# Annex 10

# Implementation of Rotherham MBC policy on the Natural Environment

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# Introduction

Most observers agree that the Earth’s climate is undergoing a major change. In the last two decades, global temperatures have risen by around 0.6% above the 1961 to 1990 average & some forecasters predict that by the end of the current century, average temperatures may rise by a further 2.0 degrees centigrade.

The trend shows no sign of changing. March 2015 saw the highest average global temperature (measured across land & sea) in 136 years of global monitoring, at 0.85 degrees above the 20th century average.

These trends have been mirrored in the UK where 8 of the 10 hottest summers since the mid-19th century have occurred since 2002, with 2014 being the hottest recorded in that period.

Conversely, 2014 was also the wettest recorded & five of the wettest years have occurred since 2000, reflecting a broad trend of warmer & drier summers/autumns & wetter winters/springs; set against a background of more extreme weather events.

A global temperature rise of more than 2.0 degrees centigrade by the end of the 21st century is unsustainable, but little is being done to avoid this catastrophic prospect. Population growth is threatening both wildlife & agricultural habitat, creating an imbalance between pollutants (CO2, ‘Greenhouse Gases’, etc) & the plants/trees which could combat them through photosynthesis & carbon storage.

***Rotherham MBC will pursue a more considerate approach to the treatment of agricultural land, wild life habitats, woodland, parks, urban green spaces & specialised sites; whilst at the same time seeking to work with nature to address the effects of climate change.***

# Natural Environment Themes

## R3.1. Encouraging & Protecting Bio-diversity

Bio-diversity represents an intangible risk in our efforts to combat the effects of climate change; intangible insofar as it is difficult to measure the risks arising from such loss, due to the subtleties of the natural environment & the long term characteristics of species growth, inter-relationship & development.

One such intangible contribution is Carbon retention. UK forests & woodlands alone are estimated to “lock up” approximately 130 megatonnes of Carbon, whilst organic soils are estimated to hold a further 5,100 megatonnes.

Cumulative loss of woodlands or organic soils therefore leads to Carbon being released into the atmosphere, whilst at the same time reducing the capacity for photosynthetic activity to combat CO2 emissions.

Moreover, this is not just a rural phenomenon. In urban areas, park land, green spaces & even domestic gardens have been disappearing at an alarming rate – in London alone, garden land totalling the equivalent of 2.5 times the size of Hyde Park was lost each year during the first decade of the current century.

The value of the connectivity & enrichment of ecological networks is also recognised. The role played by wildlife in keeping the environment “in check” (eating pests, controlling plant growth, distributing seeds, etc), is invaluable & for this reason it is essential that their ecological networks are maintained in order to avoid natural communities from becoming isolated, leading to over-intense competition for resources & to inter-breeding.

None of this is to underestimate the sheer loss of enjoyment of the diverse range of flora & fauna which the Borough enjoys, many of which could be displaced as they seek new habitats owing to the effects of climate change.

***Rotherham MBC recognises the contribution that its indigenous range of flora & fauna makes to both the day-to-day enjoyment of local residents, but also to the climate change agenda. It will seek to conserve the Boroughs natural habitats, combat potential loss at every opportunity & actively enhance these habitats wherever possible.***

## R3.2. Managing Woodlands

If climate change persists, with potentially devastating consequences for the environment, the role of trees, woodlands & forests will be crucial, mainly due to their ability to absorb, store & process greenhouse gases.

It is therefore vital that we equip woodlands & forests with the means of combating the effects of future climate change, including altered habitat & the risks posed by drought, pests, diseases, wind & fire. Otherwise, we run the risk that the very tool needed to combat rising Greenhouse Gas emissions & the worst excesses of climate change, might be impaired in its performance.

As we have seen above, woodlands act as “sinks” for Greenhouse Gases, especially Carbon Dioxide, Methane & Nitrous Oxide. However, this has proved to be an increasingly uneven struggle. In 2009 for example, Greenhouse Gas emissions in the UK, totalled 566 Megatonnes, of which 474 Megatonnes comprised Carbon Dioxide.

That same year, UK woodlands are estimated to have removed 12.7 Megatonnes of Carbon Dioxide; however, since 2009 there has been a slight but discernible reduction in woodlands & other plantations arising from loss of domestic garden space, park lands & wood lands.

This has been exacerbated by an interruption in the efficiency in both managed & natural woodlands as managed stocks in particular age & pass their optimum performance age, without being supplemented or renewed. Although this problem is being addressed, it will be some years before newly-planted specimens achieve maturity & an optimum performance age – a salutary lesson in forest management.

One way of renewing woodlands is by removing timber before it ages & begins to rot, releasing Carbon back into the atmosphere. By using wood in timber products, the Carbon contained within remains stored in perpetuity rather than being released as the original tree ages & dies.

Potential uses for wood products are endless but include the construction business & the production of wood fuel. The latter is a means of not only producing clean energy, but also helps to displace traditional fossil fuel sources of energy thereby further turning the balance against Greenhouse Gas emissions.

For example, when used in electricity generation, woodchip generates 58 Kg of Carbon per Megawatt hour, compared to 530 Kgs generated by the National Grid. When used directly for heating, woodchip generates only 25 Kgs of Carbon per Megawatt, compared to 484 Kgs generated by Coal.

Efficient management of forests, ensuring that a sufficient volume of trees mature at the same time, but may be harvested before they pass their optimum age, is the key to this element of climate change adaptation.

Finally, woodlands can contribute to more “localised” climate change problems. For example, if planted sufficiently close together, isolated plantations can provide connectivity between wildlife habitats; if planted on farmland this practice can provide localised shelter for sheep & cattle; in urban centres this can provide a localised cooling effect, reducing the impact of “heat islands”; on flood-plains, plantations can help to absorb water before it reaches water courses & leads to localised flooding.

Elsewhere, their introduction can lead to the avoidance of land slip & soil erosion.

***Rotherham MBC recognises the enormous contribution that can be made to climate change adaptation by its forests, woodlands & smaller plantations, as well as the economic & environmental benefits that can arise. It also recognises that the success of this aspect of climate control depends upon a careful, considerate & integrated approach to woodland management. It will seek to carry out and manage tree planting at every opportunity, with due regard to the contribution that such planting can make to environmental improvement & climate adaptation.***

## R3.3. Protecting & Enhancing Farmland & Terrain

We have seen that trees & woodlands are responsible for the processing & storage of large amounts of carbon. However, soils & grass-lands are responsible for even greater amounts of carbon storage, being second only to the world’s oceans as repositories. In the UK alone they store forty times as much carbon as trees & wood-lands.

As with trees & woodlands, we face the dual prospect of trying to protect soils & grass lands from the worst effects of contemporary pressures, in order that they might counteract the effects of future climate change.

Such contemporary pressures include environmental threats, chiefly the loss of agricultural land to the effects of population growth & the consequent demand for new housing & associated infrastructure; as well as economic pressures as demand for food-stuffs both increases & varies.

These pressures are juxtaposed against the need to develop resilience against future climate change. For example, the loss of grass-lands in favour of crop-lands in order to produce more food-stuffs, conflicts diametrically with developing climate resilience insofar as grass-lands act as a “carbon sink”, absorbing around 13 million megatonnes of Carbon Dioxide from the atmosphere each year in the EU, whereas crop-lands release around 70 million megatonnes each year.

The consequences for agricultural land & soil are worrying insofar as drier summers & consequent lack of rain-fall can lead to soil erosion & breakdown, loss of natural habitat & the spread of pests & diseases.

In the short-term, agriculture can help reduce the production of green-house gases, chiefly Carbon Dioxide, Methane & Nitrous Oxide, with agriculture being the leading producer of the latter two gases.

Given that these gases arise from natural processes – release by crop-lands in the case of Carbon Dioxide; livestock digestive processes in the case of Methane & seepage from soils in the case of Nitrous Oxide base fertiliser: control is more difficult as they lack the predictability of man-made processes.

At the same time however, it is apparent that the best means of addressing the effects of natural processes is to utilise those very same natural processes.

In the case of Carbon Dioxide, this can best be achieved by retaining or even increasing levels of carbon retention in the soil through reduced soil disturbance (only tilling soil which needs to be planted); maintaining soil cover throughout the year & protecting the most carbon-rich environments such as peat-lands, wet-lands & grass-lands.

Further carbon retention can be achieved through the introduction onto farm-land of woody species of plant. Hedgerows are ideal in this context as they also provide a haven for wild-life & enhance ecological networks; whilst coppices can help provide shade for live-stock whilst also contributing to ecological networks.

Methane can be controlled by regulating the numbers of live-stock; improving their diet in order to control digestive processes & improved storage, break-down & re-use manure so that it might be used to fertilise soil or for the production of bio-gas, a potential source of renewable energy.

Ultimately, the application of suitably processed manure as a fertiliser, coupled with the more efficient manufacture & application of fertiliser, helps to reduce the amount of Nitrous Oxide produced in farming.

***Rotherham MBC recognises the contribution that farming can make to climate change adaptation by efficient agricultural management. It will aim to support the Boroughs farming community in any initiative which combines the commercial success of farming with environmental improvements in order to address climate change issues.***

## R3.4. Protecting & Enhancing Gardens, Parks, Urban Green Spaces, Nature Reserves & Sites of Special Scientific Interest

So far we have considered the main players in the climate change agenda – trees & woodlands, soil & farm-land & water courses.

However, there remains a substantial area to consider, which for convenience is termed “protected areas” & which includes Country Parks, Municipal Parks, Nature Reserves & Sites of Special Scientific Interest (SSSI).

Also included in this group however are highway corridors, verges, urban green-spaces & public gardens, which also play an important role in conserving the environment.

In spite of its industrial heritage, around 75% of the Metropolitan Borough of Rotherham is rural & contains 16 Municipal Parks, 3 Country Parks, 9 Nature Reserves & 5 SSSI’s, plus numerous public gardens, urban green-spaces, pocket plantations, etc.

The problem facing “protected areas” in terms of climate change, arises from their specialised nature, which tends to result in them becoming “static”. Whilst other forms of wildlife will react to climate change occurrence by re-locating to more favourable environments, the micro-environment associated with these specialised areas will revisit them for generation after generation, attracted by the plants & insects, which inhabit these areas.

Climate change can have a devastating impact on these sites, either threatening the site itself through drought, excessive rain-fall or weather extremes; or altering the micro-climate so that more mobile species will re-locate seeking the same environment elsewhere & depriving these sites of the means of procreation & expansion.

Conversely, climate change can present new opportunities for these sites, for example by being able to accommodate new species displaced from areas where similar micro-climates previously existed, prior to the onset of climate change.

Either way, it is apparent that such specialised areas need to be much more carefully monitored & possibly adapted to make them more resilient to climate change. Their highly specialised form makes this a challenging prospect with a choice being apparent between adaptation to maintain the existing micro-environment, or adaptation to attract displaced species.

This may require habitat creation between such specialised habitats to reduce the travel time of visiting species & the sympathetic treatment of surrounding habitats to provide a more diverse & localised environment.

At the same time we need to ensure that our own activities, no matter how well-intentioned, do not adversely affect the surrounding environment.

By their very nature, renewable energy sources are often focused on the most sensitive of environments. Wind turbines, for example, require open & rural environments to be most effective; hydro-power is obviously confined to rivers & water-courses; bio-mass energy originates from agricultural holdings & wood-lands; whilst solar power may also be affixed to agricultural buildings or be laid out in open fields.

Proposals such as these require careful management, upkeep & monitoring to ensure that they deliver maximum efficiency in energy provision, combined with minimum disturbance to the local wild-life & micro-climate.

Public gardens, urban green-spaces & highway verges are also included in this category, not necessarily because they are “protected” but because they provide a supportive role in supporting local flora & fauna, as well as improving the local environment.

Highway verges in particular can play an important role as “Green Corridors”, providing a healthy micro-climate for plants, trees, insects, birds & wild-life, but also providing environmental improvement & an improved perception of the local area to travellers.

Rotherham MBC recognises the contribution that Gardens, Parks, Urban Green Spaces, Nature Reserves & Sites of Special Scientific Interest make to the local environment, by contributing to bio-diversity, an appealing environment & an improved perception of the Borough as a whole. The Council will support any attempts to protect & further diversify these areas.

## R3.5. Protecting & Enhancing Watercourses & Water Features

Rivers & watercourses face a dual threat from the effects of climate change – a direct impact in the form of drought or excess rainfall & indirect impact in the form of surface water run-off from adjacent land.

At the same time, rivers & watercourses are one aspect of the natural world which has received less attention in terms of the effects of climate change, partly down to the difficulty in establishing bench-marks & bio-diversity models for the flora & fauna that populate watercourses; & partly due to the emphasis placed on the effects of climate change on human drinking water resources.

This is most frustrating insofar as freshwater ecology systems are amongst the most complicated, yet deserving of attention & as in other cases described above, must be supported in such a manner as to render them resilient to future climate change effects, as well as helping to mitigate the effects of climate change in the short-term.

The Council will support efforts to design cost-effective restoration programmes for freshwater systems, which will help combat the expected future impacts of climate change & adjacent land-use. Attention will be focused on efforts to minimise the consequences of climate change on freshwater quantity, quality & bio-diversity via three separate phenomena – increasing temperature; changes in water-levels & flow-regimes; & excess nutrient levels.

The Council will support the following objectives.

* Consider scenarios for future climate land use/land management, nutrient-loading & water-resource demand in relation to the future management of freshwater ecosystems.
* Consider measures that can be taken to mitigate the effects of temperature, changing hydrology & increased nutrient/organic loading, under different scenarios.
* Develop an understanding of the processes which govern the relationship between temperature, hydrology & nutrient/organic loading & the structure, function & bio-diversity of freshwater ecosystems.
* Develop an understanding of the thresholds & reference conditions for ecosystems facing climate change.
* Develop methods for identifying indicator systems & vulnerability assessment for ecosystems facing future climate change.
* Develop methods to assess the cost-effectiveness of adaptation/mitigation strategies in freshwater environments.
* Develop & improve integrated catchment models to protect freshwater ecosystems against climate, land-use management & pollution change.
* Ensure the long-term management of freshwater ecosystems by exploring the different catchment-scale models for adaptation, mitigation & restoration strategies.
* Engage with stakeholders to develop scenarios & models for adaptation & mitigation strategies at national & catchment levels.

These objectives will be applied at three levels – rivers & streams, lakes & reservoirs & riparian wetlands.

***Rotherham MBC acknowledges that much work needs to be carried out in identifying the effects of climate change on water based ecosystems. This requires that great caution is exercised in reconciling the various competing demands for water-based activity – leisure, recreation, green energy uses, transport, etc; with the need to protect & enhance natural ecosystems.***