Dr. C. Boyden in 1969 looking for cockle species *Cerastoderma edule* and *C. glaucum* as part of his thesis.
He reports finding specimens of the lagoon cockle *C. glaucum*. He also found
1. A brackish water isopod *Idotea viridis* (syn. *Idotea chelipes*)
2. A filamentous algae *Chaetomorpha crassa* (in which the cockles were located)
3. Rough Periwinkle *Littorina saxatilis*
4. Sand Goby *Gobius minutus* (syn. *Pomatoschistus minutus*)
5. Three Spined Stickleback *Gasterasteus aculeatus*

Local information is that the lake once held flounders *Platichthys flesus*.

A recent magnetic trawl of the water is said to have produced objects such as bicycles frames, hand grenades, and even an ancient pistol indicating that some dumping occurs.

Table 40. Summary of animals identified in sample points around Brightlingsea Boating Lake

Sample point	Distance between sample points (m)	Water Depth (cm)	Water Temp. (°C)	Stickleback Juveniles	Stickleback Adults	Prawns	Worms	Insects
1		76	21.0	8		10		
2	20	70	18.2	4		6		
3	20	70	19.0	8		26		
4	20	68	21.0	20	2 (1♂+1♀)	25		
5	20	53	20.5	6		10	3	
6	20	62	20.5	5		20	1	
7	20	58	19.7	6		8		1
8	20	57	21.0	5		5		
Mean		64.2	20.1	7.7	-	13.7	-	-

Recent survey (Thorn and Thorn 2022 including physico-chemical)
Gross area of whole lake within shoreline 24431 m^2
Area of Island 1 2811 m^2 Perimeter 220 m
Area of Island 2 1680 m^2 Perimeter 152 m
Area of Island 3 1470 m^2 Perimeter 145 m
Net surface area less islands 24431 – 517 = 23914 m^2. The volume is therefore 23 914 m3 per one metre depth. The table above shows a current mean depth of 0.64 m so volume would be approximately 15353 m3.
The water is green due to algae and there is no evidence of other weed growth. The lake bed is clay under a layer of black detritus within which birch tree and other seeds have been seen. Salinity was tested using a hand-held refractometer at 20 °C and confirmed to be brackish at 24 ppt (sg 1.018) at June 2022, which is unexpectedly low. The mean air temperature for Brightlingsea in the week prior to the survey was 18.1 °C. We would expect the water temperature to approximate this figure. However, being exposed to sunlight, the temperature is slightly higher than the mean but is variable over the lake. The female stickleback at sample point 4 was gravid and 5 cm long, the male slightly shorter at 4 cm. The insect at Sample Point 7 was a Lesser Water Boatman *Corixa punctata*. In summary, the following were observed.

Plants

The banks are concrete or metal supported and apart from some grass, there are no terrestrial or aquatic plants on the banks. There are species of algae and other microorganisms in the water.

Microorganisms

1. Green algae *Chlamydomonas* sp. but in low numbers
2. Protozoa *Vorticella* sp.
3. Rotifer *Brachionus plicatilis* (with egg sac)
4. Cyanobacteria *Anabaena spiroides* 'green algae'
5. Cyanobacteria *Chroococcales cyanobacteria* 'green algae'
6. Various diatoms including *Navicula* sp.

Animals (in the water or on the banks)

1. Beetle *Enochrus bicolor* (deceased)
2. Black Redstart *Phoenicurus ochruros*
3. Common Cockle* shell *Cerastoderma* sp. (Showing predation by whelk)
4. Common Prawn *Palaemon serratus* (See note 1)
5. Eel *Anguilla anguilla* observed by Council Grounds Manager
6. Egyptian Goose *Alopochen aegyptiaca* and five goslings
7. Large Red Demoiselle *Pyrrhosoma nymphula*
8. Lesser Black-backed Gull *Larus fuscus*
9. Lesser Water Boatman *Corixa punctata* (Not normally reported in brackish water)
10. Macro spiral coiled egg mass in 'U' shaped jelly tube (see note 2)
11. Marine Worm (Red bootlace) *Lineus ruber*
12. Mallard Duck ♂ *Anas platyrhynchos*
13. Mediterranean Gull *Ichthyaetus melanocephalus*
14. Midge larvae *Chironomus* sp.
15. Mute Swan *Cygnus olor*

16. Teal *Anas crecca*
17. Three-spined Sticklebacks *Gasterosteus aculaeatus*
18. Tufted Duck *Aythya fuligula*
19. Yellowhammer *Emberiza citrinella*

Animals that require confirmation of identity

1. Grey Isopod with woodlouse shape suspected to be *Idotea baltica*
2. Brown Isopod as above suspected to be *Idotea chelipes*

Note. * Following a study by Thorn (2023), the cockle shell is considered to be that of the Lagoon Cockle *C. glaucum.*

Algae and other micro-organisms

The water is known to have periodic algal bloom. In July 2022, the water was coloured green almost entirely by the presence of spiral algae, which far outnumber other algae species and pennate diatoms. They tended to mix in the water table when there is wind but in calmer weather collected in a denser layer near the surface. In sample containers, the water had a very foul odour. Their colour may appear as green or blue under higher magnification. In 2025 the Grounds Manager reported blooms of *Chroococcales cyanobacteria*

Of interest (and possible confusion), is the fact that whilst some sources considered *Anabaena* to be a synonym for *Dolichospermum*, (possibly *D. crassum*), others do not. If they are separate genera - and some species do appear to be very similar and although *Dolichospermum* was originally accepted as planktic Anabaena - there are differences. I have accepted that *Anabaena* is distinct from *Dolichospermum*, that the lake contains *Anabaena* sp. and that their presence is confirmed by the Environment Agency. The density of the *Anabaena spiroides* as observed under the microscope decreased over a period of weeks and following mechanical aeration of the lake. It is not known at this stage how the reduced numbers/density relates to reduced health risk. No *Anabaena* were detected on 18 August 2022 when the risk of algal blooms had decreased.

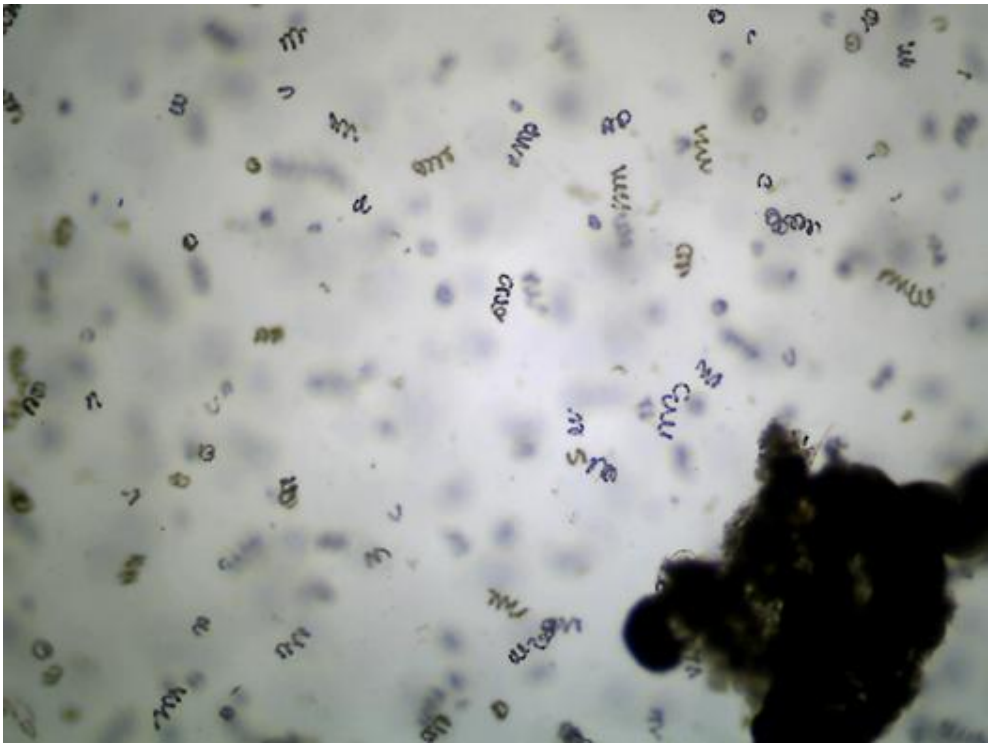

Figure 32. The spiral algae *Anabaena* vastly outnumbers all other algae and diatom species.
Picture © Tony Thorn

At one sample point the spiral organisms shown in Figure 32 were found. Note their size against the prawn head in Figure 33. The spirals are about 1 cm across.

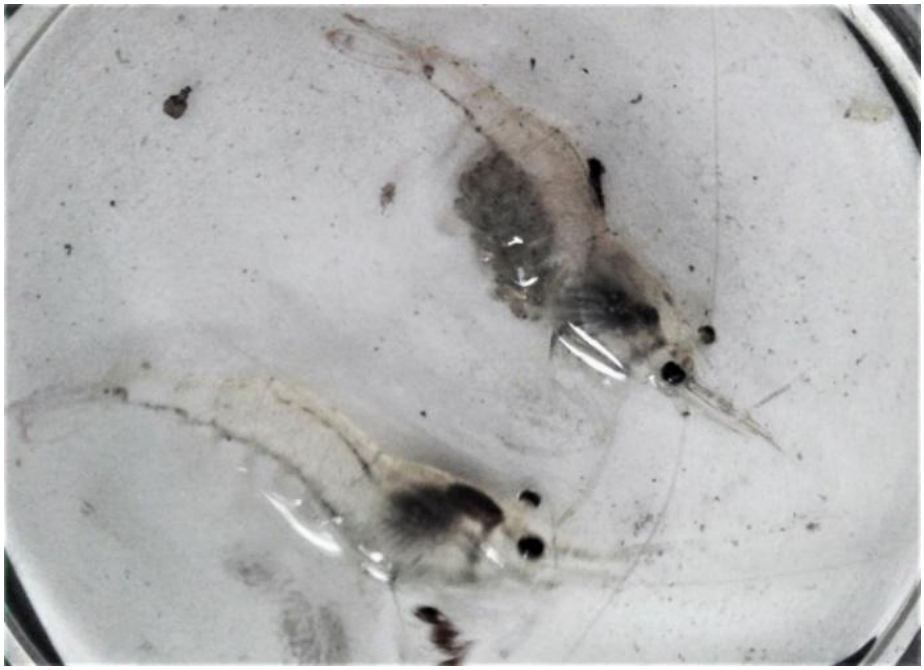

Figure 33. Two transparent prawns, the female is gravid. When totally immersed they are almost invisible.
Picture © Tony Thorn

Notes.
1. These animals have no colour pigmentation so are almost invisible in water. They appear very similar to the Ghost Shrimp (also known as the American Glass Shrimp) *Palaemonetes paludosus*. Opinion from Kent and Essex IFCA supports my opinion that the animal is *P. serratus*.
2. The Marine Biological Association were asked to identify the macro spiral coiled green algae in 'U' shaped jelly tube and advised that the images
are probably egg masses and probably those of gastropods (snails and slugs) but are not able to be more specific.

Figure 34. The rotifer *Brachionus plicatilis* (with egg sac)
Picture © Tony Thorn

Figure 35. Spiral organism in a jelly like casing, probably a marine snail or slug egg casing. Note the size compared with a prawn head.
Picture © Tony Thorn

Risk Assessment # 10		Risk of instability through environmental and biological degradation. Brightlingsea Boating Lake				
Site description system summary		Brightlingsea Boating Lake TM08221639 elevation 1 m. This concrete edged lake is owned and maintained by Brightlingsea Town Council. During the summer, rowing boats are hired to the public by the Brightlingsea 4th Scout Group and a model boat club sails model boats. There are 3 wooded islands and the brackish water is partially exchanged to the seas via sluices.				
Event to which risk applies as at 2025		Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Notes including those on long term stability	Risk *P x I*
1	Dumping of rubbish	**Medium**	**Low** Metal objects have been removed but had no obvious adverse impact	Regularly checked by BTC staff	Dumped metal objects, bicycles, guns and hand grenades are unusual	2
2	General contamination and pollution	**Low**	**Medium** No record of oil or chemical pollution	Regularly checked by BTC Staff	Water is partially exchanged to the sea diluting any potential pollution	2
3	Excessive air temperature and drought	**High**	**Medium** Dehydration of lake island vegetation	No mitigation possible. Watering island vegetation is impractical	Island vegetation includes trees and bushes used by nesting birds	6

4	Fire	**Low**	**Medium** Impacts on dry island vegetation and nesting birds	Islands are removed from usual fire sources	No record of any fires	2
5	Excessive water temperature	**Hig**h	**Medium** Warm lake water can be exchanged with cooler sea water	Water exchange controlled by BTC staff via sluices. Water paddle aeration system	High water temperature linked to air temperature and direct sunlight low Oxygen levels	6
6	Reduced Oxygen levels	**High**	**High** Resulting from excessive water temperature	BTC water paddle aeration system in summer is effective	Fish and eels seen on surface resolved by aeration	9
7	Vandalism	**Low**	**Medium** Limited to damage to surrounding structure & signage	Islands are secure. Most of the lake surrounds are solid	No historical record of vandalism Limited opportunity	2
8	Detrimental disturbance of nesting birds	**Low**	**Medium** Limited to birds nesting on islands Geese & goslings feed on lake edges	Islands are secure But goslings & ducklings on lake edges vulnerable to dogs and foxes	Nesting Egyptian Geese and goslings forage on lake surround	2
9	Detrimental disturbance of other animals	**Low**	**Low** Apart from birds, few animal species in vicinity	No mitigation possible	Environment supports limited species	1
10	Diseases of plants and animals	**Low**	**Low** No record of any plant disease on lake surround or islands	No mitigation possible	No recent survey of islands to provide data	1
11	Adverse impact caused by presence of dogs	**Low**	**Medium** Ducks and other species are threatened by dogs	Owners to keep dogs on leads when near lake	Goslings especially vulnerable. Dogs can carry toxins from *anabaena* in their fur	2
12	Lack of maintenance	**Low**	**High** Increased probability of deoxygenation & algal blooms	Regular water changes to the sea via sluices. Paddle aeration	Regularly checked and maintained by BTC staff	3
14	General habitat loss	**Low**	**High** Loss may include water & reduced quality & quantity of island vegetation	Islands are secure but some wooden surrounds are deteriorating & could cause bank collapse	Regularly checked by BTC staff but remedial action needs to be considered	3
15	Specific biohazards such as Algae *Anabaena* sp. and *Chroococcales cyanobacteria*	**High**	**High** Neurotoxins hazardous to humans & animals if ingested	Use of water paddle aeration system and consider algicide dye (e.g. *Pro Blue Lake Dye*. *Dyofix* etc.) in summer	Effective control of *Anabaena* now checking for *Chroococcales cyanobacteria*	9
16	Specific risks to humans	**Medium**	**High** Danger of unsupervised young children drowning	Warning notices Life belts Lake is not isolated	*Anabaena* is a long term health problem.	6

Comments. The boating lake is under the control of BTC Grounds Manager and is well maintained. Most risks apply to the summer months when people are using the rowing boats, encouraging their dogs to swim or sailing model boats.

The lake is especially susceptible to algal blooms in hot sunny weather and the overall impact is a potential toxic build up and lower oxygen levels that will impact on fish populations. The cyanobacteria *Anabaena* is present and is known to be dangerous to people and their dogs if they come into contact. It adds poisons that may impact on wildlife. When algal blooms are noted, the water is checked, warning notices placed and the Environment Agency notified. Salinity at 19.07.22 was 30.00 ppt (1.0226 sg) so saline water has been introduced since the initial survey as part of a normal exchange of waters through the sluice system. Low oxygen levels were reported by the Grounds Manager but a causal link with fish deaths and eels rising to the surface is not definite. A paddle wheel 'oxygenator' has been introduced from the summer of 2022. The risk of algal blooms of *Anabaena* will remain high in the foreseeable future or blooms may alternate with harmful algal blooms (HAB) of *Chroococcales cyanobacteria*. The lake water is brackish and *Anabaena* is generally a freshwater species.

Samples of water taken from the lake were initially green tinted but after several weeks the sample water clarified with a brown deposit left at the bottom of the container. The *Anabaena* are presumed dead but any toxicity levels remaining are unknown. It is assumed that toxicity decreases over time but the associated natural half-life and the impact of environmental conditions is not known. A water test certificate dated 01.08.23 shows no algae species detected. Since then the Grounds Manager reports that HABs of *Chroococcales cyanobacteria* has been found in high levels.

There are records of the dumping of metal objects including bicycles, guns and hand grenades, the latter being an obvious risk to human health. It is not known how long any metal objects have been in the lake.
There will be a continual risk of the dumping of metal objects, which will be largely undetected but, in some cases, could involve the introduction of harmful matter or danger to pleasure boat passengers in extreme cases.

The lake islands should be monitored for bank stability and repaired where deemed necessary.

Overall, the risk to environmental degradation and to health is seasonal and may be very high for several weeks in summer. This may be mitigated by monitoring, warning notices and water oxygenating measures.

Endangered species or species of note or interest
Anabaena and *Chroococcales cyanobacteria* are a potential health hazard.
Unidentified spiral organism is shown in Fig. 29

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9** respectively
Site score = sum of individual scores/number of risk areas = 56/16 = 3.5 rounded up to 4
Overall risk rating. From the site score, the overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated **Medium**
Main potential single event concerns. Algal blooms. Toxins produced by *Anabaena* sp. and reduced oxygen levels, which are mitigated by aeration paddle.

Potential for enhancement
Limited additional enhancement is possible apart from repair to island wooden support surrounds

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11. The Lozenge Nature Area TM08161674 Elevation 2.0 m

This is a small wooded area, with permanent earthen pathways, sponsored by The Community Reach Partnership of the East of England Development Agency (EEDA) and Brightlingsea Town Council.
The site originated from waste land in 2008 and is maintained by Council staff. Each August a Nature Spotting event is organised for youngsters as part of an event organised by the British Naturalists' Association and the Cinque Port Liberty of Brightlingsea. A small spinney sits beside the Lozenge but there is currently no access between the two. A small pond constructed in 2008 and which was a central part of the area has deteriorated. There are potential plans to construct a new pond when the Lozenge and the spinney will be linked on completion of construction. There is a possibly nearby Badger sett and Badgers been monitored by at least two individuals using trail cams. Although the most recent samples of biodiversity were obtained by the author, much of the data recorded is extracted from recent historic information from the British Naturalists' Association website.

Historical data shows that Grasshoppers and Crickets are of special interest and the rare plant Dittander *Lepidium latifolium* is found here together with a wide range of other plants. Bird song is normally noticeable. However, a brief survey made on 17 July 2022 failed to record any animal life apart from Wood Pigeons *Columba palumbus*,

Blackbirds (*Turdus merula*), flies and two species of butterfly. Neither were there any obvious artifacts such as snail shells. The temperature at midday was approximately 30 ºC with bright sunlight. Further visits on 19 August 2022 and 24 August 2022, with similar weather, initially looked at the small spinney to the left of the main gate that has two entrance paths but does not seem to link to the main Lozenge area. There was some litter including broken bottles and dog faeces. Wood Pigeons (*Columba palumbus*) were common, but there were no signs of other bird life.

The main site gave similar results to the visit of 17 July 2022, the butterflies being Large Whites (*Pieris brassicae*) and Ringlets (*Aphantopus hyperantus*). Again, Wood Pigeons (*C. palumbus*) were noticeable and there were several small birds that flew by too fast to be identified. There was no birdsong and some dog faeces were noted. On this visit, eight random sites were selected for a thorough survey, which for six of them involved getting into the thickets as far as possible then removing and filtering leaf litter and small twigs down to the bare ground level. The soft foliage of two further sites were hand inspected for insects and logs were moved to see if animals were sheltering. None was observed. Finally, a walk-over survey was conducted effectively looking everywhere for any animal life.

At all sites, the ground was found to be very dry and dusty making it perhaps unsuitable for insects of all species and the growth of bramble, much of it also very dry and too thick to allow deeper access to much of the off-path areas of the site. Several adult snail shells were present, these being the victims of much earlier bird predation but a live juvenile Lapidary Snail thought to be *Helicigona lapicida* with characteristic flattened shell was found. In 2022 until the time of the current surveys, most trees seemed to have coped well with drought, which may last several months, with little related leaf fall, but there are signs that a more noticeable leaf fall is imminent. Trailcams have been set up over the past few years and one in 2021 had shown Badgers (*Meles meles*) in residence including a specimen with only one eye.

In February 2023 another trail cam was set to record any animals present, and recorded a Fox (*Vulpes vulpes*), a bat of unknow species, male and female Muntjac Deer (*Muntiacus reevesi*) and a Brown Rat (*Rattus norvegicus*). Also recorded was the monoculous badger, earlier evidence of its presence included many areas where the grass had been turned over, presumably the result of foraging for worms. It was noted that although the pond, originally an important part of the area, was very overgrown and now has no current plans to revitalise it. There was a nearby, but not obvious, (possibly spring fed) small pool. There were reports of much increased bird activity in April 2023 and many more species as recorded in the tables. Permission to survey was given by Brightlingsea Town Council.

Figure 36. Gate to The Lozenge nature Area
Picture © Tony Thorn

Combined historical and current data. All plants listed under are present currently (2023/24), but apart from birds and butterflies, few animals were observed in the earlier daytime surveys.

Plants

1. Apple *Malus domestica*
2. Bay Willow *Salix pentandra*
3. Blackberry/Bramble *Rubus fruticosus*
4. Blackthorn *Prunus spinosa*
5. Bluebell *Hyacinthoides non-scripta*
6. Bristly Oxtongue *Helminthotheca echioides*
7. Broadleaf Cattail *Typha latifolia*
8. Common Knapweed *Centaurea nigra*
9. Common Mallow *Malva sylvestris*
10. Common Ragwort *Senecio jacobaea*
11. Cow Parsley *Anthriscus sylvestris*
12. Crocus *Crocus vernus*
13. Daisy *Bellis Perennis*
14. Dittander *Lepidium latifolium*
15. Dog Rose *Rosa canina*
16. English Oak *Quercus robur*
17. Field Bindweed *Convolvula arvensis*
18. Field Maple *Acer camestre*
19. Guelder Rose *Viburnum opulus*
20. Hawthorn *Crataegus monogyna*
21. Hedge Bindweed *Calystegia sepium*
22. Henbit Dead-nettle *Lamium amplexicaule*
23. Lady's Bedstraw *Galium verum*
24. Lords and Ladies *Arum maculatum*
25. Mallow *Malva sylvestris*
26. Mugwort *Artemisia vulgaris*
27. Nettle *Urtica dioca*
28. Pedunculate Oak *Quercus robur*
29. Perforate St John’s Wort *Hypericum perforatum*
30. Purging Buckthorn *Rhamnus cathartica*
31. Red Dead-nettle *Lamium purpurem*
32. Reed *Phragmites australis*
33. Sea Bindweed *Calystegia soldanella*
34. Sea-buckthorn *Hippophae rhamnoides*
35. Silver Birch *Betula pendula*
36. Snowdrop *Galanthus nivalis*
37. Stinking Iris *Iris foetidissima*
38. Stone Parsley *Sison amomum*
39. Turkey Oak *Quercus cerris*
40. Wild Carrot *Daucus c*arota
41. Wild Cherry *Prunus avium*
42. Wild Teasel *Dipsacus fullonum*
43. Yarrow *Achillea millefolium*

Fungi

1. Dead Man's Fingers

Animals

1. Bat* *Unknown species*
2. Badger *Meles meles*
3. Blackbird *Turdus merula*
4. Blackcap *Sylvia atricapilla*
5. Brown-lipped Snail *Cepaea nemoralis*
6. Carrion Crow *Corvus corone*
7. Chiffchaff *Phylloscopus collybita*
8. Common Shrew *Sorex araneus* (deceased)
9. Common Wasp *Vespula vulgaris*
10. Dark Bush Cricket *Pholidoptera griseoaptera*
11. Goldcrest *Regulus regulus*
12. False Oil Beetle *Oedemera nobilis*

13. Field Cuckoo Bee *Bombus campestris*
14. Field Grasshopper *Chorthippus brunneus*
15. Fox* *Vulpes vulpes*
16. Fly *Empis digramma*
17. Garden Snail *Helix asperasa*
18. Garden Warbler *Sylvia borin*
19. Gatekeeper Butterfly *Pyronia tithonus*
20. Great Green Bush-cricket *Tettigonia viridissima*
21. Green Bottle fly *Lucilia sericata*
22. Green Woodpecker *Picus viridus*
23. Lesser Marsh Grasshopper *Chorthippus albomarginatus*
24. Lapidary Snail *Helicigona lapicida*
25. Long-winged Cone-head Cricket *Conocephalus discolor*
26. Magpie *Pica pica*
27. Meadow Brown Butterfly *Maniola jurtina*
28. Meadow Grasshopper *Chorthippus parallelus*
29. Mother of Pearl Moth *Pleuroptya ruralis*
30. Muntjac Deer* ♂♀ (Reeves Muntjac) *Muntiacus reevesi*
31. Oak Bush-cricket *Meconema thalassinum*
32. Pygmy Shrew *Sorex minutus*
33. Rat Brown* *Rattus norvegicus*
34. Ringlet Butterfly *Aphantopus hyperantus*
35. Robin *Erithacus rubecula*
36. Roesel's Bush-cricket *Metrioptera roeselii*
37. Short-winged cone head cricket *Conocephalus dorsalis*
38. Slowworm *Anguis fragilis*
39. Speckled Bush Cricket *Leptophyes punctatissima*
40. Speckled Wood Butterfly *Pararge aegeria*
41. Wasp Plumehorn Hoverfly *Volucella inanis*
42. Water shrew *Neomys fodiens* (deceased)
43. White-lipped Snail *Cepaea hortensis*
44. Woodpigeon *Columba palumbus*

Most early surveys did not confirm the presence of many of the animal species recorded above, although a later survey and in particular trail-cam footage identified some species that would otherwise have not been recorded. If the pond could be refurbished to give a reliable source of drinking water it may encourage the presence of more wildlife. As with many wildlife areas, dog excrement is sometimes a nuisance and consideration should be given to a ban on dog access. The risk of degradation is a balance between public access, especially with dogs, and maintenance by Council staff, and risk would ordinarily be considered Medium. Bramble growth should be monitored as it may increase at the expense of other plants.

The Nature Reserve was advertised in October 2022 as the location of an event called a Mini Winter Wonderland featuring Father Christmas, a Hog Roast, games and mulled wine, this to take place on 4 December 2022. Opposition to the event was expressed on the grounds that such an event is incompatible with the concept of a Nature Reserve. However, having been made aware of the risk some restrictions were put in place.
The reserve has been closed to the public during the winter months with a locked gate and spikes on fences. This is a period when wildlife is not subjected to disturbance.

The pond at the time of this report is a neglected feature that could deprive some animals of a ready source of water so reconstruction would give a great boost to biodiversity. As with the rest of the area, biodiversity is likely to be heavily impacted by adverse climate conditions in the future and the risk rating should be regularly reviewed.

Figure 37. Animals captured on trailcam February 2023

Risk Assessment # 11		The Lozenge Nature Area. Risk of instability through environmental and biological degradation				
Site description system summary		This is a small 5 acre wooded area with permanent earth pathways TM08161674 elevation 1 m. It was sponsored by the Community Reach Partnership of the East of England Development Agency (EEDA) and BTC. The site originated from waste land in 2008 and is maintained by BTC staff. Wildlife was originally serviced by a small pond but this has fallen into disrepair. There is evidence of a small spring. The small wooded area alongside the Lozenge is not fenced and vulnerable to vandalism and misuse.				
Risk as at 2025		Estimated probability of occurrence (P)	Environmental impact (I)	Mitigation, Constraints and Controls	Notes on long term stability/overall risk	Risk $P \times I$
1	Dumping of rubbish Commercial	**Low**	**Medium** Dumping of rubbish is likely to block pathways or smother or contaminate existing plants	Access is via a lockable gate. Council staff maintain the area. General public would also be alert to possibility of rubbish dumping	Stable and established planted area. The Small additional wooded area alongside the Lozenge currently has no gates and is vulnerable	2
2	Dumping of rubbish by public	**Low**	**Low** Any rubbish and litter volumes are insignificant and there is a general respect for the area	BTC staff maintain area and regularly empty the resident rubbish bin	Stable, but the small wooded area alongside has many dog excrement bags and minor rubbish	1
3	General contamination and pollution	**Low**	**Medium** Although deliberate contamination is unlikely (See 7) it could have great impact	Access is via a lockable gate. Council staff maintain the area. General public would also be alert to contamination	No record of contamination or pollution. (Similar considerations as for 1 and 2)	2
4	Excessive air temperature	**Low**	**Medium** High temperatures for short periods.	None possible	Plants are well established and can cope in short term.	2
5	Drought	**Low**	**Medium** drought for short periods	Council may water area if absolutely necessary	Plants well established and can cope in short term. Ponds may not be refilled	2
6	Fire	**Low**	**High** Major damage possible due to arson or discarded cigarettes	Fire is easily identified and fire station is nearby	No known record of fire but reports of small campfires being lit	3
7	Vandalism (excluding arson)	**Low**	**Medium** General public would alert authorities	BTC staff maintain area	No known record	2
8	Industrialization and new build	**Low**	**High** May result in the whole site being reduced or destroyed	No known plans for new build. Public would react to any proposal	Area has support of BTC, public and some professional bodies.	3

9	Lack of maintenance	**Low**	**High** Any failure in the high standards of maintenance would result in slow decline (See 10)	BTC staff maintain area	No evidence that high standards of maintenance will not continue. Use of the site for any purpose other than affinity with nature to be discouraged	3
10	General habitat loss	**Medium**	**Medium** The nature of the biodiversity is such that the area could be overgrown with bramble	BTC staff should continue trimming species likely to suffocate others whilst maintaining footpath boundaries	Signs of bramble invading several. Geographical area of site may increase if nearby wooded area is included.	1
11	Loss of rare or endangered species	**Low**	**Low** The only rare species is Dittander *Lepidium latifolium*	Dittander is recognised and its presence will be monitored	No reason to suspect this plant is endangered at this location	1
Comments. The Lozenge has been established for 17 years and the plant life has expanded extensively to produce a small wooded area containing some rare plants. Care should be taken to ensure the area is maintained in a condition that balances its use as both a public recreational area and a wildlife sanctuary. A refurbished pond would provide a boost for birds and mammals. There are no known plans for change and the geographical area is relatively stable but future climate change bringing the possibility of drought and potentially higher fire risks could have a major impact on biodiversity. The adjacent wooded copse could be considered for inclusion within the Lozenge boundaries The rare plant Dittander (*Lepidium latifolium*) is found here A list of tree diseases is found at https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/tree-pests-and-diseases/key-tree-pests-and-diseases/						
Endangered species or species of note or interest Dittander (*Lepidium latifolium*) Slow worms (*Anguis fragilis*) are fairly common here						
Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9** respectively **Site score =** sum of individual scores/number of risk areas = 22/11 = 2.0 **Overall risk rating.** From the site score, the overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated as bordering **low/medium** **Main potential single event concerns. Fire**						
Potential for enhancement Inclusion of wooded area to side of the Lozenge. Consider excluding dogs from the area.						

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12. Morses Lane and Morses Farm area. TM08701830.

Grassland, wood and public footpath. Elevation 24.5 m to 2.6 m

This survey area includes the main length of Morses Lane, adjacent upper field, the footpath boundary of the wooded area known as Morses Wood (Barker's Grove) and part of the wood itself visible from the footpath. It continues past lower fields to the drain at the beginning of the marshland.

The top of the lane is bordered by the supermarket and Morses Lane Industrial Estate. Here there is a little vegetation on the border of the supermarket site. Continuing past the industrial estate the side of the dirt lane is occupied by a waste disposal company Eastern Waste Disposal, part of the Dunmow Group. The lane is bordered by vegetation including ferns and bindweed and this middle part of the lane is where the local conservation group has planted saplings/whips to encourage the formation of hedges but these have not survived and are discussed in more detail in the section on hedges and hedgerows . Although headed 'uncultivated grassland' in Table 9, in June 2022 the upper field was mainly covered with Cow Parsley (*Anthriscus sylvestris*). By July this had been mown and the cuttings placed in a large silage heap.

At the bottom of this field, Morses Wood is largely sycamore, some of which bear triple bladed fruits or samaras (helicopters). Information was obtained as follows. Many of these trees were blown over during the great gale of 1987. Several recumbent trees were still partially rooted and their branches then grew vertically as small trees.

Eventually these 'branches' became massive enough to succumb to gravity and fall over, tending to rotate the original trunk through 90º, which then became fully uprooted due to the resulting torque. In time, the tree then died. Within the wood Bluebells are common in springtime. There is a spring around which were found the shells of dead Swan Mussels (*Anodonta cygnea*) indicating that water levels were historically far higher. Some maps show the spring supports a small stream, but this is not obvious from the ground. This area was not surveyed to confirm these details.

At the Western extremity, the Wood contains Warren's Pond, a flooded gravel pit that has been used as a fishery by local fishing clubs. The pond has not yet been subjected to a biodiversity survey as far as I am aware.
The dirt road continues past two currently (2022) dried ponds and a large willow tree to Morses Farmhouse. Here the public footpath takes over. The footpath is not well maintained and is bordered by an extensive range of plants and grasses with small trees forming a canopy. Some of the plant species in the lane are abundant and found over an extensive geographical range, others appear to be limited to single specimens at punctuated locations. The footpath continues via a gate though another field, used to graze cows, past a cattle trough to a footbridge over a drain that marks the approximate boundary of Brightlingsea with Thorrington. The drain has not been surveyed. Permission to survey any areas away from the public footpath was obtained from occupants of the farmhouse.

Figure 38. Cow Parsley *Anthriscus sylvestris* in the field beside Morses Lane prior to mowing
Photo © Tony Thorn

Upper Morses Lane TM08621809 Elevation 22 m
Plants
1. Beaked Hawk's Beard *Crepis versicaria*
2. Black Medic *Medicago lupilina*
3. Borage *Borago officinalis*
4. Charlock *Sinapsis arvensis*
5. Common Field Speedwell *Veronica persica*
6. Hairy Tare *Vicia hirsuta*
7. Shepherd's Purse *Capsella bursa-pastoris*
8. Spotted Medic *Medicago arabica*
9. White Campion *Siline latifolia*
10. Wild Candytuft *Iberis amora*

Animals
1. Buzzard *Buteo buteo*
2. Feral horse *Equus caballus*
3. Kestrel *Falco tinnunculus*
4. Lapwing *Vanellus vanellus*
5. Peregrine Falcon *Falco peregrinus*

6. Red Legged Partridge *Alectoris rufa*
7. Sailor Beetle *Cantharis rustica*
8. Small Tortoiseshell *Anglai urticae*

Morses Lane /vicinity of Morses Farm TM08731830 Elevation 15 m
Plants

1. Alder *Alnus glutinosa*
2. Beaked Hawk's Beard *Crepis versicaria*
3. Bearded Fescue *Vulpa ambigua*
4. Bindweed Hairy *Calystegia pulchra*
5. Bindweed Hedge *Calystegia sepium*
6. Black Medic *Medicago lupulina*
7. Blubell *Hyacinthoides non-scripta*
8. Borage *Borago officinalis*
9. Bristly Oxtongue *Picris echioides*
10. Bramble Rubus *Fruticosus agg*
11. Branched Burr-reed *Sparganium erectum*
12. Bush Grass *Calamagrostis epigejos*
13. Charlock *Sinapis arvensis*
14. Cock's-foot *Dactylis glomerata*
15. Common Duckweed *Lemna minor*
16. Common Field Speedwell *Veronica persica*
17. Common Nettle *Urtico dioica*
18. Common Poppy *Papaver rhoeas*
19. Common Ragwort *Senecio jacobaea*
20. Common Vetch *Vicia sativa*
21. Couch Grass *Elymus repens* syn. *Elytrigia repens*
22. Cotton Thistle *Onopordum acanthium*
23. Cow Parsley *Anthriscus sylvestris*
24. Cut-leaved Crane's-bill *Geranium dissectum*
25. False Oat-grass *Arrhenatherum elatius*
26. Hairy Oat-grass *Helictotrichon pubescens* syn. Downy Oat-grass *Avenula pubescens*
27. Hairy Tare *Vicia hirsuta*
28. Italian Rye-grass *Lolium multiflorum*
29. Meadow Fox-tail *Alopecurus pratensis*
30. Musk Mallow *Malva moschata*
31. Narrow-leaved Meadow-grass *Poa angustifolia*
32. Oak *Quercus robur*
33. Perennial Ryegrass *Lolium perenne*
34. Purple Moor-grass *Molinia caerulea*
35. Purple Small-reed *Calamagrostis conescens*
36. Rosebay willowherb *Chamerion angustifolium*
37. Shepherd's purse *Capsella bursa-pastoris*
38. Smaller Cat's-tail *Phleum bertolonii*
39. Smooth Hawksbill *Crepis capillaris*
40. Spear Thistle *Cirsium vulgare*
41. Spotted medic *Medicago arabica*
42. Stinging Nettle *Urtica dioica*
43. Sycamore *Acer pseudoplatanus* (Specimens have samara with three wings)
44. Tall Fescue *Festuca arundinacea*
45. Wall Barley *Hordeum murinum*
46. Weeping Willow *Salix babylonica*
47. White Campion *Siline latifolia*
48. White Clover *Trifolium repens*
49. Wild Carrot *Daucus carota*
50. Wild Celery *Apium nodiflorum*
51. Wild Oat *Avena fatua*
52. Yarrow *Achillea millefolium*
53. Yellow Oat-grass *Trisetum flavescens*

Animals

1. Bank Vole *Myodes glareolus*
2. Buzzard *Buteo buteo*
3. Comma Butterfly *Polygonia c-album f. hutchinsononi*
4. Cuckoo *Cuculus canorus*
5. Great Spotted Woodpecker *Dendrocopos major*
6. Green Shield Bug *Palomena prasina*
7. Kestrel *Falco tinnunculus*
8. Lapwing *Vanellus vanellus*
9. Large White Butterfly *Pieris brassicae*
10. Magpie *Pica pica*
11. Peacock Butterfly *Aglais io*
12. Peregrine Falcon *Falco peregrinus*
13. Pygmy shrew (i) *Sorex minutus*
14. Rabbit *Oryctolagus cuniculus*
15. Ringlet Butterfly *Aphantopus hyperantus*
16. Rook *Corvus frugilegus*
17. Shore Sexton Beetle *Necrodes littoralis*
18. Short Tailed Vole *Microtus agrestis*
19. Strawberry Snail *Trochulus striolatus*
20. Wood Pigeon *Columba palumbus*

Field Near Morses Farm TM08881853 Elevation 3 m

Plants

1. Cock's-foot *Dactylis glomerata*
2. Common Reed *Phragmites australis*
3. Downy Oatgrass *Avenula pubescens*
4. False Oat-grass *Arrhenatherum elatius*
5. Italian Rye-grass *Lolium multiflora*
6. Meadow Foxtail *Alopecurus pratensis*
7. Narrow-leaved Meadow-grass *Poa angistifolia*
8. Perennial Rye-grass *Lolium perenne*
9. Purple Moor-grass *Molinia caerulea*
10. Purple Small-reed *Calamagrostis canescens*
11. Reed Sweet-grass *Glyceria maxima*
12. Smaller Cats-tail *Phleum bertolinii*
13. Tall Fescue *Schedonorus arundinaceus*
14. Variegated Reed Grass *Phalaris arundinacea var. picta*
15. Wall Barley *Hordeum morinum*
16. Wild-oat *Avena fatua*
17. Wood Small-reed *Calamagrostis epigejos*
18. Yellow Oat-grass *Trisetum flavescens*
19. Yorkshire Fog *Holcus lanatus*

Animals

1. Bank Vole (deceased) *Myodes glareolus*
2. Brimstone *Gonepteryx rhamni*
3. Comma *Polygonia c-album*
4. Common Blue *Polyommatus icarus*
5. Field Vole *Microtus agrestis*
6. Green-veined White *Pieris napi*
7. Lapwing *Vanellus vanellus*
8. Meadow Brown *Maniola jurtina*
9. Pygmy Shrew (ii) *Sorex minutus*

Figure 39. Triple bladed samara, one of many from a Sycamore *Acer pseudoplatanus*
Picture © Tony Thorn

Figure 40. Fallen trees in a wooded area near to the public footpath.
Picture anon

Figure 41. The upper field borders the private Morses Wood (historically known as Barker's Grove), which contains a small spring, and Warren's Pond, a flooded gravel pit that was used by a local fishing club.
Picture © Tony Thorn

Risk Assessment # 12		Risk of instability through environmental and biological degradation. Morses Lane to Morses Farm area				
Site description system summary		Morses Lane commences as a concrete road between the supermarket and the Industrial Estate. TM086181 to TM089185Various elevations 22m to 3m. It then progresses as a dirt road past the Eastern Waste Disposal depot ending at Morses Farmhouse where it is replaced by a narrow hedge lined public footpath. This leads through fields, mainly used to graze cattle, to a narrow wooden slatted footbridge over the Brightlingsea/Thorrington boundary ditch/drain which is assessed separately.				
Event to which risk applies as at 2025		Estimated probability of occurrence (P)	Impact (I)	Mitigation, Constraints and Controls	Notes including those of long term stability	Risk *P x I*
1	Dumping of rubbish Commercial	**Low**	**Medium** Some overspill possible from commercial waste unit. Unofficial dumping unlikely	Area not known to be monitored/controlled so prevention not possible. Easy vehicle access along dirt road.	Close to commercial waste site. Some accidental overflow on dirt road. No record of deliberate dumping.	2
2	Dumping of rubbish Domestic	**Low**	**Medium** Domestic rubbish tends to be closely associated with local housing so is unlikely	No record of dumping along length of road & footpath. Area is not monitored/controlled.	Footpath past farmhouse is used mainly by dog and recreational walkers	2
3	General contamination and pollution	**Low**	**Medium** Possibility of run-off from commercial premises or farm land	No historic evidence to suggest any contamination	Any adverse commercial activity likely to impact only a very small part of area	2

4	Excessive air temperature for long periods	**High**	**Medium** Leads to drought and associated potential fire hazards. Adverse impact on plants and wildlife	High temperatures are becoming more usual. No possible temperature control or mitigation.	Unpredictable temperature rise due to global warming but trends indicate long term increase.	6
5	Drought	**High**	**Medium** Two small local ponds known to dry out Some vegetation may dehydrate leading to loss & increased fire risk	Most vegetation is well established & drought resistant but new plants may be affected. No control over drought.	The increasing risk of drought due to global warming & its impact is not predictable.	6
6	Fire	**Low**	**High** Hot dry weather makes nearby fields & hedges susceptible to severe fire damage	Potential access by fire services is poor at lower end of lane. Spread of fire along hedgerows in lower more area likely	Fire is unlikely from natural causes. Arson attack has low probability	3
7	Vandalism	**Low**	**High** Vandalism may cause damage to lane, local farm environment & any supported wildlife.	No historic evidence of vandalism. Area is mainly frequented by naturalists, nature lovers, ornithologists and ramblers.	Low footfall level & limited opportunity for vandalism	3
8	Industrialisation and new build	**Low**	**High** Newbuild would impact adversely on biodiversity	No known plans for newbuild or industrialisation. Area is not prime building land	Area may be unsuitable for newbuild. Plans resulting in habitat loss would be resisted by public	3
9	General habitat Loss	**Low**	**High** Change of use or habitat loss from other causes outwith newbuild would reduce available space.	No positive mitigation and no known natural or planned habitat loss. Change of use such as ploughing fallow fields is unlikely	On available information this area is stable and habitat loss is unlikely unless impacted by climate change	3

Comments. This area supports a huge range of plants many of which can be observed from the Public Footpath. As with other sites, the list is not exhaustive. An attempt to keep intruders away is illustrated by blocked vehicular access to fields, the fencing of wooded areas or blocked access to the wooded area, and the display of suitable footpath signage. This allows much of the area to be mimic a reserve, with obvious advantages to wildlife. Footfall is currently restricted to dog walkers and recreational walkers.
The lower part of the public footpath appears to be little used and can become overgrown, which is another pointer to stability of biodiversity and low footfall. No current building plans are known for this area. Vegetation is rich but two local ponds dried up during the hot dry summer of 2023, although water remained in the drain at the end of the footpath. Attempts at planting new hedgerows along the dirt track part of this location and along the edge of the industrial estate by a local nature group failed, possibly due to drought. However, disturbing the earth enabled germination of a dormant seedbank with many species now growing along the route planned for the hedgerow. The area shows few signs of animal life during the day, but overnight trail-cams would probably provide more details. Moorhens were recorded in the drain at the end of the footpath by this method.

Endangered species or species of note or interest
Open field attract species such as Buzzard *Buteo buteo*, Kestrel *Falco tinnunculus* and Peregrine Falcon *Falco peregrinus*

Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9** respectively **Site score =** sum of individual scores/number of risk areas = 27/8 = 3.37 rounded to 4 **Overall risk rating.** From the site score, the overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated as **medium** **Main potential single event concerns.** Drought and excessive air temperature for long periods
Potential for enhancement There is little potential for enhancement. Preservation of what we have is a reasonable objective. The failure of the hedge planting exercise along Morses Lane should be revisited with emphasis on the reasons for the failure of the previous exercise and an examination of the new growth resulting from the disturbance of the soil.

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13. Drain at End of Morses Lane on Boundary of Brightlingsea District. TM08901855 Elevation 2.6 m**.** Crossed by the first footbridge of the public footpath that commences in Morses Lane, this drain is of negligible flow and meanders through various agricultural land types. It does not form a continuous water body, but is fragmented, effectively forming several ditches. The sample point leads to the footbridge, from which the footpath continues through a large area of open marshland to the Thorrington area. In summer, the ditch water is covered with a layer of duckweed and mainly bordered by rushes or common reed punctuated by muddy spaces where cattle from the adjacent fields drink.

Salinity was tested using a hand-held refractometer and the water was found to be fresh. Using a trail cam overnight showed that the ditch was home to a moorhen and chick, but no other animals were recorded. Permission to survey any areas not associated with public footpaths was obtained from the occupants of the farmhouse.

Figure 42. View of the drain from a footbridge.
Picture © Tony Thorn

Plants

1. Bramble Rubus *fruticosus agg*
2. Common Duckweed *Lemna minor*
3. Common Nettle *Urtico dioica*
4. Common Ragwort *Senecio jacobaea*

5. Common Reed *Phragmites australis*
6. Cow Parsley *Anthriscus sylvestris*
7. Echinate / Hedgehog Bramble *Rubus echinatus*
8. Mallow *Larentia clavaria*
9. Many-seeded Goosefoot *Chenopodium polyspermum*
10. Mugwort *Artemisia vulgaris*
11. Possibly Goat Willow *Salix caprea*
12. Soft-rush *Juncus effusus*
13. Spear Thistle *Cirsium vulgare*

Animals

1. Blackbird *Turdus merula*
2. Fieldfare *Turdis pilaris*
3. Great Spotted Woodpecker *Dendrocopos viridus*
4. Large White *Pieris brassica*
5. Magpie *Pica pica*
6. Marsh Harrier *Circus aeruginosus*
7. Moorhen *Gallinula chloropus* and near fully grown chick (via night camcorder).
8. Planthopper *Issus coleoptratus*
9. Rufous-shouldered Longhorn Beetle *Anaglyptus mysticus*
10. Skylark *Alauda arvensis*
11. Stock Dove *Columba oenas*
12. Wheatear *Acrocephalus scirpaveus*

Risk Assessment #13		Risk of instability through environmental and biological degradation. Drain at end of Morses Lane				
Site description system summary		At the extreme end of Morses Lane (TM089185 Elevation 2.6 m) a narrow footpath leads to a small footbridge over the open freshwater drain that effectively marks the boundary between Brightlingsea and Thorrington. The Thorrington side is marshy open meadow, the Brightlingsea side is grazing meadow for cows.				
Event to which risk applies as at 2025		Estimated probability of occurrence (P)	Environmental impact (I)	Mitigation Constraints and Controls	Notes on long term stability/overall risk	Risk *P x I*
1	Commercial dumping of rubbish	**Low**	**Medium** Impact will vary with type & volume of any rubbish but will be minimal	Overspill from commercial waste unit at top of lane unlikely & dumping very unlikely	No known instances. Access via narrow footpath restricts dumping possibilities	2
2	Dumping of rubbish by public	**Low**	**Medium** Impact may vary with type & volume of any rubbish but is minimal with negligible rubbish	No obvious controls but is remote area with no vehicle access. Rubbish is likely to be just casual dropping of packaging etc.	No reason to expect change & current footfall is limited to dog & recreational walkers. Area is not monitored or controlled.	2
3	General contamination and pollution of land	**Low**	**Medium** No known local use of chemicals or pollution likely on fallow fields	No obvious controls in place but need is unlikely. Vandalism is only likely cause	No changes forecast	2
4	General contamination and pollution of water body	**Low**	**Medium** Limited aquatic biodiversity on this site limits impact	Impact of pollution of a water body can have impact from limited to catastrophic	Poaching by cattle and run off from field may impact water quality	2

5	Excessive air temperature	**Medium**	**Medium** Limited to summer. Coupled with lack of rain leads to drought	No mitigation possible	High air temperature unlikely to impact water biodiversity greatly	4
6	Drought impacting land	**Medium** short term seasonal Long term is Low	**Medium** Will impact summer plant growth. Increased fire risk	No mitigation possible. Irrigation not practical	Reduction of grass growth in nearby field. Plant leaf dehydration impacts animals feeding thereon	4
7	Drought impacting water	**Medium**	**Medium** Impact effectively unquantifiable but unlikely to result in complete drying up of body	Drain has never been recorded as drying up. No mitigation possible Water trough for cattle	Drought may reduce water level and increases poaching as cattle seek water.	4
8	Reduced oxygen levels in water	**Medium**	**Low** No known aquatic animal life at this location	No mitigation possible	Only animals known to inhabit are moorhens not impacted by oxygen levels	2
9	Adverse algal growth	**Low**	**Low** No algae species identified	No mitigation possible	Only duckweed observed	1
10	Vandalism	**Low**	**Medium** Vandalism may cause damage to bridge or pollution of water e.g. liquid detergent etc.	No historic evidence of vandalism. Area is mainly frequented by naturalists, nature lovers, ornithologists and ramblers.	Low footfall level & limited opportunity for vandalism. Other water features in Brightlingsea have had soap introduced	2
11	Industrialisation and newbuild	**Low**	**High** Newbuild would impact adversely on biodiversity	No known plans for newbuild or industrialisation. Area is not prime building land	Area may be unsuitable for newbuild. Plans resulting in habitat loss would be resisted by public	3
12	General habitat Loss	**Low**	**High** Change of use or habitat loss from other causes outwith newbuild would reduce available space.	No positive mitigation and no known natural or planned habitat loss. Change of use such as ploughing nearby fallow fields is unlikely	On available information this area is stable and habitat loss is unlikely unless impacted by climate change	3

Comments. The area is 'off the beaten track' and unlikely to be disturbed by heavy footfall or rubbish, although the occasional group of ramblers has been seen. Its general isolation greatly reduces the risk of rubbish dumping. Commercial waste site may produce some accidental overflow on dirt road but this is very unlikely to be transmitted to the end of the lane and there is no record of any deliberate dumping.

The banks of the drain are heavily pouched by cattle. Currently, the risk of water in the drain completely evaporating is low. The adjacent fields are not ploughed.

Area has limited observed wildlife during the day but this includes bird species such as Blackbird, Marsh Harriers and Great Spotted Woodpecker, and insects such as butterflies. Overnight trailcams showed Moorhens. This is an area that is unlikely to deteriorate but a more intensive series of surveys might usefully add to the data currently held. The risk of fire and its consequences is negligible.

Endangered species or species of note or interest None recorded
Site scoring = probability x impact gives maximum scores of **L = 1, M = 4 and H = 9** respectively **Site score** = sum of individual scores/number of risk areas = 31/12 = 2.6 rounded up to 4 **Overall risk rating**. From the site score, the overall risk to biodiversity and of environmental degradation for the overall area and the impact of adverse events is rated **Medium** **Main potential single event concerns**. Drought leading to drying out.
Potential for enhancement Limited potential for enhancement

Brightlingsea Marsh centred on TM075167

As part of the Colne Estuary National Nature Reserve (NNR), Brightlingsea Marsh occupies approximately 82.5 Ha, which is about 8% of the Brightlingsea land area. Of this, 18 Ha cannot normally be accessed in order to prevent the disturbance of breeding birds, this area being centred on TM075165. Access to other parts of the marsh is by permit only. Most of the Marsh is level, lowland neutral grassland that ranges from TM06871745 in the West to TM08041636 in the East. The land is drained or fed by ditches or meandering natural drainage channels. In the past, other similar areas of marshland will have been drained to support arable farming, this being evident from the straight and regular boundaries between the marsh and adjacent fields. Historically, the area has been mown and the aftermath grazed by cattle and sheep between May and December, resulting in a grass height suitable for the grazing of Brent Geese (*Branta bernicla*). The site manager reports that the lower parts of the site retain water in the winter.
As the area abuts the seawall for some of its borders, several species of birds and flying insects have been recorded for the BEBP as they fly from the reserve and over the seawall, and although public access is prohibited, much of the area can be observed from the coastal seawall. Raptors are fairly common.

This section could be used to illustrate the stability element of the risk assessment process since we have data from the initial survey to compare with data from the more recent surveys.
However, I have not formally risk assessed this part of the NNR for detrimental change to environmental stability and biological degradation. The controls are considered to be robust but not infallible. An unconfirmed report that shooting parties have entered the reserve has been forwarded to Natural England. Formal access to the site is with the permission of Natural England only and physical access restricted by hedges, ditches and a locked gate. When visited for survey by myself and John Attiwell (Wilder Community Ranger Essex Wildlife Trust) our presence was challenged by three residents whose gardens overlook the marsh. The discourse was friendly and constructive and they gave some data on the wildlife that they had observed, including several owl species and Fallow Deer (*Dama dama)*. The presence of ruminantia is a characteristic of the grazing marsh and the resulting impact (in both senses) of hooves on the grassland is unquantified.

Survey reports Brightlingsea Marsh NNR.
Although Brightlingsea Marsh National Nature Reserve (NNR) is an extremely important part of Brightlingsea's natural environment, it is not included as one of the selected risk assessment sites because adequate controls are assumed. These controls provide stability.

This report covers four surveys, each summarised in the Tables following. The initial survey was by Natural England (NE) on 02.09.10, the second was by Thorn and Thorn on 25.10.24, whilst the third and fourth combined surveys were by Thorn and Attiwell on 27.03.25. Data from the NE survey is reproduced with their permission. Although public access is prohibited, much of the area can be observed from the coastal seawall as the NNR abuts the seawall for some of its borders. Formal access to the site is with the permission of Natural England only and physical access is restricted by hedges, ditches and a locked gate.

Survey 1 on 2 September 2010
Early Natural England data shows that cattle, horses and sheep graze on the marsh, as do Brent Geese (*Branta bernicla*). Other birds include Curlew (*Numenius arquata*), Heron (A*rdea cinerea*), Snipe (*Gallinago gallinago*), Canada Geese (*Branta canadensis*), Swallows (*Hirundo rustica*) and House Martins (*Delichon urbicum*). Insect species include the dragonflies Common Darter (*Sympetrum striolatum*) and Southern Hawker (*Aeshna cyanea*). Water levels are controlled by sluices giving the area the general characteristics of coastal marshland (i.e. a flat, marshy, grassland). Water sources include quarry settling ponds and the Roman Brook, a small stream that rises from a spring in Springmead Garden. The invasive Australian Swamp Stonewort (*Crassula helmsii*) is present in the main ditch. The presence of numerous anthills indicates that no recent ploughing has taken place and cattle (*Bos taurus*) and sheep (*Ovis aries*) now graze the area possibly between May and December each year.

Survey 2 on 25 October 2024
This was conducted from the seawall to the south of the NNR. Several species of birds and flying insects were recorded as they flew from the reserve and over the seawall. Observations were assisted by the use of binoculars and cameras with high magnification telephoto lenses. Most of the animals observed were birds, including several raptor species, and at this time cows and sheep were grazing the marsh.

Survey 3 on 27 March 2025
Lodge Lane access path. This was the first of a two-part survey conducted by Tony Thorn (compiler of the Brightlingsea Environment and Biodiversity Project) and John Attiwell (Wilder Community Ranger Essex Wildlife Trust)
Weather was sunny and dry, temperature 18 ºC. Access to the NNR is via Lodge Lane. Data here was collected in the usual manner by observation and extensive use of photography. Photographs enabled a better identification of plant species via programs such as pl@ntnet but also provide a means of verification should the identification of a species be challenged. Lodge Lane is bordered for much of its length by urban gardens on one side and a blackthorn hedge on the other. At the end of the lane is a locked gate that prevents unauthorised access and leads to the northern area of the marsh.

Survey 4 on 27 March 2025
The Northern Marsh area. Because there was limited time available, the survey covered only the extreme northern boundary of the site, effectively similar to that of the coastal seawall survey of 25.10.24 but viewing south. This was aided by the use of binoculars and cameras with telephoto lenses. A further visit venturing further into the site would provide a better representation of its biodiversity and it would be constructive if this could be authorised.

The main northern boundary of much of the marsh is defined by hedgerows and a water filled ditch. Other field boundaries are defined by hedges which run alongside and parallel to water filled drainage ditches that are punctuated by small ponds. The water in these ponds and their ditches is coloured brown and is assumed to be fresh. Within the restricted area, open fields are grazed by ruminants, mainly in summer, and the grazed field areas are generally undulating rough pasture, this being exaggerated by cow hoofprints and anthills.

Data obtained on the Brightlingsea Marsh surveys

Survey 1
Natural England's survey at TM079172 on 02.09.10
(Data reproduced with kind permission of Natural England. Natural England Copyright.
Source: Condition assessment field form for: coastal grazing marsh/sea walls/berms/ditches/invertebrate Colne Estuary - Brightlingsea Marsh NNR.)
Plants
1. *Australian Swamp Stonewort *Crassula helmsii* (I)
2. Autumn Hawkbit *Leontodon autumnalis* (O)
3. *Brackish Water Crowfoot *Ranunculus baudotii* (R)
4. *Branched Bur-reed *Sparganium erectum*
5. *Celery-leaved buttercup *Ranunculus scleratus* (R)
6. Common Bird's-foot Trefoil *Lotus corniculatus* (R)
7. Common Duckweed *Lemna minor* (A)
8. Common Mouse-ear *Cerastium fontanum* (R)
9. Couch *Elymus repens* (F)
10. Creeping Bent *Agrostis stolonifera* (A)
11. Creeping Thistle *Cirsiun aevense*
12. *Crested Dog's Tail *Cynosurus cristatus* (F)
13. Curled dock *Rumex crispus*
14. *Curved Hard Grass *Parapholis incurva* (R)
15. *Divided Sedge *Carex divisa* (R)
16. Duckweed *Lemna minuta*
17. False Fox-Sedge *Carex otrubae* (O)
18. *Great Water Dock *Rumex hydrolapathum* (R)
19. *Greater Pond Sedge *Carex riparia* (O)
20. Greater Sea-spurrey *Spergularia media* (R)
21. Gypsywort *Lycopus europaeus* (R)
22. Hard Rush *Juncus inflexus* (R)

23. Lady's Bedstraw *Galium verum* (O)
24. *Lesser Reedmace *Typha augustifolia* (R)
25. *Marsh Foxtail *Alopecurus geniculatus* (R)
26. *Meadow Barley *Hordeum marinum* (A)
27. Nettle *Urtica dioica*
28. Perennial Rye Grass *Lolium perenne* (F)
29. Reed Sweet-grass *Glyceria maxima* (O)
30. Saltmarsh Rush *Juncus geradii* (R)
31. *Sea Barley *Hordeum marinum* (R)
32. Sheep's Sorrel *Rumex acetosella* (O)
33. *Small-leaved Timothy Grass *Phleum bertolonii* (F)
34. Soft Rush *Juncus effusus* (O)
35. Spear Thistle *Cirsium vulgare*
36. *Spiny Restharrow *Ononis spinosa* (F)
37. *Strawberry Clover *Trifolium fragiferum* (O)
38. *Water Plantain *Alisma plantago* (R)
39. Water Starworts *Callitriche* agg. (O)
40. Yarrow *Achillea millefolium* (F)

Animals

1. Canada Goose *Branta canadensis*
2. Common Darter *Sympetrum striolatum*
3. Curlew *Numenius arquata*
4. Goldfinch *Carduelis carduelis*
5. Grey Heron *Ardea cinerea*
6. House Martin *Delichon urbicum*
7. Kingfisher *Alcedo atthis*
8. Snipe *Gallinago gallinago*
9. Southern Hawker *Aeshna cyanea*
10. Swallow *Hirundo rustica*

Key for NE data. (A) Abundant (R) Rare (O) Occasional (F) Frequent (I) Invasive.
Plants marked * were not found elsewhere in the Brightlingsea area during BEBP surveys**.**

Survey 2
Species observed from the sea wall flying over, from, or on the Marsh TM075167 or boundary on 25.10.24.
Plants
None recorded but generally typical of the sea wall (See separate sea wall survey data).
Animals

1. Blackbird *Turdus merula*
2. Blue tit *Cyanistes caeruleus*
3. Brent Goose *Branta bernicla*
4. Carrion Crow *Corvus corone*
5. Cormorant *Phalacrocorax carbo*
6. Cows (Cattle. Breed not known) *Bos taurus*
7. Curlew *Numenius arquata*
8. Dunnock *Prunella modularis*
9. Godwit *Limosa* sp.
10. Goldfinch *Carduelis carduelis*
11. Great Black-backed Gull *Larus marinus*
12. Green Woodpecker *Picus viridis*
13. Greylag Goose *Anser anser* (Chevron of about 60 birds in flight over marsh)
14. Grey Heron *Ardea cinerea*
15. Kestrel *Falco tinnunculus*
16. Kingfisher *Alcedo atthis*
17. Linnet *Linaria cannabina*
18. Little Egret *Egretta garzetta*
19. Long tailed tit *Aegithalos caudatus*
20. Pheasant *Phasianus colchicus*
21. Redshank *Tringa totanus*

22. Reed Bunting *Emberiza schoeniclus*
23. Robin *Erithacus rubecula*
24. Sheep *Ovis aries*
25. Shelduck *Tadorna tadorna*
26. Skylark (Heard not seen) *Alauda arvensis*
27. Turnstone *Arenaria interpres*
28. Widgeon *Anas penelope* (Approximately 100 from marsh landed on mudflats)
29. Wren *Troglodytes troglodytes*

Survey 3
Brightlingsea Marsh North. Lodge Lane at TM079172 on 27.03.25
Plants
1. Alexanders *Smyrnium olusatrum*
2. Blackthorn *Prunus spinosa*
3. Bramble *Rubus fruticosus*
4. Chickweed *Stellaria media*
5. Cow Parsley *Anthriscus sylvestris*
6. Cocksfoot Grass *Dactylis glomerata*
7. Greater Stitchwort *Rabalera holostea*
8. Ivy *Hedera helix*
9. Lords and Ladies *Arum maculatum*
10. Mediterranean Spurge *Euphorbia chracias*
11. Nettle *Urtica dioica*
12. Poison Hemlock *Conium maculatum*
13. Purple Deadnettle *Lamium purpureum*
14. Swiss Chard *Beta vulgaris*
15. Three Cornered Leek *Allium triquetrum*

Animals
1. Blue tit *Cyanistes caeruleus*
2. House Sparrow *Passer domesticus*
3. Magpie *Pica pica*
4. Marsh Harrier *Circus aeruginosus*
5. Starling *Sturnus vulgaris*
6. Woodpigeon *Columba palumbus*
7. Wren *Troglodytes troglodytes*

Survey 4
Brightlingsea Marsh North at TM078169 on 27.03.25
Plants
1. Alexanders *Smyrnium holostea*
2. Blackthorn *Prunus spinosa*
3. Bramble *Rubus fruticosus*
4. Cherry Plum *Prunus cerasifera*
5. Common Reed *Phragmites australis*
6. Common Thistle *Cirsum vulgare*
7. Creeping Thistle *Cirsum arvense*
8. Cut-leaved Cranesbill *Geranium dissectun*
9. Daffodil *Narcissus sp*. (Garden escapee)
10. English Scurvygrass *Cochlearia anglica*
11. Fan-leaved Water-crowfoot *Ranunculus circinatus*
12. Greater Stitchwort *Stellaria holostea*
13. Greater Tussock Sedge *Carex paniculata*
14. Hard Rush *Juncus inflexus*
15. Meadow Buttercup *Ranunculus acris*
16. Red Deadnettle *Lamium purpureum*
17. Reedmace *Typha latifolia*
18. Sharp Rush *Juncus acutus*
19. Spear Thistle *Cirsium vulgare*
20. Nettle *Urtica dioica*
21. Water Starwort *Callitriche stagnalie*

Animals

1. Blackbird *Turdus merula*
2. Black Headed Gull *Chroicocephalus ridibundus*
3. Blue tit *Cyanistes caeruleus*
4. Brown Hare *Lepus Europaeus*
5. Buff-tailed Bumblebee *Bombus terrestris*
6. Buzzard *Buteo buteo*
7. Carrion Crow *Corvus corone*
8. Cetti's Warbler *Cettia cetti*
9. Chaffinch *Fringilla coelebs*
10. Chiffchaff *Phylloscopus collybita*
11. Comma Butterfly *Polygonia c-album*
12. Coot *Fulica atra*
13. Cormorant *Phalacrocorax carbo*
14. Curlew *Numenius arquata*
15. Dunnock *Prunella modularis*
16. Feral pigeon *Columba livia*
17. Fox *Vulpes* (identified by faeces)
18. Goldfinch *Carduelis*
19. Great tit *Parus major*
20. Greenfinch *Chloris*
21. Grey Heron *Ardea cinerea*
22. Greylag Goose *Anser*
23. Hairy Footed Flower Bee *Anthophora plumipes*
24. Herring Gull *Larus argentatus*
25. House Sparrow *Passer domesticus*
26. Jackdaw *Coloeus monedula*
27. Kestrel *Falco tinnunculus*
28. Lapwing *Vanellus*
29. Lesser Black-backed Gull *Larus fucsus*
30. Magpie *Pica*
31. Mallard *Anas platyrhynchos*
32. Marsh Harrier *Circus aeruginosus*
33. Moorhen *Gallinula chloropus*
34. Oystercatcher *Haematopus ostralegus*
35. Peacock Butterfly *Aglais io*
36. Pheasant *Phsianus coplchicus*
37. Pied Wagtail *Motacilla alba*
38. Rabbit *Oryctolagus cuniculus*
39. Raven *Corvus corax*
40. Red Legged Partridge *Alectoris rufa*
41. Robin *Erithacus rubecula*
42. Rook *Corvus frugilegus*
43. Skylark *Alauda arvensis*
44. Small Tortoiseshell *Aglais urticae*
45. Sparrowhawk *Accipiter nisus*
46. Starling *Sturnus vulgaris*
47. Woodpigeon *Columba palumbus*
48. Wren *Troglodytes troglodytes*
49. Yellow Meadow Ant *Lasius flavus*

No risk assessment has been conducted as the risk of degradation for the whole area is considered Low because the site has a Natural England overview and access to the public is restricted. The impact of grazing cattle must be considered. The threats of change to the environment due to global warming and rising sea levels are recognised but not quantified.

Figure 43. Part of Brightlingsea Marsh

Miscellaneous questions

The overall objective of this project is to provide a picture of what Brightlingsea's environment and biodiversity at a particular date. The resulting data then provides a baseline against which change can be measured, or in the case of planning processes provides a means of gauging the impact of future construction work. I have not consciously used guidance such as found in documents including the Natural History publication *UK Environmental Framework Guide to Citizen Science*, and also Tweddle *et al.* (2022). The Natural History Guide Glossary states that, for its purposes 'The term citizen science is restricted to studies of biodiversity and the environment, and is defined as a volunteer collection of biodiversity and environmental information which contributes to expanding our knowledge of the natural environment, including biological monitoring and the collection or interpretation of environmental observations'. I suggest that the BEBP is therefore a genuine citizen science project.

By researching the eight objectives, a broad range of meaningful data has been obtained, but further evaluation of its methodology and scope is needed. If this document is viewed favourably by its readers then the possibility of conducting similar projects on a wider geographical basis - perhaps progressing towards a national composite baseline i.e. an amalgam of a mosaic of local surveys - should be considered at the appropriate level.
I have yet to be convinced that all of the legislation and recommendations from various sources over the years have resulted in tangible and long-term improvements to our natural world, or that there is any indication that they shall do in the future. I therefore use the term 'nature recovery' with caution. My opinions are expressed in the following observations and concerns.

How effective has legislation been?

Early biodiversity legislation included the Council of Europe's *Convention on the Conservation of European Wildlife and Natural Habitats* (1979) (known as the Bern Convention) which was implemented in the UK on 1 Sept 1982 'The mission of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) is to ensure that wild flora, fauna and habitats are maintained at, or restored to a favourable conservation status' from which the Convention's Appendix 2 lists strictly protected species and Appendix 3 lists protected fauna species.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora, sometimes referred to as the Washington Convention or simply CITES, protects endangered plants and animals from the threats of international trade. Closer to home there is the Wildlife and Countryside Act 1981.

Recently we have seen new legislation and conferences including the 2021 Environment Act and the *Convention on Biological Diversity*. We have guidance for planners such as the Biodiversity Metric Tool and the Small Sites

Metric, guides to the restoration of ponds, after care for gravel pits, and more locally, the Essex Forest Initiative, the Essex Tree Management Plan, and Essex Wildlife Trust's Wilder Towns and Wilder Villages initiative. And for specific animals we have older but still current legislation examples of which include the previously mentioned *Badgers Act 1991*, the *Badgers (Further Protection) Act 1991* and the *Protection of Badgers Act 1992 an Act to consolidate the Badgers Act 1973*. If the badger related acts had true meaning, would badgers be killed on the assumption that they spread bovine TB? The Bureau of the Bern Convention advised the UK in 2025 that the culling of badgers was not appropriate and the reasons for doing so did not stand up to scrutiny (Convention on the conservation of European wildlife and natural habitats Bureau meeting 18th-19th June 2025 Standing Committee 45th meeting 5.4 Complaints on stand-by.)

So can we trust the effectiveness of such legislation? (Note that the 1992 Act advises 'If, save as permitted by or under this Act, any person wilfully kills, injures or takes, or attempts to kill, injure or take, any badger, he shall be guilty of an offence'. However it further contains the provision 'An authorised person shall not be guilty of an offence under paragraph (c) of section 2 of this Act if he satisfies the court before whom he is charged that his action was necessary for the purpose of preventing serious damage to land, crops, poultry or any other form of property or for the purpose of preventing the spread of disease'). The protection of badgers is discussed further by the Badgers Trust (2022).

The illegal killing of Hen Harriers (*Circus cyaneus*) is discussed in Geographical Magazine (January 2025). Because these birds are historically credited with preying on domestic fowl, they have been persecuted, a position made worse by landowners anxious to protect their grouse shooting. Hen Harriers are also described as the most intensely persecuted of all of the UK's birds but have been a protected species since the 1954 Protection of Birds Act and more recently under the 1981 Wildlife and Countryside Act and other Directives to which the UK is party. The effectiveness of laws aimed at protecting the above examples of Badgers and Hen Harriers is discussed by Hyde and Day (2024).

What have all these early legislations achieved? Maybe I have missed it but in the past there does not seem to have been a national coordinating mechanism with clear meaningful objectives and the means of evaluating them. (See also the earlier section entitled 'Nature Recovery - Historical legislation, plans, objectives and reports'). Where is the evidence that this well-meaning legislation has produced benefits that include protection of wildlife but in particular, the coveted nature recovery? The implementation of legislation needs information, opportunity and resources, but above all it needs the informed drive and determination of those wielding the power to draw them together to enforce improvement.

Should invasive species be recovered?

It might be worth adding a note about invasive species and whether they fall within the recovery remit. Coypu (*Myocastor coypus*) escaped from fir farms in the 1950s, establishing colonies in Norfolk with numbers up to 200, 000. They damaged crops and river banks and were trapped and hunted to extinction by 1989. American Mink *Neovison vison* also escaped from fir farms and their numbers in the wild are not yet officially controlled although considered a threat to Water Voles (*Arvicola amphibius*) and to sea birds.

The Grey Squirrel *Sciurus carolinensis* has already been discussed. Indian Parakeets *Psittacula krameri manillensis* are common in London and I have observed them in Richmond Park. Would true nature recovery require that these and other species, such as Chinese Muntjac Deer (*Muntiacus reevesi*), be exterminated? Certainly action to eradicate or at least control the numbers of the invasive Asian Hornet (*Vespa velutina*) should figure highly on any nature recovery programme. Although this carnivorous species will prey on many insect species, it is particularly fond of the native Western Honeybee (*Apis mellifera*), which unlike the Eastern Honeybee (*Apis cerana*) has not evolved a protective strategy.

Are plans and strategies sustainable?

In our area in future can the new Environment Improvement Plan and the Essex Local Nature Recovery Strategy (LNRS) overcome these apparent difficulties and produce meaningful improvement, or are they doomed to eventual failure through general apathy? Despite much media publicity on climate change, habitat loss and general degradation of the environment, I suggest that public apathy is real, whilst historical Government apathy has been evident in the implementation and enforcement of legislation, rather than in its production. For example, the phosphorus and nitrate levels in Essex rivers have been poor for years and no improvements noted. Then we have the added problem of sewage discharge.

A lack of improvement has been recognised by certain protest groups and their need frustration is shown in their anti-social but perhaps well-meaning protest activities. Their methods do little to advance their cause and illustrate the need for greater public awareness and education using a common-sense approach. It is hoped that current administrations will address these concerns. Projects such as the BEBP provide facts that can help to explain

where and why there is need for local action. Currently only a small fraction of the pubic is actively involved in measures to counter losses to biodiversity and the environment. Some of this small fraction will be doing so through volunteer roles in organisations such as the Wildlife Trusts. But in general, people will naturally prioritise personal needs, including housing and amenities, over the biodiversity of open fields and woodland because their main concerns are to counter the pressures and constraints of everyday living. This will vary from individual to individual, and many will say that even if they care greatly, they simply cannot afford the luxury of helping nature. And general concern for nature will decrease as the population increases.

Are dogs a problem?
This section is not to describe the activities of dogs (*Canis lupus familiaris*), it is to consider the impact of their activities on biodiversity and potentially the results of surveys. It may be asked why should dogs be a problem? According to the website *Statistica* the current UK pet dog population is 13.5 million. Working dogs will add to this figure but an approximate ratio will give one dog for every five persons. Pet food accounts for one quarter of total meat production (Doghop website, 2024). The use of food resources by dogs is therefore well illustrated.

From my own experience of biological and environmental survey work I know that a minority of dog owners do not care about conservation. This is illustrated by the absurdity of some dog walkers collecting their dog faeces in black plastic bags, which are then discarded or thrown into trees, and others that simply do not pick up after their dogs. Dog waste is a chemical and biological pollutant and can transmit parasites and disease to other dogs and humans

Dogs may also cause physical damage to the environment. Sections of a river bank known to me have been severely damaged due to dog owners encouraging their pets to jump into the river, and on emerging damaging the river banks as they claw their way out (Thorn 2020). In one case, this damage was so severe that the river width increased threefold. The bank was eventually repaired by the land owners and further damage reduced when the local car park was closed. This did not prevent dog owner accessing the area but reduced their numbers considerably and the damage caused and the number of black bags deposited reduced *pro rata*.

Wildlife may be severely impacted by dogs, which are genetically close to wolves, not just by their activities, but simply by their presence. Hennings (2016) takes this consideration further and advises that animals will relocate from areas where dogs are present, thus reducing the area of their habitat. Dog scent does not easily dissipate and remains long after the dog or dogs have moved on, the effect of which adds to the probability of wildlife moving away and remaining away. Frightened animals increase the amount of energy they use, and change routines thus reducing opportunities. Reproduction is impacted by repeated long term stress, as is growth and resistance to both disease and parasites. I will qualify this by adding that my trailcam footage and observations of the Lozenge Nature Area showed the night time visits of muntjac deer, foxes, badgers and rats. This despite the presence of dog faeces and presumably their scent.

Dogs can transmit disease and kill wildlife and farm animals (And in extreme cases people). Whilst acting in my (then) capacity as an EWT River Warden, I have spoken to apparently well educated visitors to the area querying why they have let their dogs off the lead in a field containing lambing sheep only to be met with verbal abuse and the information leaflet that I gave being ripped up with the response 'I know all about this, I'm on the Panel'. Dogs are hunting pack animals by instinct and I have personally observed this in some Mediterranean and North African countries. Abandoned dogs of all breeds and sizes instinctively form packs that survive by scavenging and hunting. This instinct is reflected in the actions of the few dogs that injure or kill people.
At the risk of offending those naturalists who are also dog owners, these observations are part of a pragmatic reality. The considerations could also impact on the animal counts in biodiversity surveys, since many of the BEBP surveys are conducted on or near public footpaths. I appreciate the close affinity of dogs and humans and I have owned and loved mongrels, Pembrokeshire Corgis and Border Collies for most of my life. My family have also owned cats.

Are Cats a Problem?
The domestic cat (*Felis domesticus* syn. *Felis cata*) is found in homes as pets or in the wild as independent populations. Trouwborst *et al.* (2019) advises that they are intensive breeders and may have up to three litters a year. Although domesticated cats are provided with food and shelter by their 'owners' the hunting instinct is retained and this impacts on small birds, mammals and insects. An article by the Countryside Alliance (Bonner 2022) suggests that up to 270 million wild animals are killed each year by the UK cat population of 9.5 million, which has an immense impact on biodiversity. Negus, in Shooting UK (2020), refers to a report that estimates 27 million songbirds are killed annually by cats in the UK. Strangely, in his book Catlore, Morris (1988) describes cat activity but does not include a dedicated section on predation, which is an important instinct driven activity. Numerous other publications describe cat activity in general.

What is Brightlingsea Town Council's Environmental Policy?
Brightlingsea Town Council (BTC) has an Environmental Policy dated 2019, which was produced to satisfy the requirements of the 2006 Natural Environment and Rural Communities Act. Although comprehensive, the Policy generally appears to cover only land and property owned or controlled by the Council and its implementation is likely to have negligible impact on the majority of the BTC geographical area. At the time of writing, it can be found online and is available for scrutiny from:
https://brightlingseatowncouncil.gov.uk/wp-content/uploads/2021/11/Action-Plan-Environmental-Policy.pdf
The Council website shows the policy objectives were reviewed with recommendations on 7 February 2021. The reviews are comprehensive and available from:
https://brightlingseatowncouncil.gov.uk/wp-content/uploads/2021/11/Environmental-Policy-Actions-Review-with-Recommendations.pdf.

The BTC Policy vision is 'To stabilise and progressively reduce our environmental footprint, to progressively reduce our greenhouse gas emissions and make sure our estate and services are adapted to the future impacts and opportunities of climate change; and to contribute positively to Brightlingsea's character, local environment and natural environment.' The Policy objectives include the development of activities that will minimise negative effects on the general environment and will be subject to annual review and where possible the Council's improved environmental performance will be measured against specific targets and objectives.

I do not know if and how specific environmental actions are conducted, nor how they are monitored to show impact, nor how many targets and objectives have been achieved. A Nature Recovery Group (NRG) consisting of several dedicated individuals, including members with experience and expertise, is/was Chaired by a BTC Councillor. A draft biodiversity policy and group constitution was drafted for the NRG but was not progressed.

Have the general public been involved in the BEBP?
Local information, from which people can relate to the state of nature on their doorstep, seems far better received than vague statistics on national decline. Projects such as the BEBP can provide such local information, but need support from expert domains. Experts tend to work within their own bubbles of interest and are constrained by their available resources. Consequently, few have seen the need to support relatively unknown projects such as the BEBP – indeed, some will consider that it has no purpose or value at all and have said so. There are several small groups or organisations willing to take part in projects to support nature recovery but their efforts, sadly, are insignificant when compared with the scale of the need for meaningful action. That is not to say their efforts are not worthy of praise, but we must accept the pragmatic reality that meaningful improvements must be resourced, co-ordinated and directed by a central expert domain. I judge the BEBP as failing in this respect. There is little opportunity for ordinary individuals to make their views known and their effort recognised.

Efforts to increase public interest in the BEBP included local awareness sessions and materials including participation in biodiversity events at the local library and the Lozenge Nature Area. Here informative posters were displayed and leaflets issued. The events were very well organised by the leader of a local nature group. However, these were, and may still be, limited events of perhaps one or two each year and the numbers attending, including children, are relatively few, though very welcome. Additional ways of reaching out to a wider audience are needed as local, events seem to be generally preaching to the converted. A greater proportion of the local community needs to be made more aware of the situation in their own immediate geographical areas and attempts made to educate and empower them. Baselines and reports such as the BEBP could provide necessary information and evidence though I repeat earlier doubts that through necessity, nature is not high on the priority list of many people.

We should also consider whether schools or bodies such as scouts and other youth organisations can be a 'conduit to awareness'. Should Nature Recovery be the subject of a school qualification? It is already a college qualification at NVQ Level 2 and university subject at Masters level. The scouts already have their 'Champions for Nature Challenge' and it may be advantageous to routinely introduce nature recovery to much younger students.

Nature recovery vs. Human need. What are the priorities?
Even if some parts of nature recovery are successful in the short term, the needs of the human population may still be problematic in the longer term. Current food production in the UK is inadequate for our population's need and we rely on imports to supplement demand. If imports were restricted by political means or by war, starvation as a weapon is a distinct possibility. 'Digging for victory' to reduce the need for food imports in favour of military imports may have been relevant during the second world war but had the effect of reducing space for biodiversity. In the long term such schemes would not work because the wartime (1944) UK population of 47 million has increased greatly and currently (2025) stands at 69.7 million. The UK produces only 16% of its fruit consumption and 53 % of its vegetable consumption (UK.GOV 2024). The balance is imported and even if we dismiss the

possibility of war, the countries from which the produce originates may be unable to maintain the rate of export, due to their own population increases and climate change affecting the range of possible produce.

Biodiversity and the environment are too fragile to absorb such imbalance and eventually choices may have to be made between human needs (agriculture, town, housing, infrastructure, domestic pets) and the natural environment. But if my assessment of the perceived conflict between human needs and nature is correct, then the decline of one or the other is inevitable. As mentioned briefly in the introduction, overshadowing the whole concept of nature recovery is the ability and will of Governments and administration at all levels to fulfil their commitments. If a choice has to be made between human need, nature conservation and nature recovery human need will always come first.

Global politics are unpredictable and any that cause restrictions on food imports must impact on the environment. My understanding is that there is an opinion that the UK can make land usage changes such that the land available for agriculture will become sufficient to reduce the risk of food shortages in 'times of unrest'. I assume that efficiencies in food production, including the setting aside of additional land for many acres of greenhouses and the use of agroforestry systems, hydroponics and roof top gardening may also be supplemented by the agricultural development of much of the land currently set aside for nature. This won't just jeopardise the implementation of nature recovery, nature conservation and nature enhancement: it will debase its relevance. However, this view contradicts my own view that in fact we cannot meet the needs of the population in times of political stress.
Of the whole of this report, I feel this one paragraph may prove to be the most meaningful.

Is risk analysis an accepted component of nature recovery?
Risk assessments as part of the process of risk analysis are not normally a priority in citizen science projects. My opinion is that projects designed to enhance biodiversity, or to make environmental changes that might enhance biodiversity, need to involve risk analysis and the production of risk assessments. Apart from identifying immediate risks and identifying the need for mitigation, they also provide a deeper insight into the problems often showing needs that might otherwise have been overlooked. Even something as simple as planting a new hedge needs a risk assessment. In this case the first question to ask is 'Why does this site need a new hedge? The second question is 'What is the impact on the environment and biodiversity of planting a new hedge and what are the risks to existing biodiversity?. In most cases the answer will be obvious but the questions must still be asked. In this project risk assessments have been made for thirteen sites, effectively to monitor detrimental changes.

Recovery, conservation or enhancement – which is it?
Earlier in the text I gave my opinion that people may easily be confused about the differences between nature recovery, nature conservation and nature enhancement. Without a baseline leading to a positive recovery plan, I suspect that many naturalists' activities in the Brightlingsea area and others are directed more towards nature enhancement and conservation, than nature recovery, which I interpret as to bring back what we have lost. Not only is the meaning of nature recovery unclear, there is no definition of what we are supposed to be recovering from, nor from how far back in time the baseline or datum point for this recovery is to be fixed. Are we talking about recovery from many different arbitrary dates? Are we seeking our own version of Jurassic Park (should that be Cretaceous Park)?
We need also to consider carrying capacity.

I also mentioned that the LNRS (Greater Essex) defines Nature Recovery as 'Efforts aimed at restoring and enhancing natural habitats and ecosystem to increase biodiversity, improve ecosystem services and strengthen ecological resilience'. The statement would be far more positive if it read 'The restoration and enhancement of natural habitats and ecosystem to increase biodiversity, improve ecosystem services and strengthen ecological resilience'. 'Efforts aimed' allows for the possibility of failure. But does either definition blur the line between recovery of an old system and enhancement of an existing one?
The need to rationalise definitions between the various bodies is further illustrated by the fact that there is no single and commonly accepted definition of a nature recovery network.

Miscellaneous considerations

Biodiversity Net Gain
The Government's appetite to prioritise enhanced biodiversity can change but current information is that from early 2024, developers must have a positive impact on biodiversity, i.e. Biodiversity net gain (BNG), by creating and improving biodiversity when developing a site. Currently (2025) the Government is considering the removal of BNG requirements from small developers.

BNG is measured using the statutory biodiversity methodology and measures all types of habitat, including:
1. grassland

2. hedgerows
3. lakes
4. woodland
5. watercourses such as rivers and streams

Biodiversity is measured by calculating the value of habitats in terms of biodiversity units. These include:
1. The number of units in a habitat before development
2. The number of units needed to replace those lost as a result of the development and to achieve 10% net gain through the creation or enhancement of habitat

The formula takes different factors into account, including the habitat's:
1. size
2. condition
3. strategic significance
4. type

For created or enhanced habitats, the formula also takes account of:
1. difficulty of creation or enhancement
2. the time it takes a habitat to reach its target condition
3. distance from the habitat loss

The statutory (official) biodiversity metric calculation tool must be used to demonstrate that the developer has calculated the number of biodiversity units for existing habitat or habitat enhancements in accordance with the statutory biodiversity metric. Currently, Natural England's Biodiversity Metric 3.1 tool (JP039), which is likely to be replaced with version 4.0, can be used to calculate biodiversity losses and gains for terrestrial and/or intertidal habitats. Instructions for use by the appropriate competent person are in The Statutory Biodiversity Metric User Guide. The method must involve the following:

1. Assess the biodiversity unit value of an area of land
2. Demonstrate biodiversity net gains or losses in a consistent way
3. Measure and account for direct impacts on biodiversity
4. Compare proposals for a site - such as creating or enhancing habitat on-site or off-site

With ecological advice, it can assist decisions on designs, plans and land management thereby taking better account of biodiversity.

Local Guidance on BNG shows the following hierarchy
1. Avoid
2. Mitigate
3. Compensate

Further example of a mitigation hierarchy (Arlidge *et al.* 2018) Objective of no net loss (NNL) or net gain (NG)
1. Avoid
2. Minimise
3. Remediate
4. Offset

The use of eDNA sampling in water bodies
A problem with sampling local flooded gravel pits is that in many cases the pits consist of two main zones, a shallow beach-like circumference and the deep pit itself. The shallow region may be relatively warm in summer but can be weed free and hence some biodiversity in this zone is challenged. The deeper, often weeded, region is difficult to sample and traditional methods such as kick sampling are impossible. Because of these difficulties the use of eDNA processes was considered and the methodology, advantages and costs researched. I sent a written request to a local angling club for permission to undertake biodiversity surveys, which was accepted, but no response was received to a later request for permission to sample for eDNA.
eDNA analysis, whilst highly advantageous has drawbacks. DNA degrades at different rates depending on environmental conditions and different organisms may also shed DNA at a rate that may vary with its life stage, particularly in the case of insects. Although these factors may affect calculations of species density, which is not a main objective, they are variables to be aware of. The eDNA process requires professional processing and is expensive. I made enquiries for details of obtaining possible funding from several bodies but without success. I

decided not to pursue eDNA/sequencing technology because sampling was not agreed, it could not be sponsored, and even if it was, the cost estimated at £10,000 even with a University Research voucher, would be prohibitive.

Population dynamics
The BEBP biodiversity data is collated by a simple 'observed' and 'not observed' system, and is insufficient to establish any form of mathematical model to assess or predict the probability of decline in general and the rate of decline in particular for the population of any species. Hence the need for repeat baselining surveys. If a decline in any population is suggested following a repeat baselining exercise, mitigation may be considered provided the cause of decline is identified. This may prove to be difficult. Firstly the decline must be real and not an artifact of the methodology. Secondly, the reasons for any decline cannot necessarily be blamed entirely on human activity. Given that both population sizes and the carrying capacity of their environment can vary over time for many reasons, this may have to be factored in when conducting comparative surveys following baselining. Moreover the fact that a species was observed at commencement and not observed subsequently does not necessarily show a decline, it is an indication that further research is needed.

Many local population sizes (and hence the probability of observing a species) can vary over time and by season. Real population size, rather than observed size, tends to be in a state of flux between upper and lower extremes. In the absence of controls and given sufficient resources and a suitable environment, the size of a given population will tend to increase exponentially. The fact that we are not knee deep in (say) squirrels shows that there are controls and perhaps a form of Malthusian Theory applies. For example, some animals may limit their reproductive rates to match available resources (University of Toronto 2000). Other natural controls include geographical restrictions and isolation, interspecific and intraspecific competition for resources, disease, environmental incompatibility, and predation, all of which may restrict population size to a maximum (upper extreme) carrying capacity.

Natural variations in resources may include wide differences for example in the production of Holly (*Ilex aquifolium*) berries or in the numbers or Red Admiral *Vanessa atalanta* caterpillars and hence butterflies, both of which can be obvious to the casual observer. Human activity, including the impact of climate change, exerts additional pressures on resources and the environment, which may limit the maximum carrying capacity or decrease it, and if the decrease is reduced beyond a certain threshold, the species becomes locally extinct. Bird species observed in my garden are few in winter but maximum in early summer so the season and time of day are both relevant to the number of observations recorded (Appendix 4 and Figure 1A)

Seed Banks and Arks
If as a result of these local surveys, endangered species are identified or other species are considered to be at risk of extinction, the possibility of the use of arks and seed banks should be considered. Effectively, conservation should be pro-active with advice sought from the relevant expert domain(s) such as Kew. The Millennium Seed Bank at Wakehurst may have data for the Brightlingsea area, but they would not routinely release that data in order to protect vulnerable species (a disclosure agreement would be needed). However, although such data would be of great interest, it would probably not add greatly to this project. Of interest is the fact that seed banks occur naturally and it may take just a slight disturbance of the soil to induce germination. (See the section on hedges).

Arks are an effective way of preserving endangered species. There are arks for animals such as the White-clawed Crayfish (*Austropotamobius pallipes*), an example being the National Trust's ark in Northumberland's River Wansbeck, Bristol's Fernhill Farm and further sites in Essex. Elsewhere, that for the Pearl Mussel (*Margaritifera margaritifera*) is administered from Windemere and run by the Freshwater Biological Association.
Species may be pressurised into decline for several reasons and those reasons must be considered when conservation action is planned.

Certain species have been reintroduced to England: for example the European Beaver (*Castor fiber*), which has a beneficial impact on the environment by building dams and thereby creating ponds.
The overriding consideration is that the cause of population decline must first be addressed. With beavers, the cause of the original extinction is probably hunting but new populations must reach a viable population size to enable permanent re-establishment. The absence of a suitable environment - i.e. rivers - precludes the introduction of beavers to Brightlingsea of course. Beavers have been reintroduced to sites in London under the Ealing Beaver Project. Most English beavers originated from Bavarian stock.

By maintaining a database of local species any decline can be measured and anticipated and where necessary recovery action can be taken in the same manner as that for beavers

Natural seedbanks are of course common and the disturbance of soil will often stimulate the germination of seeds. This is illustrated by soil disturbance at several sites where a local group planted whips in attempts to introducing new hedgerows.

Avian Influenza or Bird Flu
Avian influenza (AI) or bird flu is a variety of influenza virus that is specific to birds and is known as the influenza A virus or highly pathogenic avian influenza (HPA1). There are several dozen subtypes of the A strain (H1, H2, H3, H4 etc.) and Humans can be infected. In October 2022 Defra notified households in the Brightlingsea area that bird flu infections have been be reported and that the notified household is within 10 km of an outbreak i.e. in or very close to a declared Al Protection Zone and within a Surveillance Zone.
The impact of avian flu on populations recorded in this project is unquantified. The risk is mainly to poultry but wild birds such as waterfowl (swans, geese and ducks) and others such as gulls and raptors can be infected with high probability of death. The Defra website showed local control zones in Essex, Suffolk, Norfolk, and Cambridge. Brightlingsea is within 10 Km of a Clacton-on-Sea outbreak, which is identified as Control Zone HPA1, 10 km Surveillance Zone. Confirmed No. AIV2022/73.

Further statistics were obtained from the Animal and Plant Health Agency (APHA, 2024) website, which showed that the main species affected are geese and swans with raptors such as hawks and owls also badly affected. Data for Essex (Basildon, Braintree, Brentwood, Colchester, Maldon and Uttlesford) shows cases affecting geese, ducks and raptors have occurred, but the numbers reported are relatively low. It is unlikely that the numbers of all species in the local Brightlingsea bird population will be significantly reduced based on current statistics.

The British Trust for Ornithology was also asked for any data on bird mortality and activity. A summary of their advice is that as the days become shorter many birds become behaviourally less conspicuous. Dunnocks, and in particular Woodpigeons, (*Columba palumbus*) form flocks that come and go depending on weather and food availability. Hence short-term observations of local population fluctuations are common and do not necessarily reflect trends in population size. AI is however recorded in Wood Pigeons. Defra's 'Mitigation Strategy for Avian Influenza in Wild Birds in England and Wales' is found on their website. My own observations of birds in my garden show great seasonal variation in the numbers and species visiting feeders, with winter visits sometimes limited to Robins *Erithacus rubecula* and Woodpigeons and with no visits at all for several periods of many days.(Appendix 4).
It is very pleasing to note that the Gov.uk Animal and Health website reports no AI cases in Essex during 2024.

Geese
Greylag Geese (*Anser anser*) and Canada Geese (*Branta canadensis*) are common every year, alighting on the waters of gravel pits such as those situated in Robinson Road, and in the Colne Estuary, whilst flocks of Brent Geese (*Branta bernicla*) have been recorded on the coast earlier in the year. However, the mass Autumn migrations observed in previous years do not appear to have occurred along their usual flight paths for several years (recognising that different species may migrate in different directions).

Geese have been seen on other flight paths so the change may be simply a change in the location of their summer residence rather than in their numbers. I saw a single Greylag above my home address on 19 November 2022, whereas in earlier years many chevrons of a dozen or more geese were common over this location. Two more were observed on 02 March 2023. Egyptian geese (*Alopochen aegyptiaca*) and Greater White-fronted Geese (*Anser albifrons*) are seen locally, but usually in far fewer numbers. See the above section on Avian Influenza.
A chevron containing an estimated 60 Greylag Geese was seen flying over the seawall on 25.10.24

The use of Trailcams (Trail Cameras)
Many species are not easily seen because either they see you first or are nocturnal. A partial solution is the use of fixed trailcams set at a position that is likely to record either a targeted species, or all species within range of the camera. Disadvantages include the limited visual range of the device and the fact that some animals, including foxes, appear to sense the presence of a camera even when it is heavily camouflaged.

The animals filmed for this project were also attracted to the area and held there using an environmentally friendly bait. The bait mix included hazel nuts and chopped vegetables, but nothing that was likely to cause the animals harm or pollute the environment. It is worth noting that many of these ingredients are actively sought by wildlife when foraging in urban areas. However, care was taken to ensure that the amounts were neither excessive nor routine such that wildlife would come to expect or depend on these offerings.

Table 41. Species recorded by trailcam

Date	Time	Location	Species observed			
Jan 2021	Various night	Not disclosed	Badger ('Popeye')			
August 2022	Various night	TM 089186	Moorhen and young			
26 Feb. 2023	Various night	TM082167	Fox	Muntjac (m+f)	Rat	Moth sp. n/k
5 March 2023	Various night	Not disclosed	Badger ('Popeye')	Muntjac (f)	Moth sp. n/k	

Hedgehogs

Hedgehog populations have suffered a decline that probably amounts to between 25% and 75% over 20 years, although estimates differ. When considering decline and distribution, differences between urban and rural populations are becoming increasingly apparent (Wembridge *et al.,* 2022). In urban areas there is a possibly stable population with signs of recovery, but in rural areas numbers are low and continue to decline, especially in the east of England. There are also regional variations in distribution. It is likely that the benefits to rural populations including relatively advantageous environments such as gardens and more easily obtained food supplies, may be offset by higher road kills so here there is a balance to be considered. Recorded badger numbers are low, so there may be less competition for food from a common diet.

Hedgehog data are shown at websites including Hedgehog Street, The Big Hedgehog Map, and City Population and Office for National Statistics and some are used to inform Table 42 below. Note that data for a town area under a post code may give slightly different outcomes to those for the geographical area under a town name. The figures can only be approximations.

Table 42. Data for Hedgehog sightings recorded for several Essex Town areas from 2015. An unsuccessful attempt at statistical comparison.

Location	Town area ($Km^{2)}$	Human population	Human population/km^2	Hog sightings per town district	% total hog sightings	Hog density (hogs/km^2)	Hogs / Humans %
Braintree	10.45	41634	3984	406	12.67	38.9	0.98
Brightlingsea	2.24	8076	3605	409	12.76	182.6	5.06
Chelmsford	25.56	110507	4323	616	19.22	24.1	0.56
Clacton	13.41	50548	3769	361	11.26	26.9	0.71
Colchester	34.32	119441	3480	548	17.10	16.0	0.46
Harlow	19.86	82059	4132	415	12.95	20.9	0.51
Maldon	6.90	21462	3110	450	14.04	65.2	2.10
Total	**112.74**	**433727**	**-**	**3205**	**100.00**	**-**	**-**
Mean	**16.10**	**61961**	**3772**	**458**	**-**	**28.43**	**0.74**

The table shows fewer sightings in Brightlingsea compared with other towns, but the geographical area is just a fraction of others. The human population size is approximately proportional to the geographical area of the town and it could be argued that the number of sightings must vary with the number of observers. However, the ratio of hedgehog sightings to town area may suggest that Brightlingsea has a higher hedgehog population density *pro rata* than other areas. But the way the data is represented in Table 42, being just a poor attempt at rationalisation, has serious statistical weaknesses and no further analysis has been conducted within this project. Sampling error factors are assumed but not quantified. Further research into hedgehog numbers continues.

Badgers

Webcams provided useful data on badgers. There are at least two badger setts in the Brightlingsea area. Sadly, one sett appears to hold only one badger, rather than a clan. If this is correct, this increases the risk to stability and viability of the sett to high. It is not known how badgers are attracted to each other during the mating season when they are separated by large distances, nor is the range of their nighttime travel known for older badgers. Generally,

the range is assumed to average between two and three kilometres, though 5% may travel up to 7.5 km up to a maximum of 22 km. Since only one entrance to the sett in question has been monitored, it is possible that other badgers are part of a clan here but may use different entrances and hence have not been observed.

Advice on our possibly single badger was obtained from local expert domains including the Badger Trust and more specifically North East Essex Badger Group. The trust advises that within their territory, it is rare for badgers to have a single sett. Setts are categorised as Main, Annexe, Subsidiary and Outlier, of which some are used only at certain times of the year whilst others are in constant use. The one-eyed badger shown in Table 14 and Figure 37 may be elderly in which case it may be seeking solitude away from competition from other younger and fitter badgers. The single eye of our local badger may not be a major disadvantage and certainly video footage suggests this to be the case. Legislation applicable to Badgers is discussed under the heading 'How effective has legislation been?

Brightlingsea Library Wildlife Garden TM08651675 and Library awareness events
The Brightlingsea Library Garden Project is financed by ECC's Climate Action Challenge Fund and is expected to feed in to the Climate Action Focus area platform, which is being built by ECC. It should also inform the Essex Local Nature Recovery Partnership and eventually the Brightlingsea Neighbourhood Plan.

Figure 44. Brightlingsea Library Wildlife Garden before work commenced

Although unlikely to significantly enhance local biodiversity, the objective was to build a wild life friendly area in the garden space behind the public library including a small area of the adjacent privately owned waste land. I surveyed the area on 19 October 2022 to ascertain potential and to draw up plans for progression including a risk assessment, the risks being the possibility of vandalism and instability through environmental and biological degradation impacting on the ongoing welfare of plants and animals. I am disappointed that the risk assessment and the rationale behind it were ignored. On 18 March 2023 an awareness event took place at Brightlingsea Public Library with stalls hosting various nature related organisations. Leaflets advertising the Brightlingsea Biodiversity Project were made available for the general public. I hoped that the awareness event and leaflets would prompt fresh input from the public to the data content of the BEBP. The event was repeated on 25 November 2023. In March 2025 a similar event took place at St. James' Church Brightlingsea.

Wildlife in urban areas
Biodiversity is opportunist and will take advantage of circumstances that are advantageous to survival of the species. In particular many species have thrived in 'unnatural' urban locations. Many are deliberately fed by humans. The list of species is extensive, but includes the following.

- Birds - Plants and feeders in gardens, Owls in suitable structures, House Martins, Bats.

- Mammals - Hedgehogs, Badgers, Mice, Rats, Squirrels, Foxes fed by humans or waste/rubbish bins etc.
- Amphibians - Newts, Frogs and Toads in garden ponds.
- Insects - Any that are supported by garden plants.

Essex Wildlife Trust Urban Wildlife Champions
Urban Wildlife Champions are volunteers who have projects that support EWT's vision of a wilder Essex. The Trust works with champions by assisting in networking, and the provision of resources and advice. Champions are not employees of EWT nor are they treated as volunteers. Their role is more advisory and within Essex there are nearly forty such volunteers. The BEBP is a project that is recognised by EWT under the Urban Wildlife Champion scheme. Although support was offered, Brightlingsea Town Council have not expressed any interest in this scheme nor of the general expert advisory input available via EWT. Another local project running under the EWT scheme is the Greener Gardens Group (3Gs), which again is not supported by BTC.

Essex Local Nature Recovery Strategy (Essex LNRS) and Local Nature Partnerships
Local Nature Recovery Strategies are products of the 2021 Environment Act and Essex County Council is the Responsible Authority for the delivery of the Essex LNRS. As one of a network of 48 Strategies nationally its objectives include the identification, improvement or creation of geographical areas that have the best chance of improving nature and the environment. The Essex LNRS website advises that the Essex LNRS also outlines agreed biodiversity priorities for nature recovery in the county and includes a series of proposed actions, known as potential measures, to achieve these priorities. Within the strategy, the Essex LNRS proposes where actions could be carried out that will connect and expand existing spaces for nature. The Essex Local Nature Partnership consists of over forty organisations and was launched in March 2022 to bring together various interested and relevant bodies with the purpose of improving the local environment. The partnership is coordinated by Essex County Council and consists of a board and four working groups, these being a Local Nature Recovery Strategy Working Group, a Community Engagement Working Group, a Planning and Biodiversity Net Gain Working Group and an Agriculture Working Group.

On the afternoon of 23 September 2025 the Essex LNRS officially launched an event situated at the Barley Barn, Cressing Temple. Guests included representatives of interested bodies and various speakers gave presentations. It also gave the opportunity for a question and answer session. Following the event, I made contact by email with various local bodies to explore the possibility of incorporating the concept and methodology of the BEBP into any local initiatives. Also the potential for networking and the sharing of data, experience and expertise. Contacts included Brightlingsea Nature Network and Brightlingsea Town Council's Nature Recovery Group. There was no response to my emails from either group. Other groups had insufficient resources.

Appraisal of the objectives

Objectives
The objectives to aid the recognition of detrimental changes to the environment and to biodiversity were

1. To increase public awareness and appreciation of the local environment and its biodiversity.
2. To provide a baseline of environmental features (topography) against which change can be measured.
3. To provide a baseline of biodiversity against which change can be measured.
4. To advocate the use of risk analysis through the risk assessment process in nature recovery and periodically risk assess a sample of sites, the risks being detrimental change to environmental stability and biological degradation. Remedial action plans should be an integral part of the risk assessment process.
5. To provide data that may inform local decision-making processes and provide evidence to strengthen arguments for retention and enhancement of important sites of biodiversity that are otherwise not protected.
6. To revisit the baselines in (say) six years' time to measure change and consider possible mitigation where change is detrimental.
7. To appraise the methodology – has it done what was intended it should do?
8. To appraise the effectiveness of citizen science by analysing the participation and data received or requested from individuals and organisations.

Each objective and, where possible, an opinion on whether it has been met is discussed below.

Objective 1. **To increase public awareness and appreciation of the local environment and its biodiversity**.
Most people are of course aware of their local environment although they become more aware when it impacts adversely on their lives or of those close to them. Awareness is not the same as appreciation so it was important to show the ‘bigger picture’ and this was attempted in several ways.

The BEBP serves as a means of enhancing awareness simply by the methodology used in its compilation and in the day to day gathering of data.
Several of my papers have been published. These explain both the purpose of the BEBP and nature recovery in general.

These include:

- An island destiny? The Brightlingsea Biodiversity Project (*Country-Side* Vol 36. No. 1 pp. 12-15)
- Nature Recovery. What are we recovering from? (*Country-Side* Vol 36. No. 4 pp. 20-23)
- A PowerPoint presentation forwarded to several interested parties or organisations
- What does nature recovery mean and is Citizen science meaningful? A discussion. (*Essex Naturalist* (New Series) 41 (2024) pp.132-142)
- The use of risk analysis in citizen science projects (*Essex Naturalist* (New Series) 42 (2025) pp. 142-150)

The project was advertised on several occasions from stalls at nature recovery events staged at Brightlingsea Public Library. Leaflets explaining the purpose of the BEBP were issued, and as a result several individuals have input some one-off data to the project. It was also advertised at an event at Brightlingsea St. James' Church in 2025 and in a Colchester Natural History Society publication *Cervus Newsletters.*

Brightlingsea Town Council formally agreed to support the BEBP in 2022 as did the Council chaired Nature Recovery Group together with a national naturalist organisation. Although I attended group meetings as an advisor, the promised meaningful support did not materialise, so as an exercise in drawing in public participation it was initially unsuccessful. However, the ability to raise both awareness and the appreciation of nature and its environment was not restricted by these early constraints and input from other individuals and bodies did eventually materialise. This document may prove to be a mechanism by which the desired awareness outcome is better achieved when published or distributed in some other form.

Objective 2. To provide a baseline of environmental features (topography) against which change can be measured.
Recording changes in topography should be relatively easy because most changes are either visible and/or have an impact on the landscape or on individuals. Changes may be in the size of wooded areas and fields, the introduction or removal of hedges, or the construction or filling-in of a flooded gravel pit. More obvious changes may be in the form of new buildings, particularly housing estates and access roads together with all the disruption this can cause to the environment. Disruption includes reductions in the available space for wildlife and the introduction of additional hazards. Here the Local Authorities have great responsibilities and their actions and decisions may have to balance social needs with conservation. It is for the relevant pressure groups to support biodiversity where necessary, and for the Authorities to fully comply with their obligations under all environmental legislation such as the Environment Act 2021. Baselines such as the BEBP may provide data to inform arguments for or against planning proposals. The full baseline, does not require annual or intermediate surveys even though changes over time might not be obvious in the proposed six-year period between full surveys. But some significant physical changes at some locations might need immediate action and cannot be allowed to wait for a later survey. Therefore, it is proposed to monitor a selection of sites to serve as environmental indicators between major surveys. This is described in greater detail under Objective 3. If the only result of this project is the identification of geographical areas at risk of a decline in biodiversity, and mitigation is possible and allowed to proceed, then something will have been achieved.

Objective 3. To provide a baseline of biodiversity against which change can be measured.
Earlier paragraphs will show that the concept of a biodiversity baseline is not new. The European Environment Agency highlighted the decline of species in the now archived document 'Biodiversity Baseline: where do we stand?' and its revision. There are other similar and related documents. Without knowing what we have, we cannot assess what we are losing and a baseline is essential for this assessment.

The Brightlingsea biodiversity baseline has been assembled using data from several sources. These include my own observations of the environment and many biodiversity surveys. Other input has been from recent surveys conducted by reliable experts, together with reports from enthusiastic naturalists. Input ranged from ongoing surveys of plants to data on insects obtained during nature walks, to the individual report of a single fly species. No individual is likely to have the knowledge and expertise needed to identify the whole range of biodiversity covered by this study and the input of others is not only greatly appreciated, it has been essential. But this baseline provides only a snapshot of interesting information at a particular point in time. Gauging change requires a mixture of constant and ongoing monitoring and a repeat baselining exercise sometime in the future in the hope that it is not too late to mitigate any identified deficiencies.

Having recognised the need for expertise, I also recognise the weaknesses of this survey. The sheer scale of the enterprise is such that it is certain that the full range of biodiversity or any high percentage of it, cannot be recognised and recorded by one or two dedicated observers, even with the input of irregular contributors. I have done the best I can with the limited resources available but errors such as some misidentification are inevitable.
The level of expertise and experience of the *specialist* recorders is not in doubt, but how relevant the data is depends on the samples being representative. Generally, it is assumed that if a specimen is identified, it is part of a population, but the size of viable populations is not considered here. The basic methodology for the initial survey of plants was 'look – see', which is described by Rich *et al.* (2005).

Since a biodiversity survey is a snapshot it cannot record every animal or plant within the survey area, Even over a short period animals may come and go, sometimes on a seasonal basis, sometimes in the never-ending search for resources. The timing of surveys is particularly important as is made obvious by Appendix 4.
Some populations may be relatively stable if there is no drive to move. It is recognised that decline in a particular species is more easily recognised if that species is especially targeted for a survey, perhaps on a national basis. But the methodology will be basically the same as used by the BEBP, that is to answer the question 'is an animal or plant that is recorded now still recorded later in intermediate and/or final surveys?'.

I draw attention here to an objective shown in the 2018 University of Cambridge Biodiversity Baseline Report. 'To measure future improvements the University needs to understand the biodiversity it has. Under the guidance of its Ecological Advisory Panel, the University has undertaken an assessment of the current state of ecology on its estate. The baseline has been synthesised from a combination of ecological assessments, research records and input from local natural history groups'.

During this project several persons connected with the recording of Essex biodiversity asked me why I did not use existing data held in other databases. In at least one case this geographical area was poorly represented and in other cases the data held covered quite considerable timespans so in my opinion the data was unfortunately unsuitable for use as a baseline.

Objective 4. To advocate the use of risk analysis through the risk assessment process in nature recovery and periodically risk assess a sample of sites, the risks being detrimental change to both environmental stability and biological degradation.
Risk assessments form a major component of this study and remedial action plans should be an integral part of the risk assessment process. A key objective of this project was to risk-assess several sites, the risks being environmental degradation and biological instability. Risk assessments are at most a best judgement and rely on the assessor's interpretation of a limited amount of data at the time of the assessment. This data may be stable and consistent or change over time. Although the risk may involve degradation of a biosphere due to human activity, there may be other natural risks introduced that also cause detrimental changes. Over time, the natural world is in a state of flux, striving to achieve equilibrium with changes that are unpredictable.

The risk assessment is an asset-based assessment using basic conventional risk analysis to focus on our surroundings. Here I have considered the 'assets' to be the identified range of biodiversity at a site together with its environment, which form part of an inventory. Any existing controls are considered, followed by the identification of vulnerability and threats. I then assess the risks of sustainability and degradation. The technicalities of the process are not recorded in this document and only very brief summaries are included. Some risks cannot be mitigated in the short term or can be only partially mitigated. Examples are the drying out of small ponds or vegetation due to drought and the development of algal blooms in still waters.

Other risks are directly related to human activity, whether this be destruction due to human footfall, vandalism, the accumulation of dog faeces, the illegal dumping of rubbish by fly tipping or output from commercial rubbish treatment plants. Having identified the risks, mitigation can often only be effective if the land owners are made aware of the risks and are willing and able to do something about it.
In my introduction and later repeated, I have argued that a second and duplicate future survey is essential to gauge change when compared with the initial survey, (which is Objective 6) since the initial baselining survey is only part of the project and it needs a reliable mechanism to resurrect it at future date. The risks are intended to be reviewed annually by short observational surveys. The use of risk analysis was suggested to a local group but rejected.

Objective 5. To provide data that may inform local decision-making processes and provide evidence to strengthen arguments for retention and enhancement of important sites of biodiversity that are otherwise not protected.

To utilise this data the recipient must be aware of the objectives of the BEBP and be willing to consider the data it contains in the relevant decision-making process. Locally, this will be at Town Council level and a copy of the report will be offered to Brightlingsea Town Council for information. It is then for them to take any relevant action that they consider appropriate i.e. consider and act on the report or ignore it. Overall, the project can only provide information and recommendation: it has no other means of achieving any improvements. My experience is such that I have little confidence that any action will be taken as a result of this document.

Objective 6. Revisiting the Baseline
The whole baselining exercise will need to be repeated in (say) six years' time to measure change by comparison of 'what is' with 'what was'. In some cases, completion of the third objective will no doubt have established some areas where mitigation has been considered. This is linked with Objective 4. Pragmatically, unless the BEBP is adopted by another, it is unlikely that further surveys will be undertaken in the manner of the BEBP because the driving force will have been lost. If the risk assessment process shows major change, the baseline may be revised.

Objective 7. To appraise the methodology – has it done what it was intended to do?
The BEBP has not yet fully achieved its primary objectives. This was partly due to limited resources as it is not a project that can be conducted and controlled comfortably by a single individual and it almost certainly needs the support of a larger organisation to be fully effective. Consistent support has not materialised, although several individuals have provided data – which is much appreciated – but a far larger team, including more dedicated specialist input, may have produced a better outcome. I use the word dedicated to mean that this is not really something that can be 'tacked on' to existing projects.

The methodology was standard survey procedure. A series of sites with varied characteristics (woodland, fields, footpaths etc) were selected for survey, each being visited to identify plants and animals. Plant species were mainly photographed and identified from reference books, on-line pictures or by means of the computer-based Pl@ntNet with the assistance of experts where necessary. Only plants and animals that were positively identified within the limits of existing expertise were recorded. The project was temporarily suspended from April 2023 for personal reasons, but later reinstated as 'version Phoenix' now version 3.0 and replaced by version 4.

The main achievement is an assessment of risk but includes a record of flora and fauna, and equally important it is a record of the key types of environments that this flora and fauna inhabit. Any change in environmental conditions will have a knock-on effect on biodiversity and without a baseline, there is no certain way of recording and eventually mitigating the impact of these changes. The project is deemed to have potential to achieve its objectives and as an experiment it may well serve as an initial template for any future project and as a means of providing lessons learned.

Objective 8. To appraise the effectiveness of citizen science by analysing the interest, participation, cooperation and data received or requested from individuals and organisations within this study.
Running concurrently, and not reported in detail in this document, was a project to measure the effectiveness of data collection from individuals and corporate entities, in particular data that could be used in citizen science projects. The number and types of enquiries and the responses to those enquiries have been collated and analysed for effectiveness. The number of replies expressed as a percentage of the number of queries varied each year but was at best 82.4%.

Failure to reply to emails asking for information was evident, for example when asking for permissions to access land or for individuals in general to update data that they had previously provided. It was disappointing that even amongst fellow members of local groups, some of whom had formally committed support, emails bearing simple requests for information were ignored. As reported earlier, whilst local groups agreed to support the BEBP in its objectives, this support simply did not materialise and emails to the groups were and are ignored. More encouraging was the fact that most respected professional organisations such as the Environment Agency, Essex Wildlife Trust and Natural England provided prompt and meaningful replies, as did the majority of persons with academic status. To these organisations and individuals, numbering over thirty, I am grateful. Citizen science projects such as this are certainly possible, but without support are most certainly difficult.

One of the main problems was the need to establish a recognised working group and to obtain the necessary insurance. Without this, there is no prospect of obtaining financial grants from any organisation for projects such as eDNA sampling or group activities such as moth trap recording. Moreover, something as simple as asking people if they would share their data or list plants in their gardens, could require insurance against claims for negligence or damage according to legal advice.
This project has covered a lot of ground but there are still some parts of the Brightlingsea district that are yet to be surveyed and which will be considered in the future.

Conclusion

This project brings together several basic methodologies. Biodiversity and environmental data provide a baseline of nature in the Brightlingsea area as at a current date. I then use risk analysis to assess the risk of degradation at thirteen different locations. From the results it should be possible, immediately or in the future, to identify areas of potential degradation in need of mitigation and prioritisation leading in some cases to nature recovery.
Through the eight key objectives of this project, I also intended to explore the possibility that citizen science could make a real difference to nature recovery by highlighting deficiencies in the local environment and its biodiversity and drawing attention to the risk of degradation. The data so obtained would allow the production of an action plan designed to mitigate risk and recover losses. The term 'nature recovery' was considered and it was concluded that its meaning was not well defined nor understood and there was confusion between the terms 'nature recovery', 'nature conservation' and 'nature enhancement'. This would be very relevant to the objectives of any adopted action plan. Moreover, any plan to mitigate risks would perhaps require an authoritative body to recognise and take ownership of the risks and manage the members of any local group charged with its implementation and any subsequent analysis and report. Does any local group have the necessary strategy, experience and expertise?

Responsible authorities are already required to produce a local recovery strategy that includes a habitat map and a written statement of biodiversity priorities. They have a duty to conserve and enhance biodiversity and must have regard to relevant local nature recovery strategies in their processes. The construction of an effective whole Essex habitat map would require many volunteers under the control and coordination of an organisational body and operating under a sound methodology. A recent successful example is that utilised by Essex Wildlife Trust's pond recovery project where the county was administratively divided into ordnance survey grids, each being allocated to volunteers for examination. Certainly a similar project would satisfy most of the initial requirement for environmental data. Each grid or group of grids would then be considered for a small area survey as discussed under.

The BEBP provides an example of a small area survey, but whether it can be used to inform strategy is not yet tested. Because it cannot be considered a good or typical representation of all Essex, other areas should be added to form a larger Greater Essex Environment and Biodiversity Project. Progressing this thought, my own vision of an efficient nature recovery process is that each of the 48 country divisions should perhaps be sub divided into geographical grids based on OS maps. Each grid or group of grids would then be considered for a BEBP style survey, with the objective of a pooled report. A record of the whole topography and its biodiversity would then be possible. Subsequently, local action plans for nature recovery can be produced for each grid group with action taken on whatever is determined to be a local priority, recognising that some areas will have greater need than others. The recovery of a group of grids might be under the control of a nominated leader and data pooled into a whole Essex report. Perhaps Mersea Island might be a good initial candidate to test such expansion. The problem with this is of course feasibility and the need for determination and resources. My experience is that it is unlikely that any body, human or corporate, would have the enthusiasm and appetite to drive forward such a plan.

Local action plans in whatever form they take should be coordinated, meaningful and based on evidence. Planting the odd tree or hedge is a good thing, but in the long term, and as part of the bigger picture, this has negligible impact on the overall objectives - and objectives do need to define potential impact and vision. What about trying to increase the size of our Hedgehog population? The mix of plant and animal species within an ecological system may be relatively stable, but this stability, if subjected to varying environmental pressures, may result in a long-term state of flux. Reintroducing or adding numbers to populations of a native species such as hedgehogs (as opposed to introducing an invasive species) into a stable system may produce a new imbalance with unintended consequences. Such imbalance is far more likely with the introduction of a non-native species, for example the disastrous impact of the introduction of rabbits to Australia (CNN World) and rats to the Galapagos or closer to home the impact of Grey Squirrels on native Red Squirrel populations.

In the forward to the document *Essex Nature Recovery Strategy* we are advised that human needs and nature recovery can go hand in hand. I do not agree. I maintain that although there are some areas where improvement is both possible and measurable, in the long term we cannot halt the overall decline in biodiversity, nor the loss of habitat caused by humans. We can only reduce the rate of this loss or decline. The human footprint cannot be made smaller within this Anthropocene epoch. Humans are no different to other species in that they are in competition with the rest of nature in the ongoing fight for resources, which after all is a driver for evolution. This can only be resolved in favour of the rest of nature if the human population and its drain on resources is at least stabilised and at best reduced.

Can the ordinary citizen influence their local LNRS and nature recovery in general? Citizen science exists in several forms. Individuals or organisations may supply data following a request from larger organisation, for example RSPB garden bird surveys. This data is fed into larger projects the pooled results of which result in

recommendations for improvement or change or simply sound alarm bells. The second is that of individuals working alone or in groups that do not have the resources and backing of larger organisations. Although some are able to publish results to a wide audience in the hope that recommendations will be noted and acted on at some level in the organisational hierarchy, the opinions of others will not be heard or simply ignored.

The BEBP has, in theory, the means of publicity available even if the path is difficult. The data and opinions contained in the BEBP should be useful to both the local Town Council, as well as the County Council, which currently has responsibility for directing the LNRS. But to ensure that the project data is at least considered it must be made known to the relevant responsible contacts within Councils or similar bodies. These representative must then be convinced that the project is accurate and meaningful, does not duplicate existing projects and serves a constructive purpose i.e. that it can enhance the objectives of the LNRS. And perhaps it is at this hurdle that a fall is likely or in fact probable. The report may be accepted, or it may be ignored as being of no consequence especially if it contradicts existing organisations, objectives and methodology. In particular the report's focus on risk analysis and mitigation may be rejected at a local level.

My personal and limited experience of liaison with those responsible for improvements to the environment and biodiversity at a very local level is disappointing. It leads me to believe that some of those with the power to cause change do not have the necessary expertise and those with the necessary expertise do not have the power. In particular at this level there is the possibility of scientific evidence giving way to the 'good idea' unless some expertise is drawn in. The challenge is to bridge the gap and effectively use the experience, knowledge and cooperation of individuals from all sources, including individual members of the public. Coupled with this is the need for recognition and use of expertise where it is offered. Specific objectives should be agreed, preferably with the assistance of risk assessments and action plans against which progress can be monitored. But these are just my opinions.

Included in this document is reference to biodiversity net gain (BNG), which is currently calculated by competent persons using the statutory biodiversity metric calculation tool and applies to all new developments from early 2024. Competency is determined by British Standard BS 8683:2021 *Process for designing and implementing Biodiversity Net Gain. Specification.* If correctly implemented, a development or land management will leave the site in a measurably better state than before. Without worked examples and experience, I cannot comment on the practicality or effectiveness of this process, but there is nothing to suggest that the desired outcomes will not be achieved. But if it is possible to provide a replacement environment and biodiversity in exchange for one that has been destroyed, it must involve human input and expertise. Confidence in the system will certainly be gained if the biodiversity considerations match those shown by Hopkins Homes, the developers of the Robinson Road housing estate. (Even though this development precedes mandatory BNG).

Much of the legislation described earlier in the text is meaningful but in addition to implementation instructions, perhaps in the form of national guidance manuals (some of which exist), there must be a policing or audit body empowered to encourage implementation. Having the necessary expertise, drive and determination to ensure its effectiveness is all very well, but Government policies and priorities are subject to change. At the time of writing, there are indications that the need to demonstrate BNG may be removed for smaller building firms. Comments attributed to government ministers, interpreted as meaning that the protection of wildlife shouldn't come at the expense of building more homes, and that newts can't be more protected than people who need houses, indicates what could be confirmation of my view that the needs of people will always take precedence over the needs of nature. And satisfying the needs of people is what keeps a democratic Government in power.

Legislation expresses good intent, but if all the legislation, from the Bern Convention onwards, has not conclusively shown measurable and consistent improvements, why should we think that any new legislation has the necessary drive and support needed to produce any of the intended results for which it was implemented? And of course legislation can be changed at the convenience and priorities of Government. Are we returning patients to a state of health that was present just before they died?

The main risks to the biodiversity and environment of this area are (i) the potential adverse impact of fire damage and (ii) drought, both related to climate change. How these risks are managed is for a higher body to consider.

Recommendations for Nature recovery, Nature conservation and Nature enhancement

An independent working group should be established to progress the following local recommendation and this should be a priority. It is appreciated that resources may be limited.

1. This report should be made available to all parties and relevant bodies with an interest or responsibility in preserving and enhancing local biodiversity and its environment

2. Through the relevant bodies, farmers and land owners should be asked to consider increasing the width and connectivity of any field boundary hedgerows.
3. Outwith hedges, the planting of trees should take into account the adequacy of existing canopy cover and consider whether resources are being targeted to activities of 'most need'. If planting is planned, the impact should be ascertained via a risk assessment.
4. Details of aftercare programmes or/and owners obligations for every flooded gravel pit in the Brightlingsea area should be accessible to any interested party.
5. A working group, or an individual should explore the current state of preservation and aftercare for each gravel pit and provide reports on the risk of degradation and, where appropriate, suggest mitigation. The permission and cooperation of the owners would be needed.
6. In general. the risk assessment process should be considered whenever citizen science projects that involve changes to the environment are planned. Mitigating the risk of degradation through fire damage should be paramount.
7. Efforts should be made to coordinate the activities of local nature recovery groups such as the BEBP, Greener Gardens Group, Essex Wildlife Trust, (including the Urban Wildlife Champions), and any groups supported by Brightlingsea Town Council. This may be overseen and encouraged by Greater Essex LNRS.
8. The methodology used to compile this report should be considered as a template for similar projects throughout Essex. The data so obtained will be a mosaic of Essex environmental and biological data that may highlight County-wide risk priorities and provide a clearer picture of the current state of nature.

Acknowledgements

I would like to thank the many individuals and organisations who, since 2022, have provided information, advice, or permission for use of their data and/or permission to conduct surveys on their property. ***This does not mean that any named individual or organisation endorses any part of the contents of this document, nor of any view expressed therein.*** In particular, thanks to the following individuals and representatives of their various bodies. My son Ed Thorn in particular for his invaluable support and assistance throughout and use of data on his observations of bird species and photographs. The Parochial Church Council (PCC) of All Saints & St James' Brightlingsea, and J.M. Environmental (East Anglia Ltd) for data relating to All-Saints Church, the churchyard and surrounding areas including Noah's Ark Pit. Dr. Chris Gibson for his support and the use of data from his blogs. Darren Tansley the Wilder Rivers & Protected Species Manager of Essex Wildlife Trust, John Attiwell EWT Wilder Community Ranger and Jenny Gifford the Greener Gardens Group (3G) coordinator. Essex Bat Group for their bat survey data. Hopkins Homes for permission to survey 'the Lagoon' and their pre-building survey data. Brightlingsea Town Council for permission to survey Brightlingsea Boating Lake, Gravel Field and the Lozenge Nature Area. Brightlingsea Town Council Grounds Manager for his support. The Secretary of Brightlingsea Angling Club. Essex County Council. Essex Fire and Rescue Service. Natural England. Ordnance Survey. Lea Merclova Coastal Ranger Bird Aware Essex Coast for additional bird data. The RSPB. Defra Helpline. The Royal Society of Biology, the Environment Agency, Essex County Council's Local Nature Recovery Coordinator. The Springmead Trust. The Royal Botanic Gardens Kew. The Millenium Seedbank. The Linnean Society of London. National Biodiversity Network Trust. Colchester Natural History Society. The Woodland Trust. The British Geological Survey.

This is a citizen science project and the author is neither a professional biologist nor an expert in most of the large range of biodiversity covered by this report. The species recorded have been identified by reference to many on-line data sources, field guides and the publications listed in the bibliography. Where applicable the opinions of several experts has been sought and their advice taken. It is recognised that a small number of species may have been misidentified and any contributing experts may wish me to note that the responsibility for any misidentification is entirely mine. The document may be updated and amended where appropriate

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Figure 45. Muntjac deer *Muntiacus reevesi*
Picture © Ed Thorn

Appendices

Appendix 1

Table A1. Local moth species and their hosts

Moth Species at TM 08329 18162	Host for caterpillars
White Satin Moth *Leucoma salicis*	Poplar *Populus alba* Willow *Salix* sp.
Brimstone *Opisthograptis luteolata*	Hawthorn *Crataegus monogyna,* Blackthorn *Prunus spinosa,* Rowan *Sorbus aucuparia*
Common Carpet Moth *Epirrhoe alternata*	Lady's Bedstraw *Galium verum* Hedge Bedstraw *Galium mollugo*
Gallium Carpet *Epirrhoe galiata*	Lady's Bedstraw *Galium verum* Hedge Bedstraw *Galium mollugo*
Clouded Silver *Lomographa temerata*	Hawthorn *Crataegus monogyna,* Blackthorn *Prunus spinosa*
Garden Rose Tortix *Acleris variegana*	Rose bushes *Rosa* sp.
Marbled Minor *Oligia strigilis*	Common Couch *Elytrigia repens* Cock's-foot *Dactylis glomerata*
Cinnabar *Tyria jacobaeae*	Ragwort *Senecio jacobaea,* Groundsel *Senecio vulgaris*.
Common Footman *Eilema lurideola*	Various lichen. Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa*, Traveller's-joy *Clematis vitalba* Bramble *Rubus fruticosus*
Hawthorn Moth *Scythropia crataegella*	Hawthorn *Crataegus monogyna* Blackthorn *Prunus spinosa* Cotoneaster *Cotoneaster horizontalis*
Magpie *Abraxas grossulariata*	Hawthorn *Crataegus monogyna* Blackthorn *Prunus spinosa*, Blackcurrant *Ribes nigrum* Gooseberry *Ribes uva-crispa*
Twenty-plume Moth *Alucita hexadactyla*	Honeysuckle *Lonicera periclymenum*
Brown Rustic *Rusina ferruginea*	Herbaceous plants, including Dock *Rumex* sp.
Large Yellow Underwing *Noctua pronuba*	Herbaceous plants and grasses. Docks, Marigolds *Tagetes* sp., Foxglove *Digitalis purpurea* and Annual Meadow-grass *Poa annua*.
Birch Marble *Apotomis betuletana*	Birch *Betula pendula*
Brown House-moth *Hofmannophila peudospretella*	Detritus
Early Grey *Xylocampa areola*	Honeysuckle *Lonicera periclymenum*
Flame *Axylia putris*	Dock *Rumex* sp. Lady's Bedstraw *Galium verum*
Light Arches *Apamea lithoxylaea*	Flowers, seeds and stem-bases of grasses.
Lime-speck Pug *Eupithecia centaureta*	Flowers of a range of low-growing plants.
Maiden's Blush *Cyclophora punctaria*	Oak *Quercus robur* .
Pale Oak Beauty *Hypomecis punctinalis*	Oak *Quercus robur* Birch *Betula pendula* and other trees.
Pebble Hook-tip *Drepana falcataria falcataria*	Birch *Betula pendula* but sometimes Alder *Alnus glutinosa*
Short Cloaked Moth *Nola cucullatela*	Blackthorn *Prunus spinosa* Hawthorn *Crataegus monogyna* and Apple *Malus* sp.
Buff Footman *Eilema depresso*	Lichens and algae growing on trees, esp. Yew *Taxus baccata*
Campanula Pug *Eupithecia denotata*	Nettle-leaved bellflower *Campanula trachelium* and Giant Bellflower *C. latifolia*
Common Grass-veneer *Aggriphila tristella*	Base of stems of grass.
Elephant Hawk-moth *Deilephila elpenor*	Fuchsia *Fuschsia* sp. Bedstraw *Galium* sp. Rosebay Willowherb *Epilobium angustifolium*,and garden flowers
Heart and Club *Agrotis clavis*	leaves and roots of low-growing plants including Common Knotgrass *Polygonum aviculare* Clover *Trifolium rubens*
Juniper Pug *Eupithecia pusillata* (Melanic form)	Juniper *Juniperus communis*

Notes on the Table.
1. It is assumed that since the food of the caterpillar of each moth species is known, it is probable that the plant grows near to the site of the moth trap and therefore can be accepted as growing in Brightlingsea.

Appendix 2.

A summary list of the UK national targets as at 2025.

• UK target 1: The UK will ensure that all areas are under participatory, integrated and biodiversity inclusive spatial planning and/or effective management processes addressing land- and sea-use change, to bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030,while respecting the rights of indigenous peoples and local communities.1

• UK target 2: The UK will ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and marine and coastal ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.

• UK target 3: The UK will ensure and enable that by 2030 at least 30 per cent of terrestrial and inland water areas, and of marine and coastal areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures, recognising indigenous and traditional territories, where applicable, and integrated into wider landscapes, seascapes and the ocean, while ensuring that any sustainable use, where appropriate in such areas, is fully consistent with conservation outcomes, recognising and respecting the rights of indigenous peoples and local communities, including over their traditional territories

• UK target 4: The UK will ensure urgent management actions to halt human induced extinction of known threatened species and for the recovery and conservation of species, in particular threatened species, to significantly reduce extinction risk, as well as to maintain and restore the genetic diversity within and between populations of native, wild and domesticated species to maintain their adaptive potential, including through in situ and ex situ conservation and sustainable management practices, and effectively manage human-wildlife interactions to minimise human-wildlife conflict for co-existence.

• UK target 5: The UK will ensure that the use, harvesting and trade of wild species is sustainable, safe and legal, preventing overexploitation, minimising impacts on non-target species and ecosystems, and reducing the risk of pathogen spillover, applying the ecosystem approach, while respecting and protecting customary sustainable use by indigenous peoples and local communities.

• UK target 6: The UK will eliminate, minimise, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by identifying and managing pathways of the introduction of alien species, preventing the introduction and establishment of priority invasive alien species, reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50% by 2030, and eradicating or controlling invasive alien species, especially in priority sites, such as islands.

• UK target 7: The UK will reduce pollution risks and the negative impact of pollution from all sources by 2030, to levels that are not harmful to biodiversity and ecosystem functions and services, considering cumulative effects, including: (a) by reducing excess nutrients lost to the environment by at least half, including through more efficient nutrient cycling and use; (b) by reducing the overall risk from pesticides and highly hazardous chemicals by at least half, including through integrated pest management, based on science, taking into account food security and livelihoods; and (c) by preventing, reducing, and working towards eliminating plastic pollution

• UK target 8: The UK will minimise the impact of climate change and ocean acidification on biodiversity and increase its resilience through mitigation, adaptation and disaster risk reduction actions, including through nature-based solutions and/or ecosystem-based approaches, while minimising negative and fostering positive impacts of climate action on biodiversity.

• UK target 9: The UK will ensure that the management and use of wild species are sustainable, thereby providing social, economic and environmental benefits for people, especially those in vulnerable situations and those most dependent on biodiversity, including through sustainable biodiversity-based activities, products and services that enhance biodiversity, and protecting and encouraging customary sustainable use by indigenous peoples and local communities.

• UK target 10: The UK will ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably, in particular through the sustainable use of biodiversity, including through a substantial increase of the application of biodiversity- friendly practices, such as sustainable intensification, agroecological and other innovative approaches, contributing to the resilience and long-term efficiency and productivity of these production systems, and to food security, conserving and restoring biodiversity and maintaining nature's contributions to people, including ecosystem functions and services.

• UK target 11: The UK will restore, maintain and enhance nature's contributions to people, including ecosystem functions and services, such as the regulation of air, water and climate, soil health, pollination and reduction of disease risk, as well as protection from natural hazards and disasters, through nature-based solutions and/or ecosystem-based approaches for the benefit of all people and nature.

• UK target 12: The UK will significantly increase the area and quality, and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas sustainably, by mainstreaming the conservation and sustainable use of biodiversity, and ensure biodiversity-inclusive urban planning, enhancing native biodiversity, ecological connectivity and integrity, and improving human health and well-being and connection to nature, and contributing to inclusive and sustainable urbanisation and to the provision of ecosystem functions and services.

• UK target 13: The UK will take effective legal, policy, administrative and capacity-building measures at all levels, as appropriate, to ensure the fair and equitable sharing of benefits that arise from the utilisation of genetic resources and from digital sequence information on genetic resources, as well as traditional knowledge associated with genetic resources, and facilitating appropriate access to genetic resources, and by 2030, facilitating a significant increase of the benefits shared, in accordance with applicable international access and benefit-sharing instruments.

• UK target 14: The UK will ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity, progressively aligning all relevant public and private activities, and fiscal and financial flows with the goals and targets of this framework.

• UK target 15: The UK will take legal, administrative or policy measures to encourage and enable business, and in particular to ensure that large and transnational companies and financial institutions: (a) regularly monitor, assess and transparently disclose their risks, dependencies and impacts on biodiversity, including with requirements for all large as well as transnational companies and financial institutions along their operations, supply and value chains, and portfolios; (b) provide information needed to consumers to promote sustainable consumption patterns; (c) report on compliance with access and benefit-sharing regulations and measures, as applicable; in order to progressively reduce negative impacts on biodiversity, increase positive impacts, reduce biodiversity-related risks to business and financial institutions, and promote actions to ensure sustainable patterns of production.

• UK target 16: The UK will ensure that people are encouraged and enabled to make sustainable consumption choices, including by establishing supportive policy, legislative or regulatory frameworks, improving education and access to relevant and accurate information and alternatives, and by 2030, reduce the global footprint of consumption in an equitable manner, including through halving global food waste, significantly reducing overconsumption and substantially reducing waste generation, in order for all people to live well in harmony with Mother Earth.

• UK target 17: The UK will establish, strengthen capacity for, and implement biosafety measures as set out in Article 8(g) of the Convention on Biological Diversity and measures for the handling of biotechnology and distribution of its benefits as set out in Article 19 of the Convention.

• UK target 18: The UK will identify by 2025, and eliminate, phase out or reform by 2030, incentives, including subsidies, harmful for biodiversity, in a proportionate, just, fair, effective and equitable way, while contributing to the global target to reduce them by at least $500 billion per year by 2030, starting with the most harmful incentives, and scaling up positive incentives for the conservation and sustainable use of biodiversity.

• UK Target 19: The UK will contribute to substantially and progressively increasing the level of financial resources from all sources, in an effective, timely and easily accessible manner, including domestic, international, public and private resources, in accordance with Article 20 of the Convention, to implement national biodiversity strategies and action plans, and contribute to the global targets for mobilising at least $200 billion per year by 2030: (a) Increasing total biodiversity related international financial resources from developed countries, including official development assistance, and from countries that voluntarily assume obligations of developed country Parties, to developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, to at least $20 billion per year by 2025, and to at least $30 billion per year by 2030; (b) Significantly increasing domestic resource mobilisation, facilitated by the preparation and implementation of national biodiversity finance plans or similar instruments according to national needs, priorities and circumstances; (c) Leveraging private finance, promoting blended finance, implementing strategies for raising new and additional resources, and encouraging the private sector to invest in biodiversity, including through impact funds and other instruments; (d) Stimulating innovative schemes such as payment for ecosystem services, green bonds, biodiversity offsets and credits, and benefit-sharing mechanisms, with environmental and social safeguards; (e) Optimising co-benefits and synergies of finance targeting the biodiversity and climate crises; (f) Enhancing the role of collective actions, including by indigenous peoples and local communities, and non-market-based approaches including community based natural resource management and civil society cooperation and solidarity aimed at the conservation of biodiversity; 67 (g) Enhancing the effectiveness, efficiency and transparency of resource provision and use.

• UK target 20: The UK will strengthen capacity-building and development, access to and transfer of technology, and promote development of and access to innovation and technical and scientific cooperation, including through South-South, North-South and triangular cooperation, to meet the needs for effective implementation, particularly in developing countries, fostering joint technology development and joint scientific research programmes for the conservation and sustainable use of biodiversity and strengthening scientific research and monitoring capacities, commensurate with the ambition of the goals and targets of the Global Biodiversity Framework (GBF).

• UK target 21: The UK will ensure that the best available data, information and knowledge are accessible to decision makers, practitioners and the public to guide effective and equitable governance, integrated and participatory management of biodiversity, and to strengthen communication, awareness-raising, education monitoring, research and knowledge management and, also in this context, traditional knowledge, innovations, practices and technologies of indigenous peoples and local communities should only be accessed with their free, prior and informed consent, in accordance with national legislation8.

• UK target 22: The UK will ensure the full, equitable, inclusive, effective and gender- responsive representation and participation in decision making, and access to justice and information related to biodiversity by indigenous peoples and local communities, respecting their cultures and their rights over lands, territories, resources, and traditional knowledge, as well as by women and girls, children and youth, and persons with disabilities and ensure the full protection of environmental human rights defenders.

• UK target 23: The UK will ensure gender equality in the implementation of the Framework through a gender-responsive approach, where all women and girls have equal opportunity and capacity to contribute to the three objectives of the Convention, including by recognising their equal rights and access to land and natural resources and their full, equitable, meaningful and informed participation and leadership at all levels of action, engagement, policy and decision making related to biodiversity.

Appendix 3

Table A2. List of sites providing data

1.	All Saints Church	TM07721873
2.	All Saints Churchyard	TM077187
3.	All Saints Verges	TM077187
4.	Area inland of Bateman's Tower	TM077163
5.	Private Garden 1	TM083182
6.	Beach near Bateman's Tower	TM077162
7.	Brightlingsea Boating Lake	TM082164
8.	Brightlingsea Boating Lake nearby Beach	TM083163
9.	Brightlingsea Marsh NNR	TM075167

10. Brightlingsea Marsh NNR North TM078169
11. Brightlingsea Marsh North NNR Lodge Lane TM079272
12. Cindery Island from the bank TM091160
13. Coastline East area 1 TM092162
14. Coastline East area 2 TM094164
15. Coastline East area 3 TM099167
16. Coastline East Area 4 TM097167
17. Drain at end of Morses lane TM089185
18. East End Green 1 TM097168
19. East End Green 2 TM098168
20. Eastern Road TM085168
21. Private Garden 2 TM094170
22. Field above Mill Street Pond and the Lagoon TM095168
23. Field behind All Saints Church TM077188
24. Field beside Church Road TM079186
25. Field near Morses Farm TM088185
26. Field opposite Brightlingsea Hall TM078186
27. Fieldgate Dock TM084163
28. Flooded Gravel Pit near Wapping Lane TM068186
29. Folkards Lane Area TM089178
30. Ford Farm Moverons Lane TM074187
31. Ford Lane TM063193
32. Ford Lane Coastal TM063195
33. Private Garden 3 TM089167
34. Private Garden 4 TM086172
35. Gravel Field TM096168
36. Gravel Pit off Moverons TM076183
37. Gravel Pit TM071187
38. Hurst Green TM092168
39. Junction Church Road and Samsons Road TM080184
40. Lodge Wood TM079177
41. Long Flooded Pit near Lower Park Road TM079168
42. Lower Coastline West, including Seawall and Borrow Dykes TM074164
43. Lower Marsh farm Folkards lane TM091180
44. Manor Wood TM084177
45. Mill Street (East) TM098168
46. Mill Street (Upper) TM094166
47. Mill Street (West) TM095166
48. Mill Street Pond TM096166
49. Morses Lane Morses Farm TM087183
50. Moverons Lane nr. Churchyard TM076186
51. Near Coop Samsons Road TM085180
52. Noah's Ark Pit and adjacent land area at TM060186 TM060186
53. North of BAC Pit Moverons TM069188
54. North Road/Spring Road TM086171
55. Open Field Near Small Sewage works TM080167
56. Open Field Nr. Brightlingsea Road. TM084188
57. Public Library TM087168

58. Richard Avenue Brightlingsea TM087169
59. Robinson Park Horseshoe Lake area or in Stoney Lane TM099170
60. Robinson Park Main Lake TM094174
61. Sea area off Batemans Tower TM076161
62. Sea area off Pincushion Island TM100164
63. Sea off Harker's Yard TM086160
64. Seafront Area 1 TM078163
65. Seafront Area 2 TM080164
66. Seawall behind Brightlingsea Leisure Village TM081165
67. Springmead Garden TM084171
68. Swallow Barn Folkards Lane TM091180
69. The 'Lagoon' pond above Mill Street Pond TM095167
70. The Lozenge Nature Reserve TM082167
71. Thicks Wood TM071190
72. Upper Coastline West area 1 TM064176
73. Upper Coastline West area 2 TM067172
74. Upper Coastline West Area 3 TM071168
75. Upper Coastline West area 4 TM072166
76. Upper Morses Lane TM086181
77. Victoria Place TM086168
78. Wellington Street TM086167
79. Whitegate Road area TM093169
80. Wicks Wood TM076174
81. Wooded area off Church Road TM080182
82. Woodlands near Moverons Lane TM075185

Appendix 4.
Number of bird species observed in author's garden

Table A3. Bird species and numbers 2024

2024	Total visits	No. Species	Robin	Sparrow	Blue Tit	Coal Tit	Gt Tit	Long-tailed Tit	Wood pigeon	Blackbird	Crow	Dunnock	Wren	Rook	Collared Dove	Starling	Magpie	Heron	Nightingale	Jackdaw	Goldfinch	Song Thrush	Golden Pheasant	Buzzard
Jan	56	8	35	2	1	0	0	0	14	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Feb	92	10	20	34	5	0	1	0	21	5	0	1	0	3	2	1	0	0	0	0	0	0	0	0
Mar	95	9	11	6	27	0	0	0	24	5	4	16	0	1	0	0	1	0	0	0	0	0	0	0
Apr	83	11	16	4	15	0	0	0	19	6	0	13	0	6	1	1	1	1	0	0	0	0	0	0
May	194	16	12	1	39	1	4	0	18	6	15	8	0	10	1	43	0	0	1	38	1	1	0	0
Jun	124	13	8	1	20	0	1	0	27	10	0	15	0	2	4	11	5	0	0	20	0	1	0	0
Jul	30	3	0	0	20	0	0	0	9	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Aug	10	3	0	0	0	0	0	0	6	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0
Sept	26	5	6	0	0	0	0	0	15	0	0	2	2	0	1	0	0	0	0	0	0	0	0	0
Oct	15	6	1	1	0	0	0	0	10	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0
Nov	13	5	8	0	0	0	0	0	0	1	1	0	0	2	0	0	1	0	0	0	0	0	0	0
Dec	19	4	15	0	0	0	0	0	2	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
total	757		132	49	127	1	6	0	165	34	22	58	4	24	9	56	11	1	1	61	1	2	0	0

Table A4. Bird species and numbers 2025

2025	Total visits	No. Species	Robin	Sparrow	Blue Tit	Coal Tit	Gt Tit	Long-tailed Tit	Wood pigeon	Blackbird	Crow	Dunnock	Wren	Rook	Collared Dove	Starling	Magpie	Heron	Nightingale	Jackdaw	Goldfinch	Song Thrush	Golden Pheasant	Buzzard
Jan	40	7	21	0	8	0	0	0	5	2	0	0	0	1	2	0	1	0	0	0	0	0	0	0
Feb	35	5	23	1	4	0	0	0	4	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Mar	90	8	17	2	19	0	0	0	23	2	0	23	0	0	3	0	0	1	0	0	0	0	0	0
Apr	55	10	2	1	15	0	1	0	20	2	0	11	0	1	0	0	1	1	0	0	0	0	0	0
May	47	9	1	0	2	0	0	0	28	0	0	0	0	1	1	3	7	1	0	3	0	0	0	0
Jun	54	8	0	0	0	0	0	0	14	17	3	0	0	0	0	6	4	0	0	7	0	1	1	1
Jul	64	6	0	0	0	0	0	0	28	25	8	1	1	0	0	0	0	0	0	0	0	1	0	0
Aug	37	5	3	0	0	0	0	0	26	0	4	0	0	0	0	0	3	0	0	0	0	1	0	0
Sep	28	6	13	0	0	0	0	0	6	0	5	1	0	0	0	0	2	0	0	0	0	1	0	0
Oct	19	6	4	0	0	0	0	0	1	0	7	1	0	0	0	0	5	0	0	0	0	1	0	0
Nov	17	5	10	0	0	0	0	0	1	1	1	0	0	0	0	0	4	0	0	0	0	0	0	0
Dec	24	8	8	0	4	0	0	3	3	0	2	0	0	0	1	0	1	0	0	2	0	0	0	0
total	510		102	4	52	0	1	3	159	49	30	40	1	3	7	9	28	3	0	12	0	5	1	1

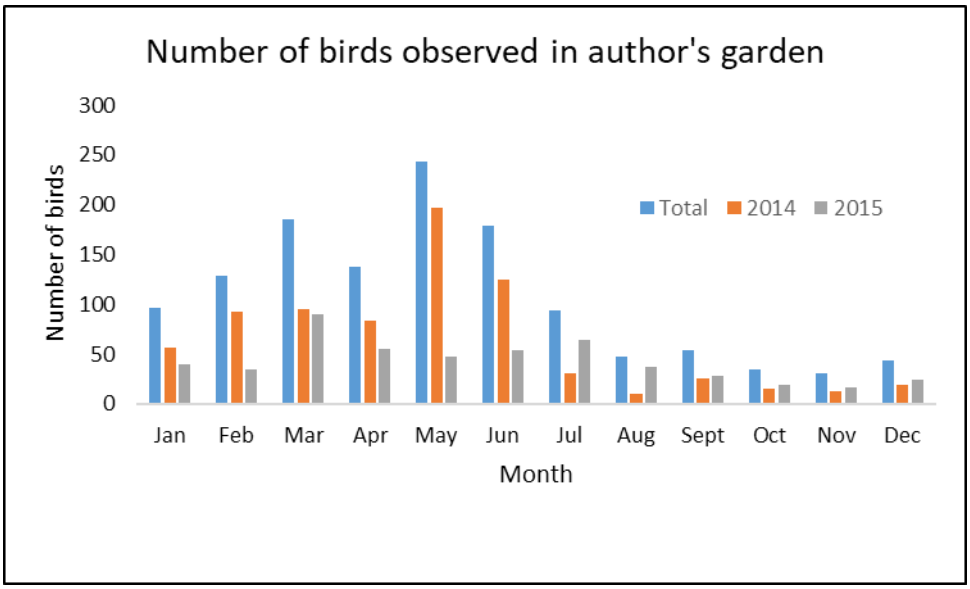

Figure A1. Number of birds observed in my garden 2024 and 2025

An incidental project running concurrently with the BEBP records the number of birds of each species visiting bird feeders containing a range of bird food. The results are shown in the tables and the chart above and should be self explanatory. Within the BEBP I have not attempted to fully analyse the data but maximum activity appears to occur around May each year and minimum around November each year. There is a significant difference between the number of observations when comparing 2024 with 2025. The exercise may be more meaningful if it continues over several years and the use of a motion triggered trail cam would increase accuracy. It confirms the need to co-ordinate observations and recordings with seasons.