Climate Change - What does it mean for Dartmoor?

Vol 2. An assessment matrix of risks, opportunities and actions

December 2011

GUIDANCE ON USING THE CLIMATE CHANGE IMPACT ASSESSMENT AND ADAPTATION PLANNING TEMPLATE (MS Office 2007)

Introduction

This template tool provides a framework for assessing the impacts of climate change over the coming century on National Parks. These instructions explain the layout of the template and give step-by-step guidance on its use.

Template Overview

The template is made up of seven thematic sheets, plus two guidance sheets (this instruction sheet and the assessment matrix sheet). Each thematic sheet is stand-alone and covers one of the major aspects of National Parks. There are close links between these themes and those used in National Park Management Plans.

The seven defined themes are common across all NPAs and have been jointly agreed along with the assessment process. The detail below this is provided as guidance but can be modified and added to as each NPA sees fit.

Each thematic sheet is sub-divided into “Areas of potential impact” (column A), which will be drawn from your National Park Management Plan and/or definition of the Special Qualities of your National Park. The thematic sheets are provided with suggestions in place in column A, but these should be modified to suit your National Park and your analysis.

Process Overview

The basic process is to identify the important aspects of National Parks that may be affected by climate change; to consider what the impacts could be, using a combination of climate change projection data and professional knowledge and opinion; and to identify what actions NPAs and their partners can take to address those impacts.

The impact assessment part of the process is based on a standard numerical risk assessment that most people should be familiar with. One difference is that you can assess both risks and opportunities. It allows you to rate the likelihood of something happening and the risk / opportunity. These are multiplied together to arrive at a figure between -25 (maximum risk) and +25 (maximum opportunity).

Each thematic sheet contains several worked examples to demonstrate how the tool should be used; to provide an indication of the anticipated level of detail; and to help to achieve consistency across the process.

Data Preparation

The template uses the 2009 UK Climate Projections (UKCP09) to provide information on likely climate changes over three rolling 30 year times periods, the 2020s (2010 to 2039), 2050s (2040 to 2069) and 2080s (2070 to 2099). This data is available at regional and sub-regional level and each National Park Authority needs to update the data in the table using the data relevant to their National Park. Refer to http://ukclimateprojections.defra.gov.uk

Step-by-step guidance

The process for each thematic sheet is as follows.

Cross-reference to NPMP

1. The first step is for the NPA to identify the cross-references from that theme to their own NPMP, to be entered in B4. Inevitably each NPMP is structured differently; for some themes there may be a one-to-one correlation, whereas for others the theme may cross into several NPMP themes. The intention here is to make sure that the template fits the NPMP and provide references back to the Plan once impacts and actions have been identified. The date and lead officer also go in here. These rows can be then be hidden.

Impact Assessment

1. Review the “Areas of potential impacts” (column A). Do they reflect the special qualities of your National Park and the subjects covered by your NPMP for this theme? Add and change them as required. We consider a level of detail giving 5 or so areas within each theme about right.

2. For each area of potential impact (column A), consider the implications of the climate change data starting in broad terms (column B) and then in detail for your National Park over the coming century (columns C, D, E). The tabulated figures are the “most likely case” scenarios; hovering over the red triangle comment symbol will bring up a further level of detail.

3. For each potential climate change outcome (e.g. hotter, dryer summers), use the professional knowledge on your working group to identify projected impacts either as a direct consequence of climate change or as an indirect result of some action by society in response to climate change. Record these in column F.

4. Once a projected impact is identified, work out the risks and/or opportunities this presents, the consequences of this and who/what is affected. These are recorded in columns G, H and I. Just keep adding in rows as they are needed to record risks and opportunities.

5. Now consider the likelihood and impact of the risk / opportunity over the three time periods, using the definitions set out in the Assessment Matrix sheet. A negative number in the impact column signifies a risk; a positive number an opportunity.

6. You will end up with assessments for short, medium and long term scenarios, which the template automatically calculates and colour-codes. Once all the areas of potential impact have been assessed, you can hide columns J, K and M, N and P, Q to facillate printing on 'A4' sheets if required.

Initial adaptation action planning

1. Having identified the potential impacts of climate change for the theme, the working group should identify **current activity** already underway that address these impacts and list these in column S.

2. The working group should also use their professional experience to identify **potential activity** that could be put in place by the NPA and/or its partners to address the previously identified impacts and list these in column T.

Detailed adaptation action planning

1. Detailed action planning involves considering how the proposed actions from one theme could have effects elsewhere. As such this stage needs to be carried out after the impact assessments and initial action planning for all of the themes is complete.

2. Considering the impact assessment over the 3 time periods, combined with the time required to implement an action, gives an estimate of when action is required which is entered at column U.

3. The action is then cross-checked against potential impacts and proposed actions in the other themes to gauge whether it will have a positive, negative or zero effect on each. Column V is used to record where an action has anything other than a zero effect on another theme.

Risk and Opportunity Assessment Definitions

Likelihood

The likelihood of a risk/ opportunity occurring is rated from 1 to 5:

Likelihood	1	Rare
	2	Unlikely
	3	Possible
	4	Likely
	5	Almost certain

Impact

The impact of a risk/ opportunity if it did occur is rated from -5 to +5:

Risk	-5	Catastrophic
	-4	Major
	-3	Moderate
	-2	Minor
	-1	Slight
	0	No Change
Opportunity	1	Slight
	2	Minor
	3	Moderate
	4	Major
	5	Fantastic

Risk / Opportunity Matrix

The combination of likelihood and impact leads to the risk / opportunity matrix:

Risk	-5	Catastrophic	-5	-10	-15	-20	-25
	-4	Major	-4	-8	-12	-16	-20
	-3	Moderate	-3	-6	-9	-12	-15
	-2	Minor	-2	-4	-6	-8	-10
	-1	Slight	-1	-2	-3	-4	-5
	0	No Change	0	0	0	0	0
Opportunity	1	Slight	1	2	3	4	5
	2	Minor	2	4	6	8	10
	3	Moderate	3	6	9	12	15
	4	Major	4	8	12	16	20
	5	Fantastic	5	10	15	20	25
			Rare	Unlikely	Possible	Likely	Almost certain
			1	2	3	4	5
			Likelihood				

Current Managed Risk

Estimated level of risk assessed after actions are taken into account

low	
medium	
high	

Dartmoor Climate Change Adaptation : Risk / Opportunities Assessment and Action Planner
Theme: Access, Recreation and Tourism

Cross-references to National Park Management Plan themes or strategic aims:	
Assessment lead officer:	
Assessment date:	

ADAPTATION PLANNING

Initial Action Planning:

Detailed Action Planning:

Area of potential impact	Relevant headline projection	UKCP09 local data 2020s	2050s	2080s	Projected impacts (Direct (D) and/or Indirect (ID))	Risks and opportunities	Consequences	What / who is affected?	Period: 2020s Likelihood (1 - 5)	Period: 2020s Impact (-5 to 5)	Short Term Risk (-25 to 25)	Period: 2050s Likelihood (1 - 5)	Period: 2050s Impact (-5 to 5)	Medium Term Risk (-25 to 25)	Period: 2080s Likelihood (1 - 5)	Period: 2080s Impact (-5 to 5)	Long Term Risk (-25 to 25)	Actions already in place or planned	Potential actions	When is action required?	Cross check against other themes	Current risk
Rights of Way and Open Access																						
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																		
					Increased frequency of moorland wildfires (D)	Areas of moorland and open access land are damaged / unsafe	Rights of way become unusable and access restrictions in place	Visitors, landowners, commoners, residents	2	-2	-4	3	-3	-9	4	-3	-12	Dartmoor Forest Fire Partnership under regular 6 month review	Extend to whole of NPA area	on going	complements land management objectives	
					increasing level of sunshine	increase in sunstroke and sunburn & greater requirement for shade		visitors, land managers and locals	2	-2	-4	3	-2	-6	3	-2	-6	Awareness raising through health initiatives	review land management & tree planting programmes to maximise shade opportunities while respecting open moorland landscape	on going	complements land management objectives	
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																		
					Increased tendency for ground to flood / be waterlogged (D)	Areas of open access land and rights of way are waterlogged / boggier	Rights of way become more difficult and less enjoyable to use; more maintenance required	Visitors, landowners, residents	3	-3	-9	4	-3	-12	5	-3	-15	National Park Authorities lobbying for primary legislation to simplify process for changing the public rights of way network. Regular & managed monitoring & maintenance of PROW. Organised event management to limit damage to senstive sites	higher rate of intervention on PROW leading to more 'managed' or manicured appearance	ongoing	also land management issue for farming, livestock poaching	
					Increased tendency for ground to flood / be waterlogged (D)	Loss of riverside paths due to increased riverbank erosion	riverside rights of way become unusable and access restrictions in place	Visitors, landowners, residents	3	-3	-9	4	-3	-12	4	-3	-12		increased maintenance of river bank & erosion control	ongoing	also land management issue for farming, livestock poaching	
					Vegetation has a longer growing season (D)	More dense vegetation on commonland, rights of way and verges	More maintenance on rights of way / verges required	Authority staff, volunteeers, visitors, landowners, residents	2	-1	-2	3	-2	-6	3	-3	-9	Developing volunteer opportunities to help with management	increase volunteer opportunities	ongoing	increase in visitor numbers may help to limit vegetation incursion	
	More extreme weather events																					
					Increased frequency of river torrent and floods (D)	Bridges and other access structures get damaged or washed away	Rights of way become unusable and access restrictions in place	Visitors and locals	3	-3	-9	4	-4	-16	4	-4	-16	Bridge specification being reviewed with the intention to increase bridge span. Infrastructure made more resilient as and when opportunity presents itself	A programme of bridge assessment and replacement is adopted and proactive work is undertaken	On or before 2018		
					increase in periods of restricted access through weather events (ID)	reduced certainty of access, reduced confidence and satisfaction, particularly for organised events such as Ten Tors and increase need for rescue services/alternative provision	Loss of income to the local economy & increase demand for rescue services	Visitors, businesses, voluntary sector (eg rescue services & voluntary event organisers etc.)	3	-4	-12	3	-4	-12	3	-4	-12	event organisers such as ten tors,encouraged to develop good emergency planning practices	Manage expectations and promote understanding and acceptance of nature of access to 'wild' landscape	ongoing		
Visitor & recreational infrastructure																						
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																		
					Longer Summer visitor season (ID)	Increased demand & pressure on infrastructure and facilities for longer Summer period	Increased potential for visitor services and activities extending season to aid economic viablity	Land owners, business owners, residents, visitors	2	3	6	3	3	9	3	3	9	develop appropirate opportunities and marketing through DP, SW tourism and SWCIP	review visitor offer and a refresh in light of new opportunities	within		
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																		
					waterlogged ground	poaching of PRoW, unsurfaced routes and carparks	reducing visitor satisfaction and increasing maintenance costs	land owners, managers and visitors	2	-3	-6	3	-3	-9	3	-3	-9	regular review, maintenance and management where required	promote appropriate winter routes as part of recreation management strategy & site managment plans	ongoing		
	More extreme weather events																					
Visitor usage and numbers																						
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																		
					Increased visitor numbers in UK from 'stay vacationers' and foreign visitors seeking more temperate climate as southern europe becomes increasingly hot.	increased demand for accommodation & facilities over longer season, increased need for shelter form sun not rain, increasing demand for water based activities	improved tourist and related service economy	Visitors, local accomodation providers, service providers, landowners	3	3	9	4	3	12	4	3	12	Working with Dartmoor Partnership and South West Tourism to highlight opportunities promote Dartmoor First to businesses, eg: SW tourisms 'preparing to prosper - building resilience into tourism' conference Dec 2011	Develop quality sustainability standard ready to promote to diversifying / new businesses. Consider as part of DNPA review of own visitor services	From 2010 onwards	See Community, Culture and economy sheet & NPA business	

			Increased visitor numbers in UK from 'stay vacationers' and foreign visitors seeking more temperate climate as southern europe becomes increasingly hot.	increased demand for public services such as health care, increasing demand for utilities such as water, increasing levels of traffic	, vi	Public bodies, utilities, visitors,	3	-2	-6	4	-2	-8	4	-2	-8	Sustainable transport bid being prepared	Develop and promote sustainable transport network to counteract congestion		See Community, Culture and economy sheet	
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																	
			Decline in visitor numbers	reduction in year round income and increasing disparity between summer and winter visitor nos	more seasonal employment and reduced business viability out of season	Visitors, service providers and residents	1	-2	-2	2	-2	-4	2	-2	-4	Continue to promote winter activities & highlight opportunities				
	More extreme weather events																				
									0			0			0						
Water-based Access and Recreation																					
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																	
			increased demand for water based activities and access to rivers / reservoir honeypot sites	increased pressure on popular honeypot sites such as spitchwick, Dartmeet & Burrator	increased congestion at honeypot sites and intruding further up river valleys such as West Dart	visitors, owners, managers and commoners	3	-3	-9	4	-3	-12	4	-3	-12	site management plans to enable appropriate access for all without detriment to wildlife	develop river network recreational management plans and consider alternative access provision			
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																	
			river levels rise	increased use of rivers by canoeists in particular white water	increasing opportunities for out of season tourism	Canoeists, accomodation providers, river managers /owners and fisherman	2	2	4	3	-2	-6	3	-2	-6	continue to work with BCU and promote good practice, promote opportunities to DP & business				
			river levels rise	increased use of rivers by canoeists in particular white water	increasing intrusion into more sensitive river valleys and conflict with fisherman	Canoeists, river managers /owners and fisherman	2	-3	-6	3	-2	-6	3	-2	-6	continue to work with BCU and promote good practice				
	More extreme weather events																				
			increasing incidence of rivers running in spate (D)	Loss of riverside paths due to riverbank erosion	riverside rights of way become unusable and access restrictions in place	Visitors, landowners, residents	2	-3	-6	3	-3	-9	3	-3	-9	Regular & managed monitoring & maintenance of riverbank.	Regular & managed monitoring & maintenance of riverbank.			
Other																					
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																	
									0			0			0						
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																	
									0			0			0						
	More extreme weather events																				
									0			0			0						

Dartmoor Climate Change Adaptation: Risk / Opportunities Assessment and Action Planner
Theme: Biodiversity

Cross-references to National Park Management Plan themes or strategic aims:	
Assessment lead officer:	
Assessment date:	Nov-11

ADAPTATION PLANNING

Initial Action Planning: **Detailed Action Planning:**

Area of potential impact	Relevant headline projection	UKCP09 local data 2020s	2050s	2080s	Projected impacts (Direct (D) and/or Indirect (ID))	Risks and opportunities	Consequences	What / who is affected?	Period: 2020s Likelihood (1 - 5)	Period: 2020s Impact (-5 to 5)	Short Term Risk (-25 to 25)	Period: 2050s Likelihood (1 - 5)	Period: 2050s Impact (-5 to 5)	Medium Term Risk (-25 to 25)	Period: 2080s Likelihood (1 - 5)	Period: 2080s Impact (-5 to 5)	Long Term Risk (-25 to 25)	Actions already in place or planned	Potential actions	When is action required?	Cross check against other themes	Current risk
Flora (Plants)																						
	Hotter, dryer summers	+1.6 °C	+2.7 °C	+3.9 °C																		
		-8%	-20%	-24%																		
					Drier season affecting the growing conditions and development of mires and bogs (D)	Stresses upon associated plant species and habitat. Conditions allow other flora to encroach and become established	Increased management needs to conserve habitat, potential loss of globally important habitat and related species at existing sites. However, in the shorter-term, wetter areas of land will dry out more in summer, and be less vulnerable to erosion, giving a positive impact	Loss of habitat, flora and their associated fauna. Reduced peat formation and carbon sequestration. Lowering of water table.	3	1	3	1	-3	-3	4	-3	-12	Dartmoor mires project and restoration of existing habitat. Research to understand tolerance levels of important species	Development of buffering land and natural networks to allow migration of species; improving management techniques	Opportunisitic till 2020s	Implications surrounding flooding and erosion, therefore having direct association with farming issues.	
					Drier conditions impacting upon Rhos pasture. (D)	Reduced ground water will affect the sward make up and reduce the area classifiable as Rhos Pasture	Floral species immigration and establishment of drier pasture flora	Floral biodiversity will be reduced and conditions will allow other invasive species to take hold.	3	-3	-9	3	-4	-12	4	-4	-16	grazing to reduce the impact and spreading of gorse and other larger plant species, to maintain pasture land	Development of buffering land and networks to allow migration of species; improving management techniques	Opportunisitic till 2020s	Closely comparable/associated with farming issues.	
					More people holidaying at home leading to increased visitor numbers and the consequent pressures upon landscape, particularly river valleys and reservoir areas. (ID)	Increased frequency of events causing trampling pressure at specific sites & increased disturbance of sensitive species.	Consequent loss of flora and associated fauna at these sites.	Increased pressure upon management of land and visitors. Loss of flora and habitat in heavily visited areas. Reduced quality of grazing pasture and sward.	4	-3	-12	4	-3	-12	4	-4	-16	Review programmes for site management plans revision. Increased management of high impact events such as the Ten Tors Challenge.	Changes in access and restrictions. Production of natural networks and seasonal access constraints.	Immediate and repeated regularly	See details in Access, recreation and tourism	
					Area covered by invasive plant species expands into upper altitudes (D)	Increased competition against native flora	Loss of significant upland/heathland flora. Direct knock-on effect on populations of associated fauna. Reduction of grazable land.	Condition of upland habitat and its species. Upland farmers and livestock. Land managers and economic cost of invasive plant control.	2	-3	-6	3	-3	-9	3	-3	-9	Limitation of cover of such flora through active control and removal.	Use of new methods of control as they arise.	Continued management as a preventative practice.	Economic impact of prevention/control. Implications upon farming and wider environment.	
	Warmer, wetter winters	+1.3 °C	+2.1 °C	+2.8 °C																		
		+7%	+17%	+23%																		
					Longer growing season	Change in distribution and balance of species	Some species lose out to other more dominant species, leading to a loss of diversity.	Habitats: plant diversity	3	-4	-12	4	-4	-16	5	-4	-20	Review of management techniques. Revision of management plans	More active intervention on more sites	Depends on spp and sites but investigation needed now	Positive farming implications whilst being potentially detrimental to migrant birds.	
					Violets become out-competed by larger plant species and early growth of bracken. (D)	Reduced successful population of priority species such as Pearl-Bordered Fritilary.	Potential loss of species in region, and reduction of invertebrates in moorland ecosystem.	Biodiversity is directly reduced by worst case scenario.	4	-3	-12	4	-3	-12	4	-4	-16	Management of bracken and taller flora at end of growing season to allow early growth of small, flowering species such as violets.		This is a very current issue, as numbers of the fritilaries are in decline.		
											0			0			0					
	More extreme weather events																					
					Flooding causing blanket bog erosion (D).	Stresses upon flora, through excessive water levels and loss of soil/peat strata.	Increased pressure to manage and conserve habitat through flood prevention. Potential loss of important habitat and its fauna.	Upland biodiversity and range of habitat. Increased financial and personnel pressure through management needs.	4	-3	-12	4	-4	-16	4	-4	-16	Dartmoor mires project restoring and conserving existing bogs. Current EA work around water catchment areas	larger scale flood control/prevention programme. Limitation of other stresses to increase resilience of flora.	Flooding is a continual seasonal issue which might become worse over time. Actions should therefore reflect this.	Huge social and economic implications of flooding makes this very real. Erosion has direct issues in grazing and ecosystem survival.	
											0			0			0					
Fauna (Animals)																						
	Hotter, dryer summers	+1.6 °C	+2.7 °C	+3.9 °C																		
		-8%	-20%	-24%																		
					Earlier seasonal changes causing mis-timing of migrant birds with food sources. (D)	Greater food resources for native/wintering species, whilst providing diminished food supply to newly arriving migrant species.	Reduced success of migrant populations. Numbers of which may shift to different areas as a result.	Successes of migrant populations. Regional biodiversity.	3	-3	-9	4	-4	-16	4	-4	-16	Educating and encouraging people to feed their garden birds.	More expansive provision of species specific foods.	Actions should attempt the actual issue arising.	Shifts in seaonality has direct related implications in pollenation of crops, and animal rearing.	
					Changes in range for species on the boundaries of their territories. (D)	Species such as Dartford Warbler or Bechsteins bats on their northern most boundaries potentially become more successful. Whilst, species such as Ring Ouzel or Dunlin on their most southerly boundaries become less frequent visitors as colder climes retreat north.	Directly related changes in regional biodiversity.	Changes in successful species within ecosystem chains.	3	-2	-6	4	-2	-8	4	-3	-12	Recording of species sightings to assess their territory. Research into range & territory such as joint project between EA & DNPA for Southern Damsel fly.	Maintenance of specific habitat to encourage there residence.			

		Drought having greater impact upon smaller more susceptible species populations. (D)	Potential loss of species only present in small populations due to increased pressure upon their survival	Potential reduction in biodiversity and likely impact upon other dependant or associated species.	Increased managerial focus upon small/declining species populations. Regional biodiversity is reduced.	2	-4	-8	3	-4	-12	4	-4	-16	Monitoring of species and the health of their habitats. Develop natural networks approach to encourage populations to intersperse	Reduction of other stresses to minimise the impact of new stresses such as climate change.	Actions should attempt the actual issue arising.		
	Warmer, wetter winters +1.3 °C +7% / +2.1 °C +17% / +2.8 °C +23%																			
		Milder conditions directly affecting patterns of hibernation of for example: bats and dormice	Reduced rate of survival through winter as warmer conditions maintain raised metabolism of small mammal species. This causes the abnormal need to feed during winter period when there is minimal food resources and potential cold spells.	Increased failure to survive winter, especially through sudden cold periods. Reduction of population causing further pressure upon species survival.	Ecosystem and regional biodiversity. These are often popular species and so might also affect public opinion and action.	3	-4	-12	4	-4	-16	4	-4	-16	Monitoring of such fauna, and habitat creation through nesting boxes etc.	More direct care if species become critically endangered.	Actions should alleviate issuebefore it becomes an issue of species survival.		
								0			0			0						
	More extreme weather events																			
		Loss of habitat by fire during periods of drought. (D)	Increased risk of accidental fire causing damage to existing habitat and affecting its animal populations	Forced movement of populations. Potential loss of habitat and its fauna. Traditional practices of swailing need to be re-assessed, adgusting when it is done and how it is controlled.	Large risk to health and safety of vistors, farmers and land managers. Animal populations directly affected. Biodiversity affected.	3	-3	-9	4	-3	-12	5	-3	-15	Controlled fires at seasonally appropriate times are currently used to reduce risk and limit over growth of heathland.	Changes in timings of controlled burns to be more appropriate to new patterns of growth, breeding and migration, etc.	There is a need to learn how seasonality might affect fauna and then actions should be appropriated.	Fire is a common issue across many themes relating to safety and quality of life.	
		Increased frequency of flooding affecting animal populations. (D)	Habitat affected/destroyed by flooding.	Potential long term damage to habitat forcing movement of fauna into new areas.	Important health and safety risk. Access becomes restricted. Common fauna becomes threatened and habitats lost.	3	-3	-9	4	-3	-12	5	-3	-15	Community flood protection schemes will facilitate the prevention of this issue.	Programmes aimed at flood relief for species specific issues, in conjunction with more mainstream flood management schemes.	Flooding is a continual seasonal issue which might become worse over time therefore actions should be preventative of this.	Flooding is a common issue across numerous themes and actions are mostly common to one another.	
Other																				
	Hotter, dryer summers +1.6 °C -8% / +2.7 °C -20% / +3.9 °C -24%																			
								0			0			0						
	Warmer, wetter winters +1.3 °C +7% / +2.1 °C +17% / +2.8 °C +23%																			
								0			0			0						
	More extreme weather events																			
								0			0			0						

Dartmoor Climate Change Adaptation: Risk / Opportunities Assessment and Action Planner
Theme: Community, Culture and Economy

Cross-references to National Park Management Plan themes or strategic aims:	
Assessment lead officer:	
Assessment date:	Nov-11

ADAPTATION PLANNING

Initial Action Planning: | **Detailed Action Planning:**

Area of potential impact	Relevant headline projection	UKCP09 local data 2020s	2050s	2080s	Projected impacts (Direct (D) and/or Indirect (ID))	Risks and opportunities	Consequences	What / who is affected?	Period: 2020s Likelihood (1 - 5)	Period: 2020s Impact (-5 to 5)	Short Term Risk (-25 to 25)	Period: 2050s Likelihood (1 - 5)	Period: 2050s Impact (-5 to 5)	Medium Term Risk (-25 to 25)	Period: 2080s Likelihood (1 - 5)	Period: 2080s Impact (-5 to 5)	Long Term Risk (-25 to 25)	Actions already in place or planned	Potential actions	When is action required?	Cross check against other themes	Curent risk	Screened SMART target with priority
Buildings: including housing.																							
	Hotter, dryer summers	+1.6 °C	+2.7 °C	+3.9 °C																			
		-8%	-20%	-24%																			
					Higher interior building temperatures (D)	Demand for cooling through mechanical air conditioning.	intrusion of air conditioning units into built environment. CO_2 footprint of National Park increases due to increased energy consumption, increased costs, fuel poverty	Landscape: built environment CO_2 emmisions businesses, services, and people	1	-3	-3	2	-3	-6	3	-3	-9	Air conditioning subject to planning policies. Reviewing supplementary planning policy guidance / building design guide.	Monitor uptake of air conditioning where possible and estimate impact on National Park carbon footprint based on national models. Encourage uptake of renewable energy	Incorporate awareness issues within current press material	Affect upon business trends in the local area, and therefore economy and employment.		Targetted promotion of principles
						Demand for cooling delivered by innovative building design, passive ventilation, solar shading provided by trees or built design features with the inclusion of modern insulation which has cooling	Buildings without intrusive features that is comfortable to live or work in.	Landscape, built environment, Developers, building occupiers	1	3	3	2	3	6	3	3	9	Reviewing supplementary planning policy guidance / building design guide to include appropriate cover for shade and natural air flow.	Promote best practice and work with developers to establish longterm demonstration home.	Look to develop these ideas within next twelve months.	Related positive impacts upon community, employment and economy. Improvement to local quality of life.		Targetted promotion of good design principles
					Increased need for building to improve water efficiency due to more frequent drought conditions. (D)	Inefficient buildings increase pressure upon water resources. Demand for modernisation and new technologies affects visual landscape and listed buildings.	Hose pipe bans and the need for rainfall harvesting for garden usage become more of a requirement. Increased economic cost of water and related technologies. Reduced provision of soft landscaping in new development	Home owners and developers incur higher costs. Water companies under pressure to provide affordable, drinking water and make infrastructure more efficient.	3	-1	-3	4	-2	-8	4	-3	-12	Increased width of guttering and catchment of rain water for outdoor domestic use.	Use of more innovative technologies and designs reducing volume of water wasted and required for domestic use.	Ongoing application as technologies become mainstream and former standards are superceded.			Targetted promotion of good design principles
	Warmer, wetter winters	+1.3 °C	+2.1 °C	+2.8 °C																			
		+7%	+17%	+23%																			
					Reduction of use of heating and fuel costs. (D)	Need for expensive, fuel heavy heating is reduced and cost of living decreases. Decreased dependence on organic fuel resources.	Cuts to cost of living expenses in winter months, reducing fuel poverty	Local residents, particularly the less wealthy and the elderly. CO2 footprint	3	2	6	3	3	9	4	4	16	Provisions are in place to provided for harsher winters. These could be downscaled as appropriate to changes as they arise.	Replacement of heating systems with smaller, more efficient ones which are adequate for the climate.	Proportionately to notable consistant patterns of climate in the region as they arise.			
					increasing incidence of condensation, related mould & fungal growth	reduction of internal air quality	damage to buildings and greater incidence of respiratory desease	buildings and residents	2	-4	-8	3	-4	-12	3	-4	-12						
											0			0			0						
	More extreme weather events																						
					Increased risk of flooding. (D)	Existing developments & infrastructure need to asssess their susceptability and install management measures.	Potential huge impact to landscape of prone areas. Massive economic expenditure to maintain existing buildings and communities. Disruption of services. Increased financial and emotional stresses.	Home owners in prone communities. Councils, developers and insurers. Visitors to the national park have reduced access and enjoyment of landscape.	3	-3	-9	4	-3	-12	4	-4	-16	Local flood management programmes are being developed and areas/buildings are being assessed to evaluate their risk factor.	Continued management and development of further, more advanced methods as the risk increases. Promote information & warning resources such as:http://www.environment-agency.gov.uk/homeandleisure/floods/31624.aspx		Potential increase in cost of living for existing community members.		
						New developments need to provide such measures and should not be built in high risk areas.	Trickle down effect upon buyers and cost of living, covering costs of management programme. Increasingly complicated provisions for planning permission.	Buyers and property developers. The quality of the landscape and its accessability.	2	-3	-6	3	-3	-9	4	-3	-12	New regulations ensure that future flood risk is assessed at development stage of potential developments.	Strict regulations highlighting where can be built upon and how flood control should be incorporated into new developments		Serious implication surrounding new developments and potential new inputs to local economy.		
											0			0			0						
Local economy																							
	Hotter, dryer summers	+1.6 °C	+2.7 °C	+3.9 °C																			
		-8%	-20%	-24%																			
					Increased length of 'tourist season.' (D)	More desirable weather trends attract more sustained visitor numbers and their financial input.	Improved local economy with increased dependence on external input. Increased pressure upon local attractions, infrastructure (roads, water) and landscape.	Local small businesses and communities. Increased need for management of tourists attractions and landscape. Move from wet weather facilities to hot weather such as shading.	3	3	9	3	3	9	3	3	9	Local tourism is a continually growing industry and amenities and services are considering this factor.			Tourism also directly impacts upon the environment, policy and funding.		
						Increased trend to holiday in England localising related economy	Increased visitor numbers and holiday makers. Improved local economy with increased reliance upon tourism as a source of income.	Pressure upon local resources and infrastructure. Increased need to manage local attraction and popular sites.	3	3	9	4	3	12	3	3	9	Infrastructure is managed to cater to present demands.			Local communities dependence upon tourisms revenue could have serious implaction in other themes should this income collapse.		
											0			0			0						
	Warmer, wetter winters	+1.3 °C	+2.1 °C	+2.8 °C																			
		+7%	+17%	+23%																			
					Local agribusiness will have to adapt to new climate expectations. (D)	Potential for alternative crops, changing seasons, increase in respiratory problems for housed livestock, increase in land poaching with related welfare issues. Need to be more innovative and diversify from current agricultural norms.	Initial investments could be high, but in the longterm might generate increased local economy and employment for the community.	Farmers with smaller income or less ability to invest. Potential longterm local benefit to the economy.	2	1	2	3	3	9	3	3	9	Small farms are following buyer trends in purchasing local produce and wanting a continued variety of choice.	Improvement of understanding of potential risks, and understanding of new alternative methods and options.	Continuation of current actions throughout.	This is a social aspect of the common issue of needing to diversify in order to adapt.		

			possible reduction in tourist numbers	reduction in winter trade with increased demand for 'dry' ground activities	lower occupancy rates, particularly for those with no additional offer, during winter months	smaller, low end businesses			0			0			0							
									0			0			0							
	More extreme weather events																					
			Local businesses need to protect themselves against unsual weather patterns.	businesses could become limited by weather events affecting communication, transport and potentially safety.	Greater cost of business needs, and need for alternative plans. Increased need for health and safety provisions and insurance.	Viability of local small business network. Local economy.	3	-1	-3	3	-2	-6	3	-3	-9	During 2009 SWCIP undertook a number of sector led Adaptation workshops to promote understanding of issues and reduce vulnerability	Repeat and extend targetted workshop approach to Dartmoor businesses through DP and Forum to raise awareness. Ensure businesses are also engaged with community based emergency plans.	Continuation of current actions throughout.	Increased cost of living and difficulty in being self employed in region.		need to raise awareness
									0			0			0							
Community life																						
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																		
			Increased numbers of tourists in the region. (D)	Improved economy comes with increased cost of living, and pressures upon local services, amenities and transport networks.	Perceived changes to local traditions and lifestyle. Increased demand for property for holiday lets increasing cost of property and financial pressures for local community members.	Local residents, Transport services and infrastructure.			0			0			0	Developing infrastructure to cater for growing numbers of visitors.	Further improvements to green transportation and services.	This should be considered when installing new infrastructure.	Infrastrucure needs to respond to needs of the permanent community also, and potentialy cater for bringing in external resources too.		
			Increased incidence of health issues associated with heat & exposure to the sun. (D)	Number of cases of skin cancer and heat stress in region rises.	Greater regional medical costs. Increased need for educating local communities about prevention of such illnesses.	Community members, particularly the elderly, outdoor workers e.g farmers, land managers etc. Pressure upon local medical facilities. Employers	2	-4	-8	3	-4	-12	4	-4	-16	Improved eduction about the risks and awareness of preventative techniques.	Provision of shelter and water in commonly visited areas.		Current trends in seasonal illnesses will change as the climate becomes more intolerable.		
									0			0			0							
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																		
			Parasites such as ticks winter survival rates improving and causing increased prevalence of cases of health issues such as lymes disease. (ID)	Increased likelihood in certain rural communities where working outdoors is common place giving greater chance of contact.	Increased regional medical costs, prevalence of mental health issues in rural communities and pertinent need to educate communities about the risks and their minimisation.	Local community members particularly remote rural populations. Increased pressure on medical facilities and community education.	2	-4	-8	3	-4	-12	3	-4	-12	Development of awareness of the issue and its consequences.	Facilitation of new research. Application of new control methods as they become available.	From now on.	Comparable to issues in fauna and woodland where winter conditions increase frequency of parasites and disease.		
			Reduction in frequency of common winter illnesses such as flu. (ID)	Warmer conditions show less winter health issues in older members of rural communities.	Health issues which are currently common are seen to become less frequent.	Positive affect upon more elderly community members, less stress upon wider community and medical sector.	2	2	4	3	2	6	3	2	6	Current actions are in place for colder more servere conditions. These would need ammending as conditions change.	Reduction in need for vaccination of the elderly population for such illnesses.	As significant reduction of the issue is observed.	Seasonal illness will affect differing demographic, creating implication in other community themes.		
			Community and outdoor events have a longer season within which they can take place. (D)	More reliable conditions for extended season for outdoor, community events improves community bonds and togetherness.	Better sense of community and local relations. Greater likelihood of developing local co-operatives and better neighbourhood security.	The community as a whole.	2	3	6	3	3	9	4	4	12	There is already an active calendar of events organised by local communities.	Expansion of existing events, and development of new ones. Broadening the catchment and popularity of the calendar of events bringing in external interest and revenue.	As opportunities arise.	Positive, strengthening to community bonds will help to alleviate serverity of other climate change impacts.		
			Less need for continued heating of housing. (D)	Warmer climes show easier living conditions for remote community members.	Improved conditions for vulnerable and elderly populations. Notable reduction in fuel/heating costs. Reduction in reliance upon fuels throughout the winter.	Possible reduction in cost of living in winter months. Reduced fuel dependecy.	2	2	4	3	3	9	4	3	12	Current actions are facilitating the need for heating for long periods over winter.	Use of new technologies and more effiencient heating methods as they continue to become available and feasible.	As significant reduction of the issue is observed.	Improvement to living standards making it influencial upon other soical and community themes.		
	More extreme weather events																					
			Potential increase in frequency of being cut off/isolated due to e.g road closure, through extreme weather such as flooding or storms. (D)	Greater risk for vulberable communities such as the elderly and hill farmers. Significant risks made worse by circumstances.	Increased pressure upon road maintenance and infrastructure. Need for preparation in case of such instances. Need for strong community spirit, communication and team work.	Remote hill farms and other small communities. The elderly. Road maintenance companies, and demand for grit.	2	-4	-8	3	-4	-12	3	-4	-12	Preparation for winter, by potential risk removal/control such as roadside tree removal. Gritting of core access roads. Advice on being ready for such incidents. Parish Emergency plans in place for some communities	Further improvement to infrastructure and community connection. Extend coverage of parish emegency plans & raise awareness	Preventative actions should be seen as ongoing.	Associated issue to other service type themes.		
Infrastructure.																						
	Hotter, dryer	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																		
			Increased pressure upon water as a resource due to frequency of drought conditions. (D)	Perceivable lowering of water table due to continued pressure not allowing time for its restoration.	Volume of extractable local water is permanently reduced and the need to provide water from another source develops with great costs including provsion of sufficient infrastructure. Private supplies fail	Water companies are directly affected with a knock on affect upon the consumer to cover costs and practice more efficient usage.	2	-4	-8	3	-4	-12	4	-4	-16	Advice is available to consumers on how to reduce needs and be more water efficient. Water metering. Dartmoor Mires project increasing storage capacity and lengthening summer periods of flow	Promote existing & new advice, water efficiciency measures and good practice	now	Diverse implications across many other themes.		
				Condition of surface storage decreasing through increased concentration of minerals and agricultural run-off.	Processing of water to make it potable becomes increasingly complex and expensive.	Water companies are directly affected. Costs for the consumer will increase and requirements to use less mains water and store own rain water will become compulsary.	2	-2	-4	3	-3	-9	4	-4	-16	Increased awareness of the issue has developed trends in rainwater use for domestic outdoor spaces and developments in efficient technologies are becoming more widely available.			Implications across biodiversity issues and farming.		

		increased liklihood of subsidence & stress to structures	failure of structures such as dams, bridges, roads, embankments, melting road surfaces	disruption to networks, loss of service, increased maintenance & monitoring, increased cost & increased risk	utilities, resident,	2	-2	-4	3	-2	-6	4	-2	-8	structures and road netowrks are part of planned maintenance strategy through Devon Local Transport Plan					
	Warmer, wetter +1.3 °C +7% / +2.1 °C +17% / +2.8 °C +23%																				
		Pressure on providers of power supply to dartmoors communities. (D)	Increasingly variable weather conditions cause stress on power cables etc increasing the amount of maintenance they require.	More regular management and checks to infrastructure are required, potentially with the installation of more heavy duty alternatives.	Electricity providers will have greater responsibility to provider a involved service. This will in tern increase the cost of electricity to the community/ end user.	3	-3	-9	4	-3	-12	4	-4	-16	WPD planned maintenance programme. Undergrounding of vulnerable infrastructure.	Use of green power sources which are local to dartmoor. Development of local grid networks	As new practices arise.	Changes in needs through tourism, shifts in industry etc will have related impact.		
		Pressure upon Broadband, telecommunictaion and other contemporary service providers. (ID)	Stresses upon the provision of these services will result in more maintenance requirements and a need for more suitable methods of provision if they are available.	Increased costs and pressures upon service providers. Greater need to look for alternative methods of provision.	Service providers will incur greater costs which will result in greater cost of their product to the end user.	2	-2	-4	3	-3	-9	4	-4	-16	Use of fibre-optics to provide fast, efficient services from the onset.	Application of new methods and technologies as they become viable & consideration of vulnerabilitiesin development of network. .	As new practices arise.	Associated with economic and business issues as well as community safety.		
		Increased water volume affecting current drainage and sewerage systems. (D)	Increased risk of contamination of water courses by flooding of sewerage system. Potential further risk of this affecting community water supplies.	Need to develop systems to handle surges and increased volume whilst remaining efficient in everday conditions. Implimentation of S.U.D.S into the wider community.	Affect upon home owners, service providers and local environment.	2	-2	-4	3	-3	-9	3	-3	-9	Use of Sustainable Urban Drainage Systems to releive the issue in larger communities.	Continued development of S.U.D.S to include smaller and more remote communities. Provision of new systems as they become practicable.	Preventative actions should be installed with new developments.	Wider implications in supply of potable water. All flooding has implications around habitat and farming as well as cost of living.		
	More extreme weather events																				
		Maintenance of roads and access in the event of extreme weather conditions. (D)	Extreme weather events will create a greater need for emergency access. There will also be increased stress upon surfaces and transport provision due to such weather events.	Greater reliance on preempting events and being prepared. Increased need for regular maintenance and community transport.	Community members and emergency services will need to have consistant access. Road maintenance and gritting etc will be more in demand with greater cost to councils etc.	3	-3	-9	3	-4	-12	4	-4	-16	There are existing flood preventiion programmes and a routeways maintenance programme. Roadside clearence of high risk trees or other potential blockages.	Use of permiable surfaces and improved drainage systems.	Seasonal preparation should be annual at least.	Implications within tourism and during extreme weather events of all kinds.		
Transport																					
	Hotter, dryer summers +1.6 °C -8% / +2.7 °C -20% / +3.9 °C -24%																				
		increasing visitor traffic	iincreasing car traffic levels	increasing road congestion and parking presures	Visitors, service providers and residents	2	-3	-6	2	-3	-6	2	-3	-6	Dartmoor Traffic Management Strategy, Coach drivers handbook regularly reviewed along side review of traffic & animal accident statistics . Promote public transport and sustiniable transport options	Development of Local Sustainable Transport Bid to promote transport alternatives and infrastructure such Electric network etc.	Ongoing			
		increasing visitor traffic	increasing opportunites for viable public transport schemes	improving bus services and other alternatives visitors and residents	Visitors, service providers and residents, particularly those suffering rural isolation	1	3	3	3	3	9	3	3	9	support for community schemes such as Moorcar,	Support for community transport schemes and link with public/private sector, maintain & de4velop public infrstructure such as shelters, bike racks	ongoing			
								0			0			0							
	Warmer, wetter winters +1.3 °C +7% / +2.1 °C +17% / +2.8 °C +23%																				
		increasing need for shelter on public transport routes	increasing need for bus shelters and drying areas	costs and maintenance of new bus shelters etc	Visitors, service providers and residents,	2	1	2	3	1	3	3	1	3	adequate infrastructure in place	enhance existing infrastructure & update	ongoing			
								0			0			0							
								0			0			0							
	More extreme weather events																				
		flash flooding etc leading to road damage	increase in damage to road surface	increase in road maintenance costs	highways authority	3	-3	-9	5	-4	-20	5	-4	-20	adequate road maintenance	review current road surfaces and investigate more robust alternatives	ongoing			alternatives need to meet landscape aspirations as identified in highway design guidance
		flooding or snow/ice	flooding/ice preventing access	economic and welfare implicaitons from restricted access, increasing issues of rural isolation	residnets, emergency services	1	-4	-4	3	-4	-12	3	-4	-12	parish emergency plans being developed & promoted, Snow warden scheme developed and promoted		ongoing			
Cultural practices and assets																					
	Hotter, dryer summers +1.6 °C -8% / +2.7 °C -20% / +3.9 °C -24%																				
		increased visitors to community events/fetes/shows/fairs	increased numbers will support viability some traditional practices may need to adapt	community events become larger, increasing opportunity	voluntary sector, residents, visitors, businesses	2	3	6	3	3	9	4	3	12		increasing opportunity but will require appropriate management to ensure no adiverse impact on special qualities		Biodiversity, access, recreation		
		increased visitors to community events/fetes/shows/fairs	increased numbers will also increase pressure on community run events, some traditional practices may	community events become larger, increasing risk	voluntary sector, residents, visitors, businesses	1	-3	-3	2	-3	-6	2	-3	-6		Promotion of good business planning and awareness		tourism		
		greater demand for community openspace, growing, allotments etc	community space is appreciated and 'owned' meeting multi use demands	increasing community cohesion, community activity, if demand unmet then possible conflict	residents & service providers	2	3	6	3	3	9	3	3	9	enable provision through LDF policies & support through work with HOGCO & DSDF etc					
								0			0			0							
	Warmer, wetter winters +1.3 °C +7% / +2.1 °C +17% / +2.8 °C +23%																				
		increase in growing season	mowing season extended	greater maintenance costs for community open space, church yards etc	Community	3	-3	-9	4	-3	-12	4	-3	-12							
								0			0			0							

	More extreme weather events																					
				poor weather preventing traditional event or activity taking place	increased uncertainty for weather dependent community events	event cancellation, loss of income, higher insurance costs, increased risk, loss of event & community fund raising	communities	1	-4	-4	2	-4	-8	2	-4	-8	promote good event planning with emergency procedures & alternatives to limit inpact					
Other																						
	Hotter, dryer summers	+1.6 °C	+2.7 °C	+3.9 °C																		
		-8%	-20%	-24%																		
										0			0			0						
	Warmer, wetter winters	+1.3 °C	+2.1 °C	+2.8 °C																		
		+7%	+17%	+23%																		
										0			0			0						
	More extreme weather events																					

Dartmoor Climate Change Adaptation: Risk / Opportunities Assessment and Action Planner
Theme: Historic Environment

Cross-references to National Park Management Plan themes or strategic aims:	
Assessment lead officer:	
Assessment date:	Nov-11

ADAPTATION PLANNING

Initial Action Planning: | **Detailed Action Planning:**

Area of potential impact	Relevant headline projection	UKCP09 local data 2020s	2050s	2080s	Projected impacts (Direct (D) and/or Indirect (ID))	Risks and opportunities	Consequences	What / who is affected?	Period: 2020s Likelihood (1 - 5)	Period: 2020s Impact (-5 to 5)	Short Term Risk (-25 to 25)	Period: 2050s Likelihood (1 - 5)	Period: 2050s Impact (-5 to 5)	Medium Term Risk (-25 to 25)	Period: 2080s Likelihood (1 - 5)	Period: 2080s Impact (-5 to 5)	Long Term Risk (-25 to 25)	Actions already in place or planned	Potential actions	When is action required?	Cross check against other themes	current risk	Screened SMART target with priority
Historic buildings																							
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																			
					Soil shrinkage in dry weather, variable depending on soil type	Some buildings more susceptible to subsidence, variable risk depending on nature of build/foundations & soil type but Dartmoor soil types generally lower risk	Damage to structures and features	People: Building managers, owners and occupiers Buildings: Historic fabric of older buildings	1	-2	-2	2	-2	-4	3	-2	-6	raise awareness & promote inspection and monitoring to identify failures & appropriate remedial actions		on going			
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																			
					Increase in moisture resulting in rise in damp and condensation in buildings (D)	Water ingress into fabric of building and stonework, possible increase in salts, mould growth and rot	Damage to structure / features. Need for intrusive renovation work. Health risk for building occupants.	People: Building managers, owners and occupiers Buildings: Historic fabric of older buildings	2	-3	-6	3	-3	-9	4	-3	-12	promote good practice through guidance, such design guide and work of EH, SPAB	Promote findings of SPAB research into energy efficiciency and condensation management in traditional builidngs	By 2013			
					Reduction in the number of days experiencing sub-zero temperatures (D)	Reduced number of occurrences of freeze/thaw affecting historic buildings	Less weathering/damage to building fabric and structures, render	People: Building managers, owners and occupiers Buildings: Historic fabric of older buildings	2	3	6	3	3	9	5	3	15		Review implications for historic buildings maintenance budget	As part of building mainteneance programme			
					increase in moisture resulting in increased fungal growth on thatch rooves	failure of thatch roof, particularly water reed	decrease in lifetime of roof and increase in related costs	People: Building managers, owners and occupiers Buildings: Historic fabric of older buildings	3	-4	-12	4	-4	-16	4	-4	-16	promote regular maintenance such as scraping	additional research into materials & use of wheat reed rather than water	2015			
	More extreme weather events																						
					Increased frequency of heavy downpours (D)	Deterioration in traditional building mortars	Water ingress causing structural damage to fabric of historic buildings	People: Building managers, owners and occupiers Buildings: Historic fabric of older buildings	3	-3	-9	3	-3	-9	4	-3	-12	promote regular inspection & maintenance					
					increase in storm events and wind speeds causing roof damage	failure of slate & tiled rooves through lifting tiles	increased maintenance requirement & threat to building fabric	People: Building managers, owners and occupiers Buildings: Historic fabric of older buildings	3	-3	-9	3	-3	-9	3	-3	-9	encourage regular maintenance	further research to consider additional appropriate solutions such as lime bedding of slate	2015			
					Increase in flash flooding and river surges	Historic Bridges unable to accommodate greater flow	damage or loss of historic fabric, increased maintenance and interuption to road network	People: owners & managers and members of the public Buildings: Historic Bridges	2	-3	-6	3	-3	-9	3	-3	-9	regular inspections linked to formal risk management process					
Archaeological remains																							
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																			
					increase in summer visitor recreation numbers	increase in footfall, erosion and visitor pressure	increased disturbance to exposed arch remains	mangers & owners of arch remains	2	-1	-2	3	-2	-6	3	-2	-6	management plans in place for at risk remains	consider management opportunities through HLS				
					dryer ground conditions & reduction in vegetation cover	more friable soil leading to increase in erosion	increased disturbance to exposed arch remains	mangers & owners of arch remains	1	-1	-1	2	-1	-2	3	-1	-3		consider management opportunities through HLS				
					dryer ground conditions	soil shrinkage especially in peat soils	Peat drying leads to loss of palaeoenvironmental evidence	arch managers, researchers moorland bog arch remains	1	-2	-2	2	-2	-4	2	-2	-4	Mires on the moor rewetting project underway	extend rewetting project				
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																			
					Rabbit numbers increase due to improved breeding success	Increase in burrowing activity	Increase in damage to archaeological remains as a result of burrowing activity	Buried archaeological remains	2	-2	-4	3	-2	-6	3	-3	-9	Regular monitoring of rabbit numbers taking place on high risk sites and control measures adopted as necessary	Extend monitoring to all sites. Work with English Heritage and Natural England to incorporate rabbit control measures in Higher Level Stewardship schemes where appropriate	Make assessment of extent of problem within 12 months. Raise issue with key partners within 12 months. Address Stewardship funding opportunity as appropriate	-		
					increase in invasive plant growth such as bracken	increase in root growth	increase in damage to archaeological remains through root damage	site managers/owners arch remains	2	-2	-4	3	-2	-6	4	-2	-8	targetted swaling and bracken bashing	consider management opportunities through HLS				
					Increased risk of flooding and waterlogging (D)	Wetter soil conditions and higher water table	Disruption of palaeoenvironmental evidence; damage to earthworks; disruption of buried sediments e.g. medieaval plough soil	site managers/owners arch remains	2	-2	-4	4	-2	-8	4	-2	-8						
	More extreme weather events																						
											0			0			0						
Historic settlements, landscapes, parks and gardens																							
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																			
											0			0			0						
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																			
											0			0			0						
	More extreme weather events																						
											0			0			0						
Other																							
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																			
											0			0			0						
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																			

							0			0			0						
	More extreme weather events																		

Dartmoor Climate Change Adaptation: Risk / Opportunities Assessment and Action Planner
Theme: Farming and Land Management

Cross-references to National Park Management Plan themes or strategic aims:	
Assessment lead officer:	
Assessment date:	Nov-11

ADAPTATION PLANNING

Initial Action Planning: | **Detailed Action Planning:**

Area of potential impact	Relevant headline projection	UKCP09 local data 2020s	2050s	2080s	Projected impacts (Direct (D) and/or Indirect (ID))	Risks and opportunities	Consequences	What / who is affected?	Period: 2020s Likelihood (1 - 5)	Period: 2020s Impact (-5 to 5)	Short Term Risk (-25 to 25)	Period: 2050s Likelihood (1 - 5)	Period: 2050s Impact (-5 to 5)	Medium Term Risk (-25 to 25)	Period: 2080s Likelihood (1 - 5)	Period: 2080s Impact (-5 to 5)	Long Term Risk (-25 to 25)	Actions already in place or planned	Potential actions	When is action required?	Cross check against other themes	current risk	Screened SMART target with priority
Soils, geology and landform																							
	Hotter, dryer summers	+1.6 °C	+2.7 °C	+3.9 °C																			
		-8%	-20%	-24%																			
					Loss of moisture in soils (D)	Loss of upland heath habitat and poorer grazing. Reduced grazing offered by inbye land and pasture, reduced fodder (silage etc) yield although may benefit from more reliable harvesting opportunties.	More pronounced erosion and fire risk. Increased pressure upon biodiversity and farmland. Greater potential of water supplies becoming contaminated. Impact on river habitats.	Dartmoors bogs and moorland and their ecosystems. Farmers and land owners/managers, water companies. Livestock	1	-4	-4	3	-4	-12	5	-4	-20	Dartmoor mires project is working to restore existing upland bogs. Close management of farmed land.	Upgrade farm wide water distribution systems and reduce water loss from cracked pipes. Review grazing and fodder management systems to maximise yield.	By 2020	Links to activity under water resources section below		Minimal current risk but expansion of Mires work will be important to remedy longer term impacts
					Increased risk of peat and heathland fire. (D)	Controlled fires (swailing) become increasingly difficult to manage as there is an increased risk of peat burning and spreading the fire within soil layer.	Loss of moorland habitat. Short term release of CO_2, long-term effect on carbon sequestration and temporary effect on landscape appearance. Increased cost of managing risk, and health and safety.	Bog and heathland condition, and their associated biodiversity. Land managers, farmers, public access. Fire & rescue services.	3	-4	-12	4	-4	-16	5	-4	-20	Dartmoor Forest Fire precaution and management plans. Changing of timings for seasonal controlled burns.	Develop Fire Partnership Moor wide and raise awareness amongst land managers. Maintain resources for fire watch system. Public awareness raising campaign highlighting dangers of inappropriate actions	By 2013	Links to activity identified on biodiversity sheet Also links to recreation sheet, predicted rise in summer tourist activity will also increase risk of accidental fire		Expansion of Dartmoor Forest Fire plan moor wide will reduce risk
						Loss of soil through wind erosion	Further reduction in soil quality in upland areas. Reduced potential for plant growth. Possibility of silt entering water resource and over time reducing storage and condition.	Upland habitat, ecology and farming. River ecology and water resources. Land and water management.	2	-2	-4	3	-3	-9	4	-3	-12	Preservation of hedgerows, linear woods and dry stone boundaries. Dartmoor mires poroject. SWARM project promoting good soil conservation & Management	Develop soil conservation training opportunities specific to upland landscapes for land managers. Greater use of natural wind breaks where appropriate to do so.	By 2015			
											0			0			0						
											0			0			0						
											0			0			0						
	Warmer, wetter winters	+1.3 °C	+2.1 °C	+2.8 °C																			
		+7%	+17%	+23%																			
					Wetter winters create higher risk of flooding in Dartmoors quarries. (D)	Greater need for close management of rainwater catchment, and quarryings affect upon water table and aquifers.	flash flooding and drainage of quarries could cause contamination of waterways and silting of reservoirs.	Quarrying companies are directly responsible for such management, with potential affect upon water companies, local communities and aqautic ecosystems.	3	-3	-9	4	-4	-16	3	-3	-9	Quarry management plans in place	Preventative drainage systems to reduce water levels in quarries and limit the mineral and sediment content of released water.		Associated with other flood risks, and issues of water purity and production of potable water.		
						Potential secondary use of quarry pit to form new reservoirs and newly established habitat.	Less pressure upon existing water resources in the long term.	Quarrying companies, water companies and local biodioversity.	3	1	3	3	3	9	2	4	8	Redevelopment of aggregate quarries into new environmental areas.		As quarries come to the end of their production.	Benefits to environment and slight positive impact upon water concerns.		
											0			0			0						
	More extreme weather events																						
					Increased risk of flash flooding in dartmoor valleys. (D)	Flash floods cause rapid soil erosion and damage to land, trees and property.	Transition of soil layer towards lower areas and into water courses and reservoirs. Further upland issue with land use, safety, and continued pressure upon regions flora and fauna.	Upland biodiversity, and lower lying aquifers, valleys, and reservoirs (including their ecology). Upland farmers and their livestock. Water companies and in turn their customers. Local communities and insurers.	3	-3	-9	4	-4	-16	4	-4	-16	Mires project looking to increase holding capacity of peat moorland. EA work on river catchment areas.	Rewooding of river valleys to reduce flash flow. Promote consideration of water management within farming practices	By 2015	Consequent issues with the affect upon natural environment and impact upon community life on dartmoor.		Expansions of mires work and active rewooding of valleys to reduce risk
											0			0			0						
											0			0			0						
	Sea level rise	+6cm	+22cm	+36cm																			
											0			0			0						
											0			0			0						
											0			0			0						
Livestock.																							
	Hotter, dryer summers	+1.6 °C	+2.7 °C	+3.9 °C																			
		-8%	-20%	-24%																			
					Increased periods of drought (D)	Reduced drinking water availability for livestock brings need for provision.	Dehydrated livestock, illness, lower yields, increased need for supplementary water supply, increased costs and lower returns for land managers	Livestock, land managers	2	-1	-2	3	-3	-9	4	-4	-16	Supplementary water provision (water troughs) already in place and looking into alternative breeds	Expansion of on farm water collection & storage facilities and water efficiency devices Commit to new breeds	Look to introduce water efficiency measures during routine maintenance. Identify resources and undertake review of water storage options over the next five years	Links to activity under crop management section below		
						Degraded quality, and area of grazing land.	Lower quality, and quantity of yield for acreage means lower returns for farmers/land managers. Concentration of grazing puts more pressure on higher quality land which begins to reduce its condition leaving it prone to consequent issues.	Livestock, and land managers. Land value. Consequential affect upon lands biodiversity.	2	-2	-4	3	-3	-9	4	-4	-16	Practicing rotation of land use to minimise pressure. Management of condition of soil and vegetation quality.			Links to continued soil erosion, loss of upland heathland and bogs, and is therefore a consequential factor in loss of biodiversity.		
						Greater need to provide shade.	Increased management considerations and cost.	Livestock, and land managers.	2	-1	-2	3	-2	-6	3	-2	-6	Maintenance of hedgrows and stone walling.	Planting of new trees, hedges or building simple structure to increase cover for livestock.	As need requires.			
	Warmer, wetter	+1.3 °C	+2.1 °C	+2.8 °C																			

	winters	+7%	+17%	+23%																	
					Conditions increase the rate of survival of pests and diseases. (D)	Greater likelihood of livestock getting infectious conditions.	Increased cost of production. More time consuming management, lower yield, and returns.	Livestock, and land managers. Price/quality of product for the consumer.	2	-2	-4	3	-2	-6	4	-2	-8	Use of existing vaccines and preventative methods. Monitoring of stock and current initiatives including research in pests such as ticks bearing Lymes disease	new research into vaccines, antibiotics and management practices. Use of new options as they come on the market.	preventative actions such as vaccine development and usage could take place with foresight of these potential issues arising.	Similar issues arise within biodiversity and community sections, although with differing diseases and carriers.		
					Changes in feasible breeding season increases potential yield.	Early lambing/calving gives more time for growth and conditioning for sale.	Earlier yields, changes to traditional practices to accommodate changes in climate patterns.	Livestock, farmers and consumers.	2	3	6	3	3	9	3	3	9	Change of farming practices to maximise return and benefit. Use of artifitial insemination techniques.			This is a controlled management of a broader issue within the biodiversity of Dartmoor. Assessment of management practices here could be beneficial to the strengthening of certain resident flora and fauna.		
					Lengthened vegetation growing season gives better grazing conditions earlier in the season.	Brings about a shift in timings of rearing and other livestock management practices.	Changes in seasonality of products and timings of rearing or sale etc.	Livestock, farmers and consumers.	1	2	2	2	2	4	3	3	9	Adjustment to existing, traditional practices to align with seasons.			As above. Maybe some conflict with predicted increase in poaching arising from wetter ground conditions		
	More extreme weather events																				
											0			0			0				
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											0			0			0				
	Sea level rise	+6cm	+22cm	+36cm																	
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											0			0			0				
Crop management																					
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																	
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	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																	
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	More extreme weather events																				
											0			0			0				
											0			0			0				
											0			0			0				
	Sea level rise	+6cm	+22cm	+36cm																	
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Trees, hedgerows and woodland																					
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																	
					Less established woodland fail due to dry conditions. (D)	Proposed plantation of deciduous woodland needs considered management to alleviate risk.	Young woodlands fail with further consequence to its developing ecosystem. Plantation for revenue or flood protection does not meet its investiture.	Flood prevention programmes, potential biofuel and other markets. Conservation of native woodland and associated biodiversity.	2	-3	-6	3	-3	-9	4	-3	-12	Plantation of deciduous woodland in line with current management plan.	Irrigation to feed younger trees until they become more established. Concentrated management for carbon sequestration purposes.	This could be a on going method of long term control of an issue.	Consequential issues arise within biodiversity and community sections. Related to issues around water and its contamination.	1	
					Sustained drought conditions increase likelihood of accidental fire, particularly in conifer plantations. (D)	Risk of losing crop plantations and therefore considerable revenue.	Economic impact upon owners and local area. Loss of associated biodiversity.	Land owners and managers, with potential loss of local employment. Loss of associated biodiversity. Negative affect upon carbon sequestration/ regional footprint.	2	-3	-6	3	-3	-9	4	-4	-16	Fire prevention and management plan.	Diversification of plantation species.	Ongoing throughout.	Fire will be a continued risk on dartmoor, having an impact upon many human, social, agricultural and environmental sections.	2	Integrated approach to fire plans for all woodland and moorland areas required.
					Wet woodlands are dried out and habitat is affected. (D)	Potential loss of specific habitat and natural flood control.	Biodiversity of area is reduced. Rate of soil erosion in area is increased, as is the likelihood of flooding in lower land.	Regional biodiversity, and habitat variety. Knock on affect upon water management and home/land owners in increasingly flood prone areas.	2	-2	-4	3	-3	-9	4	-3	-12	Plantation of deciduous woodland in line with current management plan.	Maintenance and management of such habitats in high risk areas.	Action should be preventative of a known potential occurance.	This will have a particular impact upon flood prevention and control, and the associated themes. It will also impinge upon other biodiversity issues.	1	
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																	
					Conditions facilitate the success of pests and diseases; from Deer through to Phytophthora. (D)	Trees stressed due to climate conditions are more susceptible to such pest and disease.	Loss of woodland of all ages and impact upon the ecosystem and biodiversity. Potential loss of cash crop if plantation woodlands suffer.	Regional biodiversity, with potential loss of visitor interest and revenue. Potential of trees falling creating new health and safety risk for public.	2	-3	-6	3	-3	-9	4	-3	-12	Pest control, and young tree protection to allow them to become established with less risk of damage.	Use of new control/prevention methods as they become available.	As such methods become readily available and viable.	Common issue that will become more prevelant. Here there will be further impact upon local industry, employment and possibly building; as well as its impact upon biodiversity.	1	
						Single species woodlands are most prone to disease.	Having minimal species variety means that if a disease is present all trees have a comparable risk of being affected.	Plantation woodlands and their management. Lone trees, established hedgerows and linear woodlands. Biodiversity.	2	-3	-6	3	-3	-9	4	-3	-12		Increase resilience by diversification. Creation of natural networks. Management for carbon sequestration.	This should be seen as a long term evolving action.	Trickle down affect upon the associated ecosystems.	1	
					Increased length of growing season changes growth rates and therefore quality of wood. (D)	Quicker growth make biofuel market more feasible at the cost of the loss of high end quality wood production as this is a slower process.	More rapid turnover of lower quality wood harvests. Cost of lower quality is reduced whilst quantity of high quality wood produced is reduced and made more valuable.	Changes in industrial trends due to influence of the climate.	2	-1	-2	3	1	3	4	2	8	Plantation woodlands are tending to become more diverse in there crop species.			Consequential affect upon industry structure in the region and therefore upon economy, employment and local communities.	1	

			Conditions brings flowering out of sync with insect pollenation and frost.	Particular issue for orchard production.	Reduced viability of fruit production as an income for small holdings. Loss of harvest.	Small producers. Natural process is impinged so insect population and therefore ecosystem will suffer.	2	-3	-6	3	-3	-9	4	-3	-12				Comparable issues will be seen in migrant birds and other faunas interrelations with its food stuff and habitat.	2	
	More extreme weather events																				
									0			0			0						
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									0			0			0						
	Sea level rise	+6cm	+22cm	+36cm																	
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Water resources																					
	Hotter, dryer summers	+1.6 °C	+2.7 °C	+3.9 °C																	
		-8%	-20%	-24%																	
					Loss of water table through increased pressure upon water resources. (D)	Potential permanent loss of underground storage due to demand.	Water companies are forced to provided water from outside source, and therefore develop better infrastructure.	Water companies, local commuities. Cost of living increases.	2	-2	-4	3	-4	-12	4	-4	-16	Encouragement to use rain catchment to water garden or provide for livestock. Water metering and use of more efficient plumbing etc.	Larger rainwater use for irrgation. Improved education on the need to conserve water.	Preventative action is required.	Quality and qauntity of water will have an influence upon many of these themes in the long term and in the worst case scenarios.	3	
					Surface storage is reduced and at risk of contamination or even seasonal loss. (D)	Risk of losing potable water supply to local area. Limitation upon irrigation of arable land. Greater cost of processing water resource.	Pressure upon consumer to be more efficient. Increased cost of water. Stresses upon infrastructure and demand.	Water companies, local commuities. Cost of living increases. Visual landscape is affected. Aquatic ecology is put under increased stress.	2	-2	-4	3	-4	-12	4	-4	-16	Monitoring and testing of supply water.	Recycling water. Education about water efficiency and needs.	Preventative action is required.	Contamination of water will be detrimental to standards of living and the survival of dartmoors ecosystems.	3	
									0			0			0						
	Warmer, wetter winters	+1.3 °C	+2.1 °C	+2.8 °C																	
		+7%	+17%	+23%																	
					More frequent flash flooding. (D)	Loss of soil moisture increases rate of run off and therefore increases the risk of flash floods in low lying areas and valleys.	Rapid soil erosion, silting of water course and reservoirs. Damage to property and land. Inability to get insurance to cover buildings etc in high risk areas.	Home and land owners, local community. Aquatic ecology and water courses habitats. Water companies.	2	-3	-6	3	-3	-9	4	-3	-12	Dartmoor mires project. Community flood protection schemes.	Planting deciduous woodland in high risk areas to reduce flow and soil loss.	Continued action should take place.	This will impact upon many human themes, including cost and quality of life, as well as affecting flora, fauna and farming also.	2	
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	More extreme weather events																				
									0			0			0						
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									0			0			0						
	Sea level rise	+6cm	+22cm	+36cm																	
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Coastal land																					
	Hotter, dryer summers	+1.6 °C	+2.7 °C	+3.9 °C																	
		-8%	-20%	-24%																	
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	Warmer, wetter winters	+1.3 °C	+2.1 °C	+2.8 °C																	
		+7%	+17%	+23%																	
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	More extreme weather events																				
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	Sea level rise	+6cm	+22cm	+36cm																	
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Other																					

Dartmoor Climate Change Adaptation: Risk / Opportunities Assessment and Action Planner
Theme: NPA Business Continuity

Cross-references to National Park Management Plan themes or strategic aims:	
Assessment lead officer:	
Assessment date:	Nov-11

ADAPTATION PLANNING

Initial Action Planning: | **Detailed Action Planning:**

Area of potential impact	Relevant headline projection	UKCP09 local data			Projected impacts (Direct (D) and/or Indirect (ID))	Risks and opportunities	Consequences	What / who is affected?	Period: 2020s		Short Term Risk	Period: 2050s		Medium Term Risk	Period: 2080s		Long Term Risk	Actions already in place or planned	Potential actions	When is action required?	Cross check against other themes	current managed risk	Screened SMART target with priority
		2020s	2050s	2080s					Likelihood (1 - 5)	Impact (-5 to 5)	(-25 to 25)	Likelihood (1 - 5)	Impact (-5 to 5)	(-25 to 25)	Likelihood (1 - 5)	Impact (-5 to 5)	(-25 to 25)						
Staff welfare																							
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																			
					Heat waves	Increase in absenteeism due to sickness or need to look after sick family members	Disruption to key services	Public, Staff, Reputation	1	-3	-3	2	-3	-6	2	-3	-6	Business continuity plan in place and tested on an annual basis	Review home working opportunities for all relevant staff	By 2014			
							Disruption to work flow (eg postponement of meetings, extended timescales to projects)	Staff, Partners, Reputation	1	-3	-3	2	-3	-6	2	-3	-6	Business continuity plan in place and tested on an annual basis		By 2020			
					more sun hours/ hotter temps	increased risk of sunburn and heat stroke	health implications for staff and reduction in performance	staff , volunteers, customers	2	-3	-6	3	-3	-9	4	-3	-12	Flexible working arrangements for staff , appropriate clothing for outside workers & sun screen, Occupational health provision & management in place	Review working arrangements regularly, including extension of lunchtime break to cover hotter hours	By 2020			
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																			
											0			0			0						
	More extreme weather events																						
					increased storm severity & flooding	inability to reach work for office based staff and heightened risks for staff on site	disruption to services and to work flow	staff , customers	3	-3	-9	4	-3	-12	5	-3	-15	lone working procedures in place, working from home policy in place, tele conferencing facs, staff made aware of adverse weather warnings	Promote other information sites such as: warhttp://www.metoffice.gov.uk/services/public/winter-weather	opportunities when fire training carried out			
NPA property & estates																							
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																			
					Increased likelihood of fires	Properties & estates disrupted by fire / smoke damage	Damage to estate / injury to people	Habitats, key species, livestock, staff, public	1	-3	-3	2	-3	-6	3	-4	-12	Established plans to close moorland areas due to fire risk. Fire watch system in place once The Met Office Fire Severity Index reaches a certain point. Fire wardens appointed in all NPA	Additional fire breaks Additional mobile water storage at high risk sites Further training and fire fighting equipment Fire watch sessions extended	Opportunities when fire training carried out	Links to actions within Access, Recreation & Tourism sheet		
					increased internal temps	workplaces become unsuitable due to heat	reduced productivity and efficiency, increased cost of mechanical air conditioning	staff, customers, business effciciency	1	-4	-4	2	-4	-8	3	-4	-12	Sun blinds added to some window openings	Limited opportunities within historic buildings. Consider mechanical air conditioning/ventilation. Explore solar shading opps. Flexible working & working from home will help	2015			
					increased internal temps	increased stress on IT equipment/servers	IT failure & loss of service	staff, customers, business effciciency	1	-3	-3	2	-3	-6	3	-3	-9	mechanical abstraction system already in place. Server virtualisation project completed	No further action required, current provision allows for predicted increase				
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																			
					Increased likelihood of flooding	Properties & estates disrupted by flood damage	Damage to properties & estates, service disruption, need to relocate people & livestock	Habitats, key species, livestock, staff, public	3	-2	-6	4	-3	-12	4	-3	-12	buildings & sites regularly maintained Clearing drainage channels etc Flood alert system	Review at risk properties such as uppacot, Retrofit flood protection measures Alter building / estate uses	When maintenance / refurbishment is undertaken When acquiring new properties / estates			
						Work disrupted due to travel restrictions / property closure etc	Project deadlines affected Key services not delivered	Staff, public, reputation	1	-2	-2	3	-2	-6	3	-3	-9	Working from home systems in place Tele/video conference facilities	Expansion of working from home options for staff Additional tele/video conference capacity	When reviewing IT infrastructure			
					The need for supplementary heating of the workplace environment reduces	Energy used to heat buildings reduced and subsequently CO_2 emissions reduced	Financial savings, CO_2 savings	Finances, CO_2 emissions	3	2	6	3	3	9	4	3	12	Review of heating systems in use across entire estate	Procure low carbon emission heating systems	As and when equipment needs replacement or earlier if finances permit			
	More extreme weather events																						
					Damage to properties & estates	Properties & estates become unsafe and have to be closed	Disrupted service provision to public & partners	Staff, partners, reputation	1	-2	-2	3	-3	-9	3	-3	-9	Regular checks on buildings to identify damage as part of asset managment	Changes to building maintenance specifications to withstand stronger winds, more intense	From now - especially when major refurbishment / maintenance works carried out			
							Disrupted access to estates	Staff, public, reputation	3	-1	-3	4	-2	-8	4	-3	-12	Management plans in place	review management plans regularly & consider closure plans for areas not previously affected	From now - any review of estate management plans			
					Damage to utilities infrastructure	Loss of power supply, loss of water service. Loss of BT connection & web access	Disrupted service provision to public & partners, Building management & staff H & S	Staff, public, reputation, IT	2	-3	-6	4	-3	-12	4	-3	-12	Disaster Recovery & Business Continuity Plan for ICT Services in place and tested on an annual basis	Review home working opportunities for all relevant staff	2020			
Other																							
	Hotter, dryer summers	+1.6 °C -8%	+2.7 °C -20%	+3.9 °C -24%																			

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									0			0			0						
	Warmer, wetter winters	+1.3 °C +7%	+2.1 °C +17%	+2.8 °C +23%																	
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	More extreme weather events																				
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