

# Impacts of climate change on tourism and marine recreation

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## EXECUTIVE SUMMARY

Tourism and marine recreation form a major component of the UK visitor economy, with the tourism sector alone worth £127 billion and accounting for 3.1 million jobs in 2017. Much of this activity takes place in coastal resorts and natural settings. While the nature and value of such activity and settings have been extensively researched, far less is known about the magnitude of possible impacts of climate change on them and the likely adaptations that will be necessary. Many likely effects recognised in 2013 remain broadly evident but have not been revisited in light of subsequent advances in climate science. The body of knowledge on ‘what is happening’ and ‘what may happen’ has not grown, and together this suggests a relative decline in the evidence base relating to tourism and marine recreation. Three knowledge gaps identified in 2013 (visitor preferences for conditions, vulnerability of coastal destinations, and the magnitude and timing of climate change impacts) have not been satisfactorily addressed in the interim. In 2019, the key challenges and emerging issues are more broadly based, namely: to move beyond the 2013 picture, in particular to consider the potential and effectiveness of current and planned approaches to adaptation; to appraise both vulnerabilities *and* opportunities for business more systematically; and to improve analytical precision by considering the effects of climate change on different types of tourism and marine recreation and the attendant combinations of activities, stakeholders and geographies at the local (i.e. destination) level.

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## 1. INTRODUCTION

This report updates the previous MCCIP assessment of the impacts of climate change on tourism and marine recreation (Simpson, 2013). Specifically, it focuses on progress in the nature and extent of understanding since the last report appeared and it draws on material published in the interim. For reasons that will become apparent later, it does not seek to replicate its predecessor directly in form, format or content. Rather it revisits several of the emerging issues first covered in 2013, and it points to several new challenges that have arisen in the intervening six-year period.

Before proceeding, some clarification is necessary to foster greater analytical clarity in two respects. First, it is important to observe that, along with ‘leisure’, the terms ‘tourism’ and ‘recreation’ are often used interchangeably in everyday discourse. There are, however, important differences in definition that drive the collection of data and thus how the sector, its size, and importance are understood. For the United Nations World Tourism Organization (UNWTO, 2019), ‘tourism’ is commonly understood and defined as a stay away from home of at least one night and less than a year. In contrast, recreation represents an active and deliberative form of leisure, a discretionary use of free time (Shaw and Williams, 2002), perhaps needing a day visit outside the person’s usual environment (UNWTO, 2019), but without necessarily requiring an overnight stay away from home (VisitBritain, 2019a). Recreational activities are often recorded separately but they can also be embedded in data on domestic day visits, domestic tourism, and international tourism. Collectively, the shorthand of ‘visitor economy’ (e.g. LGA, 2016) refers to these forms of activity and their spend but definitions and interpretations can vary, often making direct comparisons between research challenging.

Second, there are particular geographies of administration that determine the collection and presentation of tourism and recreation statistics (cf. Coles *et al.*, 2012; 2014). Within central government, tourism, recreation and the visitor economy are the remit of the Department of Digital, Culture, Media and Sport (DDCMS, formerly DCMS). Each of the countries within the UK has its own independent ‘arm’s length’ non-departmental public body (NDPB) for, *inter alia*, marketing, promotion and administration (especially quality assurance) of tourism: VisitEngland, VisitScotland, VisitWales and Discover Northern Ireland exist alongside VisitBritain (and the relevant institutions for the Crown Dependencies of the Channel Islands and Isle of Man). Overlapping with their spatial remits are multiple Charting Progress 2 (CP2) regions as a major unit of marine administration (see Table 1). For instance, the Irish Sea and North Channel relate to all four ‘national’ NDPBs (as well as the Crown Dependency of the Isle of Man). The implications are that tourism and recreation data are not published for CP2 regions (or areas covered by marine management plans); future climate-related effects associated with the ‘regional seas’ may impact on tourism administered by more than one NDPB; and – as argued below – recognising these multiple geographies is vital to future adaptation.

Table 1: Correspondence of CP2 regions and NDPBs involved in tourism administration in the UK

CP2 Region	Overlaps or connects with area covered by NDPBs			
	VisitEngland	VisitScotland	VisitWales	Discover NI
1. Northern North Sea	X	X		
2. Southern North Sea	X			
3. Eastern English Channel	X			
4. Western English Channel, Celtic Sea and South-West Approaches	X		X	
5. Irish Sea and North Channel	X	X	X	X
6. Minches and Western Scotland		X		X
7. Scottish Continental Shelf		X		
8. Atlantic North West Approaches		X		

Source: author

Table 2: United Kingdom domestic tourism and day visitors in 2017 (excluding Northern Ireland)

	England	Scotland	Wales	GB
Domestic trips (million)	100.6	11.7	9.0	120.7
Domestic nights (millions)	299.4	39.1	31.0	369.4
Domestic expenditure (£ millions)	19,049	3006	1628	23,683
Day visits volume (millions)	1505	151	100	1,793
Day visits expenditure (£ millions)	50,899	5995	4332	62,447

Sources: abridged from VisitBritain (2019d, p. 5; 2019e, p. 11)

## 2. WHAT IS ALREADY HAPPENING?

Since 2013 the visitor economy has continued to grow. Worth £127 bn in total and accounting for 3.1 million jobs in 2017, tourism is the country's fourth largest service export sector with greater earnings (£29.8 billion per annum) than the automotive, digital and nuclear industries (Visit Britain, 2019b). While there are distinctive patterns of development around the UK, tourism continues to be a growth priority for each of the devolved administrations and local authorities. England is the mainstay of the UK visitor economy, with 32.7 million international visits and spend of £19.8 billion in 2018 (VisitBritain, 2019c). London as the principal destination (19.1 million visits, £12.3 billion) exceeded the totals for Scotland (3.5 million visits, £2.2 billion) and Wales (941k visitors, £405 million). A similar picture of growth is painted in the most recent whole-year data on domestic tourists and day visitors (Table 2).

Attempts to disaggregate activity suggest that, in England and Wales in 2015, the coast accounted for 31% of domestic tourism trips and 8% of tourism day

visits while 15% of international guests visited the coast (NCTA, 2016, p. 5). Visitors to coasts are reported to spend on average more and stay longer than those to the rest of England (NCTA, 2016, p. 17). Natural England (2016) estimated that (day) visits to coasts result in greater average spend (£18 per person) than those to towns and cities or the countryside (both £6). Seaside resorts or towns were almost twice as popular (202 million visits) than rural areas on the seaside coastline (111 million visits), and they resulted in longer average length of stay (3h 3m) than the countryside (1h 58m) and urban destinations (1h 51m).

At a national level, through its ‘Great’ campaign, VisitBritain (2019f) heavily markets the quality of the coastal offer to overseas markets (32 destinations, 99 things to do). In fact, the coastline around mainline Great Britain is around 11,000 miles according to the Ordnance Survey (Brilliant Maps, 2016). Eight national parks (The Broads, Exmoor, New Forest, North York Moors, Lake District, Pembrokeshire Coast, Snowdonia, South Downs) are directly adjacent to the coast (National Parks UK, 2019) as are 26 coastal Areas of Outstanding Natural Beauty (NAAONB, 2019). There are 32 heritage coasts in the UK totalling 1627 miles (Natural England, 2019), although Scotland has none, and the coast is the focus for two of the UK’s World Heritage Sites (the Dorset and East Devon Coast, i.e. the ‘Jurassic Coast’, and the Giant’s Causeway and Causeway Coast). Among a well-developed network of national trails in England and Wales, five are contiguous with the coast (National Trails, 2019), including the 630-mile South West Coast Path (SWCP), the England Coast Path, the Peddlars Way and Norfolk Coast Path, and the Pembrokeshire Coast Path. Scotland has nine national trails intersecting with its coastline (Scottish National Heritage, 2019).

The coast presents a diverse range of opportunities for leisure and recreation, and these are widely taken up by UK residents. The annual Watersports Participation Survey in 2018 revealed that 3.9 million adults in the UK participated in one or more watersports (Arkenford, 2019). Among these were sailboat racing, yacht racing, yacht cruising, power boating, general motor boating/cruising, canal boating, canoeing, rowing/sculling, windsurfing, water skiing, wakeboarding, and using personal watercraft (RYA, 2019). The most popular were canoeing (1.8 million, 3.3% of the population); surf, body and paddle-boarding (3.2 million, 5.9%); and sea angling (0.8 million, 1.4%). Research by Defra (2013, p. 1) in England estimated that there are around 884 thousand sea anglers supporting £2.1 billion, over 23,600 jobs and almost £980 million of Gross Value Added (GVA) once other indirect and induced economic effects have been taken into account, data that are still used (and contested) in current discourse on fisheries policy (Oliver, 2019). More-frequently practiced among watersports were activities not requiring any specialist training or equipment, including coastal walking (by 7.7 million, 14.4% of the population), outdoor swimming (6.1 million, 11.4%) and spending leisure time at the beach (10.1 million) which was reported by nearly a fifth of the population (18.8%)

(Arkenford, 2019, p. 5). Between 2008 and 2018 there was an 8.8% increase in participation in watersports (Arkenford, 2019, p. 7), with over 800,000 more boat owners over the same period (RYA, 2019). Natural England (2017) reports that in 2015 approximately 350,000 people were involved in Scuba diving. Moreover, in 2012 there were around 200,000 divers certified by the Professional Association of Diving Instructors (PADI); around 30,000 members of the British Sub-Aqua Club (BSAC); and 900 BSAC clubs around the UK, with 200–250k dives being completed.

Given the levels of participation, the value of activities at the coast to the visitor economy are significant and extensively researched. For instance, the South West Coast Path, the longest in the UK, was estimated to generate £436 million in spend in 2012 from around 8 million users (SWCPA, 2014). Mills and Cummins (2015) calculated that, after taking account of economic multipliers, domestic surfers contribute £4.95 billion to the UK economy, with an average direct spend of £2980 per year. The net economic impact of coastal wildlife tourism in Scotland was calculated at £24 million, accounting for 36% of all such activity in the country and for 995 additional Full Time Equivalent (FTE) jobs (Scottish Government, 2010). In a more wide-ranging study, the Scottish Marine Recreation and Tourism Survey from 2015 estimated that activities in this space were worth £3.7 billion to the Scottish economy. Around £2.4 billion was associated with general recreation whereas £1.3 billion originated in more-specialised pursuits including wildlife watching, sailing, kayaking, surfing and angling (LUC, 2016, p. 11).

In the previous MCCIP tourism report (Simpson, 2013), an attempt was made to differentiate the tourism and marine recreation activities taking place in the various CP2 regions, as well as to speculate on the general effects that predicted changes in climate may have on them. This approach has limited analytical value in 2019. Searches for spatial variations for particular activities reveal that there is very little absolute distinctiveness or differentiation in terms of the experiences offered from region-to-region, although there are relative variations in emphasis and strength. The rapid and widespread reproduction of successful ‘products’ is common practice in coastal settings and marine environments around the UK, just as it is elsewhere around the world (Ritzer, 2004). For instance, although Cornwall may have been the original home of British surfing (Booth, 2012), this activity is now widespread across the British Isles, and strong opportunities for enthusiasts and beginners are marketed as part of a broader watersports offer by VisitWales (Williams, 2019), Visit Scotland (2019) and Discover Northern Ireland (2019).

Table 3 points to a range of effects of climate change on tourism and marine recreation identified overtly in the 2013 report, and it is not the intention of the present update to rehearse these in detail (see also Box 1). They include, *inter alia*: sea-level rise and its effects in terms of flooding in intertidal zones, erosion of beaches and cliff lines; warmer sea temperatures making bathing

and watersports more popular, as well as inducing habitat changes and species migration; warmer temperatures, especially in summer months, creating more-attractive conditions for visitors, possibly extending visitation earlier into spring and later into autumn; and more intensive and/or frequent extreme weather events, especially storms.

Of course, a closer inspection of the 2013 report suggests that, in general, all of these effects may be experienced in coastal and marine environments around the UK to varying degrees; gaps simply indicate that they were not publicly discussed and/or supporting evidence was unavailable. For instance, a similar exercise concluded that ‘summer tourism in the North Sea region (including the UK coast i.e. CP2 regions 1 and 2) is expected to benefit from rising temperatures (air and water), decreasing precipitation and longer seasons. Destinations can reduce the negative impacts of climate change on tourism by adapting to the changes (Kreilkamp *et al.*, 2016: 477). Since 2013, the same broad effects have also been variously reported across the UK in the popular media. For instance, *The Guardian* newspaper asked whether the hotter summer of 2018 was the one that finally ended climate denial (McCarthy, 2018). Subsequent coverage considered whether it had resulted in overtourism such that hotter, drier conditions attracted many more visitors to Cornwall who had to be requested to avoid two of the county’s most popular beaches (Coldwell, 2018).

In some respects though, media discourses of this nature serve to emphasise that opportunities are being frequently, even routinely, missed by academics and other policy-interested researchers, almost to conduct ‘natural experiments’. Recent record warm conditions have offered ideal circumstances by which to study the potential impacts on visitor patterns and preferences via analogues for future climate. Since 2013, further research on Harmful Algal Blooms (HABs) has emphasised the potential aesthetic issues and risks to health- and well-being for visitors and local residents, especially those involved in fisheries, tourism and recreation (Berdalet *et al.*, 2016). Based on a small sample size and qualitative approach, Willis *et al.* (2018, p. 232) argued that ‘HABs can impact human well-being through disruptions to therapeutic and inspirational opportunities in the natural environment, opportunities for recreation, aesthetic enjoyment, and losses to traditional ways of life, sense of place and collective identity’. Despite this and the development of publicly funded citizen-science approaches to recording blue-green algae (cf. CEH, 2019), very little is known about the extent to which visitor behaviours are – or have to be – modified at the coast; how tourism and recreational activities are diverted, displaced or lost; and the possible place-based economic losses from HABs. The loss of properties and other assets due to increased coastal erosion has been a longstanding concern (Defra, 2008) and continues to be a topic to which the popular media frequently returns, regionally and nationally (see for example Dalton, 2019). Notwithstanding greater concerns about the quickening pace of erosion, better estimation of the number and total value of second homes (Partington,

2019), and continued interest in second homes in tourism studies (Hall, 2014), very little is known about the number of holiday homes or holiday lets in the UK at or near the coast, and their relative vulnerability to environmental change.

Table 3: Possible climate-change related effects mapped by region in the 2013 report

2013 designations	Coastal England		Irish Sea†		Coastal Scotland		Possible effects
	1*, 2, 3, 4		5		6, 7, 1*		
Warmer summer temperatures, (including longer summers and warmer 'shoulder months')	H	C	H	C	H	C	<ul style="list-style-type: none"> <li>• Extended seasons, more comfortable conditions at coast</li> <li>• More attractive temperatures to overseas visitors</li> <li>• Increased revenues, new infrastructure</li> <li>• Increased demand for services, energy, water and waste management</li> <li>• Relative redistribution of visitors around UK</li> <li>• Overtourism (in peak season)</li> <li>• Environmental degradation</li> </ul>
Sea-temperature rise	H	C	-	C	-	C	<ul style="list-style-type: none"> <li>• New watersports opportunities</li> <li>• Growth of current activities (i.e. surfing, yachting, kayaking etc)</li> <li>• Endanger marine life, especially shellfish populations, in local food offer</li> </ul>
Extreme weather more intense	H	-	H	C	-	C	<ul style="list-style-type: none"> <li>• Cancellation of coastal events and festivals</li> </ul>
Extreme weather more frequent	H	-	H	C	-	C	<ul style="list-style-type: none"> <li>• Adverse weather conditions disrupting travel, especially by air and sea</li> <li>• Increase in weather-related insurance claims (and premiums).</li> </ul>
Sea-level rise	H	C	H	C	-	C	<ul style="list-style-type: none"> <li>• Damage to coastal structures and (transport) infrastructure</li> <li>• Losses of beaches and coastal habitats</li> <li>• Cliff erosion and instability (especially coastal footpaths at risk)</li> </ul>

Coastal flooding	H	C	H	C	-	C	<ul style="list-style-type: none"> <li>Flooded accommodation and attractions, temporarily out of business</li> <li>Monetary (uninsured) losses</li> <li>Total loss of tourist assets at risk of flooding</li> </ul>
Shoreline erosion	H	C	H	C	-	C	<ul style="list-style-type: none"> <li>Damage to marquee attractions (e.g. Giant's Causeway, Jurassic Coast)</li> <li>Loss of land for connected uses in tourism, recreation (e.g. golf), forestry and agriculture that service visitor economy</li> </ul>
Greater seasonality variation in wave height	-	C	H	-	-	C	<ul style="list-style-type: none"> <li>Safety risk to marine-based activities</li> <li>Disruption to ferry-based operations and marine excursions</li> </ul>
Habitat change	H	C	H	C	H	C	<ul style="list-style-type: none"> <li>Loss of fragile coastal ecosystems (i.e. mudflats, salt marshes, dunes)</li> <li>Habitat loss for key marine bird species</li> </ul>
Species migration	H	C	-	C	H	C	<ul style="list-style-type: none"> <li>Northward migration of sea angling fish</li> <li>Changing populations of species supporting nature-based tourism</li> </ul>
Health risks	-	C	-	C	-	-	<ul style="list-style-type: none"> <li>Increase in marine pathogens dangerous to human health</li> <li>Increased risk of skin cancer, heat exhaustion and dehydration</li> </ul>

Source: adapted from Simpson (2013)

Notes:

H – effected noted as ‘Happening’

C – effect noted as ‘Could happen’

\* Northern North Sea region considered in two 2013 report regions.

‡ Coastal Wales, coastal Northern Ireland and Isle of Man.

Other media reports in 2018 noted changes in sea-level temperature and ongoing research on whether new marine species are being attracted (Barkham, 2018). Perhaps most eye-catching was the possibility that, over the next 30 years, ten new shark species would be in British waters (Southampton University, 2018). According to a ‘Shark Map of Britain’ for Nat Geo Wild (Taylor Herring, 2018), Cornwall would become the apparent



‘shark capital’. Also, more whales and dolphins have been spotted around the UK (Pavid, 2018). Beyond megafauna, other warm-water fish have been detected in the Channel Islands, including species of bream and jack, bluefin tuna and Atlantic bonito, the latter of which is popular for sea angling (BBC, 2018). Once more, it appears as though the implications for tourism and marine recreation have not been fully acknowledged nor subsequently investigated. As Lambert *et al.* (2010) have demonstrated in their international review, changing migration patterns and the redistribution of cetacean species resulting from shifting environmental conditions (including, but not restricted to, sea temperature) have the potential to alter the length and nature of local tourism seasons and in the process either challenge or build the resilience of whale-watching businesses.

But storms, sea levels and flooding events have attracted most attention, in particular the coverage of the ‘continual and highly unusual storms’ between December 2013 and March 2014 (EA, 2015, p. iv). The cost of the sustained flooding in England and Wales to tourism and recreation were estimated at £3.5 million (with moderate to high uncertainty) (EA, 2015, p. v) to ‘tourism and recreation assets, including holiday cottages, beach huts and other tourism infrastructure’ across the country, both at the coast and further inland (EA, 2015, p. 227ff.). In the same period, but using different terms of reference, Cornwall Council (2014, p. 4) estimated that £8.2 million was lost from non-visitation and cancellations within the county because the railway line at Dawlish in Devon was washed out by storm surges, with damage to the coast path, ports and harbour facilities among other aspects of the impacted tourism and recreation infrastructure. Rising seas and higher rainfall have also placed at risk culture heritage attractions at the coast, including the Heart of Neolithic Orkney World Heritage Site (Cook, 2019), among several other sites in Scotland (Graham *et al.*, 2017) and around the UK. In further work on the winter floods from 2015–16, the Environment Agency (2016) estimated that, across the UK, the losses to ‘wildlife, heritage and tourism’ [sic] as a category were between £13 million and £25 million with a high level of uncertainty.

Since 2013, coastal flooding (Haigh *et al.*, 2017) and extreme weather events (Met Office, 2019a) have been widely reported and catalogued. Dedicated guidance has been published for tourism businesses to respond to flooding (VisitBritain, 2019g). However, there have been neither country-wide syntheses of evidence nor systematic meta-analyses of the data on the (damaging) effects of climate- and weather-related events on coastal tourism and marine recreation *per se*. This is also the case for many other countries. A major inference from this inspection is that to understand fully and properly the nature and totality of what is at risk, more integrative or cumulative perspectives are imperative, and in view of the science they will become more salient. For instance, the term ‘compound flooding’ describes events where storm surges and heavy rainfall combine to produce high impact risks (Wahl *et al.*, 2015). Recent research by Bevacqua *et al.* (2019) predicts coastal areas

in the UK and Northern Europe will experience an increase in such events, with parts of Devon, Cornwall and the Bristol Channel susceptible to this additional threat (McGrath, 2019).

Such an approach points to the limitations of considering storm surges and intense, heavy precipitation separately. To date though, in research on tourism and marine recreation, the tendency has been to consider climate-related events, effects or impacts independently, in isolation. As two distinct strands of research on golf demonstrate, compound environmental effects are matched with compound economic effects. Direct spend on playing or attending tournaments is accompanied by subsequent rounds of indirect and induced expenditure of significance to other supply chains and the wider economy (Gelan, 2003). Many golf courses around the UK are located close to or directly on the coastline and some of the most historic and famous courses – including those used in the Open Championship – are ‘links’, located in sensitive dune environments. As the Climate Coalition (2018, pp. 8–9) observed in its *Game Changer* report, increased rainfall, more extreme weather (including winds), coastal erosion and rising sea level are among the several threats to golf. For example, the North Sea has advanced 70 m in the last 30 years placing several parts of the ancient Montrose course in jeopardy. More important than single headlines of this nature, it is the multiple effects associated with changing climate that present a combined threat to a sport that has 977k participants in the UK and generates around £4 billion for the economy (Climate Coalition, 2018, p. 10).

### 3. WHAT COULD HAPPEN IN THE FUTURE?

From this evidence, a complex picture of the future emerges including three main elements. The first is the continued identification and exploitation of new opportunities for tourism and recreation experiences in coastal and marine environments, supported by dedicated resources and infrastructure (NCTA, 2019). Far from restricted to physically active forms of recreation, this granulation will include greater local food-and-drink tourism as well as creative arts experiences in places like St Ives or Margate (Ward, 2018), Llandudno or Dundee.

Second, coastal and marine environments will continue to be integral to economic, social and cultural life within the UK. Tourism and marine recreation are central to the vibrancy and vitality of coastal communities, to future prosperity and employment in seaside towns (Beatty *et al.*, 2014), and to investment and reinvention in long-term regeneration programmes (BHA, 2016; House of Lords, 2019). As attractive environments for residents and visitors alike, the coast offers considerable health and well-being benefits. Work since 2009 on the ‘Blue Gym’ demonstrates that citizens living near the coast are generally healthier and happier than those living inland (White *et*

*al.*, 2016). The World Health Organisation (2014) reports that walks on the Wales Coast Path represent an £18.3 million saving to the healthcare budget.

*Box 1: Key messages from the 2013 report on the impacts of climate change on tourism and marine recreation in the UK.*

- Flooding and coastal erosion are significant threats, as are more frequent and severe weather events which may result in increased damage to coastal communities, accommodation and infrastructure, including travel links, as well as safety risks.
- Warmer conditions present opportunities for increased visitor numbers, but these may place increased burdens on coastal communities and infrastructure (roads, energy, water, waste management).
- Warmer summers are expected to result in more comfortable conditions especially at the coast, extended seasons, increased revenues, new infrastructure, increased employment and watersport opportunities.
- Rising relative sea levels result in increased flooding, loss of beaches and changes to other habitats, including recreational angling fish species and those vital to wildlife watching.
- Increasing sea temperatures increase safety risks through increases in marine pathogens.

Source: abridged from Simpson (2013, p. 271)

The third element of the picture is the longer-term relationship between tourism and climate change in coastal and marine environments. This is little changed from the previous report which extensively listed the range of likely future impacts (Table 3; Box 1). In sharp contrast though to the body of knowledge published between 2013 and 2019 on the different types of activities and their economic values, within the public domain there is no recent (i.e. updated) modelling or dedicated analysis of how climate change (scenarios) may impact on UK tourism and marine recreation in the longer-term, for instance into the 2030s, 2040s and 2050s. The conclusions from more-recent climate science have not informed specific discussions or projections of UK tourism futures into the next decade and beyond (cf. SE, 2018; NCTA, 2016; VisitBritain, 2019b, House of Lords, 2019). For instance, updated UKCP18 data (Met Office, 2019b) have yet to be utilised in a similar manner to the UKCP09 data as a basis for understanding potential future demand (Southwest Tourism, 2010). There has been some limited consideration of the UK in the context of coarse Europe-wide examinations of the consequences of +2°C global warming on summer tourism at the state and (NUTS3) regional levels (Grillakis *et al.*, 2016; Aristeidis *et al.*, 2018), notwithstanding the contestability of the Tourism Climate Index (Scott *et al.*, 2016a). In fact, revised temperature projections for the UK suggest more warming in summer than winter, and a pronounced north/south contrast in summer with greater increases in maximum summer temperatures over the southern UK compared to northern Scotland (Fung *et al.*, 2018: 2). Modelling of weather types points to UK winter conditions becoming milder and in certain instances wetter, and by the 2080s the temperature levels during ‘cold’ weather winter events will be similar to those currently experienced in ‘warm

and wet' events (Maisey *et al.*, 2018: 2). Such data clearly raise new and important questions as to the potential redistributive and seasonal effects of climate change on tourism demand around the UK and its coastal and marine environments. As Kreilkamp *et al.* (2016) note in work on climate change in the wider North Sea region, perception of climatic conditions is just one of several factors driving the choice of destination for visitors.

There is an emerging disconnection. Several significant updates to major statements on climate change have appeared in the last six years, earlier versions of which directly informed the key messages in the previous MCCIP report (Simpson, 2013; Box 1; Table 3). The Fifth Assessment Report of the United Nations Intergovernmental Panel on Climate Change (IPCC) was finalised in 2014, as was a follow-up to the UK National Ecosystem Assessment which examines the value of the natural environment for leisure and recreation among many other uses. The Committee on Climate Change (UK CCC, 2017a) updated the evidence base behind the 2017 UK Climate Change Risk Assessment (HMG, 2017), with a chapter on business-related effects, while the second national adaptation programme for 2018–2023 (Defra, 2018) was published in 2018.

There is little mention of tourism and recreation in this major, updated documentation on UK climate change; there is less still on them regarding the potential impacts on coastal and marine environments (Table 4); and what there is adds little more than further clarification of the general effects already observed in 2013 (Box 1). For instance, the UK Climate Change Risk Assessment Synthesis Report (UK CCC 2017b) variously states that: UK tourism and outdoor recreation may increase as a result of climate change (p. 3); further research on ecosystem changes will be important for tourism (p. 42); warmer temperatures may encourage more active recreation, affect holiday choices to and in the UK (p. 44); climate changes will create opportunities for tourism and outdoor recreation at the coast (p. 46); severe flooding and coastal erosion may lead to loss of coastal business locations and infrastructure, especially related to tourism (p. 68); and climate change may create risks and opportunities through changes in demand for existing and new products and services (p. 69). A further important feature of this documentation is that tourism is represented as a singular, largely undifferentiated entity in most UK climate documentation (Table 4), only occasionally invoking types such as 'heritage tourism' (UK CCC 2017a: 83) or 'tourism and nature watching' (UK NEA, 2014: 31). A limitation of such broad classifications is that they do not correspond with those typically used by tourism practitioners (Church *et al.*, 2017), and they imprecisely conflate wider arrays of sub-types which may be differentially impacted by climate changes.

Table 4. The inclusion of tourism and recreation in selected recent documents intended to inform the national debate on climate change

Document	Total Pages	In-text mentions		Discussion in brief
		Tourism	Recn.	
UK CC Risk Assessment (2017)	24	0	0	Presents an array of potentially applicable risks, especially to natural capital in coastal and marine ecosystems, but no direct mention of tourism and recreation activities.
UK CCRA Synthesis Report (2017)	86	8	0	Subtitled priorities for the next five years, notes activity may increase in general, especially at beach. Notes general vulnerability to risk of coastal erosion and severe flooding.
UK CCRA Evidence Report (2017)				
Chapter 3	209	1	19	Natural Environment and Natural Assets chapter mentions tourism once as it relates to uplands. Considers recreation as an ecosystem service, in the context of woodlands. Notes water has cultural benefits from bathing and (sea) fishing.
Chapter 6	121	32	5	Business and Industry chapter notes risks and opportunities for tourism businesses. Warmer temperatures will make UK more attractive. Notes business disruption, especially in Wales; flood risks; lack of business awareness; use of management plans with local authorities. Some note of differential impacts on different types of activities e.g. visits to heritage attractions, cycling, rambling etc.
National Adaptation Programme (2018)	2018	1	2	Warmer weather offers potential benefits for tourism, including more journeys by foot. Protecting groundwater and river flow vital to recreation, as natural capital exploitation.
Environment Agency Climate Change Impacts and Adaptation (2018)	19	0	0	Presents an array of potential changes, especially at the coast, that may be applicable, but tourism and recreation not invoked.

Source: abridged from documents

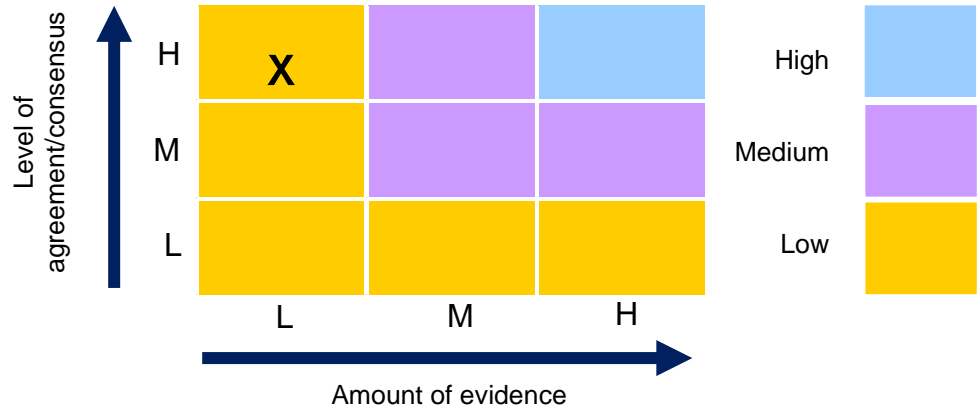
#### 4. CONFIDENCE ASSESSMENT

In the 2013 report, similar assessments were made about the level of confidence regarding both what is already happening *and* what could happen in the future in the context of tourism and marine recreation around the UK (Simpson, 2013, p. 281). These were that there is a high level of agreement or consensus originating from an intermediate or ‘middling’ body of knowledge (i.e. medium amount of evidence), especially informed by practitioner research.

Both 2013 assessments were entirely appropriate. Several contemporary texts at the time highlighted that topics connected to ‘tourism and climate change’ were gathering traction both within and beyond the academy (Scott *et al.*, 2012; Gössling *et al.*, 2013). The 2013 report incorporates several now well-cited, early contributions dealing with the UK that served to set the initial agenda and advance understanding in the 2000s (e.g. Viner and Agnew, 1999; Hamilton and Tol, 2007). Since 2013 though, these have not been built upon in subsequent work on or in the UK, nor have they been revisited by the authors or others using similar or other methods. Many studies informing the

2013 report – including those published by public bodies – comprised single cross-sectional ‘snapshots’. Indeed, a lack of (temporal) comparative research has been noted as a limitation of research on sustainable tourism more generally (Font *et al.*, 2019).

**What is already happening?**



All of this is important context for assessment of the qualitative level of confidence in 2019. The availability of evidence would suggest that a change in level of confidence is warranted.

In 2013, a modest body of knowledge had delivered several notable insights mostly on the general effects of climate change, the broader impacts of which on tourism and recreation most commentators had been able to agree (Box 1). Since then, it is hard to argue that there have been major new advances in our (scientific) understanding of either the broad range or the possible extent of impacts of climate change on tourism and marine recreation in the UK. Thus, there remains a high level of agreement on what may be happening (i.e. unchanged) but this is based on an ageing, now more limited body of knowledge in comparative terms.

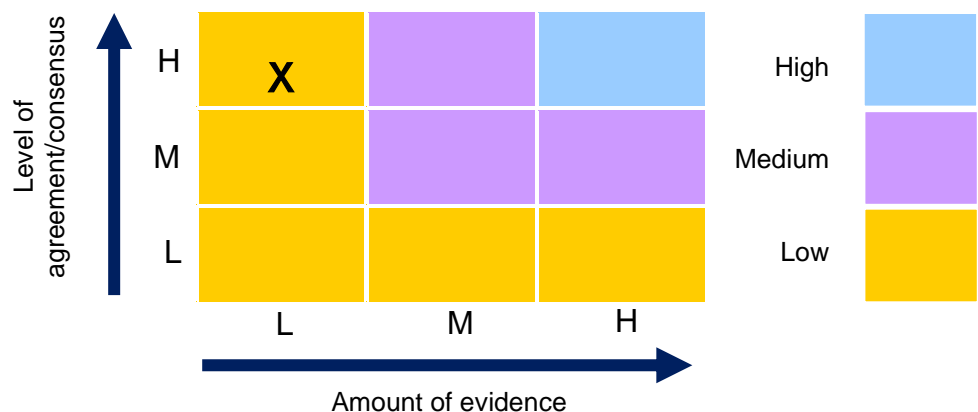
Table 5: key word search results for the period, 2013–2019

Search terms	Scopus		Web of Science		Match
	Total	Relevant	Total	Relevant	
Tourism climate change England	12	3	15	2	2
Tourism climate change Wales	3	1	2	0	
Tourism climate change Scotland	6	0	5	0	0
Tourism climate change Northern Ireland	0	0	1	0	0
Recreation climate change England	10	2*	7	0	0
Recreation climate change Wales	1	0			0
Recreation climate change Scotland	2	2*	1	0	0
Recreation climate change Northern Ireland	1	0	1	0	0

Source: searches 22/07/19 \* same entries revealed by different parameters

For the period 2013–19, key word searches were conducted of two major bibliographical databases (Scopus, Web of Science). Table 5 records the number of hits in total, as well as those outputs directly relevant to this report. The body of (scholarly) knowledge has not grown significantly either in its own right quantitatively or qualitatively in terms of new insights nor, proportionately, in relation to advances in climate science. None of the research listed in Scopus for tourism and climate change on Scotland deals with coasts or marine environments. One study on Wales reported the results of a pilot study on ‘beach nourishment’ as a means of combating future coastal erosion (Wellard and Rimmington, 2014) while just three articles on England deal with adaptation-related topics and coasts. These deal variously with how place-specific social structures feature in adaptation in the Isles of Scilly and Flushing in Cornwall (Petzold, 2014); application of a method to identify the risk of flooding and erosion in the Teign Estuary (Horrillo-Caraballo *et al.*, 2013), as a major tourism destination in Devon; and a systematic approach to identifying dune disturbances and isolating them from the effects of climate illustrated by the Sefton dune system between Liverpool and Blackpool (Delgado-Fernandez *et al.*, 2019).

### What could happen in the future?



Arguably then, a larger knowledge gap is related to prediction and the future. The stalling of the research effort on the possible impacts on tourism and recreation of climate change in the UK is more prevalent when a longer-term perspective is taken.

In 2019, there remains a high level of agreement or consensus, in general terms, about the broad types of effects of climate change that may impact on tourism and recreation (as in the 2013 assessment, Box 1) rather than the more-exact effects and risks. As the evidence elsewhere in other MCCIP reports makes clear, there has been much more significant progress in understanding the likely nature of climate change effects around the coast and marine environments of the UK (see also Met Office, 2018b; Fung *et al.*, 2018; Maisey *et al.*, 2018). Be this as it may, revised and/or new UK forecasts

for future changes in climate to 2030, 2040, or even 2080 have not been the subject of renewed modelling, scenario planning or systematic analysis relating to tourism and marine recreation.

## 5. KEY CHALLENGES AND EMERGING ISSUES

In many respects, the high level of consensus is not necessarily a virtue so much as a statement about the level and type of knowledge that has been – and more importantly not been – subsequently produced on climate change as it relates to tourism and marine recreation. Within the previous report, three main knowledge gaps were suggested for urgent attention (Simpson, 2013: 280). Briefly, to paraphrase these, further research was deemed necessary into:

- visitor preferences for temperature and comfort, how these drive decisions about visiting particular locations (or not), and how these might alter as climate changes;
- vulnerability of coastal destinations to flooding, including mapping, to identify how and where to target adaptation; and
- the magnitude and timing of climate change impacts, in particular as related to marine ecosystem interactions and processes (e.g. related to pathogens, fish and other species migration), due to their role in delivering particular tourism experiences.

It is important to record that there has been little progress in the intervening period to address these gaps which remain both as necessary and relevant to the future of tourism and marine recreation in 2019 as they were in 2013, arguably more so in light of the planned growth of the sector (VisitBritain, 2019b) and advances in our understanding of physical impacts on marine ecosystems and coastal environments. Nevertheless, these gaps are quite acutely focused lacuna. In 2019 the three key challenges and emerging issues are more-broadly based than they were in 2013; they relate more towards the need to renew impetus in this topic area, and to the potential implications of non-activity.

### 5.1 Beyond the 2013 picture

The research agenda dealing with climate change (adaptation) and the tourism sector in the UK more generally, in British coastal settings and marine environments more specifically, has stalled since the last report. It is somewhat puzzling to find very little detailed current work on tourism and marine recreation examining climate impacts, adaptation and/or projections for the UK as one of the countries on which climate science has advanced furthest. This is all the more urgent because of the importance of tourism and marine recreation to economy, society, culture and environment in the UK.



Instead, a 2013 view of the impact of climate change on tourism and marine recreation in the UK largely endures. As the IPCC Fifth Assessment makes clear, climate science has notably progressed since the previous survey period, with some knowledge gaps having persisted while others have subsequently emerged. Among the latter are the need for greater integration whether in the form of combining potential effects and vulnerabilities, the full range of potential impacts and their interactions (i.e. potentially compounding one another), or producing risk assessments across scales that connect the local (i.e. destination) level to transboundary impacts (Scott *et al.*, 2016b).

In order to overcome this, there is an urgent need to reconnect physical scientists and social scientists in fruitful dialogues. Previous insights from simulation and modelling exercises have pointed to the effectiveness of combining progress on physical systems with behavioural sciences (Whittlesea and Owen, 2012), in particular to overcome the unfortunate (and unintended) analytical consequences of conflating tourism, recreation and visitation in the climate change corpus (Table 4). Such an approach is vital to moving forward our understanding of potential and effectiveness of any current or planned approaches to adaptation. Without a renewed and more concerted effort, gaps will grow between what we know about UK climate change *per se*, what we know about climate change in UK coastal and marine settings, and how we understand the potential impacts of forecast change on the numerous forms of tourism and marine recreation they support.

## 5.2 Systematic appraisal of both vulnerabilities and opportunities

Related to the first issue and elaborating Simpson's second lacuna, more-careful and detailed assessment is necessary of the role of climate change as a key enabler and/or inhibitor of tourism futures especially given the importance of the sector. More than just mapping the relative vulnerabilities of, and threats to, coastal destinations and businesses, there is a clear need to develop greater understanding of the nature and value of opportunities generated by climate change for tourism and recreation, and the ability of the sector to realise them.

As a vital vector to delivering economic, social and cultural change, still very little is known about the sector response to climate change, both at the business and destination levels. In the case of the latter, the nature of the administrative landscape for tourism has changed (Coles *et al.*, 2012; 2014) as it has for coastal and marine management. Key challenges are therefore to understand the nature of their stakes and to engage stakeholders more actively in adaptation strategies. On the former, notable knowledge gaps persist regarding how UK tourism businesses currently manage for, respond to, and adapt to changing climate (cf. Jenkins and Nicholls, 2010), whether there are important spatial or sectoral variations, and how climate features in appetites for risk. An even more nuanced approach is required though in a sector dominated by micro-, small- and medium-sized enterprises (MSMEs).

Beyond gauging the demand-side response of visitors (Simpson, 2013: 280), supply-side views are necessary and should not be assumed. For instance, greater demand in peak season or an extension to the season may at first sight seem attractive (Box 1; Table 3). However, for many accommodation providers and hospitality businesses in peak season occupancy is already very high, the potential for future bookings and revenue is limited without further investment and business transformation, and many smaller tourism MSMEs are lifestyle businesses that do not necessarily seek more extended opening periods.

### **5.3 Improving analytical precision to assist adaptation**

Finally, like its predecessor, this report highlights the fragmentary nature of the evidence base, the many approaches and methods to measuring the (economic) impacts of tourism and marine recreation, and the difficulties in drawing sectoral and spatial comparisons.

Consideration of tourism and recreation together here reflects the obvious connections between two modes of leisure which, as noted above, can lead to unfortunate confluences impeding, not aiding our understanding. A term like the ‘visitor economy’ can be helpful shorthand. Used too frequently or indiscriminately though and it can also obscure the diverse range of activities that constitute the categories of ‘tourism’ and ‘recreation’, in the process diverting attention away from the potential for differential impacts of climate change on different sub-types (or niches). In principle, climate change may exert distinct effects on heritage tourism compared to creative tourism, on nature-based tourism compared with food tourism. While there are frequent assessments of the (economic) values of many (but not all of these) particular types of activities at the coast or in marine settings, little is known about how they may be specifically affected by projected climate change and related effects, nor the potential adjustments in value that may have to follow, either beneficial or adverse, direct or indirect and induced.

Destinations offer discrete local combinations of tourist experience, they attract distinctive types of tourist with varying motivations, and the same is also true of recreation in coastal communities. To date however, most analysis of tourism and marine recreation has been at regional level, with no apparent attempt to distinguish potential effects on place-based ‘product mixes’, by destination types, or by the nature of coastal and/or marine environments.

As the previous MCCIP report noted, it is vital that proper adaptation strategies and appropriate action plans to be developed and delivered (Simpson, 2013). This report would go further and argue that a more detailed consideration of local conditions is a vital prerequisite to this process just as it is necessary to recognise that local conditions are framed by the nested institutional geographies of tourism administration and marine management.

Legislation to enhance the management of marine environments in inshore and offshore waters (Marine and Coastal Access Act 2009, for England and Wales; the Marine (Scotland) Act 2010; Marine Act (Northern Ireland) 2013) has resulted in 14 ‘plan areas’ (11 for England) around the UK that superimpose onto the CP2 regions, as well as 91 Marine Conservation Zones around England alone (HMG, 2019). Rarely though are the geographies of tourism administration and marine management brought together.

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