Climate Change Risk and Impact Assessment for Kent and Medway

Part 2:

Natural Environment Sector Summary

November 2019

N. Natural Environment Sector Summary

N.1 Key characteristics

The natural environment in Kent and Medway is important for economic prosperity and quality of life, with high landscape character value – a key asset to the county. Kent has a rich and varied natural landscape thanks to a 350-mile coastline, south eastern location and diverse geology. Across Kent and Medway there are 116 sites of national or international importance for nature conservation, 455 local wildlife sites and 2 Areas of Outstanding Natural Beauty (AONBs), and 9 Marine Protected Areas. The Kent Downs and High Weald AONBs cover 32% of Kent's land area. Coupled with the iconic White Cliffs of Dover, this network of sites and AONBs make up some of the United Kingdom's unique and most iconic landscapes.

The habitats and landscapes present in Kent support a wide variety of rare, unique and endemic species including the lady, monkey and late spider orchids; black veined and straw belle moths; the adonis blue butterfly and several rare arable field wildflowers[1]. Kent and Medway have several Priority Habitats, as described in the Biodiversity Action Plan (BAP)[2].

The Kent Environment Strategy (KES); published in March 2016 stated that, over the previous five years, 30% of local wildlife sites in Kent had been damaged and 2% had been lost completely[3]. In response to these losses, the KES, and the accompanying Implementation Plan, provide a framework to protect and enhance Kent's natural environment.

The 2018 KES public perception survey measured how residents perceive, use and prioritise different aspects of the environment. 76% of residents rated the Kent countryside as very important to them and four in five use the natural environment for leisure or recreational purposes at least once a fortnight[4]. Access to Kent and Medway's natural environment, landscape and habitats are supported by the Public Rights of Way (PRoW) network of footpaths and bridleways. A 2017 survey identified over 6,900km of PRoW and a further 5,700 km of footpaths[5] around Kent and Medway.

However, despite the value placed on our environment by residents, recent trends show that the quality of the natural environment in Kent and Medway is declining. In response to this trend, the KES provides a framework to improve biodiversity through revising the Kent Biodiversity Strategy and developing a Pollinator Action Plan for Kent (Kent's Plan Bee). Specific projects, including the Fifth Continent project on

[1] Kent Downs AONB Management Plan Second Revision Final Draft Text Version. 2013. https://democracy.gravesham.gov.uk/documents/s22589/Kent%20Downs%20AONB%20Management%20Plan%20Second%20Revision%20Final%20Draft%20Text%20Version%20Dec%202013.pdf
[2] Assessing Regional Habitat Change (ARCH). 2012. Kent habitat survey. https://www.kent.gov.uk/__data/assets/pdf_file/0020/95114/Kent-Habitat-Survey-2012-section-5-results-and-habitat-distribution-by-districts.pdf
[3] Kent County Council. 2016. Kent Environment Strategy: A Strategy for Environment, Health & Economy. https://www.kent.gov.uk/__data/assets/pdf_file/0020/10676/KES_Final.pdf
[4] Kent County Council. 2016. Kent Environment Strategy: A Strategy for Environment, Health & Economy. https://www.kent.gov.uk/__data/assets/pdf_file/0020/10676/KES_Final.pdf
[5] Kent County Council. 2018. Kent County Council's Rights of Way Improvement Plan 2018-2028. https://kccconsultations.inconsult.uk/gf2.ti/f/873698/44445893.1/PDF/-/ROWIP_20182028.pdf

Romney Marsh and the Old Chalk New Downs project on the North Downs are delivering aspects of the KES through their work.

N.2 Key projected changes to Kent's climate

The UK Climate Projections from the UKCP18 model identifies these potential changes for Kent:

- **Hotter summers** with an increase in average summer temperature of 2 – 3°C by 2040 and 5 – 6°C by 2080.
- **Warmer winters** with an increase in average winter temperature of 1 – 2°C by 2040 and 3 – 4°C by 2080.
- **Drier summers** with a reduction in average precipitation of 20 – 30% by 2040 and 30 – 50% by 2080.
- **Wetter winters** with an increase in average precipitation of 10 – 20% by 2040 and 20 – 30% by 2080.
- **Increases in sea-level rise** by up to 0.3m by 2040 and 0.8m by 2080.

More details on the projected climate impacts for Kent can be found in Part 1 of the CCRIA.

N.3 Climate risks and impacts for Kent

The 2017 UK Climate Change Risk Assessment acknowledges that climate change is already having an impact upon natural systems across the UK and therefore presents a substantial risk to the vital goods and services provided to people by the natural environment. It recognises that the less well accounted for goods and services provided by the natural environment such as pollination, carbon capture & storage and cultural benefits provided by landscapes and wildlife are also at risk.

The main relevant climate risks for the natural environment identified by the 2017 UK Climate Change Risk Assessment (CCRA) are:

- Risk to natural capital, including terrestrial, coastal, marine, and freshwater ecosystems, soils and biodiversity.
- New and emerging pests and diseases, and invasive non-native species, affecting people, plants and animals.

In addition to the two risks directly addressed in the UK CCRA, the natural environment will also be affected by other risks – flooding and coastal change, high temperatures and water scarcity will all impact the natural environment.

The natural environment in Kent is an asset to the county and climate change could have significant effects on it. Any future increase in extreme events is likely to affect the natural environment, with impacts on biodiversity, habitat loss and species range, as well as wider impacts for Kent's economy and society due to its amenity value and contribution to health and wellbeing. Since all species react independently to climate change, widespread species with a broad range of habitat requirements and good dispersal ability can expand into new areas. Those with small geographical

distribution, poor dispersal ability and specific habitat requirements are less able to successfully establish in new areas and are limited by non-climatic factors[6].

N.3.1 Increasing temperatures

With increased temperatures and reduced precipitation, there is the potential for changes to river flow, temperature, water chemistry, depth of sunlight penetration and timing of seasonal events.

Over the last 40 years, there have been noticeable changes in Kent's seasonal patterns in-line with overall warming temperatures. Across Britain, the first flowering date for 385 plant species has advanced by 4.5 days during the past decade, in comparison with the previous four decades. A study of 726 UK plants and animals found an average advance of spring and summer events of almost four days per decade between 1976 and 2005, with faster shifts at the bottom of food chains[7].

Changes to seasonal weather patterns and overall increasing annual temperatures have both positive and negative impacts on native tree and plant species, causing both increases and decreases in their number. While a longer growing season may have benefits for agriculture and food production, it can have a negative impact on the natural environment as it causes habitat imbalance. For example, warmer spring temperatures have influenced the timing of both the golden plover nesting and cranefly emergence. Growth and survival of golden plover chicks depend on availability of prey in the form of craneflies. Increasing summer temperatures and lower rainfall are reducing the number of successful cranefly larvae hatching from peatland soils as the surface dries out. This leads to a reduction in adult craneflies emerging the following spring, resulting in food shortages and decreasing chick survival[8]. Higher summer temperatures could also lead to a loss of sensitive tree species, such as the Beech tree and cause a loss of forest yields by 12-26%.

Warmer and drier conditions are likely to increase the risk of wildfire damage to woodlands by 10-50% by 2080, which could pose a risk to the survival of endemic plant and animal species as well as the natural environment. In 1997, two fires occurred in Tunbridge Wells, the first lasting over three hours covering 600m^2 of Pembury Woods and the second spreading over 500m^2 of undergrowth. In August 1998, there were over four times as many blazes involving grass, fields and hedges compared to the year before, and Kent Fire and Rescue Service tackled 318 fires in six days. Following the 10-day August 2003 heatwave, where temperatures reached record highs, three times more grassland fires occurred than usual (990)[9].

Increasing temperatures may allow a more hospitable environment for pests, diseases and invasive non-native species (INNS) to colonise where they were previously unable to survive. Milder winters can increase the ability for some species to overwinter in the UK, while earlier springs will favour the growth of others. There is limited information on the species and impacts of INNS that may establish in Kent as

[6] Parliamentary Office of Science and Technology. 2009. Postnote: Biodiversity and Climate Change. https://www.parliament.uk/documents/post/postpn341.pdf.
[7] Parliamentary Office of Science and Technology. 2009. Postnote: Biodiversity and Climate Change. https://www.parliament.uk/documents/post/postpn341.pdf
[8] Parliamentary Office of Science and Technology. 2009. Postnote: Biodiversity and Climate Change. https://www.parliament.uk/documents/post/postpn341.pdf
[9] Kent County Council. 2010. A Local Climate Impacts Profile for Kent. https://www.kent.gov.uk/__data/assets/pdf_file/0007/24595/LCLIP-summary-report-1996-2010.pdf

there are several other factors key to survival, not just a more favourable climate. Some INNS already identified as posing a risk to Kent and Medway as temperatures increase are pests, such as the Asian tiger mosquito and the Killer Shrimp. Previous examples of INNS colonisations indicate there will be an impact on native populations, other species and surrounding ecosystems, as well as impacts on access to the countryside if PRoW and footpaths are closed. For example, *Hemigrapsus takanoi* (Asian shore crab), first recorded in the Colne Estuary in Essex in 2011, is now well established along the north Kent coast, which poses a threat to the native shore crab *Carcinus maenas*[10].

As native and non-native species migrate further in response to increasing temperatures and other climate risks, fragmentation of the natural environment may partially inhibit movement. Kent's geographic location may result in native species migrating north and west. Continental species migrating north as a result of higher temperatures may be blocked by the barrier of the English Channel, inhibiting their ability to colonise Kent. However, there are strong transport links between Kent and Europe which could act as vectors for invasive species.

One example of a harmful non-native disease is *Hymenoscyphus fraxineus* (Chalara Ash dieback). A fungal pathogen which causes leaf loss and crown dieback in Ash trees, Ash dieback has been occurring in the UK since the 1970s[11] and is having an increasingly detrimental effect on Kentish Ash trees. There is not thought to be a direct link between Ash dieback and climate change. However, recent research on the potential impacts of climate change on the distribution of Ash dieback has showed an increased probability of infected Common Ash in the South East by 2080, even in the lowest emissions scenario. This disease needs to be managed in the future as natural regeneration in heavily infected woodlands is compromised, and mature ash trees are showing susceptibility to secondary infection. Invasive forest pests and pathogens are likely to increase through the direct impact of climate on their abundance or distribution, or the indirect effect of increased water stress. Pathogens that infect foliage or have an aerial phase of their life cycle are likely to be affected by climate change[12].

Freshwater fish species have a limited ability to regulate their body temperatures and any change in water temperature has the potential to impact key fish species. Salmonid fish and macroinvertebrate species, particularly those near or at their southern limit and/or where connectivity to upstream habitats are inhibited may be particularly vulnerable to changes in water temperature caused by climate change[13]. Increased river temperatures may also increase disease transmission and reduce health of juvenile fish[14].

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[10] Rapid. 2018. Invasive Non-native Species: Marine Examples
http://www.nonnativespecies.org/downloadDocument.cfm?id=1682
[11] The Ash Project. No date. Ash Dieback.
https://www.theashproject.org.uk/ash-dieback/
[12] NERC. 2016. Agriculture and Forestry Climate Change Impacts: Report Card 2016. Living with Environmental Change.
https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/agriculture/
[13] Natural England. 2013. Assessing the potential consequences of climate change for England's landscapes: North Kent. Natural England Research Report NERR052.
http://publications.naturalengland.org.uk/file/6524842442489856
[14] Johnson, A.C., Acreman, M.C., Dunbar, M.J., Feist, S.W., Giacomello, A.M., Gozlan, R.E., Hinsley, S.A., Ibbotson, A.T., Jarvie, H.P., Jones, J.I., Longshaw, M., Maberly, S.C., Marsh, T.J., Neal, C., Newman, J.R., Nunn, M.A., Pickup, R.W., Reynard, N.S., Sullivan, C.A., Sumpter, J.P. and Williams, R.J. 2009. The British river of the future: How climate change and human activity might affect two contrasting river ecosystems in England. Science of The Total Environment. 407(17), pp.4787–4798.

Increasing sea temperatures and acidification of marine environments will affect marine biodiversity around the Kent coast. Increasing sea temperatures resulting in a reduction of dissolved oxygen will have a negative impact on a range of species. Marine organisms and corals with calcium carbonate shells will grow at a slower rate and require more energy as acidity levels in the sea rise, while temperature increases, and reduced oxygen levels may have a significant impact on a range of species including cold water fish. Catches of warm water fish species may increase off Kent's coasts, while cold water species may be lost[15].

N.3.2 Droughts

Currently, many of the rivers in Kent and Medway are classed as poor under the Water Framework Directive. Higher temperatures, possible increases in droughts and low flows, and pollution and runoff concentrations are likely to increase while also limiting the potential to improve the status of these water bodies[16].

The River Stour was at its lowest level for 200 years in April 1997; in August 2006 water levels at Bewl Water fell to 37% of total capacity, and water levels in the reservoir dropped to 33% of capacity in December 2018. Small pockets of subsidence occurred across in Dover district due to drought conditions in August 2000 and again in 2006[17].

There is also a high risk of deoxygenation as a result of algae blooms in waterbodies and watercourses as temperatures increase, and rainfall decreases in the summer months. This may increase nutrient concentration in waterbodies and watercourses, negatively impacting on plant and animal life in aquatic environments. Smaller waterbodies such as ponds will have a higher risk of deoxygenation and increased nutrient concentrations. As a result of this, eutrophication of river systems where the nutrient load is high may occur, contributing to degradation of water quality and encouraging the growth of toxic algae[18].

Low flows are likely to lead to oxygen depletion, often linked to loss of fish[19], and droughts could lead to some smaller rivers and water bodies drying up entirely. In April 2019 the River Darent was recorded as being 55% below its long-term average flow[20] and was below its ecological flow target level for 30% of 2018. At the end of summer 2018, the Darent came very close to not flowing at all. The Darent dried up

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https://www.researchgate.net/publication/223626866_The_British_river_of_the_future_How_climate_change_and_human_activity_might_affect_two_contrasting_river_ecosystems_in_England

[15] Kent County Council. 2006. Select Committee Report on Climate Change. https://www.kent.gov.uk/__data/assets/pdf_file/0005/12848/climate-change-report.pdf

[16] Kent County Council. 2015. Kent state of the Environment 2015: A review of current and potential indictors within the Kent Environment Strategy. https://www.kent.gov.uk/__data/assets/pdf_file/0020/63812/Kent-State-of-the-Environment-Report-Evidence-base-supporting-the-strategy.pdf

[17] Kent County Council. 2006. Select Committee Report on Climate Change. https://www.kent.gov.uk/__data/assets/pdf_file/0005/12848/climate-change-report.pdf

[18] Natural England. 2013. Assessing the potential consequences of climate change for England's landscapes: North Kent. Natural England Research Report NERR052.

[19] DEFRA. 2014. The consequences of climate change for the water environment in England: an assessment of the current evidence. http://sciencesearch.defra.gov.uk/Document.aspx?Document=12328_WT1540ConsequencesofCCforthewaterenvironmentinEngland_FINAL.pdf

[20] The Rivers Trust. 2019. Chalk Streams in Crisis – A call for drought action now. https://www.theriverstrust.org/media/2019/06/Chalk-streams-dossier_June-2019_FINAL_FINAL-1.pdf

completely in 1976 and regularly through the droughts of the 1990s[21]. Similarly, the effects of low flows were seen on the River Cray in 1902. During a drought that lasted from winter 1901, several smaller rivers including the Cray experienced extreme low flows. Fish deaths were reported in a dry pond on the Cray in 1902, and the pond remained dry into 1903[22].

Increased risk of higher temperatures and drought and resulting low flows, coupled with over abstraction and population increase may cause waterbodies and watercourses to dry out more frequently or earlier in the year. Kent's globally significant Chalk Streams, including the River Darent, River Dour and Little Stour, are unique important freshwater ecosystems that are at risk of drying out for large parts of the year or entirely.

Increased risk of drought and more intense precipitation events resulting in amplified soil erosion may cause greater rates of siltation in waterbodies and watercourses in Kent. This could influence aquatic environments and have impacts on wildlife. Sediment delivery into waterbodies and watercourses results in a reduction of water quantity and quality and can have impacts on fish, invertebrates and aquatic vegetation. A national study found there is a risk to Macroinvertebrates from increased siltation of rivers and found high levels of fine sediment accumulation in Kent, East Anglia, Lincolnshire and Sussex[23].

N.3.3 Increased rainfall, flooding and sea-level rise

Some of the impacts from changes in seasonal rainfall patterns and wetter winters will be felt in Kent and Medway, for example, the impact of increased winter rainfall on soil stability and nutrient content. Increased rainfall may increase the amount of agricultural runoff, leading to loss of nutrients in agricultural areas and nitrate leaching as rainwater drains through soil and percolates down to groundwater aquifers, degrading the quality of local water bodies. Less stable soils and loss of topsoil, particularly on riverbanks and in coastal areas may combine with higher water tables to increase rates of bank and cliff erosion. Problems will be greatest in areas where tree cover has been removed as this provides easier access to the soil for rain, and loss of trees weakens root systems holding soil together and preventing erosion. Increased winter rainfall could combine with lower rainfall in the summer months and lead to soil erosion and slope destabilisation which may lead to more frequent summer landslips as a result of groundwater movement[24].

Wetter winters are also likely to increase fluvial flood risk, as well as threatening large areas of nationally and internationally important habitats and species. Flood events can destroy nesting sites, reduce food supplies and make foraging for food harder for some species.

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[21] The Rivers Trust. 2019. Chalk Streams in Crisis – A call for drought action now. https://www.theriverstrust.org/media/2019/06/Chalk-streams-dossier_June-2019_FINAL_FINAL-1.pdf

[22] Environment Agency. 2006. The impact of climate change on severe droughts: Major droughts in England and Wales from 1800 and evidence of impact. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/290832/scho1206blsm-e-e.pdf

[23] Department for Food and Rural Affairs. 2015. Extending the evidence base on the ecological impacts of fine sediment. http://sciencesearch.defra.gov.uk/Document.aspx?Document=13478_ALC_WQ0128_Evid4_WORDversionforfinaleditshFINALVERSION.pdf

[24] NERC. 2015. Biodiversity Climate Change Impacts: Report Card 2015. Living with Environmental Change. https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/biodiversity/

Coastal and wetland habitats, such as those present in Romney Marsh and on the Isle of Sheppey, are particularly vulnerable to floods and droughts due to the presence of habitat-sensitive species and unique landscapes. In the past, floods have caused waterlogging and increased silt accumulation; and droughts have caused significant drying of marshland leading to temporary habitat loss and increased soil erosion. Loss of mudflats and eelgrass beds reduces the area available for internationally important bird populations (e.g. dunlin, knot, widgeon) that spend winters in Kent[25]. Loss of saltmarsh habitat threatens breeding birds such as redshank.

Coastal habitats are potentially vulnerable to the impacts of increased rainfall, sea-level rise and changes in erosion rates. Changes in water levels consisting of more intense rainfall in winter or lower rainfall in summer are known stressors of freshwater ecology. Changes in water levels can lead to changes in local hydrological conditions, impacting habitat suitability and connectivity. Kent and Medway have extensive areas of wetland habitat and grazing marsh on the Hoo peninsula, Chetney marshes, Swale Channel, Isle of Sheppey and Romney Marsh, which may suffer as a result of changes in water levels.

In Kent, coastal and floodplain grazing marsh, saltmarsh (Sheppey, Grain), mudflats and Shingle (Dungeness) are all listed as priority habitats. All these habitats are particularly vulnerable to the impacts of flooding, sea-level rise, increased storminess and coastal squeeze which could cause increases in soil erosion and siltation, and potentially change species composition. Coastal grazing marshes, raised bogs, and saline lagoons (such as those at Cliffe) are all threatened by increases in salinity that can result from increased percolation and inundation of sea water during storm tides and flooding. With potential increases in inundation under climate change, some of these habitat areas may become saltmarsh or other intertidal habitats and some may be lost altogether as a result of coastal squeeze, the process whereby habitats are squeezed against 'hard' sea defences. In North Kent, this process could result in significant losses of saltmarsh[26].

Saline intrusion of aquifers could also lead to brackish coastal lakes and rivers. Waterways and lakes in Romney Marsh are particularly vulnerable to these impacts as the water table is relatively high compared to the land surface. In coastal wetlands, the impacts of saltwater intrusion vary dependent on the magnitude, duration, and frequency of the intrusion. Impacts of saline intrusion may include changes in plant growth, plant community composition and the provisioning of ecosystem services in coastal wetlands[27]. Organisms respond to saline intrusion in different ways, depending on the level, duration, and abruptness of exposure. If saline intrusion is sufficiently frequent or extreme, the plant community is likely to transition to one better suited to higher salinity and/or one that is more flood tolerant. For example, *Spartina anglica* is found on mud deposits in lower intertidal and saltmarsh zones around the UK coastline and estuaries. It is considered a hardy species and has a greater ability to tolerate periodic flooding by seawater, trap

[25] Kent County Council. 2006. Select Committee on Climate Change Report. https://www.kent.gov.uk/__data/assets/pdf_file/0005/12848/climate-change-report.pdf
[26] Kent County Council. 2006. Select Committee on Climate Change Report. https://www.kent.gov.uk/__data/assets/pdf_file/0005/12848/climate-change-report.pdf
[27] White, E. and Kaplan, D. 2017. Restore or retreat? Saltwater intrusion and water management in coastal wetlands. Ecosystem Health and Sustainability. 3(1): e01258. doi: 10.1002/ehs2.1258

sediment and promote the accretion of mud deposits than others[28]. Saltwater intrusion can also change the types and amounts of ecosystem services provided by coastal wetlands; including affecting fisheries production, carbon sequestration, coastal erosion/shoreline stabilisation, tourism and recreation, water quality, and biodiversity support. However, there are limited quantitative studies addressing the magnitude of these changes and their wider effects[29].

Projected rises in sea-level can accelerate the natural erosion of coastal and intertidal habitats and alter the natural geomorphological processes in coastal regions. For example, the north coast of the Isle of Sheppey is home to the Sheppey Cliffs SSSI. This area is of geological interest due the occurrence of fossils and of botanical interest due to the presence of the rare cliff vegetation *Tetragonolobus maritimus* (Dragon's Teeth). Frequent cliff falls and accelerated cliff recession caused by erosion of the cliff base in this SSSI may obstruct or limit access to this site in future[30], as well as affecting the biodiversity of the area.

N.4 Management of climate risks and impacts

Stakeholders identified that increasing habitat connectivity will be key for Kent and Medway in managing current and future climate risks and impacts for the natural environment. Another key management measure will be habitat restoration, which may reduce the degree of population collapse in response to extreme events and contribute to population recovery[31]. For example, there is evidence that active restoration of peatland habitats through raising water levels can increase the resilience of cranefly populations to future warming. This in turn supports the survival of golden plover chicks, maintaining balance between both cranefly and plover populations.

Connections between habitats needs to be accompanied by habitat restoration and improved management of habitats. Several projects are already underway in Kent and Medway to reduce habitat fragmentation. Canterbury City Council has been developing green corridors to ensure open spaces are better connected, allowing greater opportunity for species to move, and providing more recreational opportunities for local communities[32]. The ARCH project, completed in 2013, saw Kent County Council and Nord Pas de Calais work together to improve the way habitats are maintained, and to restore and expand habitats in Kent and France.[33].

[28] Natural England. 2016. *Spartina anglica* and its management in estuarine Natura 2000 sites: an update of its status and monitoring future change in England
http://publications.naturalengland.org.uk/file/6507145221636096
[29] Eliot White Jr, David Kaplan. 2017. Ecosystem, Health and Sustainability Journal: Restore or retreat? Saltwater intrusion and water management in coastal wetlands
https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ehs2.1258
[30] Natural England. 2013. Assessing the potential consequences of climate change for England's landscapes: North Kent. Natural England Research Report NERR052.
http://publications.naturalengland.org.uk/file/6524842442489856
[31] Parliamentary Office of Science and Technology. 2009. Postnote: Biodiversity and Climate Change.
https://www.parliament.uk/documents/post/postpn341.pdf
[32] Kent County Council. 2018. Kent Environment Strategy: Impact Report 2018
https://www.kent.gov.uk/__data/assets/pdf_file/0008/89351/Kent-environment-strategy-impact-report-2018.pdf
[33] Assessing Regional Habitat Change (ARCH). 2012. Kent habitat survey.
http://www.archnature.eu/assets/files/final-pdfs/KHS-Section-5-Results.pdf

Natural England reported in May 2019 that 90.50% of Kent and Medway's SSSIs are in favourable or recovering condition, a decrease of 0.39% on 2018[34]. The Kent Nature Partnership has committed to, and is working towards, a target of having over half of Local Wildlife Sites in good management by 2044[35]. There has been an increase of 2% in 2017/18, and 43% of Kent and Medway's local wildlife sites are now in positive management[36].

It is well understood that many of Kent and Medway's nationally important habitats are sensitive to changes in management of water, particularly in water levels and river flows. For example, water in Romney Marsh is managed through a system of artificial watercourses and water levels are carefully managed by the Romney Marsh Internal Drainage Board to protect the area from flooding and assist in sustainable arable farming[37]. Current action to monitor saline intrusion is concentrated around the aquifers that supply drinking water – in Romney Marsh, the rain fed Denge gravel aquifer is being monitored for saline intrusion as it is a key local water supply. The aquifer lies below the largest managed shingle system in Europe with distinctive, internationally designated flora and fauna influenced by the groundwater levels[38].

Many management actions for the natural environment will impact on the agriculture and utilities sector as they are very closely linked, particularly for water management issues.

N.5 Urgency scoring and recommendations

Using available evidence, urgency scoring was undertaken based on risk magnitude, interdependencies, and adaptation shortfall. This urgency scoring can be used to help prioritise and manage the climate risks and opportunities to Kent and Medway. Further information on the methodology can be found in the CCRIA Part 1.

[34] Kent County Council. 2019. Kent Environment strategy Indicators: July 2019. https://www.kent.gov.uk/__data/assets/pdf_file/0005/91058/Kent-environment-strategy-indicators.pdf
[35] Kent Nature Partnership. 2018. Biodiversity Strategy 2018 – 2044. https://democracy.kent.gov.uk/mgConvert2PDF.aspx?ID=89509
[36] Kent County Council. 2019. Kent Environment strategy Indicators: July 2019. https://www.kent.gov.uk/__data/assets/pdf_file/0005/91058/Kent-environment-strategy-indicators.pdf
[37] Kent County Council. 2017. Flood Risk to Communities in Shepway. https://www.kent.gov.uk/__data/assets/pdf_file/0009/71667/Flood-risk-to-communities-in-Shepway.pdf
[38] Natural England. 2013. NCA Profile: 123 Romney Marshes (NE499). http://publications.naturalengland.org.uk/publication/5701066775592960

Table N-1: Urgency Scoring for Natural Environment Sector

Risk	Magnitude	Explanation	Adaptation Shortfall	Explanation	Inter-dependencies	Explanation	Urgency score	Recommendation
Increasing temperatures and extreme events causing increase in plant and animal disease and habitat fragmentation	High	There is likely to be increases in pests such as the Asian tiger mosquito, killer shrimp, and disease such as Ash dieback. Also identified as priority risk in the UK CCRA.	High	Habitat restoration projects and monitoring of risks seen across the County but there is minimal progress being made.	High	Previous disease outbreaks such as the foot and mouth outbreak have caused impacts to the natural environment by closing PRoW, and as a result, impacted the tourism industry. Disease could also impact the agriculture and Industry sector, particularly food and drink production in Kent.	High	More research is needed into the scale of the impacts of increase pests and diseases.
Sea-level rise impacts on coastal and estuarine habitat	High	Many coastal areas in the regions are a risk of being squeezed by coastal defences. Coastal defence options could change habitats (e.g. intertidal habitat) which supports important species.	Medium	There are some projects currently ongoing in areas such as Romney Marsh, which are looking to restore and improve habitat, however this is not necessarily climate change focused.	High	Loss of habitat could impact the tourism industry as less people visit from the UK or from the rest of the world (link to cross cutting theme of international aspects). Loss of areas of outdoor space which can be used for recreation could impact health and well-being.	High	More action is needed to ensure hard defences do not result in a loss of habitat.
Increased temperatures and drought leading to low river flows	High	Many rivers in the areas classified as poor under WFD, and low flows would cause higher concentrations of pollutants, cause further declining	High	Adaptation mostly driven from the agriculture and utilities sector. Some habitat restoration projects to	Medium	Low river flows and resulting fish kills could impact anglers, tourism, agriculture, aquaculture and the industry sectors. Water scarcity and low river flows may affect water intensive	High	More research is needed into the impacts of drought and potential adaptation for this.

Risk	Magnitude	Explanation	Adaptation Shortfall	Explanation	Inter-dependencies	Explanation	Urgency score	Recommendation
		water quality. Low flows can also lead to oxygen depletion in rivers which can result in fish kills.		minimise impacts.		industry in Kent due to potential future limits on abstractions from fluvial and groundwater sources. Utility companies such as water companies will have increased difficulties with water quality and abstraction. People and the built environment may be affected by potential bans on using water in periods of drought and increased temperatures e.g. hosepipe bans. Local planning authorities are unable to impose limits on water usage beyond those within building regulations.		More action is needed to future proof and increase the resilience of water governance structures.
Higher temperatures causing a loss of tree species and risk of wildfire	Medium	Forest yields could decrease by 12-26% by 2080 with increasing temperatures. Wildfire risk could increase by 10-50% by 2080.	High	Lack of evidence to show adaptation measures to the increased risk of wildfire and species loss.	Medium	Wildfire could damage agriculture land and have indirect impacts on people and the built environment, and industry.	Medium	More research is needed into the effects of temperature on differing tree species and more action needed to prepare for wildfire events.