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Regional and subregional assessments of biodiversity and ecosystem services: regional and subregional assessment for the Americas

Summary for policymakers of the regional and subregional assessment of biodiversity and ecosystem services for the Americas

Note by the secretariat

1. In decision IPBES-3/1, section III, paragraph 2, the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) approved the undertaking of four regional and subregional assessments of biodiversity and ecosystem services, for Africa, the Americas, Asia and the Pacific, and Europe and Central Asia (hereinafter called regional assessments), in accordance with the procedures for the preparation of the Platform's deliverables set out in annex I to decision IPBES-3/3, the generic scoping report for the regional and subregional assessments of biodiversity and ecosystem services set out in annex III to decision IPBES-3/1, and the scoping reports for each of the four regional assessments (decision IPBES-3/1, annexes IV–VII).

2. In response to the decision, a set of six individual chapters and their executive summaries and a summary for policymakers were produced for each of the regional assessments by an expert group in accordance with the procedures for the preparation of the Platform's deliverables.

3. The annex to the present note sets out the summary for policymakers of the regional and subregional assessment for the Americas (deliverable 2 (b)), which is underpinned by the six individual chapters and their executive summaries (IPBES/6/INF/4). At its sixth session, the Plenary will be invited to approve the summary for policymakers. It will be also invited to accept the chapters of the assessment, which will be revised following the sixth session to ensure consistency with the summary for policymakers as approved.

* IPBES/6/1.

Annex

Summary for policymakers of the regional assessment report on biodiversity and ecosystem services for the Americas of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

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[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.

Key messages

The Americas region is highly biologically and culturally diverse. It hosts 7 out of the 17 most biodiverse countries of the world and spans from pole to pole, with some of the most extensive wilderness areas on the planet and highly distinctive or irreplaceable species composition. The Americas is also a highly culturally and socioeconomically diverse region, home to 15 per cent of global languages and a human population density that ranges from 2 per 100 km^2 in Greenland to over 9,000 per km^2 in several urban centres. This combination of social, economic and ecological heterogeneity makes it challenging to develop general conclusions that apply uniformly across all subregions of the Americas.[2]

A. Nature's contributions to people and quality of life[3]

A1. **The Americas are endowed with much greater capacity for nature to contribute to people's quality of life than the global average**. The Americas contain 40 per cent of the world ecosystems' capacity to produce nature-based materials consumed by people and to assimilate by-products from their consumption, but only 13 per cent of the total global human population. Such capacity results in three times more resources provided by nature per capita in the Americas than are available to an average global citizen. Those resources contribute in essential ways to food security, water security[4] and energy security, as well as to providing regulating contributions such as pollination, climate regulation and air quality, and non-material contributions such as physical and mental health and "cultural continuity".[5]

A2. **The economic value of terrestrial nature's contributions to people in the Americas is estimated to be at least $24.3 trillion per year, equivalent to the region's gross domestic product**. The countries with the greatest land area account for the largest values, while some island States account for the highest values per hectare per year. Such differences occur partly because the monetary value of specific ecosystem types varies, with units of analysis such as coastal areas and rainforests having particularly high economic values. Difficulties in valuation of non-market nature's contributions to people make comparative evaluations among subregions or units of analysis inconclusive.

A3. **The cultural diversity of indigenous peoples and local communities in the Americas provides a plethora of knowledge and world views for managing biodiversity and nature's contributions to people in a manner consistent with cultural values promoting the respectful interaction of people with nature.** Major indigenous and local knowledge systems in the region have shown their capacity to protect and manage the territories under their particular set of values, technologies and practices, even in a globalized world. In addition, the many cultures that immigrated to the Americas over the past five centuries contribute to the diversity of values. This collective diversity provides many opportunities to develop world views compatible with sustainable uses of and respect for nature in a globalized world.

A4. **Many aspects of quality of life are improving at regional and subregional scales. However, the majority of countries in the Americas are using nature more intensively than the global average and exceeding nature's ability to renew the contributions it makes to quality of life.** The 13 per cent of the global human population that resides in the Americas and produces 22.8 per cent of the global ecological footprint,[6] with North America accounting for 63 per cent of that proportion with only 35.9 per cent of the Americas population. Moreover, the distribution of benefits from the use of many of nature's contributions to people is uneven among people and cultures in the Americas such that human well-being, based in whole or in part on nature's contributions to people, faces threats or shows declines.

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[2] See chapters 1 and 3 for more details on where this information was obtained.

[3] See appendix 2 for further information on the concept of nature's contributions to people.

[4] The definition that follows is for the purpose of this assessment only: water security is used to mean the ability to access sufficient quantities of clean water to maintain adequate standards of food and goods production, sanitation and health care and for preserving ecosystems.

[5] The definition that follows is for the purpose of this assessment only: cultural continuity is the contribution of nature to the maintenance of cultures, livelihoods, economies and identities.

[6] The definition that follows is for the purpose of this assessment only: ecological footprint has a variety of definitions, but is defined by the Global Footprint Network as "a measure of how much area of biologically productive land and water an individual, population or activity requires to produce all the resources it consumes and to absorb the waste it generates, using prevailing technology and resource management practices". The ecological footprint indicator is based on the Global Footprint Network, unless otherwise specified.

A5. **Food security: Agricultural production, fisheries and aquaculture continue to increase the provision of food for the region and the planet, but in some cases at the expense of other important aspects of nature's contributions to people**. Unsustainable extensification and intensification to increase food production are causing, respectively, the replacement and degradation of natural ecosystems that provide multiple material, non-material and regulating nature's contributions to people, sustain many livelihoods and contribute to many aspects of quality of life, with less diverse systems producing fewer of nature's contributions to people and supporting fewer livelihoods. Small-scale fisheries, agriculture, livestock husbandry and agroforestry practised by indigenous peoples and local communities reflect diversification of sustainable uses of nature and play major roles for food security and health at the local level. Agricultural production builds on a foundation of the biodiverse American tropics and montane regions, which are centres of origin for many domesticated plants, including globally important crops and commodities.

A6. **Water security: The Americas are rich in freshwater resources; however, water supply varies widely across subregions and is declining per capita, and there is widespread unsustainable use of surface water and groundwater in many parts of the region. Moreover, trends in water quality are decreasing in most watersheds and coastal areas, and dependence on infrastructure for water provisioning is increasing.** Despite abundance, freshwater supplies can be locally scarce. This uneven availability, combined with inadequate distribution and waste treatment infrastructure, make water security a problem for over half the population of the Americas, reducing reliable access to a sufficient quality and quantity of fresh water, with impacts on human health.

A7. **Energy security: Energy from nature-based sources, including cultivated biofuels and hydropower, has increased in all the subregions of the Americas. Nevertheless, at the local level, bioenergy production may compete with food production and natural vegetation and may have social, economic and ecological consequences.** Increases in hydropower production alter watersheds, with the potential for consequences for aquatic biodiversity, displacement of people and alternative uses of land that is inundated or otherwise altered and for uses of water needed by hydropower facilities.

A8. **Health: The peoples of the Americas benefit from the availability of food, water, pharmacological products and interaction with nature for their physical and mental health; nevertheless, many challenges for health improvement remain.** Pharmacological products from biodiversity hold potential for the development of new products with high economic value. Experience with nature contributes to physical and mental health. In tropical areas, land-use changes, caused particularly by deforestation, mining and reservoirs, are among the main causes of outbreaks of infectious human diseases and emergence of new pathogens. Diarrhoea from contaminated water and poor sanitation accounts for over 8,000 deaths per year for children under 5 years of age.

A9. **"Cultural continuity": Indigenous peoples and local communities have created a range of biodiversity-based systems, such as polyculture and agroforestry systems, which has provided livelihoods, food and health and, through diversification processes, increased biodiversity and shaped landscapes. On the other hand, the decoupling of lifestyles from local habitats and direct degradation of the environment can erode sense of place, language and local ecological knowledge, compromising "cultural continuity"**. For example, 61 per cent of the languages in the Americas, and the cultures associated with them, are in trouble or dying out. In places throughout the Americas, indigenous peoples and local communities continue sustainable agricultural and harvesting practices, which provide learning opportunities globally.

B. Trends in biodiversity and nature's contributions to people affecting quality of life

B1. **Biodiversity and ecosystem conditions in many parts of the Americas are declining, resulting in a reduction in nature's contributions to people´s quality of life.** In the Americas, 65 per cent of nature's contributions to people in all units of analysis are declining, with 21 per cent declining strongly. Wetlands have been highly transformed in large tracts of the Americas, particularly by expansion of agriculture, ranching and urbanization. Marine biodiversity, especially associated with specific habitats like coral reefs and mangroves, has experienced major losses in recent decades, resulting in declines in the food, livelihoods and "cultural continuity" of coastal people. Alien species, including invasive alien species, are abundant in all major habitats in the Americas, but their impacts on biodiversity, cultures and economies differ among subregions.

B2. **Close to a quarter of the 14,000 species in taxonomic groups comprehensively assessed in the Americas by the International Union for Conservation of Nature are classified as being at high risk of extinction**. The risk of populations or species threatened with loss or extinction is increasing in terrestrial, coastal, marine and freshwater habitats. Of the groups of endemic species that have been assessed for risk of extinction, more than half of the species in the Caribbean, over 40 per cent in Mesoamerica and nearly a quarter in North America and South America are found to be at high risk. Loss of populations or species can reduce important nature´s contributions to water, energy and food security, livelihoods and economies.

B3. **Biodiversity has increased in some areas through effective management or natural processes in abandoned agricultural areas**. Examples include the increase of Caribbean forest cover and many restored areas in all subregions and units of analysis.

C. Drivers of trends in biodiversity and nature's contributions to people

C1. The most important indirect anthropogenic drivers of changes in nature, nature's contributions to people and quality of life include population and demographic trends, patterns of economic growth, weaknesses in the governance systems and inequity. Economic growth and trade can positively or negatively affect biodiversity and nature's contributions to people. Currently, on balance, they have an adverse impact on biodiversity and nature's contributions to people. The sixfold increase in gross domestic product since 1960 has improved many people's quality of life in a growing population with increasing wealth and accompanying greater demand for food, water and energy. However, meeting these demands has increased pressures on natural resources, with negative consequences for nature, many regulating and non-material nature's contributions to people, and quality of life of many people.

C2. In the Americas, ecosystems and biodiversity are managed under a variety of governance arrangements and social, economic and environmental contexts, which makes it complex to disentangle their respective roles in driving past trends in nature and nature's contributions to people. Although there are environmental policies and governance approaches that aim to reduce pressure on nature and nature's contributions to people, they have often not been effectively coordinated to achieve their objectives. Subordination of environment to economics in policy trade-offs and inequities in distribution of benefits from uses of nature's contributions to people continue to be present in all subregions. On average, biodiversity and nature's contributions to people have been diminishing under the current governance systems in the Americas; however, local instances of successful protection or reversal of degradation of biodiversity show that progress is possible.

C3. Habitat conversion, fragmentation and overexploitation/overharvesting are the greatest direct drivers of loss of biodiversity, loss of ecosystem functions and decrease of nature's contributions to people from local to regional scales in all biomes. Habitat degradation due to land conversion and agricultural intensification; wetland drainage and conversion; urbanization and other new infrastructure; and resource extraction are the largest direct threats to nature's contributions to people and biodiversity in the Americas. The resulting changes in terrestrial, freshwater and marine environments may be interrelated and often lead to changes in biogeochemical cycles, pollution and eutrophication of ecosystems, and biological invasions. Intensified, high-input agricultural production contributes to food and energy security, but in many cases, has resulted in nutrient imbalances and introduced pesticide residues and other agrochemicals into ecosystems, threatening biodiversity and nature's contributions to people and health in all subregions.

C4. Human-induced climate change is becoming an increasingly important direct driver, amplifying the impacts of other drivers (i.e., habitat degradation, pollution, invasive species and overexploitation) through changes in temperature, precipitation and the nature of some extreme events. Regional changes in temperature of the atmosphere and the ocean will be accompanied by changes in glacial extent, rainfall, river discharge, wind and ocean currents and sea level, among many other environmental features, which, on balance, have had adverse impacts on biodiversity and nature's contributions to people. The majority of ecosystems in the Americas have already experienced increased mean and extreme temperatures and/or, in some places, mean and extreme precipitation, causing changes in species distributions and interactions and in ecosystem boundaries.

C5. Many human activities, including the production and combustion of fossil fuels, are a major source of the pollution that adversely impacts most terrestrial and marine ecosystems. Air pollution may cause significant adverse effects on biodiversity. Ocean acidification from increased atmospheric carbon dioxide is increasing, affecting key marine species and major components of ocean food webs, and with other stressors (e.g., deoxygenation in the upper water column due to nutrient run-off, and warmer temperatures) likely contributing to a Caribbean-wide flattening of coral reefs.

D. Future trends in biodiversity and nature's contributions to people and the global goals, targets and aspirations

D1. Key drivers of trends in biodiversity and nature's contributions to people are expected to intensify into the future, increasing the need for improved policy and governance effectiveness if biodiversity and nature's contributions to people are to be maintained.

- By 2050, the population of the Americas is projected to increase by 20 per cent to 1.2 billion and the gross domestic product to nearly double, with concomitant increases in consumption.
- Unsustainable agricultural practices and climate change are projected to be major drivers of further degradation of most terrestrial, freshwater and coastal ecosystems.
- Multiple drivers are projected to intensify and interact, often in synergistic ways, further increasing biodiversity loss, reducing ecosystems' resilience and the provision of present levels of nature's contributions to people.

D2. Pressure on nature is projected to increase more slowly, or even be reduced in some subregions, under the transition pathways to sustainability scenarios by 2050 (box 1), while it is projected to increase under the business-as-usual scenario. Of many possible pathways, the three examined in this report project a reduction of biodiversity loss in all the subregions compared to the projected loss under the business-as-usual scenario.

D3. For most countries, global environmental goals, targets and aspirations are uncoupled from national policies. Biodiversity and nature's contributions to people are diminishing in many regions of the Americas. It is likely that few of the Aichi Biodiversity Targets will be met by the 2020 deadline for most countries in the Americas, in part because of policy choices and trade-offs with negative impacts on aspects of biodiversity. Continued loss of biodiversity could undermine the achievement of some of the Sustainable Development Goals, as well as some international climate-related goals, targets and aspirations.

E. Management and policy options

E1. **There are options and initiatives that can slow down and reverse ecosystem degradation in the Americas; however, most ecosystems in the Americas continue to be degraded.**

- **An increase in protected areas by most countries is contributing to maintaining options for the future.** Protection of key biodiversity areas increased 17 per cent from 1970 to 2010, yet fewer than 20 per cent of key biodiversity areas are protected. Coverage of marine protected areas is smaller than for their terrestrial counterparts in all subregions except North America. Sustainable land use systems of indigenous peoples and local communities has proven a powerful instrument for protecting nature.
- **Ecological restoration is having positive effects at local scales, often speeding up ecosystem recovery and improving the ability of such areas to provide nature's contributions to people.** However, initial costs can be significant, and non-material contributions may not be restored for some people.
- **Protected and restored areas contribute to nature's contributions to people but are likely to continue to comprise a minority of the land and sea of the Americas, so sustainable use and management outside protected areas remains a priority.** Diverse, more integrative strategies, from the holistic approaches of many indigenous peoples and local communities to the ecosystem-based approaches developed for sectorial management, can be effective when appropriately implemented. Strategies for making human-dominated landscapes (e.g., agricultural landscapes and cities) supportive of biodiversity and nature's contributions to people (e.g., multifunctional, diversified landscapes and agroecological systems) are essential if biodiversity and nature's contributions to people are to be protected and enhanced where they have been degraded.

E2. Policy interventions can be more effective when they take into account causal interactions between distant places and leakage and spillover effects[7] at many levels and scales across the region. Additionally, the causes of many threats to biodiversity and nature's contributions to people are inherently beyond national borders and may be most effectively addressed through bilateral and multilateral agreements.

[7] The definition that follows is for the purpose of this assessment only: leakage and spillover effects can be defined as environmentally damaging activities relocated elsewhere after being stopped locally.

E3. **Mainstreaming conservation and sustainable use of biodiversity in productive sectors is extremely important for the enhancement of nature's contributions to people.** However, for most countries of the region, the environment has been mostly dealt with as a separate sector in national planning, and has not been effectively mainstreamed across development sectors**.** Mechanisms for integrating biodiversity policies into agencies with jurisdiction over pressures on biodiversity would promote better policies. Policies and measures to achieve conservation and sustainable use outcomes are most effective when coherent and integrated across sectors. A broad array of policy instruments, such as payment for ecosystem services, rights-based instruments and voluntary eco-certification, can be used by a range of actors to better mainstream biodiversity and nature's contributions to people into policy and management.

E4. **Implementation of effective governance processes and policy instruments can address biodiversity conservation and enhanced provision for nature's contributions to people.** However, the increasingly broad array of policy instruments used by a range of actors to support the management of biodiversity and nature's contributions to people and to avoid or mitigate impacts on the different ecosystems have not added up to overall effectiveness at the national or subregional scales, although they are often effective locally. Implementation of public policies is most effective with, inter alia, appropriate combinations of behavioural change, improved technology, effective governance arrangements, education and awareness programmes, scientific research, monitoring and evaluation, adequate finance arrangements, and supporting documentation and capacity-building. Behavioural changes may be needed from individuals, communities, business and governments. Factors to promote conservation and sustainable use of biodiversity and nature's contributions to people can be aided by enabling governance arrangements, including partnerships and participatory deliberative processes, and recognition of the rights of indigenous peoples, local communities and people in vulnerable situations, in accordance with national legislation.

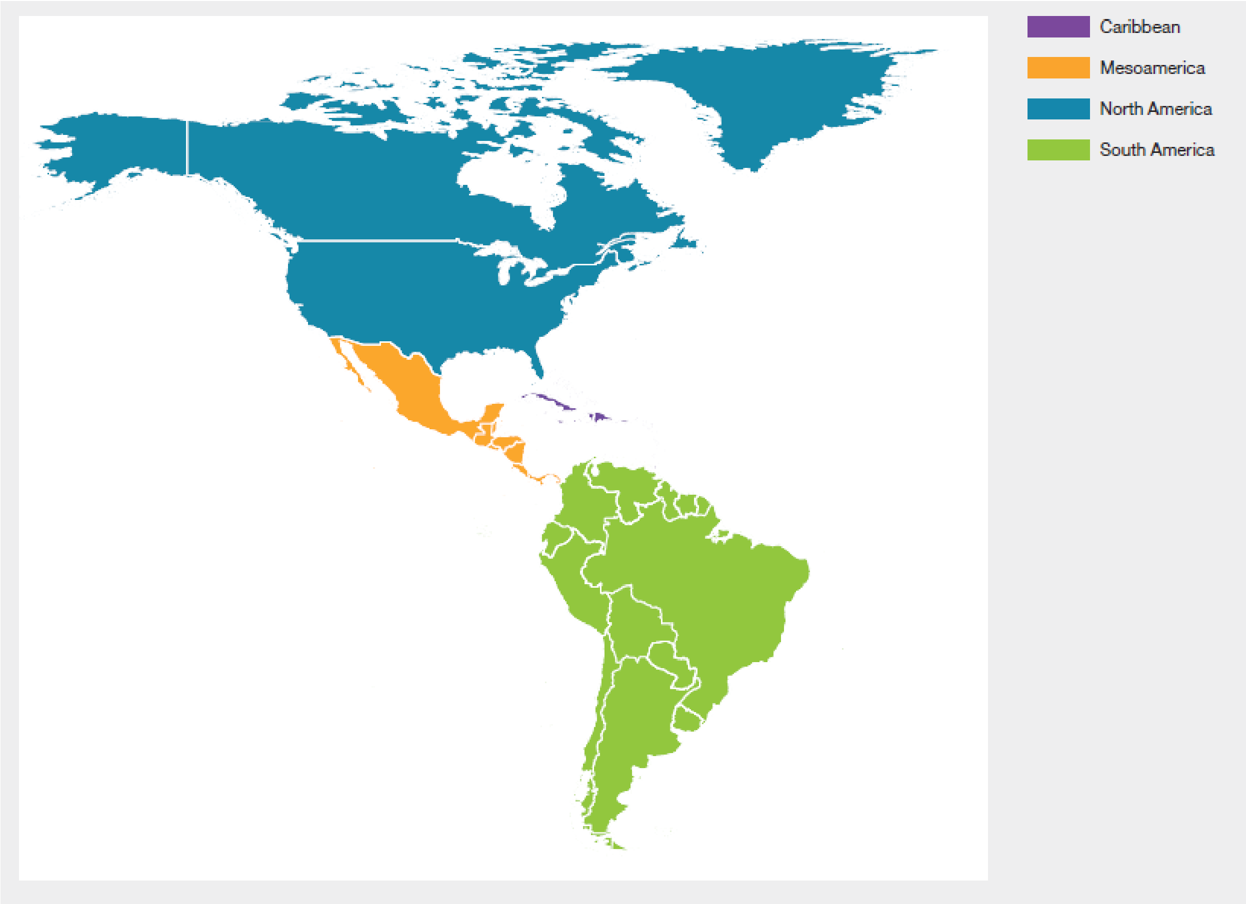
E5. **Knowledge gaps were identified in all chapters.** The assessment was hampered by the limited information (a) on the impact of nature's contributions to people to quality of life, in particular because there is a mismatch between social data related to quality of life produced at the political scale and ecological data produced at a biome scale; (b) on nature's non-material contributions to people that contribute to quality of life; (c) for assessing the linkages between indirect and direct drivers and between the drivers and specific changes in biodiversity and nature's contributions to people; and (d) on the factors that affect the ability to generalize and scale the results of individual studies up or down.

Background

The Americas region (Figure SPM.1) is highly biologically diverse, hosts 7 out of the 17 most biodiverse countries of the world and encompasses 14 units of analysis (Figure SPM.2) across 140 degrees of latitude (*well established*) {1.1, 1.6.1}. The Americas include 55 of the 195 terrestrial and freshwater world ecoregions with highly distinctive or irreplaceable species composition. The region hosts 20 per cent of globally identified key biodiversity areas, 26 per cent of globally identified terrestrial biodiversity conservation hotspots and three of the six longest coral reefs. In addition, the Gulf of California and the Western Caribbean are included in the top 18 key marine biodiversity conservation hotspots {1.1, 3.2}. The region has some of the most extensive wilderness areas on the planet, such as the Pacific Northwest, the Amazon and Patagonia. The Páramo and Amazonian forests, respectively, are the richest tropical alpine area and tropical wet forests in the world (*well established*) {3.4.1.1, 3.4.1.5}. Around 29 per cent of the world´s seed plants, 35 per cent of mammals, 35 per cent of reptiles, 41 per cent of birds and 51 per cent of amphibians are found in the Americas, totalling over 122,000 species for those species groups alone (*established but incomplete*) {3.2.2.2; Table 3.1}, in addition to over one third of the world´s freshwater fish fauna, consisting of over 5,000 species (*well established*) {3.2.3.1}. Conservatively, 33 per cent of the plants used by humans are found in the Americas (*well established*) {3.2.2.2}.

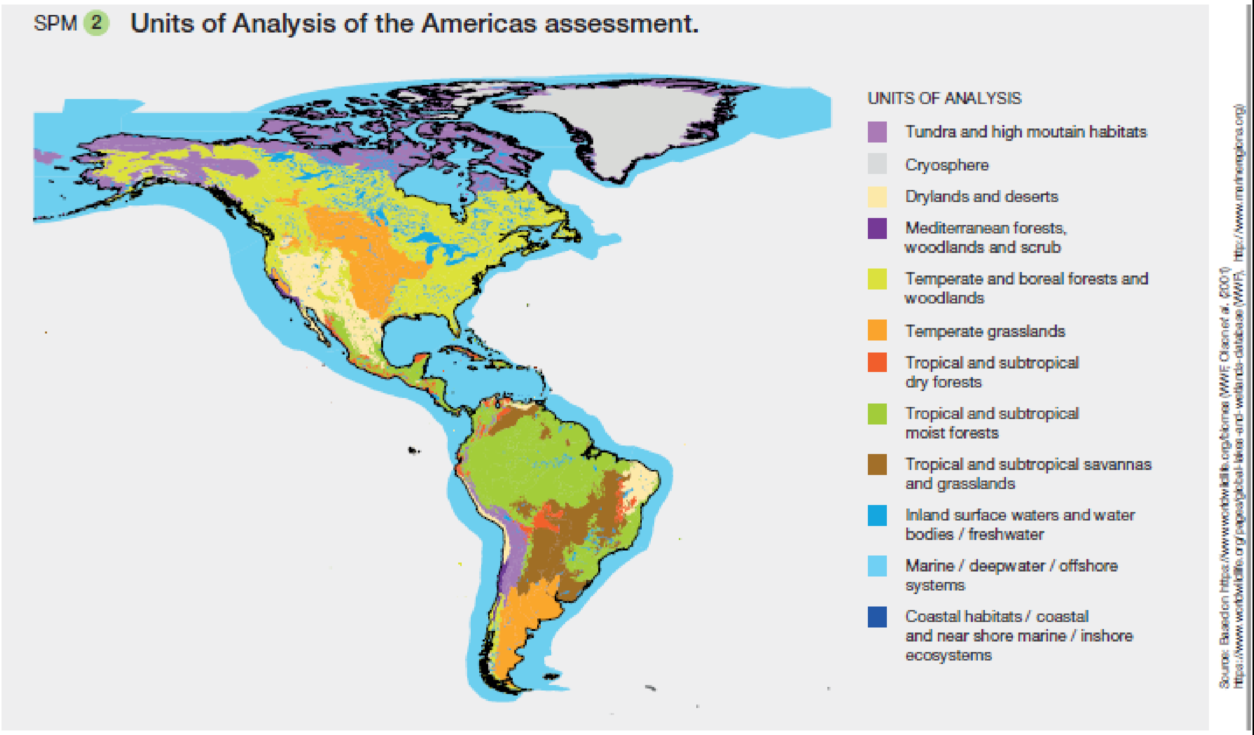
Figure SPM.1

Subregions of the Americas assessment



Source: Adapted from a map available from Natural Earth, http://www.naturalearthdata.com/.

Figure SPM.2
Units of analysis of the Americas assessment



Source: Adapted from Olson et al., 2001, World Wildlife Fund, 2004 and 2012, and Marine Regions, 2016.[8]

The Americas is a highly culturally and socioeconomically diverse region *(well established*). It is populated by over 66 million indigenous people whose cultures have persisted in all subregions and, in addition, by an exceptionally large proportion of new immigrants and descendants of immigrants, mainly from Europe, Asia and Africa (*established but incomplete*) {2.1.1, 2.1.2, 2.3.5, 2.5}. The Americas are home to 15 per cent of global languages {2.1.1}. The human population density in the Americas ranges from 2 per 100 km^2 in Greenland to over 9,000 per km^2 in several urban centres {1.6.3}. Socioeconomically, the region contains 2 of the 10 countries with the highest Human Development Index, as well as 1 of the 30 countries with the lowest Human Development Index (*well established*) {1.6.3}. Such heterogeneity makes it difficult to develop general conclusions that apply uniformly across all subregions.

A. Nature’s contributions to people and quality of life

Although the high “biocapacity”9 **of the Americas means that nature has an exceptional ability to contribute to people’s quality of life (well established) {2.6; Table 2.24}, the links between “biocapacity” and the real availability of individual nature’s contributions to people are not fully established** (see appendix 2). The relatively high average per capita availability of natural

[8] Olson, D. M., E. Dinerstein, E.D. Wikramanayake, N.D. Burgess, G.V. Powell, E.C. Underwood, J.A. D’Amico, I. Itoua, H.E. Strand, & J.C. Morrison (2001). Terrestrial Ecoregions of the World: A New Map of Life on Earth: A new global map of terrestrial ecoregions provides an innovative tool for conserving biodiversity. BioScience, 51, 933-938. https://doi.org/10.1641/0006-3568(2001)051[0933:TEOTWA]2.0.CO;2.

World Wildlife Fund (2004). Global Lakes and Wetlands Database. Retrieved from https://www.worldwildlife.org/pages/global-lakes-and-wetlands-database.

World Wildlife Fund (2012) Terrestrial Ecoregions of the World. Retrieved from https://www.worldwildlife.org/publications/terrestrial-ecoregions-of-the-world.

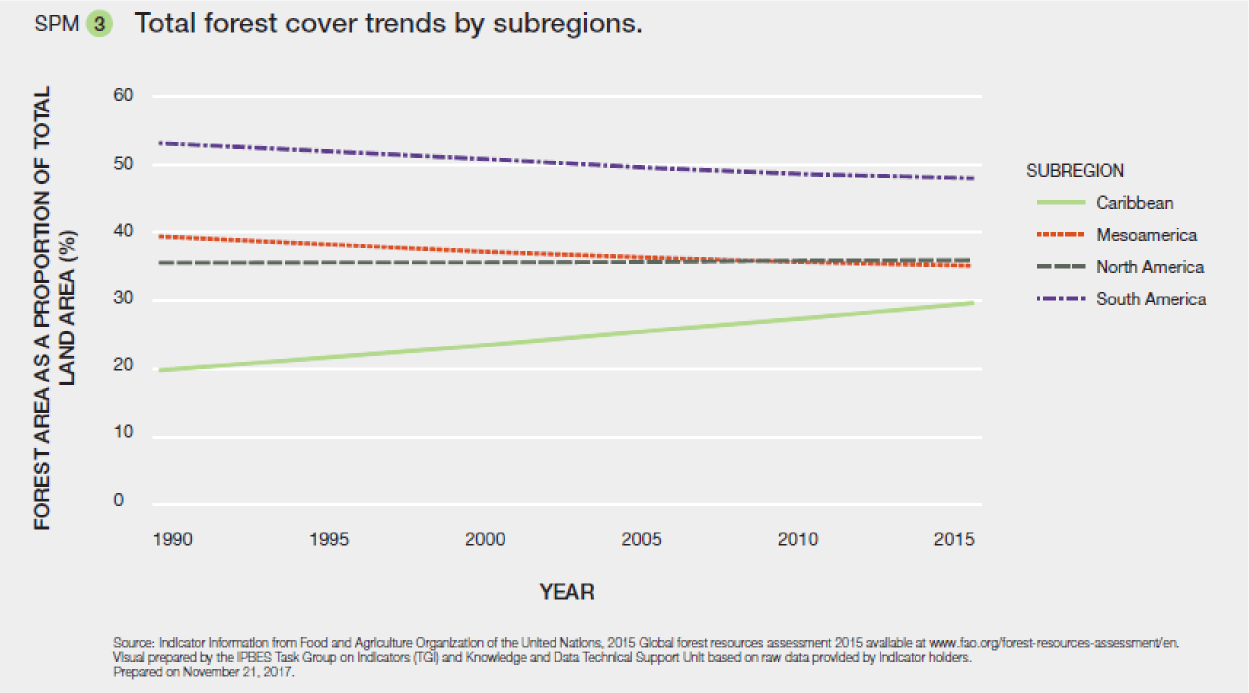
Marine Regions (2016). Marine Regions. Retrieved from http://www.marineregions.org.

[9] The definition that follows is for the purpose of this assessment only: "biocapacity" has a variety of definitions, but is defined by the Global Footprint Network as "the ecosystem’s capacity to produce biological materials used by people and to absorb waste material generated by humans, under current management schemes and extraction technologies". The "biocapacity" indicator used in the present report is based on the Global Footprint Network, unless otherwise specified.

biological resources does not ensure their equitable availability or prevent resource shortages at a given time or place or within a given socioeconomic stratum {2.5, 2.6; Figure 2.36; Table 2.24}.

The disproportionate and unsustainable use of "biocapacity" in the Americas has increased steadily in recent decades (*well established*) {2.6; Table 2.25}. Since the 1960s, renewable fresh water available per person has decreased by 50 per cent {2.2.10; Figure 2.19}, land devoted to agriculture has increased by 13 per cent {4.4.1}. Since 1990, forest areas have continued to be lost in South America (9.5 per cent) and Mesoamerica (25 per cent), although there have been net gains in North America (0.4 per cent) and the Caribbean (43.4 per cent) {4.4.1} (Figure SPM.3). The ecological footprint of the Americas has increased two- to threefold in each subregion since the 1960s. This trend has become attenuated in recent decades for North America, Mesoamerica and the Caribbean, but continues to increase in South America (Figure SPM.4), and the patterns vary significantly among subregions {2.6; Table 2.24} and units of analysis {4.3.2} (*well established*). In all subregions, there are cultures and lifestyles that are achieving sustainable management of natural resources towards a good quality of life. However, the aggregate ecological footprint of the Americas remains unsustainable and continues to grow (*established but incomplete*) {2.1.1, 2.6, 5.4.11}.

Figure SPM.3
Total forest cover trends by subregions



Source: Food and Agriculture Organization of the United Nations (FAO, 2015) [10]

Differences in economic development attained within and among countries of the Americas and variation in countries' ecological footprint associated with their pursuit of development pose challenges to an equitable and sustainable use of nature (*well established*). In some areas of all subregions, social inequity in distribution of benefits from uses of and access to nature's contributions to people continues to be an important concern (established but incomplete) {2.5, 4.3}. Although overall poverty rates have decreased in the last 20 years, large numbers of people, particularly in Mesoamerica, the Caribbean and South America, are still vulnerable {4.3}. The increasing global demand for food, water and energy security increases consumption and intensifies the ecological footprint of the Americas {2.3.2, 2.3.5, 4.3.2} (Figure SPM.4). This intensification, when based on unsustainable practices, has had negative consequences for nature, with adverse implications for nature's contributions to people (Figure SPM.5) and quality of life, and for availability of future options (well established) {2.3.5, 3.2.3, 3.3.5, 3.4, 4.4.1, 4.4.2, 5.5}.

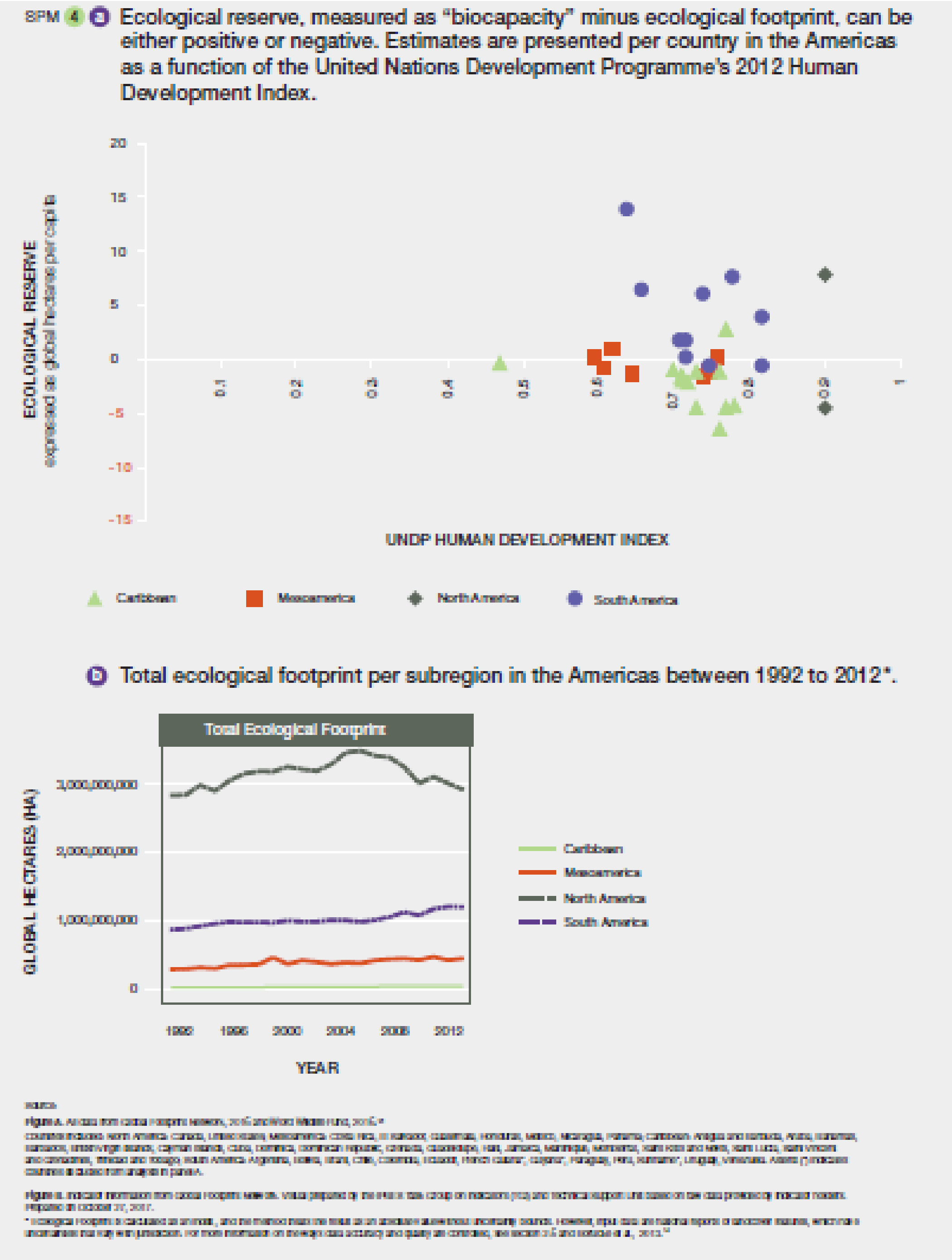
[10] Food and Agriculture Organization of the United Nations (2015). *Global Forest Resources Assessment 2015*. Retrieved from www.fao.org/forest-resources-assessment/en. Visual prepared on November 21, 2017, by the IPBES task group on indicators and the technical support unit based on raw data provided by indicator holder.

Figure SPM.4a

Ecological reserve, measured as "biocapacity" minus ecological footprint, can be either positive or negative. Estimates are presented per country in the Americas as a function of the United Nations Development Programme's 2012 Human Development Index

Figure SPM.4b

Total ecological footprint per subregion in the Americas between 1992 to 2012*



Source: Global Footprint Network, 2016 and World Wildlife Fund, 2016.[11]

[11] Figure SPM 4.A. All data from Global Footprint Network, 2016 and World Wildlife Fund, 2016.13 Countries included: North America: Canada, United States; Mesoamerica: Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama; Caribbean: Antigua and Barbuda, Aruba, Bahamas, Barbados, British

Figure SPM.5

Trends in the provision of nature's contributions to people (NCP) for each unit of analysis.

Trends and importance values are based on a modified Delphi process* to build consensus, as indicated by synthesis among experts from Chapters 2 and 3. Values were assigned based on the proportion of the unit of analysis that has not been converted by human activities. Squares without arrows indicate that there is no clear link [or trend] between nature's contributions to people for that category and the corresponding unit of analysis. (Note:

Virgin Islands, Cayman Islands, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and Grenadines, Trinidad and Tobago; South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana*, Guyana*, Paraguay, Peru, Suriname*, Uruguay, Venezuela. Asterix (*) indicates countries excluded from analysis in panel A.

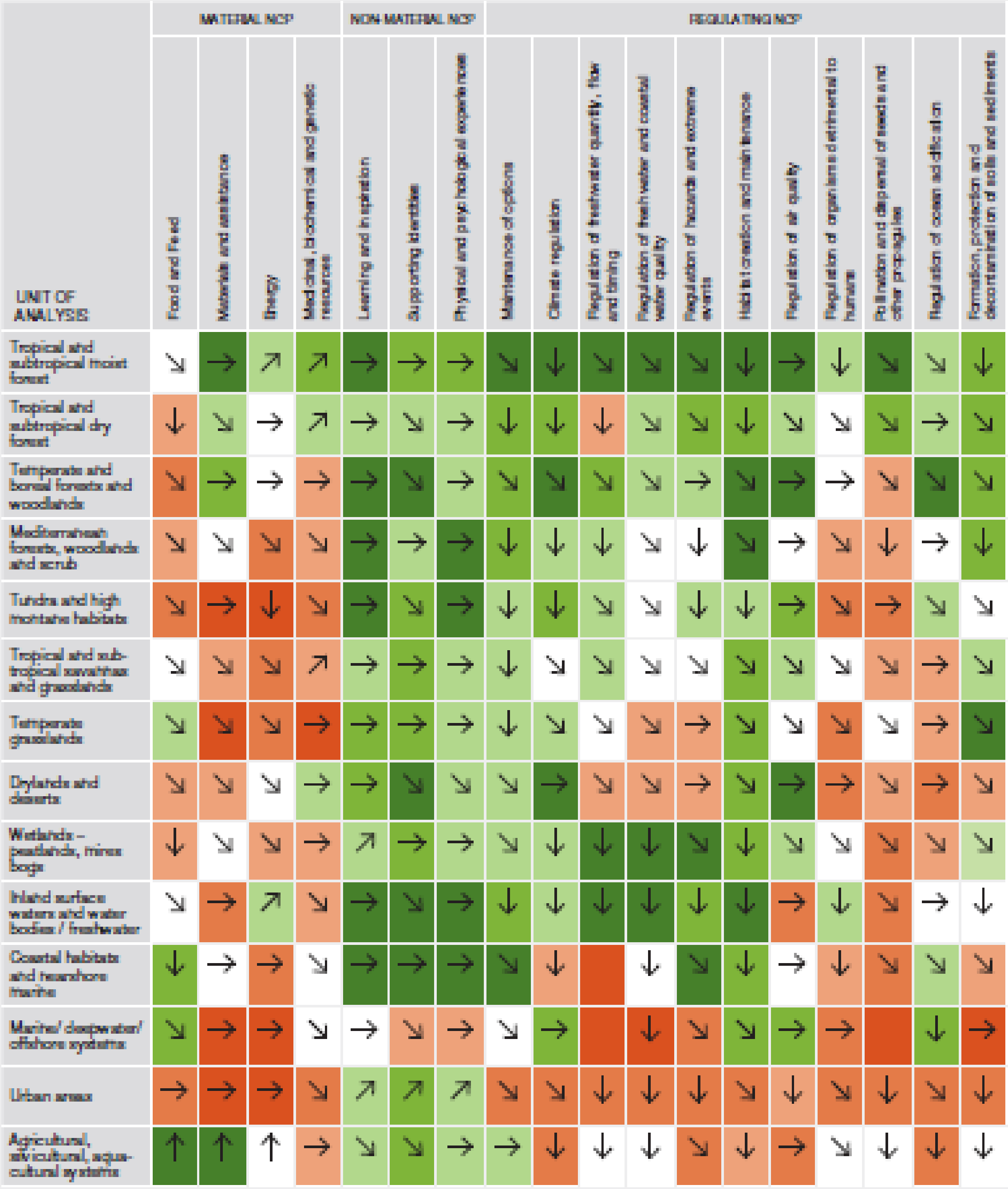
Figure SPM 4.B. Indicator information from Global Footprint Network. Visual prepared by the IPBES Task Group on Indicators (TGI) and TSU based on raw data provided by indicator holders. Prepared on October 27, 2017.

* Ecological Footprint is calculated as an index, and the method treats the result as an absolute value without uncertainty bounds. However, input data are national reports of landcover features, which have uncertainties that vary with jurisdiction. For more information on the ways data accuracy and quality are controlled, see section 2.6 and Borucke *et al.*, 2013.14

the cryosphere is not considered in this analysis.)

SPM 5 Trends in the provision of nature's contributions to people (NCP) for each unit of analysis.

Trends and importance values are based on a modified Delphi process* to build consensus, as indicated by synthesis among experts from Chapters 2 and 3. Values were assigned based on the proportion of the unit of analysis that has not been converted by human activities. Squares without arrows indicate that there is no clear link (or trend) between nature's contributions to people for that category and the corresponding unit of analysis. (Note: the cryosphere is not considered in this analysis.)



* The Delphi method is a structured and iterative evaluation process that uses expert panels to establish consensus regarding the assessment of a specific topic.

Importance of unit of analysis for delivering each nature's contribution to people

Very High | High | Medium High | Medium | Medium Low | Low | Very Low

Direction of change in provision of each nature's contribution to people

↑ Strongly Increasing ↗ Increasing → Stable ↘ Decreasing ↓ Strongly Decreasing

Source: Own representation.

In the Americas, increases in the uses of nature have resulted in the region being the largest global exporter of food and one of the largest traders in bioenergy (*well established*). Agricultural and livestock production in the Americas, which is critical to providing food for both the region and the rest of the world, continues to increase, albeit with subregional differences {1.2.3, 3.2.1, 3.3.5}. Except in the Caribbean, crop production in the Americas more than doubled between 1961 and 2013 due to extensification and intensification of large-scale agriculture {2.2.2.1, 2.3.5} and replacement of natural ecosystems. This has resulted in the reduction of many types of nature's contributions to people and in changes to the distribution of economic benefits and livelihoods (*well established*) {2.5, 2.7}. In places throughout the Americas, indigenous and local communities continue sustainable agricultural and harvesting practices, which provide learning opportunities globally. While this contributes a small volume to the Americas' share of global trade, it can be critical for local and national food security and livelihoods {sections 2.2.1, 2.3.1, 2.4, 2.5, 2.6}. All scales of agriculture have benefited from domestication of plants from tropical and montane areas of the Americas (*well established*) {1.1, 2.2.1, 2.4, 3.3.3}. Marine fish harvests have peaked in all subregions and are decreasing as stocks decline[12] or management reduces harvest rates, while freshwater-capture fish production has increased slightly and the contribution of aquaculture grew from 3 per cent of total fish production in 1990 to 17 per cent in 2014 {4.4.5}.

In addition to export of food commodities, the Americas have a large commerce of timber and fibre from plants and animals (*well established*). Although timber and fibre production have increased significantly over the last several decades, they have begun to slow and are expected to continue to decrease as new technologies and production substitutes emerge and supplies of timber continue to decrease (*well established*) {2.2.2, 4.3.4}. However, there are cases where overall reduction in hardwood harvest has not reduced pressure on some valuable species {4.4.5}, and since 2000, coniferous production has increased in South America {2.2.2}.

The water security challenges for over half the population of the Americas arise from unevenly distributed supply and access and decreasing water quality (*well established*). Supply challenges occur in all subregions, particularly in arid lands, densely populated urban centres and areas of increasingly extensive and intensive agriculture with seasonal lack of rain (*well established*) {1.3.2, 2.3.2}. Climate change and unsustainable rates of extraction of surface water and groundwater exacerbate this challenge, especially in areas not expected to receive increased rainfall. Importation of commodities containing water from water-rich areas helps offset water scarcity, particularly in arid regions. This may result in reduced water quality at the site of commodities production due to environmental damage (e.g., potential pollution of water bodies with agrochemicals) (*established but incomplete*) {2.2.10, 2.3.2, 4.3, 4.4.2, 5.4.10}. Moreover, in all regions, some natural watersheds have been insufficiently protected from land conversion to agriculture and grazing, unsustainable forest harvesting, the loss of natural habitat and urban development practices (*established but incomplete*) {4.4.1, 4.4.5}. This may cause water quality degradation by run-off from urban centres, areas with inadequate sanitation and areas with unsustainable agricultural practices (*well established*) {2.2.11, 2.3.2, 4.4.1, 4.4.2, 5.3.10}. In the Americas, approximately 23 million tons of nitrogen fertilizer and 22 million tons of phosphorus were used in 2013. In some watersheds throughout the Americas, a large proportion of this ends up in water run-off owing to unsustainable agricultural practices (*established but incomplete*) {2.3.2, 2.3.11, 4.4.1, 4.4.2}.

Energy produced from hydropower and biological fuel sources, including cultivated biofuel species, has increased in the Americas, contributing to energy security (*well established*) {2.3.3}. Both trends can negatively affect biodiversity due to habitat conversion and changes in biogeochemical cycles (*established but incomplete*). In some areas and for particular crops, bioenergy production can result in land competition with food production and natural vegetation, with social, economic and ecological consequences {4.4.1}. The increases in hydropower production have resulted in alterations to watersheds, with many consequences, both negative and positive, for ecosystems, aquatic biodiversity, water availability for local uses, the quality of life of displaced people and alternative uses of lands inundated or otherwise altered by the hydropower facilities {2.3.2, 2.3.3, 3.2.3.1, 4.3.1, 4.7}.

Human health depends directly and indirectly on nature. Biodiversity is a source of medicines and other products that contribute to human health and have high potential for the development of pharmacological products (*well established*) {2.2.4, 2.4}. In some areas outside of North America, the commercial development of medicinal products has been weak. In the Americas, many

[12] Stocks may decline for many reasons, including overfishing, climate change, pollution and disturbance of habitats.

opportunities remain for further development of products from nature that can contribute to human health, including through bioprospecting, in accordance with national legislation {2.2.4, 2.4}.

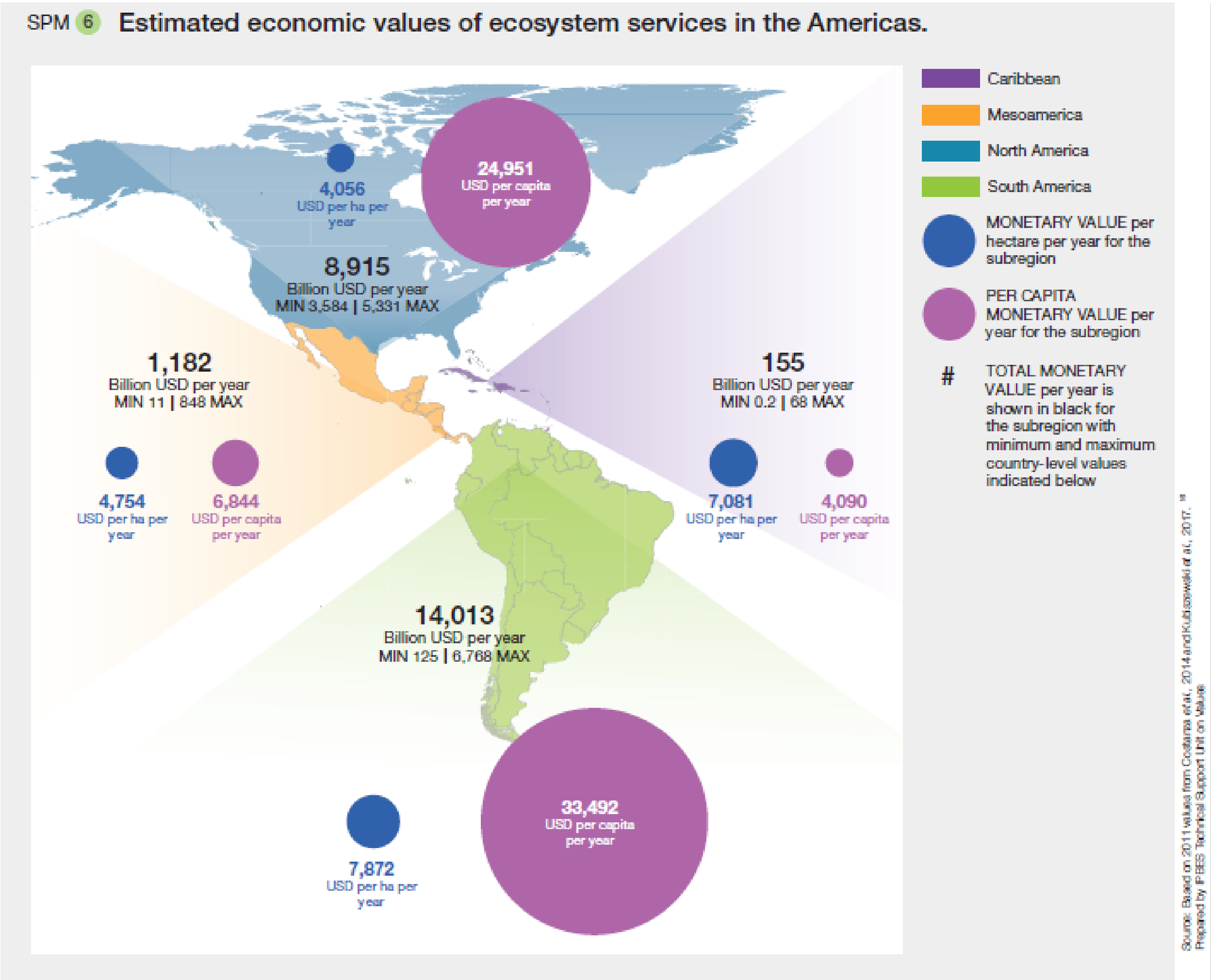
Health benefits from biodiversity and access to nature are well documented (*established but incomplete*). Examples include diets based on diverse natural products improve health and nearness to green space has been linked to reduced childhood obesity in some urban areas {1.3.2, 2.3.4}. On the other hand, ecosystem contaminants and pollutants transferred to humans via food supplies have been linked to widespread and sometimes serious health problems, such as cancer and reproductive or nervous-system disorders {4.4.2}.

Trends in livelihoods and good quality of life depend not only on material nature's contributions to people with high economic value (e.g., food, wood, fibre), but also on non-material contributions (e.g., learning and experiences, supporting identities) and regulating contributions (e.g., regulation of extreme events, disease, pollination) that are often not accounted for in economic or development planning (***well established***) {1.3.2, 2.2.5, 2.2.6, 2.2.7, 2.2.8, 2.2.9, 2.2.10, 2.2.11, 2.2.12, 2.5.1, 4.5}. Mental health is strongly and positively influenced by access to nature, including urban green spaces, and such benefits are increasingly included in urban and regional planning {2.3.4, 5.4.8}. However, green spaces in urban and suburban areas are unequally distributed across the Americas and within cities (*well established*) {3.3.4}. The mechanisms by which these contributions are delivered and the ways in which the characteristics of natural settings can affect the resulting nature's contributions to people in different geographical locations, cultures and socioeconomic groups may warrant more attention.

Comprehensively evaluating the ways that a specific nature's contribution to people supports quality of life can be most effective when taking into account the multiple values and value systems associated with that contribution (*well established*) {2.5.1; Table 2.21}. For example, as a nature's contribution to people, food and feed can be, among others, evaluated relative to their biophysical metrics, including species richness and extent of land cover devoted to producing the food {2.2.1}. At the same time, this edible biodiversity is incorporated into human quality of life via health effects that can be positive (e.g., malnutrition has decreased in the last decades in the Americas {2.3.1}) or negative (e.g., agriculture-related pollution {2.2.1, 4.4.2}). Nature's contributions to people also relates to sociocultural practices that are meaningful to humans (e.g., food-related production activities such as farming, ranching, fishing and hunting; and cultural customs and sometimes requirements to fulfil dietary needs in particular ways {2.3.1}) and constitute nature-based livelihoods. Holistic evaluations of indigenous and local knowledge could be used to understand the traditional ways that nature was managed to produce food and feed, many of which allowed for the maintenance or even enhancement of local and regional biodiversity, in contrast to some unsustainable forms of modern industrial food production (*well established*) {2.2.1, 2.2.6, 2.3.5, 2.4}.

When only economic values of ecosystem services are taken into account, subregional differences are noted (Figure SPM. 6). Nature's contributions to people in terms of total ecosystem services value, as well as per area (ha) and per capita values, are highest for South America (*established but incomplete*). Brazil, the United States of America and Canada had the largest total monetary values per country, with $6.8, $5.3 and $3.6 trillion per year, respectively. When expressed per hectare per year, the Bahamas, and Antigua and Barbuda had the highest value (over $20,000 per hectare per year) (Table 2.22). These differences are influenced by both the size of these countries and the different economic value of specific ecosystem types, with biomes such as coastal wetlands and rainforests having particularly high economic values {2.5.1}.

Figure SPM.6
Estimated economic values of ecosystem services in the Americas



Source: Based on 2011 values from Costanza et al., 2014 and Kubiszewski et al., 2017. [13].. Prepared by IPBES TSU on Values

B. Trends in biodiversity and nature's contributions to people affecting quality of life

The rich biodiversity of the Americas is under pressure (*well established*) {3.4.1}. Compared to pre-European settlement status, over 95 per cent of the tall grass prairie grasslands in North America; 72 per cent and 66 per cent of tropical dry forest in Mesoamerica and the Caribbean, respectively; and 88 per cent of the Atlantic tropical forest, 70 per cent of the Rio de la Plata grasslands, 50 per cent of the tropical savanna (Cerrado), 50 per cent of the Mediterranean forest, 34 per cent of the Dry Chaco and 17 per cent of the Amazon forest in South America have been transformed into human-dominated landscapes.

The threats to or declines in all the nature-based securities[14] in the Americas reflect the ongoing reduction of nature's ability to contribute to human quality of life. Past rates of loss are high and

[13] Costanza, R., R. de Groot, P. Sutton, S. van der Ploeg, S.J. Anderson, I. Kubiszewski, and R.K. Turner (2014). Changes in the Global Value of Ecosystem Services. Global Environmental Change 26:152–158. https://doi.org/10.1016/j.gloenvcha.2014.04.002.

Kubiszewski, I., R. Costanza, S. Anderson, P. Sutton (2017). The Future of Ecosystem Services: Global scenarios and national implications. Ecosystem Services. https://doi.org/10.1016/J.ECOSER.2017.05.004.

Analysis by Marcello Hernandez-Blanco. Prepared by the IPBES values technical support unit.

[14] The definition that follows is for the purpose of this assessment only: nature-based securities are human securities based in whole or in part on nature or nature's contributions to people, including food, water and energy security and health.

losses continue, with some biomes under particular pressure (*well established*). From 2014 to 2015, approximately 1.5 million hectares of the Great Plains were lost to conversion or reconversion {3.4.1.7}; between 2003 and 2013, the north-east agricultural frontier in Brazil more than doubled from 1.2 to 2.5 million hectares, with 74 per cent of new croplands taken from intact Cerrado in that specific region {3.4.1.6}; and North American drylands lost 15–60 per cent of habitat between 2000 and 2009 {3.4.1.8}. Even relatively well-conserved high elevation habitats have been degraded. For example, the Peruvian Jalca was converted at a rate of 1.5 per cent per year over a 20-year period starting from 1987 {3.4.1.5}. Nevertheless, increases in nature's contributions to people can be found locally, such as the Caribbean forests that are currently expanding as agriculture and the use of wood as fuel decline and the population becomes more urbanized, and the boreal forest that is also expanding as climate change allows favourable growing conditions to extend poleward {3.4.1.1, 3.4.1.2, 3.4.1.4, 3.4.1.6, 3.4.1.7}.

Wetlands are highly transformed in large tracts of the Americas, particularly by expansion of agriculture and ranching, urbanization and overall population growth (*well established*). For instance, over 50 per cent of all wetlands in the United States have been lost since European settlement, with up to 90 per cent lost in agricultural regions {5.4.7}. The transformation of wetlands has altered ecosystem functions and biodiversity and reduced their ability to provide nature's contributions to people related to, for example, quantity and quality of fresh water, provision of food (fish, shellfish, rice, waterfowl) and climate regulation such as through carbon capture and sequestration {2.2.9, 2.2.10, 2.2.11; Figure 2.18; 3.4.1.9, 4.4.1, 4.4.2, 4.7}. In another instance, between 1976 and 2008 the Pantanal wetlands lost around 12 per cent of their area, a twentyfold increase in the loss of floodplain vegetation, due to changes in land use and with negative consequences for large animal species {3.4.1}.

Marine biodiversity, especially associated with specific habitats like coral reefs and mangroves, has experienced major losses in recent decades, resulting in declines in the food, livelihoods and "cultural continuity" of coastal people (*well established*) {3.4.2, 4.4.2, 4.4.5, 5.4.11}. Coral reefs had declined in cover by more than 50 per cent by the 1970s, and only 10 per cent remained by 2003, followed by widespread coral bleaching in 2005 and subsequent mortality from infectious diseases (*established but incomplete*). Coastal salt marshes and mangroves are disappearing rapidly (*established but incomplete*). Considerable loss of seagrasses has also occurred {3.4.2.1}. Oceans of the Americas contain high numbers of threatened species, including large numbers of species that are important for human quality of life, as well as three of the seven global threat hotspots for more surface-dwelling oceanic sharks in coastal waters {3.4.2}. Marine plastic pollution is increasing and is expected to interact with other stressors in marine ecosystems (*established but incomplete*); microplastics have adverse effects on marine life that may transfer up the food chain. Impacts on marine wildlife include entanglement, ingestion and contamination for a wide variety of species {4.4.2}.

Alien species are abundant in all major habitats in the Americas, but rates of appearance, where known, and their impacts on biodiversity, cultural values, economies and production, differ among subregions (*established but incomplete*) {3.2.2.3, 3.2.3.2, 3.2.4.2, 3.5.1, 4.4.4}. Based on potential vectors and disturbance levels, the terrestrial invasion threat across the Americas is highest in North America and Mesoamerica {3.2.2.3, 4.4.4; Figure 3.8}. Invasive alien species (and other problematic species, genes and diseases)[15] contribute to extinction risks to the greatest degree in North America, followed by the Caribbean, Mesoamerica and South America subregions {4.4.4; Figure 3.31}. Marine species invasion is more frequent in North America, particularly on the Pacific coast (*well established*) {3.2.4.2}. Invasive alien species have numerous negative socioeconomic impacts. For example, the monetary cost to manage the impact of zebra mussels on infrastructure for power, water supply and transportation in the Great Lakes is over $500 million annually {3.2.3.2; Tables 3.2, 3.3; Figure 3.31; 4.4.4; Boxes 4.21–4.24}. In less than 30 years, the Indo-Pacific lionfish has dramatically expanded its non-native distribution range to include the eastern coast of the United States, Bermuda, the entire Caribbean region and the Gulf of Mexico {4.4.4, Box 4.2}.

Overall, the number of populations or species threatened with loss or extinction is increasing in the Americas and the level of threat that they face is also increasing, but the underlying causes are different among subregions (*well established*). Close to a quarter of the 14,000-species in taxonomic groups comprehensively assessed by the International Union for Conservation of Nature in

[15] IUCN threats classification scheme (version 3.2) category 8

[15] PBL Netherlands Environmental Assessment Agency (2012). *Roads from Rio+20. Pathways to achieve global sustainability goals by 2050.* The Hague: PBL Netherlands Environmental Assessment Agency.

the Americas are evaluated as threatened, with the highest proportion of assessed endemic species classified as at risk in the Caribbean {3.5.1}. Aggregate extinction risk over a period of two decades showed generally heightened risk levels in the region, particularly in South America (*well established*) (Figure 3.30). Particularly high proportions of forest birds and mammals, most amphibian groups, and marine species (such as turtles and sharks) are assessed as facing high-risk levels {3.2.3.1, 3.4.2, 4.4.5; Figure 3.17}.

On local scales, there are many cases of restoration initiatives having improved degraded habitats, with greater biodiversity and a wider range of nature's contributions to people provided as the restoration efforts progress *(established but incomplete)* {4.4.1, 6.4.1.2}. Successful projects have been undertaken in North American grasslands, wetlands in North and South America, coastal forest in Mesoamerica, and sensitive coastal habitats in all subregions, particularly in the Caribbean. Nevertheless, restored areas still represent an extremely small proportion of the total lands and waters in the Americas {4.4.1}.

C. Drivers of trends in biodiversity and nature's contributions to people

Some indicators of good quality of life are improving at regional and subregional scales, such as increased gross domestic product {4.3.2}, decreased malnutrition {2.3.1} and increased sources of energy {2.3.3}; however, other indicators do not show the same level of improvement , such as decreases in water security {2.3.2}, environmental health {4.4.1}, human health {2.3.4}, sustainable livelihoods {2.3.5}, "cultural continuity" and identity {2.4}, and access and benefits sharing of nature {2.5} (*well established*). Many areas of concern were already identified in the Millennium Ecosystem Assessment as requiring action, but they have either improved little or deteriorated further in the ensuing dozen years (*well established*) (Figure SPM.5).

The upward trend in the size of the ecological footprint of the Americas reflects multiple indirect anthropogenic drivers (underlying factors), including patterns of economic growth; **population and demographic trends; weaknesses in the governance systems; and inequity (*established but incomplete*) {4.3}.** Key economic drivers that may increase pressures on biodiversity and nature's contributions to people include factors related to increases in per capita consumption; technological developments that increase consumptive uses of natural resources; and commerce in cases when it decouples consumption from products based on nature and nature's contribution to people {4.3, 4.7}. Increasing economic globalization has become an important driver of regional development, but has resulted in disconnection of the places of production, transformation and consumption of resource-based products (*established but incomplete*). This disconnection makes socioenvironmental governance and regulatory implementation more challenging {4.3, 4.7, 5.6.3}.

Economic growth (measured as gross domestic product and gross domestic product per capita), in part based on nature's contributions to people, and production and use of commodities from nature, have been major drivers of natural resource consumption, water use and a decline in water quality in the Americas (*established but incomplete*) {4.3}. Economic growth, as measured as gross domestic product growth and gross domestic product per capita, which has increased approximately sixfold since 1960, is a major driver of natural resource consumption in the Americas, as is international trade. Patterns of economic growth differ both among and within the subregions {1.6.3}, and the benefits of the growth have not been experienced similarly across and within subregions (*well established*) {1.1, 2.3.5, 2.5, 4.3.2}. The economic growth of different nations also reflects the diversity of value systems in the Americas, which differ among cultural groups and identities across the whole region (*established but incomplete*) {2.5.1, 4.3.2, 5.6.4}.

Habitat conversion, fragmentation and overexploitation/overharvesting are resulting in a loss of biodiversity and ecosystem functions and a loss of or decrease in nature's contributions to people on local to regional scales in all biomes (*established but incomplete)* {3.2.3, 3.4.1, 3.4.2, 3.5.1, 4.4.1, 4.4.5}. The causes of habitat conversion and fragmentation vary subregionally and on more local scales, reflecting expansion of both more extensive and intensive forms of agriculture, livestock husbandry and forestry, and increases in urbanized areas and space allocated to infrastructure, including transportation and energy corridors {4.4.1, 4.4.5}. Habitat loss and degradation are associated with losses in species richness, changes in species composition, and erosion of ecosystem functions and nature's contributions to people (*well established*) {3.4.1; Figure 3.24; 4.4.1, 4.4.4}. For instance, in the Americas, mangroves have disappeared at a rate of 2.1 per cent per year due to exploitation (e.g., aquaculture), deteriorating water quality, coastal development and climate change {3.4.2.1}. Overfishing has been widespread in the Americas for decades, with 20 to 70 per cent of stocks reduced by past overfishing. This degree of overfishing has altered ecosystems' productivity and functions in many marine and some freshwater systems, and although overfishing has been reduced or ceased in many parts of the Americas, overfished stocks and ecosystems are recovering slowly (*established but incomplete*) {4.4.5}.

Unsustainable intensification of agricultural production in many cases has caused habitat conversion, imbalances in soil nutrients and the introduction of pesticides and other agrochemicals into ecosystems (*well established*). These elevated levels of nutrients and pollutants have negative consequences for ecosystem functioning and air, soil and water quality, including major contributions to coastal and freshwater oxygen depletion, creating "dead zones" with impacts on biodiversity, human health and fisheries {1.2.1, 2.2.11, 3.2.1.3, 4.4.2}.

Human-induced climate change has already caused increased mean and extreme temperatures and/or, in some places, mean and extreme precipitation throughout the Americas, with adverse impacts on ecosystems (*well established*) {4.4.3, 5.3}. These changes in weather and local climate have in turn caused changes in species distributions and interactions and in ecosystem boundaries, the retreat of mountain glaciers, and melting of permafrost and ice fields in the tundra {3.4.1.5}. Climate change has adversely affected biodiversity at the genetic, species and ecosystem level, and will continue to do so (*established but incomplete*) {4.4.2, 4.4.3}. This is also associated with trends of accelerated tree mortality in tropical forests {4.4.3}. Climate change is likely to have a substantial impact on mangrove ecosystems through factors including sea level rise, changing ocean currents increased temperature and others {4.4.3}.

The air, water and soil pollution produced by the production and combustion of fossil fuels and introduction of various pollutants has adversely affected most terrestrial and marine ecosystems, both directly, through increased mortality of sensitive plants and animals, and indirectly, through entering food chains (*well established*) {4.4.2}. Air pollution (especially particulates, ozone, mercury, and carcinogens) causes significant adverse health effects on elderly humans and infants and on biodiversity (*well established*). For example, increasing anthropogenic mercury emissions are entering the food of wildlife and people with diets dominated by fish, eggs of fish-eating birds and marine mammals, with cases where concentrations have reached levels that have affected reproduction. Ocean acidification is affecting the calcium carbonate balance in the oceans and on the coasts, with negative effects on many types of biota, particularly species with shells or exoskeletons, such as bivalves and corals {4.4.2, 4.4.3}. In addition, many of the policies and actions taken to reduce the activities that produce greenhouse gas emissions, such as the conversion of land and the intensification of agriculture for biofuel production, which could have potentially negative consequences for nature and for important nature's contributions to people if not appropriately designed and managed {4.4.1, 4.4.3, 5.3}.

Urbanization and the associated spread of infrastructure for movement of energy, materials and people are a rapidly growing driver of loss of biodiversity and nature's contributions to people (*well established*). However, the nature and the magnitude of impacts varies substantially among the subregions of the Americas (***established but incomplete***). Urban land-cover change threatens biodiversity and affects nature's contributions to people, for example through loss of habitat, biomass and carbon storage; pollution; and invasive alien species, among other drivers {3.3.4, 4.4.1, 4.4.4}. The largest rates of increase in impacts occur in South America and Mesoamerica, and in coastal areas and habitats already severely fragmented, such as South American Atlantic Forest and seagrasses across the Caribbean {3.4.1.1, 4.4.1, 4.7}.

In the Americas, ecosystems and biodiversity are managed under a variety of governance arrangements and social, economic and environmental contexts. This makes disentangling the role of governance and institutions and processes of drivers of past trends of nature and nature's contributions to people complex (*established but incomplete*). Environmental governance policies, which vary in their use across the Americas, such as regulatory mechanisms, incentive mechanisms and rights-based approaches, can be directed to reduce pressures on nature and nature's contributions to people by influencing the supply or demand. Some approaches, such as public and private voluntary certification schemes or payment of ecosystem services, take advantage of markets to influence environmental decisions. The tools and approaches are not mutually exclusive and have been used in various combinations by a variety of forms of institutional arrangements, resulting in different implications for supporting and promoting the maintenance of nature's contributions to people {4.3.1}.

Environmental policies and governance approaches aimed at reducing pressure on nature and nature's contributions to people often have not been effectively coordinated to achieve their objectives (*well established*). Subordination of environment to economics in policy trade-offs and inequities in distribution of benefits from uses of nature's contributions to people continue to be present in all subregions (*established but incomplete*) {4.3, 6.1.1, 6.2, 6.4.2.1, 6.4.2.2, 6.4.3.1}.

For most countries, at national scales, global goals, targets and aspirations such as the Sustainable Development Goals and Aichi Targets have been endorsed, but development of national action plans is often uncoupled from national development and economic policies, and vary greatly among countries. This lack of coordination has had adverse implications for nature, nature's contributions to people and quality of life {6.3}. On average, biodiversity and nature's contributions to people have been diminishing under the current governance systems in the Americas, although local instances of successful protection or reversal of degradation of biodiversity show that progress is possible (*established but incomplete*) {4.4.1, 5.5.2, 5.6}.

D. Future trends in biodiversity and nature's contributions to people and global goals, targets and aspirations

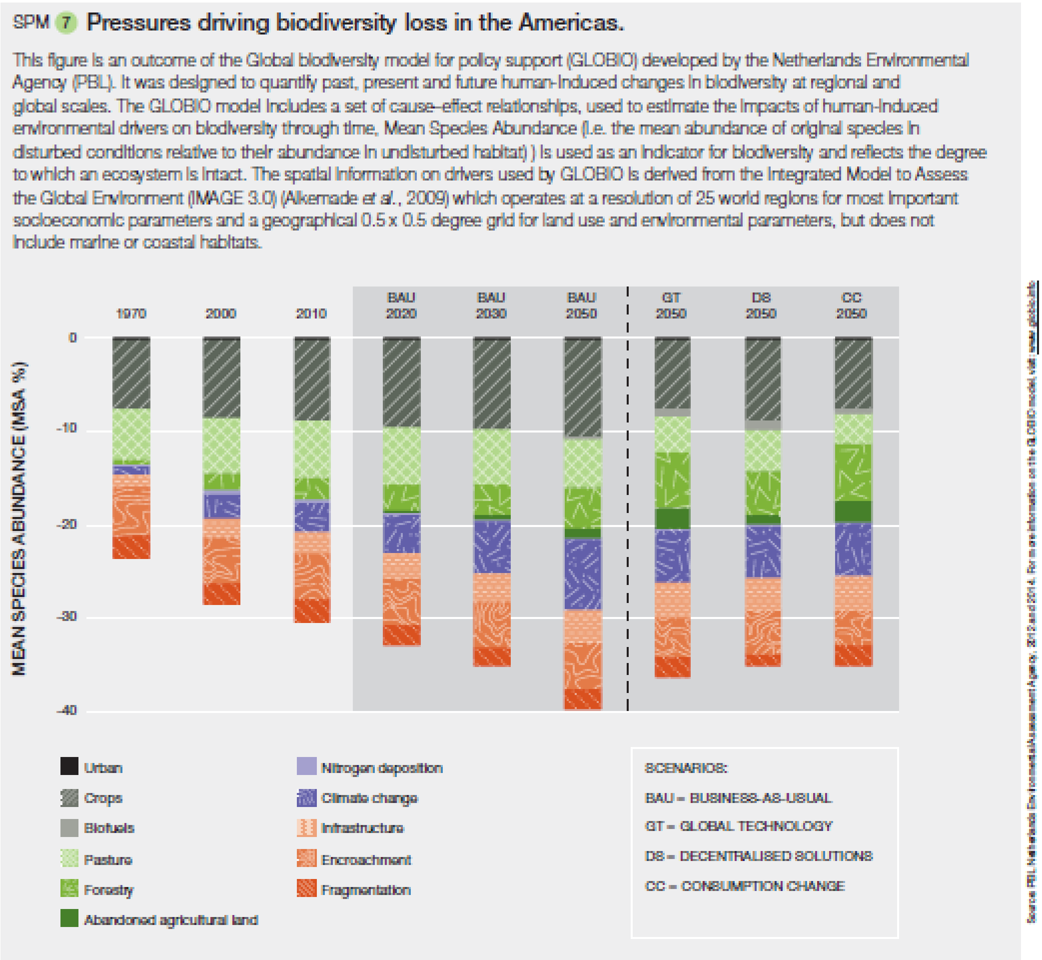
Drivers of biodiversity loss and reduced nature's contributions to people are projected to increase in intensity if existing patterns of consumption and the policies underlying them continue (*well established*). All anthropogenic drivers are projected to continue to affect all ecosystems, across all spatial scales, under all future scenarios (box SPM.1), although the specific trajectories and rates of change in biodiversity and nature's contributions to people depend on the assumptions used in the various scenarios. These multiple drivers are expected to interact, often in ways that further increase their impact on biodiversity loss, although the strength of the drivers is projected to vary with ecosystem type and the extent of past disturbance (*established but incomplete*) {4, 5.3, 5.4, 5.5, 5.6.3}.

Since the start of European settlement, it is estimated that approximately 30 per cent of the mean species abundance in the Americas had been lost by 2010. Despite reported reductions in the rate of degradation in some units of analysis, the integrated result of a suite of models projects (box SPM.1) is that loss continues through 2050 and beyond, with land use change and climate change the dominant drivers compared to other drivers such as forestry and urbanization *(established but incomplete)* (Figure SPM 7). The business-as-usual projections suggest that pressures from agricultural practices were the major aspects of land-use change and changes in temperature and precipitation regimes as well as the nature of some related extreme events were the major aspects of climate change, in all projections in Figure SPM 7. The magnitude and time course of the impacts are uncertain (*established but incomplete*) {5.5}.

Figure SPM.7

Pressures driving biodiversity loss in the Americas.

This figure is an outcome of the Global biodiversity model for policy support (GLOBIO) developed by the Netherlands Environmental Agency (PBL). It was designed to quantify past, present and future human-induced changes in biodiversity at regional and global scales. The GLOBIO model includes a set of cause–effect relationships, used to estimate the impacts of human-induced environmental drivers on biodiversity through time, Mean Species Abundance (i.e. the mean abundance of original species in disturbed conditions relative to their abundance in undisturbed habitat)) is used as an indicator for biodiversity and reflects the degree to which an ecosystem is intact. The spatial information on drivers used by GLOBIO is derived from the Integrated Model to Assess the Global Environment (IMAGE 3.0) (Alkemade et al., 2009) which operates at a resolution of 25 world regions for most important socioeconomic parameters and a geographical 0.5 x 0.5 degree grid for land use and environmental parameters, but does not include marine or coastal habitats.



Source: PBL Netherlands Environmental Assessment Agency, 2012 and 2014. For more information on the GLOBIO model, visit: www.globio.info[16]

[16] PBL Netherlands Environmental Assessment Agency (2012). *Roads from Rio+20. Pathways to achieve global sustainability goals by 2050.* The Hague: PBL Netherlands Environmental Assessment Agency.

PBL Netherlands Environmental Assessment Agency (2014). *How sectors can contribute to sustainable use and conservation of biodiversity.* Secretariat of the Convention on Biological Diversity, Montreal. Technical Series 79.

Box SPM.1

Pathways considered in this report

Hundreds of scenarios have been developed to describe plausible world futures; nevertheless, this assessment found only one scenario (Great Transitions) that analyses the entire region, exploring visionary solutions to the sustainability challenge, including new socioeconomic arrangements and fundamental changes in values {5.5}. The Netherlands Environmental Assessment Agency examines this scenario through three pathways for realizing the end goal of a more sustainable world, as described below:

o Global Technology: assumes the adoption of large-scale technologically-optimal solutions to address climate change and biodiversity loss, applying a "top-down" approach with a high level of international coordination.; Under this pathway, the most important contribution comes from increasing agricultural productivity on highly productive lands.

o Decentralized Solutions: relies on local and regional efforts to ensure a sustainable quality of life from a "bottom-up" managed system in which small-scale and decentralized technologies are prioritized. Under this pathway, the major contribution is linked to avoided fragmentation, more ecological farming and reduced infrastructure expansion.

o Consumption Change: contemplates a growing awareness of sustainability issues, which leads to changes in human consumption patterns and facilitates a transition towards less material- and energy-intensive activities. This implies a significant reduction in the consumption of meat and eggs as well as reduced wastage, which leads to less agricultural production and thus the reduction of the associated biodiversity loss.

The different pathways are compared to the Business-as-Usual scenario: a story of a market-driven world in the twenty-first century in which demographic, economic, environmental and technological trends unfold without major surprises.

Source: Netherlands Environmental Assessment Agency, *Roads from Rio+20: Pathways to achieve global sustainability goals by 2050* (The Hague, 2012).

Policy interventions at vastly differing scales (from national to local) can lead to successful outcomes in mitigating negative impacts on biodiversity (*established but incomplete*) {5.5} (Figure SPM.7). Due to the complexity of the issues of biodiversity and nature's contributions to people, as well as the universe of possible policy interventions, there are different options. For instance, the Global Biodiversity model for policy support uses the three following pathways: global technology (large-scale technologically-optimal solutions), decentralized solutions and consumption change. Under these pathways, climate change mitigation, the expansion of protected areas and the recovery of abandoned lands could contribute to either the reduction or exacerbation of biodiversity loss driven by crops, pastures and climate change. However, if abandoned lands are not recovered, the pathways considered lead to net biodiversity loss. Although the three pathways to sustainability are expected to result in a reduction of those pressures on biodiversity in comparison to the projected baseline scenario for 2050, other pressures on biodiversity, such as forestry, biofuels and abandoned land, are expected to increase. Under the business-as-usual scenario, climate change is projected to become the fastest growing driver of biodiversity loss by 2050, and a loss of almost 40 per cent of all original species in the Americas is projected relative to the current loss of about 31 per cent (a further loss of approximately 9 per cent). Under the three pathways to sustainability, a loss of 35 – 36 per cent is projected by 2050 (a further loss of approximately 4-5 per cent). Therefore, this model and these scenarios reduce the projected loss between today and 2050 by about 50 per cent. This trend varies among subregions. Results from the Global Biodiversity model for policy support show that those pathways that consider changes in societal options will lead to less pressure on nature {5.5}.

It is likely that few of the Aichi Targets will be met by the 2020 deadline for most countries in the Americas, in part because of policy choices and trade-offs with negative impacts on aspects of biodiversity. Continued loss of biodiversity could undermine achievement of some of the Sustainable Development Goals, as well as some international climate-related goals, targets and aspirations (*established but incomplete*) {2.3, 3.2.2, 3.2.3.2, 3.2.4.2, 3.3.1.10, 3.3.2, 3.4.1.1}. A large number of studies across taxonomic groups in temperate and tropical forests, grasslands and marine systems support links between biodiversity and productivity, stability and resilience of ecosystems (*well established*) {3.1.2, 3.1.3}. Thus, projections of further loss of biodiversity pose significant risks to society, because future ecosystems will be less resilient. Additionally, they are expected to face an even wider array of drivers than have been the primary causes of degradation in the past (*established but incomplete*) {5.4}. Some environmental and social thresholds (or tipping points: conditions resulting in rapid and potentially irreversible changes) are being approached or passed (*established but incomplete*) {5.4}. For instance, the interaction of warming temperatures and pollution is increasing the vulnerability of coral reefs in the Caribbean {4.4.2, 4.4.3}: under a 4°C warming scenario, widespread coral reef mortality is expected, with significant impacts on coral reef ecosystems {5.4.11}.

E. Governance, management and policy options

A variety of governance processes for biodiversity and nature's contributions to people have been developed, based on the mixture of cultures represented in the many post-European colonial governments and societies and the diverse indigenous cultures in the Americas (*well established*). Recently, in many areas, there has been an empowerment of multiple stakeholders, including indigenous peoples and local communities, in governance processes at multiple levels, which allowed for, inter alia, greater opportunities to incorporate their knowledge into ecosystem management and equity within decision-making {3.1, 5.6.2, 5.7}. The widespread endorsement of agreements on biodiversity, climate change and sustainable development by almost all American countries also allows for the sharing of lessons learned under common overall goals for development and sustainability and potential implementation at subnational, national or regional levels {6.5}. There is evidence of both successes and failures in scaling experiences upward or downward. In addition, there is no single governance approach or set of approaches to governance that will address all challenges being faced in the management of biodiversity and nature's contributions to people in the Americas. Mixed governance systems and modes have proven to have different degrees of effectiveness across subregions {4.3.1, 6.3} (Table SPM.1). What is now widely accepted, though, is that ineffective governance undermines biodiversity and nature's contributions to people (*well established*) {6.3}.

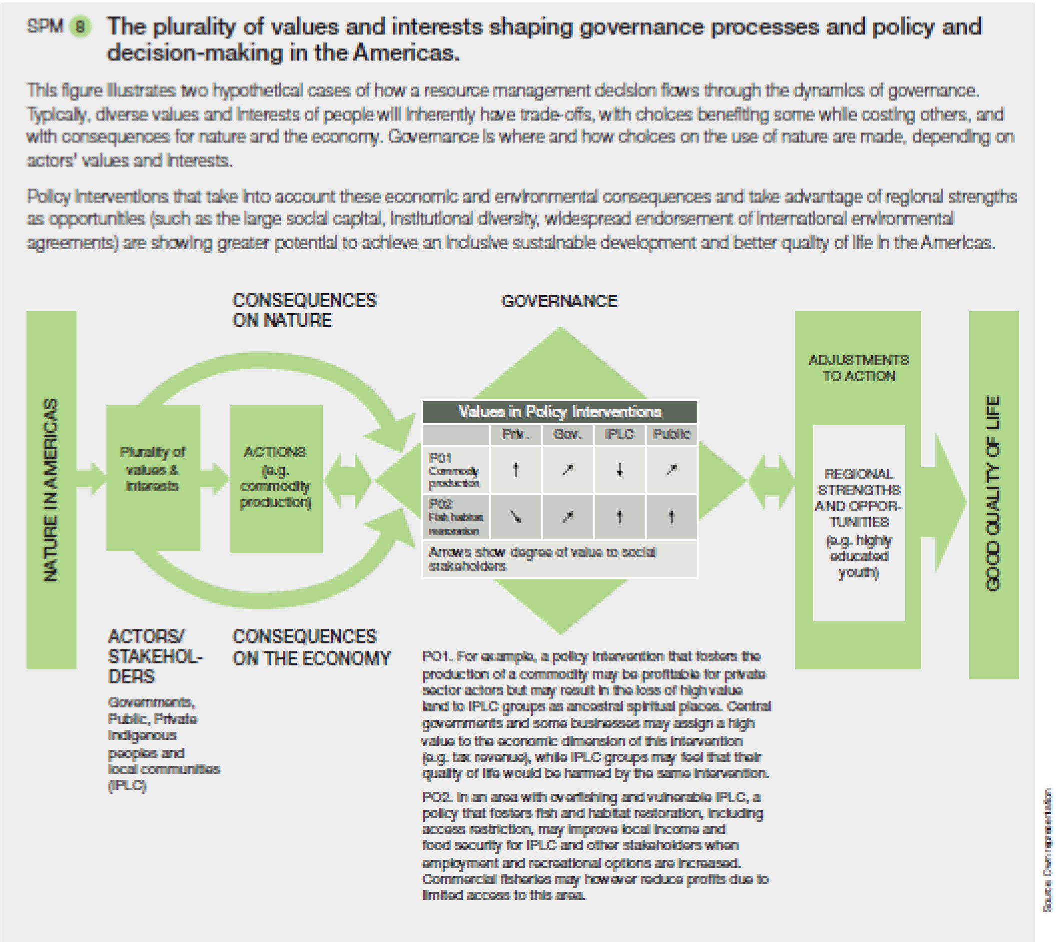
The plurality of values in the Americas shapes the use, management and conservation of nature and nature's contributions to people {1.1, 2.1.2, 2.5, 4.3.1} (Figure SPM.8). Addressing this plurality of value systems, through participative governance processes and institutions, can contribute to the design and implementation of effective conservation and sustainable use plans (*established but incomplete*). Such effectiveness can be further increased by combining it with decentralized decision-making on local and subnational issues regarding development policies, land tenure and the rights of indigenous peoples and local communities, in accordance with national legislation, and decisions on land use and natural resources exploitation. A diversity of cases across policy areas, levels of economic development and political cultures suggest that partnerships and participatory deliberative processes contribute to a large class of problem-solving situations and can support effective governance, because they allow multiple and sometime conflicting values to be considered at the local scale (*established but incomplete*) {6.3}.

Figure SPM.8

The plurality of values and interests shaping governance processes and policy and decision-making in the Americas

This figure illustrates two hypothetical cases of how a resource management decision flows through the dynamics of governance. Typically, diverse values and interests of people will inherently have trade-offs, with choices benefiting some while costing others, and with consequences for nature and the economy. Governance is where and how choices on the use of nature are made, depending on actors' values and interests.

Policy interventions that take into account these economic and environmental consequences and take advantage of regional strengths as opportunities (such as the large social capital, institutional diversity, widespread endorsement of international environmental agreements) are showing greater potential to achieve an inclusive sustainable development and better quality of life in the Americas.



Source: Own representation.

Table SPM.1

Examples of policy options in the Americas: instruments, enabling factors and country-level challenges

SU=sustainable use; RE= recovery or rehabilitation of natural and/or human systems; PR= protection.

Table 1 Examples of policy options in the Americas: instruments, enabling factors and country-level challenges.

SU=sustainable use; RE = recovery or rehabilitation of natural and/or human systems; PR = protection.

POLICY INSTRUMENTS	GOALS			ENABLING FACTORS (Way forward)	IMPEDIMENTS (Challenges more common to some countries than others)	CHAPTER -SECTION
	SU	RE	PR			
1. REGULATORY MECHANISMS						6 – 6.4.1
1.1 AREA-BASED						-
Protected areas	√	√	√	Legal basis for protecting or setting aside specific areas Community support for exclusionary measures Effective management authority by State, community or private sector Adequate resources for monitoring and enforcement	Weak or unstable legal basis for multi-sectoral management measures Insecure funding for on-going surveillance and enforcement of protection measures Low compliance with protection measures Lack of community support for measures Private sector investments threatened by spatial exclusions Fragmentation of sites and/or inadequate spatial connectivity	3 – 3.5.2 6 – 6.4.1.1
Other effective area-based conservation measures (OECM) (e.g., set-asides[1])	√	√	√			2 – Box 2.4 2 – 2.3.2 2 – 2.3.5 3 – Box 3.1 3 – 3.3.4 3 – 6 4 – Box 4.5 5 – 5.4.7 5 – 5.4.10 6 – 6.4.1.1
Indigenous and Community Conserved Areas (ICCA)	√	√	√	Capacity of self-organization Official acknowledgement of rights Mechanisms allowing co-management and/or self-governance systems	Weak or missing recognition of indigenous peoples and local communities rights and ownership/access to land by Central governments, neighboring communities or private sector	2 – 2.2.6 3 – 3.4.1.1 5 – 5.4.11 6 – 6.4.1.1 6 – 6.4.1.2
1.2 LIMITS						-
To technology (e.g., pollution control)	√		√	Adequate background information and risk analysis to set limits Technological advances to reduce or mitigate pollution /by-products while maintaining economic efficiency Adequate resources for monitoring and enforcement	Disproportionate political influence of industries Technological advances that outstrip or negate control mechanisms Low risk aversion in setting limits Weak monitoring and surveillance for compliance	3 – 3.2.2.3 3 – 3.3.3.2 3 – 3.2.4 4 – 4.4.2 6 – 6.2.1 6 – 6.6.2
To access (e.g., tourism, fisheries)	√		√	Governance capacity at local level Clear rules to manage potential sources of revenue Social cohesion and participation	Inability to regulate access to areas Lack of human and financial resources Excessive expectations from the market of enhanced consumer demand Inadequate sharing of benefits	4 – Box 4.19 4 – 4.3.3 6 – 6.6.1
1.3 MANAGEMENT						-
Ecosystem restoration	√	√		Technological and knowledge availability Economic incentives to overcome high costs favourable policy environment to promote restoration Funding for up-front costs to undertake restoration Mechanisms for cost recovery of benefits from successes	Lack of recognition of restoration in legal frameworks Inadequate funding for continuity of initiatives Insufficient knowledge to design effective restoration strategies for specific sites Lack of elimination of causes of original degradation Unreal expectations of time or funding needed for restoration to reach goals	2 – 2.2.8 2 – 2.2.11 2 – 2.2.13 4 – 4.4.1 5 – 5.4.7 6 – 6.4.1.2
Ecosystem-based approaches (e.g., EbA[2] and EcoDRR[3])	√	√	√	Availability of financing Receptiveness of industries to take on additional operating costs Inclusive governance with policy endorsement of Ecosystem Approaches to Management (use of the best knowledge available)	Weaknesses in science basis for broadening management context and accountabilities Lack of cost-effective operational tools to address full ecosystem effects of sectoral actions Lack of knowledge of transferability of progress from project to project Absence of policy framework explicitly calling for ecosystem approaches at sectoral levels	3 – 3.6 4 – Box 4.14 4 – 4.4.3 4 – 4-4.5 6 – 6.6.3

POLICY INSTRUMENTS	GOALS			ENABLING FACTORS (Way forward)	IMPEDIMENTS (Challenges more common to some countries than others)	CHAPTER -SECTION
	SU	RE	PR			
Control of Invasive-Alien Species (IAS)	√	√	√	Strong regulatory frameworks for pathways of introductions Availability of technologies for management and control Adequate monitoring for early detection Local capacity and collaboration networks for site-level mobilization of community resources for management or elimination	Shortage of scientific information on invasion pathways and likelihood of successful establishment Low awareness of risks by people involved in major invasion pathways Inadequate facilities for interception and quarantine facilities Inadequate or insecure funding for ongoing interception, monitoring and control	2 – 2.2.15 2 – 2.3.4 3 – 3.2.2.3 3 – 3.2.3.2 3 – 3.2.4.2 3 – 6 4 – 4.4.4 6 – Box 6.3
2. INCENTIVE MECHANISMS						**6 – 6.4.3**
Payment for Ecosystem Services (PES)	√	√	√	Trust building between service users and providers Direct linkages between buyers and sellers Adequate metrics for calculating payments Fair and transparent markets for exchange of payments Adequate monitoring when payment is for ongoing provision of services	Low return on investment for those paying for services Weak information basis for calculating appropriate payments Land tenure rights not adequate protected from payment arrangements Power structures that do not promote equitable and transparent payment agreements or distribution of payments Lack of recognition of non-market values of Nature and NCP when negotiating payment agreements, or lack of measures or governance processes to protect to values	2 – 2.5.1 4 – 4.3.1 6 – 6.4.2.1
Offsets	√	√		Sufficient science / knowledge base to quantify both impacts and expected benefits form offsets; Sufficient legal basis to authorize offsets as a mitigation options Adequate capacity for enforcement management and monitoring; Transparent and inclusive settings for establishing appropriate trade-offs of offsets for likely impacts.	Many weaknesses or gaps in knowledge basis for trade-off metrics, establishing equivalence, additionality, reversibility and appropriate time-scales, longevity Low availability of areas for spatial delivery of offsets Lack of resources for ongoing compliance monitoring Low adaptability of agreements on offsets, once established, if monitoring shows that benefits accruing are lower than expected or impact higher	6 – 6.4.2.2
Eco-certification	√			Adequate knowledge to set and enforce standards Reliable chain of custody for certified products Demand in high-value markets that can bear price increment for certainty of sustainability, High consumer recognition and credibility for certification labels	Weak government – private sector linkages High up-front costs to demonstrate sustainable practices and earn certification, before any economic benefits are realized Increases in operating costs so large that market competitiveness may be lost Lack of transparency in markets	2 – 2.2.1.3 2 – 2.2.1.5 2 – 2.2.2.1 6 – 6.4.2.3
3. RIGHTS-BASED APPROACHES						**6 – 6.4.2**
Rights of Mother Earth	√		√	Capacity of self-organization Official acknowledgement of rights consistent with national legislation Mechanisms allowing co-management and/or self-governance systems	Inadequate recognition of "rights" of Non-human persons in law Challenges in delimiting when such rights would be transgressed in areas already urbanized or under intensive cultivation	2 – 2.4 3 – Box 3.3 4 – Box 4.7 6 – 6.3.5
Access and Benefit Sharing (ABS)	√			Human and institutional capacities to grant access Capacity to monitor and negotiate mutually agreed terms Robust legal frameworks to require sharing benefits Inclusive, participatory mechanisms for establishing agreements	Weak legal basis to require benefit sharing of many uses of Nature Unrealistic expectations of quantity of monetary benefits Complexity and lengthy procedures for setting benefits Fundamental challenges to property rights, including intellectual property rights	2 – 2.4 2 – 2.5 2 – Box 2.6 2 – 2.7 6 – 6.4.2.4

Abbreviations: PR - protection; RE - recovery or rehabilitation of natural and/or human systems; SU - sustainable use; set-asides - areas set aside for conservation inside private properties; EbA - ecosystem-based adaptation to climate change; EcoDRR - ecosystem-based disaster risk reduction.

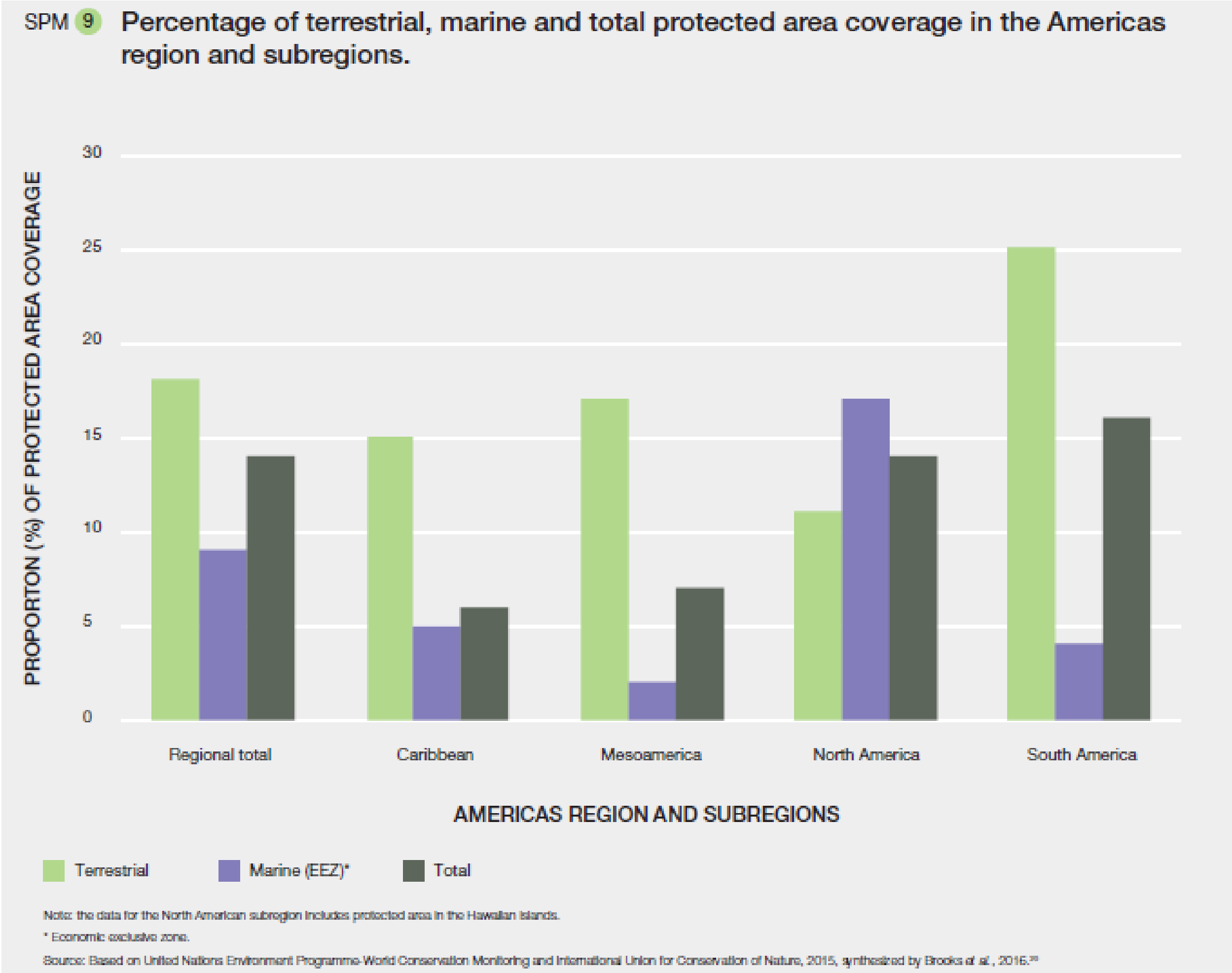
Source: Own representation.

Biodiversity conservation and sustainable use and governance processes related to nature's contributions to people are increasingly more inclusive. However, regardless of the degree of participation in governance, existing social and cultural inequalities can be reinforced by unequal power exercised by different participants within the governance processes when decisions are being made about nature and the use of nature's contributions to people (Table SPM.1) (*well established*). As the population in the Americas becomes increasingly urban, trade-offs between the livelihoods of primary users of nature's contributions to people (e.g., indigenous peoples and local communities and rural and coastal people) and secondary users (e.g., suburban and city dwellers) mean that decision-making power is likely to shift increasingly towards those who have a less direct relationship to nature's contributions to people for their livelihoods {2.3.5, 2.5, 4.3.1}. This can decrease the influence of management systems and locally adapted technologies developed by indigenous and local communities rooted in knowledge acquired through centuries of experience with agricultural production, domestication of plants, use of medicines, protection of soils, etc. (*established but incomplete*) {2.4, 5.6.3}. Such power inequalities can strongly influence the outcomes of discussions about trade-offs among nature's contributions to people or between biodiversity protection or use. The effectiveness of participatory governance systems can be enhanced with a number of enabling conditions (Table SPM.1), including building capacity among all stakeholder groups to engage in such processes and providing equal access to information relevant to the governance dialogue, in accordance with national legislation.

Within governance arrangements, several types of policy instruments are available. Measures to protect biodiversity in the Americas, including regulatory mechanisms, incentive mechanisms and rights-based approaches, have increased and diversified over the last 30 years (*well established*) {4.3.1, 6.4; Table SPM.1}. In addition to conservation and protected areas, spatial measures now include indigenous peoples and local communities' reserves, private conservation initiatives, and conservation measures in the managed landscapes matrix which incorporate biological corridors {2.2.8, 6.4.1}. However, protection efforts are unevenly distributed across subregions and among units of analysis, and large differences in protection efforts persist for terrestrial, freshwater and marine ecosystems {2.2.8, 3.4.1} (Figure SPM.9). Also, without adequate monitoring and enforcement, the effectiveness of such protection is questionable or low in many instances. The establishment of conservation areas has contributed to reducing the rate of deforestation in South American biomes, although anthropogenic fires, pollution from off-site activities and illegal logging, which are all recognized degradation drivers, were identified within these areas (*established but incomplete*) {6.4.1}. The causes of weak effectiveness of spatial protection measures, when it occurs, include poor selection or inappropriate configuration of sites to be protected, poorly designed management plans for the protected areas, inadequate resources or efforts for implementation and enforcement of the measures, and insufficient monitoring of the biodiversity to be protected, such that adaptive management cannot be applied (*established but incomplete*) {6.4.1}.

Figure SPM.9

Percentage of terrestrial, marine and total protected area coverage in the Americas region and subregions.



*Note: the data for the North American subregion includes protected area in the Hawaiian Islands. * Economic exclusive zone.*
Source: Based on United Nations Environment Programme-World Conservation Monitoring Centre and International Union for Conservation of Nature, 2015, synthesized by Brooks et al., 2016.[17]

Ecological restoration is having positive effects at local scales. Restoration has sped up ecosystem recovery significantly in the majority of cases considered, and improved the ability of such areas to provide nature's contributions to people (*established but incomplete*) {4.4.1, 5.3, 5.5}. However, restoration of ecosystems and species has high up-front costs and usually requires long periods of time {6.4.1.2}. Furthermore, full reversal of degradation, if possible at all, has not been demonstrated, and non-material contributions may not be restored for some people (*established but incomplete*). Also, restoration activities in some biomes, such as non-forest systems in the tropics and subtropics (especially wetlands, savannas and grasslands), are still rare, despite high rates of degradation and subsequent losses of nature's contributions to people. Sustainable use to avoid degradation is clearly preferable to restoration of degraded diversity and the corresponding reduction in nature's contributions to people {4.4.1}.

Protected and restored areas are relevant for maintaining options and increasing security in providing nature's contributions to people in the long term {6.4.1.1} and have an important role in conservation planning; however, they are likely to comprise a minority of the land and sea (*well established*). Diverse, more integrative strategies, from the holistic approaches of many indigenous peoples and local communities in the Americas {2.4} to the ecosystem-based approaches

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[17] United Nations Environment Programme-World Conservation Monitoring Centre and International Union for Conservation of Nature (2015). *Protected Planet: The World Database on Protected Areas* (WDPA). Cambridge, United Kingdom of Great Britain and Northern Ireland. Retrieved from www.protectedplanet.net.

T.M. Brooks, H.R. Akçakaya, N.D. Burgess, S.H. Butchart, C. Hilton-Taylor, M. Hoffmann, D. Juffe-Bignoli, N. Kingston, B. MacSharry, M. Parr, L. Perianin, E.C. Regan, A.S. Rodrigues, C. Rondinini, Y. Shennan-Farpon, and B.E. Young (2016). Analysing biodiversity and conservation knowledge products to support regional environmental assessments. Scientific Data, 3, [160007]. DOI: 10.1038/sdata.2016.7.

of sectoral management, are generally effective when appropriately implemented (Table SPM.1). Nature's contributions to people also can be greatly enhanced and secured within human-dominated landscapes, such as agricultural landscapes and cities, and strategies for making human-dominated landscapes supportive of biodiversity and nature's contributions to people are important. Such strategies could include multifunctional, diverse, heterogeneous landscapes, which contribute to the diversity of nature's contributions to people and allow for a better balance of different types of nature's contributions to people {2.2.13, 4.4.4}, and are effective means of maintaining options for access to many nature's contributions to people in the future (*established but incomplete*) {2.2.8}.

Mainstreaming conservation and sustainable use of biodiversity in productive sectors is extremely important for the enhancement of nature's contributions to people (*well established*). However, for most countries of the region, the environment has been mostly dealt with as a separate sector in national planning, and has not been effectively mainstreamed across development sectors {6.2}. Greater mainstreaming is occurring in many governments, but scope for substantially more progress has been identified in many reviews, including by the Conference of the Parties to the Convention on Biological Diversity at its thirteenth meeting in December 2016 (*well established*) {6.3.3}.

Policymaking is more likely to be effective in achieving conservation and development goals when it takes into account (i) trade-offs between both short- and long-term conservation and development goals and their effects on different beneficiaries, (ii) transboundary issues and (iii) leakage and spillover effects (*established but incomplete*). All biome types in the Americas face multiple pressures, and although cases of simultaneous improvements in biodiversity, nature's contributions to people and quality of life can be found, these instances are rare (*established but incomplete*) {5.4}. More commonly:

(a) Trade-offs are made that result in at least short-term losses in some aspects of biodiversity and nature's contributions to people, either in order to increase the amount or availability of other nature's contributions to people (e.g., commodity-oriented agriculture) or to pursue activities not directly dependent on nature or nature's contributions to people but nevertheless impacting nature (e.g., building transportation infrastructure). It is common for these trade-offs to be experienced in different ways by people with different world views and cultures, depending on their values {2.1.2, 2.7} (Figure SPM.8). This is true for all biomes or vegetation types in the Americas, as all biomes produce nature's contributions to people important to quality of life for local inhabitants of the areas under pressure, and often for much larger areas or globally.

(b) National governance processes and institutions to address sustainability of resource use and biodiversity conservation are challenged in several ways on both larger and smaller scales {4.3.1}. The root causes of some threats to biodiversity and nature's contributions to people, such as ocean acidification, plastic pollution in oceans and climate change, are inherently above the national scale {4.4.2, 4.4.3}. Efforts to address these successfully can include international collaborations that could improve the effectiveness of national and subnational plans, and, where institutional arrangements allow, transboundary governance of nature's contributions to people (*established but incomplete)* {6.4; Box 6.3}.

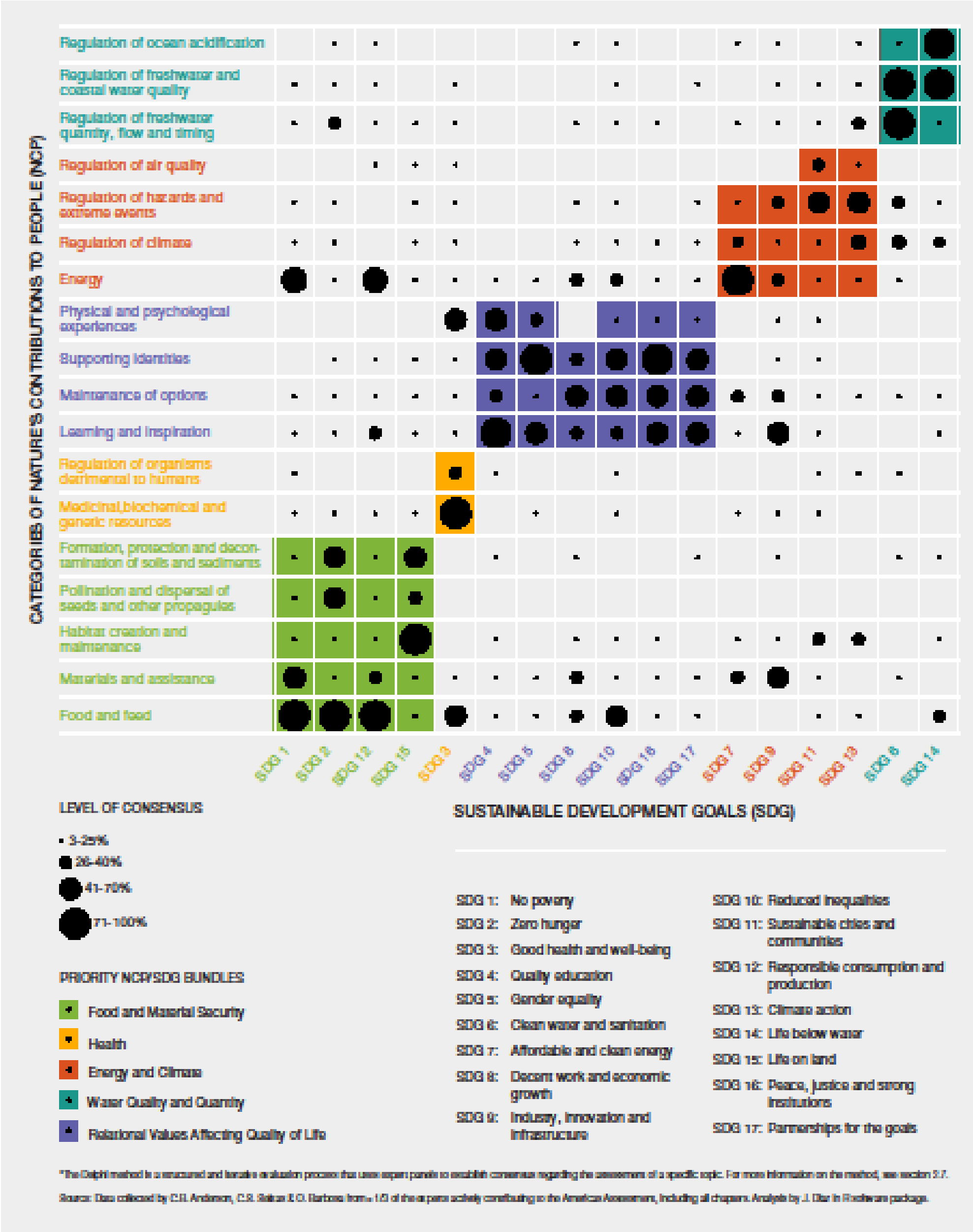
(c) Implementation of some policies can lead to adverse impacts (i.e. loss of biodiversity) in other regions, through leakage and spillover effects *(established but incomplete*). Therefore, it is critical to assess whether policies are likely to have negative impacts elsewhere. Causal interactions between distant places and leakage and spillover effects in many levels and scales across the region can be considered when implementing policies {4.3, 4.7, 5.4.7, 6.3.4}.

Effective implementation of public policies and instruments can address effective biodiversity conservation and provision for nature's contributions to people (*well established*). However, the increasingly broad arrays of policy instruments used by a range of actors to support the management of biodiversity and nature's contributions to people and to avoid or mitigate impacts on the different ecosystems have not added up to overall effectiveness at the national or subregional scales, although they are often effective locally (*established but incomplete*). Although policy development and adoption are important, there are other factors that must be addressed for effective biodiversity conservation and provision and maintenance of nature's contributions to people. Implementation of public policies is most effective with, inter alia, appropriate combinations of behavioural change {4.3.1, 5.4.7}, improved technologies {4.3.4, 5.4.7, 6.6.4}, effective governance arrangements {5.4.7, 6.3}, education and public awareness programmes {6.3.5, 6.4.1.1, 6.4.1.2}, scientific research {6.6.4}, monitoring and evaluation {6.4.1; Table 6.1; 6.4.2, 6.6.1, 6.7}, adequate finance arrangements {6.4.2.1}, and supporting documentation and capacity-building {6.6.4}.Addressing these factors to promote conservation and sustainable use of biodiversity and nature's contributions to people can be aided by enabling governance arrangements, including partnerships and participatory deliberative processes, and recognition of the rights of indigenous peoples, local communities and people in vulnerable situations, in accordance with national legislation. Effective implementation can also be facilitated when policies are perceived as presenting opportunities for stakeholders, including individuals, communities and the private sector, and not just imposing further limitations on their choices {6.3.1; Table 6.1}. Additionally, policymakers can use trade-off analyses and plural valuations to maximize both nature conservation and development {2.5.1, 2.7}. Bundles of nature's contributions to people can be prioritized in policy interventions to achieve specific Sustainable Development Goals related to health, food and material security, energy and climate, water quality and quantity, and relational values of nature (Figure SPM.10). The expert judgment of the authors suggests that while it is clear that some material nature's contributions to people are crucial to achieving a specific Sustainable Development Goal, it is also evident from the plurality of values involved in quality of life that non-material nature's contributions to people, such as learning and inspiration and maintenance of options, are also important {2.7; Table 2.25}.

Figure SPM.10

Bundles of Nature's Contributions to People (NCP) that are considered to be a priority for achieving Sustainable Development Goals (SDGs)

Bundles of nature's contributions to people that are a priority for achieving the Sustainable Development Goals. To identify the nature's contributions to people that potentially contribute the greatest amount to achievement of specific Sustainable Development Goals, expert opinions were elicited from the Americas assessment authors to determine the level of consensus regarding the three most important nature's contributions to people for each Sustainable Development Goals*. Statistical methods were then used to identify clusters with similar relationships between nature's contributions to people and Sustainable Development Goals. Blank cells indicate that no expert identified it as a priority, and the size of dots within cells illustrates the level of consensus among experts (% of respondents who prioritized a nature's contributions to people for a specific Sustainable Development Goals)..[18]



*The Delphi method is a structured and iterative evaluation process that uses expert panels to establish consensus regarding the assessment of a specific topic. For more information on the method, see section 2.7.

Source: Data collected by C.B. Anderson, C.S. Seixas & O. Barbosa from >1/3 of the experts actively contributing to the Americas Assessment in all the chapters. Analysis by J. Diaz in R software package.

[18] Data collected by C.B. Anderson, C.S. Seixas and O. Barbosa. Analysis by J. Diaz in R software package.

Knowledge gaps were identified in all chapters. The assessment was hampered by the limited information (a) on the impact of nature's contributions to people to quality of life , particularly because there is a mismatch between social data related to quality of life produced at the political scale and ecological data produced at a biome scale; (b) on non-material nature's contributions to people that contribute to quality of life; (c) for assessing the linkages between indirect and direct drivers and between the drivers and specific changes in biodiversity and nature's contributions to people; and (d) on the factors that affect the ability to generalize and scale the results of individual studies up or down (*well established*). Much biodiversity remains to be scientifically recorded for all types of ecosystems, particularly in the South American subregion and in the deep oceans in general. Short-term and long-term policy evaluation in the Americas is generally insufficient. This is most pronounced in Mesoamerica, South America and the Caribbean. Investments in generating new knowledge on these matters may better elucidate how human quality of life is highly dependent on a healthy natural environment, as well as how threats to natural environments affect quality of life in the short, median and long term.

Appendix I

Communication of the degree of confidence

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.A1). The evidence includes data, theory, models and expert judgement. Further details of the approach are documented in the note by the secretariat on the guide to the production and integration of assessments of the Platform (IPBES/6/INF/17).

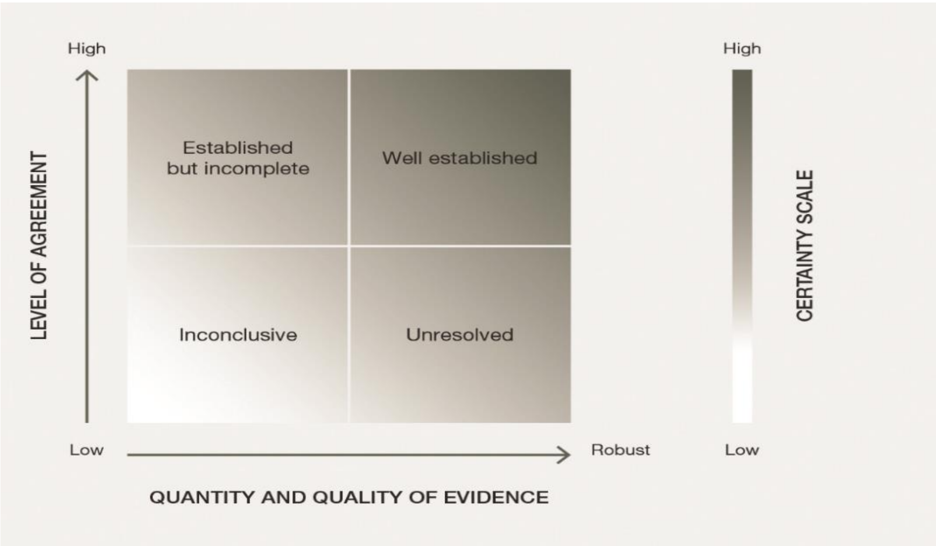
The summary terms to describe the evidence are:

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

Figure SPM.A1

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.[19]

[19] 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 from www.ipbes.net/sites/default/files/downloads/pdf/spm_deliverable_3a_pollination_20170222.pdf.

Appendix II

Nature's contributions to people

This appendix describes the evolving concept of nature's contributions to people and its relevance to these IPBES regional assessments.[20]

Nature's contributions to people are all the contributions, both positive and negative, of living nature (i.e., diversity of organisms, ecosystems and their associated ecological and evolutionary processes) to the quality of life of people. Beneficial contributions from nature include such things as food provision, water purification, flood control and artistic inspiration, whereas detrimental contributions include disease transmission and predation that damages people or their assets. Many of nature's contributions to people may be perceived as benefits or detriments depending on the cultural, temporal or spatial context.

The concept of nature's contributions to people is intended to broaden the scope of the widely-used ecosystem services framework by more extensively considering views held by other knowledge systems on human-nature interactions. It is not intended to replace the concept of ecosystem services. The concept of nature's contributions to people is intended to engage a wide range of social sciences and humanities through a more integrated cultural perspective on ecosystem services.

Ecosystem services has always included a cultural component. For example, the Millennium Assessment[21] defined four broad groups of ecosystem services:

- Supporting services (now part of "nature" in the IPBES Conceptual Framework)
- Provisioning services
- Regulating services
- Cultural services

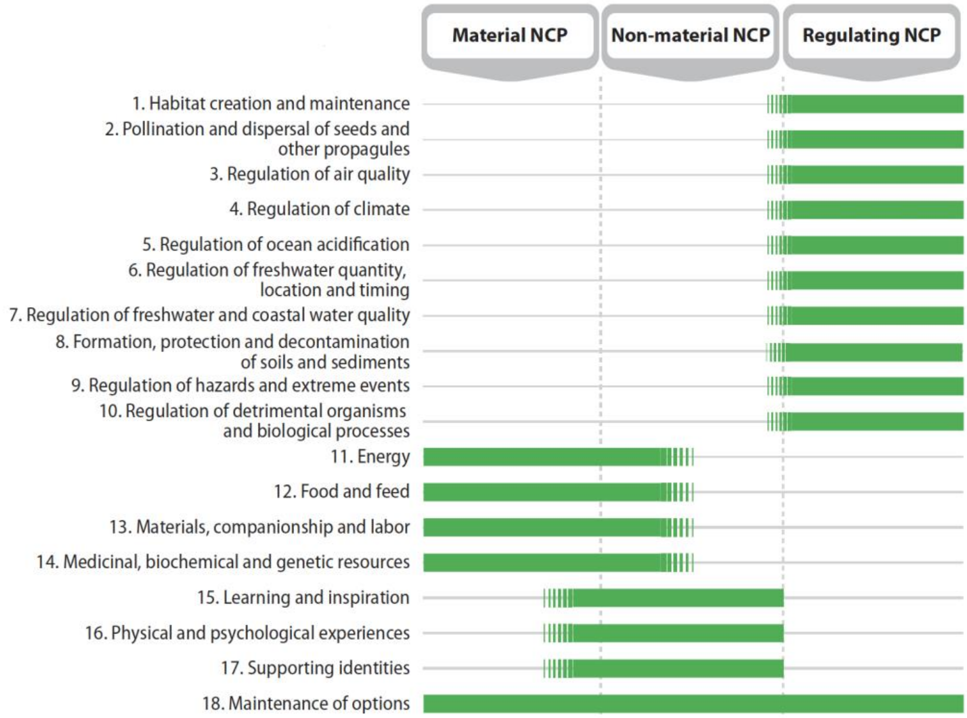
At the same time, there has been a long-standing debate in the ecosystem services science community, and in policy circles, about how to deal with culture. The social science community emphasizes that culture is the lens through which ecosystem services are perceived and valued. In addition, the groups of ecosystem services have tended to be discrete, while nature's contributions to people allow for a more fluid connection across the groups. For example, food production, traditionally considered to be a provisioning service, can now be categorized both as a material and a non-material contribution by nature to people. In many – but not all – societies, people's identities and social cohesion are strongly linked to growing, gathering, preparing and eating food together. It is thus the cultural context that determines whether food is a material contribution by nature to people, or one that is both material and non-material.

The concept of nature's contributions to people was developed to address the need to recognize the cultural and spiritual impacts of biodiversity, in ways that are not restricted to a discrete cultural ecosystem services category, but instead encompasses diverse world views of human-nature relations. Nature's contributions to people also make it possible to consider negative impacts or contributions, such as disease.

There are 18 categories of nature's contributions to people, many of which closely map onto classifications of ecosystem services especially for provisioning and regulating services. These 18 categories of nature's contributions to people are illustrated in Figure SPM.A2. The 18 categories fall into one or more of three broad groups of nature's contributions to people - regulating, material and non-material - as illustrated by the green bars.

[20] Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R.T., Molnár, Z., Hill, R., Chan, K.M.A., Baste, I.A., Brauman, K.A., Polasky, S., Church, A., Lonsdale, M., Larigauderie, A., Leadley, P.W., van Oudenhoven, A.P.E., van der Plaat, F., Schröter, M., Lavorel, S., Aumeeruddy-Thomas, Y., Bukvareva, E., Davies, K., Demissew, S., Erpul, G., Failler, P., Guerra, C.A., Hewitt, C.L., Keune, H., Lindley, S., Shirayama, Y., 2018. Assessing nature's contributions to people. Science 359, 270–272. https://doi.org/10.1126/science.aap8826

[21] Millennium Ecosystem Assessment (2005). Ecosystems and human well-being. (Island Press, Washington, D.C.).



Source: Díaz et al. (2018)[27]