Planning Inspectorate Written Representation re SPR EA1N and EA2

Bridget Chadwick reference numbers 20024947 and 20024988

Following on from my husband's description of the rare Sandlings habitat, maybe you are aware of a recent news headline: a **'Lost decade for nature' as the UK fails on 17 of 20 UN biodiversity targets.** The government itself has said it failed on two-thirds of its targets; its 2015 **policy on biodiversity and ecosystems** states "In England, much of our biodiversity, including many of our birds, butterflies and plants, is declining (and insects of course). Our wildlife areas are too disjointed and fragmented, making it harder for wildlife to flourish and respond to climate change and other pressures." https://www.theguardian.com/global-development/2020/sep/14/lost-decade-for-nature-as-uk-fails-on-17-of-20-un-biodiversity-targets-aoe

The attached English Nature report of 2002 states:
"**Open heathland is rarer than rain forest**. In the UK we have only about 16% left of the area that existed in 1800. That means that from an area similar to the size of Cornwall, only the equivalent of the Isle of Wight remains. The process of loss and disintegration has been particularly fast in recent decades. However, **this country still holds 20%** (more than 60,000 hectares) **of the whole world's lowland heathland**. Thus there is a need, not only to preserve and improve our remaining heathlands, but if possible, to re-create them in areas where they have recently been lost. There is a special case for linking small fragments of heathlands, where the few remaining species are stretched for space and risk disappearing in the event of a fire, to create areas which can maintain a wider range of wildlife and can survive in the future……. lowland heathlands are home to many plants and animals whose distribution range has decreased along with the disintegration or disappearance of the habitat or the lack of management of many heaths.
Dartford warblers, nightjars and stone curlews are some of the species primarily associated with lowland heathland, but many others live in areas where heathland is one of the components of the landscape, such as kestrels, hobbies and stonechats; Dartford warblers and nightjars use mosaics of scrub and open heath to forage, breed and perch. It is therefore important to keep some scrub as part of the heathland landscape.
However, small plants like the yellow centaury can only grow in open sandy or peaty bare ground. Animals as diverse as the black and red sand wasps, the ladybird spider and sand lizard rely on the presence of bare sand to hunt and lay their eggs.
Many insects have heathlands as their primary habitat and feed on grasses and flowers typical of the heaths. Some of them are not very mobile, so fragmentation and deterioration of the habitat is a serious threat to them. Some species, such as silver-studded blue butterfly, require a continuous supply of young heather, a warm microclimate and vegetation with a varied age structure for shelter and roosting. The leaves and flowers of plants such as sorrel, ragwort or yarrow are vitally important for moths and nectar-feeding invertebrates.
The sand lizard is another typical inhabitant of the heaths. Sand lizards require unshaded areas of sand and also sunny stands of heather on south-facing slopes. All six native British reptiles are found in some lowland heaths in Britain.
Nowadays the importance of lowland heathlands is recognised by national and international designations which should help to ensure their protection against further losses.
The need for restoration and recreation is recognised in the Government's UK Biodiversity Action Plan. Some of the aims of this plan are to restore all existing heaths and re-create a further 6,000 hectares by 2005. Maintaining the current heathlands and

creating new ones require a great economic and human effort which has resulted in the formation of strong partnerships among organisations interested in nature conservation. Several programmes have taken place in recent years in Britain, which aim to restore heathlands or to re-create them on sites where they have been lost."
Well, so much for yet another stated ambition ……..

SPR's proposed cable trenches would be going round three sides of a Specially Protected Area between Thorpeness, Sizewell and Aldringham – which is hardly going to provide a safe haven for the inhabitants during years of disruption, noise and light pollution. The trench digging and associated 'temporary' loss of hedgerows and habitat will sever the wildlife corridor which stretches along 30 miles of the Suffolk Coast and Heaths AONB for a likely period of 12-15 years of continuous work as these two SPR projects are intended to be followed by the proposed Nautilus and Eurolink projects which aim to connect here as well, resulting in additional permanent loss to our precious biodiversity.

As an aside, it is interesting that the direct route from Thorpeness to Aldringham along the edge of a golf course is more protected than the natural habitat for wildlife, even though a golf course can be much more easily reinstated – and it's also alongside an existing road.

My first point is, I'd like to be sure the Planning Inspectorate is seriously assessing this threat to a habitat 'rarer than rain forest' and it's attendant biodiversity.

Next, a 2019 Intergovernmental Global Assessment of Biodiversity and Ecosystems concluded that ""The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. **We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide**."
https://ipbes.net/news/Media-Release-Global-Assessment All I have been led to believe is that SPR are bulldozing their way through with no acknowledgement of these factors. There are no significant local jobs here but instead will be job losses.

So, my second point is I'd like to be sure the Planning Inspectorate is seriously assessing the impact on our local tourist economy and on our national health through loss of amenity and nature for all.

And finally, I believe that this SPR project is flying in the face of the many policies, targets and reports set out by the government. For example:

a. Our own report on the 20 targets for 2020 that we signed up to at the 2010 Aichi Convention on Biological Diversity https://www.cbd.int/sp/targets/ shows progress is too slow https://www.cbd.int/doc/nr/nr-06/gb-nr-06-p3-en.pdf, **with protecting and restoring ecosystems a particular challenge**.
https://www.theguardian.com/environment/2019/mar/22/ukmiss-almost-all-2020-nature-targets-official-report-admits
And this same Convention is being repeated this very month with the Treasury commissioning another Review of the Economics of Biodiversity.

b. A 25-Year Environment Plan published by the May Government committed to improving biodiversity by creating new wildlife habitats but again indicators show short and long-term declines in bird and insect populations.
c. And another Public Bill Committee is due to report on the Environment Bill by 1st December – this is to make provision about targets, plans and policies to improve the natural environment; to protect it; about nature and biodiversity; and for conservation. https://services.parliament.uk/Bills/2019-21/environment.html

BUT WHAT THE HELL IS THE POINT OF ALL THESE COMMITTEES AND CONVENTIONS????? This SPR project is another that flies in the face of all these policies. It is apparent that there is no joined-up thinking between different government departments and the objectives of one can just cancel out those of another.

Remember, "This is our rain forest". How can a so-called eco-project countenance green field sites instead of brown and all this desecration of rare habitats that we have committed to conserve? Why is National Grid dictating that SPR join Sizewell's power lines instead of installing new ones to existing industrial sites, especially in light of all the future intended projects in East Anglia?

And how can we expect foreign-owned private companies to take care of our wildlife and biodiversity when our own government abdicates any responsibility for ensuring that their own targets are upheld. With National Grid, another private company, having carte blanche to dictate where these projects should go, with the bottom line of foreign-owned companies being about profit, and with government not doing the job it says needs to be done, what hope is there for OUR nature and biodiversity?

Sixth National Report to the United Nations Convention on Biological Diversity: United Kingdom of Great Britain and Northern Ireland

Overview of the UK Assessments of Progress for the Aichi Targets

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Overview of the UK Assessments of Progress for the Aichi Targets

Aichi Target	Assessment conclusion	Assessment summary
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society		
Aichi Target 1 *By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.*	Progress towards target but at an insufficient rate	This target sets out two main *outcomes*. People in the UK should be *aware* of values of biodiversity, and of the *actions* they can take to conserve and use it sustainably. In this assessment, it has been assumed that either the majority of or an increasing proportion of the population should be aware of these issues. Across the UK, there is limited trend data and specific information on people's awareness of the values of biodiversity. However, there is information from Government surveys collecting data from approximately 10,000 individuals across the four countries of the UK to evaluate the public's awareness of the threats to biodiversity and also on whether people are taking action; for example, through volunteering. As data are collected across the countries via separate surveys with differing regularity, data from all four countries are only available for 2014. These data indicate approximately half of the UK population (48%) report at least some awareness of the threats to biodiversity. The data also indicates that 31% of the population report taking at least some action. Levels of volunteering have increased slightly over the period since 2010. There have also been a number of successful campaigns across the four countries of the UK, operated by Government, academic bodies and the voluntary sector. These have generated valuable data, created new habitat and established a range of community conservation projects. Taken together, this evidence suggests progress towards the target. Progress is assessed as insufficient, as there is clearly more that we can do to raise awareness. As of 2014, data combined from surveys in each of the four countries shows more than half (52%) of the UK public report no awareness of the threats to biodiversity. Where there is information on trends over time, for example within individual countries for the UK, these show there has been no significant increase in awareness amongst UK public since 2009.
Aichi Target 2 *By 2020, at the latest, the biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being*	On track to achieve target	This target sets out two main *actions*: that biodiversity should, firstly, be integrated into national and local planning processes and secondly, incorporated into national accounting and reporting systems relevant polices. Integration into poverty reduction strategies for Overseas Development Assistance is considered in section IV. This assessment is based on whether the relevant *actions* have been taken. *Outcomes* of such biodiversity mainstreaming initiatives are considered in other target assessments. In the UK biodiversity values have been integrated into a range of planning, accounting and reporting systems, including: • National natural capital asset and ecosystem service accounts published by the Office of National Statistics; • Infrastructure development plans;

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incorporated into national accounting, as appropriate, and reporting systems.		• Planning policies at the national and local level on land and at sea; • Scotland's Natural Capital Asset Index; and, • Well-being of Future Generations (Wales) Act 2015. Progress is therefore assessed as on track to reflect the fact that action is in place across the various plans and policies. The UK Government and Devolved Administrations acknowledge however that these polices should be kept under review and have set ambitions to go further, for example, in England, by embedding net gain polices across local and infrastructure planning.
Aichi Target 3 *By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-*	Progress towards target but at an insufficient rate	This target sets out two main *actions:* the elimination, phasing out or reform of *harmful incentives*; and the development and application of *positive incentives*. This assessment is based on whether the relevant *actions* have been taken. *Outcomes* of such biodiversity mainstreaming initiatives are considered in other target assessments under Targets 5, 6, 7 and 12. The UK, in common with other countries across the European Union, has made significant progress with reforming harmful subsidies – particularly with those subsidies that incentivised over-production or overharvesting in agriculture, forestry and fisheries. In particular, the introduction of greening measures in 2013 (which built on the decoupling of agricultural support from production in 2003), along with the measures proposed in the Clean Air Strategy published in January 2019, will reduce ammonia emissions from the agricultural sector to deliver key atmospheric pollutant emission reduction targets under the National Emissions Ceiling Directive. In addition, a range of incentives have been developed and implemented to achieve biodiversity outcomes and promote sustainable management. These include agri-environment measures, sustainable woodland management payments and the introduction in 2014 of the European Maritime and Fisheries Fund. There has therefore been progress across both elements of this target. Progress is assessed as insufficient because the countries of the UK recognise some ongoing declines of woodland, farmland and marine biodiversity and that there have been some recent reductions in areas under agri-environment schemes which could impact the target if land of high biodiversity value comes out of those schemes, suggesting that there is scope to improve or target uptake of positive incentives more effectively.

Overview of the UK Assessments of Progress for the Aichi Targets

Aichi Target	Assessment conclusion	Assessment summary
economic conditions.		
Aichi Target 4 *By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.*	Progress towards target but at an insufficient rate	This target sets out one main *action* and one main *outcome*. It requires plans for sustainable consumption and production to be in place, and that implementation of these plans keeps the UK's natural resource use within safe ecological limits. 'Safe ecological limits' are not well defined for UK production and consumption, and the assessment is based here on the potential to further reduce the UK's consumption of natural resources, improvements in the rate of reuse and recycling of resources used, and whether the impact of the use of resources on the natural environment has substantially reduced. Across the UK, the Government and the Devolved Administrations have developed and are implementing a number of plans for sustainable production and consumption. For example, the Industrial Strategy and Clean Growth Strategy. The UK is committed to becoming a low carbon economy and has made significant reductions in greenhouse gas emissions already; the Climate Change Act sets legally binding targets for emissions. The UK is on track to exceed targets leading up to 2022 - though acknowledges that further action is required to replicate progress in the energy sector across the wider economy, including emissions from soil ecosystems. The UK continues to develop its circular economy by increasing recycling and reducing waste and has strategies in place to support further progress. Evidence also indicates that over 90% of large companies in UK consider environmental issues in their supply chain and the majority have a form of environmental management system in place. It is therefore assessed that progress has been made. The target also requires that plans for sustainable production and consumption keep the use of natural resources within safe ecological limits. Such plans need action by a variety of organisations, including governments, NGOs and businesses. Although 'safe ecological limits' are not fully understood, the UK's global material footprint (raw material consumption, accounting for imports and exports of materials) fell 26% from a peak of 890 million tonnes in 2001 to around 659 million tonnes in 2013. The progress to this target is assessed as insufficient to reflect the fact that the UK Government has acknowledged in its 25 Year Environment Plan that more can be done to reduce the impact of UK consumption on the rest of the world. Evidence indicates that there are further opportunities for businesses to generate substantial financial savings by increasing resource efficiency. A 2017 study found that a series of no or low-cost interventions by businesses could deliver business savings of around £3 billion per year through a more resource efficient use of materials and waste.
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use		
Aichi Target 5 *By 2020, the rate of loss and*	Progress towards target but at	This target requires two *outcomes*: a reduction in the rate of loss and an improvement in condition and connectivity of natural habitats (and in this section, the UK has interpreted this as including both natural and semi-natural habitats).

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degradation, and fragmentation, of natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	an insufficient rate	Evidence on the changes in extent and condition of natural and semi-natural habitats in the UK is incomplete. However, data on the condition of key protected habitats and recent trends in extent of terrestrial broad habitats show that the rate of loss and degradation of natural habitats in the UK has slowed or stabilised following extensive loss and fragmentation during the 20th century. Positive trends in the extent of some terrestrial broad habitats shows some evidence of recovery and positive results have also arisen from targeted restoration programmes such as the peatland examples referred to in this 6th National Report. There is evidence of improving condition and connectivity for some natural and semi-natural habitats. Data on protected areas in the UK show improving condition of the habitats they protect, but action over a considerable timescale will be needed to restore all of them to favourable condition. The area of the UK covered by broadleaved woodland is increasing and each of the countries of the UK has also taken action to restore and re-create habitat outside the protected site series. Set against these improvements, there have been some ongoing losses of natural and semi-natural habitat, for example through neglect or development, as well as ongoing declines of a number of species groups. In addition, a proportion of habitats remain in a degraded state, particularly those outside protected sites. While understanding of marine habitat condition continues to develop, there is evidence of widespread human disturbance of marine habitats in UK waters. There has been significant progress in reducing rates of loss and degradation in natural and semi-natural habitats, and some progress in improving condition and connectivity, for example in woodland habitats, but the target is assessed as insufficient, given the ongoing imperative to maintain action to further reduce past degradation and fragmentation.
Aichi Target 6 *By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in*	Progress towards target but at an insufficient rate	This target requires *action* to ensure that fish stocks are harvested sustainably and threats to those stocks are addressed. Although the target also covers invertebrates and aquatic plants, the UK assessment is based solely on an assessment of the status of fish stock using information on progress towards achieving maximum sustainable yield (MSY). The UK has made significant progress in introducing sustainable fisheries measures, including landing obligations, gear subsidies and incentives, accreditation schemes, and area-based management measures. UK fish stocks are now showing signs of recovery following their historic over-exploitation as the proportion of stocks fished at or below the level capable of producing MSY, and the proportion of stocks with biomass above the level capable of producing MSY, have increased significantly since 1990; both to around 50%. In addition, increases in the proportion of large fish in demersal fish populations have been recorded in UK regional seas. Progress is assessed as insufficient because recovery of fish populations has not been consistent across all UK regional seas and ongoing action is required to ensure all stocks are fished at sustainable levels.

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place for all depleted species, fisheries have no significant adverse impact on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.		
Aichi Target 7 *By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.*	Progress towards target but at an insufficient rate	This target requires management measures to be in place, and the assessment has interpreted 'ensuring conservation of biodiversity' by examining whether typical species populations associated with agricultural ecosystems, aquaculture and forestry are stable or increasing. Progress has been made in regulation and incentives to improve the sustainability of agriculture, aquaculture and forestry in the UK. Monitoring, particularly of our agri-environment incentives has demonstrated a significant positive impact on biodiversity, particularly where they are targeted to areas of high existing value or potential, although such positive impacts are often localised. There has been a steady increase over the last 20 years both in the area of land in higher-level or targeted agri-environment agreements in the UK and in the proportion of woodland certified as being sustainably managed. The former, however, has started to fall in the last few years and the latter has been broadly stable at around 43% since 2010. Furthermore whilst indices of abundance for woodland birds show some stabilisation in recent years; and despite some targeted recovery for some farmland bird species the overall farmland bird index has continued to decline. Aquaculture in the UK is dominated by Scottish salmon production. The industry is strongly regulated, and plans are in place to manage potential issues such as sea lice, and to ensure the sustainability of the fishery. Progress is assessed as insufficient due to recent falls in the area under targeted agri-environment schemes, and the continued decline of the farmland birds index.
Aichi Target 8 *By 2020, pollution, including from*	Progress towards target but at	The target requires *action* to reduce pollution from all sources, with a particular focus on nutrient run-off and deposition from the atmosphere. The assessment considers both the trajectory of pollution levels and the distance from levels where they are considered not detrimental using standards applied in the UK.

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excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	an insufficient rate	The UK has made progress in reducing levels of air, water and marine pollution, these include long-term reductions in air pollutants that, in turn, have led to a decline in the area of sensitive habitats being harmed by acidification, and long-term reductions in hazardous materials in the marine environment, supported by recent initiatives to tackle plastic waste. However, progress is assessed as insufficient because specific some sources of pollution remain above target levels. Approximately 78,000km^2 of UK terrestrial habitats is sensitive to acid deposition. About 73,000km^2 is sensitive to eutrophication; much of this is sensitive to both. The area of sensitive habitat exceeding critical loads for eutrophication (a level above which nutrient input from atmospheric deposition is considered to impact on ecosystem function and biodiversity) has shown little change since 2010, but the area affected by acid deposition has decreased from 47% to 42% between 2010 and 2015. Sixty five per cent of inland and coastal surface waters remain below target levels for ecological status under the Water Framework Directive. Although countries across the UK have recently introduced a range of measures to tackle marine litter, since 2010, levels of marine litter, especially marine plastics, has continued to rise, on beaches, in the water column, on the seafloor and in seabird stomachs.
Aichi Target 9 *By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment of invasive alien species.*	Progress towards target but at an insufficient rate	This target requires *action* to be in place to stop the establishment and spread of invasive non-native species. The assessment considers the actions in place to identify priority invasive non-native species (INNS); identify and control pathways of introduction and other measures to control or eradicate INNS. The assessment also considers the *outcomes* of these measures. INNS are managed on a Great Britain and all-Ireland basis in the British Isles, with countries working closely together to co-ordinate their efforts. Priority species have been identified following extensive scientific review and expert input and a framework to prioritise their management have been developed. Comprehensive risk analysis processes are in place (including horizon scanning, risk assessment and risk management), as are new information systems and contingency plans to support rapid response. For established INNS, long term management is being undertaken to control some, but not all, of the most invasive INNS where feasible. In the recent past the GB has intercepted two species (Asian hornet and raccoon), and eradicated three species (African clawed toad, fathead minnow and black bullhead), Pathway management has focussed on a number of initial priority pathways and a comprehensive pathway prioritisation exercise in Britain is due to be completed by the end of 2018. The strategic approach adopted by UK countries has led to the successful interception and eradication of INNS with further eradications underway. Despite strong action, the number of INNS established in Britain has remained constant, in terrestrial environments, and has increased in the freshwater and marine environment. The countries of the UK acknowledge that the impact and risk from INNS species in the UK remains significant and that there is a need to continue to develop plans to reduce the risk from all high priority pathways for invasive non-native species introduction and to raise awareness of the need for strong biosecurity. For this reason, progress is assessed

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		as insufficient. INNS are known to be a pressure on many of the Overseas Territories; the logistics for eradication can be hugely challenging, but some successes have been recorded.
Aichi Target 10 *By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.*	Progress towards target but at an insufficient rate	This target requires *action* to be in place to minimise impacts on vulnerable ecosystems. The assessment considers impacts from multiple sources, including climate change itself. It considers a range of vulnerable terrestrial, marine and coastal ecosystems in the UK and Overseas Territories. There is strong evidence that climate change is affecting UK ecosystems in a variety of complex and interacting ways, often with negative consequences, and that these impacts are likely to increase as the climate continues to warm. Terrestrial ecosystems such as uplands, woodlands, heathlands and wetlands are vulnerable to rising temperatures and changes in rainfall and seasonality. Coastal ecosystems such as saltmarsh, sand dunes and machair are vulnerable to sea-level rise and increased air and water temperature. Marine ecosystems, such as corals and other biogenic reefs, are also vulnerable to increased water temperature and ocean acidification. Information on other pressures faced by UK species and habitats are given in the assessments of progress for Targets 5 to 9. In response, the UK has made significant reductions in greenhouse gas emissions and has set ambitious targets for further reductions. Management has been introduced to minimise the impact of wider anthropogenic pressures and enhance the resilience of vulnerable ecosystems, including the designation of protected areas and habitat restoration initiatives. On both cold and warm water coral reefs action has been taken across the UK and Overseas Territories to safeguard these ecosystems, for instance through the designation of protected sites and restrictions on fishing practices. However, though there have been significant reductions in the UK's greenhouse gas emissions the Government recognises the need for further reductions to mitigate the impacts of climate change; ambitious future carbon budget targets have been set. Despite efforts to minimise the impact of anthropogenic pressures and enhance ecosystem resilience through the initiatives mentioned above, some vulnerable ecosystems remain in a degraded state in the UK and Overseas Territories. For these reasons, progress is assessed as insufficient.
Strategic Goal C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity		
Aichi Target 11 *By 2020, at least 17% of terrestrial and inland water and 10% of coastal and marine areas, especially areas of particular*	On track to achieve target	This target sets a quantitative *outcome* (extent of protected areas – covering all protected area types identified by the IUCN, including National Parks and Ares of Outstanding Natural Beauty). The assessment also considers whether the more qualitative parts have also been addressed (representative and well-connected systems, effectively and equitably managed). The UK has made significant progress in ensuring its species and habitats of national and international importance are safeguarded in a network of marine and terrestrial protected areas. The UK's protected area network currently (as of March 2018) covers 28% of the UK's land area and 24% of its sea area, and further designation work is expected to ensure key species are adequately protected. The UK's protected area

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importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.		network has been designated following principles to help identify they are ecologically representative and well-connected. Civil society are involved in the protected area designation and management process through appropriate consultation processes or as stakeholders in management groups. Over 60% of sites within the UK protected area network are compliant with global management effectiveness criteria, as supported by positive trends seen in the condition of the UK protected areas. Nevertheless, the UK recognises that continued management is necessary to ensure the full recovery of protected habitats and species in the UK. In particular, work to fully implement marine protected area management measures and monitor their effectiveness is ongoing.
Aichi Target 12 *By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.*	Progress towards target but at an insufficient rate	This target relates to known threatened species and has two components: prevention of extinction and improvement in conservation status. CBD guidance recommends that assessment of status is based on IUCN red list categories, or assessments of change in the distribution or abundance of species. There is limited information change information on for IUCN status categories in the UK. The UK, has therefore used data on relative abundance and distribution of selected species. This has the advantage that data from a greater number of species can be considered in the assessment. However, these data are complex, with data showing different patterns for different groups of species and requires a qualitative assessment, rather than a simple comparison of status in 2011 vs status in 2018. The evidence of ongoing decline in conservation status is clear, and the UK has made its assessment against this background of historical, long-term, widespread decline. Good progress has been made in some limited areas, but it is acknowledged that overall conservation status of threatened species is still declining. There has been progress in improving the status (abundance and/or distribution) of some nationally and internationally threatened species, largely through targeted interventions, often involving partnerships of

Aichi Target	Assessment conclusion	Assessment summary
		Government, conservation non-governmental organisation, academics and the landowning community. Examples include successful re-introductions of the white-tailed eagle, short haired bumble bee, beaver in Scotland, and chequered skipper in England as well as recovery programmes for red kite and natterjack toad. Knowledge gaps remain in the number and trends of threatened species in the UK, but progress has been made in assessing the threat of extinction to UK species, and with monitoring indicator species to help inform a broad assessment of the status of UK species and prioritise management. Overall 14% of UK species have had their conservation status assessed; 21% of these are threatened but none have gone extinct since 2010, although not all of the UK flora and fauna has been assessed. Progress is assessed as insufficient because evidence suggests that there have been widespread and significant ongoing declines across many species (for example for priority species as a group and for groups such as farmland birds, specialist butterflies and other pollinating insects). Whilst declines have not been on the scale seen in the last Century, progress has not been sufficient to secure an overall improvement in their status.
Aichi Target 13 *By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and wild relatives, including other socio-economically as well as culturally valuable species is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.*	Progress towards target but at an insufficient rate	The target requires *action* to be in place to conserve genetic diversity in farmed or cultivated species and their relatives. The UK assessment also considers the *outcomes* of those actions, including the status of native breeds of farm animals and the genetic diversity within *ex-situ* collections in gene banks. The UK is a World leader in ex-situ seed conservation. The Millennium Seed Bank at the Royal Botanic Gardens in Kew contains 75% of the UK's total native and archeophyte plant species. The total number of accessions into UK seed banks has continued to rise since 1960 and there has been a 15% increase between 2013 and 2018 in the Enrichment index – a measure of plant genetic diversity in UK gene banks. Wider measures to conserve biodiversity also safeguard genetic resources in-situ. A significant proportion of UK crop wild relatives (CWR) are conserved within the protected site network, and in some areas of the UK, for example on the Lizard Peninsula in England, site management has started to explicitly consider the ecological requirements of CWR. CWR are commonly associated with linear habitat features (e.g. hedgerows) thus it is anticipated agri-environment measures to conserve these habitats in the UK, will benefit CWR conservation. The UK has also made progress with the conservation of genetic diversity of native breeds of livestock. No native breeds of UK livestock at risk have been lost in the last two decades, despite recent declines in the effective population size of some native horse and pig breeds. Significant progress has been made on the ex-situ conservation of genetic resources. The UK have a number of established genebanks for the preservation of genetic resources of plant species and animals, for example the UK National Livestock Gene Bank and the Millennium Seed Bank. The UK government also consults regularly with its expert committee on farm animal genetic resources. Strategic approaches to strengthen the conservation of genetic diversity are in place. For example, in England the national biodiversity strategy sets out plans for genetic conservation, including support for ex-situ collections and the integration of rare and native breeds in agri-environment management. In addition, the UK

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		has contingency plans in place to provide protection to at risk breeds in the event of exotic disease outbreak, within the constraints of controlling the disease. Despite significant progress implementing strategies for the conservation of genetic resources, particularly for ex-situ seed conservation, progress is assessed as insufficient in recognition of published declines in the effective population size of some native animal breeds. Furthermore, the UK Government is exploring options for in-situ management of crop wild relatives.
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services.		
Aichi Target 14 *By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities and the poor and vulnerable.*	Progress towards target but at an insufficient rate	This target requires that the provision of essential ecosystems services, such as climate mitigation, flood protection, pollination and wildlife conservation should be maintained. The assessment considers whether the status of key services has been assessed, and the status of supporting habitats and species. Significant progress has been made assessing the value and condition of ecosystem services in the UK, including the development of natural capital accounting systems. A variety of initiatives have been implemented to safeguard ecosystems in the UK, including the designation of protected areas to safeguard ecosystems at large and policy to protect specific services, such as national pollinator strategies. Positive trends have been recorded in the provision of climate regulation services by terrestrial ecosystems, such as woodlands, and trends in some key services have stabilised or are recovering following historic decline, for example the indicator on the proportion of large fish in the North Sea. Through the Darwin Initiative, the UK is also funding biodiversity conservation projects that support developing countries and which also reduce poverty and gender inequality. The Darwin Initiative uses criteria and guidance to ensure all projects take account of the needs of local communities, the welfare and wellbeing of local people, and gender equality. This integration is tested through monitoring and evaluation of projects. Progress is assessed as insufficient, as the condition of UK ecosystems providing key services is mixed, and some remain in a degraded state in the UK as indicated by the significant proportion of inland and coastal waters that remain below high or good levels for ecological status and recognition that further work is required to restore habitats such as peatlands so they provide a service as a carbon sink and manage the release of floodwater from uplands.
Aichi Target 15 *By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has*	Progress towards target but at an insufficient rate	This target has two main components. It requires that the contribution from ecosystems to carbon stocks has been enhanced; and that 15% of degraded ecosystems have been restored. The assessment considers the contribution of natural, semi-natural and agricultural ecosystems to carbon stocks using information from the Land Use, Land Use Change and Forestry inventories. For the target to be met these habitats should be in favourable condition (for wildlife conservation) and carbon stocks should be increasing. It has not been possible to directly measure whether 15% of degraded ecosystems have been restored – there are some difficult definitional issues in deciding at what point in time a degraded ecosystem is

Overview of the UK Assessments of Progress for the Aichi Targets

Aichi Target	Assessment conclusion	Assessment summary
been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.		restored following management intervention, including, for example, the baseline against which to assess success. The UK has ambitious future targets on the reduction of carbon emissions and in the Clean Growth Strategy set out actions to achieve these. The importance of key ecosystems, namely peatlands and woodland, in the sequestration of carbon is recognised. There has been significant progress in enhancing carbon stocks through the management of terrestrial ecosystems in the UK. The Land Use, Land Use Change and Forestry greenhouse gas inventories show that the contribution of terrestrial ecosystems to reducing greenhouse gas emissions since 1990, particularly from the forestry sector, and as arable land has been converted to grassland. A number of initiatives are being implemented to help restore key ecosystems and enhance their contribution to biodiversity and carbon storage, including peatland and woodland restoration projects – see elsewhere in this report for details of successes in rewetting peatlands by blocking drainage ditches and re-establishing vegetation cover. There is also a growing understanding of the role of marine ecosystems as blue carbon sinks in the UK. Progress is assessed as insufficient as further work is required to understand the actual and potential contributions of wetland and marine ecosystems to climate mitigation. In addition, evidence suggests that a significant proportion of key habitats and ecosystems remain in a degraded state for wildlife in the UK.
Aichi Target 16 *By 2015, the Nagoya Protocol on Access to Genetic resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.*	On track to achieve target	The UK signed the Nagoya Protocol in 2011. It was then implemented into UK law through The Nagoya Protocol (User Compliance) Regulations 2015. The Department of Business, Energy and Industrial Strategy (BEIS) have been appointed the competent authority responsible for the implementation of the Nagoya Protocol in the UK. They are also responsible for awareness raising and training of UK-based users of genetic resources, supporting users to access resources in line with national access legislation and complying with relevant EU Regulation.
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building		

Overview of the UK Assessments of Progress for the Aichi Targets

Aichi Target	Assessment conclusion	Assessment summary
Aichi Target 17 *By 2015, each Party has developed, adopted as a policy instrument, and has commenced implemented, an effective, participatory and updated national biodiversity strategy and action plan.*	On track to achieve target	The four UK countries have together developed and are implementing the UK Post-2010 Biodiversity Framework which describes how the work of each of the countries joins up with work at a UK level to contribute to the Strategic Plan for Biodiversity 2011-2020 and to the EU Biodiversity Strategy. In addition, the countries have together developed the UK Marine Strategy in response to the European Union's Marine Strategy Framework Directive, which sets out the actions that the UK will take to achieve Good Environmental Status in its marine waters by 2020. Each of the four metropolitan UK countries, plus some UK's Overseas Territories and Crown Dependencies, have developed and are implementing their own biodiversity strategies. The strategies include further priorities and are supported by additional measures and indicators, reflecting the countries' different responsibilities, needs, views and environmental circumstances.
Aichi Target 18 *By 2020, the traditional knowledge, innovations and practices of indigenous and local communities that are relevant for the conservation and sustainable use of biodiversity and their customary use of biological resources, are respected, subject to national legislation and relevant*	No assessment made	In the UK and Overseas Territories there are no indigenous peoples and local communities (IPLCs) as defined in Article 8j of the Convention and Target 18 has therefore not been assessed. The needs, knowledge and practices of IPLCs are recognised and integrated into the UK's international work.

Overview of the UK Assessments of Progress for the Aichi Targets

Aichi Target	Assessment conclusion	Assessment summary
international obligations, and fully integrated and reflected in the in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.		
Aichi Target 19 *By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.*	On track to achieve target	This target requires *action* to make data available and undertake research, and *outcomes* around knowledge sharing and its application. Progress on this target has been assessed against both whether initiatives to make data available, undertake research, share information and build knowledge are implemented as well as effectiveness of these initiatives at improving the knowledge and science base. The UK is a world leader in scientific research and is developing the use of innovative technologies to inform biodiversity conservation. Open data policy means that Government data relating to biodiversity in the UK are available by default rather than by request. The UK has made significant progress with data management and knowledge sharing systems, which continue to increase in size (for example the National Biodiversity Network includes over 219 million observations of wildlife), helping to improve the application of biodiversity knowledge. In addition, the UK has a range of research and knowledge sharing networks to help foster collaboration and the integration of science and policy to ensure the success of conservation and sustainability efforts. The assessment is judged to be sufficiently on track on the basis that a number of initiatives are in place to improve the knowledge and science base. Furthermore, evidence indicates the availability of data and information in the UK has substantially increased over the last decade.
Aichi Target 20 *By 2020, at the latest, the mobilisation of financial resources*	Progress towards target but at an insufficient rate	This target requires *action* to mobilise financial resources to support the implementation of the Strategic Plan for Biodiversity 2011–2020 particularly to help developing countries to meet their commitments. The UK has mobilised significant resources in support of the Strategic Plan for Biodiversity 2011–2020. The UK financial contribution in support of biodiversity in developing countries, especially for least developed countries, has risen from a baseline of £77.4m p.a between 2006 and 2010 to over £180m in 2015. Since 2015

Overview of the UK Assessments of Progress for the Aichi Targets

Aichi Target	Assessment conclusion	Assessment summary
for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation should increase substantially from the current levels.		the UK has announced a range of new funds for international biodiversity. For example, the UK is investing £5.8bn to support International Climate Finance between 2016 and 2021, which is helping to halt deforestation and help communities to protect and restore forests. The programme has supported the inclusion in Marine Protected Areas of over four million square kilometers of marine environment across the UK Overseas Territories. International financing is therefore assessed as progressing and on track. The overall assessment of insufficient is an acknowledgement that whilst international financing has increased, expenditure indicators show a fall in Government spend on biodiversity in the UK. Each of the UK countries has plans in place to mainstream biodiversity into other sectors and to mobilise resources from the private sector, and further work is required to capture the full scale of investment in domestic biodiversity.

'Lost decade for nature' as UK fails on 17 of 20 UN biodiversity targets

UK government said it failed on two-thirds of targets, but RSPB analysis is bleaker – and suggests UK is moving backwards in some areas

The high brown fritillary butterfly is a species in decline in the UK. Photograph: Sandra Standbridge/Getty Images

The age of extinction is supported by

About this content

Phoebe Weston

@phoeb0

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The UK has failed to reach 17 out of 20 UN biodiversity targets agreed on 10 years ago, according to an analysis from conservation charity RSPB that says the gap between rhetoric and reality has resulted in a "lost decade for nature".

The UK government's self-assessment said it failed on two-thirds of targets (14 out of 20) agreed at the Convention on Biological Diversity (CBD) in Nagoya, Japan, in 2010, but the RSPB analysis suggests the reality is worse. On six of the 20 targets the UK has actually gone backwards. The government's assessment published last year said it was not regressing on any target.

Significant failures include insufficient funding for nature conservation, too little land being managed for nature, and declining wildlife populations. "It [the government assessment] is a rose-tinted interpretation," said Kate Jennings, author of the report and head of site conservation policy at RSPB. "What we have seen is an awful lot of positive rhetoric, what we're not seeing is the action to back that up. The government creates an impression of

taking this stuff seriously but as soon as you dig down into the action that's just not reflected."

In the past decade, funding for UK wildlife and the environment has dropped by 30% – the equivalent of £250m. This means habitats are not being created, protected or monitored sufficiently, the report says. On paper, the UK is protecting 28% of land and 24% of sea but in practice a lot of protected land, such as national parks and sites of special scientific interest (SSSIs), are not being properly managed. The report suggests in reality as little as 5% of land in the UK is being effectively looked after for nature.

The government claims to be saving the country's most threatened species but the 2019 State of Nature report found 41% of UK species are declining and one in 10 is threatened with extinction. "It could not be more clear that what we're seeing is overall decline," said Jennings. "We're fundamentally dependent on nature, so God help the lot of us if we don't make serious headway in the next decade … Past performance doesn't inspire confidence."

The RSPB is calling for legally binding targets to protect biodiversity. Beccy Speight, chief executive at the RSPB, said: "We have targets enshrined in law to tackle the climate emergency, but none, yet, to reverse the crisis facing nature. We cannot be in this same position in 2030 with our natural world vanishing due to inaction."

Representatives from 196 governments signed up to 20 targets in 2010 – seen as a blueprint to save the planet – to restore wildlife habitats and populations. The RSPB analysis is released on the eve of the UN's Global Biodiversity Outlook 5 report, which will contain breakdowns of how each country has performed over the past decade.

The charity said that all over the world caring for wildlife was still seen as an optional extra, despite scientists saying biodiversity loss was as much of a threat to humanity as the climate crisis. The WWF's 2020 Living Planet report found global wildlife populations decreased by 68% between 1970 and 2016 with no sign of slowing.

At the next CBD in Kunming, China, in 2021, countries will agree the next 10 years of targets for nature, with many conservationists urgently calling for radical change. One of the main targets is committing to protecting 30% of land by 2030. Reaching that will mean profoundly transforming how people farm, fish, generate electricity and build houses. RSPB is launching a Revive Our World campaign to push for these targets to be made legally binding with clear milestones to monitor government progress.

"This is a global issue, and something that will take a generation to resolve, however the hard work must start today," Speight said. "We have to put our money where our mouth is and use the next decade to do something truly impressive."

A spokesperson from the Department for Environment, Food and Rural Affairs said the UK remained the first major economy to legislate for net zero and was committed to building a greener and more resilient society after the coronavirus pandemic.

"[We] are leading the world by setting ambitious goals for nature and biodiversity in our landmark environment bill as well as introducing new ways to reward farmers for protecting the environment, and investing £640m in the Nature for Climate fund," the spokesperson said.

ENGLISH NATURE

Lowland heathland

a cultural and endangered landscape

working today
for nature tomorrow

Coastal heath with western gorse and bell heather, North Wales - Woodfall Wild Images DWO15064

Lowland heathland

a cultural and endangered landscape

What is lowland heathland?

Lowland heathland is a broad term that refers to a mosaic of wet, damp and dry habitats, characterised by attractively flowering dwarf shrubs such as heathers (ling, bell and cross-leaved heaths) and gorses (common, western or dwarf). They are generally found on poor, acidic soils, in relatively wet areas with a mild temperature and below about 300 metres altitude. They support many rare plants and animals, such as the marsh gentian, southern damselfly, nightjar and sand lizard, which often live only in these areas.

Most heathlands developed during or after the Stone Age (some 3,500 ago) in areas with poor soils, where trees were removed and grazing or burning prevented their regrowth. Lowland heathland also occurs naturally in some coastal areas, where the harsh environmental conditions prevent tree growth.

Roydon Common NNR, Norfolk Peter Wakely/English Nature 17,032

Open heathland is rarer than rain forest. In the UK we have only about 16% left of the area that existed in 1800. That means that from an area similar to the size of Cornwall, only the equivalent of the Isle of Wight remains. The process of loss and

disintegration has been particularly fast in recent decades. However, this country still holds 20% (more than 60,000 hectares) of the whole world's lowland heathland. Thus there is a need, not only to preserve and improve our remaining heathlands, but if possible, to re-create them in areas where they have recently been lost. There is a special case for linking small fragments of heathlands, where the few remaining species are stretched for space and risk disappearing in the event of a fire, to create areas which can maintain a wider range of wildlife and can survive in the future.

Lowland heathland distribution in the UK

Where does lowland heathland occur?

The most significant areas for lowland heathland in the UK include the counties of Cornwall, Devon, Dorset, Hampshire, Norfolk, Staffordshire, Suffolk, Surrey, Pembrokeshire, West Glamorgan and West Gwynedd. There are small areas in Kent, Lincolnshire, the Vale of York and the Midlands.

There is little lowland heathland in Scotland. However, some forms of heathland occur at low altitudes, which are similar in character to those in England, Wales and Northern Ireland. They appear usually near the farms or agricultural holdings, although mostly as small fragments. The most distinctive and extensive are the coastal heaths.

Why are heathlands important for wildlife?

A heathland is much more than heathers and gorses. Areas of heathland may also contain grasses, a few flowers, some trees, bare ground and, in some cases, ponds or running water. In many sites, heathlands form part of bigger landscape units together with other habitats such as grasslands, woodlands, mires or scrub.

As mentioned, lowland heathlands are home to many plants and animals whose distribution range has decreased along with the disintegration or disappearance of the habitat or the lack of management of many heaths. Although there are no mammals that live only on lowland heaths, some are very characteristic inhabitants of this landscape. Rabbits, for example, an introduced species which used to be considered an agricultural pest, have shaped the

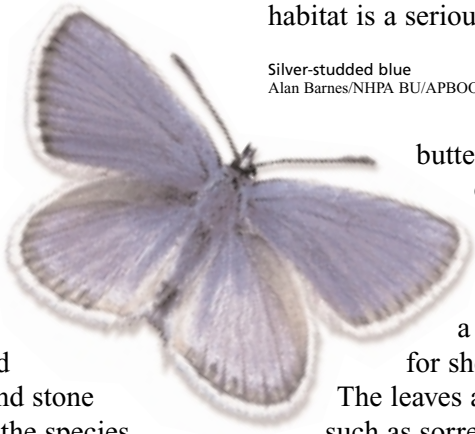
Great sundew Roger Key/English Nature

Cladonia fimbriata, Wyre Forest NNR, Herefordshire Peter Wakely/English Nature 15,181

Nightjars Simon Nobes/English Nature

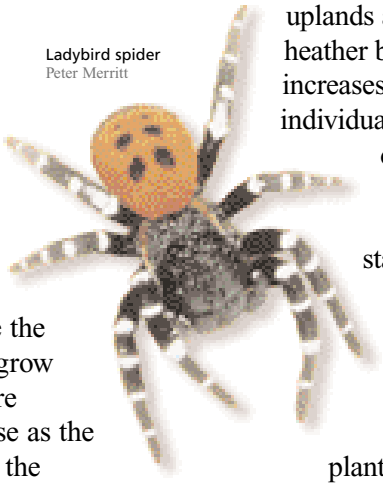
Stone curlew Geoff Higginbotham

vegetation, and maintained the openness of the heaths. Rabbits are particularly important in the East Anglian heaths, where they were originally bred for food and fur. Cattle, sheep and ponies also grazed the heathlands for centuries.



Silver-studded blue
Alan Barnes/NHPA BU/APBOOO451A

There are few birds restricted to heathlands, but some are very specialised. Dartford warblers, nightjars and stone curlews are some of the species primarily associated with lowland heathland, but many others live in areas where heathland is one of the components of the landscape, such as kestrels, hobbies and stonechats; Dartford warblers and nightjars use mosaics of scrub and open heath to forage, breed and perch. It is therefore important to keep some scrub as part of the heathland landscape.



Ladybird spider
Peter Merritt

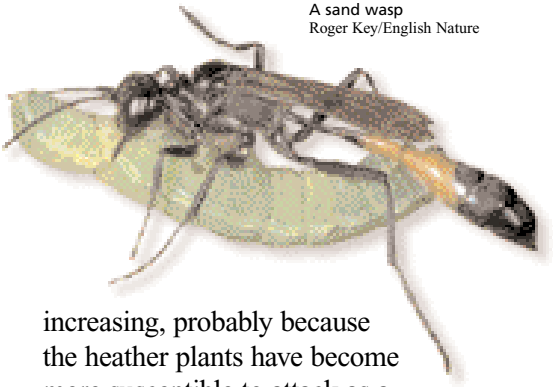
However, small plants like the yellow centaury can only grow in open sandy or peaty bare ground. Animals as diverse as the black and red sand wasps, the ladybird spider and sand lizard rely on the presence of bare sand to hunt and lay their eggs.

Many insects have heathlands as their primary habitat and feed on grasses and flowers typical of the heaths. Some of them are not very mobile, so fragmentation and deterioration of the habitat is a serious threat to them. Some species, such as silver-studded blue butterfly, require a continuous supply of young heather, a warm microclimate and vegetation with a varied age structure for shelter and roosting. The leaves and flowers of plants such as sorrel, ragwort or yarrow are vitally important for moths and nectar-feeding invertebrates.

A particularly controversial inhabitant of the heathlands, in both the uplands and the lowlands, is the heather beetle. Sporadic increases in the number of individuals can cause severe damage to the vegetation, especially to the mature, uniform stands. However, they are a natural part of the environment and most sites regenerate naturally in a few years. Stands with plants of different ages are less likely to suffer from severe outbreaks. Recently, however, the number of outbreaks seems to be

Sand cliffs – a habitat for burrowing insects Roger Key/English Nature

Marsh gentian Bob Gibbons/Natural Image 20,1824



A sand wasp
Roger Key/English Nature

increasing, probably because the heather plants have become more susceptible to attack as a result of atmospheric pollution increasing the nutritive value of the plants.

Management issues

The management of heathland for its wildlife can be complicated, as some species require very specific conditions. When heathlands were

Lakenheath Warren, Suffolk Peter wakely/English Nature 15,757

larger and exploited economically, it is likely that there was enough variation in the environment to cater for all its species. Marsh gentian is a plant only common in damp areas in the southern heathlands. The ideal management to maintain it is light grazing, which eliminates or reduces stronger competitors for light and nutrient, such as purple moor-grass. Small scale turf-cutting or controlled winter burning will also help to produce a nice blue dotted carpet in late summer.

Bogs, pools and mires are also part of the heathland complex. Where the soil is very acidic and nutrient-poor, one can often find a fascinating group of plants that specialise in trapping insects to supplement their diet. Some of the more characteristic are the sundews, whose leaves have red-tipped sticky hairs to capture insects. This sort of habitat is also home to raft spiders and amphibians. Among the amphibians, the natterjack toad is found only in open habitats, such as sand dunes and lowland heathland. A lack of management results in the vegetation growing too high and too

Bracken control Isabel Alonso/English Nature

Bell heather and ling Paul Glendell/English Nature 24,849

dense, and this means a loss of shelter and hunting areas for the toads. The same is true for the sand lizard, another typical inhabitant of the heaths. Sand lizards require unshaded areas of sand and mature, also sunny stands of heather on south-facing slopes. When near to urban areas there is an increased risk of destruction of the habitat by fires, hunting by domestic cats and severe pressure from public recreation. All six native British reptiles are found in some lowland heaths in Britain.

It is, therefore, important to maintain not only all the elements of the habitat but also keep the structural variety to benefit all the potential heathland inhabitants.

Heathlands as pieces of ancient and modern history

The agricultural use and management of heathlands has been very similar all over Western Europe and is part of our common cultural heritage. Most heathlands have traces of human use and occupation from their origin, thousands of years ago, right up to the present day. Earthworks, barrows, ditches and trenches are some of the remains of these past activities.

Mesolithic people (8,000 to 6,000 BC) almost certainly herded animals before the agricultural period, and cleared the forest, probably by burning it, to provide pasture. This drastic change

Stoborough Heath NNR, Dorset Peter Wakely/English Nature 18,574

led to the degradation and impoverishment of the soils, on which heathers then grew. Up until the beginning of the 20th century heathlands were a part of the farming system, being used for cutting turf, cutting vegetation for fodder and fuel, and being burnt to supply continuous forage. Turf was used for building or fuel and, in some countries, mixed with animal dung and spread over the arable fields as fertiliser. Some secondary products are also typical of heathlands, for example honey and wax, cheese, heather beer and liquors, wild fruits and some handcrafted objects.

The areas where lowland heathland occurs have a mild climate that allowed domestic cattle, which were mostly hardy breeds, to graze throughout the year. Often it was not necessary even to provide shelter, so farmers did not need to do much shepherding, and could concentrate on other farming activities. Increasingly, intensive farming practices have resulted in different, more profitable breeds being selected, and grazing on heaths being all but abandoned in the lowlands. In contrast, intensification has resulted in upland heaths being overgrazed.

Nowadays the importance of lowland heathlands is recognised by national and international designations which should help to ensure their protection against further losses.

Dorset Heath *Erica ciliaris* Peter Wakely/English Nature 20,520

Why is heathland a rare habitat?

At one time, heathlands occurred over several million hectares along the Atlantic coasts of Europe, but habitat losses have been substantial during the last 200 years in all countries. The main causes of loss in the UK have been:

- Development – towns and roads have been built on what used to be heathland, for example around Bournemouth. Many of the remaining heaths in the south of Britain are threatened by their proximity to urban areas from pollution, arson and disturbance.
- Conifer planting – heaths were considered a 'waste land' and commercial plantations were seen as a way of obtaining some economic benefits from the land.

Roydon Common NNR, Norfolk Peter Wakely/English Nature 17,033

Recreation damage at Canford Heath SSSI, Dorset Peter Wakely/English Nature 10,589

- Changes in agricultural practices – on one hand, the availability of cheap artificial fertilisers made it easier to reclaim heathland areas, on otherwise poor soils, for agriculture. On the other, traditional grazing practices have disappeared in all but a few places, for example The New Forest.
- Mining – some of the soils where heathlands occur are poor for agriculture but rich in mineral resources such as gravel or China clay.
- Misconceptions – a commonly shared view is that heaths are "a waste and barren land", with little wildlife or other value.

Nowadays, the lack of appropriate management is the main threat to the remaining heathlands. Although they are very valuable for wildlife and public enjoyment, their economical value is small and their abandonment has led to the invasion of undesired species, or the overgrowth of some of the typical heathland species.

Being a mostly man-made landscape, with a tendency to develop into woodland, heathlands cannot survive without active management. All the plants and animals that have specialised and adapted to the open habitats over thousands of years would disappear if their habitats become shaded and overgrown.

Cattle grazing on heathland Rob McGibbon

Restored heathland, Surrey Peter Wakely/English Nature 21,478

What do we need to do to conserve and restore our lowland heathlands?

Many lowland heathlands provide peaceful enjoyment, scenic views and recreation for millions of visitors every year. In the UK most lowland heathlands are designated as Sites or Areas of Special Scientific Interest (SSSIs/ASSIs) under the Wildlife and Countryside Act 1981. Many of these are also part of the European Natura 2000 network, protected under the Birds and the Habitats Directives. However, the attachment of a designation does not automatically guarantee the conservation of the habitat. Appropriate active management must be carried out regularly to maintain the remaining heathland areas. For example:

School party on dune trail at Studland and Godlingstone Heaths NNR, Dorset

Peter Wakely/English Nature 17,568

- Grazing: grazing was a fundamental part of traditional management of the lowland heathland areas. The use of the right animals and at the right time of the year is believed to be in most cases the best possible management to maintain the openness and diversity of the habitat.
- Control of invasive species: some heathland species, such as bracken, gorse and scrub, were cut as fodder for the farm animals. Nowadays they do not have any economic value and they have increased in area beyond advisable conservation limits. Exotic species, such as rhododendron and gaultheria (or shallon), have escaped from gardens and spread aggressively on heathlands, shading and excluding the native species.
- Maintaining low nutrient levels: the enrichment of the soils, through litter accumulation, fertilisation or atmospheric deposition of nutrients tilts the ecological balance towards less specialised vegetation which can out-compete the heathers.
- Management of recreational pressure: heathlands and their wildlife are susceptible to damage by excessive trampling, motorbikes and horse-riding in sensitive areas, as well as by arson fires.

The need for restoration and re-creation is recognised in the Government's UK Biodiversity Action Plan. Some of the aims of this plan are to restore all existing heaths and re-create a further 6,000 hectares by 2005. Maintaining the current heathlands and creating new ones

Arable reverting to heath at Stoborough Heath NNR, Dorset

Peter Wakely/English Nature 18,569

Heathland re-creation in former plantation Isabel Alonso/English Nature

require a great economic and human effort which has resulted in the formation of strong partnerships among organisations interested in nature conservation.

Several programmes have taken place in recent years in Britain, which aim to restore heathlands or to re-create them on sites where they have been lost. There may be funds available to manage, restore and re-create heaths on designated sites from the country conservation agencies and other conservation organisations. These and other areas can also benefit from voluntary environmental land management schemes, which operate throughout the UK.

Further reading

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Contact names and addresses:

Butterfly Conservation
Manor Yard, East Lulworth, near Wareham, Dorset BH20 5QP
Tel: 01929 400209
www.butterfly-conservation.org
Charitable body concerned with the conservation of butterflies and moths and their habitats.

Countryside Agency
John Dower House, Crescent Place, Cheltenham GL50 3RA
Tel: 01242 521381
www.countryside.gov.uk
Contact for National Parks, Areas of Outstanding Natural Beauty and a wide range of countryside matters.

Countryside Council for Wales
Plas Penrhos, Ffordd Penrhos, Bangor Gwynedd LL57 2LQ, Wales.
Tel: 01248 385500
www.ccw.gov.uk
Contact for all matters concerning countryside conservation, Sites of Special Scientific Interest in Wales and the Tir Gofal Scheme.

Department of Agriculture and Rural Development Northern Ireland
Countryside Management Division, Dundonald House, Upper Newtownards Road, Belfast BT4 3SB
Tel: 01232 520100
www.dardni.gov.uk
Contact for information on Environmental Land Management Schemes in Northern Ireland.

Department for Environment, Food & Rural Affairs
Nobel House, 17 Smith Square, London SW1P 3JR.
Tel: 020 7238 6000
www.defra.gov.uk
Contact for information on Environmental Land Management Schemes in England. Co-ordinates implementation of the UK Biodiversity Action Plan

English Nature
Northminster House, Peterborough PE1 1UA
Tel: 01733 455101
www.english-nature.org.uk
Contact for all matters concerning nature conservation, Sites of Special

Scientific Interest and the Wildlife Enhancement Scheme. Lead agency for the conservation of lowland calcareous grassland under the UK Biodiversity Action Plan.

Environmental & Heritage Service
Commonwealth House, 35 Castle Street,
Belfast BT1 1GU, Northern Ireland.
Tel: 029 9025 1477
www.nics.gov.uk/ehs/
Contact for matters relating to the conservation of the natural and built heritage including responsibilty for Areas of Special Scientific Interest.

The Herpetological Conservation Trust
655A Christchurch Road,
Boscombe, Bournemouth,
Dorset BH1 4AP
Tel: 01202 391319
www.hcontrst.f9.co.uk
Charitable organisation concerned with the conservation of reptiles and amphibians.

National Assembly for Wales Agriculture Department
Crown Buildings, Cathays Park,
Cardiff CF1 3NQ
Tel: 029 20825111
www.wales.gov.uk/subiagriculture
Contact for information on ESAs in Wales.

National Trust
33 Sheep Street, Cirencester,
Gloucestershire GL7 1RQ
Tel: 01285 651818
www.nationaltrust.org.uk
Charitable body concerned with the conservation of places of historic interest and natural beauty in England, Wales and Northern Ireland.

Plantlife
21 Elizabeth Street, London SW1W 9RP
Tel: 020 7808 0100
www.plantlife.org.uk
Charitable body concerned with the conservation of wild plants and their habitats.

Royal Society for the Protection of Birds
The Lodge, Sandy,
Bedfordshire SG19 2DL
Tel: 01767 680551
www.rspb.org.uk
Charitable body concerned with the conservation of wild birds and their habitats.

Scottish Executive Rural Affairs Department
Pentland House, 47 Robb's Loan,
Edinburgh EH14 1TY
Tel: 0131 556 8400
www.scotland.gov.uk
Contact for information on Environmental Land Management Schemes in Scotland (ESAs and the Rural Stewardship Scheme).

Scottish Natural Heritage
12 Hope Terrace, Edinburgh EH9 2AS
Tel: 0131 447 4784
www.snh.org.uk
Contact for all matters concerning countryside conservation and Sites of Special Scientific Interest in Scotland.

The Wildlife Trusts
UK Office, The Kiln, Waterside,
Mather Road, Newark, NG24 1WT
Tel: 01636 677711
www.wildlifetrusts.org
Voluntary conservation organisation concerned with the conservation of wildlife throughout the UK. Contact for information on Local Wildlife Trusts.

Iping Common, West Sussex Bob Gibbons/Natural Image 20.1096

ENGLISH NATURE

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The global assessment report on

BIODIVERSITY AND ECOSYSTEM SERVICES

SUMMARY FOR POLICYMAKERS

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SUMMARY FOR POLICYMAKERS OF THE IPBES GLOBAL ASSESSMENT REPORT ON BIODIVERSITY AND ECOSYSTEM SERVICES

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For further information, please contact:

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)
IPBES Secretariat, UN Campus
Platz der Vereinten Nationen 1, D-53113 Bonn, Germany
Phone: +49 (0) 228 815 0570
Email: secretariat@ipbes.net
Website: www.ipbes.net

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Hien T. Ngo (Head)
Maximilien Guèze

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MEMBERS OF THE MANAGEMENT COMMITTEE WHO PROVIDED GUIDANCE FOR THE PRODUCTION OF THIS ASSESSMENT:

Robert T. Watson, Ivar A. Baste, Anne Larigauderie, Paul Leadley, Unai Pascual, Brigitte Baptiste, Sebsebe Demissew, Luthando Dziba, Gunay Erpul, Asghar M. Fazel, Markus Fischer, Ana Maria Hernández, Madhav Karki, Vinod Mathur, Tamar Pataridze, Isabel Sousa Pinto, Marie Stenseke, Katalin Török and Bibiana Vilá.

OVERALL REVIEW EDITORS

Manuela Carneiro da Cunha, Georgina M. Mace, Harold Mooney.

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The global assessment report on BIODIVERSITY AND ECOSYSTEM SERVICES

SUMMARY FOR POLICYMAKERS

AUTHORS:[1]

Sandra Díaz (Co-Chair, Argentina), Josef Settele (Co-Chair, Germany), Eduardo Brondízio (Co-Chair, Brazil/United States of America), Hien T. Ngo (IPBES), Maximilien Guèze (IPBES); John Agard (Trinidad and Tobago), Almut Arneth (Germany), Patricia Balvanera (Mexico), Kate Brauman (United States of America), Stuart Butchart (United Kingdom of Great Britain and Northern Ireland/BirdLife International), Kai Chan (Canada), Lucas A. Garibaldi (Argentina), Kazuhito Ichii (Japan), Jianguo Liu (United States of America), Suneetha Mazhenchery Subramanian (India/United Nations University), Guy F. Midgley (South Africa), Patricia Miloslavich (Bolivarian Republic of Venezuela/Australia), Zsolt Molnár (Hungary), David Obura (Kenya), Alexander Pfaff (United States of America), Stephen Polasky (United States of America), Andy Purvis (United Kingdom of Great Britain and Northern Ireland), Jona Razzaque (Bangladesh/United Kingdom of Great Britain and Northern Ireland), Belinda Reyers (South Africa), Rinku Roy Chowdhury (United States of America), Yunne-Jai Shin (France), Ingrid Visseren-Hamakers (Netherlands/United States of America), Katherine Willis (United Kingdom of Great Britain and Northern Ireland), Cynthia Zayas (Philippines).

1. Authors are listed with, in parenthesis, their country of citizenship, or countries of citizenship separated by a comma when they have several; and, following a slash, their country of affiliation, if different from citizenship, or their organization if they belong to an international organization; name of expert (nationality 1, nationality 2/affiliation). The countries or organizations having nominated these experts are listed on the IPBES website.

IPBES is an independent intergovernmental body comprising over 130 member Governments. Established by Governments in 2012, IPBES provides policymakers with objective scientific assessments about the state of knowledge regarding the planet's biodiversity, ecosystems and the contributions they make to people, as well as options and actions to protect and sustainably use these vital natural assets.

The IPBES Global Assessment of Biodiversity and Ecosystem Services represents the landmark product of the first work programme of IPBES (2014-2018). The Global Assessment was initiated following a decision from the IPBES Plenary at its fourth session (IPBES 4, Kuala Lumpur, 2016), and considered by the IPBES Plenary at its seventh session (IPBES 7, Paris, 2019). It is composed of a summary for policymakers, which was approved at IPBES 7, and six chapters, which were accepted at IPBES 7.

FOREWORD

A key objective of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is to provide Governments, the private sector and civil society with scientifically credible and independent up-to-date assessments of available knowledge for better evidence-informed policy decisions and action at the local, national, regional and global levels.

This Global Assessment of Biodiversity and Ecosystem Services has been carried out by about 150 selected experts from all regions of the world, including 16 early career fellows, assisted by 350 contributing authors. More than 15,000 scientific publications were analyzed as well as a substantive body of indigenous and local knowledge. Its chapters were accepted, and its summary for policymakers was approved, by the more than 130 Governments that constitute the Members of IPBES, at the seventh session of the IPBES Plenary (29th April to 4th May, 2019), hosted by France at UNESCO in Paris.

This report represents a critical assessment, the first in almost 15 years (since the release of the Millennium Ecosystem Assessment in 2005) and the first ever carried out by an intergovernmental body, of the status and trends of the natural world, the social implications of these trends, their direct and indirect causes, and, importantly, the actions that can still be taken to ensure a better future for all. These complex links have been assessed using a simple, yet very inclusive framework that should resonate with a wide range of stakeholders, since it recognizes diverse world views, values and knowledge systems.

The concept of nature's contributions to people, which is discussed in detail in chapter 1, embraces a wide range of descriptions of human-nature interactions, including through the concept of ecosystem services and other descriptions, which range from strongly utilitarian to strongly relational. The concept of nature's contribution to people was developed to embrace a fuller and more symmetric consideration of diverse stakeholders and world views, and a richer evidence base for action, i.e., the knowledge base offered by the natural and social sciences, the humanities, and the knowledge of practitioners and indigenous and local communities. The reporting system for nature's contributions to people has a gradient of complementary and overlapping approaches, ranging from a generalizing to a context-specific perspective. The generalizing perspective is analytical in purpose and is organized into eighteen categories of material, non-material and regulating contributions. The context-specific perspective

is typical of indigenous and local knowledge systems, where knowledge production does not typically seek to explicitly extend or validate itself beyond specific geographic and cultural contexts. In this way, the nature's contributions to people approach (or the IPBES approach) builds on the existing approaches, descriptors and metrics used by different communities of practice in the search for understanding and solutions.

In the last 10-15 years, since the Millennium Ecosystem Assessment, there has been a significant increase in our understanding of biodiversity and ecosystems, as well as their importance to the quality of life of every person. There is also greater understanding now about which policies, practices, technologies and behaviors can best lead to the conservation and sustainable use of biodiversity and the achievement of many of the Sustainable Development Goals, the Aichi Biodiversity Targets and the Paris Agreement on Climate Change. However, biodiversity is still being lost, ecosystems are still being degraded and many of nature's contributions to people are being compromised.

The Assessment is critical today because evidence has accumulated that the multiple threats to biodiversity have intensified since previous reports, and that the sustainable use of nature will be vital for adapting to and mitigating dangerous anthropogenic interference with the climate system, as well as for achieving many of our most important development goals.

The findings of this Assessment focus on the global scale, spanning the period from the 1970s to 2050. They are based on an unprecedented collection of evidence, integrating natural and social science perspectives, a range of knowledge systems and multiple dimensions of value. This is the first global-level assessment to systematically consider evidence about the contributions of indigenous and local knowledge and practices, and issues concerning Indigenous Peoples and Local Communities. All these features result in a more holistic assessment of indirect drivers as root causes of changes in nature and the associated risks to the quality of life of all people.

As the Chair and the Executive Secretary of IPBES, we wish to recognize the excellent and dedicated work of the co-chairs, Professors Sandra Díaz (Argentina), Eduardo S. Brondízio (Brazil and USA), and Josef Settele (Germany) and of all the coordinating lead authors, lead authors, review editors, fellows, contributing authors and reviewers, and to warmly thank them for their commitment, and for contributing their time freely to this important report. We would also like to thank Hien Ngo and Maximilien Guèze from the technical support unit located at the IPBES secretariat in Bonn, Germany, because this report would not have been possible without their extraordinary dedication. Our thanks also go the current and former members of the Multidisciplinary Expert Panel (MEP) and of the Bureau who provided guidance as part of the management committee for this report, and to members of other technical support units within the IPBES secretariat, who have supported the production of this report. We would also like to thank all Governments and other institutions that provided financial and in-kind support for the preparation of this assessment.

The IPBES Global Assessment of Biodiversity and Ecosystem Services, together with the four IPBES regional assessments of Biodiversity and Ecosystem Services, and the two thematic Assessments of Pollination, Pollinators and Food Production, and of Land Degradation and Restoration, form an impressive corpus of knowledge to make better-informed decisions regarding the conservation and sustainable use of biodiversity. The IPBES Global Assessment is expected to be an important evidence base for the assessment of progress towards the achievement of the Aichi Biodiversity Targets in the fifth edition of the Global Biodiversity Outlook and to play a major role in the consideration of the post 2020 biodiversity framework by the 15th Conference of the Parties to the Convention on Biological Diversity, in October 2020. It is also expected to inform implementation of the 2030 Agenda for Sustainable Development, the Sustainable Development Goals and the Paris Agreement on Climate Change. It is our sincere hope that the IPBES Global Assessment will continue to place biodiversity at the top of the global political agenda, with similar priority to that accorded to climate change. The process leading to COP 15 offers this opportunity.

Sir Robert T. Watson
Chair of IPBES from 2016 to 2019

Anne Larigauderie
Executive Secretary of IPBES

STATEMENTS FROM KEY PARTNERS

Nature makes human development possible but our relentless demand for the earth's resources is accelerating extinction rates and devastating the world's ecosystems. UN Environment is proud to support the Global Assessment Report produced by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services because it highlights the critical need to integrate biodiversity considerations in global decision-making on any sector or challenge, whether its water or agriculture, infrastructure or business.

Joyce Masuya

Acting Executive Director,
United Nations Environment Programme (UNEP)

This essential report reminds each of us of the obvious truth: the present generations have the responsibility to bequeath to future generations a planet that is not irreversibly damaged by human activity. Our local, indigenous and scientific knowledge are proving that we have solutions and so no more excuses: we must live on earth differently. UNESCO is committed to promoting respect of the living and of its diversity, ecological solidarity with other living species, and to establish new, equitable and global links of partnership and intragenerational solidarity, for the perpetuation of humankind.

Audrey Azoulay

Director-General,
United Nations Educational, Scientific and Cultural Organization (UNESCO)

The *Global assessment of biodiversity and ecosystem services* adds a major element to the body of evidence for the importance of biodiversity to efforts to achieve the Zero Hunger objective and meet the Sustainable Development Goals. Together, assessments undertaken by IPBES, FAO, CBD and other organizations point to the urgent need for action to better conserve and sustainably use biodiversity and to the importance of cross-sectoral and multidisciplinary collaboration among decision-makers and other stakeholders at all levels.

José Graziano da Silva

Director-General,
Food and Agriculture Organization of the United Nations (FAO)

Across cultures, humans inherently value nature. The magic of seeing fireflies flickering long into the night is immense. We draw energy and nutrients from nature. We find sources of food, medicine, livelihoods and innovation in nature. Our well-being fundamentally depends on nature. Our efforts to conserve biodiversity and ecosystems must be underpinned by the best science that humanity can produce. This is why the scientific evidence compiled in this IPBES Global Assessment is so important. It will help us build a stronger foundation for shaping the post 2020 global biodiversity framework: the 'New Deal for Nature and People'; and for achieving the SDGs.

Achim Steiner

Administrator,
United Nations Development Programme (UNDP)

The IPBES' 2019 Global Assessment Report on Biodiversity and Ecosystem Services comes at a critical time for the planet and all its peoples. The report's findings — and the years of diligent work by the many scientists who contributed— will offer a comprehensive view of the current conditions of global biodiversity. Healthy biodiversity is the essential infrastructure that supports all forms of life on earth, including human life. It also provides nature-based solutions on many of the most critical environmental, economic, and social challenges that we face as human society, including climate change, sustainable development, health, and water and food security. We are currently in the midst of preparing for the 2020 UN Biodiversity Conference, in China, which will mark the close of the Aichi Biodiversity Targets and set the course for a post 2020 ecologically focused sustainable development pathway to deliver multiple benefits for people, the planet and our global economy. The IPBES report will serve as a fundamental baseline of where we are and where we need to go as a global community to inspire humanity to reach the 2050 Vision of the UN Biodiversity Convention "Living in harmony with nature". I want to extend my thanks and congratulations to the IPBES community for their hard work, immense contributions and continued partnership.

Dr. Cristiana Paşca Palmer

Executive Secretary
Convention on Biological Diversity (CBD)

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The co-chairs of the IPBES Global Assessment Report of Biodiversity and Ecosystem Services wish to thank the people and institutions that helped to make the Report possible.

We are first indebted to the hundreds of experts in biophysical and social sciences, policymakers and practitioners, as well as representatives of Indigenous Peoples and Local Communities, who generously contributed their time and knowledge, as lead authors, chapter scientists, resource person, and/or review editors (listed below), and to all contributing authors. We are fortunate to have had the opportunity to work with such an engaged, collegial and superb group of authors.

We are grateful to the members of the IPBES secretariat, particularly Executive Secretary Anne Larigauderie, the IPBES Chair (Robert Watson), representatives of member States, the Multidisciplinary Expert Panel and Bureau and other resource persons for their dedication, strategic vision, constructive comments and continued advice. The Global Assessment would not have been possible without the titanic effort of its technical support unit (Hien T. Ngo and Maximilien Guèze) during the whole process, including the long and challenging seventh session of the IPBES Plenary (#IPBES7), which resulted in the approval of this Summary for Policymakers and the acceptance of the underlying chapters. In addition, we are thankful for the support of several IPBES technical support units, and their host institutions at different stages of the process: Knowledge and data technical support unit (NIE, Republic of Korea), indigenous and local knowledge technical support unit (UNESCO), scenarios and models technical support unit (PBL, Netherlands), and the capacity building technical support unit (NEA, Norway). We also thank the data visualization specialist and the graphic designer for their skillful work. We would like to thank the IPBES communications team, for their outstanding work communicating the main messages to the general public.

We are also grateful to all supportive Governments but in particular the Governments of Germany, South Africa, Norway, the United Kingdom, France, and the Netherlands as well as to the Córdoba Province (Argentina), who generously hosted our chapter and/or author meetings. The co-chairs would especially like to acknowledge the support of their home institutions and governments: the Helmholtz Centre for Environmental Research – UFZ (Germany), iDiv (the German Centre for Integrative Biodiversity Research), Universidad Nacional de Córdoba and CONICET (Argentina), and Indiana University-Bloomington (USA). Finally, our gratitude goes to the Government of France for hosting #IPBES 7 and to UNESCO for providing the venue and support. The dedication and contributions of all of the governments, organizations and people above made the Global Assessment possible and impactful and for that we are deeply indebted and appreciative.

Sandra Díaz, Josef Settele, Eduardo S. Brondízio
Co-Chairs

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C. Adams, J. Agard, A. P. D. Aguiar, D. Armenteras, A. Arneth, Y. Aumeeruddy-Thomas, X. Bai, P. Balvanera, T. Bekele Gode, E. Bennett, Y. A. Boafo, A. K. Boedhihartono, P. Brancalion, K. Brauman, E. Bukvareva, S. Butchart, K. Chan, N. Chettri, W. L. Cheung, B. Czúcz, F. DeClerck, E. Dulloo, B. Gabrielyan, L. Galetto, K. Galvin, E. García Frapolli, L. Garibaldi, A. P. Gautam, L. R. Gerber, A. Geschke, J. Gutt, S. Hashimoto, A. Heinimann, A. Hendry, G. C. Hernández Pedraza, T. Hickler, A. I. Horcea-Milcu, S. A. Hussain, K. Ichii, M. Islar, U. Jacob, W. Jetz, J. Jetzkowitz, Md S. Karim, E. Kelemen, E. Keskin, P. Kindlmann, M. Kok, M. Kolb, Z. Krenova, P. Leadley, J. Liu, J. Liu, G. Lui, M. Mastrangelo, P. McElwee, L. Merino, G. F. Midgley, P. Miloslavich, P. A. Minang, A. Mohammed, Z. Molnár, I. B. Mphangwe Kosamu, E. Mungatana, R. Muradian, M. Murray-Hudson, N. Nagabhatla, A. Niamir, N. Nkongolo, T. Oberdorff, D. Obura, P. O'Farrell, P. Osano, B. Öztürk, H. Palang, M. G. Palomo, M. Panahi, U. Pascual, A. Pfaff, R. Pichs Madruga, S. Polasky, A. Purvis, J. Razzaque, B. Reyers, V. Reyes-García, C. Rondinini, R. Roy Chowdhury, G. M. Rusch, O. Saito, J. Sathyapalan, T. Satterfield, A. K. Saysel, E. R. Selig, R. Seppelt, L. Shannon, Y. J. Shin, A. Simcock, G. S. Singh, B. Strassburg, S. Subramanian, D. Tarkhnishvili, E. Turnhout, M. Verma, A. Viña, I. Visseren-Hamakers, M. J. Williams, K. Willis, H. Xu, D. Xue, T. Yue, C. Zayas, L. Balint, Z. Basher, I. Chan, A. Fernandez-Llamazares, P. Jaureguiberry, M. Lim, A. J. Lynch, A. Mohamed, T. H. Mwampamba, I. Palomo, P. Pliscoff, R. Salimov, A. Samakov, O. Selomane, U. B. Shrestha, A. Sidorovich, R. Krug, J.H. Spangenberg, E. Strombom, N. Titeux, M. Wiemers, and D. Zaleski.

Review editors:
M. Carneiro da Cunha, G. Mace, H. Mooney, R. Dirzo, S. Demissew, H. Arceo, S. Asah, E. Lambin, J. Mistry, T. Brooks, F. Berkes, M. Chytry, K. Esler, J. Carabias Lillo and J. Plesnik.

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KEY MESSAGES

KEY MESSAGES

A. Nature and its vital contributions to people, which together embody biodiversity and ecosystem functions and services, are deteriorating worldwide.

Nature embodies different concepts for different people, including biodiversity, ecosystems, Mother Earth, systems of life and other analogous concepts. Nature's contributions to people embody different concepts, such as ecosystem goods and services and nature's gifts. Both nature and nature's contributions to people are vital for human existence and good quality of life (human well-being, living in harmony with nature, living well in balance and harmony with Mother Earth, and other analogous concepts). While more food, energy and materials than ever before are now being supplied to people in most places, this is increasingly at the expense of nature's ability to provide such contributions in the future, and frequently undermines nature's many other contributions, which range from water quality regulation to sense of place. The biosphere, upon which humanity as a whole depends, is being altered to an unparalleled degree across all spatial scales. Biodiversity – the diversity within species, between species and of ecosystems – is declining faster than at any time in human history.

A1 **Nature is essential for human existence and good quality of life. Most of nature's contributions to people are not fully replaceable, and some are irreplaceable.** Nature plays a critical role in providing food and feed, energy, medicines and genetic resources and a variety of materials fundamental for people's physical well-being and for maintaining culture. For example, more than 2 billion people rely on wood fuel to meet their primary energy needs, an estimated 4 billion people rely primarily on natural medicines for their health care and some 70 per cent of drugs used for cancer are natural or are synthetic products inspired by nature. Nature, through its ecological and evolutionary processes, sustains the quality of the air, fresh water and soils on which humanity depends, distributes fresh water, regulates the climate, provides pollination and pest control and reduces the impact of natural hazards. For example, more than 75 per cent of global food crop types, including fruits and vegetables and some of the most important cash crops, such as coffee, cocoa and almonds, rely on animal pollination. Marine and terrestrial ecosystems are the sole sinks for anthropogenic carbon emissions, with a gross sequestration of 5.6 gigatons of carbon per year (the equivalent of some 60 per cent of global anthropogenic emissions). Nature underpins all dimensions of human health and contributes to non-material aspects of quality of life – inspiration and learning, physical and psychological experiences, and supporting identities – that are central to quality of life and cultural integrity, even if their aggregated value is difficult to quantify. Most of nature's contributions are co-produced with people, but while anthropogenic assets – knowledge and institutions, technology infrastructure and financial capital – can enhance or partially replace some of those contributions, some are irreplaceable. The diversity of nature maintains humanity's ability to choose alternatives in the face of an uncertain future.

A2 **Nature's contributions to people are often distributed unequally across space and time and among different segments of society. There are often trade-offs in the production and use of nature's contributions.** Benefits and burdens associated with co-production and use of nature's contributions are distributed and experienced differently among social groups, countries and regions. Giving priority to one of nature's contributions to people, such as food production, can result in ecological changes that reduce other contributions. Some of these changes may benefit some people at the expense of others, particularly the most vulnerable, as may changes in technological and institutional arrangements. For example, although food production today is sufficient to satisfy global needs, approximately 11 per cent of the world's population is undernourished, and diet-related disease drives 20 per cent of premature mortality, related both to undernourishment and to obesity. The great expansion in the production of food, feed, fibre and bioenergy has occurred at the cost of many other contributions of nature to quality of life, including regulation of air and water quality, climate regulation and habitat provision. Synergies also exist, such as sustainable agricultural practices that enhance soil quality, thereby improving productivity and other ecosystem functions and services, such as carbon sequestration and water quality regulation.





A3 **Since 1970, trends in agricultural production, fish harvest, bioenergy production and harvest of materials have increased, but 14 of the 18 categories of contributions of nature that were assessed, mostly regulating and non-material contributions, have declined.** The value of agricultural crop production ($2.6 trillion in 2016) has increased approximately threefold since 1970 and raw timber harvest has increased by 45 per cent, reaching some 4 billion cubic metres in 2017, with the forestry industry providing about 13.2 million jobs. However, indicators of regulating contributions, such as soil organic carbon and pollinator diversity, have declined, indicating that gains in material contributions are often not sustainable. Currently, land degradation has reduced productivity in 23 per cent of the global terrestrial area, and between $235 billion and $577 billion[2] in annual global crop output is at risk as a result of pollinator loss. Moreover, loss of coastal habitats and coral reefs reduces coastal protection, which increases the risk from floods and hurricanes to life and property for the 100 million to 300 million people living within coastal 100-year flood zones.

A4 **Nature across most of the globe has now been significantly altered by multiple human drivers, with the great majority of indicators of ecosystems and biodiversity showing rapid decline.** Seventy-five per cent of the land surface is significantly altered, 66 per cent of the ocean area is experiencing increasing cumulative impacts, and over 85 per cent of wetlands (area) has been lost. While the rate of forest loss has slowed globally since 2000, this is distributed unequally. Across much of the highly biodiverse tropics, 32 million hectares of primary or recovering forest were lost between 2010 and 2015. The extent of tropical and subtropical forests is increasing within some countries, and the global extent of temperate and boreal forests is increasing. A range of actions – from restoration of natural forest to planting of monocultures – contributes to these increases, but these actions have very different consequences for biodiversity and its contributions to people. Approximately half the live coral cover on coral reefs has been lost since the 1870s, with accelerating losses in recent decades due to climate change exacerbating other drivers. The average abundance of native species in most major terrestrial biomes has fallen by at least 20 per cent, potentially affecting ecosystem processes and hence nature's contributions to people; this decline has mostly taken place since 1900 and may be accelerating. In areas of high endemism, native biodiversity has often been severely impacted by invasive alien species. Population sizes of wild vertebrate species have tended to decline over the last 50 years on land, in freshwater and in the sea. Global trends in insect populations are not known but rapid declines have been well documented in some places.

A5 **Human actions threaten more species with global extinction now than ever before.** An average of around 25 per cent of species in assessed animal and plant

2. Value adjusted to 2015 United States dollars, taking into account inflation only.

groups are threatened **(Figure SPM.3)**, suggesting that around 1 million species already face extinction, many within decades, unless action is taken to reduce the intensity of drivers of biodiversity loss. Without such action, there will be a further acceleration in the global rate of species extinction, which is already at least tens to hundreds of times higher than it has averaged over the past 10 million years **(Figure SPM.4)**.

A6 **Globally, local varieties and breeds of domesticated plants and animals are disappearing. This loss of diversity, including genetic diversity, poses a serious risk to global food security by undermining the resilience of many agricultural systems to threats such as pests, pathogens and climate change.** Fewer and fewer varieties and breeds of plants and animals are being cultivated, raised, traded and maintained around the world, despite many local efforts, which include those by indigenous peoples and local communities. By 2016, 559 of the 6,190 domesticated breeds of mammals used for food and agriculture (over 9 per cent) had become extinct and at least 1,000 more are threatened. In addition, many crop wild relatives that are important for long-term food security lack effective protection, and the conservation status of wild relatives of domesticated mammals and birds is worsening. Reductions in the diversity of cultivated crops, crop wild relatives and domesticated breeds mean that agroecosystems are less resilient against future climate change, pests and pathogens.

A7 **Biological communities are becoming more similar to each other in both managed and unmanaged systems within and across regions.** This human-caused process leads to losses of local biodiversity, including endemic species, ecosystem functions and nature's contributions to people.

A8 **Human-induced changes are creating conditions for fast biological evolution – so rapid that its effects can be seen in only a few years or even more quickly. The consequences can be positive or negative for biodiversity and ecosystems, but can create uncertainty about the sustainability of species, ecosystem functions and the delivery of nature's contributions to people.** Understanding and monitoring these biological evolutionary changes is as important for informed policy decisions as it is in cases of ecological change. Sustainable management strategies then can be designed to influence evolutionary trajectories so as to protect vulnerable species and reduce the impact of unwanted species (such as weeds, pests or pathogens). The widespread declines in geographic distribution and population sizes of many species make clear that, although evolutionary adaptation to human-caused drivers can be rapid, it has often not been sufficient to mitigate them fully.

B. Direct and indirect drivers of change have accelerated during the past 50 years.

The rate of global change in nature during the past 50 years is unprecedented in human history. The direct drivers of change in nature with the largest global impact have been (starting with those with most impact): changes in land and sea use; direct exploitation of organisms; climate change; pollution; and invasion of alien species. Those five direct drivers result from an array of underlying causes – the indirect drivers of change – which are in turn underpinned by societal values and behaviours that include production and consumption patterns, human population dynamics and trends, trade, technological innovations and local through global governance. The rate of change in the direct and indirect drivers differs among regions and countries.

B1 **For terrestrial and freshwater ecosystems, land-use change has had the largest relative negative impact on nature since 1970, followed by the direct exploitation, in particular overexploitation, of animals, plants and other organisms, mainly via harvesting, logging, hunting and fishing. In marine ecosystems, direct exploitation of organisms (mainly fishing) has had the largest relative impact, followed by land-/sea-use change.** Agricultural expansion is the most widespread form of land-use change, with over one third of the terrestrial land surface being used for cropping or animal husbandry. This expansion, alongside a doubling of urban area since 1992 and an unprecedented expansion of infrastructure linked to growing population and consumption, has come mostly at the expense of forests (largely old-growth tropical forests), wetlands and grasslands. In freshwater ecosystems, a series of combined threats that include land-use change, including water extraction, exploitation, pollution, climate change and invasive species, are prevalent. Human activities have had a large and widespread impact on the world's oceans. These include direct exploitation, in particular overexploitation, of fish, shellfish and other organisms, land- and sea-based pollution, including from river networks, and land-/sea-use change, including coastal development for infrastructure and aquaculture.

B2 Climate change is a direct driver that is increasingly exacerbating the impact of other drivers on nature and human well-being. Humans are estimated to have caused an observed warming of approximately 1.0°C by 2017 relative to pre-industrial levels, with average temperatures over the past 30 years rising by 0.2°C per decade. The frequency and intensity of extreme weather events, and the fires, floods and droughts that they can bring, have increased in the past 50 years, while the global average sea level has risen by between 16 and 21 cm since 1900, and at a rate of more than 3 mm per year over the past two decades. These changes have contributed to widespread impacts in many aspects of biodiversity, including species distribution, phenology, population dynamics, community structure and ecosystem function. According to observational evidence, the effects are accelerating in marine, terrestrial and freshwater ecosystems and are already impacting agriculture, aquaculture, fisheries and nature's contributions to people. The compounding effects of drivers such as climate change, land-/sea-use change, overexploitation of resources, pollution and invasive alien species are likely to exacerbate the negative impacts on nature, as seen in different ecosystems including coral reefs, the Arctic systems and savannas.

B3 Many types of pollution, as well as invasive alien species, are increasing, with negative impacts for nature. Although global trends are mixed, air, water and soil pollution have continued to increase in some areas. Marine plastic pollution in particular has increased tenfold since 1980, affecting at least 267 species, including 86 per cent of marine turtles, 44 per cent of seabirds and 43 per cent of marine mammals. This can affect humans through food chains. Greenhouse gas emissions, untreated urban and rural waste, pollutants from industrial, mining and agricultural activities, oil spills and toxic dumping have had strong negative effects on soil, freshwater and marine water quality and on the global atmosphere. Cumulative records of alien species have increased by 40 per cent since 1980, associated with increased trade and human population dynamics and trends. Nearly one fifth of the Earth's surface is at risk of plant and animal invasions, impacting native species, ecosystem functions and nature's contributions to people, as well as economies and human health. The rate of introduction of new invasive alien species seems higher than ever before and shows no signs of slowing.

B4 In the past 50 years, the human population has doubled, the global economy has grown nearly fourfold and global trade has grown tenfold, together driving up the demand for energy and materials. A variety of economic, political and social factors, including global trade and the spatial decoupling of production from consumption, have shifted the economic and environmental gains and losses of production and consumption, contributing to new economic opportunities, but also to impacts on nature and its contributions to people. Levels of consumption of material goods (food, feed, timber and fibre) vary greatly, and unequal access to material goods can be associated with inequity and may lead to social conflict. Economic exchange contributes to aggregate economic development, yet often is negotiated between

actors and institutions of unequal power, which influences the distribution of benefits and long-term impacts. Countries at different levels of development have experienced different levels of deterioration of nature for any given gain in economic growth. Exclusion, scarcity and/or the unequal distribution of nature's contributions to people may fuel social instability and conflict in a complex interaction with other factors. Armed conflicts have an impact on ecosystems beyond their destabilizing effects on societies, and a range of indirect impacts, including the displacement of people and activities.

B5 Economic incentives have generally favoured expanding economic activity, and often environmental harm, over conservation or restoration. Incorporating the consideration of the multiple values of ecosystem functions and of nature's contributions to people into economic incentives has, in the economy, been shown to permit better ecological, economic and social outcomes. Local, national, regional and global governance initiatives have improved outcomes in this way by supporting policies, innovation and the elimination of environmentally harmful subsidies, introducing incentives in line with the value of nature's contribution to people, increasing sustainable land-/sea-use management and enforcing regulations, among other measures. Harmful economic incentives and policies associated with unsustainable practices in fisheries, aquaculture, agriculture (including fertilizer and pesticide use), livestock management, forestry, mining and energy (including fossil fuels and biofuels) are often associated with land-/sea-use change and overexploitation of natural resources, as well as inefficient production and waste management. Vested interests may oppose the removal of subsidies or the introduction of other policies. Yet policy reforms to deal with such causes of environmental harm offer the potential to both conserve nature and provide economic benefits, including when policies are based on more and better understanding of the multiple values of nature's contributions.

B6 Nature managed by indigenous peoples and local communities is under increasing pressure. Nature is generally declining less rapidly in indigenous peoples' land than in other lands, but is nevertheless declining, as is the knowledge of how to manage it. At least a quarter of the global land area is traditionally owned, managed[3], used or occupied by indigenous peoples. These areas include approximately 35 per cent of the area that is formally protected, and approximately 35 per cent of all remaining terrestrial areas with very low human intervention. In addition, a diverse array of local communities, including farmers, fishers, herders, hunters, ranchers and forest users, manage significant areas under various property and access regimes. Among the local indicators developed and used by indigenous peoples and local communities, 72 per cent show negative trends in nature that underpin local livelihoods and well-being. The areas managed (under various types of tenure and access regimes) by indigenous peoples and local communities are facing growing resource extraction, commodity production, mining and transport and energy infrastructure, with various consequences for local livelihoods and health. Some climate change mitigation programmes have had negative impacts on indigenous peoples and local communities. The negative impacts of all these pressures include continued loss of subsistence and traditional livelihoods resulting from ongoing deforestation, loss of wetlands, mining, the spread of unsustainable agriculture, forestry and fishing practices and impacts on health and well-being from pollution and water insecurity. These impacts also challenge traditional management, the transmission of indigenous and local knowledge, the potential for sharing of benefits arising from the use of, and the ability of indigenous peoples and local communities to conserve and sustainably manage, wild and domesticated biodiversity that are also relevant to broader society.

C. Goals for conserving and sustainably using nature and achieving sustainability cannot be met by current trajectories, and goals for 2030 and beyond may only be achieved through transformative changes[4] across economic, social, political and technological factors.

Past and ongoing rapid declines in biodiversity, ecosystem functions and many of nature's contributions to people mean that most international societal and environmental goals, such as those embodied in the Aichi Biodiversity Targets and the 2030 Agenda for Sustainable Development, will not be achieved based on current trajectories. These declines will also undermine other goals, such as those specified in the Paris Agreement adopted under the United Nations Framework Convention on Climate Change and the 2050 Vision for Biodiversity.

3. These data sources define land management here as the process of determining the use, development and care of land resources in a manner that fulfils material and non-material cultural needs, including livelihood activities such as hunting, fishing, gathering, resource harvesting, pastoralism and small-scale agriculture and horticulture.

4. A fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values.

The negative trends in biodiversity and ecosystem functions are projected to continue or worsen in many future scenarios in response to indirect drivers such as rapid human population growth, unsustainable production and consumption and associated technological development. In contrast, scenarios and pathways that explore the effects of low-to-moderate population growth, and transformative changes in the production and consumption of energy, food, feed, fibre and water, sustainable use, equitable sharing of the benefits arising from use and nature-friendly climate adaptation and mitigation will better support the achievement of future societal and environmental objectives.

C1 **The implementation of policy responses and actions to conserve nature and manage it more sustainably has progressed, yielding positive outcomes relative to scenarios of no intervention, but progress is not sufficient to stem the direct and indirect drivers of nature deterioration. It is therefore likely that most of the Aichi Biodiversity Targets for 2020 will be missed.** Some of the Aichi Biodiversity Targets will be partially achieved, for example those related to policy responses, such as the spatial extent of terrestrial and marine protected areas, the identification and prioritization of invasive alien species, national biodiversity strategies and action plans, and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity. However, while protected areas now cover 15 per cent of terrestrial and freshwater environments and 7 per cent of the marine realm, they only partly cover important sites for biodiversity and are not yet fully ecologically representative and effectively or equitably managed. There has been significant growth in official development assistance in support of the Convention on Biological Diversity and in funding provided by the Global Environment Facility, with biodiversity aid flows reaching $8.7 billion annually. However, current resource mobilization from all sources is not sufficient to achieve the Aichi Biodiversity Targets. In addition, only one in five of the strategic objective and goals across six global agreements[5] relating to nature and the protection of the global environment are demonstrably on track to be met. For nearly one third of the goals of these conventions, there has been little or no progress towards them or, instead, movement away from them.

C2 **Nature is essential for achieving the Sustainable Development Goals. However, taking into consideration that the Sustainable Development Goals are integrated, indivisible, and nationally implemented, current negative trends in biodiversity and ecosystems will undermine progress towards 80 per cent (35 out of 44) of the assessed targets of Goals related to poverty, hunger, health, water, cities, climate, oceans and land (Sustainable Development Goals 1, 2, 3, 6, 11, 13, 14, and 15).** Important positive synergies between nature and the Goals related to education, gender equality, reducing inequalities and promoting peace and justice (Sustainable Development Goals 4, 5, 10 and 16) were found. Land or resource tenure insecurity, as well as declines in nature, have greater impacts on women and girls, who are most often negatively impacted. However, the current focus and wording of the targets of these Goals obscures or omits their relationship to nature, thereby preventing their assessment here. There is a critical need for future policy targets, indicators and datasets to more explicitly account for aspects of nature and their relevance to human well-being in order to more effectively track the consequences of trends in nature on the Sustainable Development Goals. Some pathways chosen to achieve the Goals related to energy, economic growth, industry and infrastructure, and sustainable consumption and production (Sustainable Development Goals 7, 8, 9 and 12), as well as the targets related to poverty, food security and cities (Sustainable Development Goals 1, 2 and 11), could have substantial positive or negative impacts on nature and therefore on the achievement of the other Sustainable Development Goals.

C3 **Areas of the world projected to experience significant negative effects from global changes in climate, biodiversity, ecosystem functions and nature's contributions to people are also home to large concentrations of indigenous peoples and many of the world's poorest communities.** Because of their strong dependency on nature and its contributions for subsistence, livelihoods and health, those communities will be disproportionately hard-hit by those negative changes. Those negative effects also influence the ability of indigenous peoples and local communities to manage and conserve wild and domesticated biodiversity and nature's contributions to people. Indigenous peoples and local communities have been proactively confronting such challenges in partnership with each other and with an array of other stakeholders, through co-management systems

5. Convention on the Conservation of Migratory Species of Wild Animals, Convention on International Trade in Endangered Species of Wild Fauna and Flora, Convention concerning the Protection of the World Cultural and Natural Heritage, International Plant Protection Convention, United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, and Convention on Wetlands of International Importance especially as Waterfowl Habitat.

and local and regional monitoring networks and by revitalizing and adapting local management systems. Regional and global scenarios lack an explicit consideration of the views, perspectives and rights of indigenous peoples and local communities, their knowledge and understanding of large regions and ecosystems, and their desired future development pathways.

C4 **Except in scenarios that include transformative change, negative trends in nature, in ecosystem functions and in many of nature's contributions to people are projected to continue to 2050 and beyond, due to the projected impacts of increasing land-/and sea-use change, exploitation of organisms and climate change.** Negative impacts arising from pollution and invasive alien species will likely exacerbate these trends. There are large regional differences in the projected patterns of future biodiversity and ecosystem functions and in the losses and changes in nature's contributions to people. These differences arise from the direct and indirect drivers of change, which are projected to impact regions in different ways. While regions worldwide face further declines in biodiversity in future projections, tropical regions face particular combined risks of declines due to the interactions between climate change, land-use change and fisheries exploitation. Marine and terrestrial biodiversity in boreal, subpolar and polar regions is projected to decline mostly because of warming, sea ice retreat and enhanced ocean acidification. The magnitude of the impacts and the differences between regions are much greater in scenarios with rapid increases in consumption or human population than in scenarios based on sustainability. Acting immediately and simultaneously on the multiple indirect and direct drivers has the potential to slow, halt and even reverse some aspects of biodiversity and ecosystem loss.

C5 **Climate change is projected to become increasingly important as a direct driver of changes in nature and its contributions to people in the next decades. Scenarios show that meeting the Sustainable Development Goals and the 2050 Vision for Biodiversity depends on taking into account climate change impacts in the definition of future goals and objectives.** The future impacts of climate change are projected to become more pronounced in the next decades, with variable relative effects depending on scenario and geographic region. Scenarios project mostly adverse climate change effects on biodiversity and ecosystem functioning, which worsen, in some cases exponentially, with incremental global warming. Even for global warming of 1.5°C to 2°C, the majority of terrestrial species ranges are projected to shrink dramatically. Changes in ranges can adversely affect the capacity of terrestrial protected areas to conserve species, greatly increase local species turnover and substantially increase the risk of global extinctions. For example, a synthesis of many studies estimates that the fraction of species at risk of climate-related extinction is 5 per cent at 2°C warming and rises to 16 per cent at 4.3°C warming. Coral reefs are particularly vulnerable to climate change and are projected to decline to 10 to 30 per cent of former cover at 1.5°C warming and to less than 1 per cent of former cover at 2°C warming. Therefore, scenarios show that limiting global warming to well below 2°C plays a critical role in reducing adverse impacts on nature and its contributions to people.

D. Nature can be conserved, restored and used sustainably while other global societal goals are simultaneously met through urgent and concerted efforts fostering transformative change.

Societal goals, including those related to food, water, energy, health and the achievement of human well-being for all, mitigating and adapting to climate change and conserving and sustainably using nature, can be achieved in sustainable pathways through the rapid and improved deployment of existing policy instruments and new initiatives that more effectively enlist individual and collective action for transformative change. Since current structures often inhibit sustainable development and actually represent the indirect drivers of biodiversity loss, such fundamental, structural change is called for. By its very nature, transformative change can expect opposition from those with interests vested in the status quo, but such opposition can be overcome for the broader public good. If obstacles are overcome, a commitment to mutually supportive international goals and targets, supporting actions by indigenous peoples and local communities at the local level, new frameworks for private sector investment and innovation, inclusive and adaptive governance approaches and arrangements, multi-sectoral planning, and strategic policy mixes can help to transform the public and

private sectors to achieve sustainability at the local, national and global levels.

D1 **The global environment can be safeguarded through enhanced international cooperation and linked, locally relevant measures. The review and renewal of internationally agreed environment-related goals and targets, based on the best available scientific knowledge and the widespread adoption and funding of action on conservation, ecological restoration and sustainable use by all actors, including individuals, are key to this safeguarding.** Such widespread adoption implies advancing and aligning local, national and international sustainability efforts and mainstreaming biodiversity and sustainability across all extractive and productive sectors, including mining, fisheries, forestry and agriculture, so that together, individual and collective actions result in a reversal of the deterioration of ecosystem services at the global level. Yet these bold changes to the direct drivers of the deterioration of nature cannot be achieved without transformative change that simultaneously addresses the indirect drivers.

D2 **Five main interventions ("levers") can generate transformative change by tackling the underlying indirect drivers of the deterioration of nature: (1) incentives and capacity-building; (2) cross-sectoral cooperation; (3) pre-emptive action; (4) decision-making in the context of resilience and uncertainty; and (5) environmental law and implementation.** Using these levers will involve the following: (1) developing incentives and widespread capacity for environmental responsibility and eliminating perverse incentives; (2) reforming sectoral and segmented decision-making to promote integration across sectors and jurisdictions; (3) taking pre-emptive and precautionary actions in regulatory and management institutions and businesses to avoid, mitigate and remedy the deterioration of nature, and monitoring their outcomes; (4) managing for resilient social and ecological systems in the face of uncertainty and complexity, to deliver decisions that are robust in a wide range of scenarios; and (5) strengthening environmental laws and policies and their implementation, and the rule of law more generally. All five levers may require new resources, particularly in low-capacity contexts, such as in many developing countries.

D3 **Transformations towards sustainability are more likely when efforts are directed at the following key leverage points, where efforts yield exceptionally large effects (Figure SPM.9): (1) visions of a good life; (2) total consumption and waste; (3) values and action; (4) inequalities; (5) justice and inclusion in conservation; (6) externalities and telecouplings; (7) technology, innovation and investment; and (8) education and knowledge generation and sharing.** Specifically, the following changes are mutually reinforcing: (1) enabling visions of a good quality of life that do not entail ever-increasing material consumption; (2) lowering total consumption and waste, including by addressing both population growth and per capita consumption differently in different contexts; (3) unleashing existing, widely-held values of responsibility to effect new social norms for sustainability, especially by extending notions of responsibility to include the impacts associated with consumption; (4) addressing inequalities, especially regarding income and gender, which undermine the capacity for sustainability; (5) ensuring inclusive decision-making and the fair and equitable sharing of benefits arising from the use of and adherence to human rights in conservation decisions; (6) accounting for nature deterioration from local economic activities and socioeconomic and environmental interactions over distances (telecouplings), including, for example, international trade; (7) ensuring environmentally friendly technological and social innovation, taking into account potential rebound effects and investment regimes; and (8) promoting education, knowledge generation and the maintenance of different knowledge systems, including in the sciences and indigenous and local knowledge, regarding nature, conservation and its sustainable use.

D4 **The character and trajectories of transformation will vary across contexts, with challenges and needs differing, among others, in developing and developed countries. Risks related to the inevitable uncertainties and complexities in transformations towards sustainability can be reduced through governance approaches that are integrative, inclusive, informed and adaptive.** Such approaches typically take into account the synergies and trade-offs between societal goals and alternative pathways and recognize a plurality of values, diverse economic conditions, inequity, power imbalances and vested interests in society. Risk-reducing strategies typically include learning from experience that is based on a combination of precautionary measures and existing and emerging knowledge. These approaches involve stakeholders in the coordination of policies across sectors and in the creation of strategic, locally relevant mixes of successful policy instruments. The private sector can play a role in partnership with other actors, including national and subnational governments and civil society; for example, public-private partnerships in the water sector have been an important vehicle for financing investments to meet the Sustainable Development Goals. Some effective policy measures include the expansion and strengthening of ecologically representative, well-connected protected-area networks and of other effective area-based conservation measures; the

protection of watersheds; and incentives and sanctions to reduce pollution **(Table SPM.1)**.

D5 Recognizing the knowledge, innovations, practices, institutions and values of indigenous peoples and local communities, and ensuring their inclusion and participation in environmental governance, often enhances their quality of life and the conservation, restoration and sustainable use of nature, which is relevant to broader society. Governance, including customary institutions and management systems and co-management regimes that involve indigenous peoples and local communities, can be an effective way to safeguard nature and its contributions to people by incorporating locally attuned management systems and indigenous and local knowledge. The positive contributions of indigenous peoples and local communities to sustainability can be facilitated through national recognition of land tenure, access and resource rights in accordance with national legislation, the application of free, prior and informed consent, and improved collaboration, fair and equitable sharing of benefits arising from the use, and co-management arrangements with local communities.

D6 Feeding humanity and enhancing the conservation and sustainable use of nature are complementary and closely interdependent goals that can be advanced through sustainable agriculture, aquaculture and livestock systems, the safeguarding of native species, varieties, breeds and habitats, and ecological restoration. Specific actions include promoting sustainable agricultural and agroecological practices, such as multifunctional landscape planning and cross-sectoral integrated management, that support the conservation of genetic diversity and the associated agricultural biodiversity. Further actions to simultaneously achieve food security, biodiversity protection and sustainable use are context appropriate climate change mitigation and adaptation; incorporating knowledge from various systems, including the sciences and sustainable indigenous and local practices; avoiding food waste; empowering producers and consumers to transform supply chains; and facilitating sustainable and healthy dietary choices. As part of integrated landscape planning and management, prompt ecological restoration, emphasizing the use of native species, can offset the current degradation and save many endangered species, but is less effective if delayed.

D7 Sustaining and conserving fisheries and marine species and ecosystems can be achieved through a coordinated mix of interventions on land, in freshwater and in the oceans, including multilevel coordination across stakeholders on the use of open oceans. Specific actions could include, for example, ecosystem-based approaches to fisheries management, spatial planning, effective quotas, marine protected areas, protecting and managing key marine biodiversity areas, reducing run-off pollution into oceans and working closely with producers and consumers **(Table SPM.1)**. It is important to enhance capacity-building for the adoption of best fisheries management practices; adopt measures to promote conservation financing and corporate social responsibility; develop new legal and binding instruments; implement and enforce global agreements for responsible fisheries; and urgently take all steps necessary to prevent, deter and eliminate illegal, unreported and unregulated fishing.

D8 Land-based climate change mitigation activities can be effective and support conservation goals (Table SPM.1). However, the large-scale deployment of bioenergy plantations and afforestation of non-forest ecosystems can come with negative side effects for biodiversity and ecosystem functions. Nature-based solutions with safeguards are estimated to provide 37 per cent of climate change mitigation until 2030 needed to meet the goal of keeping climate warming below 2°C, with likely co-benefits for biodiversity. Therefore, land-use actions are indispensable, in addition to strong actions to reduce greenhouse gas emissions from fossil fuel use and other industrial and agricultural activities. However, the large-scale deployment of intensive bioenergy plantations, including monocultures, replacing natural forests and subsistence farmlands, will likely have negative impacts on biodiversity and can threaten food and water security as well as local livelihoods, including by intensifying social conflict.

D9 Nature-based solutions can be cost-effective for meeting the Sustainable Development Goals in cities, which are crucial for global sustainability. Increased use of green infrastructure and other ecosystem-based approaches can help to advance sustainable urban development while reinforcing climate mitigation and adaptation. Urban key biodiversity areas should be safeguarded. Solutions can include retrofitting green and blue infrastructure, such as creating and maintaining green spaces and biodiversity-friendly water bodies, urban agriculture, rooftop gardens and expanded and accessible vegetation cover in existing urban and peri-urban areas and new developments. Green infrastructure in urban and surrounding rural areas can complement large-scale “grey infrastructure” in areas such as flood protection, temperature regulation, cleaning of air and water, treating wastewater and the provision of energy, locally sourced food and the health benefits of interaction with nature.

D10 A key component of sustainable pathways is the evolution of global financial and economic

systems to build a global sustainable economy, steering away from the current, limited paradigm of economic growth. That implies incorporating the reduction of inequalities into development pathways, reducing overconsumption and waste and addressing environmental impacts, such as externalities of economic activities, from the local to the global scales. Such an evolution could be enabled through a mix of policies and tools (such as incentive programmes, certification and performance standards) and through more internationally consistent taxation, supported by multilateral agreements and enhanced environmental monitoring and evaluation. It would also entail a shift beyond standard economic indicators such as gross domestic product to include those able to capture more holistic, long-term views of economics and quality of life.

BACK-GROUND

BACKGROUND

A. Nature and its vital contributions to people, which together embody biodiversity and ecosystem functions and services, are deteriorating worldwide.

1 Nature underpins quality of life by providing basic life support for humanity (regulating), as well as material goods (material) and spiritual inspiration (non-material) *(well established)* {2.3.1, 2.3.2}. Most of nature's contributions to people (NCP) are co-produced by biophysical processes and ecological interactions with anthropogenic assets such as knowledge, infrastructure, financial capital, technology and the institutions that mediate them *(well established)* {2.3.2} **(Appendix I)**. For example, marine and freshwater-based food is co-produced by the combination of fish populations, fishing gear, and access to fishing grounds {2.3.3} There is unequal access to nature's contributions and unequal impact of nature's contributions on different social groups *(established but incomplete)* {2.3.5}. Furthermore, increases in the production of some of nature's contributions cause declines in others **(Figure SPM.1)** {2.3.2, 2.3.5}, which also affects people differently *(well established)*. For example, clearing of forest for agriculture has increased the supply of food, feed, (NCP 12) and other materials important for people (such as natural fibres and ornamental flowers: NCP 13), but has reduced contributions as diverse as pollination (NCP 2), climate regulation (NCP 4), water quality regulation (NCP 7), opportunities for learning and inspiration (NCP 15) and the maintenance of options for the future (NCP 18). However, very few large-scale systematic studies exist on those relationships {2.3.2}. Land degradation has reduced productivity in 23 per cent of the global terrestrial area, and between $235 billion and $577 billion in annual global crop output is at risk as a result of pollinator loss {2.3.5.3} *(established but incomplete).*

2 Many of nature's contributions to people are essential for human health (*well established*) and their decline thus threatens a good quality of life (*established but incomplete*) {2.3.4}. Nature provides a broad diversity of nutritious foods, medicines and clean water *(well established)* {2.3.5.2, 3.3.2.1, 3.3.2.2 (Sustainable Development Goal 3)}; can help to regulate disease and the immune system {2.3.4.2}; can reduce levels of certain air pollutants *(established but incomplete)* {2.3.4.2, 3.3.2.2}; and can improve mental and physical health through exposure to natural areas *(inconclusive)*, among other contributions {2.3.2.2, 2.3.4.2, 3.3.2.2 (Sustainable Development Goal 3)}. Nature is the origin of most infectious diseases (negative impact), but also the source of medicines and antibiotics for treatment (positive contribution) *(well established)*. Zoonotic diseases are significant threats to human health, with vector-borne diseases accounting for approximately 17 per cent of all infectious diseases and causing an estimated 700,000 deaths globally per annum *(established but incomplete)* {3.3.2.2}. Emerging infectious diseases in wildlife, domestic animals, plants or people can be exacerbated by human activities such as land clearing and habitat fragmentation *(established but incomplete)* or the overuse of antibiotics driving rapid evolution of antibiotic resistance in many bacterial pathogens *(well established)* {3.3.2.2}. The deterioration of nature and consequent disruption of benefits to people has both direct and indirect implications for public health *(well established)* {2.3.5.2} and can exacerbate existing inequalities in access to health care or healthy diets *(established but incomplete)* {2.3.4.2}. Shifting diets towards a diversity of foods, including fish, fruit, nuts and vegetables, significantly reduces the risk of certain preventable non-communicable diseases, which are currently responsible for 20 per cent of premature mortality globally *(well established)* {2.3.4.2, 2.3.5.2 (NCP 2 and 12)}.

3 Most of nature's contributions are not fully replaceable, yet some contributions of nature are irreplaceable (*well established*). Loss of diversity, such as phylogenetic and functional diversity, can permanently reduce future options, such as wild species that might be domesticated as new crops and be used for genetic improvement {2.3.5.3}. People have created substitutes for some other contributions of nature, but many of them are imperfect or financially prohibitive {2.3.2.2}. For example, high-quality drinking water can be realized either through ecosystems that filter pollutants or through human-engineered water treatment facilities {2.3.5.3}. Similarly, coastal flooding from storm surges can be reduced either by coastal mangroves or by dikes and sea walls {2.3.5.3}. In both cases, however, built infrastructure can be extremely expensive, incur high future costs and fail to provide synergistic benefits such as nursery habitats for edible fish or recreational opportunities {2.3.5.2}. More generally, human-made replacements often do not provide the full range of benefits provided by nature {2.3.2.2} **(Figure SPM.1)**.

Figure SPM 1 **Global trends in the capacity of nature to sustain contributions to good quality of life from 1970 to the present, which show a decline for 14 of the 18 categories of nature's contributions to people analysed.**

Data supporting global trends and regional variations come from a systematic review of over 2,000 studies {2.3.5.1}. Indicators were selected on the basis of availability of global data, prior use in assessments and alignment with 18 categories. For many categories of nature's contributions, two indicators are included that show different aspects of nature's capacity to contribute to human well-being within that category. Indicators are defined so that an increase in the indicator is associated with an improvement in nature's contributions.

4 Humanity is a dominant global influence on life on earth, and has caused natural terrestrial, freshwater and marine ecosystems to decline (*well established*) {2.2.5.2} **(Figure SPM.2)**. Global indicators of ecosystem extent and condition have shown a decrease by an average of 47 per cent of their estimated natural baselines, with many continuing to decline by at least 4 per cent per decade *(established but incomplete)* {2.2.5.2.1}. On land, particularly sensitive ecosystems include old-growth forests, insular ecosystems, and wetlands; and only around 25 per cent of land is sufficiently unimpacted that ecological and evolutionary processes still operate with minimal human intervention *(established but incomplete)* {2.2.3.4.1, 2.2.5.2.1}. In terrestrial "hotspots" of endemic species, natural habitats have generally undergone greater reductions to date in extent and condition, and tend to be experiencing more rapid ongoing decline, on average than other terrestrial regions {2.2.5.2.1}. Globally, the net rate of forest loss has halved since the 1990s, largely because of net increases in temperate and high latitude forests; high-biodiversity tropical forests continue to dwindle, and global forest area is now approximately 68 per cent of the estimated pre-industrial level *(established but incomplete)* {2.2.5.2.1}. Forests and natural mosaics sufficiently undamaged to be classed as "intact" (defined as being larger than 500 km^2 where satellites can detect no human pressure) were reduced by 7 per cent (919, 000 km^2) between 2000 and 2013, shrinking in both developed and developing countries {2.2.5.2.1}. Inland waters and freshwater ecosystems show among the highest rates of decline. Only 13 per cent of the wetland present in 1700 remained by 2000; recent losses have been even more rapid (0.8 per cent per year from 1970 to 2008) *(established but incomplete)* {2.2.7.9}.

5 Marine ecosystems, from coastal to deep sea, now show the influence of human actions, with coastal marine ecosystems showing both large historical losses of extent and condition as well as rapid ongoing declines (*established but incomplete*) {2.2.5.2.1, 2.2.7.15} **(Figure SPM.2)**. Over 40 per cent of ocean area was strongly affected by multiple drivers in 2008, and 66 per cent was experiencing increasing cumulative impacts in 2014. Only 3 per cent of the ocean was described as free from human pressure in 2014 *(established but incomplete)* {2.2.5.2.1, 3.2.1}. Seagrass meadows decreased in extent by over 10 per cent per decade from 1970 to 2000 *(established but incomplete)* {2.2.5.2.1}. Live coral cover on reefs has nearly halved in the past 150 years, the decline dramatically accelerating over the past two or three decades due to increased water temperature and ocean acidification interacting with and further exacerbating other drivers of loss *(well established)* {2.2.5.2.1}. These coastal marine ecosystems are among the most productive systems globally, and their loss and deterioration reduce their ability to protect shorelines, and the people and species that live there, from storms, as well as their ability to provide sustainable livelihoods *(well established)* {2.2.5.2.1, 2.3.5.2}. Severe impacts to ocean ecosystems are illustrated by 33 per cent of fish stocks being classified as overexploited and greater than 55 per cent of ocean area being subject to industrial fishing *(established but incomplete)* {2.1.11.1, 2.2.5.2.4, 2.2.7.16}.

6 The global rate of species extinction is already at least tens to hundreds of times higher than the average rate over the past 10 million years and is accelerating (*established but incomplete*) {2.2.5.2.4} **(Figure SPM.3)**. Human actions have already driven at least 680 vertebrate species to extinction since 1500, including the Pinta Giant Tortoise in the Galapagos in 2012, even though successful conservation efforts have saved from extinction at least 26 bird species and 6 ungulate species, including the Arabian Oryx and Przewalski's Horse {3.2.1}. The threat of extinction is also accelerating: in the best-studied taxonomic groups, most of the total extinction risk to species is estimated to have arisen in the past 40 years *(established but incomplete)* {2.2.5.2.4}. The proportion of species currently threatened with extinction according to the International Union for the Conservation of Nature's Red List criteria averages around 25 per cent across the many terrestrial, freshwater and marine vertebrate, invertebrate and plant groups that have been studied in sufficient detail to support a robust overall estimate *(established but incomplete)* {2.2.5.2.4, 3.2}. More than 40 per cent of amphibian species, almost a third of reef-forming corals, sharks and shark relatives and over a third of marine mammals are currently threatened {2.2.5.2.4, 3}. The proportion of insect species threatened with extinction is a key uncertainty, but available evidence supports a tentative estimate of 10 per cent *(established but incomplete)* {2.2.5.2.4}. Those proportions suggest that, of an estimated 8 million animal and plant species (75 per cent of which are insects), around 1 million are threatened with extinction *(established but incomplete)* {2.2.5.2.4}. A similar picture also emerges from an entirely separate line of evidence. Habitat loss and deterioration, largely caused by human actions, have reduced global terrestrial habitat integrity by 30 per cent relative to an unimpacted baseline; combining that with the longstanding relationship between habitat area and species numbers suggests that around 9 per cent of the world's estimated 5.9 million terrestrial species – more than 500,000 species – have insufficient habitat for long-term survival, and are committed to extinction, many within decades, unless their habitats are restored *(established but incomplete)* {2.2.5.2.4}. Population declines often give warning that a species' risk of extinction is increasing. The Living Planet Index, which synthesises trends in vertebrate populations, shows that species have declined rapidly since 1970, with reductions of 40 per cent for terrestrial species, 84 per cent for freshwater species and 35 per cent for marine species *(established but*

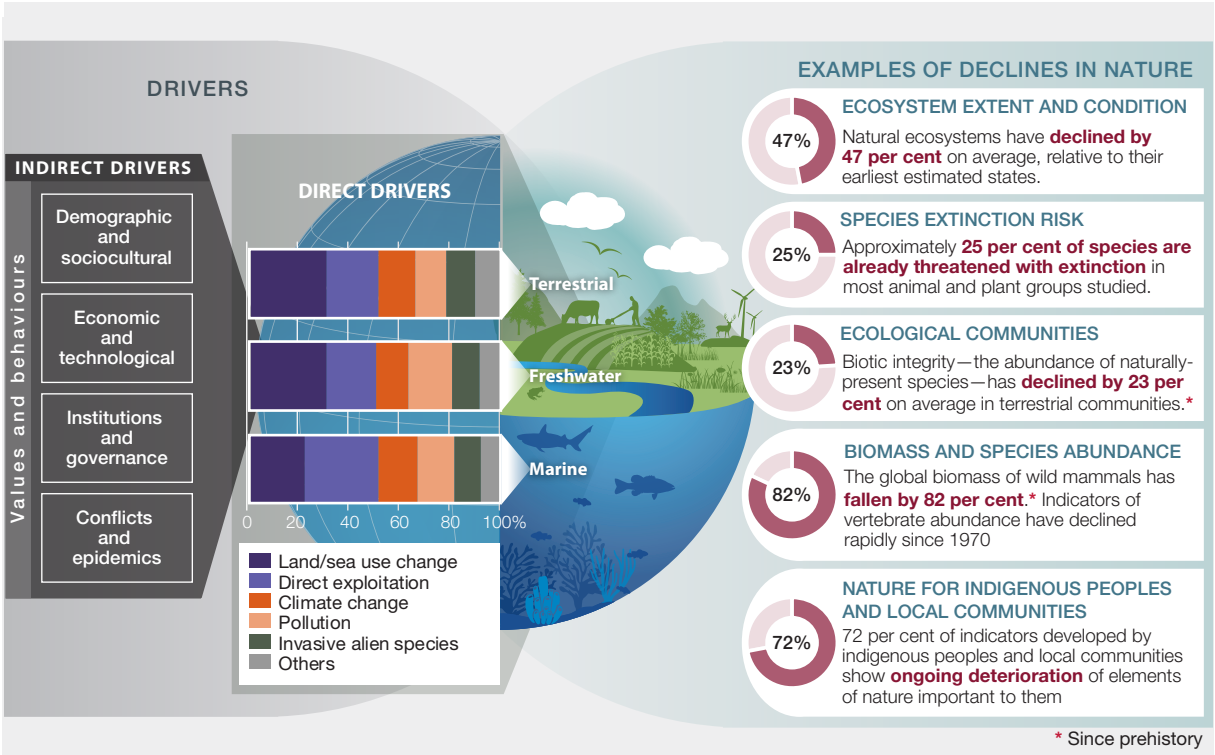

Figure SPM 2 **Examples of global declines in nature, emphasizing declines in biodiversity, that have been and are being caused by direct and indirect drivers of change.**

The direct drivers (land-/sea-use change; direct exploitation of organisms; climate change; pollution; and invasive alien species)[6] result from an array of underlying societal causes[7]. These causes can be demographic (e.g., human population dynamics), sociocultural (e.g., consumption patterns), economic (e.g., trade), technological, or relating to institutions, governance, conflicts and epidemics. They are called indirect drivers[8] and are underpinned by societal values and behaviours. The colour bands represent the relative global impact of direct drivers, from top to bottom, on terrestrial, freshwater and marine nature, as estimated from a global systematic review of studies published since 2005. Land- and sea-use change and direct exploitation account for more than 50 per cent of the global impact on land, in fresh water and in the sea, but each driver is dominant in certain contexts {2.2.6}. The circles illustrate the magnitude of the negative human impacts on a diverse selection of aspects of nature over a range of different time scales based on a global synthesis of indicators {2.2.5, 2.2.7}.

incomplete) {2.2.5.2.4}. Local declines of insect populations such as wild bees and butterflies have often been reported, and insect abundance has declined very rapidly in some places even without large-scale land-use change, but the global extent of such declines is not known *(established but incomplete)* {2.2.5.2.4}. On land, wild species that are endemic (narrowly distributed) have typically seen larger-than-average changes to their habitats and shown faster-than-average declines *(established but incomplete)* {2.2.5.2.3, 2.2.5.2.4}.

7 The number of local varieties and breeds of domesticated plants and animals and their wild relatives has been reduced sharply as a result of land use change, knowledge loss, market preferences and large-scale trade (*well established*) {2.2.5.2.6, 2.2.5.3.1}. Domestic varieties of plants and animals are the result of natural and human-managed selection, sometimes over centuries or millennia, and tend to show a high degree of adaptation (genotypic and phenotypic) to local conditions *(well established)* {2.2.4.4}. As a result, the pool of genetic variation which underpins food security has declined *(well established)* {2.2.5.2.6}. Ten per cent of domesticated breeds of mammals were recorded as extinct, as well as some 3.5 per cent of domesticated breeds of birds *(well established)* {2.2.5.2.6}. Many hotspots of agrobiodiversity and crop wild relatives are also under threat or not formally protected. The conservation status of wild relatives of domesticated livestock has also deteriorated. These wild relatives represent critical reservoirs of genes and traits that may provide resilience against future climate change, pests and pathogens and may improve current heavily depleted gene pools of many crops and domestic animals {2.2.3.4.3}. The lands of

6. The classification of direct drivers used throughout this assessment is in {2.1.12 - 2.1.17}.
7. The interactions among indirect and direct drivers are addressed in {2.1.11, 2.1.18}.
8. The classification of indirect drivers used throughout this assessment is in {2.1.3 - 2.1.10}.

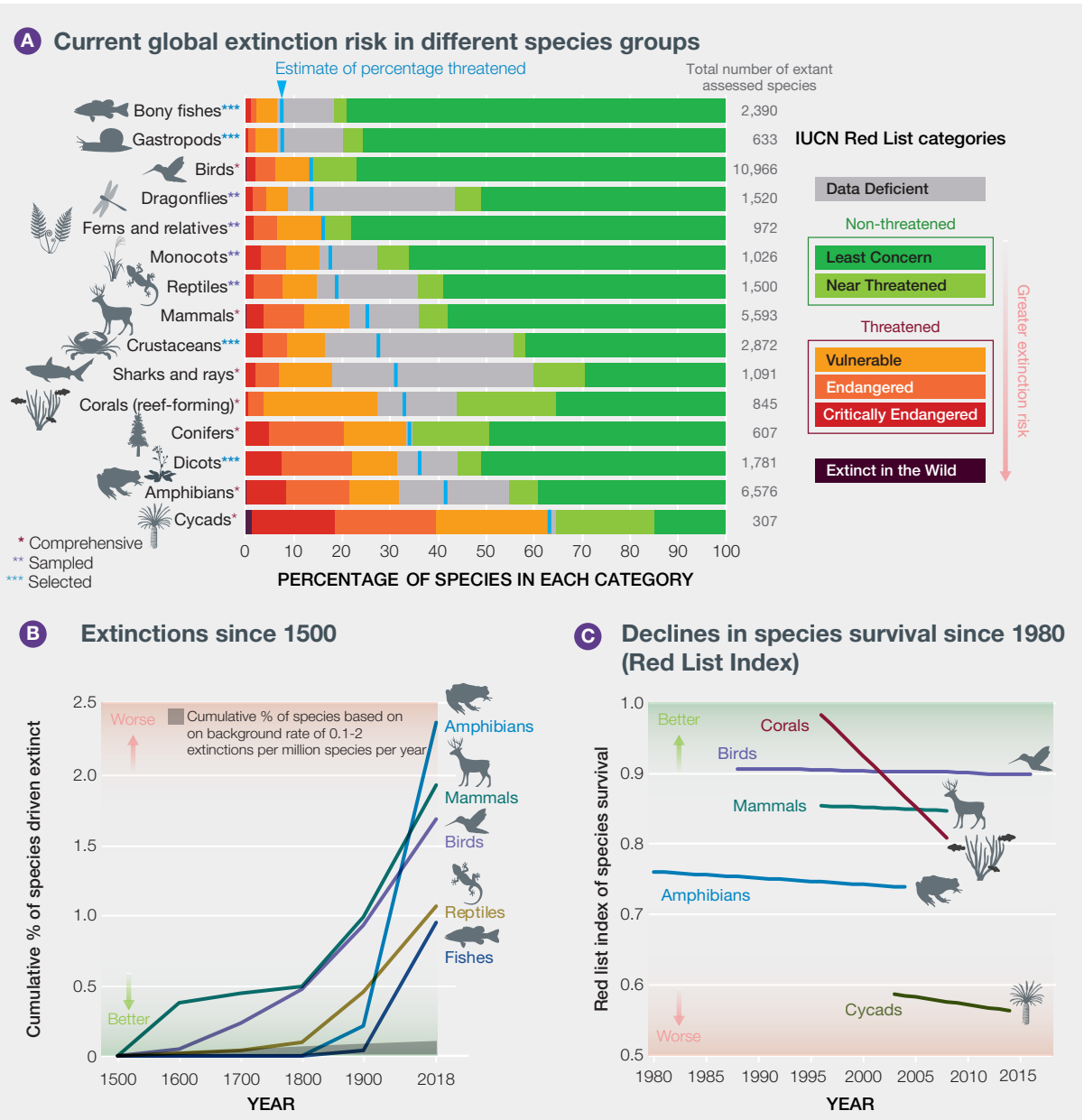

Figure SPM 3 **A substantial proportion of assessed species are threatened with extinction and overall trends are deteriorating, with extinction rates increasing sharply in the past century.**

A Percentage of species threatened with extinction in taxonomic groups that have been assessed comprehensively, or through a 'sampled' approach, or for which selected subsets have been assessed, by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. Groups are ordered according to the best estimate for the percentage of extant species considered threatened (shown by the vertical blue lines), assuming that data deficient species are as threatened as non-data deficient species. B Extinctions since 1500 for vertebrate groups. Rates for reptiles and fishes have not been assessed for all species. C Red List Index of species survival for taxonomic groups that have been assessed for the IUCN Red List at least twice. A value of 1 is equivalent to all species being categorized as Least Concern; a value of zero is equivalent to all species being classified as Extinct. Data for all panels derive from www.iucnredlist.org (see Chapter 3 Figure 3.4 and Chapter 2 Figure 2.7).

indigenous peoples and local communities, including farmers, pastoralists and herders, are often important areas for *in situ* conservation of the remaining varieties and breeds *(well established)* {2.2.5.3.1}. Available data suggest that genetic diversity within wild species globally has been declining by about 1 per cent per decade since the mid-19th century; and genetic diversity within wild mammals and amphibians tends to be lower in areas

where human influence is greater *(established but incomplete)* {2.2.5.2.6}.

8 Human-driven changes in species diversity within local ecological communities vary widely, depending on the net balance between species loss and the influx of alien species, disturbance-tolerant species, other human-adapted species or climate migrant species (*well established*) {2.2.5.2.3}. Even though human-dominated landscapes are sometimes species-rich, their species composition is markedly altered from that in natural landscapes *(well established)* {2.2.5.2.3, 2.2.7.10, 2.2.7.11}. As a result of human-caused changes in community composition, naturally occurring species in local terrestrial ecosystems worldwide are estimated to have lost at least 20 per cent of their original abundance on average, with hotspots of endemic species tending to have lost even more *(established but incomplete)* {2.2.5.2.3}. The traits of species influence whether they persist or even thrive in human-modified ecosystems *(well established)* {2.2.3.6, 2.2.5.2.5}. For example, species that are large, grow slowly, are habitat specialists or are carnivores – such as great apes, tropical hardwood trees, sharks and big cats – are disappearing from many areas. Many other species, including those with opposite characteristics, are becoming more abundant locally and are spreading quickly around the world; across a set of 21 countries with detailed records, the numbers of invasive alien species per country have risen by some 70 per cent since 1970 {2.2.5.2.3}. The effects of invasive alien species are often particularly severe for the native species and assemblages on islands and in other settings with high proportions of endemic species *(well established)* {2.2.3.4.1, 2.2.5.2.3}. Invasive alien species can have devastating effects on mainland assemblages as well: for example, a single invasive pathogen species, *Batrachochytrium dendrobatidis*, is a threat to nearly 400 amphibian species worldwide and has already caused a number of extinctions *(well established)* {2.2.5.2.3}. Many drivers add already widespread species to ecological communities in many places; and many drivers cause endemic species to decline in many places. These two processes have contributed to the widespread erosion of differences between ecological communities in different places, a phenomenon known as biotic homogenization or the "anthropogenic blender" *(well established)* {2.2.5.2.3}. The consequences of all these changes for ecosystem processes and hence nature's contributions to people can be very significant. For example, the decline and disappearance of large herbivores and predators has dramatically affected the structure, fire regimes, seed dispersal, land surface albedo and nutrient availability within many ecosystems *(well established)* {2.2.5.2.1}. However, the consequences of changes often depend on details of the ecosystem, remain hard to predict and are still understudied *(established but incomplete)* {2.2.5.2.3}.

9 Many organisms show ongoing biological evolution so rapid that it is detectable within only a few years or even more quickly – in response to anthropogenic drivers *(well established)* {2.2.5.2.5, 2.2.5.2.6}. Management decisions that take those evolutionary changes into account will be noticeably more effective (*established but incomplete*) {Box 2.5}. This human-driven contemporary evolution, which has long been recognized in microbes, viruses, agricultural insect pests and weeds *(well established)*, is now being observed in some species within all major taxonomic groups (animals, plants, fungi and microorganisms). Such changes are known to occur in response to human activities or drivers, such as hunting, fishing, harvesting, climate change, ocean acidification, soil and water pollution, invasive species, pathogens, pesticides and urbanization *(established but incomplete)* {2.2.5.2.5}. However, management strategies typically assume that evolutionary changes occur only over much longer time periods and thus ignore rapid evolution. These policy considerations span many spheres in which management actions designed to slow or speed evolution can dramatically change outcomes, as the following examples indicate. Insects, weeds and pathogens evolve resistance to insecticides, herbicides and other control agents, yet management strategies such as refuges, crop rotation, and crop diversity can dramatically slow that undesirable evolution *(well established)* {Box 2.5}. Commercial fish populations have evolved to mature earlier under intensive harvesting, which sometimes can be minimized by mandating changes in fishing gear or fish size limits *(established but incomplete)* {2.2.5.2.5}. Climate change favours the evolution of seasonally earlier reproduction in many organisms, which can in principle be facilitated through the introduction of individuals from populations already adapted to such conditions *(established but incomplete)* {2.2.5.2.5}. Mosquitoes rapidly evolve resistance to efforts to control them, but evolutionarily informed management actions can dramatically slow that undesirable evolution *(established but incomplete)* {2.2.5.2.5}. Contemporary evolution is thus relevant to many policy concerns. Understanding and working with contemporary evolution can address important concerns surrounding pollination and dispersal, coral persistence in the face of ocean acidification, water quality, pest regulation, food production and options for the future *(established but incomplete).* The specific actions taken will typically be case-specific and therefore will require careful assessment of evolutionary potential and consequences. In many cases, the best strategy could be to simply maintain the ability of natural populations to respond evolutionarily on their own – rather than through direct human manipulation of evolution.

B. Direct and indirect drivers of change have accelerated during the past 50 years.

10 Today, humans extract more from the Earth and produce more waste than ever before *(well established)*. Globally, land-use change is the direct driver with the largest relative impact on terrestrial and freshwater ecosystems, while direct exploitation of fish and seafood has the largest relative impact in the oceans (*well established*) (Figure SPM.2) {2.2.6.2}. Climate change, pollution and invasive alien species have had a lower relative impact to date but are accelerating (*established but incomplete*) {2.2.6.2, 3.2, 4.2}. Although the pace of agricultural expansion into intact ecosystems {2.1.13} has varied from country to country, losses of intact ecosystems have occurred primarily in the tropics, home to the highest levels of biodiversity on the planet (for example, 100 million hectares of tropical forest from 1980 to 2000), due to cattle ranching in Latin America (~42 million ha) and plantations in South-East Asia (~7.5 million hectares, 80 per cent in oil palm) among others {2.1.13}, noting that plantations can also increase total forest area. Within land-use change, urban areas have more than doubled since 1992. In terms of direct exploitation, approximately 60 billion tons[9] of renewable and non-renewable resources {2.1.2} are being extracted each year. That total has nearly doubled since 1980, as population has grown considerably while the average per capita consumption of materials (e.g., plants, animals, fossil fuels, ores, construction material) has risen by 15 per cent since 1980 *(established but incomplete)* {2.1.6, 2.1.11, 2.1.14}. This activity has generated unprecedented impacts: since 1980, greenhouse gas emissions have doubled {2.1.11, 2.1.12}, raising average global temperatures by at least 0.7 °C {2.1.12}, while plastic pollution in oceans has increased tenfold {2.1.15}. Over 80 per cent of global wastewater is being discharged back into the environment without treatment, while 300–400 million tons of heavy metals, solvents, toxic sludge and other wastes from industrial facilities are dumped into the world's waters each year {2.1.15}. Excessive or inappropriate application of fertilizer can lead to run-off from fields and enter freshwater and coastal ecosystems, producing more than 400 hypoxic zones that affected a total area of more than 245,000 km^2 as early as 2008 {2.1.15}. In some island countries, invasive alien species have a significant impact on biodiversity, with introduced species being a key driver of extinctions.

11 Land-use change is driven primarily by agriculture, forestry and urbanization, all of which are associated with air, water and soil pollution. Over one third of the world's land surface and nearly three-quarters of available freshwater resources are devoted to crop or livestock production {2.1.11}. Crop production occurs on some 12 per cent of total ice-free land. Grazing occurs on about 25 per cent of total ice-free lands and approximately 70 per cent of drylands {2.1.11}. Approximately 25 per cent of the globe's greenhouse gas emissions come from land clearing, crop production and fertilization, with animal-based food contributing 75 per cent of that. Intensive agriculture has increased food production at the cost of regulating and non-material contributions from nature, though environmentally beneficial practices are increasing. Small landholdings (less than 2 hectares) contribute approximately 30 per cent of global crop production and 30 per cent of the global food caloric supply, using around a quarter of agricultural land and usually maintaining rich agrobiodiversity {2.1.11}. Moving to logging, between 1990 and 2015, clearing and wood harvest contributed to a total reduction of 290 million hectares in native forest cover, while the area of planted forests grew by 110 million hectares {2.1.11}. Industrial roundwood harvest is falling within some developed countries but rising on average in developing countries {2.1.11}. Illegal timber harvests and related trade supply 10–15 per cent of global timber, and up to 50 per cent in certain areas, hurting revenues for state owners and livelihoods for the rural poor. All mining on land has increased dramatically and, while still using less than 1 per cent of the Earth's land, has had significant negative impacts on biodiversity, emissions of highly toxic pollutants, water quality and water distribution, and human health {2.1.11}. Mined products contribute more than 60 per cent of the GDP of 81 countries. There are approximately 17,000 large-scale mining sites in 171 countries, with the legal sites mostly managed by international corporations, but there is also extensive illegal and small-scale mining that is harder to trace, and both types of sites are often in locations relevant for biodiversity {2.1.11}.

12 In marine systems, fishing has had the most impact on biodiversity (target species, non-target species and habitats) in the past 50 years alongside other significant drivers *(well established)* {2.1.11, 2.2.6.2} (Figure SPM.2). Global fish catches have been sustained by expanding fishing geographically and penetrating into deeper waters *(well established)* {3.2.1}. An increasing proportion of marine fish stocks are overfished (33 per cent in 2015), including stocks of economically important species, while 60 per cent are maximally sustainably fished and only 7 per cent are underfished *(well established)* {Box 3.1}. Industrial fishing, concentrated in a few countries and corporations {2.1.11}, covers at least 55 per cent of the oceans, largely concentrated in the

9. All references to "tons" are to metric tons.

northeast Atlantic, the northwest Pacific and upwelling regions off South America and West Africa *(established but incomplete)* {2.1.11}. Small-scale fisheries account for more than 90 per cent of commercial fishers (over 30 million people), and nearly half of global fish catch *(established but incomplete)*. In 2011, illegal, unreported or unregulated fishing represented up to one third of the world's reported catch *(established but incomplete)* {2.1.11}. Since 1992, regional fisheries bodies have been adopting sustainable development principles. For instance, more than 170 members of the Food and Agriculture Organization of the United Nations (FAO) adopted the Code of Conduct for Responsible Fisheries in 1995, and as of 1 April 2018, 52 countries and one member organization had become Parties to the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, in order to address the depletion of marine fisheries *(established but incomplete)* {2.1.11}, reduce by-catch {3, box 3.3} and lower damage to seabeds and reefs. In addition, the set of established marine protected areas has been growing *(well established)* {2.1.11.1, 2.2.7.16}.

13 The direct driver with the second highest relative impact on the oceans is the many changes in the uses of the sea and coastal land (*well established*) (Figure SPM.2) {2.2.6.2}. Coastal habitats, including estuaries and deltas critical for marine biota and regional economies, have been severely affected by sea-use changes (coastal development, offshore aquaculture, mariculture and bottom trawling) and land-use changes (onshore land clearance and urban sprawl along coastlines, plus pollution of rivers). Pollution from land sources is already a major driver of negative environmental change. Ocean mining, while relatively small, has expanded since 1981 to ~ 6,500 offshore oil and gas installations worldwide in 53 countries (60 per cent in the Gulf of Mexico by 2003) and likely will expand into the Arctic and Antarctic regions as the ice melts {2.1.11}. Ocean acidification from increased carbon dioxide levels largely affects shallow waters, with the ecosystems of the subarctic Pacific and western Arctic Ocean particularly affected. Plastic microparticles and nanoparticles are entering food webs in poorly understood ways {2.1.15.3}. Coastal waters hold the highest levels of metals and persistent organic pollutants from industrial discharge and agricultural run-off, poisoning coastal fish harvests. Severe effects from excess nutrient concentrations in certain locations include damage to fish and seabed biota. The dynamics of ocean and airborne transport of pollutants mean that the harm from inputs of plastics, persistent organic pollutants, heavy metals and ocean acidification is felt worldwide, including with consequences for human health.

14 Climate change is already having an impact on nature, from genes to ecosystems. It poses a growing risk owing to the accelerated pace of change and interactions with other direct drivers (*well established*) {2.1.12, 2.1.18, 2.2.6.2}. Shifts in species distribution, changes in phenology, altered population dynamics and changes in the composition of species assemblage or the structure and function of ecosystems, are evident {2.2.5.3.2, 2.2.5.2.3, 2.2.6.2} and accelerating in marine, terrestrial and freshwater systems *(well established)* {2.2.3.2}. Almost half (47 per cent) of threatened terrestrial mammals, excluding bats, and one quarter (23 per cent) of threatened birds may have already been negatively affected by climate change in at least part of their distribution (birds in North America and Europe suggest effects of climate change in their population trends since the 1980s) *(established but incomplete)* {2.2.6.2}. Ecosystems such as tundra and taiga and regions such as Greenland, previously little affected by people directly, are increasingly experiencing the impacts of climate change *(well established)* {2.2.7.5}. Large reductions and local extinctions of populations are widespread *(well established)* {2.2.6.2}. This indicates that many species are unable to cope locally with the rapid pace of climate change, through either evolutionary or behavioural processes, and that their continued existence will also depend on the extent to which they are able to disperse, to track suitable climatic conditions, and to preserve their capacity to evolve *(well established)* {2.2.5.2.5}. Many of these changes can have significant impacts on a number of important economic sectors, and cascading effects for other components of biodiversity. Island nations, in particular those in East Asia and the Pacific region, will be most vulnerable to sea-level rise (1m) as projected by all climate change scenarios, {2.1.1.7.1} which will displace close to 40 million people {2.1.1.7.1, 2.2.7.1.8}.

15 Unsustainable use of the Earth's resources is underpinned by a set of demographic and economic indirect drivers that have increased, and that furthermore interact in complex ways, including through trade (*well established*) {2.1.6}. The global human population has increased from 3.7 to 7.6 billion since 1970 unevenly across countries and regions, which has strong implications for the degradation of nature. Per capita consumption also has grown, and also is unequal, with wide variations in lifestyles and access to resources across and within regions, plus consequences for nature that are distributed globally through trade. Total gross domestic product is four times higher and is rising faster in developed than in least developed countries. Approximately 821 million people face food insecurity in Asia and Africa, while 40 per cent of the global population lacks access to clean, safe drinking water. Generally, environmentally-based health burdens, such as air and water pollution, are more prevalent in least developed countries {2.1.2, 2.1.15}.

16 Due to expansions of infrastructure, extensive areas of the planet are being opened up to new threats (*well established*) {2.1.11}. Globally, paved road lengths are projected to increase by 25 million kilometres by

2050, with nine tenths of all road construction occurring within least developed and developing countries. The number of dams has increased rapidly in the past 50 years. Worldwide, there are now about 50,000 large dams (higher than 15 metres) and approximately 17 million reservoirs (larger than 0.01 hectares or 100m^2) {2.1.11}. The expansions of roads, cities, hydroelectric dams and oil and gas pipelines can come with high environmental and social costs, including deforestation, habitat fragmentation, biodiversity loss, land grabbing, population displacement and social disruption, including for indigenous peoples and local communities *(established but incomplete)*. Yet infrastructure can generate positive economic effects and even environmental gains, based on efficiency, innovation, migration, and urbanization, depending on where and how investment is implemented and governed *(well established)* {2.1.11}. Understanding this variation in impacts is critical.

17 Long-distance transportation of goods and people, including for tourism, have grown dramatically in the past 20 years, with negative consequences for nature overall (*established but incomplete*). The rise in airborne and seaborne transportation of both goods and people, including a threefold increase in travel from developed and developing countries in particular, has increased pollution and significantly increased the presence of invasive alien species *(well established)* {2.1.15}. Between 2009 and 2013, the carbon footprint from tourism rose 40 per cent to 4.5 gigatons of carbon dioxide, and overall, 8 per cent of total greenhouse gas emissions are from tourism-related transportation and food consumption {2.1.11, 2.1.15}. The demand for nature-based tourism or ecotourism has also risen, with mixed effects on nature and local communities, including some potential for contributions to local conservation, in particular when carried out at a smaller scale {2.1.11}.

18 Distant areas of the world are increasingly connected, as consumption, production, and governance decisions increasingly influence materials, waste, energy, and information flows in other countries, generating aggregate economic gains while shifting economic and environmental costs, which can link to conflicts (*established but incomplete*) (Figure SPM.4). As per capita consumption has risen, developed countries and rapidly growing developing countries {2.1.2, 2.1.6}, while at times supporting efficient production for exports, often reduce water consumption and forest degradation nationally {2.1.6, 2.1.11} by importing crops and other resources, mainly from developing countries {2.1.6}. The latter, as a result, see declines in nature and its contributions to people (habitat, climate, air and water quality) different from the exported food, fibre and timber products **(Figures SPM.1 and 5)**. Reduced, declining and unequal access to nature's contributions to people may, in a complex interaction with other factors, be a source of conflict within and among countries *(established but incomplete)*. Least developed countries, often rich in and more dependent upon natural resources, have suffered the greatest land degradation, have also experienced more conflict and lower economic growth, and have contributed to environmental outmigration by several million people {2.1.2, 2.1.4}. When indigenous peoples or local communities are expelled from or threatened on their lands, including by mining or industrial logging for export, this too can spark conflict – often between actors with different levels of power, as today a few actors can control large shares of any market or capital asset rivalling those of most countries {2.1.6}, while funds channelled through tax havens support most vessels implicated in illegal, unreported and unregulated fishing. More than 2,500 conflicts over fossil fuels, water, food and land are currently occurring across the planet, and at least 1,000 environmental activists and journalists were killed between 2002 and 2013 {2.1.11, 2.1.18}.

19 Governance has at many levels moved slowly to further and better incorporate into policies and incentives the values of nature's contributions to people. However, around the globe, subsidies with harmful effects on nature have persisted (*well established*) {2.1, 3, 5, 6.4}. The incorporation by society of the value of nature's contributions to people will entail shifts in governance even within private supply chains, for instance when civil society certifies and helps to reward desired practices, or when States block access to markets because of undesirable practices {2.1.7}. Successful local governance supported by recognition of local rights has often incorporated knowledge of how nature contributes to human wellbeing to motivate such behaviours {2.1.8}. National agencies have also promoted land management strategies that are more sustainable and introduced regulations, among other policy measures {2.1.9.2}, and have coordinated with other nations on global agreements to maintain nature's contributions to people {2.1.10}. Economic instruments that may be harmful to nature include subsidies, financial transfers, subsidized credit, tax abatements, and prices for commodities and industrial goods that hide environmental and social costs. Such instruments favour unsustainable production and, as a consequence, can promote deforestation, overfishing, urban sprawl, and wasteful uses of water. In 2015, agricultural support potentially harmful to nature amounted to $100 billion in countries belonging to the Organization for Economic Cooperation and Development, although some subsidy reforms to reduce unsustainable pesticide uses and adjust several other consequential development practices have been introduced {2.1.9.1, 6.4.5}. Fossil fuel subsidies valued at $345 billion result in global costs of $5 trillion when including the reduction of nature's contributions (coal accounts for about half of these costs, petroleum for about one third and natural gas for about one tenth {2.1.9.1.2}). In fisheries, subsidies to

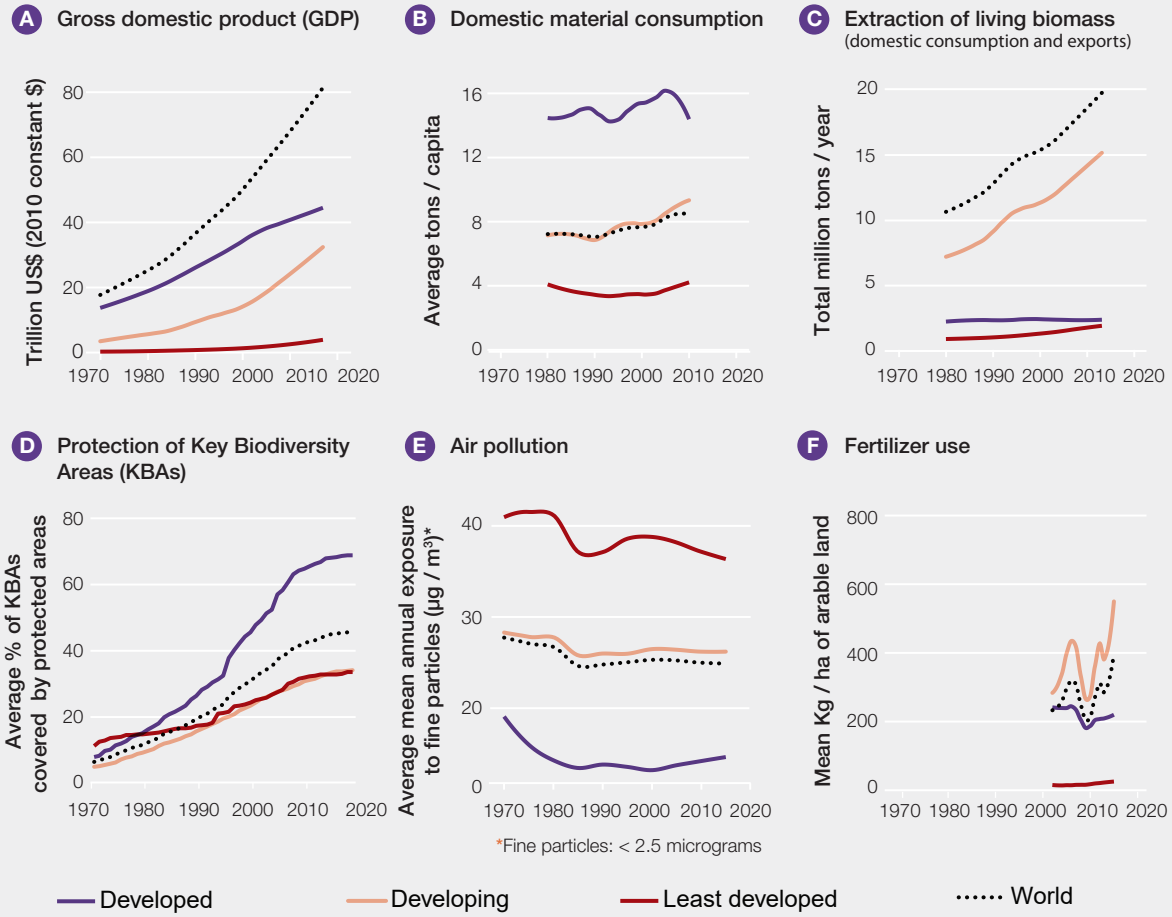

Figure SPM 4 **Development pathways since 1970 for selected key indicators of human-environment interactions, which show a large increase in the scale of global economic growth and its impacts on nature, with strong contrasts across developed, developing, and least developed countries.**

Countries are classified according to the United Nations World Economic Situation and Prospects (https://www.un.org/development/desa/dpad/publication/world-economic-situation-and-prospects-2019/). Global gross domestic product has risen fourfold in real terms, with the vast majority of growth occurring in developed and developing countries A. Extraction of living biomass (e.g., crops, fish) to meet the demand for domestic consumption and for export is highest in developing countries and rising rapidly B. However, material consumption per capita within each country (from imports and domestic production) is highest in developed countries. Overall protection of Key Biodiversity Areas is rising, being highest within developed countries D. Air pollution is highest in least developed countries E, while the challenges of non-point-source pollution from the use of fertilizers are highest in developing countries.
Data sources: A, E, F: www.data.worldbank.org; B, C: www.materialflows.net; D: www.keybiodiversityareas.org, www.protectedplanet.net.

increase and maintain capacity, which in turn often lead to the degradation of nature, constitute perhaps a majority of the tens of US$ billions spent on supports {5.3.2.5}.

20 Much of the world's terrestrial wild and domesticated biodiversity lies in areas traditionally managed, owned, used or occupied by indigenous peoples and local communities (*well established*) (Figure SPM.5) {2.2.4}. In spite of efforts at all levels, although nature on indigenous lands is declining less rapidly than elsewhere, biodiversity and the knowledge associated with its management are still deteriorating (*established but incomplete*) {2.2.4, 2.2.5.3}. Despite a long history of resource use, conservation conflicts related to colonial expansion and land appropriation for parks and other uses {3.2} *(well established),* indigenous peoples and local communities have often managed their landscapes and seascapes in ways that were adjusted to local conditions over generations. These management methods often remain compatible with, or actively support, biodiversity conservation by "accompanying" natural processes with anthropogenic assets *(established but incomplete)* {2.2.4, 2.2.5.3.1} (Figure SPM.5).

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Figure SPM 5 **Contributions of indigenous peoples and local communities to the enhancement and maintenance of wild and domesticated biodiversity and landscapes. Indigenous and local knowledge systems are locally based, but regionally manifested and thus globally relevant.**

A wide diversity of practices actively and positively contributes to wild and domestic biodiversity through "accompanying" natural processes with anthropogenic assets (knowledge, practices and technology). Indigenous peoples often manage the land and coastal areas based on culturally specific world views, applying principles and indicators such as the health of the land, caring for the country and reciprocal responsibility. As lifestyles, values and external pressures change with globalization, however, unsustainable practices are becoming increasingly common in certain regions[10]. The image in the centre of the above figure shows the global overlap between 1) land areas traditionally owned, managed[11], used, or occupied by indigenous peoples; 2) formally designated protected areas; and 3) remaining terrestrial areas with very low human intervention (areas that score <4 on the Human Footprint Index[12]). Circles and overlapping sections are proportional in area. Land areas traditionally owned, managed[11], used, or occupied by indigenous peoples overlap with approximately 35 per cent of the area that is formally protected, and approximately 35 per cent of all remaining terrestrial areas with very low human intervention. The topics and pictures in the figure aim to illustrate, not represent, the types and diversity of the following contributions of indigenous peoples and local communities to biodiversity: a domestication and maintenance of locally adapted crop and fruit varieties (potatoes, Peru) and b animal breeds (rider and sheep, Kyrgyzstan) {2.2.4.4}; c creation of species-rich habitats and high ecosystem diversity in cultural landscapes (hay meadows, Central Europe) {2.2.4.1-2}; d identification of useful plants and their cultivation in high-diversity ecosystems (multi-species forest garden, Indonesia) {2.2.4.3}; e and f management and monitoring of wild species, habitats and landscapes for wildlife and for increased resilience (e - Australia, f - Alaska) {2.2.4.5-6}; g restoration of degraded lands (Niger) {3.2.4}; h prevention of deforestation in recognized indigenous territories (Amazon basin, Brazil) {2.2.4.7}; i offering alternative concepts of relations between humanity and nature (Northern Australia).

10. In Stephen Garnett *et al.*, "A spatial overview of the global importance of Indigenous lands for conservation", *Nature Sustainability*, Vol. 1 (July 2018) pp. 369–374.
11. These data sources define land management here as the process of determining the use, development and care of land resources in a manner that fulfils material and non-material cultural needs, including livelihood activities such as hunting, fishing, gathering, resource harvesting, pastoralism, and small-scale agriculture and horticulture.
12. Venter, O. *et al.* Global terrestrial Human Footprint maps for 1993 and 2009. Sci. Data 3, sdata201667 (2016).

At least one quarter of the global land area is traditionally managed[13], owned, used or occupied by indigenous peoples. These areas include approximately 35 per cent of the area that is formally protected, and approximately 35 per cent of all remaining terrestrial areas with very low human intervention *(established but incomplete)* {2.2.5.3.1}. Community-based conservation institutions and local governance regimes have often been effective, at times even more effective than formally established protected areas, in preventing habitat loss *(established but incomplete)*. Several studies have highlighted contributions by indigenous peoples and local communities in limiting deforestation, as well as initiatives showing synergies between these different mechanisms *(well established)* {6.3.2, 2.2.5.3}. In many regions, however, the lands of indigenous peoples are becoming islands of biological and cultural diversity surrounded by areas in which nature has further deteriorated *(established but incomplete)* {2.2.5.3}. Among the local indicators developed and used by indigenous peoples and local communities, 72 per cent show negative trends in nature that underpinned local livelihoods *(established but incomplete)* {2.2.5.3.2}. Major trends include declining availability of resources – due in part to legal and illegal territory reductions, despite expanding indigenous populations – as well as declining health and populations of culturally important species; new pests and invasive alien species as climate changes; losses in both natural forest habitats and grazing lands; and declining productivity in remnant ecosystems. A more detailed global synthesis of trends in nature observed by indigenous peoples and local communities is hindered by the lack of institutions that gather data for these locations and then synthesize them within regional and global summaries {2.2.2}.

13. These data sources define land management here as the process of determining the use, development and care of land resources in a manner that fulfils material and non-material cultural needs, including livelihood activities such as hunting, fishing, gathering, resource harvesting, pastoralism, and small-scale agriculture and horticulture.

C. Goals for conserving and sustainably using nature and achieving sustainability cannot be met by current trajectories, and goals for 2030 and beyond may only be achieved through transformative changes[14] across economic, social, political and technological factors.

21 There has been good progress towards the components of 4 of the 20 Aichi Biodiversity Targets under the Strategic Plan for Biodiversity 2011–2020. Moderate progress has been achieved towards some components of 7 more targets, but for 6 others, poor progress has been made towards all components. There is insufficient information to assess progress towards some or all components of the remaining 3 targets (*established but incomplete*) {3.2}. Overall, the state of nature continues to decline (12 of 16 indicators show significantly worsening trends) (*well established*) {3.2} (Figure SPM.6).

By 2015, greater progress had been made in implementing policy responses and actions to conserve biodiversity for drivers with an impact on coral reefs and other ecosystems vulnerable to climate change *(established but incomplete*) *{3.2}.* Anthropogenic drivers of biodiversity loss, including habitat loss as a result of land-use and sea use change (addressed by Aichi Target 5), unsustainable agriculture, aquaculture and forestry (Aichi Target 7), unsustainable fishing (Aichi Target 6), pollution (Aichi Target 8), and invasive alien species (Aichi Target 9) are increasing globally, despite national efforts to meet the Aichi Targets *(established but incomplete)* {3.2}.

22 Conservation actions, including protected areas, efforts to manage unsustainable use and address the illegal capture and trade of species, and the translocation and eradication of invasive species, have been successful in preventing the extinction of some species (*established but incomplete*). For example, conservation investment during the period between 1996 and 2008 reduced the extinction risk for mammals and birds in 109 countries by a median value of 29 per cent per country, while the rate of decrease in extinction risk for birds, mammals and amphibians would have been at least 20 per cent higher without conservation action in recent decades. Similarly, it is likely that at least 6 species of ungulate (e.g., the Arabian Oryx and Przewalski's Horse) would now be extinct or surviving only in captivity without conservation measures. At least 107 highly threatened birds, mammals and reptiles (e.g., the Island Fox and the Seychelles Magpie-Robin) are estimated to have benefited from invasive mammal eradication on islands {3.2.2}. Although still few and spatially localized, such cases show that with prompt and appropriate action, it is possible to reduce human-induced extinction rates

14. A fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values.

Goal	Target	Target element (abbreviated)	Progress towards the Aichi Targets		
			Poor	Moderate	Good
A. Address the underlying drivers	1	1.1 Awareness of biodiversity			
		1.2 Awareness of steps to conserve			
	2	2.1 Biodiversity integrated into poverty reduction			
		2.2 Biodiversity integrated into planning			
		2.3 Biodiversity integrated into accounting			
		2.4 Biodiversity integrated into reporting			
	3	3.1 Harmful subsidies eliminated and reformed			
		3.2 Positive incentives developed and implemented			
	4	4.1 Sustainable production and consumption			
		4.2 Use within safe ecological limits			
B. Reduce direct pressures	5	5.1 Habitat loss at least halved			
		5.2 Degradation and fragmentation reduced			
	6	6.1 Fish stocks harvested sustainably			
		6.2 Recovery plans for depleted species	Unknown		
		6.3 Fisheries have no adverse impact			
	7	7.1 Agriculture is sustainable			
		7.2 Aquaculture is sustainable			
		7.3 Forestry is sustainable			
	8	8.1 Pollution not detrimental			
		8.2 Excess nutrients not detrimental			
	9	9.1 Invasive alien species prioritized			
		9.2 Invasive alien pathways prioritized	Unknown		
		9.3 Invasive species controlled or eradicated			
		9.4 Invasive introduction pathways managed			
	10	10.1 Pressures on coral reefs minimized			
		10.2 Pressures on vulnerable ecosystems minimized			
C. Improve biodiversity status	11	11.1 10 per cent of marine areas conserved			
		11.2 17 per cent of terrestrial areas conserved			
		11.3 Areas of importance conserved			
		11.4 Protected areas, ecologically representative			
		11.5 Protected areas, effectively and equitably managed			
		11.6 Protected areas, well-connected and integrated			
	12	12.1 Extinctions prevented			
		12.2 Conservation status of threatened species improved			
	13	13.1 Genetic diversity of cultivated plants maintained			
		13.2 Genetic diversity of farmed animals maintained			
		13.3 Genetic diversity of wild relatives maintained			
		13.4 Genetic diversity of valuable species maintained	Unknown		
		13.5 Genetic erosion minimized			
D. Enhance benefits to all	14	14.1 Ecosystems providing services restored and safeguarded			
		14.2 Taking account of women, IPLCs, and other groups	Unknown		
	15	15.1 Ecosystem resilience enhanced	Unknown		
		15.2 15 per cent of degraded ecosystems restored	Unknown		
	16	16.1 Nagoya Protocol in force			
		16.2 Nagoya Protocol operational			
E. Enhance implementation	17	17.1 NBSAPs developed and updated			
		17.2 NBSAPs adopted as policy instruments			
		17.3 NBSAPs implemented			
	18	18.1 ILK and customary use respected			
		18.2 ILK and customary use integrated	Unknown		
		18.3 IPLCs participate effectively	Unknown		
	19	19.1 Biodiversity science improved and shared			
		19.2 Biodiversity science applied	Unknown		
	20	20.1 Financial resources for Strategic Plan[a] increased			

Abbreviations: ILK: indigenous and local knowledge; IPLCs: indigenous peoples and local communities; NBSAPs: national biodiversity strategies and action plans.
[a] Strategic Plan for Biodiversity 2011–2020.

Figure SPM 6 **Summary of progress towards the Aichi Targets.**

Scores are based on a quantitative analysis of indicators, a systematic review of the literature, the fifth National Reports to the Convention on Biological Diversity and the information available on countries' stated intentions to implement additional actions by 2020. Progress towards target elements is scored as "Good" (substantial positive trends at a global scale relating to most aspects of the element); "Moderate" (the overall global trend is positive, but insubstantial or insufficient, or there may be substantial positive trends for some aspects of the element, but little or no progress for others; or the trends are positive in some geographic regions, but not in others); "Poor" (little or no progress towards the element or movement away from it; or, despite local, national or case-specific successes and positive trends for some aspects, the overall global trend shows little or negative progress); or "Unknown" (insufficient information to score progress).

(established but incomplete) {2.2.5.2.4, 4}. There are, however, few other counterfactual studies assessing how trends in the state of nature or pressures upon nature would have been different in the absence of conservation efforts *(well established)* {3.2}.

23 Biodiversity and ecosystem functions and services directly underpin the achievement of several of the Sustainable Development Goals, including those on water and sanitation, climate action, life below water and life on land (Sustainable Development Goals 6, 13, 14 and 15), *(well established)* {3.3.2.1}. Nature also plays an important and complex role in the achievement of the Sustainable Development Goals related to poverty, hunger, health and well-being and sustainable cities (Sustainable Development Goals 1, 2, 3 and 11) *(established but incomplete)* {3.3.2.2} (Figure SPM.7). Several examples illustrate the interdependencies between nature and the Sustainable Development Goals. For example, nature and its contributions may play an important role in reducing vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters, although anthropogenic assets are also involved *(established but incomplete)*. Nature's underpinning of specific health targets varies across regions and ecosystems, is influenced by anthropogenic assets and remains understudied. The relationship can be positive or negative, as in the case of certain aspects of biodiversity and infectious diseases (see paragraph 2 of the present document). Nature directly underpins the livelihoods of indigenous peoples and local communities and the rural and urban poor, largely through direct consumption or through the income generated by trade in material contributions such as food (see paragraphs 2 and 36 of the present document) and energy *(well established)*. Such contributions are generally underrepresented in poverty analyses *(established but incomplete)*. Nature and its contributions are also relevant to the Goals for education, gender equality, reducing inequalities and promoting peace, justice and strong institutions (Sustainable Development Goals 4, 5, 10 and 16), but the current focus and wording of the related targets obscures or omits their relationship to nature *(established but incomplete)*.

24 To achieve the Sustainable Development Goals and the 2050 Vision for Biodiversity, future targets are likely to be more effective if they take into account the impacts of climate change *(well established)* {3.2, 3.3}. For example, climate change is projected to greatly increase the number of species under threat, with fewer species expanding their ranges or experiencing more suitable climatic conditions than the number of species experiencing range contraction or less suitable conditions *(established but incomplete)* {4.2, 3.2}. The impact of climate change on the effectiveness of protected areas calls for a re-evaluation of conservation objectives; meanwhile, there are currently few protected areas whose objectives and management take climate change into account *(established but incomplete)*. The Sustainable Development Goals for poverty, health, water and food security, and sustainability targets are closely linked through the impacts of multiple direct drivers, including climate change, on biodiversity and ecosystem functions and services, nature and nature's contributions to people and good quality of life. In a post-2020 global biodiversity framework, placing greater emphasis on the interactions between the targets of the Sustainable Development Goals {4.6, 3.7} may provide a way forward for achieving multiple targets, as synergies (and trade-offs) can be considered. Future targets are expected to be more effective if they take into account the impacts of climate change, including on biodiversity, and action to mitigate and adapt to climate change {4.6, 3.7}.

25 The adverse impacts of climate change on biodiversity are projected to increase with increasing warming, so limiting global warming to well below 2°C would have multiple co-benefits for nature and nature's contributions to people and quality of life; however, it is projected that some large-scale land-based mitigation measures to achieve that objective will have significant impacts on biodiversity *(established but*

Selected Sustainable Development Goals	Selected targets (abbreviated)	Recent status and trends in aspects of nature and nature's contributions to people that support progress towards target *		Uncertain relationship
		Poor/Declining support	Partial support	
No poverty	1.1 Eradicate extreme poverty			U
	1.2 Halve the proportion of people in poverty			U
	1.4 Ensure that all have equal rights to economic resources	■		
	1.5 Build the resilience of the poor	■		
Zero hunger	2.1 End hunger and ensure access to food all year round		■	
	2.3 Double productivity and incomes of small-scale food producers		■	
	2.4 Ensure sustainable food production systems	■		
	2.5 Maintain genetic diversity of cultivated plants and farmed animals		■	
Good health and well-being	3.2 End preventable deaths of newborns and children			U
	3.3 End AIDS, tuberculosis, malaria and neglected tropical diseases			U
	3.4 Reduce premature mortality from non-communicable diseases	Unknown		
	3.9 Reduce deaths and illnesses from pollution	Unknown		
Clean water and sanitation	6.3 Improve water quality	■		
	6.4 Increase water use and ensure sustainable withdrawals	■		
	6.5 Implement integrated water resource management		■	
	6.6 Protect and restore water-related ecosystems	■		
Sustainable cities and communities	11.3 Enhance inclusive and sustainable urbanization	■		
	11.4 Protect and safeguard cultural and natural heritage		■	
	11.5 Reduce deaths and the number of people affected by disasters	■		
	11.6 Reduce the adverse environmental impact of cities	■		
	11.7 Provide universal access to green and public spaces	■		
Climate action	13.1 Strengthen resilience to climate-related hazards	■		
	13.2 Integrate climate change into policies, strategies and planning		■	
	13.3 Improve education and capacity on mitigation and adaptation	Unknown		
	13a Mobilize US$100 billion/year for mitigation by developing countries	Unknown		
	13b Raise capacity for climate change planning and management	Unknown		
Life below water	14.1 Prevent and reduce marine pollution	■		
	14.2 Sustainably manage and protect marine and coastal ecosystems		■	
	14.3 Minimize and address ocean acidification	■		
	14.4 Regulate harvesting and end overfishing		■	
	14.5 Conserve at least 10 per cent of coastal and marine areas		■	
	14.6 Prohibit subsidies contributing to overfishing	■		
	14.7 Increase economic benefits from sustainable use of marine resources	■		
Life on land	15.1 Ensure conservation of terrestrial and freshwater ecosystems	■		
	15.2 Sustainably manage and restore degraded forests and halt deforestation	■		
	15.3 Combat desertification and restore degraded land	■		
	15.4 Conserve mountain ecosystems		■	
	15.5 Reduce degradation of natural habitats and prevent extinctions	■		
	15.6 Promote fair sharing of benefits from use of genetic resources		■	
	15.7 End poaching and trafficking	■		
	15.8 Prevent introduction and reduce impact of invasive alien species	■		
	15.9 Integrate biodiversity values into planning and poverty reduction		■	
	15a Increase financial resources to conserve and sustainably use biodiversity		■	
	15b Mobilize resources for sustainable forest management		■	

* There were no targets that were scored as good/positive status and trends

Figure SPM 7 **Summary of recent status and trends in aspects of nature and nature's contributions to people that support progress towards achieving selected targets of the Sustainable Development Goals.**

The targets selected are those where the current evidence and wording of the target make it possible to assess the consequences of the trends in nature and nature's contribution to people as they relate to the achievement of the target. Chapter 3, Section 3.3 provides

an assessment of the evidence of the links between nature and the Sustainable Development Goals. The scores for the targets are based on a systematic assessment of the literature and a quantitative analysis of the indicators, where possible. None of the targets scored "Full support" (that is, having a good status or substantial positive trends on a global scale). Consequently, the score of "Full support" was not included in the table. "Partial support" means that the overall global status and trends are positive, but still insubstantial or insufficient; or there may be substantial positive trends for some relevant aspects, but negative trends for others; or the trends are positive in some geographic regions, but negative in others. "Poor/Declining support" indicates poor status or substantial negative trends at a global scale. "Uncertain relationship" means that the relationship between nature and/or nature's contributions to people and the achievement of the target is uncertain. "Unknown" indicates that there is insufficient information to score the status and trends.

***incomplete)* {4.2, 4.3, 4.4, 4.5}.** All climate model trajectories show that limiting human-induced climate change to well below 2°C requires immediate, rapid reductions in greenhouse gas emissions or a reliance on substantial carbon dioxide removal from the atmosphere. However, the land areas required for bioenergy crops (with or without carbon capture and storage), afforestation and reforestation to achieve the targeted carbon uptake rates are projected to be very large {4.2.4.3., 4.5.3}. The biodiversity and environmental impact of large-scale afforestation and reforestation depends to a large degree on where these occur (prior vegetation cover, state of degradation), and the tree species planted *(established but incomplete)*. Likewise, large bioenergy crop or afforested areas are expected to compete with areas set aside for conservation, including restoration, or agriculture *(established but incomplete)*. Consequently, large-scale land-based mitigation measures may jeopardize the achievement of other Sustainable Development Goals that depend on land resources *(well established)* {4.5.3}. In contrast, the benefits of avoiding and reducing deforestation and promoting restoration can be significant for biodiversity *(well established)* and are expected to have co-benefits for local communities *(established but incomplete)* {4.2.4.3}.

26 Biodiversity and nature's regulating contributions to people are projected to decline further in most scenarios of global change over the coming decades, while the supply and demand for nature's material contributions to people that have current market value (food, feed, timber and bioenergy) are projected to increase (*well established*) {4.2, 4.3} (for example, see **Figure SPM.8**). These changes arise from continued human population growth, increasing purchasing power, and increasing per capita consumption. The projected effects of climate change and land use change on terrestrial and freshwater biodiversity are mostly negative, increase with the degree of global warming and land use change, and have an impact on marine biodiversity through increased eutrophication and deoxygenation of coastal waters *(well established)* {4.2.2.3.2, 4.2.3, 4.2.4}. For instance, a synthesis of many studies estimates that the fraction of species at risk of extinction due to climate change is 5 per cent at 2°C warming, rising to 16 per cent at 4.3°C warming {4.2.1.1}. Climate change and business-as-usual fishing scenarios are expected to worsen the status of marine biodiversity *(well established)* {4.2.2.2, 4.2.2.3.1}. Climate change alone is projected to decrease ocean net primary production by between 3 and 10 per cent, and fish biomass by between 3 and 25 per cent (in low and high warming scenarios, respectively) by the end of the century *(established but incomplete)* {4.2.2.2.1}. Whether or not the current removal of nearly 30 per cent of anthropogenic carbon dioxide emissions by terrestrial ecosystems continues into the future varies greatly from one scenario to the next and depends heavily on how climate change, atmospheric carbon dioxide and land-use change interact. Important regulating contributions of nature, such as coastal and soil protection, crop pollination and carbon storage, are projected to decline *(established but incomplete)* {4.2.4, 4.3.2.1}. In contrast, substantial increases in food, feed, timber and bioenergy production are predicted in most scenarios *(well established)* {4.2.4, 4.3.2.2}. Scenarios that include substantial shifts towards sustainable management of resource exploitation and land use, market reform, globally equitable and moderate animal protein consumption, and reduction of food waste and losses result in low loss or even recovery of biodiversity *(well established)* {4.2.2.3.1, 4.2.4.2, 4.3.2.2, 4.5.3}.

27 The magnitude of the impacts on biodiversity and ecosystem functions and services and the differences between regions are smaller in scenarios that focus on global or regional sustainability (*well established*) (Figure SPM.8). Sustainability scenarios that explore moderate and equitable consumption result in substantially lower negative impacts on biodiversity and ecosystems due to food, feed and timber production *(well established)* {4.1.3, 4.2.4.2, 4.3.2, 4.5.3}. The general patterns at the global level – namely, declines in biodiversity and regulating contributions versus increases in the production of food, bioenergy and materials – are evident in nearly all subregions {4.2.2, 4.2.3, 4.2.4, 4.3.3}. For terrestrial systems, most studies indicate that South America, Africa and parts of Asia will be much more significantly affected than other regions, especially in scenarios that are not based on sustainability objectives (see **Figure SPM.8** as an example). That is due in part to regional climate change differences and in part to the fact that scenarios generally foresee the largest land use conversions to crops or bioenergy in those regions {4.1.5, 4.2.4.2}. Regions such as North America and Europe are expected to have low conversion to crops and continued reforestation {4.1.5, 4.2.4.2}.

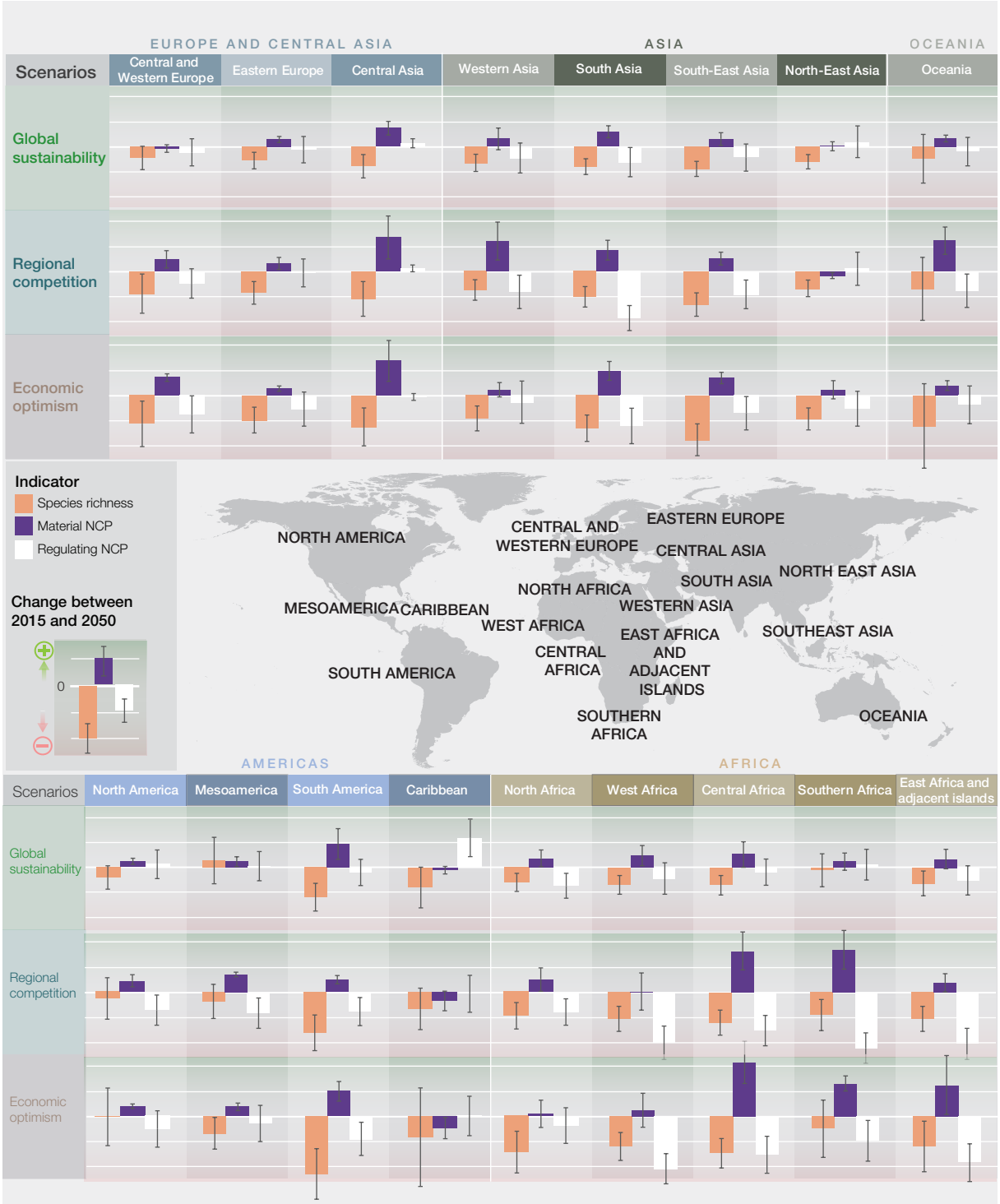

Figure SPM 8 **Projections of the impacts of land use and climate change on biodiversity and nature's material and regulating contributions to people between 2015 and 2050.**

This figure illustrates three main messages: i) the impacts on biodiversity and on nature's contributions to people (NCP) are the lowest in the "global sustainability" scenario in nearly all sub-regions, ii) regional differences in impacts are high in the regional competition and economic optimism scenario, and iii) material NCP increase the most in the regional competition and economic optimism scenarios, but this comes at the expense of biodiversity and regulating NCP. Projected impacts are based on a subset of the Shared Socioeconomic Pathway (SSP) scenarios and greenhouse gas emissions trajectories (RCP) developed in support of Intergovernmental Panel on Climate Change assessments. This figure does not cover the scenarios that include transformative change that are discussed in Chapter 5.

- The **"Global sustainability"** scenario combines proactive environmental policy and sustainable production and consumption with low greenhouse gas emissions (SSP1, RCP2.6; top rows in each panel);
- The **"Regional competition"** scenario combines strong trade and other barriers and a growing gap between rich and poor with high emissions (SSP3, RCP6.0; middle rows); and
- The **"Economic optimism"** scenario combines rapid economic growth and low environmental regulation with very high greenhouse emissions (SSP5, RCP8.5; bottom rows).

Multiple models were used with each of the scenarios to generate the first rigorous global-scale model comparison estimating the impact on biodiversity (change in species richness across a wide range of terrestrial plant and animal species at regional scales; orange bars), material NCP (food, feed, timber and bioenergy: purple bars) and regulating NCP (nitrogen retention, soil protection, crop pollination, crop pest control and ecosystem carbon storage and sequestration: white bars). The bars represent the normalized means of multiple models and the whiskers indicate the standard errors. The global means of percentage changes in individual indicators can be found in Figure 4.2.14.

28 **Climate change impacts also play a major role in regionally-differentiated projections of biodiversity and ecosystem functioning in both marine and terrestrial systems. Novel communities, where species will co-occur in historically unknown combinations, are expected to emerge (*established but incomplete*) {4.2.1.2, 4.2.4.1}** Substantial climate change-driven shifts of terrestrial biome boundaries, in particular in boreal, subpolar and polar regions and in (semi-) arid environments, are projected for the coming decades; a warmer, drier climate will reduce productivity in many places *(well established)* {4.2.4.1}. In contrast, rising atmospheric carbon dioxide concentrations can be beneficial for net primary productivity and can enhance woody vegetation cover, especially in semi-arid regions *(established but incomplete)* {4.2.4.1}. For marine systems, impacts are expected to be geographically variable, with many fish populations projected to move poleward due to ocean warming, meaning that local species extinctions are expected in the tropics *(well established)* {4.2.2.2.1}. However, that does not necessarily imply an increase in biodiversity in the polar seas, because of the rapid rate of sea ice retreat and the enhanced ocean acidification of cold waters *(established but incomplete)* {4.2.2.2.4}. Along coastlines, the upsurge in extreme climatic events, sea level rise and coastal development are expected to cause increased fragmentation and loss of habitats. Coral reefs are projected to undergo more frequent extreme warming events, with less recovery time in between, declining by a further 70–90 per cent at global warming of 1.5°C, and by more than 99 per cent at warming of 2°C, causing massive bleaching episodes with high coral mortality rates *(well established)* {4.2.2.2.2}.

D. Nature can be conserved, restored and used sustainably while simultaneously meeting other global societal goals through urgent and concerted efforts fostering transformative change.

29 **The Sustainable Development Goals and the 2050 Vision for Biodiversity cannot be achieved without transformative change, the conditions for which can be put in place now (*well established*) {2, 3, 5, 6.2}** **(Figure SPM.9)**. Increasing awareness of interconnectedness in the context of the environmental crisis and new norms regarding interactions between humans and nature would support that change *(well established)* {5.3, 5.4.3}. In the short term (before 2030), all decision makers could contribute to sustainability transformations, including through enhanced and improved implementation and enforcement of effective existing policy instruments and regulations, and the reform and removal of harmful existing policies and subsidies *(well established)*. Additional measures are necessary to enable transformative change over the long term (up to 2050) to address the indirect drivers that are the root causes of the deterioration of nature *(well established)*, including changes in social, economic and technological structures within and across nations {6.2, 6.3, 6.4} **(SPM Table.1)**.

30 **Sustainability transformations call for cross-sectoral thinking and approaches (Figure SPM.9). Sectoral policies and measures can be effective in particular contexts, but often fail to account for indirect, distant and cumulative impacts, which can have adverse effects, including the exacerbation of inequalities (*well established*).** Cross-sectoral

approaches, including landscape approaches, integrated watershed and coastal zone management, marine spatial planning, bioregional scale planning for energy, and new urban planning paradigms offer opportunities to reconcile multiple interests, values and forms of resource use, provided that these cross-sectoral approaches recognize trade-offs and uneven power relations between stakeholders *(established but incomplete)* {5.4.2, 5.4.3, 6.3, 6.4}.

31 **Transformative change is facilitated by innovative governance approaches that incorporate existing approaches, such as integrative, inclusive, informed and adaptive governance. While such approaches have been extensively practised and studied separately, it is increasingly recognized that together, they can contribute to transformative change (*established but incomplete*) {6.2}.** They help to address governance challenges that are common to many sectors and policy domains and create the conditions for implementing transformative change. Integrative approaches, such as mainstreaming across government sectors, are focused on the relationships between sectors and policies and help to ensure policy coherence and effectiveness *(well established)*. Inclusive approaches help to reflect a plurality of values and ensure equity *(established but incomplete)*, including through equitable sharing of benefits arising from their use and rights-based approaches *(established but incomplete)*. Informed governance entails novel strategies for knowledge production and co-production that are inclusive of diverse values and knowledge systems *(established but incomplete)*. Adaptive approaches, including learning from experience, monitoring and feedback loops, contribute to preparing for and managing the inevitable uncertainties and complexities associated with social and environmental changes *(established but incomplete)* {6.2, 5.4.2}.

32 **A summary of the evidence related to the components of pathways to sustainability suggests that there are five overarching types of management**

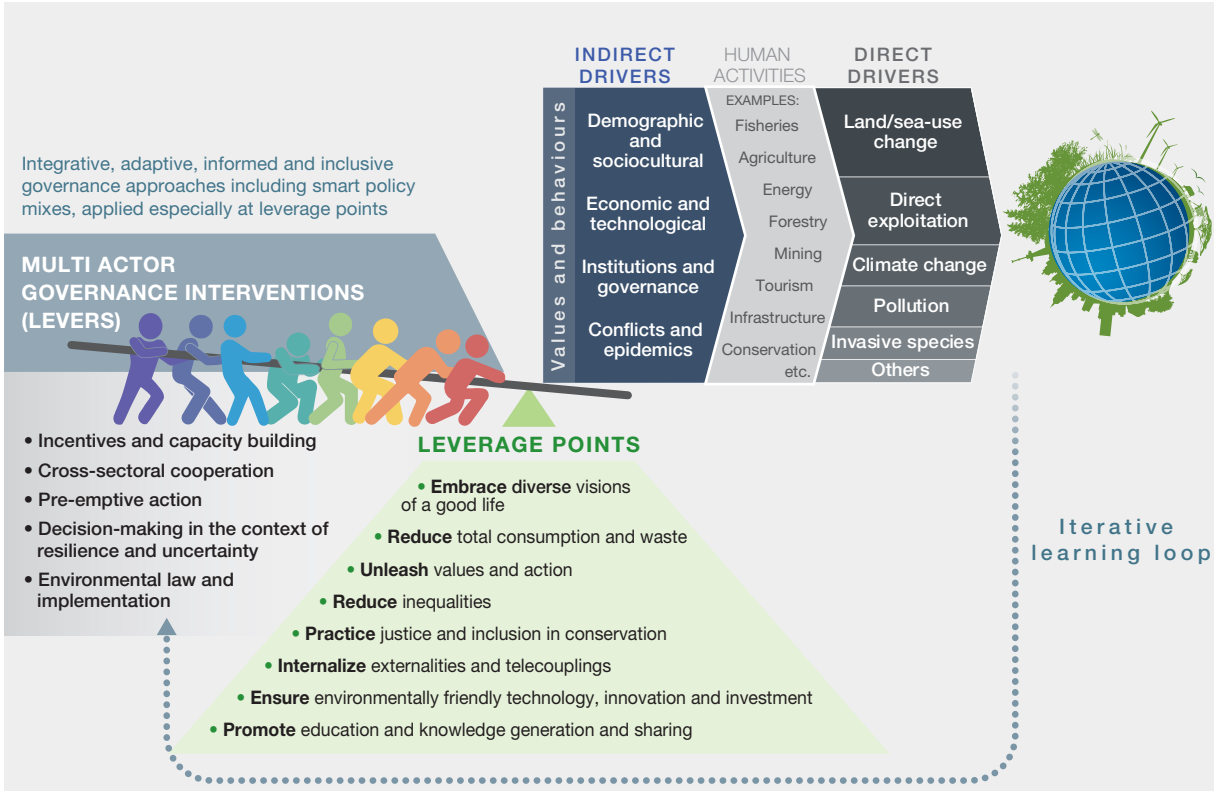

Figure SPM 9 **Transformative change in global sustainability pathways.**

Collaborative implementation of priority governance interventions (levers) targeting key points of intervention (leverage points) could enable transformative change from current trends towards more sustainable ones. Most levers can be applied at multiple leverage points by a range of actors, such as intergovernmental organizations, governments, non-governmental organizations, citizen and community groups, indigenous peoples and local communities, donor agencies, science and educational organizations, and the private sector, depending on the context. Implementing existing and new instruments through place-based governance interventions that are integrative, informed, inclusive and adaptive, using strategic policy mixes and learning from feedback, could enable global transformation.

interventions, or levers, and eight leverage points that are key for achieving transformative change (**Figure SPM.9**; D3 and D4 above) {5.4.1, 5.4.2}. The notion of levers and leverage points recognizes that complex global systems cannot be managed simply, but that in certain cases, specific interventions can be mutually reinforcing and can generate larger-scale changes towards achieving shared goals *(well established)* **(Table SPM.1)**. For example, changes in laws and policies can enable and underpin changes in resource management and consumption, and in turn, changes in individual and collective behaviour and habits can facilitate the implementation of policies and laws {5.4.3}.

33 **Changes towards sustainable production and consumption and towards reducing and transforming residues and waste, particularly changes in consumption among the affluent, is recognized by some individuals and communities worldwide as central to sustainable development and reducing inequalities. While actual reductions have been limited, actions already being taken at different levels can be improved, coordinated and scaled up *(well established).*** Those include introducing and improving standards, systems and relevant regulations aimed at internalizing the external costs of production, extraction and consumption (such as pricing wasteful or polluting practices, including through penalties); promoting resource efficiency and circular and other economic models; voluntary environmental and social certification of market chains; and incentives that promote sustainable practices and innovation. Importantly, they also involve a change in the definition of what a good quality of life entails – decoupling the idea of a good and meaningful life from ever-increasing material consumption. All those approaches are more effective when they are mutually reinforcing. Actions that help to voluntarily unleash existing social values of responsibility in the form of individual, collective and organizational actions towards sustainability can have a powerful and lasting effect in shifting behaviour and cultivating stewardship as a normal social practice *(established but incomplete)* {5.4.1.2, 5.4.1.3, 6.4.2, 6.4.3}.

34 **Expanding and effectively managing the current network of protected areas, including terrestrial, freshwater and marine areas, is important for safeguarding biodiversity (*well established*), particularly in the context of climate change. Conservation outcomes also depend on adaptive governance, strong societal engagement, effective and equitable benefit-sharing mechanisms, sustained funding, and monitoring and enforcement of rules (*well established*) {6.2, 5.4.2}.** National Governments play a central role in supporting primary research, effective conservation and the sustainable use of multi-functional landscapes and seascapes. This entails planning ecologically representative networks of interconnected protected areas to cover key biodiversity areas and managing trade-offs between societal objectives that represent diverse worldviews and multiple values of nature *(established but incomplete)* {6.3.2.3, 6.3.3.3}. Safeguarding protected areas into the future also entails enhancing monitoring and enforcement systems, managing biodiversity-rich land and sea beyond protected areas, addressing property rights conflicts and protecting environmental legal frameworks against the pressure of powerful interest groups. In many areas, conservation depends on building capacity and enhancing stakeholder collaboration, involving non-profit groups as well as indigenous peoples and local communities to establish and manage marine protected areas and marine protected area networks, and proactively using instruments such as landscape-scale and seascape-scale participatory scenarios and spatial planning, including transboundary conservation planning *(well established)* {5.3.2.3, 6.3.2.3, 6.3.3.3}. Implementation beyond protected areas includes combating wildlife and timber trafficking through effective enforcement and ensuring the legality and sustainability of trade in wildlife. Such actions include prioritizing the prosecution of wildlife trafficking in criminal justice systems, using community-based social marketing to reduce demand and implementing strong measures to combat corruption at all levels *(established but incomplete)* {6.3.2.3}.

35 **Integrated landscape governance entails a mix of policies and instruments that together ensure nature conservation, ecological restoration and sustainable use, sustainable production (including of food, materials and energy), and sustainable forest management and infrastructure planning, and that address the major drivers of biodiversity loss and nature deterioration (*well established*) {6.3.2, 6.3.6}.** Policy mixes that are harmonized across sectors, levels of governance and jurisdictions can account for ecological and social differences across and beyond the landscape, build on existing forms of knowledge and governance and address trade-offs between tangible and non-tangible benefits in a transparent and equitable manner *(established but incomplete)*. Sustainable landscape management can be better achieved through multifunctional, multi-use, multi-stakeholder and community-based approaches *(well established)*, using a combination of measures and practices, including: (a) well-managed and connected protected areas and other effective area-based conservation measures; (b) reduced impact logging, forest certification, payment for ecosystem services, among other instruments, and reduced emissions from deforestation and forest degradation; (c) support for ecological restoration; (d) effective monitoring, including public access and participation as appropriate; (e) addressing illegal activities; (f) the effective implementation of multilateral environmental agreements and other relevant international agreements by

their parties; and (g) promoting sustainable, biodiversity-based food systems *(well established)* {6.3.2.1, 6.3.2.3, 6.3.2, 6.3.2.4}.

36 Feeding the world in a sustainable manner, especially in the context of climate change and population growth, entails food systems that ensure adaptive capacity, minimize environmental impacts, eliminate hunger, and contribute to human health and animal welfare *(established but incomplete)* {5.3.2.1, 6.3.2.1}. Pathways to sustainable food systems entail land-use planning and sustainable management of both the supply/producer and the demand/consumer sides of food systems (*well established*) {5.3.2.1, 6.3.2.1, 6.4}. Options for sustainable agricultural production are available and continue to be developed, with some having more impacts on biodiversity and ecosystem functions than others {6.3.2.1}. These options include integrated pest and nutrient management, organic agriculture, agroecological practices, soil and water conservation practices, conservation agriculture, agroforestry, silvopastoral systems, irrigation management, small or patch systems and practices to improve animal welfare. These practices could be enhanced through well-structured regulations, incentives and subsidies, the removal of distorting subsidies {2.3.5.2, 5.3.2.1, 5.4.2.1, 6.3.2}, and – at landscape scales – by integrated landscape planning and watershed management. Ensuring the adaptive capacity of food production entails the use of measures that conserve the diversity of genes, varieties, cultivars, breeds, landraces and species, which also contributes to diversified, healthy and culturally-relevant nutrition. Some incentives and regulations may contribute to positive changes at both the production and consumption ends of supply chains, such as the creation, improvement and implementation of voluntary standards, certification and supply-chain agreements (e.g., the Soy Moratorium) and the reduction of harmful subsidies. Regulatory mechanisms could also address the risks of co-option and lobbying, where commercial or sectoral interests may work to maintain high levels of demand, monopolies and continued use of pesticides and chemical inputs {5.3.2.1}. Non-regulatory alternatives are also important, and potentially include technical assistance – especially for small-holders – and appropriate economic incentive programs, for example, some payment for ecosystem services programmes and other non-monetary instruments {5.4.2.1}. Options that address and engage other actors in food systems (including the public sector, civil society, consumers and grassroots movements) include participatory on-farm research, the promotion of low-impact and healthy diets and the localization of food systems. Such options could help reduce food waste, overconsumption, and the demand for animal products that are produced unsustainably, which could have synergistic benefits for human health *(established but incomplete)* {5.3.2.1, 6.3.2.1}.

37 Ensuring sustainable food production from the oceans while protecting biodiversity entails policy action to apply sustainable ecosystem approaches to fisheries management; spatial planning (including the implementation and expansion of marine protected areas); and more broadly, policy action to address drivers such as climate change and pollution (*well established*) {5.3.2.5, 6.3.3}. Scenarios show that the pathways to sustainable fisheries entail conserving, restoring and sustainably using marine ecosystems, rebuilding overfished stocks (including through targeted limits on catches or fishing efforts and moratoria), reducing pollution (including plastics), managing destructive extractive activities, eliminating harmful subsidies and illegal, unreported and unregulated fishing, adapting fisheries management to climate change impacts and reducing the environmental impact of aquaculture *(well established)* {4, 5.3.2.5, 6.3.3.3.2}. Marine protected areas have demonstrated success in both biodiversity conservation and improved local quality of life when managed effectively and can be further expanded through larger or more interconnected protected areas or new protected areas in currently underrepresented regions and key biodiversity areas *(established but incomplete)* {5.3.2.5; 6.3.3.3.1}. Due to major pressures on coasts (including from development, land reclamation and water pollution), implementing marine conservation initiatives, such as integrated coastal planning, outside of protected areas is important for biodiversity conservation and sustainable use *(well established)* {6.3.3.3}. Other measures to expand multi-sectoral cooperation on coastal management include corporate social responsibility measures, standards for building and construction, and eco-labelling *(well established)* {6.3.3.3.2, 6.3.3.3.4}. Additional tools could include both non-market and market-based economic instruments for financing conservation, including for example payment for ecosystem services, biodiversity offset schemes, blue-carbon sequestration, cap-and-trade programmes, green bonds and trust funds and new legal instruments, such as the proposed international, legally binding instrument on the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction under the United Nations Convention on the Law of the Sea *(established but incomplete)* {6.3.3.2, 6.3.3.1.3, 5.4.2.1, 5.4.1.7}.

38 Sustaining freshwater in the context of climate change, rising demand for water extraction and increased levels of pollution involves both cross-sectoral and sector-specific interventions that improve water-use efficiency, increase storage, reduce sources of pollution, improve water quality, minimize disruption and foster the restoration of natural habitats and flow regimes (*well established*) {6.3.4}. Promising interventions include practising integrated water resource management and landscape planning across

scales; protecting wetland biodiversity areas; guiding and limiting the expansion of unsustainable agriculture and mining; slowing and reversing the de-vegetation of catchments; and mainstreaming practices that reduce erosion, sedimentation, and pollution run-off and minimize the negative impact of dams *(well established)* {6.3.4.6}. Sector-specific interventions include improved water-use efficiency techniques (including in agriculture, mining and energy), decentralized rainwater collection (for example, household-based), integrated management of surface and groundwater (e.g., "conjunctive use"), locally-developed water conservation techniques, and water pricing and incentive programmes (such as water accounts and payment for ecosystem services programmes) {6.3.4.2, 6.3.4.4}. With regard to watershed payment for ecosystem services programmes, their effectiveness and efficiency can be enhanced by acknowledging multiple values in their design, implementation and evaluation and setting up impact evaluation systems *(established but incomplete)* {6.3.4.4}. Investment in infrastructure, including in green infrastructure, is important, especially in developing countries, but it can be undertaken in a way that takes into account ecological functions and the careful blending of built and natural infrastructure {5.3.2.4, 6.3.4.5}.

39 Meeting the Sustainable Development Goals in cities and making cities resilient to climate change entails solutions that are sensitive to social, economic and ecological contexts. Integrated city-specific and landscape-level planning, nature-based solutions and built infrastructure, and responsible production and consumption can all contribute to sustainable and equitable cities and make a significant contribution to the overall climate change adaptation and mitigation effort. Urban planning approaches to promote sustainability include encouraging compact communities, designing nature-sensitive road networks and creating low-impact infrastructure and transportation systems (from an emissions and land-use perspective), including active, public and shared transport {5.3.2.6, 6.3.5}. However, given that most urban growth between now and 2030 will take place in the Global South, major sustainability challenges include creatively and inclusively addressing the lack of basic infrastructure (water, sanitation and mobility), the absence of spatial planning, and the limited governance capacity and financing mechanisms. Those challenges also offer opportunities for locally-developed innovation and experimentation, which will create new economic opportunities. A combination of bottom-up and city-level efforts through public, private, community and Government partnerships, can be effective in promoting low-cost and locally-adapted solutions to maintaining and restoring biodiversity and ecosystem functions and services. Nature-based options include combining grey and green infrastructure (such as wetland and watershed restoration and green roofs), enhancing green spaces through restoration and expansion, promoting urban gardens, maintaining and designing for ecological connectivity, and promoting accessibility for all (with benefits for human health). Additional solutions include disseminating new, low-cost technologies for decentralized wastewater treatment and energy production and creating incentives to reduce over-consumption {6.3.5}. Integrating cross-sectoral planning at the local, landscape and regional levels is important, as is involving diverse stakeholders *(well established)*. Particularly important at the regional scale are policies and programmes that promote sustainability-minded collective action {5.4.1.3}, protect watersheds beyond city jurisdictions and ensure the connectivity of ecosystems and habitats (e.g., through green belts). At the regional scale, cross-sectoral approaches to mitigating the impact of infrastructure and energy projects entail support for comprehensive environmental impact assessments and strategic environmental assessments of local and regional cumulative impacts {6.3.6.4, 6.3.6.6}.

40 Decision makers have a range of options and tools for improving the sustainability of economic and financial systems *(well established)* {6.4}. Achieving a sustainable economy involves making fundamental reforms to economic and financial systems and tackling poverty and inequality as vital parts of sustainability (*well established*) {6.4}. Governments could reform subsidies and taxes to support nature and its contributions to people, removing perverse incentives and instead promoting diverse instruments such as payments linked to social and environmental metrics, as appropriate *(established but incomplete)* {6.4.1}. At the international level, options for reacting to the challenges generated by the displacement of the impacts of unsustainable consumption and production on nature include both rethinking established instruments and developing new instruments to account for long-distance impacts. Trade agreements and derivatives markets could be reformed to promote equity and prevent the deterioration of nature, although there are uncertainties associated with implementation *(established but incomplete)* {6.4.4}. Alternative models and measures of economic welfare (such as inclusive wealth accounting, natural capital accounting and degrowth models) are increasingly considered as possible approaches to balancing economic growth and the conservation of nature and its contributions and to recognizing trade-offs, the pluralism of values, and long-term goals *(established but incomplete)* {6.4.5}. Structural changes to economies are also key to shifting action over long timescales. Such changes include technological and social innovation regimes and investment frameworks that internalize environmental impacts, such as the externalities of economic activities, including by addressing environmental impacts in socially just and appropriate ways *(well established)* {5.4.1.7}. Although such market-based policy instruments as payments for ecosystem services, voluntary certification and

biodiversity offsetting have increased in use, their effectiveness is mixed, and they are often contested; thus, they should be carefully designed and applied to avoid perverse effects in context *(established but incomplete)* {5.4.2.1, 6.3.2.2, 6.3.2.5, 6.3.6.3}. The widespread internalization of environmental impacts, including externalities associated with long-distance trade, is considered both an outcome and a component of national and global sustainable economies *(well established)* {5.4.1.6, 6.4}.

Table SPM 1 **Approaches for sustainability and possible actions and pathways for achieving them.**

The appropriateness and relevance of different approaches varies according to place, system, decision-making process and scale. The list of actions and pathways in the following table is illustrative rather than exhaustive and uses examples from the assessment report.

Approaches for sustainability	Possible actions and pathways to achieve transformative change Key actors: (IG=intergovernmental organizations, G=Governments, NGOs =non-governmental organizations, CG=citizen and community groups, IPLC = indigenous peoples and local communities, D=donor agencies, SO= science and educational organizations, P=private sector)
Enabling integrative governance to ensure policy coherence and effectiveness	• Implementing **cross-sectoral approaches** that consider linkages and interconnections between sectoral policies and actions (e.g., IG, G, D, IPLC) {6.2} {D1}. • **Mainstreaming biodiversity** within and across different sectors (e.g., agriculture, forestry, fisheries, mining, tourism) (e.g., IG, G, NGO, IPLC, CG, P, D) {6.2, 6.3.5.2} {D5}. • **Encouraging integrated planning and management for sustainability at the landscape and seascape levels** (e.g., IG, G, D) {6.3.2} {D5}. • **Incorporating environmental and socioeconomic impacts**, including externalities, into public and private decision-making (e.g., IG, G, P) {5.4.1.6} {B5}. • **Improving existing policy instruments** and using them **strategically and synergistically** in smart policy mixes (e.g., IG, G) {6.2, 6.3.2, 6.3.3.3.1, 6.3.4.6, 6.3.5.1, 6.3.6.1} {D4}.
Promoting inclusive governance approaches through stakeholder engagement and the inclusion of indigenous peoples and local communities to ensure equity and participation	• **Recognizing and enabling the expression of different value systems and diverse interests** while formulating and implementing policies and actions (e.g., IG, G, IPLCs, CG, NGO, SO, D) {6.2} {B5, D5}. • **Enabling the inclusion and participation** of indigenous peoples and local communities, and women and girls in environmental governance and **recognizing and respecting the knowledge, innovations, and practices**, **institutions and values** of indigenous peoples and local communities, in accordance with national legislation (e.g., G, IPLC, P) {6.2, 6.2.4.4} {D5}. • **Facilitating national recognition for land tenure, access and resource rights** in accordance with national legislation, and the application of **free, prior and informed consent and fair and equitable benefit-sharing arising from their use** (e.g., G, IPLC, P) {D5}. • Improving **collaboration and participation among** indigenous peoples and local communities, other relevant stakeholders, policymakers and scientists to generate novel ways of conceptualizing and achieving transformative change towards sustainability (e.g., G, IG, D, IPLC, CG, SO) {D5}.
Practicing informed governance for nature and nature's contributions to people	• **Improving the documentation of nature** (e.g., biodiversity inventory and other inventories) **and the assessment of the multiple values of nature, including the valuation of natural capital** by both private and public entities (e.g., SO, D, G, IG, P) {6.2} {D2}. • **Improving the monitoring and enforcement** of existing laws and policies through **better documentation and information-sharing** and **regular, informed and adaptive readjustments** to ensure transparent and enhanced results as appropriate (e.g., IG, G, IPLC, P) {D2}. • Advancing knowledge co-production and **including and recognizing different types of knowledge**, including indigenous and local knowledge and education, that enhances the legitimacy and effectiveness of environmental policies (e.g., SO, IG, G, D) {B6, D3}.
Promoting adaptive governance and management	• **Enabling locally tailored choices** about conservation, restoration, sustainable use and development connectivity that account for uncertainty in environmental conditions and scenarios of climate change (e.g., G, IPLC, CG, P) {D3}. • **Promoting public access to relevant information as appropriate** in decision-making and responsiveness to assessments by improving monitoring, including setting goals and objectives with multiple relevant stakeholders, who often have competing interests (e.g., IG, G). • **Promoting awareness-raising activities** around the principles of adaptive management, including through using short, medium and long-term goals that are regularly reassessed towards international targets (e.g., IG, G, SO, CG, D) {D4}. • Piloting and testing **well-designed policy innovations** that experiment with scales and models (e.g., G, D, SO, CG, IPLC) {D4}. • Increasing the **effectiveness of current and future international biodiversity targets and goals** (such as those of the post-2020 global biodiversity framework and of the Sustainable Development Goals), (e.g., IG, G, D) {6.2, 6.4}.

Approaches for sustainability	Possible actions and pathways to achieve transformative change Key actors: (IG=intergovernmental organizations, G=Governments, NGOs =non-governmental organizations, CG=citizen and community groups, IPLC = indigenous peoples and local communities, D=donor agencies, SO= science and educational organizations, P=private sector)
Managing sustainable and multifunctional landscapes and seascapes and some of the actions they may entail	
Producing and consuming food sustainably	• **Promoting sustainable agricultural practices**, including good agricultural practices, agroecology, among others, multifunctional landscape planning and cross-sectoral integrated management {6.3.2}. • **Sustainable use of genetic resources in agriculture,** including by conserving gene diversity, varieties, cultivars, breeds, landraces and species (e.g., SO, IPLC, CG) {6.3.2.1} {A6}. • **Promoting the use of biodiversity-friendly management practices** in crop and livestock production, forestry, fisheries and aquaculture, including, where relevant, the use of traditional management practices associated with indigenous peoples and local communities {6.3.2.1} {D6}. • **Promoting areas of natural or semi-natural habitat** within and around production systems, including those that are intensively managed, and restoring or reconnecting damaged or fragmented habitats where necessary {6.3.2.1} {D6}. • Improving **food market transparency** (e.g., traceability of biodiversity impacts, transparency in supply chains) through tools such as labelling and sustainability certification. • **Improving equity in food distribution and in the localization of food systems**, where appropriate and where beneficial to nature or nature's contributions to people (NCP). • **Reducing food waste from production to consumption.** • Promoting **sustainable and healthy diets** {6.3.2.1} {D6}.
Integrating multiple uses for sustainable forests	• Promoting **multifunctional, multi-use and multi-stakeholder approaches and improving community-based approaches** to forest governance and management to achieve sustainable forest management (e.g., IG, G, CG, IPLC, D, SO, P) {6.3.2.2} {A4}. • Supporting the **reforestation and ecological restoration** of degraded forest habitats with appropriate species, giving priority to native species (e.g., G, IPLC, CG, D, SO) {6.3.2.2} {A4}. • **Promoting and strengthening community-based management and governance, including customary institutions and management systems, and co-management regimes involving** indigenous peoples and local communities (e.g., IG, G, CG, IPLC, D, SO, P) {6.3.2.2} {D5}. • **Reducing the negative impact of** unsustainable **logging** by improving and implementing sustainable forest management, and **addressing illegal logging** (e.g., IG, G, NGO, P) {6.3.2.2} {D1}. • **Increasing efficiency in forest product use**, including incentives for adding value to forest products (such as sustainability labelling or public procurement policies), as well as promoting intensive production in well-managed forests so as to reduce pressures elsewhere (e.g., P, D, NGO) {6.3.2.2} {B1}.
Conserving, effectively managing and sustainably using terrestrial landscapes	• **Supporting, expanding and promoting effectively managed and ecologically representative networks** of well-connected protected areas and other multifunctional conservation areas, such as other effective area-based conservation measures (e.g., IG, G, IPLC, CG, D) {3.2.1, 6.3.2.3} {C1, D7}. • **Using extensive, proactive and participatory landscape-scale spatial planning** to prioritize land uses that balance and further safeguard nature and **to protect and manage key biodiversity areas** and other important sites for present and future biodiversity (e.g., IG, G, D) {B1, D7}. • Managing and restoring biodiversity beyond protected areas, (e.g., IG, G, CG, IPLC, P, NGO, D) {B1}. • **Developing robust and inclusive decision-making processes** that facilitate the positive contributions of indigenous peoples and local communities to sustainability by incorporating locally-attuned management systems and indigenous and local knowledge {B6, D5}. • **Improving and expanding the levels of financial support** for conservation and sustainable use through a variety of innovative options, including through partnerships with the private sector {6.3.2.5} {D5, D7, D10}. • **Prioritizing land-based adaptation and mitigation measures that do not have negative impacts on biodiversity** (e.g., reducing deforestation, restoring land and ecosystems, improving the management of agricultural systems such as soil carbon, and preventing the degradation of wetlands and peatlands) {D8}. • **Monitoring the effectiveness and impacts of protected areas** and other effective area-based conservation measures.
Promoting sustainable governance and management of seascapes, oceans and marine systems	• Promoting shared and **integrated ocean governance, including for biodiversity, beyond national jurisdictions** (e.g., IG, G, NGO, P, SO, D) {6.3.3.2} {D7}. • **Expanding, connecting and effectively managing marine protected area networks** (e.g., IG, G, IPLC, CG {5.3.2.3} {D7}, including protecting and managing priority marine key biodiversity areas and other important sites for present and future biodiversity, and **increasing protection and connectivity.** • **Promoting the conservation and/or restoration of marine ecosystems** through rebuilding overfished stocks; preventing, deterring and eliminating illegal, unreported and unregulated fishing; encouraging ecosystem-based fisheries management; and controlling pollution through the removal of derelict gear and through addressing plastics pollution (e.g., IG, G, P, IPLC, CG, SO, D) {B1, D7}. • **Promoting ecological restoration, remediation and the multifunctionality of coastal structures**, including through marine spatial planning (e.g., IG, G, NGO, P, CG, IPLC, SO, D) {6.3.3.3.1} {B1, D7}. • Integrating **ecological functionality concerns into the planning phase of coastal construction** (e.g., IG, G, NGO, P, CG, IPLC, SO, D) {6.3.3.3.1} {B1, D7}. • **Expanding multi-sectoral cooperation** by increasing and improving corporate social responsibility measures and regulation in building and construction standards, and eco-labelling and best practices (e.g., IG, G, NGO, P, CG, IPLC, SO, D) {6.3.3.3.1} {B1, D7}.

Table SPM 1 *(continued)*

Approaches for sustainability	Possible actions and pathways to achieve transformative change Key actors: (IG=intergovernmental organizations, G=Governments, NGOs =non-governmental organizations, CG=citizen and community groups, IPLC = indigenous peoples and local communities, D=donor agencies, SO= science and educational organizations, P=private sector)
Promoting sustainable governance and management of seascapes, oceans and marine systems	• **Encouraging effective fishery reform strategies** through incentives with positive impacts on biodiversity and through the removal of environmentally harmful subsidies (e.g., IG, G) {6.3.3.2} {D7}. • **Reducing the environmental impacts of aquaculture** by voluntary certification and by using best practices in fisheries and aquaculture production methods (e.g., G, IPLC, NGO, P) {6.3.3.3.2, 6.3.3.3.5} {B1, D7}. • **Reducing point and nonpoint source pollution**, including by managing marine microplastic and macroplastic pollution through effective waste management, incentives and innovation (e.g., G, P, NGO) {6.3.3.3.1} {B1, D7}. • **Increasing ocean conservation funding** (e.g., G, D, P) {6.3.3.1.3} {D7}.
Improving freshwater management, protection and connectivity	• **Integrating water resource management and landscape planning**, including through increased protection and connectivity of freshwater ecosystems, improving transboundary water cooperation and management, addressing the impacts of fragmentation caused by dams and diversions, and incorporating regional analyses of the water cycle (e.g., IG, G, IPLC, CG, NGO, D, SO, P) {6.3.4.6, 6.3.4.7} {B1}. • **Supporting inclusive water governance,** e.g., through developing and implementing invasive alien species management with relevant stakeholders (e.g., IG, G, IPLC, CG, NGO, D, SO, P) {6.3.4.3} {D4}. • **Supporting co-management regimes for collaborative water management** and **to foster equity** between water users (while maintaining a minimum ecological flow for the aquatic ecosystems), and engaging stakeholders and using transparency to minimize environmental, economic and social conflicts {D4}. • Mainstreaming practices that **reduce soil erosion, sedimentation and pollution run-off** (e.g., G, CG, P) {6.3.4.1}. • **Reducing the fragmentation of freshwater policies** by coordinating international, national and local regulatory frameworks (e.g., G, SO) {6.3.4.7, 6.3.4.2}. • **Increasing water storage** by facilitating groundwater recharge, wetlands protection and restoration, alternative storage techniques and restrictions on groundwater abstraction. (e.g., G, CG, IPLC, P, D) {6.3.4.2} {B1, B3}. • **Promoting investment in water projects** with clear sustainability criteria (e.g., G, P, D, SO) {6.3.4.5} {B1, B3}.
Building sustainable cities that address critical needs while conserving nature, restoring biodiversity, maintaining and enhancing ecosystem services	• Engaging **sustainable urban planning** (e.g., G, CG, IPLC, NGO, P) {6.3.5.1} {D9}. • **Encouraging densification for compact communities**, including through brownfield development and other strategies {6.3.5.3}. • **Including biodiversity protection, biodiversity offsetting, river basin protection, and ecological restoration in regional planning** {6.3.5.1}. • **Safeguarding urban key biodiversity areas** and ensuring that they do not become isolated through incompatible uses of surrounding land {6.3.5.2, SM 6.4.2}. • **Promoting biodiversity mainstreaming through stakeholder engagement and integrative planning** (e.g., G, NGO, CG, IPLC) {6.3.5.3}. • **Encouraging alternative business models and incentives for urban conservation** {6.3.2.1}. • **Promoting sustainable production and consumption** {6.3.6.4}. • **Promoting nature-based solutions** (e.g., G, NGO, SO, P) {6.3.5.2} {D8, D9}. • **Promoting, developing, safeguarding or retrofitting green and blue infrastructure** (for water management) while improving grey (hard) infrastructure to address biodiversity outcomes, {6.3.5.2}. • **Promoting ecosystem-based adaptation within communities** {3.7, 5.4.2.2}. • Maintaining and designing for **ecological connectivity within urban spaces**, particularly with native species {6.3.5.2, SM 6.4.1}. • **Increasing urban green spaces and improving access to them** {6.3.2}. • **Increasing access to urban services for low-income communities**, with priorities for sustainable water management, integrated sustainable solid waste management and sewage systems, and safe and secure shelter and transport (e.g., G, NGO) {6.3.5.4} {D9}.
Promoting sustainable energy and infrastructure projects and production	• Developing **sustainable strategies, voluntary standards and guidelines** for sustainable renewable energy and bioenergy projects (e.g., G, SO, P) {6.3.6} {D8}. • Strengthening and promoting **biodiversity-inclusive environmental impact assessments**, laws and guidelines {6.3.6.2} {B1}. • **Mitigating environmental and social impacts** where possible and **promoting innovative financing and restoration** when necessary (e.g., G, P, NGO, D) {6.3.6.3} {B1}, including by redesigning **incentive programmes and policies** to promote bioenergy systems that optimize trade-offs between biodiversity loss and benefits (e.g., through life cycle analysis) {D8}. • **Supporting community-based management and decentralized** sustainable energy production (e.g., G, CG, IPLC, D) {6.3.6.4, 6.3.6.5} {D9}. • **Reducing energy demands** so as to reduce the demand for biodiversity-impacting infrastructure (e.g., through energy efficiency, new clean energy and reducing unsustainable consumption) (e.g., G, P) {B1}.

Approaches for sustainability	Possible actions and pathways to achieve transformative change Key actors: (IG=intergovernmental organizations, G=Governments, NGOs =non-governmental organizations, CG=citizen and community groups, IPLC = indigenous peoples and local communities, D=donor agencies, SO= science and educational organizations, P=private sector)
Improving the sustainability of economic and financial systems	• **Developing and promoting incentive structures** to protect biodiversity (e.g., removing harmful incentives) (e.g., IG, G) {6.4} {D10}. • Promoting **sustainable production and consumption**, such as through: sustainable sourcing, resource efficiency and reduced production **impacts**, circular and other economic models, corporate social responsibility, life-cycle assessments that include biodiversity, trade agreements and public procurement policies (e.g., G, CA, NGO, SO) {6.4.3, 6.3.2.1} {D10}. • **Exploring alternative methods of economic accounting** such as natural capital accounting and Material and Energy Flow Accounting, among others (e.g., IG, G, SO) {6.4.5} {D10}. • **Encouraging policies that combine poverty reduction** with measures to increase the provision of nature's contributions and the conservation and sustainable use of nature (e.g., IG, G, D) {3.2.1} {C2}. • **Improving market-based instruments**, such as payment for ecosystem services, voluntary certification and biodiversity offsetting, to address challenges such as equity and effectiveness (e.g., G, P, NGO, IPLC, CG, SO) {B1}. • **Reducing consumption** (e.g., encouraging consumer information to reduce overconsumption and waste, using public policies and regulations and internalizing environmental impacts) (e.g., G, P, NGO) {B4, C2}. • **Creating and improving supply-chain models** that reduce the impact on nature {D3}.

APPENDICES

APPENDIX 1
Conceptual framework and definitions

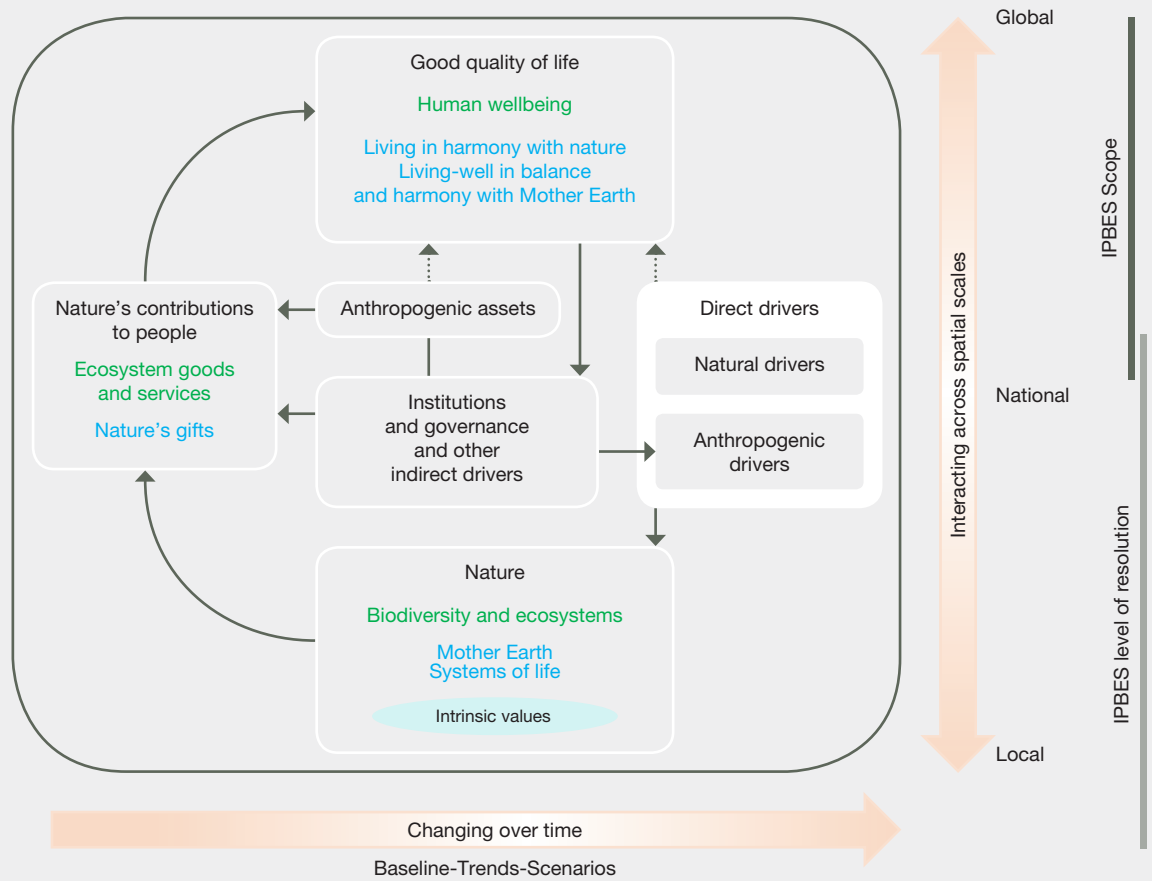

Figure SPM A 1 The IPBES conceptual framework. Source: Díaz *et al.* (2015).

Figure SPM A1. The IPBES Conceptual Framework is a highly simplified model of the complex interactions between the natural world and human societies. The model identifies the main elements (boxes within the main panel outlined in grey), together with their interactions (arrows in the main panel), that are most relevant to the Platform's goal. "Nature", "nature's contributions to people" and "good quality of life" (indicated as black headlines and defined in each corresponding box) are inclusive categories that were identified as meaningful and relevant to all stakeholders involved in IPBES during a participatory process, including various disciplines of the natural and social sciences and the humanities, and other knowledge systems, such as those of indigenous peoples and local communities. Text in green denotes scientific concepts, and text in blue denotes concepts originating in other knowledge systems. The solid arrows in the main panel denote influence between elements, and dotted arrows denote links that are acknowledged as important, but that are not the main focus of the Platform. The thick coloured arrows below and to the right of the central panel indicate the scales of time and space, respectively. This conceptual framework was accepted by the Plenary in decision IPBES-2/4, and the Plenary took note of an update presented in IPBES/5/INF/24 and in decision IPBES-5/1. Further details and examples of the concepts defined in the box can be found in the glossary and in Chapter 1.

Nature, in the context of the Platform, refers to the natural world, with an emphasis on biodiversity. Within the context of science, it includes categories such as biodiversity, ecosystems, ecosystem functioning, evolution, the biosphere, humankind's shared evolutionary heritage, and biocultural diversity. Within the context of other knowledge systems, it includes categories such as Mother Earth and systems of life. Other components of nature, such as deep aquifers, mineral and fossil reserves, and wind, solar, geothermal and wave power, are not the focus of the Platform. Nature contributes to societies through the provision of contributions to people.

Anthropogenic assets refers to built-up infrastructure, health facilities, knowledge (including indigenous and local knowledge systems and technical or scientific knowledge, as well as formal and non-formal education), technology (both physical objects and procedures), and financial assets, among others. Anthropogenic assets have been highlighted to emphasize that a good life is achieved by a co-production of benefits between nature and societies.

Nature's contributions to people refers to all the contributions that humanity obtains from nature. Ecosystem goods and services, considered separately or in bundles, are included in this category. Within other knowledge systems, nature's gifts and similar concepts refer to the benefits of nature from which people derive good quality of life. Aspects of nature that can be negative to people (detriments), such as pests, pathogens or predators, are also included in this broad category.

Nature's regulating contributions to people refers to functional and structural aspects of organisms and ecosystems that modify the environmental conditions experienced by people, and/or sustain and/or regulate the generation of material and non-material contributions. For example, these contributions include water purification, climate regulation and the regulation of soil erosion.

Nature's material contributions to people refers to substances, objects or other material elements from nature that sustain people's physical existence and the infrastructure (i.e. the basic physical and organizational structures and facilities, such as buildings, roads, power supplies) needed for the operation of a society or enterprise. They are typically physically consumed in the process of being experienced, such as when plants or animals are transformed into food, energy, or materials for shelter or ornamental purposes.

Nature's non-material contributions to people refers to nature's contribution to people's subjective or psychological quality of life, individually and collectively. The entities that provide these intangible contributions can be physically consumed in the process (e.g., animals in recreational or ritual fishing or hunting) or not (e.g., individual trees or ecosystems as sources of inspiration).

Drivers of change refers to all those external factors that affect nature, anthropogenic assets, nature's contributions to people and good quality of life. They include institutions and governance systems and other indirect drivers, and direct drivers (both natural and anthropogenic).

Institutions and governance systems and other indirect drivers are the ways in which societies organize themselves and the resulting influences on other components. They are the underlying causes of environmental change that are exogenous to the ecosystem in question. Because of their central role, influencing all aspects of human relationships with nature, they are key levers for decision-making. "Institutions" encompasses all formal and informal interactions among stakeholders and the social structures that determine how decisions are taken and implemented, how power is exercised, and how responsibilities are distributed. To varying degrees, institutions determine the access to and control, allocation and distribution of the components of nature and of anthropogenic assets and their contributions to people. Examples of institutions are systems of property and access rights to land (e.g., public, common-pool or private), legislative arrangements, treaties, informal social norms and rules, including those emerging from indigenous and local knowledge systems, and international regimes such as agreements against stratospheric ozone depletion or for the protection of endangered species of wild fauna and flora. Economic policies, including macroeconomic, fiscal, monetary or agricultural policies, play a significant role in influencing people's decisions and behaviour and the way in which they relate to nature in the pursuit of benefits. However, many of the drivers of human behaviour and preferences, which reflect different perspectives on a good quality of life, work largely outside the market system.

Direct drivers, both natural and anthropogenic, affect nature directly. "Natural drivers" are those that are not the result of human activities and are beyond human control. These include earthquakes, volcanic eruptions and tsunamis, extreme weather or ocean-related events such as prolonged drought or cold periods, tropical cyclones and floods, the El Niño/La Niña Southern Oscillation and extreme tidal events. The direct anthropogenic drivers are those that are the result of human decisions, namely, of institutions and governance systems and other indirect drivers. Anthropogenic drivers include habitat conversion, e.g., degradation of land and aquatic habitats, deforestation and afforestation, exploitation of wild populations, climate change, pollution of soil, water and air and species introductions. Some of these drivers, such as pollution, can have negative impacts on nature; others, as in the case of habitat restoration, or the introduction

of a natural enemy to combat invasive species, can have positive effects.

Good quality of life is the achievement of a fulfilled human life, a notion which varies strongly across different societies and groups within societies. It is a context-dependent state of individuals and human groups, comprising access to food, water, energy and livelihood security, and also health, good social relationships and equity, security, cultural identity, and freedom of choice and action. From virtually all standpoints, a good quality of life is multidimensional, having material as well as immaterial and spiritual components. What a good quality of life entails, however, is highly dependent on place, time and culture, with different societies espousing different views of their relationships with nature and placing different levels of importance on collective versus individual rights, the material versus the spiritual domain, intrinsic versus instrumental values, and the present time versus the past or the future. The concept of human well-being used in many western societies and its variants, together with those of living in harmony with nature and living well in balance and harmony with Mother Earth, are examples of different perspectives on a good quality of life.

APPENDIX 2
Communication of the degree of confidence

Figure SPM A 2 **The four-box model for the qualitative communication of confidence.**

Confidence increases towards the top-right corner as suggested by the increasing strength of shading. Source: IPBES (2016).[15]

In this assessment, the degree of confidence in each main finding is based on the quantity and quality of evidence and the level of agreement regarding that evidence **(Figure SPM.A2)**. The evidence includes data, theory, models and expert judgement. Further details of the approach are documented in the note by the secretariat on the information on work related to the guide on the production of assessments (IPBES/6/INF/17).

- **Well established:** there is a comprehensive meta-analysis or other synthesis or multiple independent studies that agree.
- **Established but incomplete:** there is general agreement, although only a limited number of studies exist; there is no comprehensive synthesis, and/or the studies that exist address the question imprecisely.
- **Unresolved:** multiple independent studies exist but their conclusions do not agree.
- **Inconclusive:** there is limited evidence and a recognition of major knowledge gaps.

15. IPBES, Summary for policymakers of the assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on pollinators, pollination and food production. S.G. Potts, V. L. Imperatriz-Fonseca, H. T. Ngo, J. C. Biesmeijer, T. D. Breeze, L. V. Dicks, L. A. Garibaldi, R. Hill, J. Settele, A. J. Vanbergen, M. A. Aizen, S. A. Cunningham, C. Eardley, B. M. Freitas, N. Gallai, P. G. Kevan, A. Kovács-Hostyánszki, P. K. Kwapong, J. Li, X. Li, D. J. Martins, G. Nates-Parra, J. S. Pettis, R. Rader, and B. F. Viana (eds.)., secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany, 2016. Available at http://doi.org/10.5281/zenodo.2616458.

APPENDIX 3
Knowledge gaps

In the course of conducting this assessment key information needs were identified. See draft table Appendix IV.

- Data, inventories and monitoring on nature and the drivers of change
- Gaps on biomes and units of analysis
- Taxonomic gaps
- NCP-related gaps
- Links between nature, nature's contributions to people and drivers with respect to targets and goals
- Integrated scenarios and modelling studies
- Potential policy approaches
- Indigenous peoples and local communities

APPENDIX 4
Draft table of knowledge gaps

Disclaimer: This table of knowledge gaps was prepared by the experts of the Global Assessment and presented to and considered by a working group established by the Plenary at its seventh session. The Plenary did not approve this table as part of the summary for policymakers. It is therefore included in draft form, which does not imply working group or Plenary approval.

Sector	Knowledge gaps (in data, indicators, inventories, scenarios)[16]
Data, inventories and monitoring on nature and the drivers of change	• Data on ecosystem processes (including rates of change) that underpin nature's contributions to people and ecosystem health • Data from monitoring of ecosystem condition (generally less well represented than ecosystem extent) • Data on changing interactions among organisms and taxa • Impacts of increasing CO_2 upon the total Net Primary Production of marine systems, and consequences for ecosystem function and nature's contributions to people • Syntheses of how human impacts affect organismal traits and global patterns and trends in genetic composition • Data on extinction risks and population trends, especially for insects, parasites and fungal and microbial species • Indicators on the global extent and consequences of biotic homogenization, including genetic homogenization • Global spatial datasets on key threats, e.g., data on patterns in the intensity of unsustainable exploitation of species and ecosystems • More comprehensive understanding of how human-caused changes to any Essential Biodiversity Variable class (e.g., ecosystem structure) have impacts on others (e.g., community composition) and on nature's contributions to people • Data gaps in key inventories: World Database on Protected Areas, the World Database of Key Biodiversity Areas™, red lists of threatened species and ecosystems, and the Global Biodiversity Information Facility • Monitoring of many listed species in the Convention on International Trade in Endangered Species of Wild Fauna and Flora. • Monitoring of the long-term effects of dumped waste, especially radioactive material and plastics • Data on the impacts of war and conflict on nature and nature's contributions to people
Gaps on biomes and units of analysis	• Inventories on under-studied ecosystems: freshwater, Arctic, marine/ocean, seabed, and wetlands • Inventories in soil, benthic and freshwater environments, and the implications for ecosystem functions
Taxonomic gaps	• Basic data on many taxa (86 per cent of existing species on Earth and 91 per cent of species in the ocean still await description) • Extinction risks and population trends for the following taxonomic groups: insects, fungal species, microbial species (microorganisms) and parasites • Data on the genetic diversity and conservation status of breeds of farmed and domestic plants and animals
NCP-related gaps	• Data on the status of species and nature's contributions to people linked to specific ecosystem functions • Systematic indicators to report the status and trends for categories of nature's contributions to people • Data on the impacts and extent of nature's contributions to people on quality of life, by major user group (also lacking an agreed typology on major user groups) • Data on the interrelationships between gender equality, nature and nature's contributions to people • Data and information on NCP 10: regulation of detrimental organisms and biological processes (populations of vectors and vector-borne diseases) and overlaps with vulnerable human populations and ecosystem interactions • Data and information on NCP 9: the role of nature and nature's contributions to people in mitigating or reducing vulnerability to disasters

16. This list of knowledge gaps in the IPBES Global Assessment of Biodiversity and Ecosystem Services is not exhaustive.

Sector	Knowledge gaps (in data, indicators, inventories, scenarios)[16]
Links between nature, nature's contributions to people and drivers with respect to targets and goals	• Understanding on how nature contributes to achieving targets (the positive and negative relationships between nature and targets/goals like the Sustainable Development Goals) • Disaggregated data on the impacts that nature has on good quality of life, particularly across regions, societies, governance systems, and ecosystems • Need for indicators for some Sustainable Development Goals and Aichi Biodiversity Targets (e.g., Aichi Biodiversity Target 15 on ecosystem resilience and contribution of biodiversity to carbon stocks and Target 18 on integration of traditional knowledge and effective participation of indigenous and local communities) • Better quantitative data to assess the Sustainable Development Goals and Aichi Targets where qualitative indicators havebeen dominant (9 out of 44 targets under the Sustainable Development Goals reviewed) • Data on the benefits to human mental health from exposure to natural environments • Indicators that reflect the heterogeneity of indigenous peoples and local communities
Integrated scenarios and modelling studies	• Regional and global socioeconomic scenarios explicitly considering the knowledge, views and perspectives of indigenous peoples and local communities • Regional and global ssocioeconomic scenarios developed for, by and in collaboration with indigenous peoples and local communities and their associated institutions • Quantitative data showing how nature, its contributions to people, and good quality of life interact and change in time along different pathways • Scenarios of the future of biodiversity which quantify the possible co-benefits related to nature's contributions to people • Scenarios about nonmaterial benefits to people compared to material benefits and regulating benefits • Integrated scenarios for areas projected to experience significant impacts and possible regime shifts (e.g., Arctic, semi-arid regions, and small islands) • Knowledge about the interaction, feedback and spill-overs among regions within future global scenarios • Assessment of nature's contributions to people across scenario archetypes with robust knowledge and quantitative estimates
Potential policy approaches	• Data to analyse the effectiveness of many policy options and interventions, including: a) Data on the comparative effectiveness of different area-based conservation mechanisms (e.g., protected areas, other effective area-based conservation measures) in conserving nature and nature's contributions to people and contributing to good quality of life b) Indicators of the effectiveness of different restoration methodologies and to assess restoration progress over time (including values) c) Data on the comparative effectiveness of different processes of access and benefit sharing to ensure fairness and equity d) Better data on the global extent and forms of wildlife trafficking and its impacts on nature and nature's contributions to people e) Data on the comparative effectiveness of different models for reconciling bioenergy and biodiversity conservation f) Data on the effectiveness of different schemes and models for payment for ecosystem services (PES), particularly the trade-offs that arise between policy goals, the integration of multiple values in PES, data on the profiles of PES participants and long-term monitoring of relational and behavioural implications of participation g) Data on the comparative effectiveness of different models of marine governance relating to conservation • Data on the extent of the participation of indigenous peoples and local communities in environmental governance • Indicators on the impacts of environmentally harmful subsidies and trends and effectiveness of their removal at the global level • Data on areas of uncertainty in applying the precautionary principle • Data on the monitoring of policy effectiveness to adapt and adjust policies and to share lessons • Data on the impacts of resource mobilization, using robust program evaluation methods (e.g., examples of successful use of funding including impacts of donor funding for conservation and impacts of specific biodiversity financing projects) • Data on the impacts of climate change on marine and coastal governance regimes • Data on the impacts of mainstreaming of biodiversity across sectors • Better data to develop biodiversity and environmental quality standards
Indigenous Peoples and Local Communities	• Agreed-upon methods to enable systematic processes of knowledge generation, collection and synthesis regarding indigenous and local knowledge (for assessments and elsewhere) and participation of indigenous peoples and local communities in this process • Syntheses of indigenous and local knowledge about the status and trends in nature • Data to assess how progress in achieving goals and targets affects indigenous peoples and local communities, either in positive or in negative ways • Trends in relation to the socioeconomic status of indigenous peoples and local communities (e.g., noting the lack of data differentiation in aggregate statistics)

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)

is the intergovernmental body which assesses the state of biodiversity and ecosystem services, in response to requests from Governments, the private sector and civil society.

The mission of IPBES is to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.

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INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES (IPBES)

IPBES Secretariat, UN Campus

Platz der Vereinten Nationen 1, D-53113 Bonn, Germany

Tel. +49 (0) 228 815 0570

secretariat@ipbes.net

www.ipbes.net

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1.

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Aichi Biodiversity Targets

- Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society
- Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use
- Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity
- Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services
- Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building

Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

Target 1
By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Target 2
By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Target 3
By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

Target 4
By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use

Target 5
By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

Target 6
By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Target 7
By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Target 8
By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Target 9
By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

Target 10
By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

Target 11
By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

Target 12
By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Target 13
By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services

Target 14
By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Target 15
By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Target 16
By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building

Target 17
By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

Target 18
By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

Target 19
By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Target 20
By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

Aichi Biodiversity Targets webpages

- These webpages present data drawn from the online 6NRs related to the implementation status of each global target. Examples of measures and outcomes drawn respectively from post-COP10 NBSAPs and 6NRs, from each UN region, are also provided. Various resources that can assist Parties and stakeholders in implementing each global target are highlighted as well.

Find National Targets

- Click here to view national targets, including national targets linked to the Aichi Biodiversity Targets by Parties.

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Biodiversity

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UK will miss almost all its 2020 nature targets, says official report

Failure to protect wildlife, cut pollution and increase funding have left nature in 'deep crisis'

Damian Carrington *and* **Patrick Wintour**

Fri 22 Mar 2019 11.14 GMT

The UK will miss almost all the 2020 nature targets it signed up to a decade ago, according to a report by the government's official advisers.

The nation is failing to protect threatened species; end the degradation of land; reduce agricultural pollution; and increase funding for green schemes, the assessment concludes. It also says the UK is not ending unsustainable fishing; stopping the arrival of invasive alien species; nor raising public awareness of the importance of biodiversity.

The targets were set in 2010 by the global Convention on Biological Diversity (CBD) and the report from the joint nature conservation committee (JNCC) found insufficient progress was being made on 14 of the 19 targets.

The news came on the day Britain formally launched its bid to host the UN climate change conference in 2020, seeking to prove its green credentials are not tarnished and to show the disarray that has been caused by Brexit does not mean the UK has forfeited its right to be a major international player.

Speaking at a launch event for the bid in Downing Street, the foreign secretary, Jeremy Hunt, said: “Britain has an exceptional record of hosting big international events, ranging from the G20 summit in 2009 to the London Olympics in 2012.

“Most importantly of all, we are ambitious. If we are going to ensure that future generations do not pay a price for our prosperity today, we must collectively change our economies and societies. We believe this can be done and protecting the environment can go hand-in-hand with economic growth.”

Hunt has not yet said if the UK bid will involve London as the venue.

Critics of the government said the report showed wildlife and natural habitats were in deep crisis. The UK is “among the most nature-depleted countries in the world”, according to a separate 2016 report, with continuing declines in species such as skylarks, hedgehogs, many insects including butterflies and corn marigolds.

One in 10 UK wildlife species faces

“The JNCC report says nature in the UK is pretty bad, declining and not recovering, and that is in the context of an awful lot of rhetoric

extinction, major report shows

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[from ministers] about being a world leader on the environment," said Kate Jennings, the head of site conservation policy at the Royal Society for the Protection of Birds (RSPB).

"We are going to fail to meet the vast majority of our international commitments," she said. "Some of the things presented as positive are where places are getting worse more slowly – if that's the best achievement we've got, it's a pretty sorry state of affairs."

The environment minister Thérèse Coffey said: "Nature matters. Our species and ecosystems are valued in their own right, but they also contribute to our wellbeing and economic prosperity. We acknowledge that in many areas there are ongoing declines in nature, but there are real points of progress on which we can build. Our 25 Year Environment Plan is a step-change in ambition."

A key CBD target is to improve the conservation status of threatened species but the report says "there have been widespread and significant ongoing declines across many species", such as farmland birds and pollinating insects.

Another of the 2020 targets is to cut the rate of loss and degradation of natural habitats to "close to zero". While the report says some places have improved, there have been "ongoing losses of natural and semi-natural habitat, for example through neglect or development".

The target to cut fertiliser and other pollution to levels that do not harm biodiversity is being missed, the report says, with little reduction in sensitive habitats since 2010 and with 65% of inland and coastal waters remaining below target levels.

Only about half of fish stocks are sustainably caught, the report says, meaning the target to end overfishing will be missed. The goal to prevent new invasive species entering the UK and harming wildlife, as the grey squirrel has, is also being missed. Despite strong action, the report says, the number of invasive species has increased in fresh and marine waters.

The CBD targets also require that funding to support biodiversity should "increase substantially" but the report found a fall in government spend on biodiversity. Another goal is to eliminate subsidies that harm nature and increase those that boost it. But the report says: "The UK recognises some ongoing declines of woodland, farmland and marine biodiversity and some recent reductions in areas under agri-environment schemes."

The CBD targets also require the UK government to make the public aware of the value of biodiversity but the JNCC found "more than half of the UK public report no awareness of the threats to biodiversity … and there has been no significant increase since 2009".

"This report proves that behind the smoke and mirrors of [the environment secretary] Michael Gove's press releases, photo opportunities and endless consultations, our natural world is in deep crisis," said Sue Hayman, the shadow environment secretary. "This government doesn't put its money where its mouth is when it comes to biodiversity."

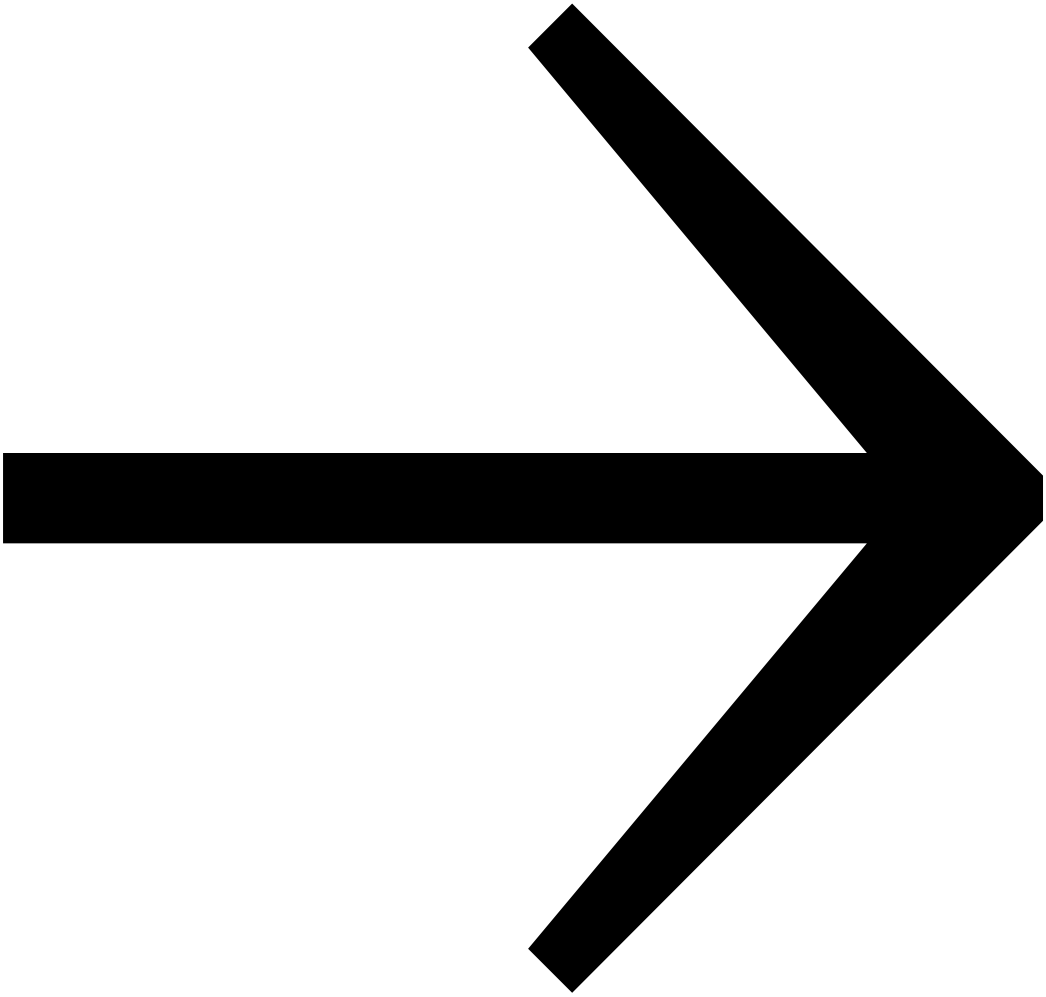
The five targets the JNCC says are being met include implementing a national biodiversity action plan, improving scientific knowledge and integrating biodiversity values into planning processes. "The process box – not outcomes – is much easier to tick," said Jennings.

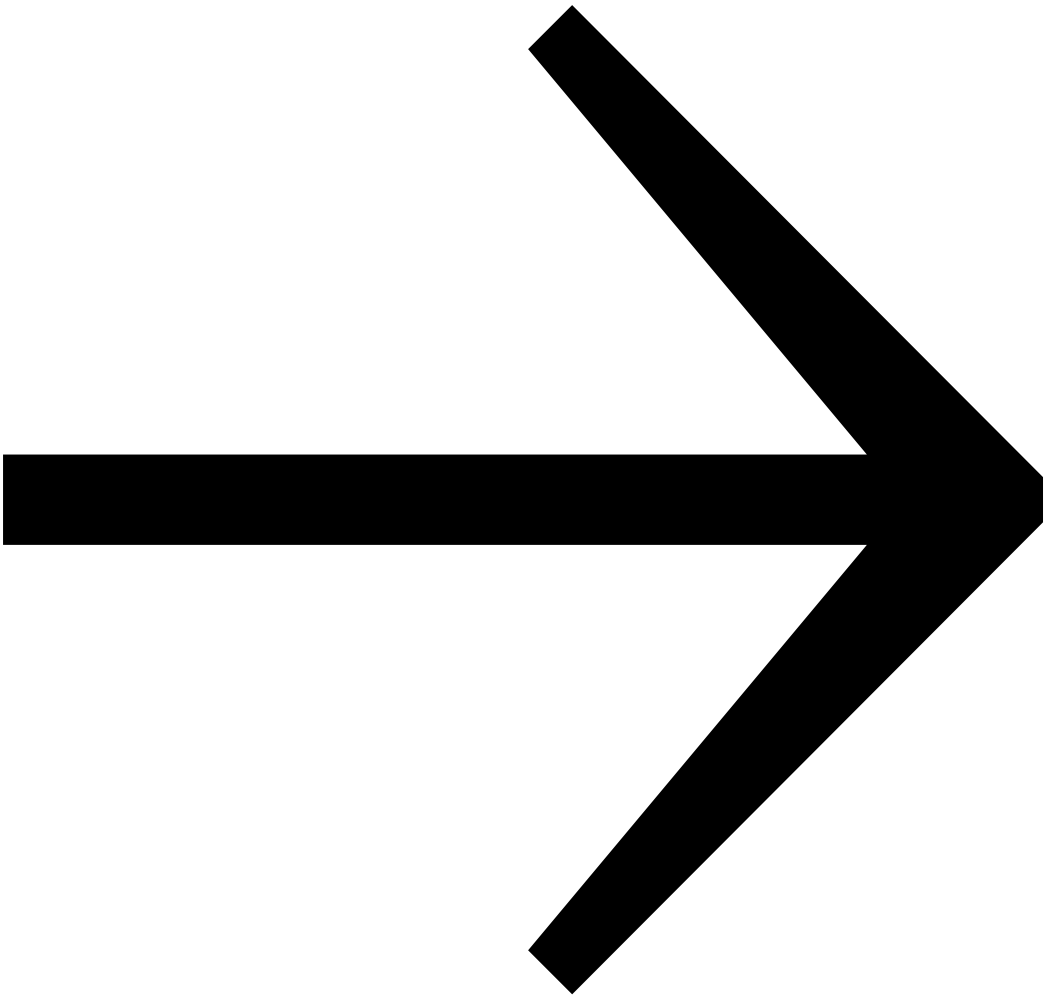
The JNCC also says the UK has exceeded the target of effectively conserving 17% of land and 10% of marine areas, with 28% of land and 24% of the sea now protected. But Jennings said the land total includes national parks and areas of outstanding natural beauty, which are not managed for biodiversity.

In England, she said, only 8.5% of land was protected for wildlife, and only 40% of that was in good condition. "I'm not sure how anything not in favourable condition can be said to be effectively managed."

The CBD targets are not legally binding. "Embarrassment is the only enforcement mechanism," Jennings said.

Martin Harper, also of the RSPB, said: "After decades of fudged targets and false promises on the environment, it's crucial that we secure binding targets in new national legislation, and a robust watchdog."





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Type of Bill:
Government Bill
Sponsor:
George Eustice
Department for Environment Food & Rural Affairs

Progress of the Bill

Bill started in the House of Commons

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    2. 2nd reading
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2. House of Lords
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3. Consideration of Amendments
4. Royal Assent

Last event

- Programme motion: House of Commons 28 September, 2020 | 28.09.2020

Next event

- Committee stage: House of Commons Committee stage: House of Commons | 03.11.2020
- Read debates on all stages of the Environment Bill 2019-21

Latest Bill

House	Bill	Date
Commons	Bill 009 2019-21 (as introduced) (PDF)	30.01.2020

- All Bill documents

Latest news on the Environment Bill 2019-21

This Bill is now being considered again by a Public Bill Committee which is scheduled to report by Tuesday 1 December 2020.

The membership of the Public Bill Committee has been announced by the Committee of Selection:

- Environment Bill: Public Bill Committee membership

Certain parts of this Bill have been certified by the Speaker as relating exclusively to England and England and Wales, so the 'English votes for English laws' procedure will apply to it in the House of Commons.

Additional information

- About Parliament: Passage of a Bill
- Briefing Paper: Commons Library briefing paper on the Bill
- Bill Documents: Including text of the Bill, explanatory notes, amendment papers and briefing papers

Summary of the Environment Bill 2019-21

A Bill to make provision about targets, plans and policies for improving the natural environment; for statements and reports about environmental protection; for the Office for Environmental Protection; about waste and resource efficiency; about air quality; for the recall of products that fail to meet environmental standards; about water; about nature and biodiversity; for conservation covenants; about the regulation of chemicals; and for connected purposes.

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