



LAND USE & GREEN INFRASTRUCTURE CLIMATE ACTION PROGRAMME

ENVIRONMENT & CLIMATE ACTION





MEMBERS OF THE LAND USE AND GREEN INFRASTRUCTURE SPECIAL INTEREST GROUP

- Chair: **John Meehan**, Head of Sustainability & Resilience
- **Dr Simon Lyster** (Essex and Suffolk Water)
- **Prof. Jacqueline McGlade** (University College London)
- **Prof. Graham Underwood** (University of Essex)
- **Rob Wise** (National Farmers Union)
- **Prof. Peter Hobson** (Writtle University College)
- **Jo Roberts** (Wilderness Foundation)
- **Prof. Jules Pretty** (University of Essex)
- **Heather Hilburn** (Thames Estuary Partnership)
- **Advisor: Archie Ruggle-Brise** (Spains Hall Estate)
- **Advisor: Yarema Ronish** (RM Architects)



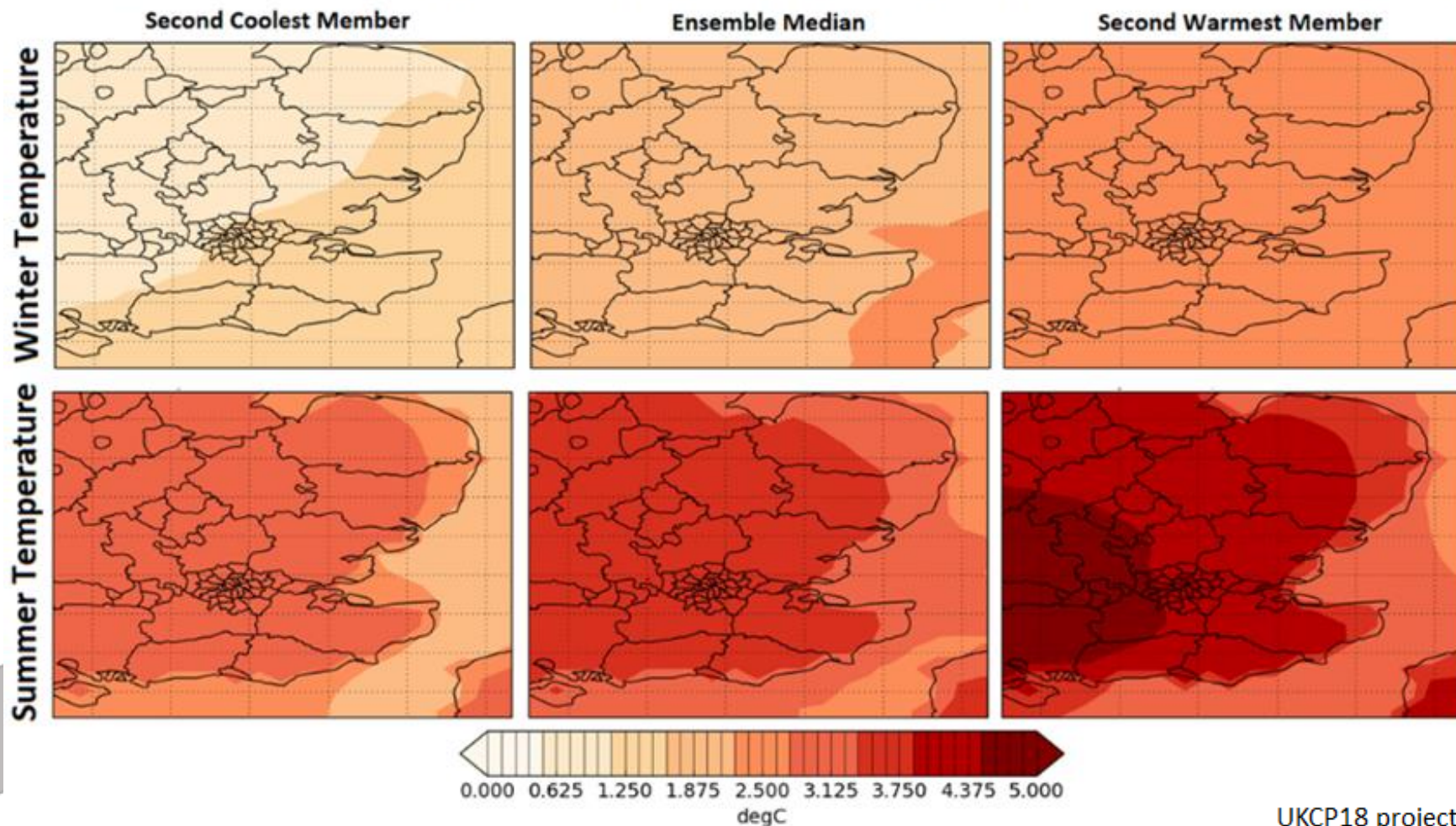
THE CLIMATE CHALLENGE FOR ESSEX: SCENARIOS IF NO ACTION IS TAKEN

ENVIRONMENT & CLIMATE ACTION



INCREASING TEMPERATURES ACROSS THE REGION, HIGH - IMPACT SCENARIO

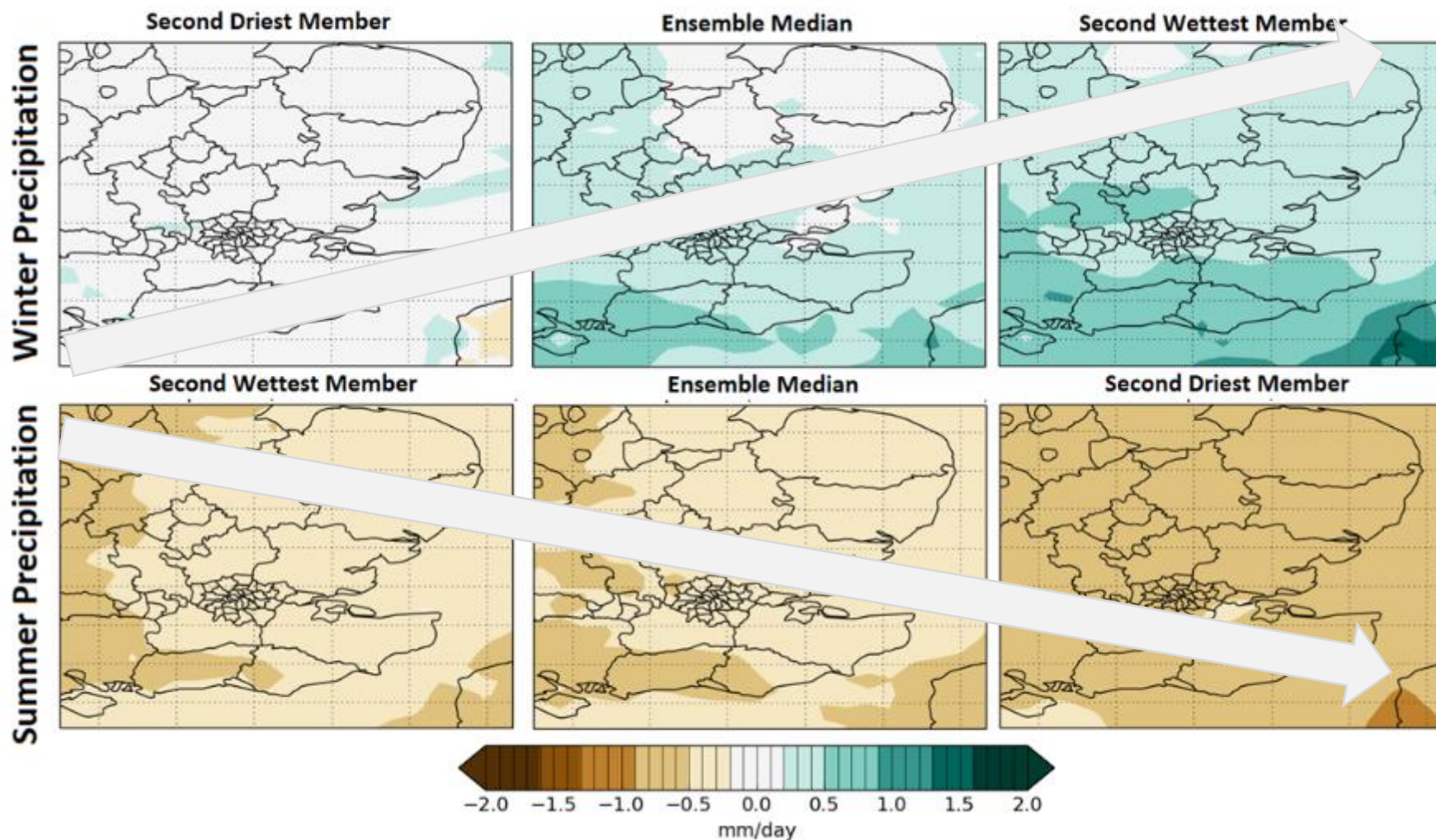
Change in mean seasonal temperature for the 2050s compared to 1981-2000 from UKCP Regional (12 km)





CHANGE IN SEASONAL PRECIPITATION

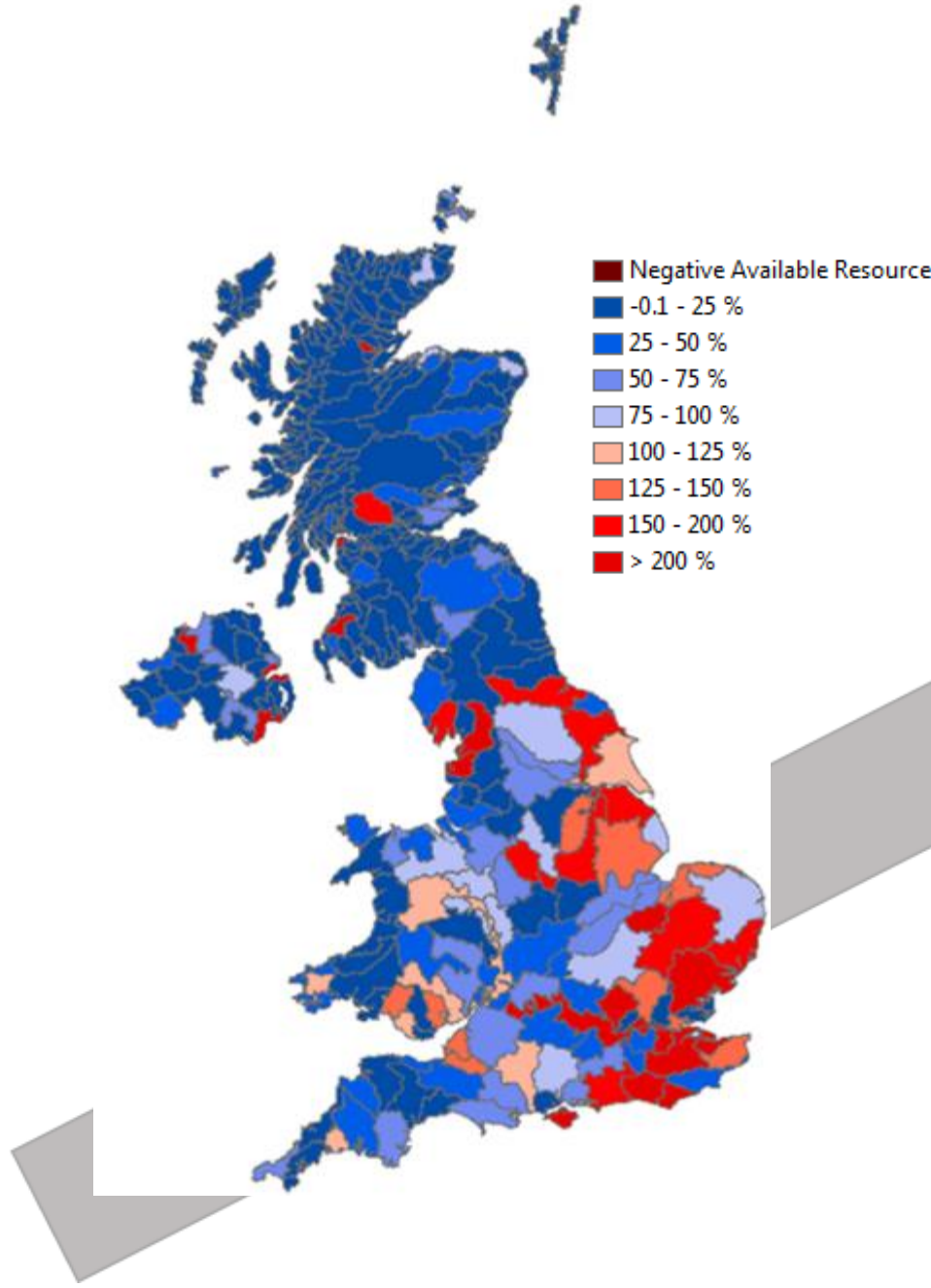
Change in mean seasonal precipitation for the 2050s compared to 1981-2000 from UKCP Regional (12 km)



FUTURE IMPACTS – WATER SCARCITY

UK map showing water demand as a % of water available for abstraction

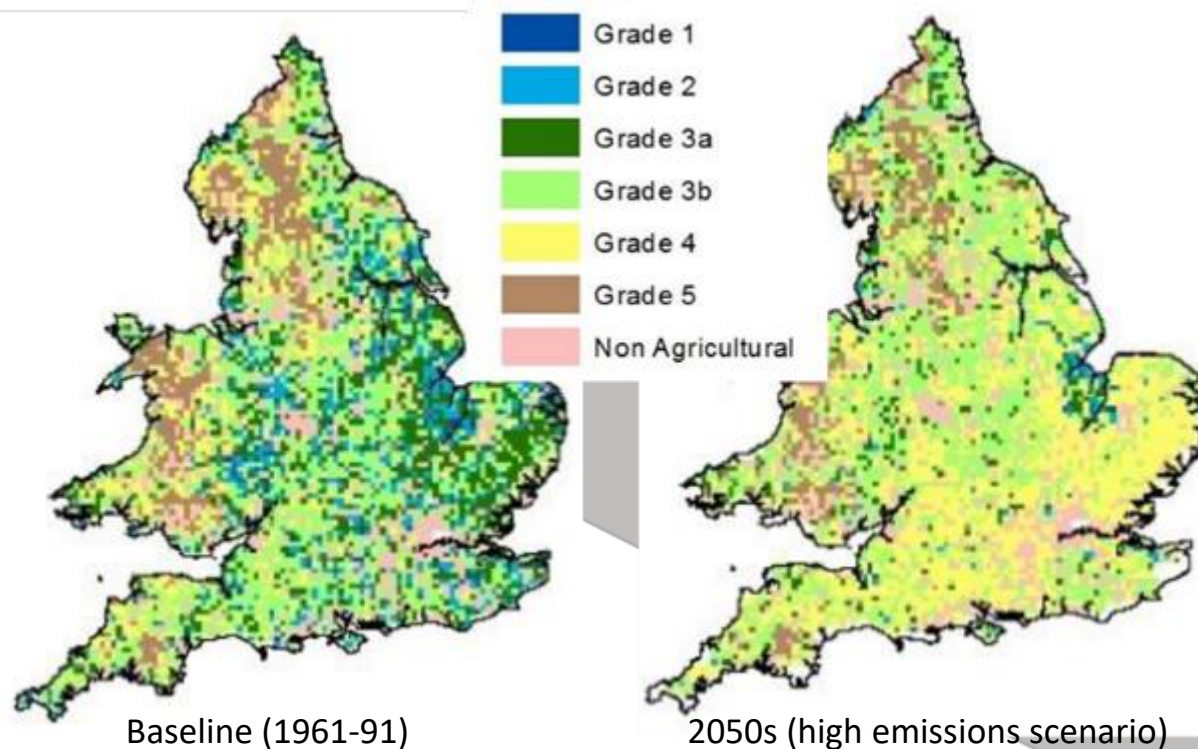
Scenario - 2050s, high climate scenario, no assumed additional adaptation, natural environment requirements are assumed to be the same proportion of total water as they are now (i.e. proportional, not fixed demand)





FUTURE IMPACTS – AGRICULTURE AND SOILS : HIGH EMISSIONS SCENARIO

Agricultural land classification in England and Wales



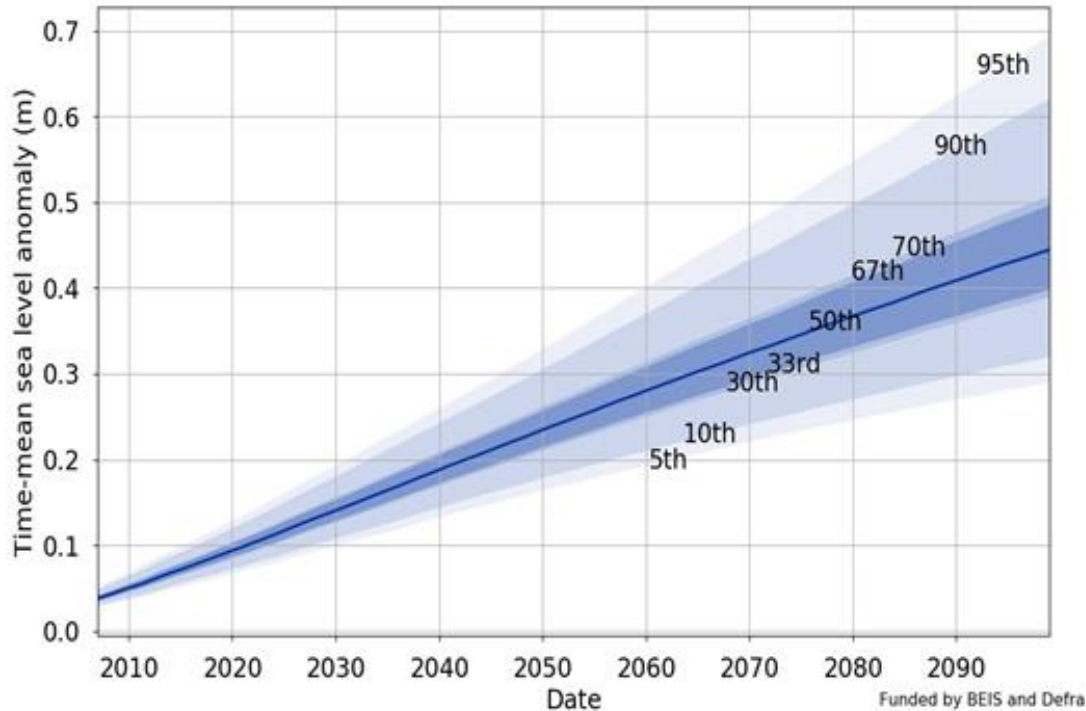
- From Defra (2015), see UK CCRA 2017 – Chapter 3: Natural environment



RISING SEA LEVELS - LOW & HIGH IMPACT PROJECTIONS

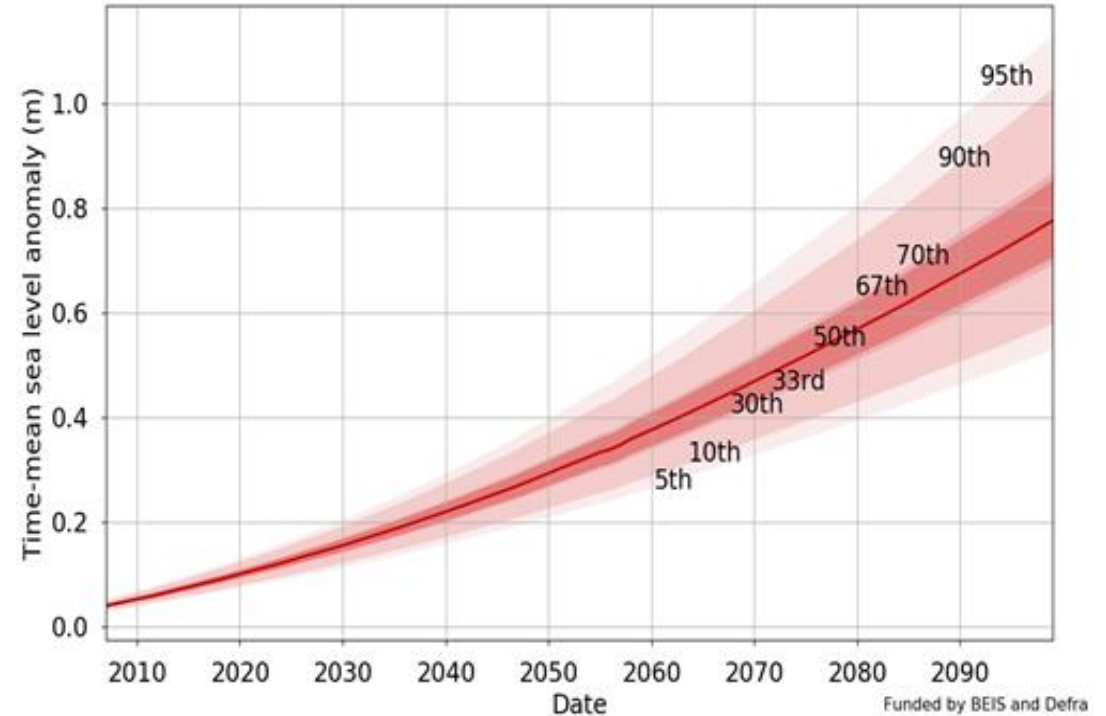
Met Office
Hadley Centre

Time-mean sea level anomaly (m) for years 2007 up to and including 2099, for grid square 51.72°, 1.08°, using baseline 1981-2000, and scenario RCP 2.6, showing the 5th, 10th, 30th, 33rd, 50th, 67th, 70th, 90th and 95th percentiles



Met Office
Hadley Centre

Time-mean sea level anomaly (m) for years 2007 up to and including 2099, for grid square 51.72°, 1.08°, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 30th, 33rd, 50th, 67th, 70th, 90th and 95th percentiles



2099 Sea Level Rise Values for Tollesbury, Blackwater Estuary, Essex: + 0.45m (0.32m to 1.03m)

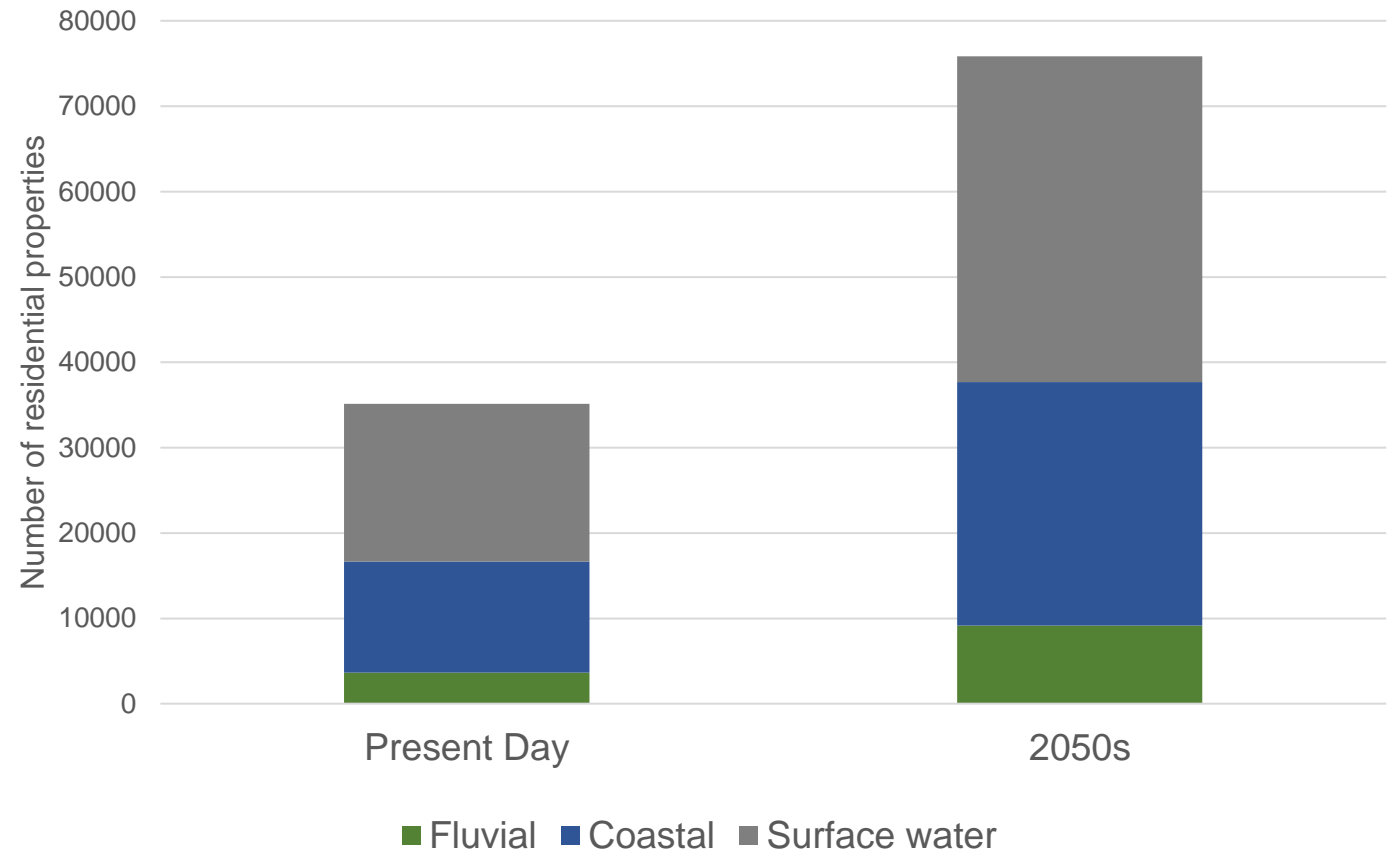


FUTURE IMPACTS

Residential properties at significant flood risk in Essex, Norfolk and Suffolk

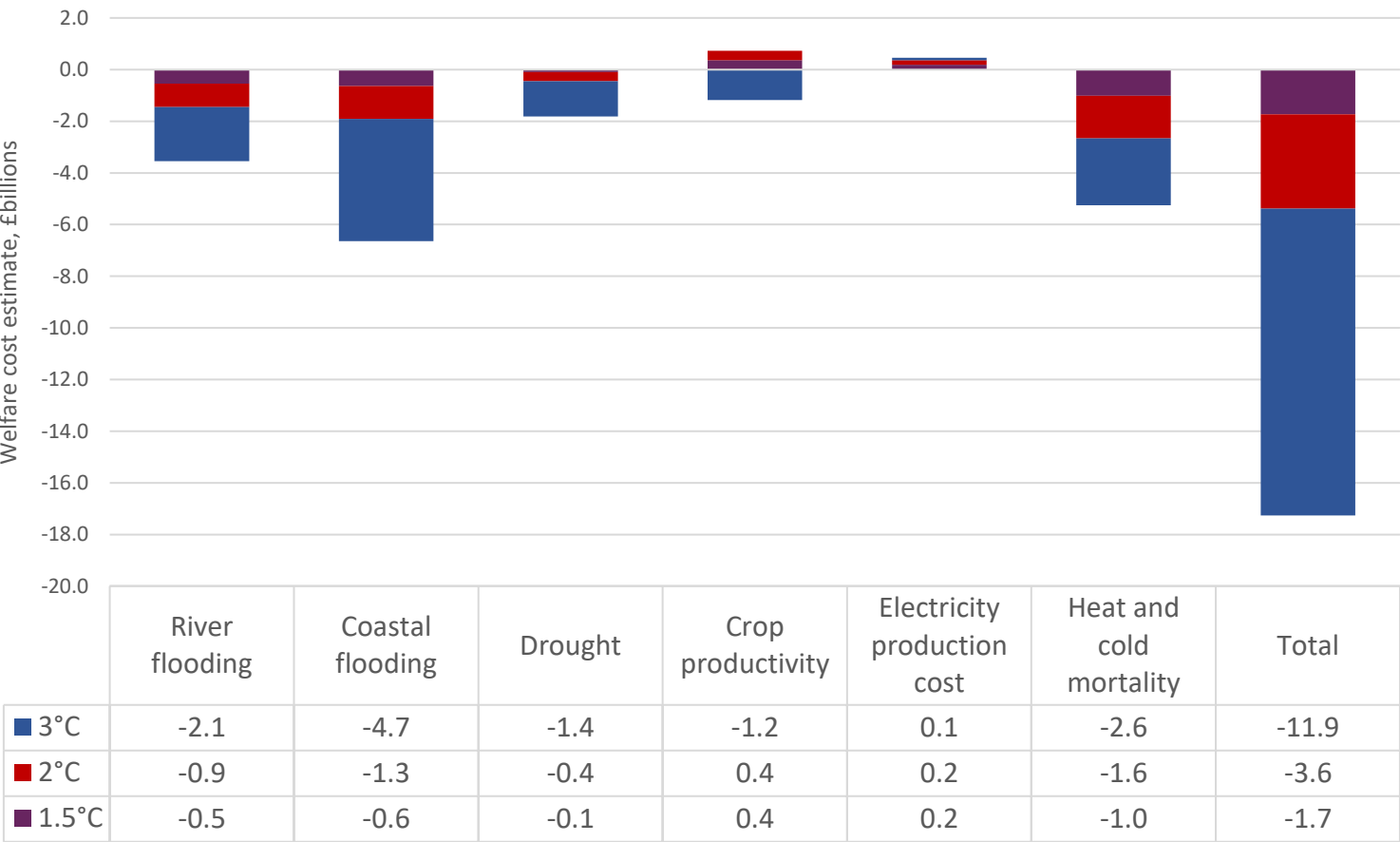
Flood Risk:

- Essex has substantial issues with coastal and surface water flooding (blue and grey boxes)
- Even over the next 30 years, the risk is projected to double without additional adaptation action



COST OF INACTION

Welfare losses per year from climate impacts in £billions, UK and Ireland - Costs of inaction are high (but hard to estimate in full)



- Note:**
- Estimates only include a selection of impacts (e.g. does not include surface water flooding, windstorms, impacts on the natural environment, loss of natural capital), so are not a national total loss estimate of climate change
 - Analysis assumes that the economy is the same size and shape as today



RECOMMENDATION 1: LAND USE - **Farmland in Essex adopt Sustainable** **Land Stewardship practices: 50 % by** **2030; 75% by 2040 and 100% by 2050**

Environment & Climate Action





SUSTAINABLE LAND STEWARDSHIP PRINCIPLES

Broad principles defining Sustainable Land Stewardship are summarised here*:



1. utilize crop varieties and livestock breeds with a high ratio of productivity to use of externally and internally derived inputs;
2. avoid the unnecessary use of external inputs;
3. harness agroecological processes such as nutrient cycling, biological nitrogen fixation, allelopathy, predation and parasitism;
4. minimize use of technologies or practices that have adverse impacts on the environment and human health;
5. make productive use of human capital in the form of knowledge and capacity to adapt and innovate and of social capital to resolve common landscape-scale or system-wide problems (such as water, pest or soil management);
6. minimize the impacts of system management on externalities such as greenhouse gas emissions, water, carbon sequestration, biodiversity, and dispersal of pests, pathogens and weeds.



SUSTAINABLE LAND STEWARDSHIP

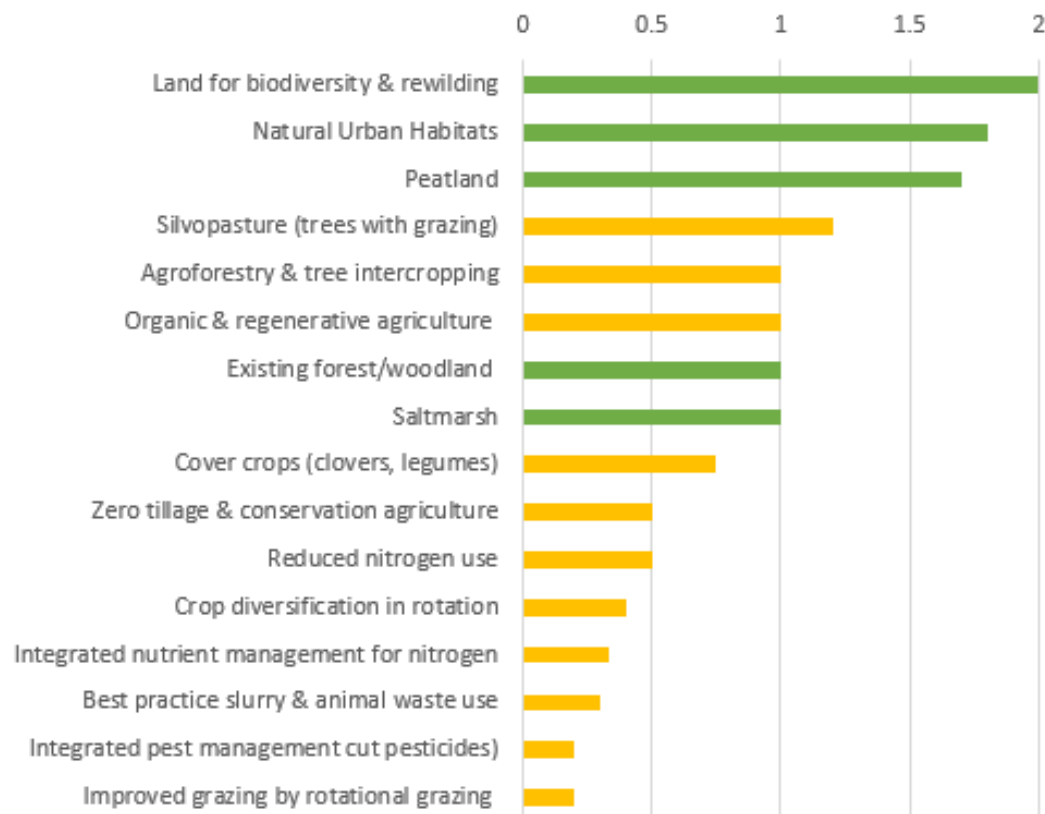


- Agricultural production can either deplete or increase carbon stocks. Sustainable land stewardship
 - can absorb carbon by increasing organic matter in plants, roots and soils; and
 - lower carbon use through increased productivity, often using less artificial inputs.
- These techniques will have concomitant benefits for biodiversity and water quality.
- Incentivising this will be built into the new Environmental Land Management Scheme (ELMS) and the Commission's recommendations centre around helping increasing scheme uptake.



CARBON SEQUESTRATION BY AGRICULTURE AND LAND USE

Carbon sequestration by agriculture and land use (tonnes carbon per hectare per year)



- Agriculture and land use contribute 24% of CO₂eq emissions (IPCC). There are numerous strategies for lowering global carbon emissions from agriculture and land use by changing land management practices.
- Most of those shown here could be described as **Sustainable land Stewardship (yellow bars)**. The exceptions in the table are biodiversity and rewilding, forestry and woodlands, peatlands and saltmarsh and these can be described as **Natural Green Infrastructure (green bars)**.
- It is notable that the three most potent land use changes to sequester carbon all include Natural Green Infrastructure changes.



WHOLE OF ESSEX TARGETS



Sustainable Land Stewardship - Whole of Essex Targets by 2050

BY 2030 • Whole of Essex Targets by 2030

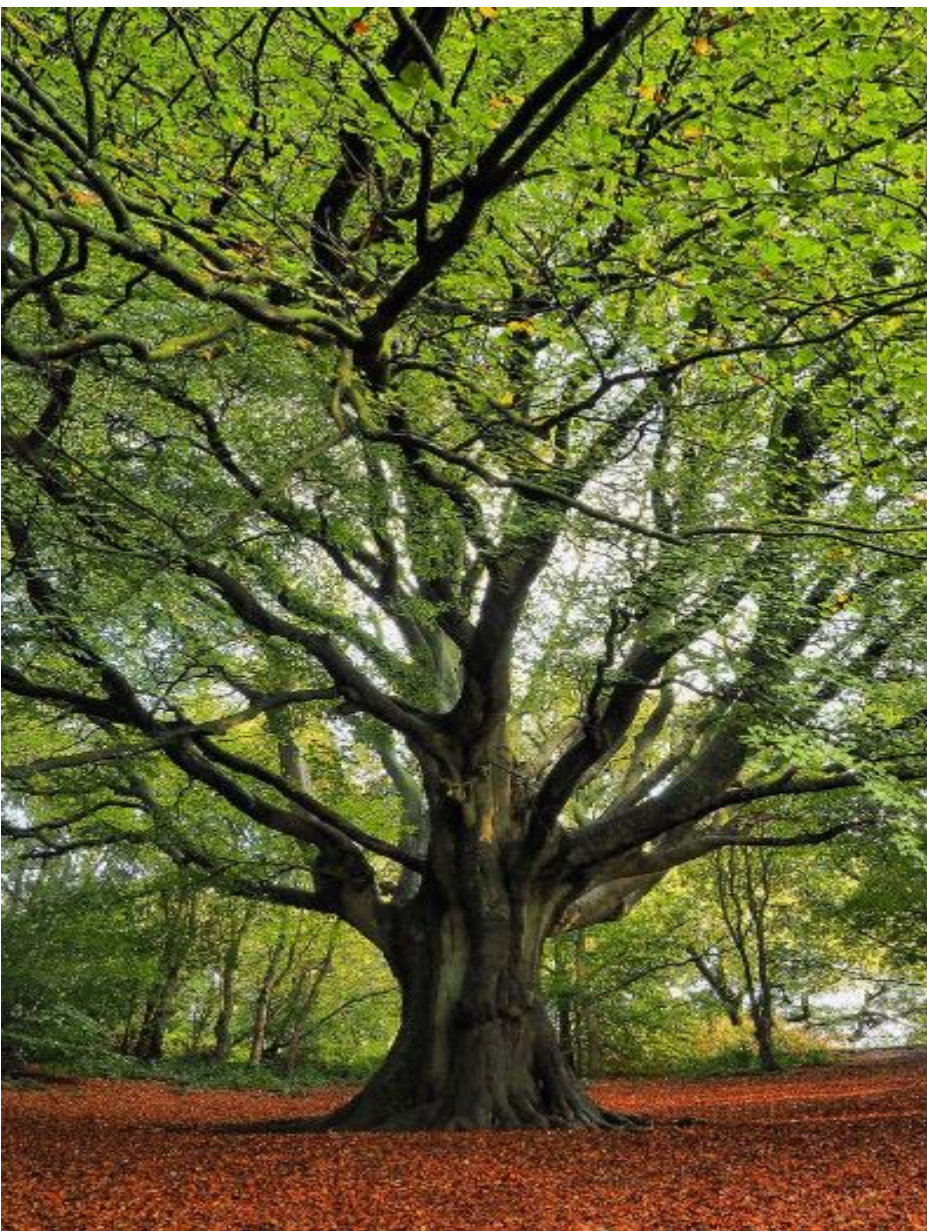
- 50% of farmland in Essex adopt sustainable land stewardship practices

BY 2040 • Whole of Essex Targets by 2040

- 75% of farmland in Essex adopt sustainable land stewardship practices

BY 2050 • Whole of Essex Targets by 2050

- 100% of farmland in Essex adopt sustainable land stewardship practices



●●●● **BIODIVERSITY AND NATURAL ECOSYSTEMS**

Environment & Climate Action





RECOMMENDATION 2: BIODIVERSITY - **30% of all Land in Essex will enhance** **biodiversity and the natural environment** **by creating Natural Green Infrastructure:** **25% by 2030 and 30% by 2040**

Environment & Climate Action





NATURAL GREEN INFRASTRUCTURE IN ESSEX

Natural Green Infrastructure covers 518 km² or 14% of Greater Essex

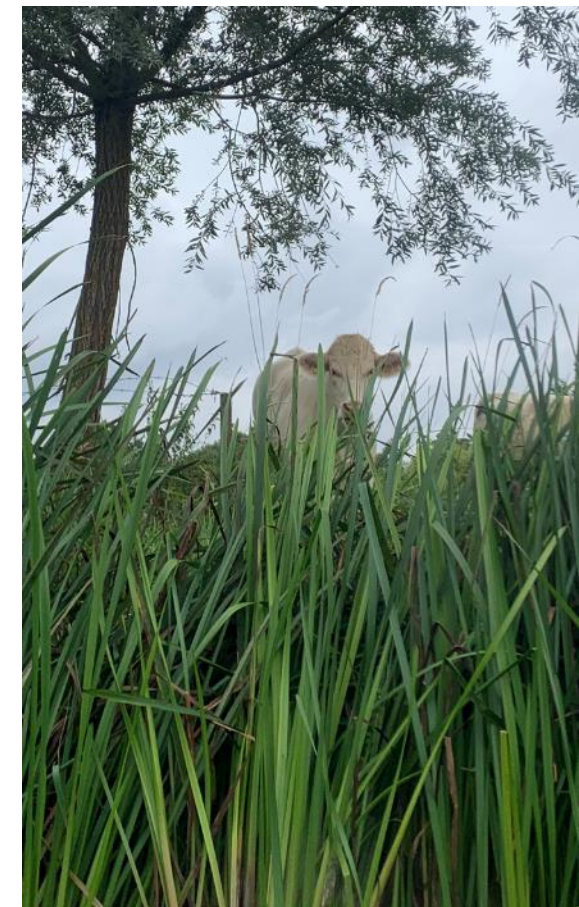
Natural and semi-natural open space (grasslands, heathland, scrub and woodland)

Country parks

Ancient Woodland

Reservoirs, lakes and ponds

Coastal features (beaches, sand dunes, rocks, foreshore, tidal water, saline water)





NATURE BENEFITS



ROLE OF BIODIVERSITY IN LIVING LANDSCAPES

- Natural landscapes are essential to absorbing carbon and creating a net zero environment
- Biodiversity is fundamental for the effective functioning of natural ecosystems
- Healthy natural ecosystems provide humanity with essential benefits and services to thrive
- Landscapes rich in biodiversity have the necessary resilience to survive change and catastrophic disturbances
- Degraded ecosystems are less able to support our living landscape, our farmlands, our woods, and our community spaces
- The state of nature in the UK is in crisis and land use practice is a large contributing factor

<https://jncc.gov.uk/news/uk-state-of-nature-2019-report/>



30 X 30 STRATEGY FOR NATURE



MAKING SPACE FOR NATURE

- To flourish nature needs space, naturalness and connectivity. New study suggests protecting 30% of priority areas and existing natural ecosystems could safeguard 70% of species from extinction and also sequester a substantial amount of carbon dioxide (Strassburg et al 2020)
- The UN and UK Government pledge to protect at least 30% of land and sea by 2030

<https://www.leaderspledgefornature.org/>

<https://www.gov.uk/government/news/pm-commits-to-protect-30-of-uk-land-in-boost-for-biodiversity>

- Essex to commit to the global 30 x 30 strategy



BY 2030 RECOMMENDATIONS



Integrating biodiversity into land use practice

- To meet the target of 30% for nature recovery by creating an additional 585 km² of natural green infrastructure, bringing the total area across Essex to 1,103 km²
- Create a Nature Recovery Network, using natural river corridors, the coast, other green linear features and new green infrastructure to establish effective interlinked wildlife corridors across the County
- Integrate nature gain strategies into planning and management of all working and cultural landscapes
- Each parish to produce a complementary and integrated biodiversity action plan



NATURAL GREEN INFRASTRUCTURE



Whole of Essex Targets by 2050

BY 2030 Whole of Essex Targets by 2030

- 25% of area will be Natural Green Infrastructure



BY 2040 Whole of Essex Targets by 2040

- 30% of area will be Natural Green Infrastructure



RECOMMENDATION 3: FLOODING - For those properties still at risk of flooding (currently 75,000), where we develop schemes to increase their flood resilience, we will aim for $\frac{3}{4}$ of the schemes developed by 2050 to include Integrated Water Management and Natural Flood Management techniques.

Environment & Climate Action





RECOMMENDATIONS



ROLE OF LANDSCAPE IN FLOOD MANAGEMENT & WATER CONSERVATION



Nature based flood solutions create large areas of Natural Green Infrastructure



Natural Green Infrastructure allows water to percolate into groundwater improving water quality and reserves



Natural Green Infrastructure acts as a huge sponge for water: growing plants sucking up water and organic soils absorbing water



Linear River and Coastal nature-based flood schemes create wildlife corridors which enhance biodiversity and contribute to Nature Recovery Networks



Natural Green Infrastructure supports water conservation in the landscape, tackling increasing water scarcity and drought



NATURAL FLOOD MANAGEMENT

We will develop **integrated water management solutions** through **Natural Flood Management** approaches to:

- Reduce flood risk
- Accumulate carbon
- Enhance biodiversity
- Support River Basin Management Plans and WFD targets.



COASTAL CHALLENGES

We will improve resilience to sea level rise through:
restoration and creation of new mudflats, salt marsh and wash lands, natural sea barriers

- Reduce flood risk
- Accumulate carbon
- Enhance biodiversity
- Build resilience

Coastal habitat restoration and re-creation





RECOMMENDATION 4: URBAN GREENING – 30%
greening of our towns, villages and
new developments by: increased greenspace
creation, naturalising existing green space, greening
the public realm and developing sustainable
drainage systems (SuDS)

Environment & Climate Action





ROLE OF URBAN GREENING INFRASTRUCTURE

- Increases biodiversity and creates wildlife corridors (“green veins”, “greening-the-grey”)
- Lowers the “heat Island effect” in built up areas
- Provides “green-exercise” benefits to mental health
- Reduces pollution
- SuDS reduces urban flooding
- SuDS improve water quality and reserves
- Absorb carbon in plants and organic matter

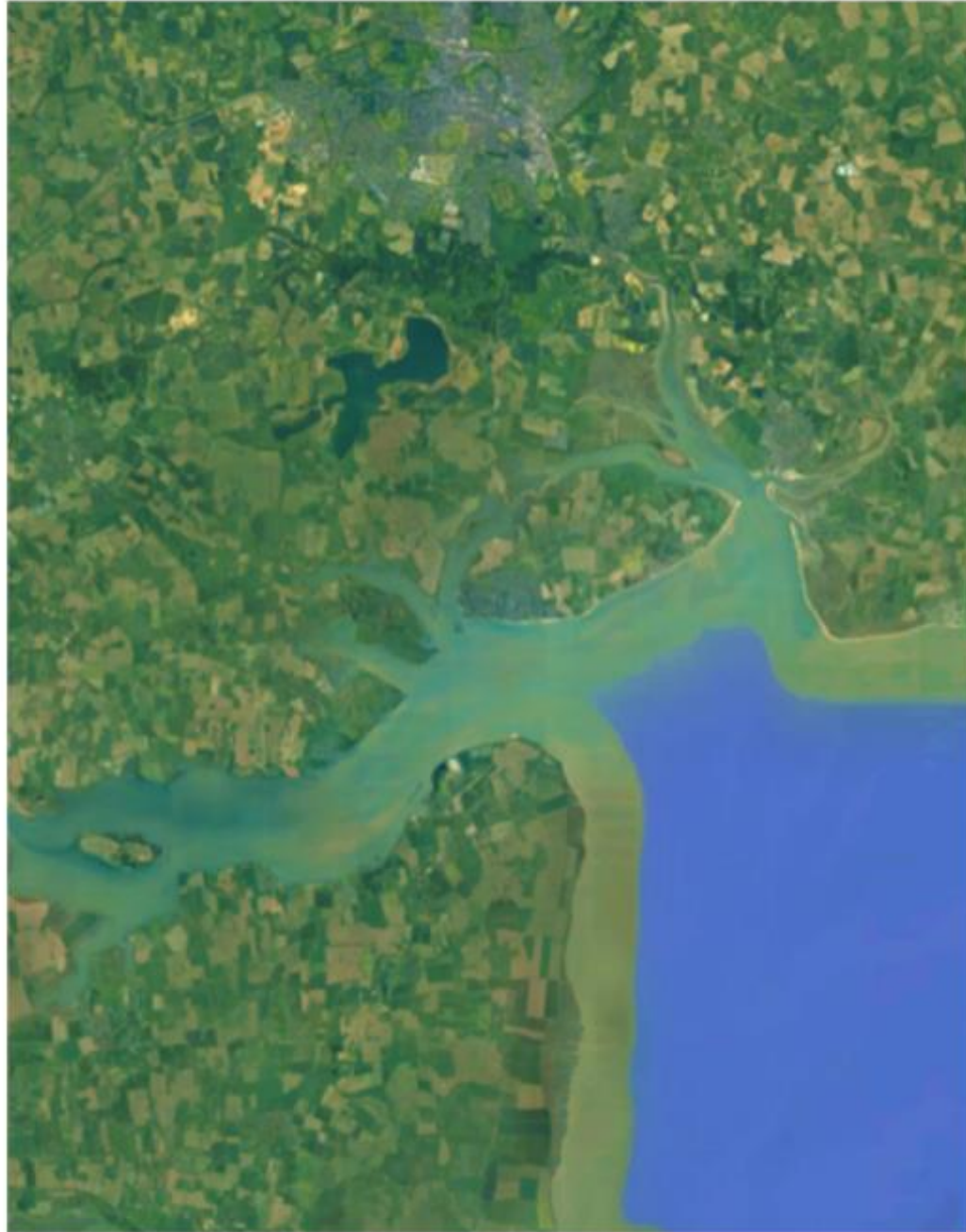


RECOMMENDATION 5: CLIMATE FOCUS

AREA - Create a Climate Focus Area to accelerate action and provide exemplars: adopting Sustainable Land Stewardship practices: 100% by 2030 and Natural Green Infrastructure: 30% by 2030

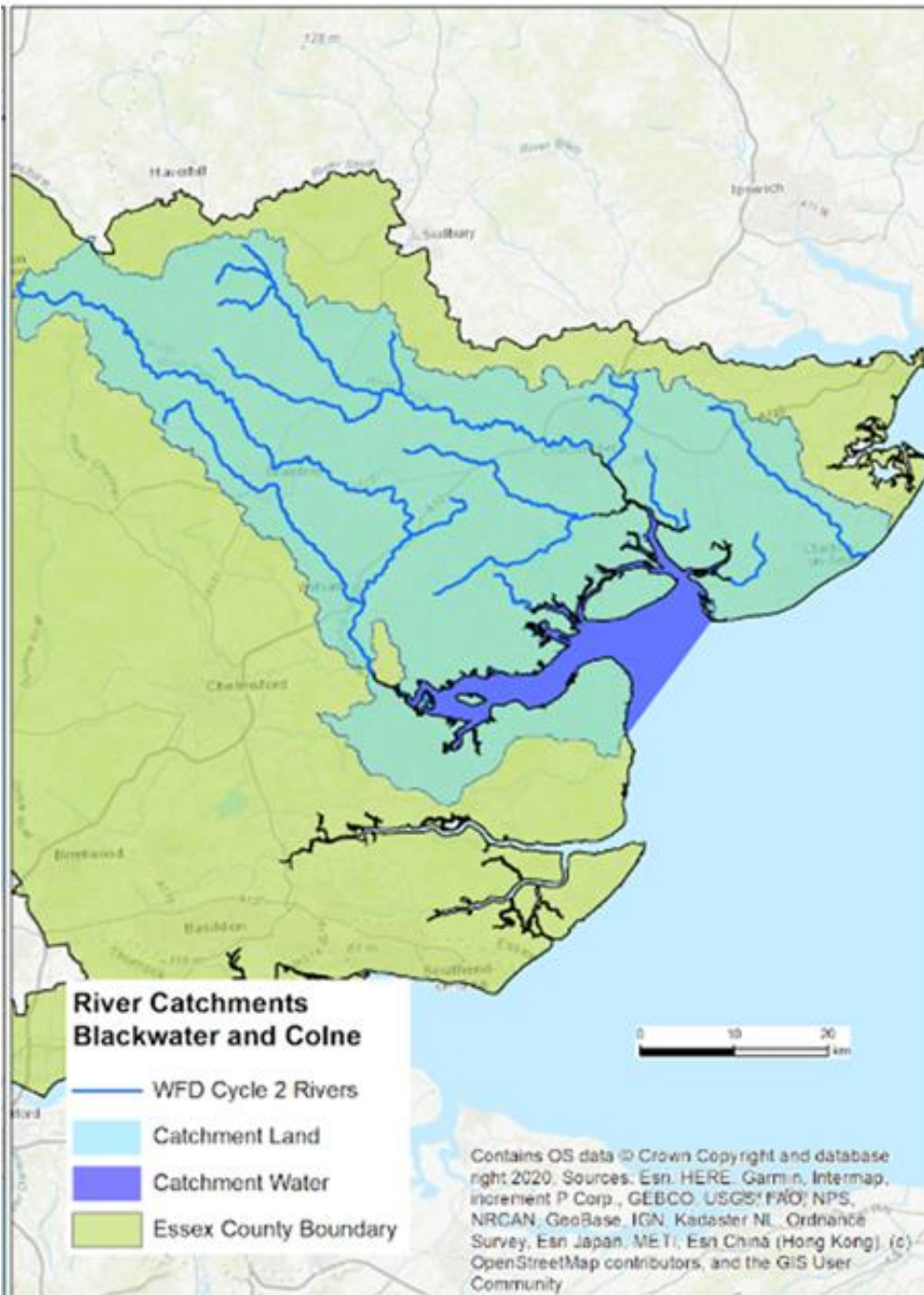
Environment & Climate Action





WHY CLIMATE FOCUS AREA? OBJECTIVES

- To serve as a pathfinder and pilot area, accelerating best practice in sustainable land management
- To act as an investment “Attractor” for innovative green business, and for pioneering new sustainable farming methods
- A focus area for transitioning local food systems and cultural eating habits
- To demonstrate ambitious and sustained nature recovery strategies
- A multi-sectoral project site for integrating and intensifying action following recommendations from the Special Interest Groups – Transport, Built Environment, Energy and Waste, and Community.



RIVER CATCHMENTS BLACKWATER AND COLNE: 30% OF ESSEX AS CLIMATE FOCUS AREA

- Covering an area of 930 km²
- Part of Northern Thames Basin and Greater Thames Estuary National Character Areas.
- Rich in geodiversity, archaeology and history, and diverse landscapes ranging from ancient woods, to open arable areas, Essex heathlands, and areas of urbanisation throughout. Includes coastland of shallow creeks, drowned estuaries, low-lying islands, mudflats and broad tracts of tidal salt marsh and reclaimed grazing marsh
- Catchment areas provide natural corridors linking Essex hinterland with the coast
- Natural Green Infrastructure currently makes up c.13% of land cover



TARGETS FOR CLIMATE FOCUS AREA

- By 2030, all farmland to adopt sustainable land stewardship practices
- By 2030, 30% of land cover to be managed as Natural Green Infrastructure
- By 2030, 30% of urban areas under Natural Green Infrastructure
- By 2030, native tree cover to double (c.5% to 10% cover)
- By 2030, every Parish to have a biodiversity action plan
- By 2030, every Parish to have a climate emergency strategy



RECOMMENDATION 6: - ENGAGEMENT - Ensure collaboration & engagement by carrying out a participatory community process, catalysing communities, farmers, landowners and individuals, encouraging personal and community action in the Climate Focus Area and the whole of Essex

Environment & Climate Action





LU & GI COMMUNITY PARTICIPATION – ESSEX WIDE



1. Enable and support community groups, schools, individuals and businesses to innovate and implement climate actions they identify for themselves.
2. Harness local knowledge and build local support to achieve sustainable land stewardship and natural green infrastructure recommendations.
3. Develop a strategy working within communities from the start to ensure local inclusion and accountability.

COMMUNITY PARTICIPATION



Stages for LU&GI community participation

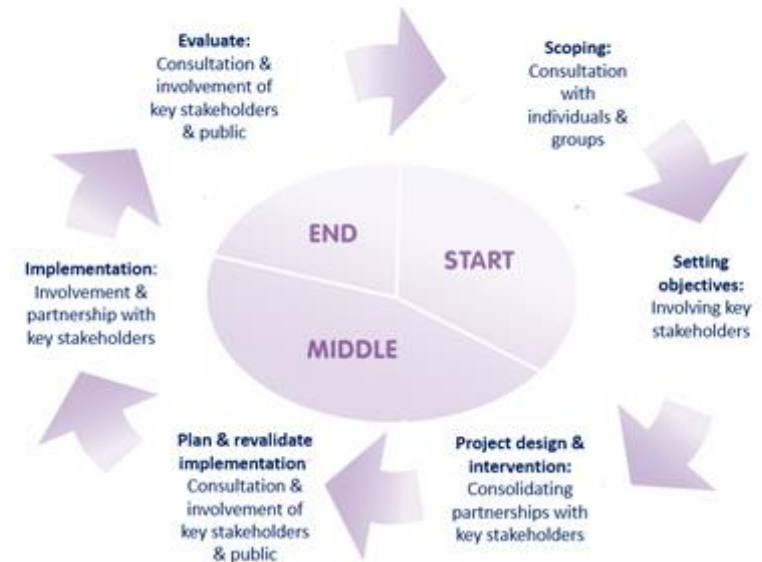
1. Create initial concept document for Essex wide community participation based on the recommendations of the Land Use and Green Infrastructure SIG.
2. Develop initial co-creative steering group of local community stakeholders, local government networks, specialists and others to map further participation and inclusion within the County and establish Terms of Reference.
3. Together, map and establish existing activity eg NGOs, schools & Parish Councils.
4. Together, establish a campaign strategy to support individual, business and community action with short term identified goals leading to longer term goals by 2050.
5. Create a framework for local groups to become independent in pushing forwards actions, communications, feedback and planning into the future across the County.



	Inform	Consult	Involve			Partnership (Collaborate)	Empower (Control)	
			Taking part (e.g. events)	Helping plan	Helping manage		Lease	Ownership
Management plan	↔							
Health improvement activities			↔					
Learning activities			↔					
Volunteering			↔					
Community-based work			↔					
Community-based business						↔		

The engagement and planning cycle

modified and adapted from B.Ambrose-Oji, P.Tabbush, B.Frost, C.Carter, K.Fielding (2011) Public Engagement in forestry: A toolbox for public engagement in forest and woodland planning. Forestry Commission





Advice and support
for Essex
wide Individuals,
Businesses and
Communities to
improve Land use and
GI

- LUGI SIG recommendations shared with farmers, landholders, local government, communities and individuals on benefits of biodiversity enhancement, greening land use and greening our towns, gardens and rural areas through representative groups eg FWAG & Parish Councils.
- Integrate, cross post and make use of advice and support through other forums such as Essex is Green and Green Change Makers groups.
- Communicate advice and information to stimulate behaviour change and personal choices.



IDEAS FOR INDIVIDUAL CONTRIBUTIONS TO LAND USE AND GREEN INFRASTRUCTURE

- Put aside 30% of your garden or allotment for wildlife
- Create more greenery where you live and work e.g. climbers, green walls, green roofs, planters, troughs, trees, hedges
- Adopt public space as communal gardens or wildlife areas
- Help neighbours cultivate and re-wild their gardens
- Compost food and garden waste
- Set up communal composting projects
- Create green spaces or wildlife areas in the community where people can relax and recuperate
- Join local environment groups to improve your local area





RECOMMENDATION 7: KNOWLEDGE & DECISION SUPPORT - Developing Effective Monitoring & Evaluation, an integrated Sustainability Appraisal Framework, an Essex Climate Observatory, and a Knowledge and Decision Support Framework

Environment & Climate Action





MONITORING AND DATA

- Develop a monitoring and evaluation programme within an Essex Climate Observatory and involve citizens and researchers in data gathering activities across the Climate Focus Area
- Develop an integrated sustainability appraisal framework to support the Climate Action Programme in Essex, the Climate Focus Area and stakeholders' needs
- Collate and curate relevant data within an Essex Knowledge Platform and Decision Support Framework
- Establish a baseline audit for the Climate Focus Area





KNOWLEDGE AND DECISION-SUPPORT

The Knowledge and Decision-Support System will make it possible to answer questions such as:

- What trends can we observe in the natural environment and what is causing them?
- What will be the effects of climate change and economic activities on natural capital and ecosystem services?
- How and where does the natural environment support and influence the social and financial sustainability of the Climate Action Zone?
- Which are the relevant ecosystem services needed to deliver the targets sets for the Climate Action Zone and what is their condition? From which habitats ecosystems do they emanate? Whom do they benefit and to what extent?



RECOMMENDATION 8: UNLOCK FUNDING SUPPORT - Develop a Funding and Partnership development Programme



Environment & Climate Action





POTENTIAL FUNDING & RESOURCE SUPPORT

To implement these ambitious proposals ECC need to:

- Invest
- Convene
- Fundraise

PROVIDING LEADERSHIP – demonstration and covening

- Environment Land Management Scheme (DEFRA),
- Countryside Stewardship (DEFRA)
- Nature Recovery Networks (NE)
- Biodiversity Net Gain, (NE)

ACTING AS A CATALYST – using ECC funds as seed-capital

- Innovative Resilience Programme (EA) & Investment Readiness Fund (EA)
- Green Bonds
- Impact Investment
- Private finance
- Environmental Charitable Trusts such as the Esmée Fairbairn

EMPOWERING OTHERS – participating in world-class activities

- Water Resources East
- University combined bids
- Horizon 2020 City Forests
- UKRI Environmental Challenges and Prosperity



SUMMARY OF RECOMMENDATIONS TO BE VOTED ON



ENVIRONMENT & CLIMATE ACTION





RECOMMENDATIONS

Whole Essex Recommendations

- **RECOMMENDATION 1: LAND USE** - Farmland in Essex adopt Sustainable Land Stewardship practices: 50 % by 2030; 75% by 2040 and 100% by 2050
- **RECOMMENDATION 2: BIODIVERSITY** - 30% of all Land in Essex will enhance biodiversity and the natural environment by creating Natural Green Infrastructure: 25% by 2030 AND 30% by 2040
- **RECOMMENDATION 3: FLOODING** - For those properties still at risk of flooding (currently 75,000), where we develop schemes to increase their flood resilience, we will aim for $\frac{3}{4}$ of the schemes developed by 2050 to include Integrated Water Management and Natural Flood Management techniques.
- **RECOMMENDATION 4: URBAN GREENING** – 30% greening of our towns, villages and new developments by: increased greenspace creation, naturalising existing green space, greening the public realm and developing sustainable drainage systems (SuDS)



RECOMMENDATIONS

Whole Essex Recommendations

- **RECOMMENDATION 5: CLIMATE FOCUS AREA** - Create a Climate Focus Area to accelerate action and provide exemplars: adopting Sustainable Land stewardship practices: 100% by 2030 and Natural Green Infrastructure: 30% by 2030
- **RECOMMENDATION 6: - ENGAGEMENT** - Ensure collaboration & engagement by carrying out a participatory community process, catalysing communities, farmers, landowners and individuals, encouraging personal and community action in the Climate Focus Area and the whole of Essex
- **RECOMMENDATION 7: KNOWLEDGE & DECISION SUPPORT** - Developing Effective Monitoring & Evaluation, an integrated Sustainability Appraisal Framework, an Essex Climate Observatory, and a Knowledge and Decision Support Framework
- **RECOMMENDATION 8: UNLOCK FUNDING SUPPORT** - Develop a Funding and Partnership development Programme



QUESTIONS

