

Assessment of Climate Change

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Summary: The initial assessment of the impact of climate change on the Chilterns AONB has been completed. This is likely to be an evolving document but the Board is invited to adopt this current assessment as a basis for its work and, in particular, to assist the review of the AONB Management Plan. An area requiring further work is the development of specific policies on renewable energy. It is suggested that the Board's Climate Change Group reviews this assessment on a regular basis.

Purpose of the Report: To advise that the Board to adopt the initial assessment of the potential impact of climate change on the Chilterns AONB.

Background

1. The Board should operate on the basis that climate change is happening and is, in large measure, attributable to man's activities. As the effects are likely to be wide ranging the Board should be prepared to proof all its activities for potential climate change impact and to assess its own future activities based partly on their vulnerability to climate change and as possible contributions to the causes.
2. It is the emission of greenhouse gases which are of most concern and, as such, it is those activities which generate a demand for energy which require most attention. This basic hierarchy should apply:
 - Reduce demand for energy.
 - Improve energy efficiency.
 - Replace carbon intensive sources of energy.
 - Offset carbon emissions.
3. The landscape of the Chilterns is unlikely to change rapidly solely in response to climate change - any changes are likely to become apparent in the medium to longer term. For example the beech woods, which will be affected, are likely to take many decades to show significant visible signs of change. However, as many decisions affecting land management have long term consequences (e.g. which tree species to plant), it is essential that climate change is considered as a significant factor in making those decisions from now on.

4. Many individuals and organisations are already taking climate change into account or know this is a challenge they must face up to. The Board is increasingly involved in those deliberations and, despite the immense uncertainty over many of the issues, needs to provide guidance based on available evidence and an assessment of the likely changes.
5. The assessment of potential impacts on climate change is accompanied by an initial overview of renewable energy technologies. This is an area which will require further policy development work, which should embrace issues such as:
 - The growing of biomass for electricity production - which is relatively inefficient compared to biomass for heat.
 - The growing of crops for biofuels rather than food, which is already attracting widespread concern.

Recommendations

1. **To adopt the initial assessment of the potential impact of climate change on the Chilterns, and the associated action plan.**
2. **To develop the Board's policy on renewable energy options.**
3. **That the Climate Change Group reviews the assessment at least twice per year.**

Special Features and Qualities of Chilterns AONB	Relevant Aspects of Climate Change	Nature of Impact	Timescale		Response		CCB role
			Short Term	Long Term	Mitigation	Adaptation	
Chalk Grassland	Hotter and drier summers Earlier spring Wetter and warmer winters	Changed growing seasons Disrupted ecological relationships. Changed species composition. New species of invertebrate Grass Fires Year round breeding of rabbits – increased grazing pressure. Changes in micro climates (e.g. south facing slopes)	Low	Medium		Provision of water supply to enable grazing. Link sites to facilitate species migration New varieties of grazing stock New habitat management regimes for “new species”. Improve site linkages to enable species migration	Monitoring Support for grazing related infrastructure Support for site planning and management Promotion of appropriate reversion techniques Review areas suitable for habitat recreation and reversion.
Woodland	Earlier spring Hotter and drier summers Fewer frosts	Drought stress/soil moisture deficits Periodic water logging Wind blow	Low	High	Woodland creation	More careful species selection. Promote demand for	Information (e.g. potential impacts according to soil types) Monitoring

	<p>(timing)</p> <p>More frequent gales</p> <p>Wetter winters</p> <p>Increased CO2 in atmosphere</p>	<p>Reduced growth rates/crown and root die back</p> <p>More disease/pests</p> <p>Change in species composition - Reduced suitability for beech in particular</p> <p>Changing associated flora and fauna – both losses and gains</p> <p>Increased risk of scrub fires</p> <p>Co2 concentration will affect some species growth rates</p>				<p>wood fuel</p> <p>Link woods to facilitate species migration.</p>	<p>Promote and assist with preparation of long term management plans</p>
<p>Water Resources/ Chalk Streams</p>	<p>Variable rainfall patterns but probably wetter winters and drier summers</p> <p>Hotter Summers</p>	<p>Erratic Flows.</p> <p>More frequent and unpredictable periods of drought and flood.</p> <p>Longer growing seasons may reduce percolation to the aquifer</p> <p>Variable impact on selected species - ecological balance will be affected.</p> <p>Reduced water quality</p>	High	High		<p>Reduce demand for water</p> <p>Reduce Abstraction</p> <p>Protect Stream Bed and banks</p> <p>Channel and floodplain restoration</p> <p>Flood Management</p>	<p>Information</p> <p>Lobby for reduced abstraction and demand reduction</p> <p>Help protect channel in times of prolonged drought</p> <p>Promote flood prevention plans</p> <p>Promotion of design of development to reduce run off</p>

		(e.g. due to heating, lower oxygen levels, pollution run off). Changed species balance and growth rates Changed channel profiles				Promote water storage Promote use of grey water systems	
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Farmland	Hotter Summers Milder, wetter Winters Fewer Frosts Drought Winter run off	Longer growing seasons Variable and unpredictable yields Opportunities to grow new crops including biofuels New pest species and greater abundance of pests Summer drought stress for crops Soil erosion (winter run off) Leaching of soils Summer drought stress for livestock Possibility of more	Medium	Medium	Reduce use of fertilisers More targeted use of fertilisers Conserve soil organic matter. Reduce food miles – seek local markets Grow biofuels and biomass	New crops Avoid crops requiring irrigation Water storage Reduce vulnerability to erosion and leaching New production methods Different breeds of livestock. Target agri-env support to increase	Monitor changes Support promotion of local markets and procurement policies Provide guidance of growing biofuels

		<p>insects, which may support more farmland birds.</p> <p>Demand for water to irrigate crops</p> <p>Hedgerows and field trees subject to drought stress.</p> <p>Crop fires (mostly accidental)</p>				ecological connectivity	
Wet Grassland	Hotter and drier summers	<p>Soil moisture deficits</p> <p>Changed species composition</p> <p>Changed hydrology</p>	Medium	High		Safeguard sites in times of drought.	<p>Monitoring</p> <p>Advice</p> <p>Site identification</p>
Acid Grassland/Heath	Hotter and drier summers	<p>Associated species may benefit e.g. reptiles</p> <p>Heath fires</p>	Low	Medium		Encourage spread of heath	<p>Monitoring</p> <p>Advice</p> <p>Site identification</p>
Built Environment	<p>Hotter summers</p> <p>Heavy rain</p> <p>Milder winters</p> <p>Increased number of extreme weather events</p>	<p>Buildings will be hotter in summer</p> <p>Winter damp may be more of a problem</p> <p>Vulnerability to flooding</p> <p>Response to climate change will result in further environmental impact, e.g. design of housing and installation of renewable energy</p>	Low	Medium	<p>Enhanced energy efficiency</p> <p>Reduced energy demand</p> <p>Installation of renewable energy capacity</p> <p>Use of</p>	<p>Change design of houses/all buildings</p> <p>Retro fitting of energy efficiency measures</p> <p>Bigger rainwater goods</p>	<p>Guidance</p> <p>Lobbying for higher building standards –aiming for carbon neutrality for new building</p> <p>Promotion of energy efficiency</p> <p>Promotion of local building materials</p> <p>Promotion of water conservation and “blue</p>

		<p>technology</p> <p>Installation of solar panels and wind turbines</p> <p>Increase in timber boring insects. Increase in subsidence especially on clay soils</p> <p>Drainage capacity/flooding</p> <p>Demand for air conditioning</p> <p>Flooding of roads</p> <p>More pollution events from run off.</p> <p>Road verge fires</p> <p>Storm drains overwhelmed resulting in pollution incidents</p>			<p>building materials with low embodied energy.</p> <p>Use of permeable surfacing to reduce run off</p>	<p>Rainwater storage</p> <p>Re-design gardens to use less water.</p> <p>Porous surfaces</p> <p>Use of vegetation provide shade/cooling</p> <p>Cutting of road verge vegetation to reduce fire risk</p> <p>Storm drains with bigger capacity</p> <p>More regular maintenance of drains to remove blockages</p> <p>Promote garden design which are more tolerant of climate</p>	<p>infrastructure"</p>
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Special Features and Qualities of Chilterns AONB	Relevant Aspects of Climate Change	Nature of Impact	Timescale		Response		CCB role
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Historic Environment	Hotter Summers Heavy rain	Erosion of soil covering Windblown trees damaging sites Growing more cereals and biofuels may result in more ploughing damage. Appearance of historic parks may change if significant trees die. May not be possible to maintain water features in history parks and gardens	Low	Low		May need to import soils and divert recreation uses Remove trees which may cause damage if wind blown	
Enjoyment and Understanding	Hotter Summers Milder winters	Hot summer weather may deter visits. Mild winter weather may lead to increased number of visits. Some sites and routes will be damaged –water logging in winter and erosion in summer. May be more holidays taken in UK.	High	High	Promote visits without use of car – close to home. Promote public understanding of how their actions can lead to the way they use and enjoy the	Give greater weight to weather dependency at planning stage of events, e.g. avoid hottest months, provide under cover areas Hold events in, and visits	

		Unpredictability of weather may deter holding of outside public events			natural environment	to, shady woodland	
Economy	Seasonal variability Hotter summers Milder winters	Opportunity to introduce new crops and livestock breeds Expanded demand for wood and other biofuels. More visitors in winter Promotion of local food Promotion of local building materials. Trend for more UK based holidays. Possibility of disruption to economic activity and loss of assets			Promote local produce. Develop tourism profile as an alternative to long distance destinations Develop wood fuel market Develop markets for new crops/breeds	Give greater weight to uncertainty of weather in business activity	Promotion of the issues

Renewable Energy	Potential	Impacts	Conclusion
Solar	Medium	Installation of panels on houses and other buildings	To be promoted, with need for control in conservation areas and on listed buildings. Guidance needed to avoid visual intrusion. Promote on non building locations.
Wind	Low	Little potential for large-scale generation. Impact of large turbines in prominent locations would not be acceptable	Small scale turbines may be appropriate in specific locations. Guidance to be prepared
Wood	High – for use of standing timber Low – for fast grown crops. Priority is to use wood fuel to generate heat not electricity	Less than 15% of the sustainable yield from existing woodland is being harvested. Larger areas of woodland would be thinned and felled than recently.	Significant scope to promote timber production from existing woods for wood fuel. Limited scope for short rotation coppice or other fast growing species - soils are not generally suitable
Biofuel	Medium	Large scale growing of miscanthus (Elephant Grass) would not be appropriate. May be acceptable where it is grown in large fields currently used for arable crops. Oil seed rape is already grow non a significant scale and is likely to increase	Unlikely to have a major impact but growing of miscanthus needs to be monitored. Guidance should be produced
Hydro	Low	A few sites along the Thames may be suitable. Need to avoid disruption to	Could be supported in a small number of locations subject to minimised

		hydrology and landscape intrusion of new infrastructure. The variable flow along all other streams suggests potential is low.	damaging environmental impacts.
Waste Incineration	Low	Incinerator, storage and residues, transfer of waste	Likely to be few, if any, acceptable sites within the AONB
Ground Source Heat	Medium	None	Can be promoted especially for properties with large gardens and fields