

REGIONAL ASSESSMENT REPORT ON BIODIVERSITY AND ECOSYSTEM SERVICES FOR EUROPE AND CENTRAL ASIA							
Comments external review first order draft - Chapter 2							
Reviewer Name	Chapter	From Page	From Line	To Page	To Line	Comment	Response
Frank Wugt Larsen (EEA input)	General	General	0			General: our 'light' review has focused on relevant information hosted by the European Environment Agency (EEA) for which we believe a consultation by authors could improve the ECA report. We have also provided some specific comments to issues we spotted (please note that this has not been done systematically given the length of the report). In general, we will also refer to the EEA/ETC BD document 'Information note to IPBES secretariat on EEA and EU information' (http://bd.eionet.europa.eu/Reports/ETCBTechnicalWorkingpapers/PDF/Information_IPBES_on_EEA_EU.pdf), which was shared with the ECA TSU in 2015. Several reports provide a good starting point to find relevant information, incl. EEA, 2015 European environment — state and outlook 2015 (SOER 2015 (http://www.eea.europa.eu/soer/)), in particular, thematic briefings (http://www.eea.europa.eu/soer-2015/europe) and SOER synthesis (http://www.eea.europa.eu/soer/#tab-synthesis-report); EEA 2016. Mapping and assessing the condition of Europe's ecosystems. Progress and challenges (http://www.eea.europa.eu/publications/mapping-europes-ecosystems); EEA, 2015. State of Nature Report 2015 (http://www.eea.europa.eu/publications/state-of-nature-in-the-eu); EEA, 2015. State of Europe's Seas (http://www.eea.europa.eu/publications/state-of-europes-seas); EEA, 2016. European forest ecosystems – state and trends (http://www.eea.europa.eu/publications/european-forest-ecosystems). In general, the EEA website (http://www.eea.europa.eu) also provides access to a wealth of relevant indicators and assessments.	The ECA authors have been encouraged to use EEA reports as a resources, and we would like to thank the reviewer for providing the web links for these.
Frank Wugt Larsen (EEA input)	General	General	0			General: There seems to be quite some redundancy between the chapters. Additionally different data sources seem sometimes to be used in the redundant parts which may create more confusion than clarification leading to different partly biased messages. We assume the coherence and consistency of chapters will be dealt with in the next draft and haven't provided specific comments on this.	Agreed. We are aware of the overlap between chapters and this has been addressed in subsequent drafts
Frank Wugt Larsen (EEA input)	General	General	0			General: In general, there is a need to systematically check references in the chapters. References are cited in text but don't appear in reference lists, and references are missing in some graphs and in text etc. Specifically, EEA reports are not referenced consistently, e.g. sometime sit is EEA 2015, other times European Environment Agency 2015.	Agreed. The references were thoroughly checked in subsequent drafts and the author team has been encouraged to systematically use the Mendeley reference management software.
Thomas Brooks (IUCN)	General	0	0			Congratulations to the authors for all their hard work in producing this FOD.	Thank you
Thomas Brooks (IUCN)	General	0	0			If it would be useful to the authors for IUCN to disaggregate further the Red List data summarised for the ECA region and its component subregions by Brooks et al. (2016), please feel free to contact me accordingly. Examples of potentially useful disaggregation could include by marine/freshwater/terrestrial, by major systems (and sub-systems) aligned to the headings in Section 3.3.2, species groups aligned to the headings in Section 3.3.3, or drivers aligned to the headings in Section 4.3.	Thanks and these data have been made available to subsequent drafts of the ECA assessment
Thomas Brooks (IUCN)	General	0	0			IPBES follows the CBD definition of biodiversity, which encompasses diversity at genetic, species, and ecosystem levels. It is therefore redundant to say "biodiversity and ecosystems". Either replace with "genetic, species, and ecosystem diversity", or simply say "biodiversity". Same applies any other places this formulation is used throughout (eg Chapter 1 L146, L159, L164, L170, L788, L796; Chapter 2 L300, L1843-1844; Chapter 3 L461, L468, L472, L528, L635, L1018, L3305, L3307, L3317, L3323, L3340, L3738; Chapter 4 L265, L430, L4418; Chapter 5 L142-143, L144, L824, L846, L913, L1590, L1979, L1982, L1985).	The ECA assessment is based fundamentally on the IPBES conceptual framework. The conceptual framework refers to biodiversity and ecosystems in the 'Nature' box.
Douglas Nakashima	General	0	0			GENERAL: on incorporation of ILK as an actual source of knowledge: The way incorporation of ILK is recommended in the sections so far allows to address the question of indigenous and local people as a component of socio-ecological systems where humans and nature interact, where societies use nature, perceive it, invest it culturally etc... However, incorporation of ILK as an actual source of knowledge about biodiversity and ecosystems changes has not been fully developed in the FOD yet; although it is presented as a recommendation and announced in the 1st chapter. The involvement of indigenous and local people and ILK in scientific assessments and international organizations represents a political statement, and contributes to the recognition of indigenous people especially, as legitimate actors in decision making, in the context of natural resource management for example. However, incorporation of ILK is not only a political statement, but also represents a valuable source of knowledge. It is by taking seriously the value of this knowledge that incorporation of indigenous and local people can represent more than a superficial recognition. Published scientific literature represents a source of access to ILK. In this review, examples will be given of studies where ILK related to biodiversity and environmental change has been recorded. It can be factual qualitative observations made by local populations regarding components of the environment and the changes they observe, observations of the drivers of these changes, or narratives or stories embedded in personal history and local worldview illustrating the changes that occurred in the environment along one's lifetime or across generations. These observations can be added as a complementary source of information to scientific studies. They can corroborate scientific observations, but also complement them, contradict them, often operating at different time and space scales. It is to be noted that extraction of fragments of ILK to be incorporated to the different sections of such an assessment can be problematic, notably for the integrity of the knowledge which is outrooted from its context. (see comment line 8 of this table). SEE Nakashima & Roué 2002	Since the FOD, the author team has received the completed proceedings of the workshop with ILKP holders. Information within the proceedings has been included as much as possible within the SOD, although time constraints (the final workshop proceedings were only received 1 week before the SOD submission deadline) limited this task.
Douglas Nakashima	General	0	0			4.6.1.1. ECA in general Parrotta & Agnoletti 2007. (p1-2) "The holders and users of traditional knowledge in many parts of the world face significant challenges - continuing encroachment and/or expropriation of their lands, degradation of their forests, and the erosion of their cultures, values, and traditional lifestyles. In many developed societies, technological development, the abandonment of marginal lands, renaturalization, and inappropriate policies are rapidly erasing cultural values and contributing to the globalization of landscape, which are being simplified into areas either managed for commercial exploitation or left to natural succession." (p2) "This trend has been supported by the historical development of forestry, particularly in Europe. Since the early 19th century, the development of modern forestry promoted industrial plantations favoring species suited for timber production, as occurred in Europe with large-scale afforestation of conifers through artificial regeneration and producing even-aged forests. These ideas were spread throughout the world during the 19th century, largely through the colonial administrations of the European imperial powers. This process changed the features of many cultural forest landscapes created by traditional preindustrial societies, both in developed and developing countries. In the 1970s, forestry passed from a phase favoring almost exclusively economic aims, to one paying greater attention to the ecological roles of forests and the value of biodiversity. Unfortunately, the assessment of biodiversity has often neglected components arising from human influence, while monitoring and conservation have focused on "natural" species. The abandonment of traditional landscapes has reduced the diversity of forest management forms, creating simplified landscapes often with reduced biodiversity of habitats linked to land uses and related forest management practices."	Furthermore, the ECA assessment has established an ILP liaison group (Chaired by Zsolt Molnar) that is responsible for all aspects of ILKP within the assessment, including the SPM. We feel that this has improved the integration of ILKP within the SOD.
Germany	General		0			We believe that the regional ECA assessment generally has a comprehensive and scientifically sound structure: Status as well as trends are shown. It is however a first order draft and therefore, we hope that our comments will be useful for the further development and maturing of this regional assessment so that scientifically sound options for action can be derived. It needs to be critically highlighted in the first order draft that chapter 6 (Options for governance, institutional arrangements and private and public decision making across scales and sectors) refers to international organizations and treaties, thereby failing to discuss specific institutions and treaties, which are of relevance to Europe and Central Asia. As we are dealing with a regional assessment for Europe and Central Asia (ECA) we strongly encourage the authors of this assessment to assess regional organizations and treaties relevant to the ECA region so that useful options for actions can be derived for the potential user groups. Please also ensure that in the further development of this assessment key messages with their level of confidence/certainty are developed as outlined in the document IPBES/4/INF/9. Such key messages will be important to develop scientifically sound options for actions. We request the co-chairs of this assessment to ensure that the general comments listed here are made available to the CLAs and LAs of all 6 chapters. Reason: It is important that there is alignment in the use of terminology and structure of the document. In order to further strengthen the storyline throughout the 6 chapters we also encourage cross-referencing between the chapters so that information redundancies are avoided and the arguments are overall strengthened. We also strongly encourage the development of an appendix that lists all the acronyms and key terms (including their definitions) used in the ECA assessment and communicate these lists with the leaders of the other regional assessments to ensure that jointly, all 4 regional assessments can provide a solid basis for the global assessment (IPBES deliverable 2c) by using the same terms and definitions. We very much look forward to the second order draft of this important assessment.	Thanks you for your comments, which have been helpful for the ECA assessment. These comments have indeed been made available to all CLAs and LAs of each of the ECA assessment chapters. Ch6 deals with all relevant decisions makers including regional organisations and treaties. The standard use of terminology is being checked across chapters. The chapters will be cross-referenced and there will be a standard IPBES glossary and list of acronyms. Confidence language has been included for all key findings. However there are different traditions in using confidence language in the humanities and social sciences and this is why confidence language is not used in the key messages concerning for example options for governance. We will thereby avoid being prescriptive and instead provide a portfolio of governance option for decision-makers.
Germany	General		0			Please ensure that the general comments on the ECA assessment are provided to all CLAs and LAs! Reason: It is crucial that the chapters (a) use the same terminology; (b) don't provide redundant information and (c) don't contradict each other, and (d) provide a consistent chain of arguments and discussions.	This has been done.
Germany	General		0			New knowledge und publications should be used, if available. Some cited publications e.g. about the EU CAP (one from 2003) seem to be outdated	Citations have been fully checked and the latest available (up to April 2017) used in the assessment
Germany	General		0			Data and findings of the SoW-Report (The State of the World's Biodiversity for Food and Agriculture, http://www.fao.org/nr/cgrfa/biodiversity/sowbfa/en/) from FAO and report from the project "Preparatory Action on EU genetic resources" from COM (for more info: http://www.geneticresources.eu/) could provide some valuable information for this chapter. Both reports will be published soon. Please check both reports as soon as they become available.	This source of evidence has been checked
Germany	General		0			Often, statements are linked to "Europe" but actually only refer to "Western Europe" or the European Union. Please ensure to present a well-nuanced picture of the ECA-region and state very carefully which sub-regions are concerned (see definitions in Table 1.2, p. 19).	The use of terms to describe the sub-regions has been checked across the chapters
Zsolt Molnar	General		0			The Balkan is heavily underrepresented in all chapters.	We have attempted to achieve a geographic balance right across the assessment, within the constraints of availability of evidence in some locations.
Zsolt Molnar	General		0			Many-many important publications on ILK are not at all used and cited in the assessment (see the literature lists provided by the ILK Task Force, and the Proceedings volume of the ILK Dialogue workshop)	The ECA assessment ILKP liaison group has taken on responsibility for information chapter authors of relevant ILKP literature.
Ayman Batisha	General	1	1	105	4013	The entire report should be homogeneously arranged, logically build and fully integrated with no inconsistency, disharmony or overlapping within its chapters and sections. The titles of chapters and sections are generally too long to be professional, as a quick example "4.6 Status and recent trends in indirect drivers", the phrase "Status and recent trends in indirect drivers of" could be omitted in titles 4.6.1 to 4.6.5.	Consistency across chapters has been verified. Some chapters and sections have changed their names to be more precise.

Ayman Batisha	General	1	1	105	4013	There should be examples/chapter to clarify how the biogeochemical cycle (carbon, oxygen, nitrogen, phosphorus, sulfur, calcium, rock and water etc.) through both biotic (biosphere) and abiotic (atmosphere, hydrosphere, and lithosphere) compartments of Earth can cause land degradation and restoration. Special attention should be emphasized to the human-caused cycle of atrazine, which may affect certain species. Land degradation and restoration should be assessed in the light of Global Changes; Global Warming; Global Sea Level Rise, and Global Ocean. Land degradation and restoration should be assessed into two categories which operates at different time scales: the biological – physical, (Near-term) and the geological, (Long-term). Land restoration opportunities, planning, economics, implementation constraints, and limits should be defined.	The LDR assessment is dealing with land degradation issues and environmental pollution. ECA will take up this evidence where relevant with respect to biodiversity (in Ch3)
Ayman Batisha	General	1	1	105	4013	Research related to the Science of biodiversity and ecosystem services should be emphasized on. Assessment on biodiversity and ecosystem services generally deal with multiple meanings of fuzzy concepts, so it is strongly recommended to add chapter/section to provide General Guidance to the subject of how applying fuzzy concepts in the context of biodiversity and ecosystem services using soft computing techniques. The scope of soft computing covers the areas of Fuzzy Logic, Neural Networks, Chaos Theory, Evolutionary Computing, Rough Sets, Ant Colony, Immunological Computing, Particle Swarm, Wavelet, Probabilistic Computing, Hybrid Methods and other similar techniques to address real world complexities achieving tractability, robustness and low cost solution. The chapter may be devoted to effective approaches to Data Collection; dealing with Uncertainties; Methodological and efficient technique Choice; Time Series Consistency Identification of Key Categories, and Quality Assurance/Quality Control and Verification. The application areas of soft computing include but are not limited to Detection and Attribution of biodiversity and ecosystem services: from Global to Regional and local, biodiversity and ecosystem services Projections and Predictability (Near-term and Long-term), biodiversity and ecosystem services and its relevance for future Global and Climate Change. Detection and attribution of observed and multi-sector biodiversity and ecosystem services, emergent risks, key vulnerabilities, and opportunities should be addressed. Biodiversity and ecosystem services should be assessed in the light of statistical analysis and levels of confidence.	Literature on these topics has been assessed along with other sources of evidence in terms of how these methods contribute to understanding of biodiversity and ecosystems. Chapter 5 is concerned with the use of models supporting biodiversity and ecosystem knowledge.
Ayman Batisha	General	1	1	105	4013	Atlas of Continental, Regional and local biodiversity and ecosystem services Existing, Projections and Predictability should be annexed.	Sorry we do not understand this comment
Vânia Proença	Chapter 2	0	0	0	0	General comment: The chapter outline is well structured. However, (sub)sections show different levels of detail and should be made more homogeneous for the SOD.	We have worked towards more balanced SOD and re-structured accordingly
Vânia Proença	Chapter 2	0	0	0	0	General comment: The concept of ecosystem services integrates/relates with several other different concepts such as supply, demand, use, other capital inputs, etc. These concepts should be introduced in section 1 and applied in the remaining chapter, in particular in section 2 when introducing the indicators used to assess ecosystem services.	This is addressed in section 2.1.2 and also in table 2.1
Vânia Proença	Chapter 2	0	0	0	0	General comment: the format of references in the text should be checked and, where needed, corrected (see for example, line 360, line 582)	Thanks. The references are now in the right format but there will be further references to be included in the final order draft
Marcus Zisenis	Chapter 2	General	0			Is this chapter developed and structured according to Chapter 1, in particular Figures 1.2 and 1.3, or what is the systematic behind it?	Section 2.1.1 aims to provide a conceptual discussion that is consistent with material in chapter 1
Marcus Zisenis	Chapter 2	General	0			For taking action after the regional biodiversity assessment, it seems to be better to use a clearly structured assessment scheme such as the DPSIR by the European Environment Agency (http://ia2dec.pbe.eea.europa.eu/knowledge_base/Frameworks/doc101182). Rather putting together known knowledge from other sources, there should be an analysis of the current impacts on biodiversity in this region and which concrete targets for politicians could be included to improve the different values of biodiversity. Thereby, the text could be substantially shortened for better reading and structuring.	The whole IPBES CF relies on DPSIR approach and we will use an indicator system based on DPSIR
Sophie Condé	Chapter 2	General	0			Additional reference: Mapping and Assessment of Ecosystems and their Services - Urban ecosystems 4th Report. http://catalogue.biodiversity.europa.eu/uploads/document/file/1340/MAES_report_on_urban_ecosystems.pdf	thanks for the reference
Frank Wugt Larsen (IEA input)	Chapter 2	General	0			General: EEA reports on green infrastructure might be useful here, e.g. EEA 2015. Exploring nature-based solutions – The role of green infrastructure in mitigating the impacts of weather- and climate change-related natural hazards; EEA 2014. Spatial analysis of green infrastructure in Europe	thanks for the reference
PESC-3	Chapter 2	General	0			geographical gaps in the conclusions should be made explicit (wich countries are present, which are not)	Our synthetic sections such as section 2.2.5 clearly highlight the major geographical gaps in knowledge and these are also made clear in key tables such as Table 2.63 that provides an assessment of each NCP by ECA sub-regions.
PESC-3	Chapter 2	General	0			classification of uncertainties in the information is missing	We find a new CA expert in marine systems, Axel to go through chapter 3 to gain inconsistency, Esra will work in non-material benefits and values, and Berta revise the ILK database for including marine systems
PESC-3	Chapter 2	General	0			there are studies in Turkey showing the changes in the distribution of forest species to climate change → results can be provided if requested	Thanks
PESC-3	Chapter 2	General	0			„ruimte voor rivier” programm or discussion to re-open the dutch delta are examples for nature-based solutions in the Netherlands	thanks fro the example
PESC-3	Chapter 2	General	0			cultural ES are well covered	Thanks!
PESC-3	Chapter 2	General	0			coastal areas and deltas of rivers should be included (exclusive economic zones)	Coastal areas and deltas are now discussed under number of NCPs see for example 2.2.1.1.1 nurseries, 2.2.1.6 coastal water quality, 2.2.1.8 regulation of hazards, 2.2.1.8.6 coastal erosion and inundation mitigation
PESC-3	Chapter 2	General	0			part on the aarhus convention is very weak → there are many examples in ECA how the convention is implemented (due to time no detailed discussion in the subgroup)	The Aarhus convention is now discussed in more detail in section 2.3.4.3.2
PESC-3	Chapter 2	General	0			good overview about the equity discussion, but not specific enough for the ECA region → 1) more concrete examples and more concrete considerations for ECA would be good; 2) might be good to provide these general considerations to the authors of the other regional assessments, so that they can generate concrete considerations for their regions	included ECA relevant publications under health and procedural equity
PESC-3	Chapter 2	General	0			Imbalance between importance of services: provisioning, regulating and cultural. Regulating services is the most important part, needs more emphasis.	SOD is much more balanced
PESC-3	Chapter 2	General	0			How to use literature and data not available in English?	We did through incorporating new CAs in the chapter and through the workshop of Central, eastern Europe experts
PESC-3	Chapter 2	General	0			No authors from central asia in chapter 2	There are some CA authors from Central Asia
PESC-3	Chapter 2	General	0			Text is not talking about disservices, it would be good to mention it.	Mentioned under health, though not in this wording. We also include them in the equity part, e.g. human-wildlife conflicts
PESC-3	Chapter 2	General	0			UNCCD is not mentioned and the link between ecosystem services and land degradation neutrality should be made	land degradation and the links to ecosystem services are discussed in section 2.2.2.1.1 on woodfuel and the section on the food water energy nexus 2.3.4.1 and land degradation is mentioned in the executive summary
PESC-3	Chapter 2	General	0			There is few information about Turkey, Central Asia, Russia. Even if there is less information available the gaps should be made clear and reflected in the text.	We have recruited new Cas for these areas who have provided considerable additional material on Turkey Central asia and Russia which is in the text. Our synthetic sections such as section 2.2.5 clearly highlight the major geographical gaps in knowledge for these areas and these are also made clear in key synthetic tables such as Table 2.63
PESC-3	Chapter 2	General	0			There is partial information on Turkey about mapping and valuation of ecosystem services that should be incorporated	There are now over 20 mentions of Turkey in the chapter and 49 references included to material that discusses Turkey
PESC-3	Chapter 2	General	0			How can information from Russia and central asia be combined with European countries, there are different units of analysis	Russian data has been added separately and some indicators to be included in the SOD should be for similar units of analysis
PESC-3	Chapter 2	General	0			How are TEEB reports from countries used?	we will discuss this with the ECA team as it is a general issue like NEAs
PESC-3	Chapter 2	General	0			Artificial water bodies are increasing and their dynamics are different from natural freshwater ecosystems and this should be made explicit in the text.	Section 2.2.1.6 on the regulation of freshwater and coastal quality discusses artificial groundwater recharge of aquifers and artificial wetlands
PESC-3	Chapter 2	General	0			Marine ecosystems are not well represented	We find a new CA expert in marine systems, Axel to go through chapter 3 to gain inconsistency, Esra will work in non-material benefits and values, and Berta revise the ILK database for including marine systems
PESC-3	Chapter 2	General	0			For each section it would be useful to explicitly mention which subregions/countries are covered and what is missing	This is addressed in our synthetic sections such as section 2.2.5 clearly highlight the major geographical gaps in knowledge and these are also made clear in key tables such as Table 2.63 that provides an assessment of each NCP by ECA sub-regions.
PESC-3	Chapter 2	General	0			UNCCD is very strong in Turkey and FAO can provide information about soil erosion, wind erosion	OK thanks. Data on Turkey is present in FAO ITPS report and this was cited
PESC-3	Chapter 2	0	0			could you clarify the difference between 2.2 and 2.3, and the aim of 2.4?	The introductions to sections 2.2, 2.3 and 2.4 now make clear how they differ and chapter 1 also explains the differences in chapter 2 sections
Germany	Chapter 2	general comment	0			All regional assessments should follow the same definitions and e.g. classifications of ecosystem services. These aspects are important for the comparability of the result, especially since they all provide input for the IPBES global assessment. Please ensure this is the case by cross checking with the other reg. assessments.	Something fixed by the new doc of NBP
Germany	Chapter 2	general comment	0			Some information is quite old, particularly for Central Asia. Does this have implications on the findings in this chapter? If so, it should be mentioned.	We have recruited new Cas for central Asia who have provided considerable additional and more up to date material which is in the text. Our synthetic sections such as section 2.2.5 clearly highlight the major geographical gaps in knowledge for central asia and these are also made clear in key synthetic tables such as Table 2.63
Germany	Chapter 2	general comment	0			In some sections there seems to be a stronger focus on information for the EU. If possible, please try to be more balanced or highlight those gaps (if no information is available for sub-regions) as is already done in many subsections.	We have tried to make the chapter more geographically balanced and recruited new Cas who have provided considerable additional material on Turkey Central asia and Russia which is in the text. Our synthetic sections such as section 2.2.5 clearly highlight the major geographical gaps in knowledge for non EU areas and these are also made clear in key synthetic tables such as Table 2.63
Germany	Chapter 2	general comment	0			The chapter would benefit from a stronger focus on biodiversity.	This is the focus of chapter 3.

Germany	Chapter 2	general comment	0			Sections addressing general aspects that are of (the same) importance to all reg. assessments - like e.g. what are the different value categories and types, "Addressing equity in the assessment (section 2.4, p. 86, lines 2257-p. 97 I. 2647) contain information that is often more of general than of region-specific nature. Please minimize the general reviews of these concepts and ensure there consistency across the reg. assessments. This would help to focus on the region-specific findings regarding those values and equity aspects and allow readers to better capture their differences between regions.	We have removed some of this material. Chapter 1 now includes the general framing of values and chapter 1 lead authors are now working on ensuring values are discussed systematically throughout ECA chapters	
Tom Breeze	Chapter 2		1	0		I appreciate that a lot of the chapter is in flux but it still feels very unfocused. In the early parts of the report, there's a lot of information from larger databases but then very little from the wider body of available data. There's a lot of mentions of the general trends in things but little information on why they are changing (for the purpose of this review I'll query them as and when they appear but understand if they need to be explained further in Chapter 3). But mostly, this chapter doesn't actually cover the benefits of ecosystem services (economically or otherwise) - in many places it's assumed that what a service's benefits are is obvious but in reality this isn't the case and should definitely be expanded on. The structure is also very off: the discussion on value types and value metrics should come first then the benefits can be examined in all dimensions afterwards, simply putting in that you will do a systematic review of economic values isn't helpful because those values need to be embedded next to the services themselves to have any meaning.	We really appreciate this comment, but we follow the SCOPING FOR A REGIONAL ASSESSMENT ON BIODIVERSITY AND ECOSYSTEM SERVICES FOR EUROPE AND CENTRAL ASIA (Decision IPBES-3/1 Annex VII (advance version)). Regarding datasets, we have considerably expanded the information used from both literature review and indicator-based sources. We have also ensured that the discussion of each NCP in section 2.2 focuses on the benefits the NCP to humans.	
Tom Breeze	Chapter 2		1	0		At present, no estimates of the economic benefits of any ecosystem services are mentioned in most of the chapter. This is very easy for Crops and aquatic food as there are plenty of price databases (FAO, Eurostat) and information on the importance of agriculture to GDP and employment (World Bank). Tables of current quantities and values would be useful for each section so that readers can see what (if any) information is available for their country. I appreciate that the authors have decided to do a simple review of this in the middle of the chapter but as economic estimates are a core component of benefits as we understand them (for now, until other metrics become more advanced) then it's not enough to relegate them to a few paragraphs when policymakers and their support staff will be looking for these figures throughout the assessment.	Section 2.3.5 now provides material on this issue and more material is integrated in the discussion of NCPs in section 2.2, such as on pollination. We have appointed a new LA to work specifically on monetary valuation and they will develop material will be incorporated into section 2.3.5 along side the discussion of non-monetary values.	
Tom Breeze	Chapter 2		1	0		There should be a consensus on the use of chemical vs common names for compounds (I would advise common names).	We change the summary of the chapter	
Tom Breeze	Chapter 2		1	0		Although this needs to be accessible, I think it's important to introduce, in as concise and jargon lite way as possible, some of the core concepts in this part of the chapter. Stocks and Flows should definitely be mentioned as they are key to understanding the relation between available resources/services and benefits. The examples the authors give for timber and fuel for instance is a prime example of multiple benefit flows from a single, tangible, stock of natural capital. Finally, understanding the relation between these factors is a major unknown for many services (and market data is severely limited for others) and underpins a lot of economic evaluations of services.	Table 2.1 has been included and sets out the components of each NCP that are addressed .	
Tom Breeze	Chapter 2		1	0		Despite the many, often pedantic things I am about to say, I do believe that with a bit more focus, this will be an excellent and comprehensive chapter. I am very encouraged by the depth of literature reviewed in many parts of the document (although this starts out weaker), and believe there is the potential for a number of research papers to emerge from this report by broadening the discussion beyond what is appropriate for this technical report.	Many thanks for your comment	
Patricia Balvanera	Chapter 2		0	0	0	I really like the framing of the chapter and the chapter in general. It is well put into context and is highly consistent with the IPBES framework and the IPBES values guide. It is very encompassing and when all the sections in process are finished it will be highly relevant. Maybe a roadmap of the chapter and its links to the IPBES conceptual framework, values guide and other relevant IPBES documents would be helpful in the introduction. The text would benefit from a revision towards mainstreaming the main messages for each of the sections and subsections and paragraphs and in the later sections a more explicit link to nature and nature's benefits. More emphasis might be needed on the level of certainty or the amount of information available for each topic.	Thanks for this comment which we have sought to address in section 2.1. Chapter 1 also now provides a more fully developed contextual discussion	
Olivia Barrantes	Chapter 2	Whole	0			Unbalanced positively to soils state of the art very much, negatively to agroecosystems in general	We do not understand this comment, sorry! Agroecosystems should be further explained in chapter 3. But the discussion of different NCPs is not much more balanced due to the incorporation of new material	
Olivia Barrantes	Chapter 2	Whole	0			I missed biological invasions be addressed, to link to Chapter3 assessments	This is the focus of chapter 4, but it has been briefly discussed in Health section.	
Germany	Chapter 2	general comment	0			Most statements are not associated with quantitative likelihood statements nor qualitative confidence levels as outlined in Chapter 1, section 1.6.1. A coherent and adequate treatment of uncertainty is essential for the credibility of the assessment and, finally, the integrity of the IPBES. We strongly encourage you to look into the use of confidence terms used by the IPBES as outlined in IPBES/4/INF/9 pages 60-65.	Section 2.5 discusses knowledge gaps and confidence but also includes place holders where we feel further work is required for the final order draft. Also in appendix 2.7.1 we explain we are developing an integrated spreadsheet for the final draft that will provide confidence levels based on the literature review.	
Inge Liekens	Chapter 2	general	0			I miss a part explicitly mentioning knowledge gaps	see section 2.5	
Heikki Hokkanen	Chapter 2		1	1	145	3829	General comment 1: I believe that too little emphasis is given on the direct effects of nature and biodiversity to human health. The topic is mentioned here and there, but not even mentioning one of the most exciting findings in recent years, see two references under 'Author Annotations', Hanski et al. 2012, and Hanski 2014. This type of 'ecosystem service' does not easily fall into the common typology of ESS, and is therefore likely usually overlooked. IPBES should not overlook it. Ref: Hanski, I, et al. Environmental biodiversity, human microbiota, and allergy are interrelated. Proc Natl Acad Sci USA. 2012;109(21):8334-8339. http://dx.doi.org/10.1073/pnas.1205624109	The relation with the human microbiome is mentioned.
Heikki Hokkanen	Chapter 2		1	1	145	3829	General comment 2: unfortunately those two parts of text, which would best fall under my specific expertise, i.e. biological control and pollination services, have not been written yet and are not included in the current draft version. If there is a possibility to provide review-comments on those parts in the future, when the texts are ready, I would be willing to provide those. Ref: Hanski, I. 2014. Biodiversity, microbes and human well-being. Ethics Sci Environ Polit 14: 19-25. doi:10.3354/ese000150	This NBP is now completed with the kind contribution of Simon Pot. Thanks for the proposal of revision (MG)
Tom West	Chapter 2		2	38	2	44	These subheadings don't seem to be at the same 'level'. Health and security are instrumental values that nature provides. And under security, water and food are discussed, which are clearly related to health too. Overcoming this problems requires clarity being achieved over the different 'valuational' terms employed by the Report - see other comments to chapters 1 and 2.	We re-structure the chapter according to the taxonomy of values provided by the guide regarding diverse conceptualization of 3 multiple values of nature and its benefits (deliverable 3 (d))
Werner Rolf	Chapter 2		5	76	7	198	The summary chapters has not been looked in detail, as it still seems very immature.	The executive summary has been developed
Olivia Barrantes	Chapter 2		5	76	7	198	I missed the present state of knowledge, "Well established, Well but incomplete, Unresolved..."	In the new version, this is included.
Olivia Barrantes	Chapter 2		5	76	7	198	I missed challenging knowledge gaps in this Summary	In the new version, Knowledge gaps are included.
Germany	Chapter 2		5	77	7	198	Executive summary is only a compilation of some findings. Here we do not comment yet and wait for the SOD with a core elaborated executive summary	New in the SOD
Tom West	Chapter 2		5	79	5	80	Appreciate the summary is not complete, but would be good to have an idea of what methodological approaches have been taken at this stage. Eg have monetary values been calculated, or has physical measurement been used?	We remove anything that relates with methods in the executive summary
Olivia Barrantes	Chapter 2		5	83	8	97	I missed food and feed production, especially cereals, crops for biofuel, genetic erosion of domestic animals and plants...synthesis. In order to link with the analysis in Chapter 3	New in the SOD
Werner Rolf	Chapter 2		5	103	5	103	Can a conclusion be summarised containing the effect of EU Water Framework Directive (2000/60/EC) across Europe?	This is a comment for chapter 5 not chapter 2
Mark Snethlage	Chapter 2		5	103	5	103	But water quality of rivers in the EU improved since the 1990ies EEA, 2015. Freshwater quality - European briefing, State of Europe's Environment Report 2015. Copenhagen, Denmark. http://www.eea.europa.eu/soer-2015/europe/freshwater .	section 2.2.1.6 considers trends of water quality and it is will be distinguished from the water quality regulation which has declined in some parts of ECA
Maximilian Weigend	Chapter 2		5	103	5	106	The broad time-frame glosses over the deterioration until the 90ies and subsequent improvement, giving an incorrect impression of the efficiency of the last decades conservation efforts	section 2.2.1.6 generally and line 891 specifically highlight The change of trends of water quality and compares them to NCP trends
Germany	Chapter 2		5	103	5	106	The broad time-frame glosses over the deterioration until the 90ies and subsequent improvement, giving an incorrect impression of the efficiency of the last decades conservation efforts	section 2.2.1.6 generally and line 891 specifically highlight The change of trends of water quality and compares them to NCP trends
Mark Snethlage	Chapter 2		5	108	5	108	Storage of CO2 and other greenhouse gases in living and dead organic matter?	Yes, storage of CO2 as carbon takes place in both living and dead organic matter
Maximilian Weigend	Chapter 2		5	114	5	115	the wording leaves open whether this is a possible scenario or a know fact for the past decades (I suspect the latter). Especially in executive summary the wording should be unequivocal	More work on future trends and scenarios is being undertaken in conjunction with chapter 5 as specific literature searches have been required in addition to those already undertaken. Currently 2.2.6 presents the analysis to date on future trends.
Germany	Chapter 2		5	114	5	115	the wording leaves open whether this is a possible scenario or a known fact for the past decades. Especially in executive summary the wording should be unequivocal	More work on future trends and scenarios is being undertaken in conjunction with chapter 5 as specific literature searches have been required in addition to those already undertaken. Currently 2.2.6 presents the analysis to date on future trends.
Maximilian Weigend	Chapter 2		6	122	6	123	here and everywhere else forest is simply an area with woody plants and this does not reflect the differences between a natural, zonal forest and a pine plantation. For purposes of biodiversity the difference is gigantic, for purposes of (some) ecosystem services it is secondary. This is overlooked throughout the entire assessment.	As this chapter focuses on NBP then we think secondary; but when relevant we have mentioned such as air quality.
Germany	Chapter 2		6	122	6	123	here and in other parts of the assessment forest is considered simply as an area with woody plants. But this does not reflect the differences between a natural, zonal forest and a pine plantation. For purposes of biodiversity the difference is gigantic, for purposes of (some) ecosystem services it is secondary. This is overlooked throughout the entire assessment.	The Units of Analysis, where biomes and ecosystems are defined are discussed in chapters 1 and 3 along with data on biodiversity for the units of analysis. The terminology used in the is chapter follows these units of analysis but may need a final edit for the final draft to ensure consistent with chapter 1 and 3
Roger Keller	Chapter 2		6	128	7	163	Now it's limited to "recreation" and "food gathering" (and a little bit of "spiritual"). It is important to add "identity" and other cultural ecosystem services as well (once the respective chapters are written).	In the SOD it is covered.
Vânia Proença	Chapter 2		6	129	6	130	Revise sentence, there is no link between the trends in outdoor recreation and the trends in ILK and linguistic diversity, therefore they shouldn't be contrasted	In the SOD, it is corrected
Roger Keller	Chapter 2		6	131	6	133	The link between "nature-based recreation" in line 133 and "low human impacts" in line 133 is not obvious. In my opinion the two sentences should be separated.	In the SOD, it is corrected
Vânia Proença	Chapter 2		6	131	6	133	Revise paragraph. Not clear how human impacts (which impacts) relate to nature-based recreation.	In the SOD, impacts are described
Maximilian Weigend	Chapter 2		6	131	6	133	"nature based recreation" ist obviously restricted to more urbanized societies, other societies spend more time in nature, but they don't book it from the travel agency. The second sentence, albeit certainly right, has no connection to the first.	In the SOD, we focus on distinguishing more between rural and urban societies
Germany	Chapter 2		6	131	6	133	"nature based recreation" is obviously restricted to more urbanized societies, other societies spend more time in nature, but they don't book it from the travel agency. The second sentence, albeit certainly right, has no connection to the first.	We have changed the whole executive summary in order to apply the guidelines given to us
Tom West	Chapter 2		6	132	6	133	What do low human impacts have to do with recreation? Is there a link here? Should we understand that Scandinavia and Russia and Central Asia have less nature-based recreation?	Now clarified in section 2.2.3.2
Mark Snethlage	Chapter 2		6	132	6	133	What kind of low human impacts and on what? Is this observation related to recreation and tourism?	Now clarified in section 2.2.3.2
Tom West	Chapter 2		6	134	6	134	What is the definition of 'protected areas'?	ECA wide data uses global definitions se Balmford et al. - references to country level studies rely on country level definitions. This will be clarified further in an appendices for the final draft

Tom West	Chapter 2	6	138	6	138	Are recreational benefits always 'marketed'? Surely the point of stated/revealed preference models is because there is no market for these services	We have adjusted this to acknowledge recreational goods can be market and non market goods. Section 2.3.5 now provides material on this issue. We have appointed a new LA to work specifically on monetary valuation and they will develop material will be incorporated into section 2.3.5 along side the discussion of non-monetary values.
Maximilian Weigend	Chapter 2	6	139	6	142	Here a hunting for food and as recreation - or part of the cultural identity - should be clearly differentiated from hunting as ecosystem management, especially in WE	Hunting is discussed in section 2.2.3.2 under experience as both recreation and culture
Germany	Chapter 2	6	139	6	142	Here hunting for food and as recreation - or part of the cultural identity - should be clearly differentiated from hunting as ecosystem management strategy, especially in WE	Hunting is discussed in section 2.2.3.2 under experience as both recreation and culture
Maximilian Weigend	Chapter 2	6	143	6	145	This statement is only broadly correct. While there is not much literature on this, I have yet to visit the European country where mushroom collecting and the gathering of wild plants is not part of the local culture - if you discount the urbanized regions. We are dealing with a likely decrease and mainly a complete absence of detailed data, since these activities are nowhere captured in official statistics	This is clarified in more detail in section 2.2.3.2 under experience as a non material NCP and in section 2.2.2.1 as a material NCP under food and feed. See page 92 for details on mushroom gathering
Germany	Chapter 2	6	143	6	145	This statement is only broadly correct. While there is not much literature on this, also in the European countries mushroom collecting and the gathering of wild plants is part of the local culture - if you discount the urbanized regions. We are dealing with a likely decrease and mainly a complete absence of detailed data, since these activities are not captured in official statistics.	This is clarified in more detail in section 2.2.3.2 under experience as a non material NCP and in section 2.2.2.1 as a material NCP under food and feed
Marianne Penker	Chapter 2	6	149		149	The increase of knowledge might be debatable, thinking of the growing share of population living in cities, the knowledge lost on producing food and other ecological processes.	This is discussed in section 2.2.3.1 but further literature review is on going on this topic
Maximilian Weigend	Chapter 2	7	159	7	159	This statement is entirely unsupported and stems from the observation of the co-occurrence of language diversity and biodiversity in some of the same regions (like storks and the birth rate). Similar mechanisms shape cultural evolution and biological evolution - leading to sometimes spatially co-incident patterns.	This is now discussed in more detail in section 2.2.3.1.2 on local ecological knowledge and ILK where the relationship between ILK and linguistic diversity is considered along with the role of linguistic diversity as an indicator for the Biodiversity Indicators Partnership.
Germany	Chapter 2	7	159	7	159	This statement is unsupported here and stems from the observation of the co-occurrence of language diversity and biodiversity in some of the same regions (like storks and the birth rate). Similar mechanisms shape cultural evolution and biological evolution - leading to sometimes spatially co-incident patterns.	This is now discussed in more detail in section 2.2.3.1.2 on local ecological knowledge and ILK where the relationship between ILK and linguistic diversity is considered along with the role of linguistic diversity as an indicator for the Biodiversity Indicators Partnership.
Tom West	Chapter 2	7	160	7	160	12% of languages are extinct compared to when?	Not reported in the original source.
Maximilian Weigend	Chapter 2	7	164	7	168	the ecological footprint is very unevenly distributed across ECA and this needs to be mentioned very clearly	This is now discussed in more depth in section 2.2.4.1 on interregional flows of NCPs
Germany	Chapter 2	7	164	7	168	the ecological footprint is very unevenly distributed across ECA and this needs to be mentioned very clearly	This is now discussed in more depth in section 2.2.4.1 on interregional flows of NCPs
Maximilian Weigend	Chapter 2	7	172	7	180	the header is "future trends in ecosystem services", but then only the effects of climate change are mentioned. Either adjust header or content	awaiting new content from further literature searches and from chapter 5
Germany	Chapter 2	7	172	7	180	the header is "future trends in ecosystem services", but then only the effects of climate change are mentioned. Either adjust header or content by expanding your discussion.	awaiting new content from further literature searches and from chapter 6
Olivia Barrantes	Chapter 2	7	173	7	173	Meat (from livestock) is a type of food. Better "with food and fibre production", "with food, livestock and fibre production"	In the SOD this is fixed
Marianne Penker	Chapter 2	7	174		174	Decrease in food, fibre and livestock production might be rather caused by globalisation and increasing food imports (due to high labour and land costs in Western Europe).	for discussion in chapter 4 on drivers
Maximilian Weigend	Chapter 2	7	182	7	184	there are only two mentions of "population growth" in the entire document, nowhere is a projection provided that and to what extent population is expected to grow and - if so - if across ECA or in specific regions	for discussion in chapter 4 on drivers
Germany	Chapter 2	7	182	7	184	there are only two mentions of "population growth" in the entire document, nowhere is a projection provided that and to what extent population is expected to grow and - if so - if across ECA or in specific regions. Please expand your discussion and link the discussions on "Population growth" with chapter 4, p. 61, l. 1649ff).	for discussion in chapter 4 on drivers
Olivia Barrantes	Chapter 2	7	184	7	184	Diet changes in Central Asia, towards more animal products demand (higher feeds demand). Higher food quality demand in Western Europe, compatible with low intensity and organic farming systems	for discussion in chapter 4 on drivers
Maximilian Weigend	Chapter 2	7	185	7	186	If there are any countries, that will not face major challenges, then this should be spelt out. I can't think of any.,	this has been edited to refer to many challenges in particular locations
Germany	Chapter 2	7	185	7	186	If there are any countries, that will not face major challenges, then this should be spelt out.	this has been edited to refer to many challenges in particular locations
Marianne Penker	Chapter 2	7	190		191	Biodiversity and quality of ecosystems in urban areas are not mentioned (beehives, urban gardening, urban agriculture...)	Now, there are more sections addressing urban areas
Maximilian Weigend	Chapter 2	7	190	7	191	needs a qualifying statement "independent of other variables such as income etc.", otherwise I assume that we are talking about the wealthy residential areas....	these issues are now addressed in section 2.3.4 on environmental justice see for example page 154 on access to spaces
Germany	Chapter 2	7	190	7	191	Needs a qualifying statement "independent of other variables such as income etc.", otherwise presumably we are talking about the wealthy residential areas....	these issues are now addressed in section 2.3.4 on environmental justice see for example page 154 on access to spaces
Tom West	Chapter 2	7	197	7	197	Why use the technical economic term 'natural capital'? Surely what it means here is natural systems, since it is not only the economic manifestation of nature (ie natural capital) that must be passed on. Consider the difference between 'Nature' and 'Nature's benefits to people' in the IPBES Conceptual Framework.	This is now covered in new NBP conceptual framework produced by Sandra Diaz and so will be discussed in chapter 1
Maximilian Weigend	Chapter 2	7	197	7	198	strange place for such a mission statement	Removed
Germany	Chapter 2	7	197	7	198	Please consider, whether this is an appropriate place in the document for such a mission statement	Removed
Roger Keller	Chapter 2	9	206	9	210	I strongly support this.	thanks
Tom West	Chapter 2	10	215	11	284	Would be good to have an overview of the different types of valuation considered as well as the different types of benefits and different actors considered. ie a section 2.1.4 on valuations (following on from a more thorough introduction to different types of value in Chapter 1) which defines and introduces "socio-cultural, monetary and holistic valuation" (lines226-27). How this ties in with the implicit recognition in line 269 that value is always subjective (ie value is always value to someone/something) will be interesting. Furthermore, measuring changes in values does not only depend on changes in physical data, but also the valuation method(s) used.	This content should be covered in chapter 1.
Douglas Nakashima	Chapter 2	10	215			ADD interrelations between ecosystems and resource management by human societies, forming so-called socio-ecological systems, where practices based on ILK can lead to ecosystem services or, for example, high biodiversity rates. FOR EXAMPLE: Iniesta-Arandia et al. 2014 (Spain): (p2) "The landscape physiomy has been modeled using agricultural terraces and water transport and storage infrastructures, called acequias and aljibes (Blondel et al. 2010). These strategies avoid rainfall limitations using snowmelt and have a positive effect on (1) biodiversity maintenance through broad leaf vegetation species, such as chestnuts (Castanea sativa), which have a great ecological value and genetic diversity; (2) microclimatic regulation; and (3) hydrological regulation (Pulido-Bosch and Ben Sbihi 1995). Broad leaf species create humid spots favoring ecosystems diversity and creating habitats for other species (Espín et al. 2010)." (p9) "The importance of traditional soil and water conservation techniques for semi-arid and Mediterranean environments has been repeatedly highlighted by different authors (Blondel et al. 2010). Techniques such as terracing and the use of water ditches have effectively prevented soil erosion and promoted biodiversity." Vogl-Lukasser et al. 2002 (Austria): (p648) "Eastern Tyrol (located in the Lienz district of Austria) is characterized by a high proportion of mountain areas. In these areas, adaptive management of natural resources by Alpine small farmers has created a typical diverse and multifunctional landscape. The value of this landscape is high farmers do not only produce food, but also protect a sensitive and threatened environment. Local people safeguard and manage an area that represents a living and working space; they provide recreational resources for local inhabitants, scenery for tourists, various resources for hunters, gatherers and artisans, and habitats for local flora and fauna. Many farmers also have a strong influence on the production of renewable hydroelectric energy and on logging and reforestation activities. Homegardens are an integral part of the areas managed by farmers. In several parts of Europe, however, the numbers of such Alpine small farmers is decreasing and farm management is changing." Parrotta & Agnoletti 2007. Traditional knowledge: challenges and opportunities: (p1) "Innovative forest management practices, based on traditional knowledge (TFK) and developed by rural communities over the centuries, have contributed significantly to the world's natural and cultural heritage by creating and maintaining landscapes of outstanding beauty while helping to sustain production of multiple goods and services that enhance livelihood security and quality of life." Galuzzi et al. 2010. Home gardens: neglected hotspots of agro-biodiversity and cultural diversity. Siebert 2004. Traditional agriculture and the conservation of biological diversity in Crete, Greece.	Thank you for this suggestion. Now it is included
Tom West	Chapter 2	10	222	10	222	The use of 'and' in "(and nature's gifts)" suggests that nature's gifts are distinct from nature's benefits. But the conceptual framework says these are synonymous. Use 'or' or 'ie' instead, or rephrase.	addressed by new conceptual framework and NBP
Douglas Nakashima	Chapter 2	10	243			ADD interactions between peoples and their environment, expressed notably through practices that can be based on ILK lead to the evolution of socio-ecological systems, and building of natural-cultural landscapes. For example, Unesco World heritage list: now recognize mixed sites, recognizing both their natural and cultural characteristics: http://whc.unesco.org/en/list/7&search=&search_by_country=&media=&region=&border=&restriction=&order=year&type=mixed	Thanks for this comment. The discussion in section 2.2.3.1.2 on ILK address this and section 2.3.3 discusses world heritage sites
Tom Breeze	Chapter 2	10	244	20	251	I understand why this is included but hope that it is rolled into a single unified introductory section at the beginning of the report, ideally such harmonised text should appear in the other regional assessments	We agree that it should be in Chapter 1.
Allan Watt	Chapter 2	10	252			Presumably this will start with a simple classification (akin to that used later in this and other chapters).	See section 2.2.1 and table 2.1 which provides this
Frederic Lemaitre	Chapter 2	11	269	11	278	The complexity of assessing ecosystem services and identifying beneficiaries can be illustrated in urban ecosystems by "Gómez-Baggethun, E., Barton, D.N. 2013. Classifying and valuing ecosystem services for urban planning. Ecological Economics, 86: 235-245". Interestingly, even if urban ecosystems provide only a fraction of the total ecosystem services used in cities, high density of beneficiaries relative to existing green infrastructure implies that the social and economic value of services provided locally by urban ecosystems can be surprisingly high	thanks for the reference
Thomas Brooks (IUCN)	Chapter 2	11	269	11	270	This is a very important point. I very much agree.	Thanks
Vânia Proença	Chapter 2	11	270	11	273	This list is missing time frames (inter-generation)	addressed in the SOD

Vânia Prouença	Chapter 2	11	273	11	284	The use of cross-references in section 2.1 to introduce the chapter structure is a good idea. But text should be modified to also accommodate references to sub-sections 2.3.2/5/6; a cross-reference to section 2.2 could be added in section 2.1.2	section 2.1.1 and 2.1.2 have been rewritten and chapter 1 also introduces the ECA structure
Tom Breeze	Chapter 2	11	277	11	277	Define social actor (since this is used later in the report) and stakeholder (there are a few places where the two seem to be used interchangeably)	this is an issue for chapter 1 to define terms
Vânia Prouença	Chapter 2	11	285	11	285	Section 2.2: Add a table with the list off all the services assessed in this section, a short definition and justification for selection could also be added	See section 2.2.1 and table 2.1 which provides this
Nynke Schulp	Chapter 2	11	285	58	1524	The section on Soil Quality (2.2.2.4) explicitly states that this service cannot be measured directly and is assessed through indicators and models. This is true, but it is just as true for all the other services assessed in this chapter! For example, the UNFCCC carbon emissions are based on bookkeeping or process modelling, you quantify erosion regulation using RUSLE, which is a model, assigning a capacity to capture air pollutants to vegetation types is modelling... I appreciate that you mention it in the soil quality section and that you explain clearly which indicators were chosen and why. All other subsections in Section 2.2 should follow this example and be more specific on justifying which indicators were used, why, and what are the quality issues related to those.	This is a good suggestion and we have moved this reflection to the introduction part of regulation services.
Douglas Nakashima	Chapter 2	11	285			Section 2.2.1. Status and trends of provisioning services Add a section on medicinal products EXAMPLE: Carvalho & Morales 2010 (Portugal): (p153) "Up until the 1970s, in particular during spring and autumn, the women, shepherds, hunters and fishermen of the area all used to collect a variety of plants for both food and medicine as they engaged in their daily activities. A few men, including some well known smugglers, were skilled in gathering mushrooms and some of the rarer medicinal plants, such as the bladderseed1 (Physospermum cornubiense) or the mountain arnica (Arnica montana L.), from sites deep in the woods and from across the border in Spain." (p153) "More than half of the 364 plant species used by people are considered wild (199 species), and 140 of these (70 per cent of the wild species) were reported to have been traditionally gathered from the wild and consumed either as food (10 per cent), as medicinal plants (58 per cent), or both (32 per cent). Most of these plants, as well as the remaining 59 species of the wild flora, have also been used in the area for other purposes, such as veterinary medicine, fuel, fodder, and handicraft or building materials (Carvalho 2005)." (p162) "Generally, wives (and sometimes husbands) prepare the basic remedies to treat the family or the animals. However, particular recipes made of plant mixtures, some herbal extracts, and special lotions and ointments (such as those for wolf and viper bites and for scorpion or wasp stings) are prepared by specially trained healers who provided them on request. In the folk phytotherapy there are some important remedies that are regarded as essential contributions to the families' well-being." (p165) "traditional knowledge concerning medicinal and edible plants and plant use still remains in the memories of older and middle-aged residents. Moreover, it is still practised by some older women and middle-aged housewives, and occasionally among some young people who claim they care about healthy and safe food and alternative medicine."	Thank you very much, this is very helpful and is thus included in the SOD
Douglas Nakashima	Chapter 2	11	285			Section 2.2.1.1. Food ADD subsection on Wild plants gathering as a source of food: Della et al. 2006. An ethnobotanical survey of wild edible plants of Paphos and Larnaca countryside of Cyprus. Dénés et al. 2012. Wild plants used for food by Hungarian ethnic groups living in the Carpathian Basin. Kuczaj et al. 2013. Wild food plants used in the villages of the Lake Vrana Nature Park (northern Dalmatia, Croatia) Menendez-Baceta et al. 2011. Wild edible plants traditionally gathered in Gorbeialdea (Biscay, Basque Country) Nedelicheva 2013. An ethnobotanical study of wild edible plants in Bulgaria. Papp et al. 2013. The uses of Betula pendula Roth among Hungarian Csángós and Székelys in Transylvania, Romania Pardo-de-Santayana 2007. Traditional knowledge of wild edible plants used in the northwest of the Iberian Peninsula (Spain and Portugal): a comparative study. Schunke & Vogl 2010. Organic farmers use of wild food plants and fungi in a hilly area in Styria (Austria) Sbukand et al. 2015. An ethnobotanical perspective on traditional fermented plant foods and beverages in Eastern Europe.	Extensive attention for traditional medicinal plant knowledge included in the SOD
Douglas Nakashima	Chapter 2	11	285			ADD subsection on Fishing and hunting as sources of food and livelihood: Lavrillier et al 2016 (Siberia): "The type of reindeer herding practiced by the Evenk of southern Yakutia and the Amur region is called taiga... It corresponds to a dual economy and a dual logic of subsistence between hunting and reindeer herding, with seasonal interplay between the two." "One of the most important ecosystem services for the Evenk nomads [is] sable hunting." (A. Lavrillier, S. Gabyshev and M. Rojo (2016). The Sable for Evenk reindeer herders in southeastern Siberia: interplaying drivers of changes on biodiversity and ecosystem services – climate change, worldwide market economy, and extractive industries. In: Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris.) Kitti et al. 2006 (Sweden and Finland) : (p154) "Fishing and hunting resources are also essential components of what defines a good pasture. Herding requires a certain level of flexibility in order to manage and control the course of herding under changing conditions and to ensure sufficient income. In Sirkas, herders spent not only summer but also some of their time in autumn within the summer grazing areas where they fish and hunt, respectively. These activities provide herders with additional income or fish and meat for their own consumption. It is traditionally an important part of the economy of the household as well as of the social relations among families." Lavrillier 2013 (Northern Russia): (p262) "In the case of reindeer herding with small herds, while the main subsistence comes from hunting (food game are wild reindeer, elk, roe-deer, red deer, migrating birds, black grouse, snow partridge and occasionally bear; fur game is sable), and reindeer provide transportation. This kind of reindeer herding is common among the Evenk of Yakutia and the Amur region as well as among the Even in the Khabarovsk region. Among the Even fisherman of Kamchatka, the main subsistence comes from intense salmon fishing for humans and dogs together with hunting: (...)" See Arctic Climate Impact Assessment (ACIA) 2005- Nuttall et al. ch12 Hunting, herding, fishing, and gathering: indigenous peoples and renewable resource use in the Arctic. Section 12.3.3. The Yamal Nenets of northwest Siberia. 12.3.4. Indigenous peoples of the Russian North. ¶	Thank you very much for these suggestions. Space limitations do not allow us to fully develop discussion of this as a provisioning service, but we shall mention its introduction and refer to further discussion under cultural services.
Patricia Balvanera	Chapter 2	11	285	24	566	I totally agree that one way to describe trends in ecosystem services is to go to governmental statistics and map the trends. Fine. But the key question is why these patterns are changing, which you address in many cases, and whether these patterns can be sustained over time. The second part of the question is of course much harder to tackle and I do not have a clear cut option to do so. Maybe this issue can somehow be addressed in a section on tradeoffs among provisioning, regulating and supporting services	This requirement cannot be addressed in our chapter as the drivers impacting NBP's trends are the focus of chapter 4. This chapter aims to understand the contributions of NBPs to QoL. We will make sure that this is clear in the new version.
PESC-3	Chapter 2	11	286			Genetic resources as provisioning services are missing	This is a good point. We shall add a section related to this.
Tom Breeze	Chapter 2	11	292	11	293	Can you be a bit more specific as to what these benefits are so that readers can get a feel for this heterogeneity?	We think that examples have been listed already in line 287-288.
Tom Breeze	Chapter 2	11	297	11	298	These two sentences are a bit vague. I think it's important to, in some way embed the fact that this is largely due to the limited availability of trade data, making it (if you'll pardon the economic jargon) hard to tell where the stocks originate from or where they flow to. For example, FAO trade data can give us an idea of where crops are produced and sold but not how they are used (re-exported, processed, stored or consumed fresh). This affects our capacity to say who is benefitting and how.	THE COMMENTS SEEMS TO BE UNRELATED TO THE LINES GIVEN.
Roy Remme	Chapter 2	12	302	12	302	Here an addition would be useful, explaining that wild foods such as game meat, mushrooms and berries are considered cultural services and are explained later on in the report.	Suggestion included
PESC-3	Chapter 2	12	302			Food and fodder should both be covered in this section	This has been done in section 2.2.2.1 on food and feed
PESC-3	Chapter 2	12	302			We need to estimate the role of ecosystem regulation in agriculture production, make the difference between ecosystem production and human inputs	We agree this is an important point for ecosystem services but the implementation of the nature benefits to people by the MEP changes the perspective
Douglas Nakashima	Chapter 2	12	302			Section 2.2.1.1.2. Wild capture and cultured aquatic food production EXAMPLES of local / small-scale fishing: Demeter 2016 (Ukraine): "Game meat is an important additional food resource for a narrow layer of the community. Fishing in the streams and rivers crossing the forest is an important aspect of the traditional use of hardwood floodplain forests." (László Demeter (2016). Biodiversity and ecosystem services of hardwood floodplain forests: past, present and future from the perspective of local communities in West Ukraine. In: Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris) Ståhlberg & Svanberg 2011. Catching basking ide, Leuciscus idus (L.), in the Baltic Sea. Niemiinen et al. 2004. Local voices from the Faroe Islands. (Danmark): (p241) "For the community, Faroes, they [whales] brought a lot of food for free. That's important for the community, for all, house holds and the community in Faroes, they got a lot of meat, for free, and also, of course, blubber, and then the hunt is going on... when the hunt itself is over, it's like a dealing process and preparing process to store the meat. It gets all the people in the community in one way or another and there's a lot of people out, so you can have a talk and meet people... it's nice together." [Ólavur Sjurðarberg [Chairman of Pilot Whalers Association]" Reyes et al. 2015. What definition of the "petits métiers" in fishing? [Quelle définition des "petits métiers" de la pêche?] Moore 2003. Seals and fisheries in the Clyde Sea area (Scotland): traditional knowledge informs science. Flannery & Ó Cinnéide 2008. Spatial planning from the perspective of a small seaside community in Ireland. Cush & Varley 2013. Cooperation as a survival strategy among west of Ireland small-scale mussel farmers. Tzanatos et al. 2006. Identifying and classifying small-scale fisheries métiers in the Mediterranean: a case study in the Patrakos Gulf, Greece.	Many thanks for providing these additional references, in particular those relating to indigenous and local knowledge. Of course, the focus of this section is on the largest contributions to production, but we have taken your suggestions into account as possible within the given space limitations.

						<p>Section 2.2.1.1.1. Cultivated crops and reared animals</p> <p>ADD The case of reindeer husbandry and Sami reindeer herders: socio-ecological system depending on boreal forest, lichen, and climate conditions</p> <p>- Roturier et al 2016 (Sweden): "The whole range of ecosystems in boreal regions is necessary to complete the annual cycle that rules reindeer husbandry. It depends on access to different types of grazing pastures, particularly conifer forests supporting extensive ground lichen cover and arboreal lichen are vital to feed reindeer during wintertime." (Samuel Roturier, J. Nygård, L.E. Nutti, M.P. Åstot and M. Roué (2016). Reindeer husbandry in the boreal forest: Sami ecological knowledge or the science of "working with nature". In: Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris.)</p> <p>- Inga 2007 (Sweden) (p101) "The availability of lichen is important but is not the only determinant whether the pastureland is good or bad. They also pay attention to whether the ground is moist or dry, the snow conditions and the type of forest. The most important question is if lichens are available under the snow cover (Ruong, 1964; Ryd, 2001)."</p> <p>- Roturier & Roué 2009 (Sweden): (p1966) "Sa'mi reindeer herders are dependent on the boreal forest as an important resource for their reindeer and they use its natural diversity to manage their herds. The knowledge and know-how of Sa'mi reindeer herders allows them to adapt to variations in grazing conditions. It is not limited to the description and characterization of snow and ice properties but involves a dynamic understanding of the effects of the trees and understorey vegetation on snow cover and the ability to foresee how these factors may vary as the winter progresses. Many of the factors affecting reindeer herding, such as ground vegetation and tree cover, are directly or indirectly driven by forestry (Fig. 2)"</p> <p>ADD HNV Seminalural Grasslands, Wood pastures</p> <p>- Babai 2016 (Romania): Role of TEK based mountain small scale-farming in maintaining and managing cultural landscapes and mountain biodiversity in an Eastern European setting. "Rural communities' long-term experiences and inherited, culturally transmitted local ecological knowledge have created an adaptive land use system, which is able to maintain high biological diversity" "The long-term and sustainable use of these ecosystem services work through complex ecosystem-based land use management systems which function not at the species but at the landscape and complex mosaic ecosystem level". (Dániel Babai (2016). High nature value seminalural grasslands – European hotspots of biocultural diversity. In Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris)</p> <p>- Ivaşcu and Rakosv 2016 (Romania): The traditional practices and management driven by traditional ecological knowledge of many rural communities are the main reason for the existence and functioning of cultural landscapes and HNV farming with remarkable biodiversity. "HNV landscapes – being the result of small scale semi-subsistence farming – are linked and induced by the traditional ecological knowledge of their practitioners, proving that TEK is still present in Romania and South-Eastern Europe." "[In luead] detailed local observations on the importance of ecosystem services, e.g., grasslands near forests have a higher quality, or the beneficial presence of certain tree species in the meadows etc., reflect the close relation and detailed knowledge of their environment". (Cosmin Ivaşcu and Laszlo Rakosy (2016). Biocultural adaptations and traditional ecological knowledge in a historical village from Maramureş Land, Romania. In Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris.)</p>	<p>Many thanks for providing these additional references, in particular those relating to indigenous and local knowledge. Of course, the focus of this section is on the largest contributions to production, but we have taken your suggestions into account as possible within the given space limitations.</p>
Douglas Nakashima	Chapter 2	12	303			<p>- Varga et al 2016 (Hungary): "Wood pastures are the basis for traditional silvopastoral husbandry and constitute an integral part of the cultural landscape across Europe." "Utilization and extent of wood pastures in Hungary were significantly reduced in the past 50 years as a consequence of the suppression of traditional land-use practices." (Anna Varga, Anita Heim, László Demeter and Zsolt Molnár (2016). Rangers bridge the gap: integration of traditional ecological knowledge related to wood pastures into nature conservation. In Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris)</p> <p>- Molnár et al 2016 (Hungary): "Traditional extensive grazing is supported by nature conservation management, and agri-environmental and Natura 2000 (a network of protected habitats across the EU) regulations and payments. However, most economic and political drivers act against traditional management" (Zsolt Molnár, L. Sáfián, J. Máté, S. Barta, D.P. Sütő, A. Molnár and A. Varga (2016). "It Does Matter Who Leans on the Stick": Hungarian herders' perspectives on biodiversity, ecosystem services and their drivers. In: Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris.)</p> <p>- Kis et al 2016 (Hungary): "Traditional pasturing with herders ... has been and still is adapting to the ever-changing world. Such practices assist sustainable use of ecosystem services and preservation of biodiversity, while herders contribute to producing excellent quality ecological meat products. This is achieved through using a culture several thousand years old, both by preserving traditional knowledge and at the same time developing it with adaptive practices." (József Kis, S. Barta, L. Elekes, L. Engi, T. Fegyver, J. Keskeméti, L. Lajkó and J. Szabó (2016). Traditional herders' knowledge and worldview and their role in managing biodiversity and ecosystem-services of extensive pastures. In: Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris.)</p> <p>ADD Pastoralism in Mediterranean regions:</p> <p>- Oteros-Rozas et al. 2013 (Spain). Traditional ecological knowledge among transhumant pastoralists in Mediterranean Spain.</p> <p>- Fernández-Giménez & Estaque 2012 (Spain). Pyrenean pastoralists' ecological knowledge: documentation and application to natural resource management and adaptation.</p>	
Tom Breeze	Chapter 2	11	304	11	304	<p>As above, the main issues to my knowledge regarding crops are that we don't have easy access to how globalised markets distribute produce across different sectors. If possible, I would also like to see some mention of honey production here as, although honeybees are manufactured capital rather than a natural resource per se, the production of honey relies on the availability of surrounding nectar resources from a stable ecosystem. This isn't a huge issue in the northern parts of Europe but will have major impacts on countries with a large beekeeping culture like Ukraine, Spain and Turkey.</p>	<p>this was impossible for this SOD, although some mentions are included in pollination by yourself and Simon Potts</p>
Tom Breeze	Chapter 2	11	304	11	304	<p>Separately, I would also recommend, due to the flow of goods across continents that this is harmonised with the other regional assessments so that trade factors can be properly tailored to each region. For example, Europe and West Asia imports a large amount of fruits from abroad, even for crops that are grown across the region which should be stated but, it would be helpful to embed this in the same regional structure as used by the assessments (so e.g. what proportion of food from key nutritional groups does EWA import from Africa, Asia Pacific and the Americas respectively). This would help strengthen all four assessments.</p>	<p>Most of the literature cited in this draft relates to long-term and historic trends and their interpretation. For this purpose, it is not necessarily the best choice to rely on the most recent literature. A detailed discussion of management measures taken would, unfortunately, go beyond the scope of this assessment. Space limitations demand that we keep discussion of measure limited to what is necessary to make historic trends plausible.</p>
Tom Breeze	Chapter 2	11	304	11	304	<p>Finally, a key point I would hope to see raised here s the varying availability of data on crop and animal production and sale prices for their produce (as well as the almost total absence of information on non-monetary trade)</p>	<p>Data gaps are now discussed in section 2.5 on knowledge gaps and this discussion will be developed further for the final draft. Section 2.3.5 now provides material on non-monetary value. We have appointed a new LA to work specifically on monetary valuation and they will develop material that will be incorporated into section 2.3.5 along side the discussion of non-monetary values.</p>
Tom Breeze	Chapter 2	11	306	11	306	<p>I am a bit concerned that a lot of the literature here is very old and unlikely to be up to date. There's also a lot of vagueness here too, with little specific details as to what measures were taken and how they have affected aquatic food production.</p>	<p>This has been updated with further references</p>
Tom Breeze	Chapter 2	11	306	11	306	<p>It would also be useful to keep the graphs in this chapter harmonised to use the same time scale (Table 2.2. seems different from the others), which should be stated in the legend, and remove the extra white space.</p>	<p>The graphs will be redrawn for production, with IPBES policies on style (e.g. regarding start and end-points of time axes). Use of equal scaling for the vertical axes appears impractical. We have pointed out the overall differences in bulk production from marine, freshwater and aquaculture in the text.</p>
Allan Watt	Chapter 2	12	313			<p>General point. Suggest avoid expressing production - and other metrics subject to change - as if constant i.e. avoid present tense. For this example, it might be expressed as "was 8.9 million tons p.a. in 2014".</p>	<p>We will never be able to describe momentary status. Shall we always grammatically refer to the past for "status" assessment? Do we have a policy for this?</p>
Vânia Proença	Chapter 2	12	313	12	316	<p>Revise sentence, the text is not clear ("even when taking the smaller size of this area")</p>	<p>Thank you, we have clarified this.</p>
Vânia Proença	Chapter 2	12	316	12	317	<p>Add a reference(s)</p>	<p>We changed punctuation to link this sentence to the following, where the reference is provided.</p>
Vânia Proença	Chapter 2	12	319	12	320	<p>Add a reference(s)</p>	<p>This has been updated with further references</p>
Thomas Brooks (IUCN)	Chapter 2	12	320	12	320	<p>It would be useful to explain briefly what these "more sustainable management practices" are, and how we can be sure of this explanation, rather than simply a decline in the stock.</p>	<p>we have added a reference Geijzendorffer et al.</p>
Tom Breeze	Chapter 2	11	322	11	322	<p>What about non-EU nations? I appreciate that this may be a political hot potato (and am by no means an expert in this) but the political discourse between Norway, Iceland and the UK on this issue, along with Norway and Iceland's whaling activities should probably be mentioned here as it may affect sustainability. It would also be useful to state how this is to be implemented and what, if any, literature is available to demonstrate whether or not these policies are likely to be effective</p>	<p>We removed this sentence, since discussion of policy objectives does not fall into the scope of the report. Whaling does make only a minor contribution to overall marine food production (next to many other components), which is why it cannot be discussed here. However, we added a general note in the introduction of section 2.2.1 that the diversity of provisioning services resulting from underlying biodiversity might in some cases be just as important as its bulk quantity, but that status and trend are hard to assess based on available bulk data.</p>
PESC-3	Chapter 2	13	324			<p>Figure 2.1. is missing Arctic and far east seas, FAO report includes this information</p>	<p>The delineation of the marine areas to be included had not been decided at the time of this draft.</p>
Allan Watt	Chapter 2	12	329			<p>Give source / reference.</p>	<p>The reference is in the following line.</p>

Tom West	Chapter 2	14	344	14	345	If not complete contribution. EU aquaculture production has been stagnant for a number of years, hence aquaculture forming a key area for the EU's Blue Growth Strategy. References needed in any case.	We write that "Salmon farming in Northern Europe made an important contribution to this expansion," and the stagnation in other parts of ECA is clear from Fig 2.3. There is no reference, because the figures are derived directly from the data in Fig 2.3. We now explain this in the text. Discussion of specific policy instruments is outside the scope of this assessment.
Tom West	Chapter 2	14	345	14	347	Sources needed for these stats. Are they by weight or by value - big difference in aquaculture since shellfish are worth much less by weight than finfish (see the third table here http://www.eumofa.eu/aquaculture-yearly-comparison-between-ms)	There is no reference, because the figures are derived directly from the data in Fig 2.3. We now explain this in the text. It is policy throughout Chapter 2 to work with quantities rather than monetary value.
Germany	Chapter 2	14	349	14	352	Please provide a more nuanced picture here of the possibilities to respond to this challenge. Currently, there is a narrow focus on regulatory frameworks and the industry's commitment. The change of consumption patterns, i.e. consuming less fish and molluscs, should be mentioned here as well. What is needed is not only technical solutions, but also a cultural shift.	Unfortunately it is not clear from the comment what the "challenge" is that it relates to. If the "challenge" was the potential for expansions of aquaculture to increase production, the topic of this passage, then the comment appears off topic.
Allan Watt	Chapter 2	14	350	14	351	Give source / reference and perhaps expand on this point.	this section has been redrafted with further references
Tom West	Chapter 2	14	351	14	352	This source is rather old given that it is about industry and regulatory frameworks changing. Perhaps see the (summary of) EU states Multi Annual National Aquaculture Plans - http://ec.europa.eu/fisheries/ctp/aquaculture/multiannual-national-plans/index_en.htm	Many thanks for providing this link. However, we removed this sentence as it is off-topic.
Tom Breeze	Chapter 2	14	351	14	352	I have serious reservations about citing a 13 year old paper as a source here. Surely these adaptations have now occurred and there is evidence of what their impacts were? If not then I would suggest removing this sentence, it doesn't tell us anything about the benefits received.	We agree this sentence is best removed.
Douglas Nakashima	Chapter 2	15	357			2.2.1.2. Provisioning of materials [timber, flowers, skin...] Svanberg et al. 2012. Uses of tree saps in northern and eastern parts of Europe.	Thank you for suggesting this reference.
Tom Breeze	Chapter 2	15	363	15	363	As the concepts of stocks and flows are not explained then the problem of double counting is somewhat moot: you can't double count the benefits of a consumptive service flow, only the stocks from which they are derived	The comment appears unrelated to the line cited.
Nynke Schulp	Chapter 2	15	374	15	76	The statement on the absence of pan-European data is correct. Nevertheless, several individual countries do report on ornamental resources in their own (bilingual) statistics, and also the European Forestry Institute has some of such data.	Since the FOD the NCP classification has changed regarding ornamental materials so we are still searching for literature and reports on this topic and a place holder has been included.
PESC-3	Chapter 2	16	384			Provision of timber. Report from Plan Bleu and FAO on Mediterranean Forest ecosystem services including timber production. General Directory of forestry in Turkey has extensive data on timber production as well.	We assume these are included in the FAO statistics that we discuss.
Tom Breeze	Chapter 2	16	384	18	417	There is very little information on the actual benefits of the industry here, the section mostly reviews the total production of roundwood and industrial wood but doesn't explain the size of the industry (e.g. ha of forested land) or it's economic output (which is important to explain a lot of these trends, although I understand that this data won't be widely available, it certainly is in the UK and I would be very surprised if it wasn't available elsewhere). There's also very little information outside of the EU and Russia, however no mention of data deficiency is present. Have all the national statistics ministries been explored (I know of timber harvest statistics in Georgia for example, available from http://www.geostat.ge/index.php?action=page&p_id=431&lang=eng)?	Many thanks for the information on data sources outside the EU and Russia. Unfortunately, the comment remains vague regarding what trends exactly are explained by what. It is unclear how "economic output" can explain trends in production.
Tom Breeze	Chapter 2	16	385	16	385	What was the basis for this calculation/mapping? Modelling, national statistics (of what)?	A reference to the source of this data is included. We replace "calculated" by "reported" to avoid the false impression of a discussion of methods.
PESC-3	Chapter 2	16	392			There is information on timber stocks for Russia and Turkey, maps should be combined	The two maps display different information: density of standing stock (m ³ /ha) and yearly production (m ³). So they can't be combined.
Werner Rolf	Chapter 2	16	393	16	393	please decide whether or not to use measure in figure caption (i.e. m ³ /ha) - compare with upcoming figures 2.5, 2.6, 2.7....	Thank you for noting the missing units. This has been fixed.
Tom Breeze	Chapter 2	16	394	16	395	What is roundwood? Do you mean decisions, coniferous or both here?	Thank you. We added a proper definition.
Tom Breeze	Chapter 2	16	394	16	395	The text states that production has been stable yet looking at the graph, production almost halved over a 5 year period and has only slowly begun to recover. Why is this (my guess is the collapse of the USSR)? This seems like an important trend that should be elaborated on based on what data is available. Colleagues in countries with severe changes can then be consulted to help explain why this is.	This is the obvious explanation. However, we do not elaborate on it because separation of replotting biases and actual changes in production is difficult.
Nynke Schulp	Chapter 2	17	399	17	400	Figure 2 shows a very obvious drop around the year 1990. This drop has to be explained. Is there something really happening here, or is it a data artifact around the opening of the Iron Curtain?	This is not clear to us, either, we are trying to find out.
Tom Breeze	Chapter 2	17	402	17	402	should be "in the ECA".	Thank you, but we disagree on this point of grammar.
Tom Breeze	Chapter 2	17	402	17	404	Although this data is claimed to be more detailed I'm not sure what the message here is? That wood removal is greater in Western Europe? How are you defining western Europe? Is there any evidence that this rate of removal is unsustainable? Is most of it from plantations?	We agree that more background information could be added, space permitting. We removed discussion of the absolute production in Western Europe, since it depends indeed sensitively on the precise delineation of that region by EUROSTAT.
Tom Breeze	Chapter 2	17	402	17	404	On the same note, the text implies that the data used for Figure 2.6 distinguishes between fuel and timber use. Does that mean that 2.5. does not? And if not then I would suggest including the graphic in the introductory part of this section (before line 384) to show the total use of timber natural capital stocks for any use.	Thank you for this suggestion. We opted for a total removal of Fig 2.7.
Tom Breeze	Chapter 2	17	405	17	406	What does this decrease in productivity actually mean for the industry and the benefits it supports?	We decided that the endpoint for this assessment is the production itself, since subsequent processing and trade and resulting value added are difficult to disentangle.
Tom Breeze	Chapter 2	17	406	17	407	What is industrial wood? I'm really struggling with how you can have statistics on this for the whole of the EU and yet not have the information for roundwood removal in Eastern Europe	We removed this text and Fig 2.7.
Tom Breeze	Chapter 2	18	417	18	417	Should fuelwood be included here? It's not been discussed separately in the subsection and it's inclusion here contradicts the need to separate it from timber that the overview text mentioned	We removed this figure.
Tom Breeze	Chapter 2	18	419	18	419	"allocated" should be "located"	Thank you, fixed.
Vânia Proença	Chapter 2	18	422	18	422	Replace "not a clear trend" by "unsteady trend" - also, if possible, add some explanations for the observed pattern - for instance, is it related to changes in market demand?	We prefer the current wording (if its "unsteady", then there is no trend). Further information on attribution will be added as it become available. Variation is not actually that large by the way.
Tom Breeze	Chapter 2	18	422	18	422	Again, what about the monetary output of this industry? This is very likely to be driving changes as the price per tonne shifts.	This is indeed a likely reason for the variations seen. However, since there is no clear trend, further discussion might be rather about details, not the big picture.
Werner Rolf	Chapter 2	19	427	20	457	If you account domestic livestock in other services (f.i. transhumance shepherds (see Box 2.1)) you may consider it to take into account wool and leather products here as well.	Box 2.1 was included as a case study of ILK. Unfortunately, space does not allow us always to go into this level of detail.
Vânia Proença	Chapter 2	19	427	19	427	This sub-section could be moved to the end of section 2.2.1; Medicinal plants/substances could also be included; the various paragraphs are currently too general, merging the more relevant information in single text on "other provisioning services" possibly works better.	a new section medicinal resources NCP has been added see 2.2.2.4
PESC-3	Chapter 2	19	427			There are very limited examples of other materials	We will revisit other materials once a final decision on the classification of natures contribution to people (NCPs) has been made within IPBES.
Maximilian Weigend	Chapter 2	19	427	19	433	unless reed is picked up somewhere else in the assessment, this appears to be an entirely random piece of information	We will revisit other materials once a final decision on the classification of natures contribution to people (NCPs) has been made within IPBES.
Germany	Chapter 2	19	427	19	433	Unless reed is picked up somewhere else in the assessment, this appears to be an entirely random piece of information.	We will revisit other materials once a final decision on the classification of natures contribution to people (NCPs) has been made within IPBES.
Tom Breeze	Chapter 2	19	430	19	433	Is information only available for these countries?	Indeed, these were the only countries for which we could obtain data on reedbed areas and reed harvests.
Mark Sneathlge	Chapter 2	19	435	19	435	"majority of oak forests" should surely read "majority of Cork oak (Quercus suber) forests"?	Thank you, fixed.
Maximilian Weigend	Chapter 2	19	435	19	436	I sincerely doubt that statement, unless it only refers to the cork oak (Quercus suber)	Right, we fixed this.
Germany	Chapter 2	19	435	19	436	Please ensure validity of this statement, unless it only refers to cork oak (Quercus suber).	Right, we fixed this.
Tom Breeze	Chapter 2	19	435	19	435	What is the total volume of cork produced?	This is now included in the section on cork production on page 64
Vânia Proença	Chapter 2	19	436	19	436	Revise sentence: the majority of cork oak forests; Some recent statistics, in English, for Portugal can be found here: http://www.apcor.pt/wp-content/uploads/2015/12/APCOR-Boletim-Estatistico.pdf	We edited as suggested and are taking the linked document into account.
Allan Watt	Chapter 2	20	440			Give examples of materials to illustrate point.	The paragraph has been edited for specificity, examples for biological raw materials have been added.
Vânia Proença	Chapter 2	20	440	20	445	Provide concrete examples of raw materials from marine and benthic ecosystems	The paragraph has been edited for specificity, examples for biological raw materials have been added.

Mark Snethlage	Chapter 2	20	440	20	445	Not clear what is being referred to here	The paragraph has been edited for specificity, examples for biological raw materials have been added.
Tom Breeze	Chapter 2	20	440	20	445	It's not clear from this text what exactly the raw materials in question are? Minerals? If so what was extracted? How were they used? What is their monetary output?	The paragraph has been edited for specificity, examples for biological raw materials have been added.
Tom Breeze	Chapter 2	20	447	20	448	If it's decreasing, what is the volume produced and how much has it fallen? Between what years?	The section on cotton has been edited and new section on other vegetal materials included see 2.2.2.3.3
Mark Snethlage	Chapter 2	20	454	20	457	Odd juxtaposition of flax, hemp (plant fiber) and wool (animal fiber) in one final paragraph	The paragraph has been deleted.
Maximilian Weigend	Chapter 2	20	454	20	457	another isolated statement without useful temporal axis. Does that tie into the topic biodiversity or ecosystem services anywhere else?	The paragraph has been deleted.
Germany	Chapter 2	20	454	20	457	Does this statement tie into the topic biodiversity or ecosystem services anywhere else?	The paragraph has been deleted.
Germany	Chapter 2	20	454	20	457	very specific information for UK, not sure if appropriate here. If considered so, other national level information based on existing ecosystem services assessments could be added for more balance	The paragraph has been deleted.
Tom Breeze	Chapter 2	20	454	20	457	Data for these crops and for wool should be available for other countries too, the UKNEA is based on DEFRA statistics that are updated annually.	The paragraph has been deleted.
Santosh Kumar Mishra	Chapter 2	20	459	22	521	Before start of 2.2.1.4 Biomass-based energy (Page 22, Line 523), add following information: EU Water Framework Directive-Case Study: The increasing demand by citizens and environmental organizations for cleaner rivers and lakes, groundwater and coastal beaches has been evident for considerable time. This demand by citizens is one of the main reasons why the Commission has made water protection one of the priorities of its work. The new European Water Policy will get polluted waters clean again, and ensure clean waters are kept clean. In achieving these objectives, the roles of citizens and citizens' groups will be crucial. This is why a new European Water Policy has to get citizens more involved. European Water Policy has undergone a thorough restructuring process, and a new Water Framework Directive adopted in 2000 will be the operational tool, setting the objectives for water protection for the future. Much progress has been made in water protection in Europe, in individual Member States, but also in tackling significant problems at European level. But Europe's waters are still in need of increased efforts to get them clean or to keep them clean. After 30 years of European water legislation, this demand is expressed, not only by the scientific community and other experts, but to an ever increasing extent by citizens and environmental organizations (http://ec.europa.eu/environment/water/water-framework/info/intro_en.htm , accessed on June 18, 2016).	Thank you for this suggestion. Reference to increasing demand has been made, but this section does not lend itself for reference to policy objectives. This has been covered in other chapters.
Maximilian Weigend	Chapter 2	21	465	21	466	please use the categories for the subregions, what is the Euro-area?	The categories for subregions are now used in uniformity all throughout the sections
Germany	Chapter 2	21	465	21	466	Figure 2.11 uses the term "Euro area". How does the World Bank (source of this Figure) define this term?	Europe refers to the European Union
Tom Breeze	Chapter 2	21	468	21	470	What data is there on the distribution of these uses? Is it driving the observed trends?	This has now been provided, but guided by Eurostat data and scientific literature
Tom Breeze	Chapter 2	21	471	21	476	How is LTA calculated? Without this it's very hard to tell; what the index actually shows	This section has been removed
Allan Watt	Chapter 2	21	473			For example suggests that there are other sources. If so, they should have been considered in the assessment.	This sentence has been removed
Tom Breeze	Chapter 2	21	476	21	479	Not sure what these two sentences add to the discussion? They aren't directly related to any of the evidence subsequently cited and the Mease et al note should be included after the mention of the paper itself. (Re)Moving these two sentences would create a much better flow of information.	Agreed, sentences removed.
Tom Breeze	Chapter 2	21	476	21	477	What information on the proportion of basins exploited is available?	This section has been removed
Vânia Proença	Chapter 2	21	480	21	494	Add information on the meaning of the scores of the Water Exploitation Index	This has now been dealt with in the section on water security and FEW nexus
Tom Breeze	Chapter 2	21	480	22	496	This is very information rich and detailed but I think it may work better as a graph or map to more directly illustrate where the index is highest or lowest with the text just used to cover the main trends (where has the highest, the lowest etc.). While The authors make a good point regarding abstraction being as linked to agricultural area as it is population, some emphasis is needed that not all agricultural land is irrigated.	Thank you for your comment. Nuance has been added to the section, and most text to which you refer has been deleted.
Werner Rolf	Chapter 2	21	485	21	494	please briefly introduce in the used indicator (11,2% of what?)	This section has been rewritten, so that trends per sub-region are provided
Werner Rolf	Chapter 2	21	485	22	514	Can these data be illustrated in maps? - similar to the previous chapter (e.g. Figure 2.4)	This section has been rewritten, so that trends per sub-region are provided
Tom Breeze	Chapter 2	22	497	22	521	This is more like it!	Your positive feedback is highly appreciated
Vânia Proença	Chapter 2	22	502	22	514	"albeit mainly on status rather than trends" - however, time series data of water use may eventually be applied to derive trends; correct volumes data, m3 and km3 are given simultaneously	Your correction has been incorporated, and all data has now been presented in km3
Mark Snethlage	Chapter 2	22	502	22	514	Why give water volumes both in m3 and in km3, i.e. without systematically putting one of both between brackets, or choosing one?	Your correction has been incorporated, and all data has now been presented in km3
Nynke Schulp	Chapter 2	22	502	22	503	FAO's Water Base has more statistics. Also consult the work done in WaterGAP related projects (Kassel).	We have initially focused on available scientific literature, as well as UN studies. Additional databases will be consulted, especially for Eastern Europe and Central Asia
Werner Rolf	Chapter 2	22	523	23	551	Again: can these data be illustrated in maps? - similar to the previous chapter (e.g. Figure 2.4)	Map illustration integrated in the section
Mark Snethlage	Chapter 2	22	523	22	523	I do not understand the rationale for only considering fuel wood production in this section and ignoring arable biofuels, biogas, biodiesels of first and second generation, willow coppice etc. Reference: Manning, P., Taylor, G., E. Hanley, M., 2015. Bioenergy, Food Production and Biodiversity – An Unlikely Alliance? GCB Bioenergy 7, 570–576. doi:10.1111/gcbb.12173	Biofuels have now been covered in the SOD of the ECA report - see the following section. Willow coppice not explicit but it is assumed to be part of woody biomass based energy in the used datasets.
Tom Breeze	Chapter 2	22	523	23	563	This is another well written and informative section. I would still like to see any information on the economic output and trade patterns (e.g. is wood produced in Sweden used for fuel in Sweden only?) of the industry; and if it is absent, that is worth knowing in itself. It would also be useful to mention (or at least cross reference with the climate regulation section) what the benefits of using wood fuel over other fuels are. I am confident however from what is mentioned on Page 24 that the authors are on a good course here.	Positive feedback is appreciated. Trade patterns of wood is dealt with in Chapter's Status and trends of inter-regional flows section under 2.2.4.3.1 Materials and biomass-based energy; and the economic output of the industry also incorporated under that section. Cross reference made to Climate Regulation section.
Tom Breeze	Chapter 2	22	529	22	532	It would be useful to mention here what the energy output of wood (and other fuels) are, possibly in comparison to coal. This way readers will have an idea of just how much more or less efficient per tonne wood fuel consumption is.	Addition made to the section
Sigrid Kusch	Chapter 2	22	534	23	542	Note that there is a distinct difference between 'energy production' and 'energy consumption'. Figure 2.12 seems to refer to the production side, at primary energy level. This is not well reflected in the text, namely in line 534, which reads "consumption of renewable energy". Line 540 is also ambiguous and should be checked for correctness and clarity. Part of consumed energy in the EU is imported and part of what is referred to as 'primary energy production' in Eurostat is exported, therefore Figure 2.12 does not allow conclusions on 'consumption'. For example, the EU is a net importer of bioethanol; part of wood fuels are exported, etc.	Consumption corrected to production (line 534) in line with the Figure presented
Vânia Proença	Chapter 2	22	534	22	537	It would be worth discussing potential trade-offs between the production of biomass for energy and other ecosystem services, including food provisioning, forest services and habitat maintenance (forests).	A specific trade-offs section has been developed in SOD and covers different aspects of these mentioned ES trade-offs. Furthermore, this is partially addressed under section 2.2.4.3. Provision of timber as well as trade-offs occurring between different types of ES under section 2.3.5.1 (Distributional equity and justice)
Tom Breeze	Chapter 2	22	534	22	537	Cite the RFD here. Also state what proportion of energy is to be generated by renewables because of this directive.	The relevant EU Directive has been cited. 20% renewables target already in the text.
Tom Breeze	Chapter 2	23	544	23	548	I presume these statistics refer to roundwood for wood fuel?	Yes, the sentence specifies this
Tom Breeze	Chapter 2	23	552	23	553	Are there similar policies in play in any of these countries? If not then the difference is hardly remarkable.	Policy regarding renewables in Central Asia integrated to the text
Vânia Proença	Chapter 2	23	554	23	554	What caused the peak of 650 million m3 in 2001?	Text has been removed
Douglas Nakashima	Chapter 2	24	567			2.2.2. Status and trends of regulating services EXAMPLE: How a cultural landscape (bocage) managed by traditional practices leads to a wide array of ecosystem services: Pointereau 2005 (France): (p117) "Within open farming areas, trees help to guarantee the continuity of food chains, control crop pests and encourage the pollination of certain crops. They ensure a high level of biodiversity: the diversity of species, varieties, flora and fauna in highly productive areas. Generations of farmers have succeeded in making use of this biodiversity to optimize production systems and increase their yield by using pedoclimatic conditions to their advantage and by taking into account constraints. By choosing and then selecting the most suitable species of trees, they have been able to protect their crops and cattle from excessive wind, pesticide drifts or sunshine. They have learnt to manage the risks of erosion and to stabilize the banks of canals and rivers." (p119) "When farmers created bocages, they were hoping to achieve different results depending on the region and the period: the production of wood for fuel in the Avesnois bocage, using hornbeams; barriers for livestock using hawthorn and blackthorn; the production of drinks in the Normandy apple orchards; the production of fodder using the leaves of ash trees in the Pyrenean valleys; hedgerows acting as windbreakers using beech trees in the clos masures* in Seine-Maritime or cypresses in the Rhone Valley. Farmers quickly realized that they could also reap other benefits from this system. As maintenance techniques developed and species diversified, they were able to plant new types of trees and thereby meet broader needs. By pollarding or pruning trees with high branches, for example, farmers combined the production of firewood for bread ovens with the production of timber." (p120-121) "Traditional orchards of standard trees comprise a wide range of micro-habitats (herbaceous plants, buds, flowers and fruits, cavities, deadwood and bark) because of their structural diversity. Ecological gradients are a result of climate conditions (humid, dry, sunny, shady, windy or sheltered) and farming practices (whether or not reaping takes place). They have therefore become a refuge for declining or endangered species. Almost 2 400 plant and animal species have been recorded in these habitats in France and Germany by universities, including 408 endangered species. This rich variety also reflects the scope of the geographical area and the diversity of the facies in which the orchard meadows are situated."	This ILK example may be included as an additional ex of multiservices in 2.2.2 with citation in 2.2.1 (Axel + MG)

						Box 2.1 The role of ILK of transhumance shepherds on preserving some relevant regulating services ADD mention of the case of reindeer herders (Sam) and traditional herders (e.g. Hungary) Kis et al 2016 (Hungary): "traditional land-use practices exercised by herders contribute also to the survival of a number of protected bird and plant species. Shrubs, pioneer forests and invasive species may outcompete threatened species from areas where grazing has been abandoned." (József Kis, S. Barta, L. Elekes, L. Engli, T. Fegyver, J. Keskeméti, L. Lajkó and J. Szabó (2016). Traditional herders' knowledge and worldview and their role in managing biodiversity and ecosystem-services of extensive pastures. In: Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris.) Roturier et al 2016 (Sweden): Based on experience and knowledge of free ranging since early times, Sami reindeer herders have become experts in using ecosystem processes, "working with nature" to guide and control their herds within vast territories. (Samuel Roturier, J. Nygård, L.E. Nutt, M.P. Astot and M. Roué (2016). Reindeer husbandry in the boreal forest: Sami ecological knowledge or the science of "working with nature". In: Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris.) Molnár et al 2016 (Hungary): Grass is the key ecosystem service for herders [in Hungary]." "the pasture grazed by ancient cattle and sheep breeds that are herded by traditional herders in traditional costumes has been a high quality ecotourism product since the early 20th century." (Zsolt Molnár, L. Sáfán, J. Máté, S. Barta, D.P. Sütő, Á. Molnár and A. Varga (2016). "It Does Matter Who Leans on the Stick": Hungarian herders' perspectives on biodiversity, ecosystem services and their drivers. In: Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris.)	
Douglas Nakashima	Chapter 2	24	567			The box is really important but I consider it should be placed in a different section in which the role of the whole social ecological system in sustaining regulating services is addressed. And I wonder how this is consistent with the treatment for chapter 1. Maybe be the role of the whole social ecological system has to be clearly introduced earlier (of course it is in the conceptual framework but might need to be more explicitly fleshed out) and included into the sections of each of the types of services	We extend ILK across the chapter
Patricia Balvanera	Chapter 2	24	567	24	570	The link between the two sentences is not clear, the reference to ILK should be better framed.	Chapter 1 now provides a much wider discussion of the socio ecological system and sections 2.1.1. and 2.1.2 have been adjusted to take account of chapter 1.
Vânia Prouença	Chapter 2	24	568	24	570	While I do believe this should be retained, I would suggest moving ILK examples to the end of the subsection and flesh out this part to illustrate a) the differences between what standard scientific procedures and ILK can show us and b) localised case studies that refine the observed trends from the rest of the section.	ILK is now discussed in more depth in a variety of sections Due to useful feedback on ILK and support from the Dialogue workshop and the ILK group ILK material has been enhanced and included in a number of sections
Tom Breeze	Chapter 2	24	569	24	570		
Maximilian Weigend	Chapter 2	25	574	25	578	It would be sensible to spell this out: 70% of the overall 29(?) different types(?) of regulating services? Or are different regulating services lumped and added up to 100%? If so, how?	This has been updated with further references
Germany	Chapter 2	25	574	25	578	It would be helpful to spell this out: 70% of the overall 29(?) different types(?) of regulating services? Or are different regulating services lumped and added up to 100%? If so, how?	This has been updated with further references
Tom Breeze	Chapter 2	25	574	25	575	This sentence reads awkwardly, can I suggest "The Millennium Ecosystem Assessments suggests that 70% of regulating services were being degraded at a global scale at the start of the millennium."	This has been edited as requested
Tom Breeze	Chapter 2	25	577	25	577	Remove "Paula A." - there are similar citation errors throughout this section that I won't flag up individually.	Citations and references have been edited and improved
Sigrid Kusch	Chapter 2	25	580	27	663	Please consider mentioning marine litter.	This has been discussed in inland freshwater see 2.2.3.2.3 but we will add marine litter material later after completing on going literature searches
Tom Breeze	Chapter 2	25	582	25	582	Define Xenic? What about filtering harmful organisms?	removed reference to xenic
Tom Breeze	Chapter 2	25	582	25	583	How is this measured? To what standards?	removed this material
Patricia Balvanera	Chapter 2	25	582	25	582	Type: R for Constanza needed? - There are several other inconsistencies in the way literature is cited	Citations and references have been edited and improved
PESC-3	Chapter 2	25	587			The section on water quality is very important and the information is very brief. There is information on changes in water quality and drivers that should be mentioned. The future directions indicated by the authors are very promising and will hopefully produce a very insightful section. This section would be enhanced by some very concise information on how ecosystems filter water, especially forests and tundra as mentioned in the discussion of the National Report on Ecosystem Services in Russia.	This section has been developed further. Drivers will be discussed in chapter 4
Tom Breeze	Chapter 2	25	587	25	608	Perhaps a clearer distinction should be made between the observed trends in water quality (which are positive in many European rivers, as a result of reduced inflow of pollutants) and the rivers and freshwater ability to provide regulating services, which might have declined. See also lines 602 - 604 on page 24	More information in this subsection are added regarding how forest and tundra ecosystems filter water section 2.2.1.6 generally and line 891 specifically highlight The change of trends of water quality and compares them to NCP trends
Mark Snethlage	Chapter 2	24	588	24	597	This trend is not true for all European rivers. For example, the water quality of the Rhine river has been improving over the past years, due to transnational efforts. These efforts have been well documented.	section 2.2.1.6 generally and line 891 specifically highlight The change of trends of water quality and compares them to NCP trends
Roy Remme	Chapter 2	25	590	25	592	Harrison et al 2014 : the article explores the relationship between biodiversity and ecosystem services provision, not an analysis of the state and trends of water quality in Europe. Indeed, water quality of rivers in the EU improved since the 1990ies EEA, 2015. Freshwater quality - European briefing, State of Europe's Environment Report 2015. Copenhagen, Denmark. http://www.eea.europa.eu/soer-2015/europe/freshwater .	section 2.2.1.6 generally and line 891 specifically highlight The change of trends of water quality and compares them to NCP trends
Mark Snethlage	Chapter 2	24	590	24	592	What metrics are the basis for this? What are the magnitudes of these trends?	this section has been edited
Tom Breeze	Chapter 2	25	590	25	592	Revise sentence: among all evaluated regulating services	this paragraph has been edited
Vânia Prouença	Chapter 2	25	593	25	593	Cite a reference	references added
Tom Breeze	Chapter 2	25	604	25	604	Cite this report rather than include it as a footnote	reference added
Tom Breeze	Chapter 2	25	605	25	605		
Werner Rolf	Chapter 2	25	610	26	618	I recommend to consider indicators that can be related to EU Water Framework Directive (2000/60/EC). Thus IPBES and EU policy may be directly linked to each other.	More material on indicators is now to be added to the chapter for the final draft as the indicators liaison group have now provided an agreed list of indicators and related data sources.
Germany	Chapter 2	26	622	27	663	Please revise this section and provide the information in a more systematic manner. A synthetic evaluation/ a critical view on the provided information from the studies cited would be necessary. A concise insight into the complexity of the issue of air quality regulation by ecosystems quite at the beginning of the chapter would be very helpful. Then, in the next step, it could be declared to which selected aspects the chapter is limited to. It is necessary to stress quite at the start that ecosystems themselves are sensitive to effects air pollution and thus cannot be regarded as final sinks. Their capacity to capture air pollution is not endless. We would also welcome an analysis including a critical view on the provided information from the studies cited.	More insights into the issue of air regulation and the fact that ecosystems can be affected by air quality have been provided. The section has been re-organised. There is not space to provide a detailed critical review of the case studies.
Germany	Chapter 2	26	622	27	663	The EA report also informs about air quality direct and indirect impacts on ecosystems, which influence their provision of ecosystem services. This aspect could be more broadly discussed.	The impact of pollution on ecosystems and its effects on their ability to provide ES, has been included
Tom Breeze	Chapter 2	26	622	26	623	Rephrase - e.g. "In 2012, exposure to [compounds] as a result of poor air quality was attributed with x premature deaths and a reduced quality of life for x people across 40 European countries (ref)"	Rephrased
Tom Breeze	Chapter 2	26	622	26	625	You switch between chemical and proper names between these two sentences, I would recommend using the proper name with the chemical names in brackets in the first sentence only.	Done
Maximilian Weigend	Chapter 2	26	623	26	629	This paragraph is fairly obscure. There must be precise data on which type of vegetation captures which type of pollutant how effectively. There might be differences between deciduous and coniferous forests. Statement as it now stands is not logical.	This paragraph has been re-written
Germany	Chapter 2	26	623	26	624	It is recommended to differentiate the role of trees/forests at the local scale (1 - 1000 m - capturing traffic emissions directly), in cities and their surrounding (via climate regulation) and at the regional level (influencing dry deposition in general) as in Maes et al. (2011, reference to figure 2.13). The differences are considerable. It should be made clear that the dry deposition considered in MAES (2011) is only one part of the deposition flux. Both deposition fluxes are dependent on meteorology. Wet deposition also contributes - more or less independently from ecosystem types - to the removal of air pollutants from the air. This flux is often larger than dry deposition and it is (also) i.a. influenced by meteorological conditions (i.a. amount of rainfall). This is relevant to make clear that ecosystems alone cannot provide clean air. Maes et al (2011,) clearly says that "ecosystems influence air quality by emitting chemicals or extracting chemicals from the atmosphere...". The aspect of emission is only mentioned in the last lines, but would fit here well (alternatively it could be stated that the chapter is limited to the extraction of air pollutants).	The issue of scale has been mentioned
Germany	Chapter 2	26	623	26	629	Please re-consider this paragraph. There must be precise data on which type of vegetation captures which type of pollutant how effectively. There might be differences between deciduous and coniferous forests. Statement as it now stands is not logical.	This has been edited and section re-written
Germany	Chapter 2	26	625	26	627 (ft)	The authors limit the further consideration to "close to pollution sources". Therefore, in accordance with MAES et al. (2011) the subscription of Figure 2.14 should be completed as in the original publication: "Removal of NOx by trees in urban and peri-urban areas". It should also be made clear that vegetation is not able to capture emissions in the surrounding that are released in a great height. More important however, it should be discussed, whether the removal of pollutants is a good indicator of the ecosystem service, since it depends not only on ecosystem type but also on the level of (anthropogenic) pollution, i.e. for a certain ecosystem type the service increases, the higher pollution is. It would be the wrong message, if a high ecosystem service would be cheered if it is because of high pollution. In consequence preserving the ecosystem service could theoretically be achieved by high pollution. On the other side, the potential of capturing pollution is limited. Therefore Maes et al. (2011) suggests to combine their concept of mapping the potential of air quality regulation with the critical loads approach protecting ecosystems from damage by air pollution. The aspect is mentioned in the last lines of the chapter, but because of its importance, should be highlighted in a more prominent place.	Now, we follow the new classification of NCPs
Tom Breeze	Chapter 2	26	625	26	627	What units is DDV measured in and how is it estimated (i.e. for an uninformed reader, what does it mean?)	Done
Vânia Prouença	Chapter 2	26	627	26	628	Briefly explain the role of mountain ecosystems in accelerating deposition, is it due to the vegetation type, to forest structure,...?	These relationships are now discussed with references relating to the Pyrenees
Germany	Chapter 2	26	627	26	628	A thorough glance on the map (figure 2.13) reveals that summarising "Mountains have a high capacity, whilst vegetation - intermediate capacity" is not true. There are mountains, where the periphery has a higher potential than the center with highest altitudes. There are also a lot of spots with high capacity in lowlands. It would be more logical to compare mountains with e.g. lowlands, than with countries (Sweden, Finland). It would be helpful to give a short inside, which conditions beside occurrence of forest promote high regulation service. More generally, also the approach used by Maes et al. (2011) should be considered as an early attempt to quantify the role of ecosystems for air quality regulation (and discussed critically): He uses EMEP maps of pollutant concentrations in air (for the year 2000 - probably with a low spatial resolution as 50 km x 50 km) to calculate deposition fluxes in small areas (artificial areas with a buffer of 3 km) with assumed specific (higher) emissions. He uses deposition velocities from another concept (MAPPE Europe, Pistocchi 2011 - not 2088 ! - wrong citation given in the text - why not EMEP deposition velocities for consistency?). He assumes that the pollutants captured by vegetation in the small areas (artificial with 3 km buffer) are also emitted within these areas. While this has a logic, it is questionable, how the service then can then be calculated from the average concentrations in large EMEP grids. Of course, a pragmatical approach is needed to draw near, step by step, to a scientifically acceptable mapping procedure for ecosystem services. However it should always be said clearly, where we are actually on this way (clearly name uncertainties).	The sentence has been modified.
Tom Breeze	Chapter 2	26	627	27	656	There's quite a disparity in the estimates here. A table grouping capacity by habitat type and/or bioregion would be useful	There is not enough data to provide a full analysis by habitat or bioregion but more material will be sought to see if this is possible.

Germany	Chapter 2	26	628	26	629	The meaning of sentence "The latter is important...Europe (Fig 2.14)" is not clear to me.	Changed
Germany	Chapter 2	26	629	26	633	"In Russia...suburban forests" there seems to be a grammatical mistake. Further, about the "maximum capacity" in Russia, see comment to lines 623 - 627 (high pollution = high service). And, what is an information useful for saying that 1 ha covered by trees can capture 1 t pollutants per year without damage, if the pollution is not further specified? Including the possibility of damage here is very much appreciated, but it requires some words in the beginning of the chapter that there is a threat to trees by air pollution (see my first comment).	Sentence clarified. A sentence has been added on "The direct and indirect impacts (of air pollution) on ecosystems can influence their ability to provide ecosystem services."
Tom Breeze	Chapter 2	26	629	26	631	This also needs rephrasing, determines is definitely not the right word here. Do you mean that studies in Russia indicate that forests can absorb up to 1t/ha/yr. of toxic gases without suffering immediate damage? If so elaborate on which gasses.	Rephrased
Tom Breeze	Chapter 2	26	631	26	633	I'm not sure what this means here? Does this mean that absorption rates are highest in suburban areas? If so why?	Absorption rates are probably highest here as pollution rates are greater
Roy Remme	Chapter 2	26	634	26	637	You are correct in stating that vegetation type determines PM capture, but also PM concentration in the air plays an important factor in this ES. This concentration is an important reason why health for example scores higher than forest in Limburg.	Issues around concentration of PM10 have been mentioned
Germany	Chapter 2	26	634	26	634	It should read "the type of ecosystem affects the service delivery" (it has been stated before and is undermined in the same para by literature).	Agree
Germany	Chapter 2	26	637	26	639	The reason, why for mountains and forests ... the service has been stable between 1950 -2007 should be provided, else any practical relevance is missing. Assumably this is because forest area and forest health (?) has been stable (?), or was it stable pollution?	This sentence has been deleted
Germany	Chapter 2	27	641	27	648	In line 643 it should probably read EU Air Quality Directives.	Changed
Allan Watt	Chapter 2	27	643			Reference needed.	Added
Tom West	Chapter 2	27	643	27	643	Reference needed for 'EU Directives' - which ones?	Added
Mark Snethlage	Chapter 2	27	645			Not clear why regulation of air quality by forests should change.	Phrase now reads "the regulation of air quality by all forest types is assessed as tending to improve between 1960 and 2010, as the forest area has increased as a result of abandonment"
Allan Watt	Chapter 2	27	647	27	648	Meaning unclear.	Clarified
Frederic Lemaitre	Chapter 2	27	649	27	656	Looking at the European cities of Stockholm, Berlin, Rotterdam, Barcelona and Salzburg, Baro et al show the moderate contributions of urban ecosystems to Environmental Quality Standards due to spatial mismatch between demand and supply of e.g. PM-10, NO2 and O3 gas capture services (Baró, F., Haase, D., Gómez-Baggethun, E., Frantzeskaki, N. 2015. Mismatches between ecosystem services supply and demand in urban areas: A quantitative assessment in five European cities. Ecological Indicators 55: 146–158)	This section has been re-written and we did not include this reference but will do so in the final draft
Roy Remme	Chapter 2	27	652	27	656	Can you clarify the units for the figures in these sentences? For example, does each tree capture 600 kg O3 and 400 kg PM10? And is the €7127 for all the trees in the city centre?	Clarified
Maximilian Weigend	Chapter 2	27	652	27	656	does the figure at the end of the sentence refer to a single tree or all the - how many? - trees in Szeged?	Clarified
Germany	Chapter 2	27	652	27	656	does the figure at the end of the sentence refer to a single tree or all the - how many? - trees in Szeged?	Clarified
PESC-3	Chapter 2	27	659			There are different ways to estimate ecosystem services. Air quality regulation, in Russia they use different measures such as industrial pollutants. Amount of pollution that comes from water. Does not take into account agriculture pollution	Thank you. I have tried to indicate how the regulation is being measured. This section only looks at air. It is noted that agricultural crops and livestock can emit NH3, CH4 and nitrous oxide and this section will be expanded.
Tom Breeze	Chapter 2	27	659	27	659	What unit is this measured in?	This has been clarified
Allan Watt	Chapter 2	27	660	27	663	Useful contextual comment. Might also be worth discussing the limits to air quality regulation by vegetation.	This is now discussed in section 2.2.1.3 on air quality
Mark Snethlage	Chapter 2	27	660	27	663	Perhaps also good to indicate that a more efficient and logical way to reduce the levels of atmospheric pollution would be to reduce the emissions of pollutants to the atmosphere in the first place. Some studies also suggest that trees, although they filter or capture some of the atmospheric pollution, in some cases actually increase the levels of air pollution at street level, because they accumulate the polluted air (mainly from car exhausts) under their canopies, although local factors are important as shown by conflicting evidence: Jeanjean, A.P.R., Hinchliffe, G., McMullan, W.A., Monks, P.S., Leigh, R.J., 2015. A CFD study on the effectiveness of trees to disperse road traffic emissions at a city scale. Atmospheric Environment 120, 1–14. doi:10.1016/j.atmosenv.2015.08.003; and Vos, P.E.J., Malheu, B., Vankerkom, J., Janssen, S., 2013. Improving local air quality in cities: To tree or not to tree? Environmental Pollution, Selected Papers from Urban Environmental Pollution 2012 183, 113–122. doi:10.1016/j.envpol.2012.10.021.	Thank you for the references
Tom Breeze	Chapter 2	27	660	27	662	This is an important point that needs citations and a bit more elaboration. How does this ecosystem disservice compare to other activities?	The change in IPBES from using the term NBP to NCP was designed to integrate 'disservices' into the conceptual framework. We have therefore removed the discussion of disservices
Frederic Lemaitre	Chapter 2	27	662	27	663	See Field et al, Wu et al, Kuiper et al demonstrating an inversion of carbon fluxes in peatland due to long-term N deposition and climate warming (Field C.D., Dise N.B., Payne R.J., Britton A.J., Emmett B.A., Helliwell R.C., Hughes S., Jones L., Lees S., Leake J.R., Leith I.D., Phoenix G.K., Power S.A., Sheppard L.J., Southon G.E., Stevens C.J., Caporn, S.J.M. (2014) The role of nitrogen deposition in widespread plant community change across semi-natural habitats. Ecosystems 17:846-877 + Wu Y., Blodau C., Moore T.R., Bubier J., Juutinen S., Larmola T., (2015) Effects of experimental nitrogen deposition on peatland carbon pools and fluxes: a modelling analysis. Biogeosciences 11:1-23 + Kuiper J.J., Mooij W.M., Bragazza L., Broekow B.J.M. (2014). Plant functional types define magnitude of drought response in peatland CO2 exchange. Ecology 95(1):123-131	Thank you for these references which did not come up in the original literature search
Nynke Schulp	Chapter 2	27	665	30	714	I miss information on the actual benefits that this service provides. In section 2.2.1.3 also water use is addressed, section 2.2.2.1.2 addresses the demand for air quality regulation and takes spatial arrangement of vegetation vs pollutant sources into account. It would, therefore, for the sake of consistency make sense that in this section you also address to what extent ecosystems contribute to Kyoto targets or to mitigation of global warming.	Given the changes to IPBES NCP definitions this is now discussed in section 2.2.1.4
Patricia Balvanera	Chapter 2	27	665	31	735	The carbon dynamics is missing. I recommend looking into the literature that makes use of Dynamic Vegetation Models such as LPJmL, Joles and so on to document trends in primary productivity, and if possible modelled emissions	We agree that carbon dynamics models outputs are good indicators of global climate regulation service. The reason of not using them is the access to results from such models. We should use published results or results available in public databases. We choose to use a very global indicator (UNFCCC reports from countries) rather than model outputs due to accessibility of the data
Tom Breeze	Chapter 2	28	668	28	670	Include a citation	We have added link to UNFCCC site as footnote to page 24
Tom Breeze	Chapter 2	28	672	28	672	What is Tg C yr. ? A sentence defining the units of measure for gas storage would be very helpful for readers.	this is provided on page 24
Tom Breeze	Chapter 2	28	674	28	674	Is this also considered almost neutral? Or are you talking about the disparity between the -29Tg C yr. and 34 Tg C yr.? If the latter I would call this into questions as the EU25 will make up a much larger area than the rest of Europe unless Russia and a few of the border countries are also included in this.	Neutral was taken as the figures of -29 and 34 in the context of the total emissions. Hence the qualifying term "almost"
Tom Breeze	Chapter 2	28	677	28	677	Which countries? It would be best to just cut the likely drivers of this change off and put them at the end of subsequent paragraph.	The figures shows the 4 ECA regions and thus the countries included in each region. It was felt better to keep the drivers at the end of this paragraph
Vânia Proença	Chapter 2	29	691	29	691	Revise caption, the values shown in the vertical axis are not ratios, but (possibly) the difference between removals and emissions. Label the vertical axes in the graphs and use the same interval of values to enable comparison (or add a note on differences in the caption). In the text, state explicitly that most countries are net emitters.	In fact it is not a ratio used here but a difference between emissions and removal
Vânia Proença	Chapter 2	29	693	29	695	Revise sentence: the balance of emissions and removals depends both on the capacity of ecosystems to remove GHG and on the level of emissions; what is the meaning of "including those from other sectors"?	text has been changed
Tom Breeze	Chapter 2	29	696	29	696	Replace Flanders with Belgium	Stevens, 2015 This was the Flanders ES Assessment so should, stay as Flanders
PESC-3	Chapter 2	30	699			Work of Mediterranean wetlands observatory that looks into changes in wetland area, natural and artificial ones	I looked at material on website including http://medwet.org/wp-content/uploads/2014/10/MWO_2014_Thematic-collection-2_Land-cover-dynamics.pdf , but found nothing directly related to carbon
Werner Rolf	Chapter 2	30	715	31	735	What about trends? Can they be assessed according to land use change?	I would like to find trends. Using land use change is difficult as the effects will be context specific.
Tom Breeze	Chapter 2	30	715	30	718	Again there are quite a few terms here that won't mean anything to a non-expert audience.	Agree. Have suggested that they are included in the glossary
Mark Snethlage	Chapter 2	31	737	35	792	The aptitude of biodiversity and ecosystem functions to influence soil erosion is not limited to the soil cover factor only. Soil biodiversity also influences soil aggregate stability, and therefore soil erodibility and soil hydrological properties. Of the latter, infiltration capacity is particularly important, because when more water infiltrates, this generates less runoff, and thus less erosion. This is mentioned in para 2.2.2.4., but not developed and should perhaps better feature here.	We agree and aggregate stability was accounted for in the text already. We will develop this
Helkki Hokkanen	Chapter 2	31	738	39	873	Loss of soil organic carbon has been a trend over decades, and appears to be accelerating, and even unstoppable in conventional agriculture. This threatens the overall sustainability of agriculture in the long run, maybe more than anything else.	We agree with this comment. Mention that OC decreases can be found also in section devoted to soil quality
Tom Breeze	Chapter 2	31	746	31	747	This implies that erosion control is a) only affected by vegetation (it will also be affected by topography, soil type etc.) and b) responds linearly with increasing vegetation cover. Again, a slight extension of the sentence to explain how this method works would be helpful.	Yes indeed, but slope is not going to change with land use or management
Tom Breeze	Chapter 2	31	750	31	751	This should be "in Europe and Central Asia", with the second "in Europe and Central Asia" removed. Cite a reference here.	We changed the sentence

Tom Breeze	Chapter 2	32	753	32	753	This first sentence can be removed as the next sentence then states the same thing with more detail. It also creates a better flow with the sentence on Line 750-751 which I think should be attached to this paragraph instead.	OK done thanks
Vânia Proença	Chapter 2	32	759	32	761	The content of this sentence is not clear. Moreover, the regulation of erosion processes relies not only on vegetation cover, but also on soil structure in the case of water erosion (links with next section)	Yes we agree but no data is available for the whole Europe and Central Asia on the K factor of soil erosion (the part due to soil structure and properties)
Tom Breeze	Chapter 2	32	766	32	766	replace "circa" with "approximately"	done
Tom Breeze	Chapter 2	32	772	32	772	Replace "Europe" with EU-28 and indicate what year the map relates to	The map was deleted as it does not represent the service but the risk
Tom Breeze	Chapter 2	33	774	32	774	and throughout indicate what stage of the EU this is indicative of (i.e. EU-28 in this case) and for what year the map relates to	Done
Maximilian Weigend	Chapter 2	33	779	33	780	the legends needs to be more explicit - not everybody is familiar with the C-Factor	The C factor is explained in the text
Germany	Chapter 2	33	779	33	780	Please check the legends of the following figures 2.23, 2.24, 2.25, 2.27) and make them more explicit	WE rewrote the legends of figures
Maximilian Weigend	Chapter 2	34	783	34	783	the legends needs to be more explicit - what is 0 to 1?	explained in the text and in the legend
Maximilian Weigend	Chapter 2	34	786	34	786	the legends needs to be more explicit	We rewrote the legends of figures
Allan Watt	Chapter 2	35	787			Not "aggravating" but "worsening"?	corrected
Allan Watt	Chapter 2	35	791	35	792	The concept of conservation agriculture is not widely understood and should be defined and/or referenced e.g. Scobel et al. Agronomy for Sustainable Development, 2013, Volume 33, pp 113-130	done
Tom Breeze	Chapter 2	35	791	35	791	Maes et al can be included in the same citation if this is the case. MAES isn't an acronym.	MAES is both an acronym (the EU program on Ecosystem services) and the name of the principal investigator of this program, Joachim Maes.
Allan Watt	Chapter 2	35	794	35	819	More sources of information / references needed and whole section should be expanded to reflect the importance of this topic and the amount of research done.	Thank you for the comment. This section has been expanded and also material incorporated into other sections due to changes in the definitions of NCPs
Nynke Schulp	Chapter 2	35	794	39	874	I only see data here from the JRC Soil Data Centre. Did you consider using outputs from ISRIC's efforts on global soil mapping? They did produce quite some potentially interesting additional (or better) indicators.	Thank you for the suggestion and JRC soil data has been included and links provided see for example figure 2.24
Nynke Schulp	Chapter 2	35	808	35	810	This is a wrong deduction: you mention a myriad of indicators and from that conclude that a few of them are suitable at global scale, without explaining why the other indicators are disregarded. Please add such a description.	This perspective is recognised and the whole section has been rewritten
Tom Breeze	Chapter 2	35	808	35	810	Define cation exchange capacity (CEC), what does this measure specifically?	OK deleted
Nynke Schulp	Chapter 2	35	813	35	813	Soil organic N stocks cannot be directly derived from C content. While C content in organic matter is relatively homogeneous, N contents are widely different.	This is now addressed in section 2.2.1.7.2 on soil fertility
Nynke Schulp	Chapter 2	35	816	35	817	An NUE higher than 1 indeed points to nitrogen depletion, but this tells you nothing on the soil fertility. It could be that the soil has a legacy or natural nitrogen excess and can perfectly deal with depletion for ages. The NUE is a characteristic of the land use system, not of the soil. Don't use it as an indicator for soil fertility.	The discussion of NUE has been revised in the light of this comment please see bottom of page 39
Nynke Schulp	Chapter 2	35	817	35	819	Why isn't this addressed further?	thanks. We agree it is important and this has been addressed further in section 2.2.1.7.2
Tom Breeze	Chapter 2	35	817	35	818	give units for infiltration rate and stability	Only the processes are mentioned here, no values are given
Tom Breeze	Chapter 2	36	831	36	833	This sentence needs a reference	references added
Maximilian Weigend	Chapter 2	36	839	36	842	the legends needs to be more explicit	Legends were edited
Maximilian Weigend	Chapter 2	37	845	37	846	the legends needs to be more explicit	Legends were edited
Tom Breeze	Chapter 2	37	852	37	854	What is Nitrogen mining? Without knowing this its hard to tell if this trend if good or bad	section 2.2.1.7 on soil formation and decontamination has been redrafted and now addresses this comment
Olivia Barrantes	Chapter 2	37	852	37	852	Provide definition of NUE concept, necessary to people unfamiliar with the concept	see bottom of page 39 for discussion of NUE
Werner Rolf	Chapter 2	38	860	38	860	In particular the top figure cannot be read completely due to dense information, maybe it can be simplified?	has been repaled
Olivia Barrantes	Chapter 2	38	862	38	862	In Chapter1, Turkey is considered Central European Country	section 2.2.1.7 on soil formation and decontamination has been redrafted and now addresses this comment
Tom Breeze	Chapter 2	38	866	38	867	One of these two sentences should be referenced.	section 2.2.1.7 on soil formation and decontamination has been redrafted and now addresses this comment
Tom Breeze	Chapter 2	38	866	38	869	Within the framework defined here, without separating supporting services, this is fine as it is (although I would clarify if the soil being lost is actually good quality or actually low productivity? Even then low productivity soil can support biodiversity). However taking the MEA definition of supporting services into consideration this isn't a loss of soil quality as much as it is a loss of formed soil. Not something to change per se but something to bear in mind if you change to a 4 category route.	section 2.2.1.7 on soil formation and decontamination has been redrafted and now addresses this comment but we have to work with IPBES NCP categories
Werner Rolf	Chapter 2	39	870	39	870	green shading a difficult to distinguish	We hope the final version will be of better quality
Nynke Schulp	Chapter 2	39	871	39	873	The JRC ESDAC has better data that specifically address soil sealing, which would be more consistent with the text in the section.	section 2.2.1.7 on soil formation and decontamination has been redrafted and JRC data included with references
Allan Watt	Chapter 2	39	875	39	881	Presumably work in progress but the statement "especially near rivers" suggests that research on flow regulation within rivers will not be covered. See e.g. Gurnell et al. Aquatic Science 2016, Volume 78, pages 1-16 and REFORM project http://reformrivers.eu/home . Also, the role of wetlands in water flow regulation should be considered. In both cases, the urban context should be included.	with the help of new CA material on water flow is now in section 2.2.1.5 and wetlands are discussed in detail in this section and the following section 2.2.1.6 on regulation of freshwater
Vânia Proença	Chapter 2	39	875	39	881	Water flow regulation is very related with control of water erosion and could be merged with section 2.2.2.3	We agree that in terms of processes there is a strong relationship between water flow regulation and erosion by water. Ecosystem services are being grouped differently now that the concept of Nature Benefits to People was introduced by the MEP
Tom Breeze	Chapter 2	39	875	40	897	It's not clear how this is some sort of different service from flood prevention and water. It is also not part of any categorisation I am aware of.	We will split section 2.2.5 water flow regulation into 2 subsections as NCP 5 and 6
Maximilian Weigend	Chapter 2	39	876	39	881	This statement is at odds with Fig. 2.30 - the postulated overall trends are not reflected in the figures	The figures have been removed, and water regulation has been captured under NCP 6 and, when relevant NCP 9
Germany	Chapter 2	39	876	39	881	This statement is at odds with Fig. 2.30 - the postulated overall trends are not reflected in the figures	The figures have been removed, and water regulation has been captured under NCP 6 and, when relevant NCP 9
Vânia Proença	Chapter 2	39	880	39	881	Add an interpretation for the pattern instead of just describing what is shown in the map	The figures have been removed, and water regulation has been captured under NCP 6 and, when relevant NCP 9
Tom Breeze	Chapter 2	39	880	39	881	Where is it highest?	The figures have been removed, and water regulation has been captured under NCP 6 and, when relevant NCP 9
Frederic Lemaitre	Chapter 2	40	898	40	898	For 2.2.2.6 on hazard mitigation, please consider urban contexts, and see corresponding valuation in Barthel S, Isendahl C (2013). Urban gardens, agricultures and waters: sources of resilience for long-term food security in cities. Ecological Economics 86 : 224-234	Thanks for the suggestion, however since there exist a section about food security in this chapter I send this refer to the authors in charge of
Allan Watt	Chapter 2	40	899	40	901	Presumably coastal, other than wetland, vegetation will be considered.	Yes the information was not right and was changed
Mark Sneathlage	Chapter 2	40	899	40	901	Title and sentence do not seem to match	Yes the title and information were moved to make it match
Tom Breeze	Chapter 2	40	899	40	907	Again, this is not an ecosystem service in any classification I am aware of. It is a benefit of erosion control.	We revised the ES classification and subsection title regarding the new NBP classification
Mark Sneathlage	Chapter 2	40	900	40	901	Seems more relevant for 2.2.2.6.2 Flood protection	OK this text moved in the flood protection section
Roy Remme	Chapter 2	40	907	40	907	For this section see Stürck, Poortinga, Verburg, 2014. Mapping ecosystem services: the supply and demand of flood regulation services in Europe. Ecological Indicators 38, 198-211.	Yes this ref is included in this section
Vânia Proença	Chapter 2	41	916	41	940	The Natura 2000 network, Habitats Directive and Birds Directive should be introduced in this section	These have been integrated more fully in the chapter generally on page 15, 32, 125 and 137 and in table 2.7. They are also discussed in other chapters more fully.
Tom Breeze	Chapter 2	41	916	41	941	Again, this is not an ecosystem service in any classification I am aware of. There are a number of non-market benefits that arise from the maintenance of biodiversity that the section covers (bequest values, option values etc.) but it is not an ecosystem service in itself. A lot of the information would be better placed in the sections concerning the services they relate to (e.g. the fisheries example)	This is part of NBP 1 as it was defined
Vânia Proença	Chapter 2	41	917	41	923	Text between lines 917 and 923 could be cut. Habitat maintenance should focus only on habitat for species, as described in lines 924 and afterwards.	now covered in detail in section 2.2.1.1. as NCP1
Allan Watt	Chapter 2	41	924	41	925	A very limited view of this ecosystem service.	now covered in detail in section 2.2.1.1. as NCP1
Frederic Lemaitre	Chapter 2	41	943	41	943	For "2.2.2.8 Pollination and seed dispersal": please consider the work of Schulp et al (2014) on mismatch between demand and supply of pollination in the European Union (Schulp, CIE, S. Lautenbach, P.H. Verburg (2014): Quantifying and mapping ecosystem services: Demand and supply of pollination in the European Union, Ecological Indicators; 36:131-141)	The pollination section 2.2.1.2 has been expanded considerably due to the completion of the IPBES pollination assessment with inputs from authors who worked on the assessment.

						This subsection should cover a) the total economic benefits of pollination services to crop production (as outlined in the IPBES pollinators assessment) - see e.g. Lautenbach et al (2012) PLoS One, Leonhardt et al (2013) Ecological Economics and Gallai et al (2009), Ecological Economics. These papers will also contain maps of service benefit and give an idea of the countries most affected. b) the impacts of pollination services on the availability of nutrients in the human diet - see Smith et al (2015) The Lancet, Chaplin-Kramer et al (2014) PRSB and Eilers et al (2011) PLoS One. c) The non-market benefits of pollination services to wellbeing e.g. supporting aesthetic plant biodiversity; e.g. Breeze et al (2015) Ecological Economics; Lindeman-Matthies et al (2010) Biological Conservation d) the impacts that pollination has on cultural values (e.g. hobby beekeepers, ancient culture such as Lithuania's traditional beekeeping practices; this is where you may need some ILK expertise) and e) the impacts that pollination service stability has on the stability of other benefits such as crop yields (e.g. Garibaldi et al, (2013) Science; Garibaldi et al (2011) PNAS). It is important to note that pollinator diversity is associated with localised changes in benefits (e.g. Garibaldi et al., 2013, 2016 Science) BUT in Europe, the majority of services are provided by a handful of species (Kleijn et al., 2015), abundance is the main predictor of service (Garibaldi et al., 2013) and many countries do not have sufficient honeybees to provide services in the event of a complete loss of pollinators (Breeze et al., 2014 PLoS1 - this contains data and maps for the majority of Europe and Central Asia showing honeybee supplies relative to demands). There is some evidence in some countries that declines of diversity are slowing (Carvalho et al., 2013), however without systematic monitoring it is impossible to tell whether populations are declining in abundance (Carvell et al., 2016; National Pollinator and Pollination Service Monitoring Framework).	In the SOD, the information regarding pollination and pollinators is covered based on the IPBES deliverable on pollinators. In fact, Simon Potts is the author.
Tom Breeze	Chapter 2	41	943	41	945	If seed dispersal is to be considered a service, it should be separated here as it relies on very different biodiversity (in Europe at least)	We do not include seed dispersal
Allan Watt	Chapter 2	41	946	41	947	The absence of any text on this topic is very disappointing: pollinators are receiving the attention they deserve (in a separate assessment) but pests and diseases which are important to all crops (not just those requiring pollination) should be given equal status at least. In addition, of course, pests and diseases affect forests, livestock and humans.	In the SOD, the information regarding pollination and pollinators is covered based on the IPBES deliverable on pollinators. In fact, Simon Potts is the author.
Nynke Schulp	Chapter 2	42	958	58	1523	Whereas in the previous sections you discussed the capacity of ecosystems to support a service, in this section you address the actual use of the service. That is a different process and is driven by completely different processes as the supply. This creates a distorted picture among the different services. Rather try to find indicators for the change in supply: past changes of edible species distribution, changed land cover that influenced the capacity to support recreation.	In the SOD, we present a table in the first section (2.1.2) where we state which component of NCP is addressed in the assessment. So, a clear picture and transparent information is provided.
Heikki Hokkanen	Chapter 2	42	958	43	994	In many countries recreational fishing is far more popular than hunting; fishing is not presented well while hunting is covered at length.	Our assessment is based on literature review (that follows a systematic approach) and available indicators. The fact that fishing is poorly represented is because the lack of papers that approach fishing as an ecosystem services. In the SOD, we made a bigger effort to cover this.
Nynke Schulp	Chapter 2	42	959	42	960	This might be true, but it's not the reason. Reason is that cultural ecosystem services are notoriously difficult to quantify or even define. The cultural services that do get quantified are the relatively easy ones.	Thanks for this reflection...this phrase is reworded in the SOD
Tom Breeze	Chapter 2	42	959	42	961	This is a sensible approach but make it clear that you are discussing effectively three different services here that are grouped together because they tend to draw upon the same natural capital.	Sorry we do not understand this comment
Heikki Hokkanen	Chapter 2	42	960	42	960	In the whole document 'ecotourism' is mentioned just once; it has become an important element of the concept "Experiences with ecosystems and species" and should be explored much more thoroughly	In the SOD, we cover ecotourism as a NCP.
Frederic Lemaitre	Chapter 2	42	964	42	965	Please consider a reference to "Gómez-Baggethun, E., Barton, D.N. 2013. Classifying and valuing ecosystem services for urban planning. Ecological Economics, 86: 235–245", showing that in urban ecosystems, the high density of beneficiaries leads to surprising high values for cultural ecosystem services.	In SOD, we address more carefully urban systems
Vânia Proença	Chapter 2	42	969	42	969	Nevertheless, it should be acknowledged that there are many particular species providing cultural ecosystem services (e.g., vultures, whales)	In the SOD, we cover ecotourism (and wildlife-tourism) as a NCP.
Anna Augustyn	Chapter 2	42	980	42	983	Green care could be added to the list	This is not mentioned in the new version of the NCPs.
Vânia Proença	Chapter 2	42	990	42	990	Indicate the survey sample size, and/or surveyed populations (e.g., urban, national)	This information is not provided in the original sources
Roy Remme	Chapter 2	42	993	43	994	In Table 2.1, are you sure the 21% participant rate for mushroom picking in the Netherlands is correct? Mushroom picking is generally illegal in Dutch nature areas.	You were right, this figure belongs to Italy. Thanks!
Tom Breeze	Chapter 2	43	998	43	1001	This doesn't call food as a provisioning service into question at all (you still eat the end product). This is an issue with distinguishing between an ecosystem good/service and a benefit. Edible plants act as food (a provisioning service) and can, if grown under certain conditions provide recreational and cultural benefits too. The rest of his paragraph is very on point, well research etc. but this sentence is a bit misleading.	We do not agree! Actually this point is also acknowledged by the IPBES draft listing NCPs
Thomas Brooks (IUCN)	Chapter 2	43	1013	44	1016	From where are the raptors for this falconry obtained? Are they captive-bred, or are they wild harvested? If the latter, to what degree is this harvest sustainable? Also L1049-1060.	The original sources do not provide this information.
Allan Watt	Chapter 2	44	1017	44	1024	A very useful addition to this section, underlining the fact that conflicts exist between people. However, this part of the assessment could be expanded to include the conflicts that affect rare / threatened species. See e.g. Redpath et al. (2013) Understanding and managing conservation conflicts. Trends in Ecology and Evolution 28, 100-109.	Very useful comment. In the SOD we broaden up to human-wildlife interactions, covering conflicts and benefits
Santosh Kumar Mishra	Chapter 2	44	1026	45	1064	Before start of Mushroom gathering (Page 45, Line 1067), add following information: Hunting Tourism: Hunting tourism (defined as "leisure travel undertaken for the purpose of hunting game animals, either in the wild or on tracts of land created especially for hunting") is conducted by hunters who may sometimes travel considerable distances from their home and/or own hunting grounds, and often abroad, in order to hunt. They may be well-acquainted with their destination and be familiar with the species they hunt. There is, however, a gradient in the degree to which travelling hunters may have socio-cultural links to their hunting destinations. The more exotic and unfamiliar a hunting destination is, the greater the socio-cultural barriers can be. In addition, motivation for hunting by such tourists may place greater emphasis on adventure and souvenirs (e.g., trophies) than is the case for hunters with closer links to the hunting destination This can motivate payment of significant sums of money to intermediaries ("hunting tour operators") that organize and facilitate their hunting experiences. Reference: Brainerd, Scott (2007). Convention on the Conservation of European Wildlife and Natural Habitats: European Charter on Hunting and Biodiversity. Oslo, Norway: Norwegian Association of Hunters & Anglers.	Thanks! This consideration is now added
Allan Watt	Chapter 2	44	1026	44	1048	As well as presenting information on hunted species by shots per species (line 1029), data on other measure should be assessed, if available, e.g. animals killed, hunters involved.	This data unfortunately is not easily available. We would be very grateful if you can provide us the source of this data
Maximilian Weigend	Chapter 2	44	1026	45	1048	This entire paragraph is unsatisfactory - starting with the numbers in the second line (what the 59 species which are not mammals or birds?), also Phaseanus is not true wild species across most of Europe and is essentially farmed, the figures for game species richness appear highly dubious. May a definition of what is considered as "hunting" should here be the first sentence and then a short review of who hunts (It is certainly not "farmers and other rural people" in Germany, and then the maps have to be critically reviewed on that basis. The role of hunting as part of the ecosystem management and the conflicts resulting from that need to be spelt out.	The whole paragraph is based on published scientific literature that should be right. Now, we add a parag about the conflicts caused by hunters.
Thomas Brooks (IUCN)	Chapter 2	44	1026	44	1048	This section seems to be silent on the enormous trapping, liming, and shooting of migratory birds in the Mediterranean. Important to add a paragraph discussing this.	Now, we add a parag about the conflicts caused by hunters.
Germany	Chapter 2	44	1026	45	1048	The entire paragraph would benefit from a revision - starting with the numbers in the second line (what the 59 species which are not mammals or birds?); also Phaseanus is not a truly wild species across most of Europe; it is essentially farmed; the figures for game species richness appear need critical cross-checking. Therefore, please revise this section and try to ensure a more balanced perspective on hunting (including more data sources). Please also expand on how hunting is defined here. Also discuss, how its function is in terms of ecosystem management, and what potential conflicts hunting tourism may have? Proposal: You could start the para with a definition of what is considered as "hunting", followed by a brief review of who hunts (for example, it is certainly not "farmers and other rural people" in Germany). On the basis of this expanded discussion, it would be very useful to critically review the maps. All in all, the role of hunting as part of the ecosystem management and the conflicts resulting from that need to be spelt out.	The whole paragraph is based on published scientific literature that should be right. Now, we add a parag about the conflicts caused by hunters.
Adrian Wójcik	Chapter 2	44	1026	45	1065	Although the hunting tradition in general and falconry are for sure part of historical tradition that may be part of ILK, it is worth to show how they contribute to biodiversity and ecological services. In at least part of Eastern Europe (Poland) the hunting rights are often in contradiction with land owners right and rights of local people to take full advantage of local natural ecosystems (lakes, forests etc.)	Interesting...we try to provide more information in the SOD
Thomas Brooks (IUCN)	Chapter 2	44	1027	44	1034	I'm not sure that richness of hunted species is a particularly interesting metric. Isn't it more relevant to consider the total volumes of harvest (individuals, biomass) and the sustainability or lack thereof of the harvest?	This reflects the ecosystem service capacity. See the new addition in section 2.1.2.
Mark Snethlage	Chapter 2	44	1028	44	1028	*97 species, being 26 bird species and 12 mammals" to what taxonomic groups do the 61 other species belong?	This information is added in the SOD
Douglas Nakashima	Chapter 2	44	1039			Hunting ADD details of indigenous communities for whom hunting is a key economic activity, e.g. Lavrillier et al 2016 (Siberia): The type of reindeer herding practiced by the Evenk of southern Yakutia and the Amur region is called taiga... It corresponds to a dual economy and a dual logic of subsistence between [sable] hunting and reindeer herding, with seasonal interplay between the two. (A. Lavrillier, S. Gabyshv and M. Rojo (2016). The Sable for Evenk reindeer herders in southeastern Siberia: interplaying drivers of changes on biodiversity and ecosystem services – climate change, worldwide market economy, and extractive industries. In Marie Roué and Zolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris.)	Thanks! Information added
Tom Breeze	Chapter 2	44	1039	44	1040	How was this statistic gathered, 12% seems very high?	It comes from the reference provided
Allan Watt	Chapter 2	45	1049	45	1060	Check for repetition.	Checked
Werner Rolf	Chapter 2	45	1061	45	1061	These two diagrams can be combined using doubled axis labeling	Not really because X-axis is different
Allan Watt	Chapter 2	45	1065			Recreational fishing appears to be missing, although involving more people than hunting.	Our assessment is based on literature review (that follows a systematic approach) and available indicators. The fact that fishing is poorly represented is because the lack of papers that approach fishing as an ecosystem services. In the SOD, we made a bigger effort to cover this.

Maximilian Weigend	Chapter 2	45	1067	46	1079	The bulk of the data are here compiled from a single literature source, which clearly gives a very incomplete picture. Pleurotus is probably mostly from cultivation nowadays, Leccinum and Imleria are amongst the most important species collected. Poland has a massive export market of wild-collected mushroom to Germany, all the minor mountain ranges also have these activities etc. Also, very much of the collection comes from managed forests - which needs to be mentioned. These are often man-made ecosystems such as pine- and spruce forests.	As IPBES should relies on scientific publications, so far this is the one which provides a more general picture at the scale of Europe. In fact our assessment is based on literature review (that follows a systematic approach) and available indicators. The fact that mushroom gatherers is poorly understood here is because the lack of papers that approach this NCP as an ecosystem services. In the SOD, we made a bigger effort to cover this.
Germany	Chapter 2	45	1067	46	1079	The bulk of the data are here compiled from a single literature source, which clearly gives a very incomplete picture. Pleurotus is probably mostly from cultivation nowadays, Leccinum and Imleria are amongst the most important species collected. Poland has a massive export market of wild-collected mushroom to Germany, all the minor mountain ranges also have these activities etc. Also, very much of the collection comes from managed forests - which needs to be mentioned. These are often man-made ecosystems such as pine- and spruce forests.	As IPBES should relies on scientific publications, so far this is the one which provides a more general picture at the scale of Europe. In fact our assessment is based on literature review (that follows a systematic approach) and available indicators. The fact that mushroom gatherers is poorly understood here is because the lack of papers that approach this NCP as an ecosystem services. In the SOD, we made a bigger effort to cover this.
Maximilian Weigend	Chapter 2	46	1081	47	1114	This paragraphs is both incomplete and inconsistent, the map does not square at all with the species mentioned. I was not aware that Prunus virginiana is at all present in Europe to any extent (are we talking about Prunus spinosa here?), I find no evidence that Bunium or L. tuberosus or Cirsium arvense are of more than extremely local importance, the "undefined Rubus species" are best called Rubus fruticosus agg., Rubus chamaemorus is REALLY important in Scandinavia and Vaccinium vitis-idaea is the second most important Vaccinium species (widly sold and nearly exclusively wild-crafted in Europe). The large number of wild-collected tree and medicinal drugs are completely omitted (Drosera from CE, EE and Scandianvia, Arnica flowers, Crataegus leaves etc.).	As IPBES should relies on scientific publications, so far this is the one which provides a more general picture at the scale of Europe. Now a new section on medicinal plants is also added as material contribution
Douglas Nakashima	Chapter 2	46	1081			Section 2.2.3. Status and trends of cultural services / 2.2.3.1.1. Role of species as providers of nature-based recreation activities and tourism / subsection "Gathering of vascular plants" see examples proposed for section 2.2.1.1.	Thanks
Germany	Chapter 2	46	1081	47	1114	This paragraph appears inconsistent and seems to be incomplete; the map does not square at all with the species mentioned. Is Prunus virginiana at all present in Europe to any extent? Is there really evidence that Bunium or L. tuberosus or Cirsium arvense are of more than extremely local importance? the "undefined Rubus species" are best called Rubus fruticosus agg., Rubus chamaemorus is REALLY important in Scandinavia and Vaccinium vitis-idaea is the second most important Vaccinium species (widly sold and nearly exclusively wild-crafted in Europe). The large number of wild-collected tree and medicinal drugs are completely omitted (Drosera from CE, EE and Scandianvia, Arnica flowers, Crataegus leaves etc.).	As IPBES should relies on scientific publications, so far this is the one which provides a more general picture at the scale of Europe. Now a new section on medicinal plants is also added as material contribution
PESC-3	Chapter 2	46	1088			Diversity and gathering of vascular plants. Information from Turkey is available and should be incorporated.	In the SOD, we make an effort to cover Turkey
Maximilian Weigend	Chapter 2	46	1090	46	1110	There is a complete confusion between "famine foods" such as the rhizomes of water lilies and Elymus - and wild food collected for its specific qualities, staple foods and "luxury foods", all of which follow entirely different trend determined by socio.economical factors - Bilberries or blackberries are a luxury food, not something harvested in an emergency.	We do not agree. The references used in the statement of 'wild food scarcity' exactly indicate this point. Please, notice that the assessment is from 1950s until current times and this sentence already stated in the past decades...as it was for example in Spain after the civil war. In this paragraph, we also acknowledge the other motivations such as recreation.
Germany	Chapter 2	46	1090	46	1110	There seems to be confusion between "famine foods" such as the rhizomes of water lilies and Elymus - and wild food collected for its specific qualities, staple foods and "luxury foods", all of which follow entirely different trends determined by socio.economical factors - Bilberries or blackberries are a luxury food, not something harvested in an emergency. Therefore, please revise this paragraph. You may want to discuss in more detail the socio economic contexts (e.g. famine foods vs. Luxury). Not entirely accurate. Recently, in many parts of Europe there is a reversed trend where, as a response to globalization, people start to appreciate local products again more and more, and want to get back ownership over their consumption. See articles by Luczak.	We do not agree. The references used in the statement of 'wild food scarcity' exactly indicate this point. Please, notice that the assessment is from 1950s until current times and this sentence already stated in the past decades...as it was for example in Spain after the civil war. In this paragraph, we also acknowledge the other motivations such as recreation.
Nynke Schulp	Chapter 2	46	1100	46	1110	I'm not sure what this sentence means? That most people buy the majority of their food from a monetary market?	Thanks! This reflection is incorporated in the SOD
Tom Breeze	Chapter 2	46	1107	46	1107	The various indexes need a brief description. Is this for all of Spain or a sub-region? What data is this based on?	Yes
Tom Breeze	Chapter 2	47	1111	47	1114	Indicate the survey sample size, and/or surveyed populations (e.g. urban, national)	The information required is added in the SOD
Vânia Proença	Chapter 2	47	1112	47	1114	1) Both 'protected areas' and 'national parks' need clearer definition - lines 1120-21 indicate that protected areas are not the same as national parks, but the Schagner 2016 article is on national parks, not protected areas. Eg does protected area mean any area protected by law for its ecological characteristics? Terrestrial only or also marine? Is there a definition in Balmford et al that can work? 2) the following para also seems to be drawing out a difference between 'protected areas' and 'national parks', but without a clear definition of these, it is a bit lost.	The information required is added in the SOD
Tom West	Chapter 2	47	1116	47	1124	information about recreational landscapes in urban areas are missing	We add a definition for these terms in the glossary for the SOD. We also try to state clearly what we mean
Werner Rolf	Chapter 2	47	1116	47	1140	Is there any information on the number of national parks/other designated areas per country (there should be for the EU)? This would be a very nice table.	In SOD, we address more carefully urban systems
Tom Breeze	Chapter 2	47	1122	47	1124	What does rate of visitors mean? Visitors per 100,000 population? What is this based on (given the statement on line 1132-1133).	national parks are discussed on page 88 but we are still seeking to obtain this data in a fmrroat that allows the meaningful comparison of countries
Allan Watt	Chapter 2	47	1123	47	1130	Relative to what? If the numbers are low because the number of people in these countries is low, then this is a trivial point, but if the number is lower than expected for the population size, this is useful to know.	In the SOD the data is calculated according to the population in the country
Tom Breeze	Chapter 2	47	1126	47	1131	Is this across all of Europe? Just the EU?	Across all europe. Now clarified
Tom West	Chapter 2	47	1131	47	1131	European - or Spanish, British and Finnish?	You were right. Thanks!
Werner Rolf	Chapter 2	48	1146	56	1440	You did an astonishing work underpinning this difficult topics with evidence found in literature. However mostly it does just describe linkages (f.i. between nature and spirituality). It would be perfect if in addition you could add some data about these topics, like spatial distribution, potential hotspots, etc. across europe) based on the indicators you have pointed out - but I understand it is difficult to find these data.	Thanks for this comment! We are trying to collect this data for the final draft
Adrian Wójcik	Chapter 2	48	1146	49	1201	Focusing on only the aesthetical importance of nature is downplaying its role for everyday human functioning. One of the most important nature benefits is the improvement of cognitive functioning and attention restoration. I know that the followings parts of the chapter are related to health benefits of nature. Still, this is far more specific result that should not be neglected. Please see: Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. Journal of Environmental Psychology, 15(3), 169-182. http://doi.org/10.1016/0272-4944(95)90001-2	Restorative aspects are dealt with in the health section
Tom West	Chapter 2	48	1152	49	1186	1) Some really interesting ideas in here which deserve fuller expansion and discussion. 2) Although perhaps there is also a need to be more tentative: "people prefer natural landscapes over built environments" is a rather bold claim. 3) Lines 1163-64: is it 'landscape structures' that are contributing here or 'personal histories'? - the farmer prefers landscape A because she is a farmer, the tourist B because she is a tourist, rather than because of the landscape structure. See also lines 1177-78 which is making the same point 4) Who are 'social actors' (1158, 1175) and 'stakeholders' (1164, 1177): are they the same as 'people'? (1152-54, 1172, 1176) The latter terminology is probably preferable. 5) should 'hydrophilia' (1183) and 'phytophilia' (1156) be dealt with together as instances of EO Wilson's much more famous concept of Biophilia (which itself is potentially worth engaging with: See EO Wilson, Biophilia (Harvard University Press 1994))?	Thanks. We more people in general except the original reference compare among specific social actors. Exactly, hydrophilia and phytophilia links with biophilia. We add the idea of biophilia in section of species.
Mark Snethlage	Chapter 2	48	1153	48	1154	How is this measured? What about numbers of people visiting historic place like Rome and Florence and cultural landscapes like Tuscany? Should the sentence not be rephrased somehow to reflect this?	Rephrased accordingly
Tom Breeze	Chapter 2	48	1154	48	1157	Define "phytophilia". How does this relate to biophilia (e.g. plant biodiversity)?	This is added in the glossary as well as in the chapter itself
Tom Breeze	Chapter 2	48	1158	48	1159	Give examples of social actors	added
Tom Breeze	Chapter 2	48	1166	48	1168	See Burton et al (2008) Sociological ruralis and/or Burton (2012) Landscape Research for UK examples relevant to habitat management and maintenance	Thanks for these references
Tom Breeze	Chapter 2	49	1182	49	1183	Define hydrophilia?	This is added in the glossary as well as in the chapter itself
Allan Watt	Chapter 2	49	1189	49	1190	Supporting evidence needed.	references are added
Werner Rolf	Chapter 2	49	1195	49	1200	redundancy - see page 47, line 1135.	addressed
Roy Remme	Chapter 2	49	1201	49	1202	An additional aspect of landscape aesthetics is that it has been frequently studied in combination with housing prices, showing that attractive landscapes increase housing values. A new example from the Netherlands shows that aesthetics can contribute up to 16% of the value: Daams, Sijtsma, van der Vlist (2016). The effect of natural space on nearby property prices: accounting for perceived attractiveness (in press). Land Economics.	Now, the economics of NCP are included in the chapter
Allan Watt	Chapter 2	49	1202			This section (2.2.3.1.3) is very good but I wonder if there is evidence of changing attitudes to aesthetic beauty. For example, "beauty" may be dependent on the landscapes experienced during childhood and/or what people become used to.	We think this goes beyond this assessment. But you are right

						2.2.3.2. Education, skill and knowledge generation ILK is the result of a continued relationship between human populations and their environment, building a body of knowledge passed on along generations. [dolo et al. 2010 (Italy): (p382) "As often observed in species-rich regions (González-Rivas et al., 2006), in our analysis the high plant biodiversity of the study area (Conti, 1998) was paralleled by a high number of traditional uses concerning 145 species, including current and past uses that are still remembered." Alphandéry & Fortier 2005 (France): (p162) "From naturalist scientific institutions to hunting and trapping associations, via nature conservation agencies and local government, a wide range of actors and organizations possess varied forms of knowledge. Hunting is an area where know-how concerning flora and fauna is particularly rich. It is no coincidence that this activity has provided a unique field of observation for ethnologists and anthropologists. Beyond the capture techniques and the taxonomy used, rural hunters have long been reputed for having expert knowledge of the habitat. The development of the rational management of hunting has provided them with a greater understanding of the numbers and dynamics of populations." Parrotta & Agnoletti 2007. (p1) "Traditional forest knowledge is an integral component of a network of linkages and relations, supported by an overall framework of signs and meaning. It is often based on long historical experience and deep insight into the dynamics of forest ecosystems, and the behavior and characteristics of animal and plant species that are of special economic, social, cultural, and spiritual significance to communities. Carvalho & Morales 2010 (Portugal) : (p150) "Over time, this close relationship between people and their natural and agricultural environment has led to the development of a rich knowledge base on plants, plant uses and related practices. Some of this local ecological knowledge has been documented in old botanical or agricultural monographs (e.g., Coutinho 1877; Palhinha 1946), and in several historical and anthropological research projects conducted in northeastern Portugal (e.g., Alves 1934[1985]; Dias 1953[1984]), but there was no detailed or prolonged ethnobotanical study of such knowledge and practices until 2001 (Carvalho 2005)." Glasenapp & Thornton 2011 (Switzerland): (p774) "Manually cutting the grass, then scattering, turning, raking and finally collecting it allows a close inspection of the land each year. Annual differences in vegetation are evaluated using qualitative indicators, such as color (lush green to brownish) for ripeness or structure (diameter of stems and leaf sizes) and weight (when lifting to turn) for fodder quality and ability to dry for storage. A farmer may smell the grass to judge differences in herb content. In addition, certain plant species are classified according to their capacity to dry and their suitability for fodder. This intense, continuous involvement with various patches of land distributed across the valley allows the farmer to assemble a detailed picture of the ecological conditions each year and over time. A focal vocabulary, often endemic to the community or regional dialect, develops around key landscape conditions."	Thanks for the references regarding ILK		
Douglas Nakashima	Chapter 2	49	1203						
Patricia Balvanera	Chapter 2	49	1203	51	1264	I have mixed feelings about keeping ILK in the same section than education. I like the approach of not separating them to be inclusive but also I feel that ILK gets a bit lost this way. I would suggest rather splitting them apart	We split the two in the SOD		
Allan Watt	Chapter 2	50	1221	50	1223	There are no other estimates of financial value in this Chapter (I think) so this should be deleted.	Now, the economics of NCP are included in the chapter		
Allan Watt	Chapter 2	50	1244	50	1246	The paper cited should be consulted. As I understand it, it refers to one form of ecological knowledge ("this ecological knowledge" in the paper), not ecological knowledge in every sense. Perhaps write "may be defined" in line 1244.	You are right, but I think we forgot to change. Apologies!		
Douglas Nakashima	Chapter 2	50	1247	50	1251	"In specific locations, however, local ecological knowledge linked to nature can have significant value for local communities in Europe and Central Asia. A review of studies in Arctic regions argues that local ecological knowledge plays an important role in land rights claims (Davis & Wagner, 2003). An in-depth study of resource-users and local organisations involved in a local fishery in Sweden shows how local ecological knowledge can contribute to fish management and conservation (Olsson & Folke, 2001)." OTHER EXAMPLES: Parrotta & Agnoletti 2007 (p1). "For many developed societies, the conservation of traditional knowledge and their related landscapes supports the economic development of rural areas, tourism, promotion of local products, the conservation of biodiversity generated by human influence on the landscape, and the quality of life of the population". Fernández-Giménez & Estaque 2012 (Spain): (p287) "Pyrenean pastoralists possess extensive knowledge of relationships between terrain, climate, vegetation and animal nutrition and behavior. TEK could contribute to sustainable stewardship and facilitate adaptation by informing pasture monitoring, providing traditional practices to manage mountain vegetation, and preserving knowledge of extensive livestock production strategies, such as transhumance."	Thanks! In the SOD these refs are added		
Douglas Nakashima	Chapter 2	50	1252	50	1254	"Local ecological knowledge has been increasingly documented in Europe, particularly around its role in sustainable management of nature's benefits, its contribution to ecosystem restoration and its role in building social-ecological resilience (Hernández-Morcillo et al., 2014)". <- SEE examples line 16 of this table AND Mustonen 2011. "Songs of the Kolyma Tundra" - Co-production and perpetuation of knowledge concerning ecology and weather in the indigenous communities of Nizhnikolya, Republic of Sakha (Yakutia), Russian Federation: collection of observations, stories, memories of local inhabitants (fishers...) about a damaged freshwater environment - the article shows how this information can be useful to design management and restoration practices based on long term knowledge of the ecosystem and a holistic conception of its components. AND (p10) "Another area for further research and analysis based on the Nizhnikolya materials is the deeper layers of knowledge that have been called "shamanism" in anthropological literature (e.g., Siikala 1996). In Nuttendil and Turvaugin, these layers represent a crucial pool of knowledge regarding change, weather, landscape, and traditional practices that these communities use to make observations, reflect on them, and then decide and act. In Spring 2008 using these deeper layers of their knowledges the community elders had observed that the changes taking place in the region mean that "Nature has stopped believing in us."	Thanks! In the SOD these refs are added		
Douglas Nakashima	Chapter 2	51	1264	51	1270	"The general loss of ILK is mainly attributed to (...)" OTHER EXAMPLE: Carvalho & Morales 2010 (Portugal): (p167-168) "the loss of the traditional knowledge system is much more linked to the decline of an agro-sylvipastoral lifestyle, since most of the gathering tasks and uses were once associated with other agricultural activities. As farming, herding and forestry work disappear the opportunities to get out on the land and harvest wild plants also begin to decline."	Thanks! In the SOD these refs are added		
Allan Watt	Chapter 2	51	1278	51	1282	I agree with this conclusions but there may be exceptions. I suggest the authors consult the literature / evidence on high nature value (HNV) farming, including pastoralism, and the degree to which it is supported by the CAP.	Thanks! We add the information regarding HNV		
Douglas Nakashima	Chapter 2	51	1287	51	1293	"Although studies around Europe and Central Asia suggest a general erosion of ILK, recent studies also show the existence of a process of hybridization, in which traditional knowledge, beliefs and practices are being merged with novel forms of knowledge and technologies, in order to create new knowledge systems able to increase the resilience of social-ecological systems (Gómez-Baggethun, Reyes-García, Olsson, & Montes, 2012) or to sustainably manage nature's benefits, such as wild plants gathering for food, medicines or cultural identity (Christanell et al., 2010; Iucza et al., 2012; Menendez-Baceta et al., 2015; Pardo-de-Santayana et al., 2010; Pieroni et al., 2014; Pieroni, Nedelcheva, & Dogan, 2015)." On indigenous knowledge and hybridity, SEE - Dove 2002. Hybrid histories and indigenous knowledge among Asian rubber smallholders. - Dove et al. 2007. Globalisation and the construction of western and non-western knowledge. Mention the case of co-production of knowledge, which allows the emergence of new forms of knowledge: many examples in the world, notably in arctic contexts (Møller et al. 2004 (Canada & New Zealand); Krupnik & Jolly 2002 (Arctic); Armitage et al. 2011 (Canada); Dale & Armitage 2011 (Canada); Gearheard et al. 2009 (Canada)), and elsewhere (Maclean & Cullen 2009 (Australia); Pohl et al. 2010 (Kenya, Switzerland, Bolivia, Nepal); Carolan 2006 (US)...) not so many for Europe and Central Asia, at least not identified by the specific terms "co-production of knowledge": Examples in Sami contexts: - Sandström, P. 2015. A toolbox for co-production of knowledge and improved land use dialogues. Doctoral thesis. Swedish University of Agricultural Sciences. Umeå. - Herrmann et al. 2014. Effects of mining on reindeer/caribou populations and indigenous livelihoods: community-based monitoring by Sami reindeer herders in Sweden and First Nations in Canada Mention the fields of "citizen science", and "participatory science", which involve local actors from the general public: SEE - Leach & Fairhead 2002. Manners of contestation: "citizen science" and "indigenous knowledge" in West Africa and the Caribbean. (p299) "While analysts and activists concerned with Africa, Asia, Latin America, and the Caribbean have been debating and promoting "indigenous knowledge" (IK) and "ethnoscience", many focusing on the high-tech, late industrial contexts of Europe and North America have phrased their concerns as with "citizen science". (...) At the extreme, IK debates have moved towards emphasising the conceptual and moral dissonance and autonomy between knowledge systems, while work on citizen science emphasises how it emerges in direct engagement and contest with the science produced by "expert" institutions." - Silvertown 2009. A new dawn for citizen science. - Legrand 2013. Vigie-nature: participatory sciences and biodiversity at a large scale. [In French] - Dupre & Micoud. 2007. Public knowledge about nature and environmental public policies: role and place of amateur and professional naturalists. In Charvolin, F. (ed.) Des Sciences Citoyennes. Editions de l'Aube. pp 219-232. [In French]	Thanks! In the SOD these refs are added		
Tom Breeze	Chapter 2	51	1289	53	1351	This would be interesting but as it stands this is just a collection of basic linguistic statistics with some tangential text to the main body of work. It needs a much stronger link with European biodiversity and ecosystem services. How do differences in language affect e.g. understanding of species taxonomy? How does it affect understanding of ecosystem services? What about the formation of e.g. species names in different languages?	This is now discussed in more detail in section 2.2.3.1.2 on local ecological knowledge and ILK where the relationship between ILK and linguistic diversity is considered along with the role of linguistic diversity as an indicator for the Biodiversity Indicators Partnership.		
Roger Keller	Chapter 2	51	1294	51	1296	It's a good idea to add more. BUT it risks to become just a summing up of vaguely linked topics. It leads to "fuzziness". Maybe insert more sub-chapters and/or try to summarize the findings of the different issues?	This is now discussed in more detail in section 2.2.3.1.2 on local ecological knowledge and ILK but ILK is covered in other sections and we have benefitted from comments and inputs from the ILK liaison group		

Douglas Nakashima	Chapter 2	51	1294			<p>ADD Local ecological knowledge and links to TEK - papers from Marie Roué and Zolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris</p> <p>- Sezdebek and Albek 2016 (Kyrgyzstan): on details on indigenous protected areas (sacred sites) and knowledge co-production. "Sacred sites are biodiversity hotspots in many parts of the world... In Kyrgyzstan, sacred sites are conserved-through-use by local communities for spiritual reasons." "Sacred sites in Kyrgyzstan perform social and cultural functions... Various rituals related to healing, personal and community well-being and livelihoods are conducted on sacred sites."</p> <p>- Varga et al 2016 (Hungary): on TEK related to wood pastures. "The fundamentally different ways of learning within traditional and scientific knowledge systems provide presents an alternative for Western-scientific pedagogy." "The gap between traditional local communities and government conservation approaches could be bridged and conservation management and decision making could become more efficient if rangers have possibility to learn, adapt and use TEK during their work."</p> <p>- Babai 2016 (Romania): on the role of ILK in maintaining and managing cultural landscapes and mountain biodiversity in an Eastern European setting. "European Union and national regulations, as well as low average incomes often threaten this type of farming, while conservationists are working to help small-scale farmers maintain their livelihoods in these marginal landscapes."</p> <p>- Kis et al 2016 (Hungary): "cattle herders and shepherds with traditional ecological knowledge, have a significant role in sustaining the 'functioning' of nature preserved in cultural landscapes. Herders do have a place in protecting ecosystem services and biodiversity, and contribute a great deal to ensure the natural environment which we have received from our ancestors is handed over to the upcoming generations."</p> <p>- Lavrillier et al 2016 (Siberia): "scientists and nomadic reindeer-herders have different observing methodologies and systems of thought. For instance, climatologists observe and compare trends, mean temperatures, extreme values, threshold effect, etc. by using certain variables over the long term. In contrast, reindeer herders have their own systemic knowledge and observation system."</p> <p>- Roturier et al 2016 (Sweden): "reindeer herders do not own any land, they only benefit from land use rights. Their valuation of the land is much more holistic and sustainable, offering an ethic of land use that respects the diversity and the functioning of ecosystems in the long run."</p> <p>- Molnár et al 2016 (Hungary): "ILK in the European, Central Asian region is a rich source of local understandings and management practices that can help the sustainable management of biodiversity and ecosystem services" "[Traditional peoples] provide opportunities to learn about a potentially more sustainable use of natural resources. They may help us pinpoint incentives and policies that are harmful to biodiversity and ecosystem services, and prevent misinterpretation of the local effects of policies and other drivers" "Local traditional knowledge is dynamic and adaptive"</p> <p>- Ivaşcu and Rakosv 2016 (Romania): "HNV landscapes in Romania and many parts of Central and South-Eastern Europe – being the result of small-scale semi-subsistence farming – are linked and maintained through the traditional ecological knowledge of their practitioners. In Romania, HNV farming is the result of the survival of small-scale semi-subsistence type farms, and the traditional way of raising animals (especially in the mountainous and sub-montane areas)."</p> <p>- Demeter 2016 (Ukraine): "The forest-related traditional and non-traditional knowledge systems held by the local communities and the scientific knowledge system are collectively shaping the hardwood floodplain forest ecosystems." "The local forester, under the influence of his traditional and scientific worldview about the forest, makes his decisions often as a kind of "resiliency manager", keeping in mind the interests of the state, the forest and the local population."</p>	Thanks! in the SOD these refs are added
Douglas Nakashima	Chapter 2	51	1295	51	1296	<p>"more marine examples of how local ecological knowledge of fishermen contributes to fishery management and conservation."</p> <p>SEE: Maynou et al. 2011. Estimating trends of population decline in long-lived marine species in the Mediterranean sea based on fishers' perceptions. Moore 2003. Seals and fisheries in the Clyde Sea area (Scotland): traditional knowledge informs science. Fisheries Research.</p>	Thanks! in the SOD these refs are added
Tom West	Chapter 2	51	1298	53	1351	<p>Is there a point to be made in here about how loss of language means loss of words for things - which implies not only a loss of knowledge, but also of connection. Robert MacFarlane's work is what I am thinking of here: "To quote the American farmer and essayist Wendell Berry – a man who in my experience speaks the crash-tested truth – "people exploit what they have merely concluded to be of value, but they defend what they love, and to defend what we love we need a particularising language, for we love what we particularly know." Or as Cocker punchily puts it, "If acorn goes from the lexicon, the game is up for nature in England."" - taken from https://www.theguardian.com/books/2015/feb/27/robert-macfarlane-word-hoard-rewilding-landscape-but-inspired-by-robert-macfarlane-landmarks (Hamish Hamilton 2015)</p>	Thanks! very useful
Douglas Nakashima	Chapter 2	51	1298	53	1351	<p>Link between biological diversity and linguistic diversity: Bocharnikov 2011 (Russia): (p6) "Closely linked to the ongoing loss of biological diversity is the decline in the world's cultural and linguistic diversity. A major proportion of this cultural diversity resides with indigenous peoples, who represent an estimated 75% of the world's six thousand languages. Many of the regions of the world with the greatest biodiversity are inhabited by indigenous peoples. In the Russian Federation, 45 peoples (with populations up to 50,000 each) are recognized under the official list of indigenous peoples, of which 40 live in the North, Siberia and the Far East in the territories of 28 provinces – all are subjects of the Russian Federation."</p>	Thanks! very useful
Vânia Proença	Chapter 2	51	1302	51	1303	Linguistic diversity and biodiversity may also be driven by common factors (Gorenflo et al. 2012 PNAS)	Thanks! very useful
PESC-3	Chapter 2	52	1312			Biodiversity hotspots can be presented for the region	This belongs to chapter 3
Roger Keller	Chapter 2	53	1339	53	1339	Would be interesting to include the "non-endangered" langues like english, french etc. as well to get a better overview.	We tried to add this information but it turns into very difficult because this languages are spread across countries
Mark Sneathlage	Chapter 2	53	1340	53	1343	In the context of this assessment "overseas territories" seems a more appropriate wording than "colonies"	Totally right! Reworded
Roger Keller	Chapter 2	53	1352	53	1355	I'm looking forward to this. It's very important!	thanks!
Douglas Nakashima	Chapter 2	53	1352			<p>2.2.3.3. Identity and social relationships Grasser et al. 2014 (Austria): (p3) "Wild plant gathering has also received renewed attention as a form of intangible cultural heritage [27,32-35]. This activity is one example of the inextricable link between biodiversity and cultural diversity [36] and reflects symbols of local identities [33]. It is an irreplaceable part of the cultural history of a region [18,37,38] and therefore an expression of people's local identity and traditions [24,39]" Lavrillier 2013 (Russia, Siberia) Parrotta & Agnoletti 2007. " Strongly rooted in the past, this collective knowledge [traditional forest knowledge] is critical to the survival and future well-being of local communities, and especially, of indigenous peoples as they try to maintain their distinctive cultural identities and livelihoods, and the integrity and health of the forest ecosystems on which they depend." Kitti et al. 2006 (Sweden and Finland): (p144) "But although there have been important changes related to these more market oriented values, reindeer herding still retains many other values. It is for many herders a way of life and exemplifies values like freedom, independence and "being in nature". " Mustonen, Zavalco et al. 2004. (Kola Peninsula, Russia) Salin et al. 2004 (Finland): (p294-295) "Picking arctic cloudberries is a part of the Sami culture and adds to the variety of income sources. Ilmari Vuolab and Elina Helander shared their concern for diminishing cloudberry areas." Nieminen et al. 2004 (Faroe islands, Denmark) Pieron 2001. Evaluation of the cultural significance of wild food botanicals traditionally consumed in Northwestern Tuscany, Italy.</p>	Extensive attention for traditional medicinal plant knowledge included in the SOD
Douglas Nakashima	Chapter 2	54	1356			<p>2.2.3.4. Spiritual and/or religious experiences and connections EXAMPLES: the Arctic: - Lavrillier 2013 (Russia, Siberia): (p264) "The Tungus perceive the natural environment as a system combining the biophysical environment, humans and various spirits. The biophysical environment (fauna and flora, landscape) is thought as a system inhabited and led by spirits, the most holistic of which is called Buga among the Evenk of southern Yakutia and the Amur region, and the Even of northern Yakutia. Buga designates the entire biophysical environment, together with the spirits inhabiting it, and a main spiritual entity which manages the whole environment (lifecycle of fauna and flora, weather and so forth), the relations between its elements and the relationships the humans maintain with it (Lavrillier 2005)." - Lavrillier 2011. The creation and persistence of cultural landscapes among the Siberian Evenkis: two conceptions of "sacred" space. - Helander-Renvall 2010. Animism, personhood and the nature of reality: Sami perspectives. - Helander 2004 (Finland): (p302-303) "One reindeer herder in my own village (Kaldoaivi) said that the only thing that keeps the Sami people in their villages is the nature. On the other hand, nature and its resources are very much dependent on how humans relate to them. Traditionally, the Sami people do not go to nature if they do not need to. Culturally, the nature is seen as having a spirit, and, consequently, it is worthy of respect and worship. This view comes quite close to the "Gala" principle as presented by Lovelock (see also Strathern 1992)." Central Asia: Aitpaeva 2013. Sacred sites of the Southern Kyrgyzstan: Nature, Manas, Islam. Western Europe: Frascaroli et al. 2014. Healing animals, feeding souls: ethnobotanical values at sacred sites in central Italy.</p>	Reference suggestions incorporated as much as space allowed in this section
Adrian Wójcik	Chapter 2	54	1356	56	1440	<p>The relation between spirituality and religion is unreflexively. It is presumed that the relation is irrefutably positive. However the research shows that this may not always be the case. For example it was showed that the belief in Mother Nature may actually lower the willingness to mitigate the effects of environmental threats. Similar results are found when one is analyzing the religious beliefs about the end of times. It is often showed that people do not want to engage into pro-environmental activities because they believe that the current ecological crisis is a sign of forthcoming apocalypse. That perspective should be also accounted for. Gifford, R. (2011). The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. American Psychologist, 66(4), 290–302. http://doi.org/10.1037/a0023566; Jones, R., Cox, D., Navarro-Rivera, J. (2007). Believers, sympathizers, & skeptics - findings from the prri/air religion, values, and climate change survey</p>	This perspective is now recognised and reflected in the section

Patricia Balvanera	Chapter 2	54	1356	56	1439	This section is very interesting. I wonder if it is possible to assess how much these views are actually explicitly incorporated into decision making at different spatial scales in the different regions of ECA	We appreciate the positive feedback. Assessing if and how (at which scales) the spiritual aspects are incorporated in decision making in the ECA surpasses the scope of the literature search protocol but text has been expanded stating that in Westernized countries (esp. Europe) policy integration has not been possible.
Douglas Nakashima	Chapter 2	56	1413	56	1417	"Sacred or holy natural places occur at a variety of scales in the ECA region, varying from rock formations or forest patches to mountains and islands. For example, for the Saami peoples of modern Finland, a sieidi is a sacred place which is usually a natural object such as stone unshaped by humans used for offerings consisting usually of meat, fish, antlers, metal and coins (Mallarch, Joseph Maria; Papayannis, 2012)" --> not just in Finland, in all the Sami area = Norway, Sweden, Finland, Russia (Kola Peninsula) - Mulk & Bayliss-Smith 2007 (Sweden). Liminality, rock art and the Sami sacred landscape. - Vorren 1987. Sacrificial sites, types and function	Correction incorporated for all Sami peoples' area in Northern Europe. And reference suggestions will be incorporated as much as space allows in this section
Douglas Nakashima	Chapter 2	56	1421			Sacred sites Sezdebek and Aibek 2016 (Kyrgyzstan): "Sacred sites are biodiversity hotspots in many parts of the world. In Kyrgyzstan, sacred sites are conserved-through-use by local communities for spiritual reasons." "Sacred sites in Kyrgyzstan perform social and cultural functions. The well-being of a sacred site is often linked to the well-being of the community (Aitpaeva 2016). Various rituals related to healing, personal and community well-being and livelihoods are conducted on sacred sites" [see Table 3]. CITE Aitpaeva 2013. Sacred sites of the Southern Kyrgyzstan: Nature, Manas, Islam Frascaroli 2013 : (p587) "Numerous studies have shown that spiritual beliefs have contributed to preserving important biodiversity in sacred areas around the world. In Western contexts, however, that link has been underexplored, perhaps due to a common view of Christianity as anti-naturalistic." (p587) "Moreover, by being coherent with local practices and traditions, SNS are a paradigmatic example of community-based conservation (Ostrom 1990; Berkes and Folke 1998; Colding and Folke 2001; Berkes 2004; Borriini- Feyerabend et al. 2007; Rutte 2011) that relies upon local people's understanding and involvement and, as such, is less prone to many of the flaws and limitations of state-driven conservation efforts (Sinclair et al. 2000; Stern et al. 2001; Brown 2003)." (p597) "my observations at sample SNS suggest that they have been important for biodiversity conservation in Central Italy in at least three ways: (1) preserving relic habitats and vegetation assemblages; (2) protecting old-growth forest or individual specimens (giant trees); and (3) maintaining greater habitat heterogeneity due to the presence of multiple features such as grottos, water sources, rock outcrops, forest cover, etc." (p598) "there are signs that also the cultural mechanisms that have favoured conservation at these sites are undergoing considerable erosion. While the nature-based rituals and devotions that have long characterized many shrines are still vigorous and deeply rooted in some contexts (DeWaal 2012), they appear on the wane in many others (Antinori 2009; Micati 2007). Also, new construction has been underway at several shrines for the last decades. Together with the loss of traditional ecological knowledge in the study area (Idolo et al. 2010), these factors could severely undermine the cultural mechanisms that have likely favoured ecological conservation at SNS of this kind."	Suggested literature and citations have been integrated in the text as much as space permitted.
Roger Keller	Chapter 2	56	1430	56	1430	Maybe include "power places" like waterfalls etc? In Switzerland these places have become very popular (also for tourism/recreation), but in my opinion it's not the same as "mystical" or "spiritual"...	We could not come across sound scientific literature on power places; appropriate reference backing still needed. However further work will be done to include on the final draft
Douglas Nakashima	Chapter 2	56	1430			Link between spiritual meaning and value of nature: Frascaroli 2013: (p 587-588) "From a more theoretical angle, the presence of a symbolic link between spiritual beliefs and the environment confirms the global prominence of "intangible" values of nature not only as fundamental and effective drivers of conservation (Jepson and Canney 2003; McCauley 2006), but also as the possible ultimate source of a conservationist ethos (Ramakrishnan 2003)."	Text has been integrated to the section on 'values'
Germany	Chapter 2	56	1430			1430 ff Please provide a more differentiated discussion on cultural ES. They can also lead to potentially negative impacts on biodiversity conservation, e.g. whale hunting or big-game hunting, which is not necessarily done sustainably. Moreover, different cultural ES can conflict here, e.g. traditional practices (of hunting whales) versus aesthetic experience (of watching living whales) or existence values (regarding the existence of flourishing whale populations)	This section is focused on the spiritual interactions between humans-nature and not the broader Cultural ES. The discussion on traditional practices such as whale hunting versus whale watching is the focus of section 2.2.3.1.1 (Role of species as providers of nature-based recreation activities) and existence values are mainly covered in section 2.2.3.5 just after this section.
Tom West	Chapter 2	56	1441	57	1461	This information is useful and clears up some important issues. Much of it should be at the start of the chapter (eg in an overview of the different types of value considered - see my comment to lines 215-84), detailing what is meant by value and the different forms of it. Lines 1450-52 are a little unclear still - why is biodiversity being brought in, as it doesn't seem to help understand matters.	We discuss the distinction between services and values earlier in Chapter 2.
PESC-3	Chapter 2	56	1441			Section 2.2.3.5, the relevance of the section to the other sections is not clear	This section covers one of the ES/nature's benefits to people from the list of 18.
Douglas Nakashima	Chapter 2	56	1441			2.2.3.5. Existence of species and ecosystems Communities owning and living on ancestral land tend to have a strong sense of stewardship over the land and its resources, which may translate into an economic value to present generations of being able to pass on ancestral lands to future generations (i.e. bequest value) - see Kis et al 2016 (Hungary), Molnar et al 2016 (Hungary), Roturier et al 2016 NW Europe), Varga et al 2016 (Hungary) In Marie Roué and Zsolt Molnár (eds.), Indigenous and local knowledge of biodiversity and ecosystems services in Europe and Central Asia: Contributions to an IPBES regional assessment. UNESCO: Paris. This isn't a comment on this section, which is well written, but bequest and option values aren't exclusive to cultural services; crop diversity for example has an option value because it allows us to adapt to future markets, crop genetic diversity allows us to breed in response to disease (e.g. Panama disease). These are fairly fringe cases but should be mentioned where possible (e.g. the UK national fruit collection has several hundred species of apples, giving option benefits for the crop).	There is plenty of ILK in other parts of the chapter. We are aware that existence and bequest values do not only relate to existence of species and ecosystems but also to the continued existence of other ecosystem services provided. We added a short note on this. We do not address option values in this section.
Tom Breeze	Chapter 2	56	1441	56	1441	As stated earlier, it would be good to introduce the concept of natural capital as biodiversity is, from a utilitarian perspective, a form of natural capital. It is of course important to retain the emphasis on intrinsic, non-utilitarian values though so mention of capital should compliment, rather than replace this.	We stick to the CF of IPBES (and the language used therein), although we agree that other concepts using other language might be useful in other contexts.
PESC-3	Chapter 2	57	1463	58	1525	1. Should be more written about Transboundary National Park. 2. Involvement of local community to development and conservation of protected areas. 3. Awareness raising activities and environmental education among visitors and local communities. 4. Should be implemented special ecotourism routes for visitors and provided guide. 5. Protected areas is important for science and indicators of existence of species.	1. Transboundary national parks are considered irrelevant in the context of this ecosystem service. 2. This is a process-related, institutional issue. This is not relevant for the state of this ES. 3. This is probably relevant within the ES category on knowledge and education, but not for this ES. 4. Not relevant within the limited amount of space for this assessment. 5. We use PA as an indicator of existence value. We can make a link to another ES category on Knowledge and education later
Thomas Brooks (IUCN)	Chapter 2	57	1464	57	1487	These sections on protected areas and on wilderness are good. Need to use correct citation to WDPA.	We added the right reference.
Tom Breeze	Chapter 2	57	1464	57	1476	This is excellent. A table showing the breakdown of protected areas of different classifications per country and a short summary of EU legislation related to biodiversity protection would be useful additions.	We added such a Table. EU legislation is not appropriate here, but probably in Chapter 6 (governance)
Allan Watt	Chapter 2	57	1465	57	1473	References needed. Information on trends in protected areas should be available too, and mention of Natura 2000 should be considered.	We added references. Information on trends not available.
Tom West	Chapter 2	57	1465	57	1471	This demonstrates the need for a definition of 'protected areas' as stated earlier	We added a definition from the IUCN.
Maximilian Weigend	Chapter 2	57	1465	57	1476	This statement is too short - there must both be the will and - previously - the acknowledgement of the necessity of protecting and area. This will differ widely depending on how much "high value" landscape is still available in a given region - the less there is, the more urgent will the conversion into PAs will be. Conversely, where there is little human intervention anyway, there will be no protected areas. Particularly endangered biomes will be prioritized. The map is clearly in need of breaking down, since at this scale, the WE and CE-areas are next to invisible. A table with a breakdown of percentages PAs per defined subregion would make eminent sense.	We added such a table. there is little space to discuss the suitability of the indicators, but we discussed it.
Germany	Chapter 2	57	1465	57	1476	This statement is too short - there must both be the will and - previously - the acknowledgement of the necessity of protecting and area. This will differ widely depending on how much "high value" landscape is still available in a given region - the less there is, the more urgent will the conversion into PAs will be. Conversely, where there is little human intervention anyway, there will be no protected areas. Particularly endangered biomes will be prioritized. The map is clearly in need of breaking down, since at this scale, the WE and CE-areas are next to invisible. A table with a breakdown of percentages PAs per defined subregion would make eminent sense. Therefore, please elaborate a bit more on the conditions for protecting areas and provide sub-region-specific information. Additionally, links and information on wilderness-like areas could be expanded.	We added such a table. there is little space to discuss the suitability of the indicators, but we discussed it.
Allan Watt	Chapter 2	57	1477	57	1487	Concepts of wilderness vary and have been debated for a long time. I am not convinced that the papers cited here, notably by Mittermeier et al and Sanderson et al, reflect an ECA perspective. In any case, it could be argued that what is regarded to as wilderness (here) exists not because of the existence value of biodiversity but because these areas are difficult to farm (or otherwise develop).	We deleted the section on wilderness.
Tom West	Chapter 2	57	1477	57	1487	Does the concept of re-wilding need to be introduced and discussed here? Especially because the principles of rewilding include 'restoring natural processes and ecological dynamics' and 'taking inspiration from the past but not replicating it' - see http://www.rewildingbritain.org.uk/magazine/rewilding-europe-policy . This means that rewilding has the potential to restore cultural (and supporting) ES.	Rewilding is a policy measure/governance option. As such it could be mentioned in Chapter 6.
Maximilian Weigend	Chapter 2	57	1477	57	1487	This ties in with the statement above and needs to be integrated - and the map should be juxtaposed to the PA-map.	We deleted the section on wilderness.

						2.2.3.5. Existence of species and ecosystems/ subsection "Measures and indicators for existence value" / "Wilderness-like areas" "These areas indicate where in ECA ecosystems and landscapes without being of instrumental use for humans (existence value). There is evidence that Scandinavia, the Alps, parts of the Iberian Peninsula and the Balkan Mountains show relatively low values of human impact and hence high values for wilderness (...). --> caution should be taken with the concept of wilderness, even "wilderness-like" Wilderness is a eurocentric, culturally constructed concept reflecting a specific vision of "nature" and the environment, which is today used by some European countries and European institutions to defend their interests. The "biological" definition of wilderness cannot be separated from its cultural origins. Even in scarcely populated areas of Europe and Central Asia, "virgin nature" is a myth, since local (and indigenous) populations have invested the environment, whether symbolically or concretely, even though their mark is sometimes difficult to detect because of their low impact on natural resources, or because we consider the landscape they contributed to shape as "wild". It is not because these areas show low human impacts under the conventional scientific definition that they are "without being of instrumental use for humans", or wilderness areas. See Cronon 1996: The trouble with wilderness: Or, getting back to the wrong nature Barthod 2010. The return of the debate on wilderness [in French] For example, the struggle of Sami people against the Swedish state for the designation of the World Heritage Lapponia Area: When the Swedish state considered it as a wilderness area, with no human impact or use, this area represents a home for the Sami people, especially the reindeer herders who use and inhabit the area. The Sami fought for the recognition of the area as a "cultural landscape". After two decades of negotiation, the area has been put under the "mixed site" (natural and cultural) designation of Unesco. See Roué et al. 2011.		
Douglas Nakashima	Chapter 2	57	1477				We deleted the section on wilderness.	
Germany	Chapter 2	57	1477			Are wilderness areas indeed an indicator for existence values? The existence of more wilderness/ wilderness areas in some countries does not necessarily mean that wilderness is more valued there. Low population density and geographical areas that do not allow use for building or agriculture allow more wilderness simply because they cannot be used otherwise. It is much more difficult to maintain wilderness areas in densely populated countries like Germany (80 million inhabitants, 357.168 sq km) than in Norway (5 Million inhabitants, 385.178 sq km), for example. Therefore, regarding the existence values of wilderness areas it might be better to use valuation studies where people express their preferences etc.	We deleted the section on wilderness.	
Tom Breeze	Chapter 2	57	1477	57	1487	Another very useful section. Personally, I think a map of wilderness and a table of wilderness extent per country would be valuable additions to the report (the table could be combined with the above suggested table on protected areas).	We deleted the section on wilderness.	
Tom West	Chapter 2	57	1480	57	1502	1) The bracketed (existence value) needs a little more teasing out (line 1480). These kind of protected areas can be seen as reflecting existence value, although they can protect other human and nonhuman values too. 2) lines 1492-1502: discussion of the differences between existence/bequest value ('inherent value') and nonanthropocentric value ('intrinsic value'), and how they influence policy decisions, would be useful here (building on introductory work lines 215-284). Bowman, Davies and Redgwell, Lyster's International Wildlife Law (Cambridge University Press 2010) pp62ff is a useful guide here.	We added more information in the introduction on the difference between these values.	
						subsection "emblematic, symbolic or iconic species or ecosystems" For local and indigenous people, some species and ecosystems are emblematic or symbolic, in the sense where they are deeply connected to their identity and way of life. They constitute one single and whole entity with no boundary between them like it would be conceived in a Western conception. Lavrieller 2013 (Russia, Siberia): (p265) "I heard them often say: 'we are the people of the taiga/tundra', 'the tundra/taiga is our home', 'if the taiga/tundra no longer exists, the Tungus no longer exist', 'when I am in the taiga/tundra I feel strong, my soul is singing, I am happy, it is my homeland'. Such sentences are not only expressed by nomad and rural Tungus, but also by townspeople, even by those who have never lived a nomadic lifestyle. They reflect reality for the nomads who are materially dependent on the environment for subsistence. For settled Tungus who have salary incomes, this perception is but symbolic, although still important and recurrent." Mustonen, Zavalko et al. 2004. (Kola Peninsula, Russia): (p333) "[...] We Sami have an anecdote, no, rather it is a legend, which has the law of the Sami life in it. People tell this onwards always. The Sami say: 'We are not reapers, we are not field-plowers, we are reindeerherders. The reindeers are our bread. Everybody should cherish their land. The green land with its flowers and lichens was given to us so that we could pass it on to our children'. We try to follow this law because there are laws that the Sami follow. And the Sami guide other people to follow those laws in our land. It is true. This is the truth." [Larisa Advejeva] Niemiinen et al. 2004 (Faroe Islands, Denmark): (p241) "According to Ólavur Sjurðarberg, whaling has been and still is an essential part in the people's lives. Pilot whales bring food for people, and activities related to the hunt itself bring people together. No money is involved in hunting. After the hunt, meat is dealt for free among the participants and the habitants of the particular whaling district. Ólavur Sjurðarberg also sums up the importance of pilot whaling and connects it into cultural relevance. "[Pilot whaling] have cultural importance. (You've seen how social it's), it can assemble a lot of people from different villages, it is one. It's also a supply for special food for the Faroese households. We [have practised] that all the time people have lived on these islands and hopefully we can continue." (Ólavur Sjurðarberg)"		
Douglas Nakashima	Chapter 2	57	1491				see box added Box 2.4 page 103	
Allan Watt	Chapter 2	58	1496	58	1502	Some examples from the ECA area must be available.	More examples were added from the literature search	
Vânia Proença	Chapter 2	57	1496	58	1498	Use examples from the ECA region	More examples were added from the literature search	
Maximilian Weigend	Chapter 2	58	1500	58	1501	Forget the panda bears and think about the region you are talking about - there are a wide range of plants and animals that loom large in the public consciousness - such as gentian, rhododendron, steinbock, gemsbok, eagle, marmot in the alps, seal, sea gull, dolphin along the coast, wild horses in the camargue, bison in E Poland, the lark in agricultural landscapes, the grouse in some highlands etc. Certainly similar phenomena are bound to be present across the ECA, even more so in the east (Saiga...). These are the iconic species of the corresponding regions. This needs to be spelt out and - if there is no literature on it - spelt out as a knowledge gap.	We made more clear that this is a knowledge gap as we did not find enough literature to support statements on the species suggested by the reviewer.	
Germany	Chapter 2	58	1500	58	1501	There is a wide range of plants and animals from the ECA-region that loom large in the public consciousness - such as gentian, rhododendron, steinbock, gemsbok, eagle, marmot in the alps, seal, sea gull, dolphin along the coast, wild horses in the camargue, bison in E Poland, the lark in agricultural landscapes, the grouse in some highlands etc. Certainly similar phenomena are bound to be present across the ECA, even more so in the east (Saiga...). These are the iconic species of the corresponding regions. We would welcome more information on such examples and- if there is no literature on it - this should be spelt out as a knowledge gap.	We made more clear that this is a knowledge gap as we did not find enough literature to support statements on the species suggested by the reviewer.	
Werner Rolf	Chapter 2	58	1504	58	1523	National Bird Campaigns i.e. votes about "bird of the year" or similar categories could give an idea about appreciation of species	No data across ECA was available unfortunately.	
Tom Breeze	Chapter 2	58	1521	58	1522	This is a very useful section again. When expanding, please state roughly how many people were sampled.	This can be found in the reference.	
Tom Breeze	Chapter 2	58	1525	58	1526	This is an excellent idea and I would strongly encourage a) the authors develop it further and b) that similar information be added to the other regional assessments.	We developed this section further based on the comments and additional literature searches. We also coordinated within IPBES with the aim to have similar sections in the global and other regional assessments.	
Patricia Balvanera	Chapter 2	58	1525	59	1557	It is unclear to the readers that this section is an introduction to a large section with a lot of data on this and very nice examples of such flows	The heading says "introduction", furthermore, we added a sentence that below we will provide empirical information on inter-regional flows.	
Allan Watt	Chapter 2	58	1529	59	1554	References missing. Also, ensure consistency of section with Chapter 5.	We added references. We coordinated more within ECA to have consistency across chapters. Chapter 5 addresses scenarios and future developments, while chapter 2 assesses the current state of the interregional flows.	
Tom Breeze	Chapter 2	59	1541	59	1542	This sentence seems to be stating the obvious. Do you mean that the transformation of habitats in one region can affect the benefits generated in other areas?	We deleted the sentence.	
Tom Breeze	Chapter 2	59	1549	59	1550	These sentences are a bit awkward and could benefit from being merged into a single sentence	Sentences were merged and rephrased.	
Roy Remme	Chapter 2	59	1550	59	1552	An interesting study to look at in terms of biodiversity loss due to interregional/global flows is Lenzen, Moran, Kanemoto, Foran, Lofebano, Geschke (2012) International trade drives biodiversity threats in developing nations. Nature 486.	This study looks at flows of all traded goods, not at flows of ecosystem services in particular. As such, it is more of interest for the chapter 4 on drivers.	
Sigrid Kusch	Chapter 2	59	1568			It is stated that the Ecological Footprint mainly covers provisioning services. This should be rethought. While it was correct some years ago, today the largest share of the EF actually comes from the elements 'carbon-footprint', which in the methodology of the Global Footprint Network is the biocapacity needed for regulation/assimilation of CO2 emissions.	The sentence was deleted. In the sentence before we already state that carbon sequestration is also part of the Ecological Footprint.	
Allan Watt	Chapter 2	59	1569			Expand: "different reasons" is not sufficient.	We deleted the sentence as we had no additional space for method discussions within the ECA assessment.	
Sigrid Kusch	Chapter 2	59	1570	60	1588	Preferentially please indicate the number of countries used to calculate the data for the region. Figure 2.40 is from EEA - is this really the pan-European region as defined for this report - including Israel? Furthermore, the list of countries for which no EF data are available (line 1571 to 1572) seems incomplete; at least San Marino is missing.	We added San Marino. The data is only available in an aggregated format for "Pan Europe" from the Global Footprint Network. As this is not consistent with the division of regions within ECA, we decided to leave this Figure out.	
PESC-3	Chapter 2	60	1585			WWF has carried out ecological footprints for Turkey and other countries, information is there	We used the date from the Global Footprint Network. Turkey is included.	
Maximilian Weigend	Chapter 2	60	1587	60	1588	again, I see no explicit connection to ECA or its subunits. How does that tie in with the defined units?	The data is only available in an aggregated format for "Pan Europe" from the Global Footprint Network. As this is not consistent with the division of regions within ECA, we decided to leave this Figure out.	
Germany	Chapter 2	60	1587	60	1588	Please ensure - as far as possible - that information in figures/tables refers to the defined sub-regions of ECA. Vorschlag: general comment: Please ensure that information provided in figures/tables refers to the defined sub-regions of ECA.	The data is only available in an aggregated format for "Pan Europe" from the Global Footprint Network. As this is not consistent with the division of regions within ECA, we decided to leave this Figure out.	
Sigrid Kusch	Chapter 2	60	1588			Check the reference provided for Figure 2.40 ("EEA 2015"), I could not find the figure in that report.	The data is only available in an aggregated format for "Pan Europe" from the Global Footprint Network. As this is not consistent with the division of regions within ECA, we decided to leave this Figure out.	
Mark Sneath	Chapter 2	60	1591	60	1591	Is this figure the sum of imports and exports of all ECA countries, i.e. does it include imports and exports within the region, or is this the figure of exports and imports only outside the ECA region?	The data is only available in an aggregated format for "Pan Europe" from the Global Footprint Network. As this is not consistent with the division of regions within ECA, we decided to leave this Figure out.	
Vânia Proença	Chapter 2	60	1595	60	1597	These patterns may change or intensify with the inclusion of biofuels in the renewable energy directive. It would be worth adding a note on that, and, if available, data on future projections.	This is something to be addressed in chapter 4 on drivers.	

Maximilian Weigend	Chapter 2	62	1636	62	1640	It is important to spell out where the fish comes from (European seas? What about the North Atlantic? What about the coast of Africa?) and where it goes	No further data was available.
Germany	Chapter 2	62	1636	62	1640	It is important to spell out where the fish comes from (European seas? What about the North Atlantic? What about the coast of Africa?) and where it goes.	No further data was available.
Allan Watt	Chapter 2	63	1659			Strong bias to the impact of climate change throughout section, which should be addressed if possible. Also, ensure consistency with Chapter 5.	The bias was due to readily available material for the FOD. A more systematic review of futures material is on going with Chapter 5 as specialist literature searches were required but these searches suggest that the literature is dominated by discussions of climate change. The futures trends section 2.2.6 is now more balanced but will be further enhanced as new literature is found.
Sylvain Boucherand	Chapter 2	63	1659	65	1715	why future trends of ecosystem services are viewed only from the perspective of the climate change? How will the future ecosystem services impact each other ?	See response above
PESC-3	Chapter 2	63	1659			links between agriculture, production, climate change, rainfalls and yields should be further elaborated in the section about future trends	This has been done in section 2.2.6. A more systematic review of futures material is on going with Chapter 5 as specialist literature searches were required and this discussion will be further enhanced as new literature is found.
PESC-3	Chapter 2	63	1659			there are other relevant areas which are also important regarding future trends, other topics should be added here or links should be given to other chapters (overexploitation, luluc, urbanization, IAS, GMOs)	Links to other chapters especially Chapter 4 will be given as it deals with these drivers
PESC-3	Chapter 2	63	1659	65		chapter 3 is dedicated to future trends → why is a subsection of future trends in chapter 2? Maybe the space can be saved here?	Chapter 3 addresses future trends in biodiversity. Chapter 2 deals with future trends in the NCP that nature provides.
PESC-3	Chapter 2	63	1659			subsection on future trends is very focussed on provisioning services → either write more regarding the other services or write why there is such a strong focus on provisioning services	Currently most information in the literature is on provisioning services as they are modelled more frequently. The systematic review has led to the section on regulating NCPs being expanded and the literature search will continue.
PESC-3	Chapter 2	63	1659			refer to chapter 4 when issues regarding future trends of ES are more explained there	References to Chapter 4 will be strengthened
PESC-3	Chapter 2	63	1659	65		when the subsection on future trends of ES (2.2.6) is completely about climate change, the title should be changed and it should be mentioned in the text	See answer to comment 465, as hopefully some of the imbalance will be addressed
Douglas Nakashima	Chapter 2	63	1659			2.2.6. Future trends of ecosystem services Salin et al. 2004 (Finland): (p300) "People in the villages are worried as they face the global changes. The Sami are used to combining different economic activities, such as berry picking, reindeer herding, fishing, hunting, trapping and handicraft. If the changes are sudden, accumulate rapidly and have impact on all or most of local resources, and if the resource base is scarce, then the problems start to show themselves immediately. Many claim that the weather has become warmer, and especially the fall and early winter are warm. During the recent years, the ground has not frozen properly in the fall, and there has been little rain in September. There are many salmon rivers and lakes in the Utsjoki area where I come from. When the ground does not freeze in the fall, and there is little snow during the winter, there is very little water in late May and early summer in the rivers and lakes. Then, of course, with little rain during June, the rivers are almost dry and the fish cannot go up. But during the recent years, it has happened that in July there are heavy rains. Consequently, the amount of water increases enormously and it becomes impossible to fish in small salmon rivers. [...] [Elina Helander]" Mustonen 2005: Observations by Vera Koveinik of the telmen Nation, Kamchatka, Russia. (p21) "Winter is becoming warmer and fur-bearing animals don't migrate enough. Hunters are less successful and our machinery gets destroyed much faster. Hunting becomes economically inefficient. Native peoples have to give up hunting and social position which deteriorates the social issues."	Thank you for this suggestion. It appears to more about acknowledging current changes rather than the future. Perhaps some more information can be provided on this?
PESC-3	Chapter 2	63	1660			it would be good to have regional conclusions regarding provisioning services	This is now included in section 2.2.5 which provides syntheses of findings on NCPs
Patricia Balvanera	Chapter 2	63	1660	63	1720	How is this different from what will be found in the scenarios chapter and why does it need to be here?	The "scenarios" chapter, Chapter 5, is looking at the impacts of multiple drivers could affect ES provision. This chapter is looking at single drivers.
Mark Snethlage	Chapter 2	61	1661	61	1661	HANNP should read HANNP	This material has been removed in the revision of this section
Germany	Chapter 2	63	1661	66	1720	The section on "Future drivers of ecosystem services" is very much - if not exclusively- focused on climate change as key driver. Chapter 4 provides an in-depth assessment of direct and indirect drivers, making much more drivers than climate change evident. Also, chapter 4 explicitly covers future trends for these drivers. Please ensure that there are no duplications and consider moving this section to chapter 4. If you consider it more appropriate here, please explain the focus on Climate change here.	See answer to comment 465. Chapter 4 looks at the drivers and their trends but does not systematically assess their effect on nature's benefits to people. A consistency check will be carried out.
Mark Snethlage	Chapter 2	63	1665	63	1665	"SRES A1B" should be explained, e.g. in a footnote: IPCC Special Report on Emission Scenarios: a future world of very rapid economic growth, global population that peaks in mid-century and declines thereafter, and the rapid introduction of new and more efficient technologies and a balance across all energy sources	Scenarios are explained in Chapter 1
Mark Snethlage	Chapter 2	64	1668	64	1680	This seems a quite random list of specific and local examples. Are there no comprehensive regional projections, for selected crop types under various scenarios?	This was dependent on literature found. This has been partially addressed and hopefully the ongoing more extended literature search will address this further
PESC-3	Chapter 2	64	1671		1678	information about Macedonia, but no reference	This is all from Sutton et al 2013 referenced at the start of the paragraph
Mark Snethlage	Chapter 2	62	1673	62	1673	"medium distance" = "median distance", "average distance", ...?	This comment is about L1637 so does not fall in this section
PESC-3	Chapter 2	64	1678		1679	something is missing in this sentence → decreased calories availability or decreased calories consumption?; very strong statement and only one literature reference	Clarified as calories available
Mark Snethlage	Chapter 2	64	1683	64	1683	"B2 IPCC", see SRES A1B, needs explanation, and coherence in the naming. Both are scenarios of the IPCC SRES, but they are named in a different manner	See answer 478 and will address naming.
PESC-3	Chapter 2	64	1683			section should employ the new climate scenarios (RCP4.5 and 8.5) and should give the outcomes of alternative models (and not only one)	A more systematic review of futures and scenarios material is on going with the Chapter 5 as specialist literature searches were required. The regulating contribution section 2.2.6.2 now contains a greater range of material
PESC-3	Chapter 2	64	1688		1692	sentence is not understandable; it should be further elaborated what it means; figure should be explained as well	I cannot see the problem with this sentence. Figure is being offered to Chapter 5 and is likely to be removed
Mark Snethlage	Chapter 2	64	1693	64	1693	"Barent Sea" should read "Barents Sea"	Agreed. Will make sure it is changed in the final version if the figure is still included
PESC-3	Chapter 2	65	1701			peatlands should be added (or emphasized in parenthesis near wetlands)	This sentence has been lost in the rewriting of this section
PESC-3	Chapter 2	65	1702			water ponds for accumulation of water for later use for irrigation should be included for Tajikistan	It would be helpful to have some specific information on this
PESC-3	Chapter 2	65	1710			there are studies in Turkey showing the changes in distribution of forest species to climate change → results can be provided if requested	please could this material be provided as we have not been able to locate it
Patricia Balvanera	Chapter 2	66	1722	77	2038	I like the way these section is weaving across themes. I would just suggest to fine tune the wording to avoid using "another topic..." over and over again. I would rather emphasize the importance of each of these topics on their own.	We changed completely this section
PESC-3	Chapter 2	66	1724			part on security should be reconsidered → more focus on trade-offs and conflicts of interests; subsections on the different kinds of security (food security, water security etc. are too) and security from human made and natural disaster could be added	This section will have been revised and reorganised into 4 sections (one each for water, food and energy) and the final section on food-energy-water nexus considers trade offs. More work is required on energy security
PESC-3	Chapter 2	66	1727			trends and access to water is no aspect of security in the ECA region → not very relevant for the ECA assessment → section can be shortened (discussion, but no agreement in subgroup)	Section 2.3.1.3 has been rewritten on water security with greater use made of indicators.
Tom West	Chapter 2	66	1734	66	1736	Surely this projection is highly dependent on other choices made. Although a higher population does mean a higher demand for food, this does not mean that we necessarily need to produce more food. As for energy, there is an assumption here that energy use per capita must also increase: is this necessarily the case? These problems could be solved by interrogating the issues (a preferred option), or by rewording from "due to" to "if the following policy choices are made".	This section will have been revised and reorganised into 4 sections (one each for water, food and energy) and the final section on food-energy-water nexus considers trade offs and interdependencies. More work is required on energy security
Olivia Barrantes	Chapter 2	66	1736	66	1736	Changes in human diets preferences, again	Section 2.3.1.1 on food security has been re-written extensively
Tom West	Chapter 2	66	1739	66	1740	Under water security, there is an implication that a human right to water has been established through the MDGs. This is not the case. Rather, the human right to water has been established through General Comment 15 of the Committee on Economic, Social and Cultural Rights (see HR/GEN/1/Rev.9 (Vol. II)). Note that General Comments are non-binding, although they carry significant legal weight. The key paragraph of General Comment 15 is paragraph 2, which states that "The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses. An adequate amount of safe water is necessary to prevent death from dehydration, to reduce the risk of water related disease and to provide for consumption, cooking, personal and domestic hygienic requirements." It thus extends beyond safe drinking water. It does not explicitly mention sanitation, although this could be interpreted as being included within it even though there is no "human right to sanitation". The issue of sanitation is discussed elsewhere in General Comment 15 (paras 12(a), 29, 37(i)). Other statements of relevance in the General Comment include "Water is required for a range of different purposes, besides personal and domestic uses, to realize many of the Covenant rights. For instance, water is necessary to produce food (right to adequate food) and ensure environmental hygiene (right to health). Water is essential for securing livelihoods (right to gain a living by work) and enjoying certain cultural practices (right to take part in cultural life)." [6]; "Water should be treated as a social and cultural good, and not primarily as an economic good" [11]. See also the literature on the human right to water (eg Salman, The Human Right to Water (World Bank 2004)).	Section 2.3.1.3 has been rewritten on water security with greater use made of indicators. It is followed by a section and the final section on the food-energy-water nexus that considers trade offs.
Tom West	Chapter 2	66	1739	66	1740	Why is there no mention of the human right to adequate food - especially given that this is in the International Covenant on Economic Social and Cultural Rights (Art 11(1)), unlike the human right to water. See also CESCR General Comment 12, in particular para 6: "The right to adequate food is realized when every man, woman and child, alone or in community with others, have physical and economic access at all times to adequate food or means for its procurement. The right to adequate food shall therefore not be interpreted in a narrow or restrictive sense which equates it with a minimum package of calories, proteins and other specific nutrients ... States have a core obligation to take the necessary action to mitigate and alleviate hunger as provided for in paragraph 2 of article 11, even in times of natural or other disasters." Access is thus already recognised as a key issue. See also the literature on the human right to food, such as Saul et al, The International Covenant on Economic, Social and Cultural Rights (Oxford University Press 2014).	The human right to adequate food has been included in the introduction of this section. This section has been revised and reorganised
Tom West	Chapter 2	66	1739	66	1740	There is also information on the interlinkages between the human rights to adequate food and water with the human right to health contained in the General Comments and literature (see eg Saul above), as well as information on the importance of 'access'. I am not familiar with the treatment of energy within International Human Rights Law, but it may well have relevance too. It is perhaps not strictly necessary to go down the human rights route for Box 2.3, but given the mention of human rights in the first paragraph of it, and the need for the IPBES report to consider institutional frameworks (relevance to Q3, Q4, Q8), it may be a good choice. But to do so requires a more thorough treatment.	The rights to water and food and the institutional framework are included in the introduction of this part. This section has been revised and reorganised

Maximilian Weigend	Chapter 2	69	1781	69	1781	Vavilov was either re-surrected or this is a reprint. His "centers" are really obsolete and he should not be cited for crop wild origins anymore. Rye is definitely from Pamir - although the details of domestication history are obscure. In general, modern sources (and there are many) should be cited for up-to-date analyses of this type. The fact that rye originally came from somewhere else, is not relevant to this story, however.	Box 2.5 has been revised as suggested and updated with material from Haider and Van Oudenhoven
Germany	Chapter 2	69	1781	69	1781	Vavilov was either re-surrected or this is a reprint. His "centers" are really obsolete and he should not be cited for crop wild origins anymore. Rye is definitely from Pamir - although the details of domestication history are obscure. In general, modern sources (and there are many) should be cited for up-to-date analyses of this type. The fact that rye originally came from somewhere else, is not relevant to this story, however. Please ensure that you are using up-to-date literature on crop origins.	Box 2.5 has been revised as suggested and updated with material from Haider and Van Oudenhoven
Douglas Nakashima	Chapter 2	71	1820			2.3.1.2.1 Climate Change Risk ADD research on Indigenous observations and predictions re: climate change, e.g. - Lavrillier et al 2016 (Siberia): "scientists and nomadic reindeer-herders have different observing methodologies and systems of thought." "[Reindeer herder] observations and analysis of changes focus not only on one single element of the natural environment, but on the interactions between many elements (for instance between snow, and vegetal cover, and rivers, etc.)" This study examines how "climate change leads to specific environmental changes, which in turn create changes in traditional economic practices, which then triggers socio-economic problems among a population that needs to adapt its hunting techniques, and make compromises between economic needs and respect of their social and ritual values." -Roturier et al 2016 (Sweden): "spatial variation in the patterns of land use by winter-groups due to extreme thaw-freezing events that become more frequent. As a consequence, Sami herders have to find other lands to adapt to bad grazing conditions: ". The decrease in old-growth forest supporting arboreal lichens is a big loss for adaptation to climate change."	We are not sure we understand the meaning of this comment but this section has been revised and reorganised and these references are incorporated elsewhere in the document
Germany	Chapter 2	71	1820	71	1835	This section is entitled "climate change risk" and focuses so far on weather related catastrophes. This seems to be interchangeably used with the term "climate change events". Please define climate change events. Are all weather extremes automatically considered climate change (driven) events? A differentiated discussion during the further development of this section promises information on natural and human-made disasters. Therefore, it would be good to clarify all these concepts and the focus of this section.	The title of this section should be changed into "Weather related catastrophe" This section will be revised and reorganised (BML,SP,MG and ++)
Vânia Proença	Chapter 2	71	1824	71	1828	Revise sentence: Only France, Portugal (both with a rank of 19) and Germany (rank 18) are among the 20 countries most affected, all other 17 countries (with higher ranks) are non-European (Kreft et al. 2016). Nevertheless, European countries continue to be, in general, net emitters of GHG.	Section 2.3.1.4 has been reorganised and focuses on food energy water nexus issues and includes two specific examples.
Allan Watt	Chapter 2	71	1837	73	1898	Supporting evidence / references needed.	We included references to specific chapter of the 2015 WHO-CBD state of knowledge review on biodiversity and health; in this review many experts were involved and a lot of scientific literature was reviewed
Tom West	Chapter 2	71	1837	77	2038	Is the concept of 'ecohealth' worth mentioning here? Ecohealth considers human health and ecosystem health in a holistic manner. See the journal 'EcoHealth' for more information.	One Health is mentioned; EcoHealth and other integrating concepts could be mentioned too; but we have constraints of text space
Vânia Proença	Chapter 2	71	1837	71	1837	The text in this section requires more references and could be shortened	We included references to specific chapter of the 2015 WHO-CBD state of knowledge review on biodiversity and health; in this review many experts were involved and a lot of scientific literature was reviewed
Maximilian Weigend	Chapter 2	75	1955	75	1955	the complex relationships between plant pollen, allergies and environmental pollution is poorly understood. Maybe this whole reference to allergies should be removed altogether	True, it is complex, like all environmental/nature health relationships; allergies are mentioned in the health section
Germany	Chapter 2	75	1955	75	1955	the complex relationships between plant pollen, allergies and environmental pollution is poorly understood. It may therefore be very important to highlight that the discussion on this relationship is hampered by prevailing knowledge gaps).	Knowledge gaps are a general feature of nature - health linkages; addressed as such
Mark Snethlage	Chapter 2	75	1960	75	1968	Aspects of the potential negative impacts of biodiversity on health and wellbeing have been evoked, such as transmission of tick-borne diseases. There is also evidence that, in particular in urban areas where much of the population has lost contact with nature, nature is also a source of fear (e.g. fear of encountering poisonous animals, fear of bad weather). Furthermore, urban green spaces are sometimes associated with crime and insecurity. Reference: Sreetheran, M., van den Bosch, C.C.K., 2014. A socio-ecological exploration of fear of crime in urban green spaces – A systematic review. Urban Forestry & Urban Greening 13, 1–18. doi:10.1016/j.ufug.2013.11.006	Negative health aspects are already included in a more general sense; we cannot be exhaustive on all elements
Allan Watt	Chapter 2	76	1984	77	2038	This section relies heavily on CBD reports. How robust is this source of knowledge?	We included references to specific chapter of the 2015 WHO-CBD state of knowledge review on biodiversity and health; in this review many experts were involved and a lot of scientific literature was reviewed
Thomas Brooks (IUCN)	Chapter 2	76	1985	76	1987	General point: IPBES assessments are not mandated to undertake new assessments. Presumably change "analysis" here to "synthesis" or "review" or similar.	We have adjusted the wording in number 3 page 145
Germany	Chapter 2	77	2039	77	2050	It would be good to add links to the preliminary guide on the conceptualization of values (IPBES/4/INF/13 and explain why and how the different value categories have been addressed across the different sections of this chapter and in the other chapters.	This has been addressed in chapter 1 and the integration between chapters is being dealt with by an ECA values liaison group
Patricia Balvanera	Chapter 2	77	2039	77	2039	Is this contributions to, or contributions of? How about removing the contribution part and just say links to relational values or something like that?	this has been deleted
Tom West	Chapter 2	77	2042	77	2042	Inherent value' and 'intrinsic value' are not the same thing. 'Inherent value' is a value that humans place on something simply because of its existence (eg the Mona Lisa and the species <i>Alluropoda melanoleuca</i> may both have inherent value). 'Intrinsic value' is non-anthropocentric value, it is the value that living organisms/systems have in themselves, of themselves, for themselves (eg the Mona Lisa does not have intrinsic value since it is not a "locus of valuational activity" - B Morito, "Intrinsic Value: A Modern Albatross for the Ecological Approach" (2003) 12 Environmental Values 317; but an individual panda or potentially even a whole ecosystem does).	Section 2.3.5 is being enhanced by on going work by a new LA working on monetary values who will address these issues when completing this section. These different types of values are also discussed in chapter 1
Tom West	Chapter 2	78	2051	78	2060	The World Heritage Convention also defines and protects 'natural heritage' as a distinct category to 'cultural heritage'. 'Natural heritage' is defined as "natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view; geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation; natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty." Note that sites of natural heritage are therefore of aesthetic/scientific/conservation/universal value. Aesthetic value is surely an aspect of cultural value. Scientific value perhaps relates to supporting services, as does conservation. There are perhaps certain tones of non-anthropocentric intrinsic value here too - could be used as a demonstration of different types of value working together.	This is discussed in section 2.3.3. on contributions to cultural heritage and identity
Douglas Nakashima	Chapter 2	78	2051			2.3.3.1. Heritage and cultural values [cultural landscape...] Plieninger et al. 2006. (p317) "Europe's countryside is characterised by a rich diversity of cultural landscapes and has been shaped by traditional land-uses. These landscapes provide numerous ecological services, e.g. the support of high levels of biodiversity. However, many traditional land-use systems have been lost or diminished in past decades, as land-uses have polarised either toward extensification and land abandonment or intensification. Remaining traditional land-use systems continue to be at risk."; (p318) "In addition to their nature-conservation value, cultural landscapes are also appreciated due to their cultural values bound to the history of a place and its cultural traditions (Mitchell and Buggey, 2001). There is an increasing recognition of the necessity to include the values and priorities of people in any activity of natural or cultural resources conservation. Likewise, cooperation between actors of nature and cultural heritage conservation have been increasing recently."	Thanks for the reference
Thomas Brooks (IUCN)	Chapter 2	78	2071	78	2075	The material on natural and mixed WHS is good, and could usefully be expanded - where are these sites? What Conservation Outlook to they face?	This is expanded on and discussed in section 2.3.3. on contributions to cultural heritage and identity
Tom West	Chapter 2	78	2072	78	2075	The need to include 'natural heritage' as well as 'cultural heritage' is clear (see previous comment) if both types of sites are to be listed.	This is discussed in section 2.3.3. on contributions to cultural heritage and identity
Vânia Proença	Chapter 2	78	2089	79	2093	In Portugal, cork oak is protected by law since 2001 and has been declared national tree by the parliament after a petition in 2011	the cultural value of cork wood pastures in Spain and Portugal is considered on page 147
Tom West	Chapter 2	79	2106	81	2131	Is there room for discussion on how the CAP could support GIAHS? Perhaps in Chapter 6?	This will be covered in chapter 6
Douglas Nakashima	Chapter 2	79	2121			2.3.3.1 Heritage and cultural values ADD reference to High nature value farming and traditional ecological knowledge, e.g. Ivaşcu and Rakos 2016 (Romania): "In Romania, HNV farming is currently occupying around 32% of the total of agricultural areas... This large extent of HNV farming is the result of the survival of small-scale semi-subsistence type farms, and the traditional way of raising animals (especially in the mountainous and sub-montane areas)."	thanks for the reference
Anna Augustyn	Chapter 2	80	2130	82	2131	It could be pointed out that once collective, nowadays farming practices are more individualistic; however, the CAP pays tries to promote more collective approaches in managing public goods / land	the CAP may intend to do this but the evidence on its success is limited so we will not mention this as it attributes an impact to CAP that is limited
Zsolt Molnar	Chapter 2	79	2130	81		Box: Two new publications are available here, both on topics rarely published before. The first has ILK holders as co-authors! Molnár, Zs. Kis, J., Vadász, Cs., Papp, L., Sándor, I., Béres S., Sinka G., Varga, A.: (2015): Common and conflicting objectives and practices of herders and nature conservation managers: the need for the 'conservation herder'. Ecosystem Health and Sustainability (on-line first) Varga, A., Molnár, Zs., Biró, M., Demeter, L., Gellény, K., Míkovács, E., Molnár, Á., Molnár, K., Ujházy, N., Ullási, V., Babai, D. (2016): Changing year-round habitat use by extensively herded cattle, sheep and pigs in East-Central Europe between 1940 and 2014: Consequences for conservation management. Agriculture Ecosystems & Environment (on-line first)	thanks for the references
Allan Watt	Chapter 2	82	2152			Overlap with earlier section (2.2.3.4)?	due to changes in NCPs the material on symbolic and spiritual meanings of nature is focussed in section 2.2.3.3
Douglas Nakashima	Chapter 2	82	2152			2.3.3.2 Spiritual values ADD role of landscapes in healing and community well-being, e.g. Sezdebek and Alibek 2016 (Kyrgyzstan): "Various rituals related to healing, personal and community well-being and livelihoods are conducted on sacred sites [see Table 3]."	thanks for the reference
Allan Watt	Chapter 2	82	2161			Overlap with earlier section (2.2.3.4)?	due to changes in NCPs the material on symbolic and spiritual meanings of nature is focussed in section 2.2.3.3
Allan Watt	Chapter 2	82	2176	83	2190	Very useful perspective but should be backed up with evidence/references.	references now included
Germany	Chapter 2	82	2180	82	2181	Only here the reference to the reference to the preliminary guide on the conceptualization of values IPBES/4/INF/13 is made. The links and the corresponding values should be explained at a more central place of this chapter or be part of chapter 1.	This is being addressed by a values group for ECA

Tom West	Chapter 2	83	2202	83	2206	A Precautionary Approach could be invoked here. We cannot be sure that future generations will not acknowledge the many values of biodiversity in a number of ways, and so we must protect diversity.	The precautionary approach is subject to much debate so we would rather not use this term
Tom West	Chapter 2	83	2208	83	2221	This paragraph is unclear. I think what needs to be said is that "There are a number of tools we can use to calculate the value of many of nature's benefits to people. Some of these calculate the monetary value of nature's benefits, whereas some avoid using monetary calculations. A number of economic tools for calculating monetary valuations exist. These allow the monetary value of a number of ecosystem services to be calculated using different approaches. For example... On the other hand, non-monetary valuations [socio-cultural valuation] implies (a) that socio-cultural values can't be assessed monetarily and (b) that economic values can't be assessed non-monetarily, neither of which are true) use different, non-economic, tools to value ecosystem services. For example"	We tried to clarify this paragraph according to this suggestion and other reviewers'
Inge Liekens	Chapter 2	83	2212	83	2218	the difference between what socio-cultural and monetary value is, is a little bit too simplified here. Monetary valuation is also about importance, preferences (all willingness to pay studies are based on preferences of people), needs, and demands of people. It is only derived in a different way and put in a monetary unit. See also chapter 5 in TEEB.	Thanks! Chapter 5 of TEEB also included as a clear ref
Germany	Chapter 2	85	2240	85	2240	We look forward to this part in the SOD	Thanks!
Inge Liekens	Chapter 2	85	2241			cases /overviews of economic values of ess in EC(A) can be found within the MAES- project, ESMERALDA project. An interesting study concerning the economic valuation is also the follow up study for TEEB: brouwer et al. 2013	
Patricia Balvanera	Chapter 2	85	2243	85	2257	A synthesis of approaches to assess and value ecosystem services in the EU in the context of TEEB These tables are going to be very important	Thanks for the reference Yes we agree
Tom West	Chapter 2	86	2257	97	2647	Good to have discussion on equity/justice, but it is unclear how the terms are understood by the Report - are they synonymous? It is also unclear how exactly this section pieces in with the remainder of the chapter: what do these equity/justice considerations say about current/future access to ecosystem services? At a broader level, there is a significant body of literature on the meaning of equity and justice in both a general sense (eg Rawls, A Theory of Justice (Clarendon 1972), Pogge, World Poverty and Human Rights (2002), Nussbaum, Frontiers of Justice (Harvard 2006), Dworkin, Justice for Hedgehogs (Harvard 2011), Singer, Practical Ethics (1979)) an intergenerational sense (eg Brown-Weiss (ed), In Fairness to Future Generations (UN 1989), Caney, Climate Change, Intergenerational Equity, and the Social Discount Rate' (2014) 13 Politics, Philosophy & Economics 320, Feinberg, 'The Rights of Animals and Unborn Generations' in Ethical Theory: An Anthology (Blackwell 2013), Parfit, 'Future Generations: Further Problems' 11 Philosophy and Public Affairs 113) and an environmental (distributive/procedural) sense (eg Bullard, Dumping in Dixie (Westview 2000), Gillespie, International Law, Policy, and Ethics (OUP 2014), Schlosberg, Defining Environmental Justice (OUP 2007), Wenz, Environmental Justice (SUNY 1988), Shelton 'Equity' in The Oxford Handbook of International Environmental Law (OUP 2007). The report would be improved by engaging with this literature directly. The possibility of nonhuman justice (ie justice to nonhumans) is touched on (eg mention of Nussbaum's and Sikor's work), but is probably worthy of a section by itself - at the same level as intra/intergenerational justice. The concept certainly matches with intrinsic value (a key part of the IPBES Conceptual Framework), and also a number of cultural and spiritual values accorded to nature, as suggested in this report.	We thank the reviewer for the useful literature suggestions. As the reviewer points out, these references are on a broader level. The goal for this chapter was not to address equity and justice on a broad level, but rather in direct relation to biodiversity and ecosystem services. This introductory chapter is meant to provide an overview of relevant terms, rather than a complete overview of concepts.
Patricia Balvanera	Chapter 2	85	2260	89	2369	This section is very interesting but I wonder if it could move at least partially away from a conceptual revision of ideas to an assessment of what of all this is actually happening or not, or whether there are empirical evidences to assess how they are working	It was exactly the challenge for this section to go beyond conceptual aspects. The topic is only starting to be addressed in an empirical way in the literature on biodiversity and ecosystem services. We address those aspects for which we found empirical evidence in sections 2.4.2.1 and 2.4.2.2.
Anna Augustyn	Chapter 2	88	2306	88	2327	Public and private goods could be elaborated here	We added the notions of private and public goods in relation to equity.
Vânia Proença	Chapter 2	88	2306	88	2306	In addition to the trade-offs related to equity issues, the chapter should also have a section - or examples within sections - about (common) trade-offs between ecosystem services. That is, trade-offs are not always a matter of equity. Trade-offs could affect a single person or group as consequence of use choices or management decisions, or even different groups when access equity is considered (for instance the example lines 1020-1024).	We decided not to add more on common trade-offs between ES. This section should address only those where (in principle) equity and justice issues are involved. We summarise that this can be the case when different groups are involved.
Germany	Chapter 2	88	2306	90	2410	The concept of compensatory justice could be mentioned in this chapter.	We considered compensatory justice out of scope for the assessment of ES.
Patricia Balvanera	Chapter 2	83	2308	83	2308	Same comment on contributions of, to, or links with	? I think there is a typo in the line number
Patricia Balvanera	Chapter 2	83	2308	84	2237	I really like this sections and the exercise you did	We thank the reviewer for the compliment
Patricia Balvanera	Chapter 2	90	2384	91	2410	These sections will be highly relevant	We thank the reviewer for the compliment
Allan Watt	Chapter 2	90	2399			Is there parallel information on access to green space in rural areas e.g. to ecologically diverse areas within regions dominated by intensive agriculture? (Is this what is meant on line 2409?)	We did a literature search on access in rural areas and included relevant information.
Allan Watt	Chapter 2	90	2410			Human-wildlife conflicts are increasingly seen as conflicts between humans. See e.g. Conflicts in Conservation edited by Stephen M. Redpath, Ralph J. Gutiérrez, Kevin A. Wood, Anna Evely and Juliette C. Young	We extended the section on Human-Wildlife conflicts.
Tom West	Chapter 2	90	2412	90	2414	Why the switch in language to 'natural capital'? Natural capital is only the economic manifestation of biodiversity and nature. There are equity and justice considerations for nature as a whole rather than just nature as natural capital. Consider the difference between 'Nature' and 'Nature's benefits to people' in the IPBES Conceptual Framework.	This switch was only because the notion of critical natural capital has been there for longer in particular also in ecological-economic and ethical discourses. We have tried to avoid the term, as we agree it can raise different associations.
Tom West	Chapter 2	91	2439	94	2540	Health equity is not the same kind of distinction as the other headings at the same level as it (ie intra and intergenerational equity). Health equity should be considered under each of those headings in turn. (ie the intragenerational aspects of health equity and the intergenerational aspects of health equity)	Addressed in the SOD
Patricia Balvanera	Chapter 2	91	2439	94	2539	This section is very interesting and the table is great. Yet the links to biodiversity and ecosystem services come in quite late. It might be good to integrate this earlier in the section and more explicitly into the table	Shifted the biodiversity-ES sections to the beginning. Changing the table is not feasible, as this is taken from an existing publication
Patricia Balvanera	Chapter 2	94	2541	94	2544	Please consider including procedural equity with respect to different world views and different values of nature and nature's benefits more explicitly in this introduction	For clarification we included more ECA relevant literature
Allan Watt	Chapter 2	94	2545	97	2647	This sections are not very assessable for the presumed readership of this assessment and should be substantially written with the audience in mind. There is also an overlap with Chapter 6 so that some / all of this could be deleted.	Section deleted and replaced by ECA relevant literature
Patricia Balvanera	Chapter 2	94	2545	94	2565	This section is interesting but hard to read. Is it possible to mainstream some key messages at the beginning of separate paragraphs?	Section deleted and replaced by ECA relevant literature
Patricia Balvanera	Chapter 2	94	2566	95	2566	Would be great to link this more explicitly to nature and nature's benefits	Health equity is dealt with in another section; this section was deleted
Germany	Chapter 2	95	2575	95	2580	More information on the "voice and accountability scores" is needed.	Section deleted and replaced by ECA relevant literature
Patricia Balvanera	Chapter 2	95	2581	95	2589	Relevant though vague. Can this be specifically related to ECA and nature and nature's benefits? Maybe by articulating this more explicitly with the following section	In the SOD illustrated with ECA relevant literature
Tom West	Chapter 2	96	2590	96	2612	It would be good to have a clearer introduction to the three pillars (ie access to information, public participation, access to justice) of the Aarhus Convention, what these are based on, and how these have been delivered in practice. Listing the States Parties to the Aarhus Convention would also make sense. Note that some of the questions posed in the text are answered (not necessarily satisfactorily!) by the Aarhus Convention and associated literature and caselaw. eg Who are relevant stakeholders? "The public concerned" means the public affected or likely to be affected by, or having an interest in, the environmental decision-making; for the purposes of this definition, non-governmental organizations promoting environmental protection and meeting any requirements under national law shall be deemed to have an interest" (Art 2(5)) and "Within the scope of the relevant provisions of this convention, the public shall have access to information, have the possibility to participate in decision-making and have access to justice in environmental matters without discrimination as to citizenship, nationality or domicile and, in the case of a legal person, without discrimination as to where it has its registered seat or an effective centre of its activities" (Art 3(9)). The transboundary nature of Aarhus is worth noting, as may be the important role of NGOs in environmental law (see eg Yamin, 'NGOs and International Environmental Law: A Critical Evaluation of their Roles and Responsibilities' (2001) 10 RECIEL 149, Spiro, 'NGOs and Civil Society' in The Oxford Handbook on International Environmental Law (OUP 2007)). Standing for future generations (see the Filipino Minors Oposa case 33 ILM 173 (1994)) and nonhuman species (consider the potential role of NGOs - see Stone, 'Should Trees Have Standing?' (1972) 5 Cal L Rev) is a good point - could do with greater discussion.	The Aarhus convention is now better illustrated with ECA relevant literature
Tom West	Chapter 2	96	2614	97	2647	It would be good to have the principles of the Nagoya Protocol set out clearly. I am not an expert in the Nagoya Protocol, but it seems to be dealing with matters both of distributive justice for people currently alive and procedural justice. As such, it should be in both section 2.4.2.1 (intragenerational distributive) and in section 2.4.3. Alternatively, it could be a case study in a box demonstrating how these issues can be dealt with in practice, and how they always come combined (as recognised also by John Knox as Independent Expert on Human Rights and the Environment: "In examining the obligations pertaining to the human rights vulnerable to environmental degradation, perhaps the most basic set of issues concerns the substantive and procedural content of those obligations. One interesting development in this respect concerns possible links between substantive rights and procedural duties. Some human rights bodies have, in effect, closed the circle between the (largely substantive) rights that are most likely to suffer environmental harm, and the (largely procedural) rights whose implementation helps to ensure environmental protection. In order to safeguard the environment from the types of harm that violate the first set of rights, they have concluded that States have obligations to respect and ensure the second set of rights" (Human Rights Council, 'Preliminary report' A/HRC/22/43, para 40)	We could not easily find relevant information; not a priority here
Germany	Chapter 2	96	2614	97	2647	We would welcome more information about the performance of the other non-EU subregions regarding the ABS principle of CBD/strengthened through Nagoya Protocol.	This maybe addressed in chapter 5 in the SOD. we will check
Germany	Chapter 2	97	2649	97	2654	We look very much forward to reading this section in the SOD	thank you!
Inge Liekens	Chapter 2	126	3806			It would be a pity if interesting grey literature/research would be neglected only because it is not available in English especially for NEA's.	We are seeking to include more material from grey literature especially NEAs in the final draft and are discussing with the ECA chairs and other lead authors about how to develop a consistent approach to using this literature
Vânia Proença	Chapter 2	130	3812	130	3812	The inclusion of examples from traditional gastronomy (e.g., Lavash, Gingerbread, Mediterranean diet, etc.) should be reevaluated since all food necessarily relates to provisioning services	thank you for the suggestion