

REGIONAL ASSESSMENT REPORT ON BIODIVERSITY AND ECOSYSTEM SERVICES FOR EUROPE AND CENTRAL ASIA							
Comments external review first order draft - Chapter 3							
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" ( <a href="http://bd.eionet.europa.eu/Reports/ETCBTechnicalWorkingpapers/PDF/Information_IPBES_on_EEA_EU.pdf">http://bd.eionet.europa.eu/Reports/ETCBTechnicalWorkingpapers/PDF/Information_IPBES_on_EEA_EU.pdf</a> ), 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 ( <a href="http://www.eea.europa.eu/soer/">http://www.eea.europa.eu/soer/</a> )), in particular, thematic briefings ( <a href="http://www.eea.europa.eu/soer-2015/europe">http://www.eea.europa.eu/soer-2015/europe</a> ) and SOER synthesis ( <a href="http://www.eea.europa.eu/soer/#tab-synthesis-report">http://www.eea.europa.eu/soer/#tab-synthesis-report</a> ); EEA 2016. Mapping and assessing the condition of Europe's ecosystems. Progress and challenges ( <a href="http://www.eea.europa.eu/publications/mapping-europes-ecosystems">http://www.eea.europa.eu/publications/mapping-europes-ecosystems</a> ); EEA, 2015. State of Nature Report 2015 ( <a href="http://www.eea.europa.eu/publications/state-of-nature-in-the-eu">http://www.eea.europa.eu/publications/state-of-nature-in-the-eu</a> ); EEA, 2015. State of Europe's Seas ( <a href="http://www.eea.europa.eu/publications/state-of-europes-seas">http://www.eea.europa.eu/publications/state-of-europes-seas</a> ); EEA, 2016. European forest ecosystems – state and trends ( <a href="http://www.eea.europa.eu/publications/european-forest-ecosystems">http://www.eea.europa.eu/publications/european-forest-ecosystems</a> ). In general, the EEA website ( <a href="http://www.eea.europa.eu">http://www.eea.europa.eu</a> ) 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, L4148; 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, <a href="http://www.fao.org/nr/cgrfa/biodiversity/sowbfa/en/">http://www.fao.org/nr/cgrfa/biodiversity/sowbfa/en/</a> ) from FAO and report from the project "Preparatory Action on EU genetic resources" from COM (for more info: <a href="http://www.geneticresources.eu/">http://www.geneticresources.eu/</a> ) 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
Marcus Zisenis	Chapter 3	General		0			How is the assessment of this chapter related to and distinguished from others like Chapter 2 which also tries to analyse the different ecosystem services provided by biodiversity? Nevertheless, this chapter seems to be much clearer structured in a DPSIR scheme like logical red line than Chapter 2.	this chapter is only about biodiversity and ecosystem functioning, not services, we hope that chapter 1 and the intro of chapter 3 now better clarify the difference between this and other chapters.
Marcus Zisenis	Chapter 3	General		0			The altering recommended measures of drivers with a negative impact on biodiversity values in this region should be added wherever and as concrete as possible, including biodiversity benchmarks to be achieved in a certain period of time by whom.	conservation policies and other interventions that benefit biodiversity and ecosystem services are discussed in chapter 6. Discussing appropriate biodiversity targets and
Sophie Condé	Chapter 3	General		0			In general this chapter is too much detailed, need to review the structure in a more systematic way. Create tables to summarise the contents avoiding lengthy text.	We have fundamentally revised the whole chapter which is not much more concise and streamlined.
Sophie Condé	Chapter 3	General		0			Additional reference: EEA Report No 5/2016 European forest ecosystems - State and trends. <a href="http://www.eea.europa.eu/publications/european-forest-ecosystems">http://www.eea.europa.eu/publications/european-forest-ecosystems</a>	Will be added at SOD revisions. Thank you for the reference!
Guy Pe'er	Chapter 3	refs		0			Relevant reference on the effect of agriculture on bioiversity in Wheat versus olives versus Mediterranean grassland/shrubland species in Israel and across the climatic gradient, showing wheat to be generally quite hostile while olive grows quite benign, even to rare species, but depending on grove size. Pe'er et al. 2011:Pe'er, G., C. van Maanen, A. Turbé, Y. G. Matsinos, and S. Kark. 2011. Butterfly diversity at the ecotone between agricultural and semi-natural habitats across a climatic gradient. Diversity and Distributions 17:1186–1197.	the reference is now included and taken into account
Guy Pe'er	Chapter 3	general comment		0			There are many relevant mentioning of mountain areas. But it could be good to explicitly differentiate in one paragraph key processes and pressure in lowland versus highland and mountain regions. As a small contribution of relevant missing refs on mountain biodiversity and correlation between taxonomic groups (birds, butterflies, plants) as well as NDVI (productivity): Levanoni, O., N. Levin, G. Pe'er, A. Turbé, and S. Kark. 2011. Can we predict butterfly diversity along an elevation gradient from space? Ecography 34:372-383. ;// Kent, R., O. Levanoni, E. Banker, G. Pe'er, and S. Kark. 2013. Comparing the response of birds and butterflies to vegetation-based mountain ecotones using boundary detection approaches. PLoS ONE 8:e58229. There are of course many more, especially in the Alps.	Thanks for references and comment. This is used and to be finally checked at the final document
Frank Wugt Larsen (EEA input)	Chapter 3	General		0			General: This chapter could benefit from full use of many recent EEA publications, incl. the references listed under the 1st comment. Eg. this include EEA, 2015 European environment – state and outlook 2015 (SOER 2015), in particular, thematic briefings and SOER synthesis; EEA 2016. Mapping and assessing the condition of Europe's ecosystems. Progress and challenges (The mid-assessments providing overview on current data availability for EU / EEA Europe); EEA, 2016. European forest ecosystems – state and trends (there is more recent information e.g. for sustainable forest use) and new Corine /HRL forest data.	thanks for the suggestion, we have made extensive use of these and other EEA publications in our revisions
Frank Wugt Larsen (EEA input)	Chapter 3	General		0			General: missing a close link between ecosystem service provision and ecosystem condition / biodiversity (see MAES approach)	The section on the relationship between biodiversity and ecosystem services has been reorganised to be more ECA specific and to focus on ecosystem services rather than ecosystem functioning. In this context there are examples for several ecosystem types (units of analysis) stating how a loss of diversity affects ecosystem service provision.
Frank Wugt Larsen (EEA input)	Chapter 3	General		0			General: The classification of drivers seems not to be fully harmonized. In most cases MA approach is used but sometimes its more aggregated e.g. for birds table 3.26. If harmonisation is not possible then it should be explained.	We have revised all tables and use the same template throughout, with the following drivers: climate change, land-use change, IAES, pollution
Allan Watt	Chapter 3	General comment		0			This Chapter deals with biodiversity and ecosystems by first dealing with systems, secondly taxa, thirdly future trends and fourthly the "relationship between biodiversity and ecosystem services". Not only is this last part confusing (see comments below) but it is presented without first dealing with as assessment of status and trends in ecosystem services, a huge leap. This is, of course, dealt with in Chapter 2: either the order in which these different aspects are dealt with should be changed or there should be cross-referencing here (and elsewhere).	We cross-referenced the section with chapter 2 and we state clearly that this section serves to show the underpinning of ES by biodiversity, whereas chapter serves for showing the status and trends in ecosystem services respective NCS
Allan Watt	Chapter 3	General comment		0			There are many statements that are interesting but not essential to the assessment. In other places very little information is presented, notably in cases where much information is available. Some specific examples (for each) are given below.	We have fundamentally revised the whole chapter which is not much more concise and streamlined.
Allan Watt	Chapter 3	General comment		0			Information on status and (particularly) trends is often lacking or weak e.g. The diversity of heaths is high relative to their area (1494); Despite the low plant species diversity heathlands can have high invertebrate species richness... (1497). These examples and the text generally, usually gives the impression that we know more than we do. Statements about gaps in knowledge (e.g. 1776-1778, 2086-2087) are rare.	we have added a specific section on knowledge gaps, and specifically acknowledged the lack of quantitative or even qualitative trends when appropriate
Allan Watt	Chapter 3	General comment		0			There are several references to biodiversity hotspots (even "real biodiversity hotspots") in the Chapter. No doubt these occur in other regional assessments. These tend to be subjective, and therefore not helpful, terms.	The reference to "biodiversity hotspot" is based upon the term introduced by Conservation International. The term is defined here <a href="http://www.conservation.org/how/pages/hotspots.aspx">http://www.conservation.org/how/pages/hotspots.aspx</a> and widely used by international conservation organisations including IUCN, WWF, CI, WCS and others in their reports and assessments
Allan Watt	Chapter 3	General comment		0			The coverage of taxa is incomplete.	all taxa except protozoans and bacteria are now considered. However, we have highlighted the paucity of data for each taxa when appropriate, this is quite severe for fungi, most invertebrate groups, especially marine and freshwater, lichens and bryophytes.
Allan Watt	Chapter 3	General comment		0			I have not made suggestions to correct the numerous typographical and other errors.	most of these have been addressed and the whole assessment will be proof-read after SOD
PESC-3	Chapter 3		0	0			possible additional reference: Mapping and Assessment of Ecosystems and their Services - Urban ecosystems 4th Report: <a href="http://catalogue.biodiversity.europa.eu/uploads/document/file/1340/MAES_report_on_urban_ecosystems.pdf">http://catalogue.biodiversity.europa.eu/uploads/document/file/1340/MAES_report_on_urban_ecosystems.pdf</a> . This fourth MAES report provides guidance for mapping and assessing urban ecosystems and includes an indicator framework to assess the condition of urban ecosystems and services, which is used at European, MS and local level	thank you for the reference
PESC-3	Chapter 3		0	0			take strategic elements and representative examples in complement of a synthesis	we have aimed for this approach for SOD, a synthetic analyses with some specific examples for each UOA and taxon.
PESC-3	Chapter 3		0	0			use more integrative studies (e.g.freshwater: Balian et al. (2008) Hydrobiologia, 595	we have made much more extensive use of synthesis studies, e.g. GBO4, GEOS, MEA and reduced the use of primary literature when appropriate
PESC-3	Chapter 3		0	0			provide the more detailed information in appendix	We have significantly shortened the chapter for SOD and we will further reduce for the final document. At this moment we feel that an appendix may be necessary for the summary table of indicators of trends for UoAs and taxa but we await comments on SOD before making a final decision.
PESC-3	Chapter 3		0	0			huge amount of literature in russian is not explored: google scholar in russian and english should also be searched, not just web of science	comment taken and further work included a wider range of literature in Russian
PESC-3	Chapter 3		0	0			UNDP reports for CA also relevant, WWF reports (for EE and CA), project and scientific reports to the government (not peer reviewed but relevant)	Comment taken and further reports are used, including National Biodiversity reports, WWF ecoregional reviews and publications for Central Asia, Caucasus, etc
PESC-3	Chapter 3		0	0			help the reader to find key information- provide a table to recap on the information for each group or each sub-system	there is a summary table of trends and role of drivers for each UOA and taxon for both past/present and future projections.
PESC-3	Chapter 3		0	0			terminology/definitions/typology should be homogenized in the chapter, across chapters, across RAs	this has been addressed and continues to be addressed as the whole assessment evolves
PESC-3	Chapter 3		0	0			present drivers of change for ecosystems in a consistent table (instead of bullet points)	the table on trends for UoAs and role of drivers has been uniformed across all units of analyses. Some small inconsistencies remain which will be addressed before the final draft is submitted
PESC-3	Chapter 3		0	0			ancient tree (>350) biodiversity (unique organisms) is missing from the report	thank you we'll add text on this if we find studies that report on it
Germany	Chapter 3	General comment		0			This chapter, although numerous times mentioned as preliminary, concisely address biomes and biodiversity and ecosystem services elements. This Chapter refers to Millenium the Ecosystem Assessment, the Aichi Biodiversity Targets and the Sustainability Development Goals (SDG). The relations to Aichi Biodiv Targets and SDG may be specified more clearly by pointing more explicitly to Taxa, systems and biomes - as appropriate. The projections seem to be in line with the scientific state-of-the-art. More information from contemporary case studies from Europe and Central Asia could help to improve the understanding by giving more details based on existing long-term observations, e.g. from current research projects.	SOD more directly addresses the question of whether Aichi targets are on track to be met for ECA and whether different osico-economic scenarios achieve SDG goals for biodiversity. The final draft will summarize these in specific paragraphs for terrestrial, freshwater and marine realms
Germany	Chapter 3	General comment		0			The 200 pages FOD contains quite a lot of information and views on status and trends. However, the first pages seem repetitive since lots of information already given in chapter 1 & 2. The authors are encouraged to streamline these pages as much as possible	Thank you for the comment. At te stage of SOD development general issues were discussed among the chapters and most of the general information and methodological descriptions were moved to Ch1. New more focussed introduction to CH 3 done in more focussed way

Germany	Chapter 3	General comment	0			The abbreviation "ECA" should be used only when necessary. It should be clear that this regional assessment summarizes the available information for the ECA-region	point well taken.
Germany	Chapter 3	General comment	0			A delineation of the exact covered area (or reference to chapter 1, p. 20, l. 533) and a map of biomes would be helpful.	maps of study units are being prepared by the global assessment and will be provided in the final document
Germany	Chapter 3	General comment	0			The following reference seems useful: Mäder et al. (2002) Soil Fertility and Biodiversity in Organic Farming. Science 296, 1694.	this reference is used in the assessment indeed
Germany	Chapter 3	General comment	0			The following paper seems of relevance: Bond et al. (2015). Ancient grassland at risk. Science 351, 120-122.	as far as I know, this paper focuses on tropical grassy biomes across the globe, which is not relevant for the ECA assessment (i.e. to be used for the global assessment)
Germany	Chapter 3	General comment	0			The following paper seems of relevance: Strokey et al. (2015) Grassland biodiversity bounces back from long-term nitrogen addition. Nature 528, 401	this reference is now used and taken into account in the assessment indeed
Germany	Chapter 3	General comment	0			The following paper seems of relevance: Tittensor et al. (2016) A mid-term analysis of progress toward international biodiversity targets. Science 346, 241-244	thank you
Germany	Chapter 3	General comment	0			The status and trends section provides imbalanced information on taxa. Please try to fill gaps to provide a complete picture.	Plants, invertebrates, reptiles and amphibians which previously were incomplete have now a full draft and text on other taxa has been condensed. Generally we aimed for a uniform style and structure for all taxa
Germany	Chapter 3	General comment	0			Future dynamics refers mainly to general trends only. Is there enough information for dynamics and trends with regard to specific taxa?	SOD has now section on future trends for specific systems. We've included future trends for taxa within the systems they belong as the scenarios do not have differential impacts on taxa, rather on places
Germany	Chapter 3	General comment	0			The Tables are presently very large. Can you try to condense the information e.g. by preparing smaller tables and moving the relevant information into the main text?	for the final document we plan to include only maximum two indicators for each major system (extent and intactness) and one for species (conservation status), this will reduce their length. we also want to put tall of these in a single table so that it is more immediate to compare trends of different systems or taxa
Germany	Chapter 3	General comment	0			Key issues and balanced key examples should be presented clearly. Please try to highlight the key messages in the text or in a summary table/figure	the whole chapter has been substantially edited for conciseness. Key messages are in the executive summaries.
Germany	Chapter 3	General comment	0			If appropriate- you may want to consider research project results related to ecosystem services and biodiversity funded by national and international donors such as for instance presented here: <a href="http://nachhaltiges-landmanagement.de/en/home/">http://nachhaltiges-landmanagement.de/en/home/</a>	the impact of research or conservation projects is not within the scope of this chapter
Germany	Chapter 3	general comment	0			The chapter needs more structure and a clear target, which should be formulated upfront. As it stands now, lots of valuable information is compiled, but it is very difficult to get the main messages and linkages out of it. Please ensure that all information is presented in a well structured, comparable manner. If data gaps exist, please specify them. The methodological approach to chapter 3 is also only partly presented. Please improve on this.	Thanks for comments. Editing and streamlining the chapter was made in course of SOD development
Germany	Chapter 3	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.	All key messages now have confidence language
Zsolt Molnar	Chapter 3	General	0			ILK is missing in this chapter. ILK perceptions on biodiversity trends are really underresearched in our regions. But there is a rich literature on arctic changes from an ILK perspective, lots of publications of the Arctic Council etc., and also some for Europe and Central Asia (see the reference lists provided by the ILK Task Force, and the Proceedings volume of the ILK Dialogue workshop).	we acknowledge this is still a huge gap which we will address at SOD revision
Olivia Barrantes	Chapter 3	Whole	0			Great work, congratulations	Thank you
Germany	Chapter 3	1	4		21	One or two states is given for each author. One state reflecting the research place (funding of his position) should be the preference.	The MEP and Bureau will provide guidance on this for the final draft
Germany	Chapter 3	1	27			As indicated in "A note to reviewer", "subsections require reduction". To avoid the work load for future reviews (i.e. second order draft), reduction before review would be appreciated.	the chapter has overall extended but individual paragraphs have now been condensed.
Germany	Chapter 3	1	32			The statement of Blaise Pascal seems not helpful.	it has been removed
Harald Pauli	Chapter 3	4	77	5	157	The executive summary, sorry for mentioning this, does not really convince me that something serious enough happens to the terrestrial biota, which would need urgent action. One major point is that statements are often not conclusive and more an enumeration of threats. For cryptogamic species bryophytes and lichens, I'm not sure if it really meets the point the the most severe threats occur. E.g. at lichens, I would mention air pollution under 'moreover' but at the first point, as this is their particular sensitivity which led to the disappearance of many species in urban areas and at sensitive species even in contaminated forest areas. Of course, the bulk of organism groups, such as higher plants and most of the animal groups, are still missing. I agree, of course, one must start with the most readily available data. By this way, I also wish to mention that the efforts so far deserve very much acknowledgements. This assessment, however, is so important that it finally must be both convincing as well as a considering most of the organism groups.	the executive summary has been entirely rewritten and aimed at providing key findings. TODO Steffen Boch to address comment on cryptogames, bryophytes and lichens
Tom West	Chapter 3	4	90	4	91	How are 'species of special concern and importance' defined?	Special attention was given to species of special concern and importance, namely those listed in CITES and IUCN Red List of Threatened Species, as well as migratory species and those important for the functioning of ecosystems and livelihoods
Tom West	Chapter 3	4	98	4	98	In what way(s) is the intrinsic value of biodiversity prioritised? Understanding that species are the product of evolution might be a useful pathway through which to establish and understand intrinsic value, but it does not demonstrate its prioritisation.	Thank you for the comment. The whole section on intrinsic value is now in chapter 1 (paragraph 1.2.3) and this comment has been taken into account into the revisions.
Thomas Brooks (IUCN)	Chapter 3	4	98	4	99	This is important and appropriate, and neatly complements the focus of Chapter 2 on instrumental values. Same with, e.g. L428-440, L523-524, L631-632, L4403-4452.	Thank you
Maximilian Weigend	Chapter 3	4	105	4	110	Throughout the assessment there is little differentiation in "forest" - an this includes evergreen vs. deciduous broadleaved forests, mixed forest and coniferous forests. While there is a trend for more natural forest management, much of the forests that have been added are really "tree plantations", including exotic tree species. They may have similar effects on abiotic ecosystem services, but not on BD	note taken, plantations are also addressed in the cultivated lands, while the forest sections specially focus on natural forests
Germany	Chapter 3	4	105	4	110	Throughout the assessment there is little differentiation in "forest" - and this includes evergreen vs. deciduous broadleaved forests, mixed forest and coniferous forests. While there is a trend for more natural forest management, much of the forests that have been added are really "tree plantations", including exotic tree species. They may have similar effects on abiotic ecosystem services, but not on BD. Therefore please elaborate more specifically on this	see above
Jari Niemelä	Chapter 3	4	114	4	116	I do not understand how it can be stated that forest biodiversity conservation is achieved in ECA. This statement needs to be substantiated by evidence even here in the executive summary.	This statement is revised in the SOD to "reduced" with the confidence language added in brackets according to the approved methodology for the Executive summary
Maximilian Weigend	Chapter 3	5	119	5	124	heathlands are a mostly anthropogenic habitat - please spell that out. They have a high scenic and maybe also hydrological and climatic value - true (ericaceous) heathlands have very low plant diversity and would be expected to have very low invertebrate diversity. In both birds and invertebrates they harbour some extremely sensitive and rare species, but that does not correspond to high BD! Throughout the assessment there are no consistent terminologies and the theoretical framework is weak or absent. Overall - disregarding rarity - they may be the most species-poor habitat in WE.	Heathlands were excluded from the study units list as a separate UoA by the new Bureau agreed classification, they are integrated into other UoA. Therefore the comment is taken while discussing other ecosystems and UoAs
Germany	Chapter 3	5	119	5	124	heathlands are a mostly anthropogenic habitat - please make this more evident. They have a high scenic and maybe also hydrological and climatic value - true (ericaceous) heathlands have very low plant diversity and would be expected to have a very low invertebrate diversity. In both, birds and invertebrates they harbour some extremely sensitive and rare species, but that does not correspond to a high BD per se. Overall - disregarding rarity - they may be the most species-poor habitat in WE. Throughout the assessment there seem to be no consistent terminologies - please ensure that terms and concepts are used consistently throughout the chapter and the assessment and make it more explicit if areas are high in biodiversity and/or if they house rare species.	Heathlands were excluded from the study units list as a separate UoA by the new Bureau agreed classification, they are integrated into other UoA. Therefore the comment is taken while discussing other ecosystems and UoAs
Maximilian Weigend	Chapter 3	5	123	5	124	grazing is browsing if we are really talking about heathlands (no grass, by definition), fragmentation by what? Overexploitation for what? I would expect reforestation to be the main threat.	Heathlands were excluded from the study units list as a separate UoA by the new Bureau agreed classification, they are integrated into other UoA. Therefore the comment is taken while discussing other ecosystems and UoAs
Axel Hochkirch	Chapter 3	5	123	5	123	Fires and Grazing are important features of heathlands (at least for Calluna heathlands) and do not lead to simpler ecosystem structure, but in fact increase heterogeneity (if carried out at a small scale). Without fires and grazing, these heathlands become a much denser vegetation and ultimately become forests. Many invertebrates depend on fires and grazing in heathlands! However, grazing intensity needs to be low (as traditional sheep grazing) and fires not too frequent. See Webb (1998): The traditional management of European heathlands. Journal of Applied Ecology 35: 987-990.	Heathlands were excluded from the study units list as a separate UoA by the new Bureau agreed classification, they are integrated into other UoA. Therefore the comment is taken while discussing other ecosystems and UoAs
Germany	Chapter 3	5	123	5	124	Grazing is browsing if this statement refers truly to heathlands (no grass, by definition). Fragmentation by what? Overexploitation for what? Please try to fill these gaps	Heathlands were excluded from the study units list as a separate UoA by the new Bureau agreed classification, they are integrated into other UoA. Therefore the comment is taken while discussing other ecosystems and UoAs
Axel Hochkirch	Chapter 3	5	124	5	124	Most heathlands have disappeared because of transformation into forests or farmland (after artificial fertilizers were developed).	Heathlands were excluded from the study units list as a separate UoA by the new Bureau agreed classification, they are integrated into other UoA. Therefore the comment is taken while discussing other ecosystems and UoAs
Harald Pauli	Chapter 3	5	126	5	130	Shrubland is a rather label for a vegetation formation and mixes things together which, in fact, do not have much in common such as Mediterranean and Tugay shrublands.	Comment taken. Also pls note that shrub is no longer a separate UoA
Maximilian Weigend	Chapter 3	5	126	5	130	Mediterranean scrublands are mostly man-made and maintained by fire. Spell this out. Natural climax vegetation would be mostly Quercus ilex-forest.	This was added in the shrub related text
Germany	Chapter 3	5	126	5	130	Mediterranean scrublands are mostly man-made and maintained by fire. Spell this out and make it more evident. Natural climax vegetation would be mostly Quercus ilex-forest.	This was added in the shrub related text
Axel Hochkirch	Chapter 3	5	127	5	130	You might add the increasing numbers of wildfires in the Mediterranean as a threat.	This was added in the shrub related text

Harald Pauli	Chapter 3	5	131	5	138	Arctic tundra and alpine tundra strongly differs with respect to the actual risk of biodiversity losses. Whereas in the arctic, climate change in terms of degrees increase in temperature is highest, the risk of serious biodiversity losses is very much higher in the south of Europe due to warming and increasing aridity. In the north, retreats of glaciers will even open new ground for plants to establish such as in Greenland and many species are rather widespread, whereas the already small alpine 'islands' in the Mediterranean are at the very edge to disappear, but mostly host endemic species growing nowhere else but on a few mountain tops. The statement here does not say this at all. And polar deserts may be among the habitat types which are expanding with ongoing rapid retreat of glaciers. I also would not say 'slowly shifting' - it is a bit euphemistic - in terms of species migration, in fact, the currently rate is exceptionally rapid.	The message was edited as well as the text on tundra, while this difference was not really stressed yet. More work is on the go and the issue is to be addressed in the final document
Axel Hochkirch	Chapter 3	5	138	5	138	You might mention here that those declining species are affiliated to these habitats, while the increase in species richness is a consequence of colonization of more widespread species.	Comment taken, addressed already for the final document
Maximilian Weigend	Chapter 3	5	139	5	144	Grasslands are not a natural entity. They fall into man-made grasslands and natural grasslands, which are subject to entirely different patterns and processes. This header makes no sense without a differential view.	the distinction (between natural and man-made) had been discussing by the authors and will be made more clear at SOD revisions
Germany	Chapter 3	5	139	5	144	Grasslands are not a natural entity. They fall into man-made grasslands and natural grasslands, which are subject to entirely different patterns and processes. Please reconsider the heading here and provide a more nuanced view.	the distinction (between natural and man-made) had been discussing by the authors and will be made more clear at SOD revisions
Axel Hochkirch	Chapter 3	5	142	5	142	Very good. I completely agree. I would add the Common Agricultural Policy of the EU here.	you are welcome. Probably CAP issues could be added not here but in the grassland section below?
Axel Hochkirch	Chapter 3	5	148	5	148	Ok. For the caves, you should mention the increasing threat of limestone quarrying.	note taken, Caves are not anymore a unit of analysis (by Bureau decision), in ECA Assessment it will remain as a box example in the final document
Tom West	Chapter 3	5	151	5	151	Need a definition of 'protected areas' and 'Key Biodiversity Areas' etc. at this stage too.	a definition will be included in the final document
Maximilian Weigend	Chapter 3	5	151	5	157	some general figures such as percentage near-natural vegetation and PA per overall region and subregion would be extremely helpful here. The KBAs and IBAs are only one specialized aspect.	these information will be included in the final document
Axel Hochkirch	Chapter 3	5	151	5	157	I wonder if it would make sense to differentiate here according to the types of protected areas. Some of these high values are just a consequence of large protected areas with a low conservation status (e.g. landscape protection).	we have considered breaking the results by IUCN PA category but given that the Aichi target do not differentiate that we decided against it eventually. In addition, there is some evidence that different PA categories do not deliver different impacts in terms of avoided deforestation (see Joppa and Pfaff 2011, Proc Roy Soc B). This is not to dismiss this aspect, as other threats might be better mitigated by PAs with different management practices but to illustrate that there is limited evidence that IUCN categories matter for large scale analyses.
Jari Niemelä	Chapter 3	5	151	4	157	the crucial question is whether or not these protected areas can maintain biodiversity for the future	we agree but we haven't found any study that analyses projected future biodiversity trends inside and outside PAs within ECA
Thomas Brooks (IUCN)	Chapter 3	5	151	5	157	This key message on protected area coverage of key biodiversity areas is very important. However, where it best sits is an open question: is it about policy responses, and so may fit most appropriately in Ch 6. The conservation section in Ch 6 (1571-1573) has not yet been drafted, and so this question is hard to resolve at present. In any case, it is important that this text appear somewhere. NB also that this paragraph relates to freshwater and marine protected areas and key biodiversity areas, as well as terrestrial ones. Same applies to L2562-2616.	we debated this and decided to keep this in chapter 3 these will be added in the final document
Germany	Chapter 3	5	151	5	157	some general figures such as percentage near-natural vegetation and PA per overall region and subregion would be extremely helpful here. The KBAs and IBAs are only one specialized aspect.	Yes NW Pacific is part of ECA
Axel Hochkirch	Chapter 3	6	161	6	162	Are you sure that the NW Pacific belongs to the assessment region and not to Asia-Pacific???	In the revisions of SOD we will consider fisheries
Axel Hochkirch	Chapter 3	6	179	6	187	I don't think one can ignore the Fisheries here!	Good point which we will follow up on for the final document after SOD revisions
Axel Hochkirch	Chapter 3	6	188	6	191	I would first mention the fisheries before introducing climate change!	Done. These two pressures were included in this text
Axel Hochkirch	Chapter 3	7	206	7	210	Completely agreed, but I would add pollution and dams (or river regulation in general) as major drivers of biodiversity loss in freshwater systems.	added
PESC-3	Chapter 3	7	207	7	207	add "Irrigated"	is it only in desert and arid countries? I do not know...
PESC-3	Chapter 3	7	208	7	208	add "desert and arid"	Done
Maximilian Weigend	Chapter 3	5	212	9	314	Which subregions are we talking about? Chapter 1 sets out the subregions, but they are consistently ignored in Chapter 3. There is a lot of "Europe", but does this here correspond to EDA?	Done
Germany	Chapter 3	5	212	9	314	Please be more careful when referring to sub-regions. Chapter 1 sets out the subregions, but they are not consistently used in Chapter 3. There is a lot of "Europe", but in how far does this here correspond to ECA?	Done
PESC-3	Chapter 3	7	222	7	222	add ", salinization"	We removed redundant sentences and paragraph moved above
PESC-3	Chapter 3	7	223	7	223	add "(intended or accidentally introduced)"	We are not sure that it is needed as it an Executive summary
Axel Hochkirch	Chapter 3	7	227	8	262	I found this part particularly good (although a little bit long and partly redundant).	Done
Thomas Brooks (IUCN)	Chapter 3	7	228	7	238	Please mention that these data come from the Red List.	We are not sure that it is needed as it an Executive summary
Frederic Lemaitre	Chapter 3	7	237	7	237	it should read "such as the chytrid fungal disease"	Done
Thomas Brooks (IUCN)	Chapter 3	7	239	8	262	Please mention that these data come from the Red List.	We do not agree with this statement. We based our assessment on a thorough literature review and according to published information, pesticides are a problem but not the main threat
PESC-3	Chapter 3	8	254	8	254	add "salinization"	We are not sure that it is needed as it an Executive summary
Magali Gerino	Chapter 3	8	254	8	254	About pollution, the pesticides should be included in the sources because they are likely more harmful than nutrients	Agreed. It is currently difficult to see the consistency in this section. Under Aquatic taxa are regrouped Amphibian Freshwater invertebrates the 'fish' that include Marine and Freshwater. If so the it should be invertebrates and include Marine invertebrates as well.
Thomas Brooks (IUCN)	Chapter 3	8	263	8	275	Please mention that these data come from the Red List.	We are not sure that it is needed as it an Executive summary
Axel Hochkirch	Chapter 3	8	264	8	264	The structure of the Summary was not quite clear to me, because you start the treatment of species directly under the ecosystems (and I first thought why marine fishes are discussed in the freshwater section).	This is specified in line 321 to 324
Thomas Brooks (IUCN)	Chapter 3	8	276	9	290	Please mention that these data come from the Red List.	the source is listed in the relevant paragraph and in the figure captions
Thomas Brooks (IUCN)	Chapter 3	9	292	9	298	Please mention that these data come from the Red List.	see response above
Sophie Condé	Chapter 3	9	294	9	296	I am wondering how this assertion has been calculated. IUCN assessment is not proceeded so frequently. Is it modelling based?	no, there are at least two assessment in each group so a trend could be derived
PESC-3	Chapter 3	9	316	9	326	duplicate of the para on page 9, 303-314	it has been removed
Thomas Brooks (IUCN)	Chapter 3	10	328	10	338	This text is very important. NB that this key message encompasses aquatic species as well as terrestrial ones.	Thank you
Maximilian Weigend	Chapter 3	10	339	10	360	I fully support these conclusion, unhappy as I am with what leads up to them.	Thank you
Axel Hochkirch	Chapter 3	10	343	10	343	I would call this evidence "well established" as well.	agreed and addressed
Germany	Chapter 3	10	345			The contents of Aichi12, SDG14 und SDG15 should be explained very briefly, e.g. "extinction of known threatened species prevented and conservation status improved (Aichi 12)"	agreed, it will be revised in the final document
PESC-3	Chapter 3	10	358			change Northern and Western Europe to all Europe	that key message has been removed
Axel Hochkirch	Chapter 3	10	365	10	366	One might add here more specifically the transition of traditional grazing regimes in mountains by high-intensive grazing (cattle replaces goats and sheep) or abandonment.	Note taken and is used for the final document developemnt, while is still not explicit in the SOD
Maximilian Weigend	Chapter 3	10	368	10	368	Please make sure to treat natural and man-made grasslands differentially, identifying common and divergent patterns.	(see also similar comments below). The new headers and footnotes associated to the headers now acknowledge this, i.e.: 3.3.2.3.4 = 3.3.2.3.4 Savannas and natural grasslands (e.g. xeric grasslands, alpine meadows), versus 3.3.2.3.7 = Agricultural areas (incl. Managed grasslands) instead of "Productive ecosystems". And this has been made clear throughout the text.
Germany	Chapter 3	10	368	10	368	Please make sure to treat natural and man-made grasslands differentially, identifying common and divergent patterns.	(see also similar comments below). The new headers and footnotes associated to the headers now acknowledge this, i.e.: 3.3.2.3.4 = 3.3.2.3.4 Savannas and natural grasslands (e.g. xeric grasslands, alpine meadows), versus 3.3.2.3.7 = Agricultural areas (incl. Managed grasslands) instead of "Productive ecosystems". And this has been made clear throughout the text.
Germany	Chapter 3	10	369	11	398	This section may be allocated to other chapters; e.g. Ch 1.	Thank you, we have moved it in chapter 1 and addressed all related contents there.
Maximilian Weigend	Chapter 3	11	370	11	379	Evidence here is not unequivocal, make sure you argue this well.	We specified these statements and backed them up with references in the chapter.

Germany	Chapter 3	11	370	11	379	Evidence here is not unequivocal - please provide a more differentiated perspective	We specified these statements and backed them up with references in the chapter.
PESC-3	Chapter 3	11	374			insert loss after biodiversity	We now refer to biodiversity change in such cases.
Maximilian Weigend	Chapter 3	11	391	11	392	This either very deep or very trivial and should probably be reworded.	We explain this in more detail based on a review article.
Maximilian Weigend	Chapter 3	11	391	12	412	I find this statement incomprehensible and dubious. Knowing European tree-diversity and what mainly influences it, I wonder whether it is a sensible statement. Are we possibly just talking about the effects of topography and structure?	We explain these issues in more detail based on recent articles and point up that these are indeed effects of tree diversity.
Germany	Chapter 3	11	391	12	412	Please check this statement. There is more than topography and structure which influence tree diversity	Sorry, we did not find a statement on topography in the indicated text.
Germany	Chapter 3	11	406			Case studies: The six European countries should be specified.	For the sake of brevity the countries (Finland, Poland, Germany, Romania, Italy, Spain) are not mentioned in the text, but the spread of countries suggests results hold quite generally.
Maximilian Weigend	Chapter 3	12	422	12	427	Possibly true, but very complicated wording	The text has been simplified and clarified concerning this issue.
PESC-3	Chapter 3	12	427			mention relational values in that para on intrinsic value: stronger perception in some societies than ecosystem services	The part on intrinsic value was cut from chapter 3, in response to several reviewer comments.
Tom West	Chapter 3	12	428	12	440	It's not entirely clear to me why intrinsic value is in this Chapter (although I understand the rationale in terms of the Conceptual Framework). However, the rest of this chapter is concerned with the physical status of nature, rather than the value it has. I believe it would make more sense to have a clear analysis of the different types of value considered in the whole report in the opening chapter. Alternatively, if there were more discussion of the important biological and ecological processes that give rise to life and life's intrinsic value in the chapter (rather than a compilation of datasets on species in ECA), then a fuller discussion of intrinsic value could make more sense here.	The part on intrinsic value was cut from chapter 3, in response to several reviewer comments. Values are mentioned and and intrinsic value is explained in the final version of chapter 1.
Axel Hochkirsch	Chapter 3	12	428	12	440	This is important. The intrinsic value is the basis of conservation (since the Bible - Noahs Arc) and mentioned in many conservation legislation (e.g. the preamble of the habitats directive). I would add the "responsibility of humans" here.	The part on intrinsic value was cut from chapter 3, in response to several reviewer comments. Intrinsic value is explained in the final version of chapter 1.
Tom West	Chapter 3	12	430	5	436	'Intrinsic' and 'inherent' value are not the same thing (see Bowman, Davies and Redgwell, Lyster's International Wildlife Law (Cambridge University Press 2010) pp62ff for an explanation). It is worthwhile keeping the two meanings clear for the purposes of the IPBES assessment. 'Inherent value' is a value that humans place on something simply because of its existence (eg the Mona Lisa and the species Alluropoda melanoleuca 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).	We agree. However, the part on intrinsic value was cut from chapter 3, in response to several reviewer comments. Intrinsic value is explained in the final version of chapter 1.
Tom West	Chapter 3	12	432	42	436	Although true that there is debate over what exactly has intrinsic value, it is widely accepted that it is not only humans that have intrinsic value (see comment to Ch3 line 4404)	The part on intrinsic value was cut from chapter 3, in response to several reviewer comments. Intrinsic value is explained in the final version of chapter 1.
Maximilian Weigend	Chapter 3	12	441	13	455	Unless contrasted with what there is fairly good knowledge on, this reads like a confession "we know nothing". This is not helpful and needs a differentiated presentation.	this has been entirely reworded
Maximilian Weigend	Chapter 3	12	441	13	455	the executive summary is way to long!	it has been shortened to 4 pages for SOD
Germany	Chapter 3	12	441	13	455	This is not helpful and needs a differentiated discussion	this has been entirely reworded
Germany	Chapter 3	12	441	13	455	Please consider shortening the executive summary and make it more punchy	it has been shortened to 4 pages for SOD
Allan Watt	Chapter 3	14	457			Far too long and includes parts that are not necessary for an introduction. An edited version of the first, second and last paragraphs is enough. Some of the comments that follow relate to superfluous text.	Intro is shortened and re-written
Maximilian Weigend	Chapter 3	14	458	14	459	This should be covered elsewhere, certainly not here.	Removed here
Maximilian Weigend	Chapter 3	14	460	14	466	This is what the assessment should do, not what it does.	note taken, the text for SOD is being edited
Allan Watt	Chapter 3	14	461			This sentence is very unclear and far too dense. The meaning of "varying" is unclear and probably can be deleted. The mentions of "functional" and "function(s)" are confusing: the former is probably incorrect.	Thanks for comment, language was edited (new text for SOD)
Allan Watt	Chapter 3	14	472			If this paragraph is retained it should be much clearer. In line 473 "quality" does not make sense.	Thanks for comment, language was edited (new text for SOD)
Allan Watt	Chapter 3	14	475			Several ideas are combined and confused here: does "functional diversity" refer to diversity of functions or diversity of e.g. species that carry out that function? In any case, references (evidence) are (is) needed to support this claim.	Text for SOD is being edited
Allan Watt	Chapter 3	14	477	14	482	Text is very confusing and/or overly concise (without references). For example (of confusion) resources (surely) are services. This whole section includes too many ideas (without reference) and although much of it (once edited) is probably correct, the final sentence implies that decision-makers have to consider all characteristics of biodiversity (ecosystems, functions, services etc.) in their decision-making, an impossible task.	This introduction text for SOD was edited and made more concise and clear
Axel Hochkirsch	Chapter 3	14	478	14	478	What about pests? Don't they have a right to live as well? One might argue with ethical arguments...	Comment taken. The SOD text is more concise and this is not discussed within the natural systems functioning, while is considered to be addressed at the ethical discussion
Allan Watt	Chapter 3	14	483			A better example of text because of the supporting references, although more recent papers could have been cited.	Thanks
Allan Watt	Chapter 3	14	489			What does "basic" mean and "mismatch"? Why "increase" (is there already a mismatch)? The point could be made much more clearly e.g. Environmental change may mean that organisms are no longer adapted to the locations they previously existed in. The paragraph then refers to genetic diversity and ecological interactions, including phenological synchrony, all of which could be done in a clearer manner (and with more recent references).	Disagree with the comment, as this is more a language issue. The text for SOD is shortened but not much changed the language ( as it is also used by quoted authors)
Allan Watt	Chapter 3	14	500			This paragraph overlaps with the previous one and requires a complete re-write in conjunction with it. Or they could be deleted as suggested above: it's not clear why these examples are chosen here.	The text in SOD is shortened
Frederic Lemaitre	Chapter 3	15	502	15	505	Sentence on range shifts and adaptation to climate change should be mitigated by evidence on "climatic debts" of birds and butterflies in Europe: yearly change (for 1990–2008) in the community composition in response to climate change of bird and butterflies (respectively 9,490 and 2,130 communities studied across Europe is equivalent to a 37 and 114 km northward shift. However, the northward shift in temperature in Europe was even faster, leaving a 'climatic debt' of birds and butterflies corresponding to a 212km and 135 km lag behind climate (by Devictor et al. (2012). Differences in the climatic debt of birds and butterflies at a continental scale, Nature Climate Change 2: 121-124	Thank you for references and comment. The new text for SOD however had to be shortened
Frederic Lemaitre	Chapter 3	15	509	15	511	Please consider using these references to illustrate effects of the dampening of lemming population cycles on predators: Cornulier et al. (2013) Europe-wide dampening of population cycles in keystone herbivores. Science 340: 63-66 for this point, and for cascading effects on e.g. predators please refer to Terraube J., Arroyo B.E., Madders M., Mougeot F. (2011) Diet specialization and foraging efficiency under fluctuating food abundance in sympatric avian predators. Oikos 120:234-244 + Millon A., Petty S.J., Little B., Lambin X. (2011) Natal conditions alter age-specific reproduction but not survival or senescence in a long-lived bird of prey. Journal of Animal Ecology 80:968-975 + Terraube J., Arroyo B.E., Bragin A., Bragin E., Mougeot F. (2012) Ecological factors influencing the breeding distribution and success of a nomadic, specialist predator. Biodiversity and Conservation 21:1835-1852 + Schmidt N.M., Ims R.A., Hays T.T., Gilg O., Hansen L.H., Hansen J., Lund M., Fuglei F., Forchhammer M.C., Stittler B. (2012) Response of arctic predator guilds to collapsing lemming cycles. Proceedings of the Royal Society B 279:4417-4422 + Millon A., Petty S.J., Little B., Gimenez O., Cornulier T., Lambin X. (2014) Dampening prey cycle overrides the impact of climate change on predator population dynamics: a long-term demographic study on tawny owls. Global Change Biology 20(6):1770-1781 + Henden J.A., Ims R.A., Yoccoz N.G., Hellström P., Angerbjörn A. (2010) Strength of asymmetric competition between predators in food webs ruled by fluctuating prey: The case of foxes in tundra. Oikos 119:149-157 + Killengreen S.T., Strömberg S.E., Yoccoz N.G., Ims R.A. (2012) How ecological neighbourhoods influence the structure of the scavenger guild in low arctic tundra. Diversity and Distributions 18:563-574 + Hamel S., Killengreen S.T., Henden J.-A., Yoccoz N., Ims R.A. (2013) Disentangling the importance of interspecific competition, food availability, and habitat in species occupancy: recolonization of the endangered Fennoscandian arctic fox. Biological Conservation 160:114-120	Thank you for the reference
Allan Watt	Chapter 3	14	525			Useful but where are the questions that drove this part of the assessment?	Thank you for the references
Douglas Nakashima	Chapter 3	15	535			3.2. Methodological approach GENERAL: As stated in the first general comment, some papers, books, or conference proceedings, report a wide array of observations made by indigenous and local people regarding changes in biodiversity, ecosystems... Notably, for Arctic regions, the works of Tero Mustonen provide rich information, especially the book "Snowscapes, dreamscapes: snow change book on community voices of change" by Mustonen and Helander. The chapter 3 of the Arctic Climate Impact Assessment (ACIA - Chapter 3: Huntington et al. 2005) also provides a compilation of observations by local community members about climate change in the Arctic and its consequences on the environment. The observations reported can complement the ones made by conventional scientific procedures, or fill gaps for some areas, or provide information at a different scale. They can be factual observations, describing qualitative changes in the environment and species composition, or parts of stories and narratives, embedded in the local conception of the world. The observations can concern past, current or future trends of biodiversity and ecosystems, but also drivers of change. Observations reported in the references below have been reported in this table:	Valuable comment on indigenous and local knowledge. All useful references will be reviewed and included in the respective parts of the Chapter according to the topic (study unit) by ILK experts in our SOD revisions

Douglas Nakashima	Chapter 3	15	535			In Helander & Mustonen 2004, Snowscapes, Dreamscapes: snow change book on community voices of change. - Helander 2004. Global change - climate change observations among the Sami. - Hiltunen et al. 2004. Community voices of Jokkmokk, Region of Sápmi, Sweden. - Mustonen 2004. 'If there are no reindeers we have nothing to do here either' - Kola Sami nation. Voices from the community of Lovozero. - Salin et al. 2004. Sami nation environmental concerns from the Kaldoaivi reindeer herding region - Communities of Ochejohka (Utsjoki) and Nuorgam. - Salin et al. 2004. Sami nation environmental concerns from the community of Purnumulla and the Vuotso region. Others by Mustonen, T. - Nieminen et al. 2004. Local voices from the Faroe Islands - Mustonen 2005. Stories of the raven - Snowchange conference report. - Mustonen 2011. 'Songs of the Kolyma tundra' - co-production and perpetuation of knowledge concerning ecology and weather in the indigenous communities of Nizhnikoyma, Republic of Sakha (Yakutia), Russian federation. - Mustonen 2013. Oral stories as a baseline of landscape restoration - co-management and watershed knowledge in Jukajoki river. Others: - Fernández-Giménez & Estaque 2012. Pyrenean pastoralists' ecological knowledge: documentation and application to natural resource management and adaptation - Arctic Climate Impact Assessment (ACIA) 2005. Chapter 3. Huntington et al. The changing Arctic: indigenous perspectives. Section 3.4.7. Sápmi: the communities of Purnumukka, Ochejohka and Nuorgam; 3.4.8. Climate change and the Saami; 3.4.9. Kola: the Saami community of Lovozero - Maynou et al. 2011. Estimating trends of population decline in long-lived marine species in the Mediterranean sea based on fishers' perception. -	Valuable comment on indigenous and local knowledge. All useful references will be reviewed and included in the respective parts of the Chapter according to the topic (study unit) by ILK experts
Maximilian Weigend	Chapter 3	15	536	16	576	There is a list of habitats in previous chapters. I'd be happy to have a single one for the entire ECA-assessment. There is no methodology given at all for taxon and species diversity (BD in the strict sense), unfortunately this is then reflected in the rest of the assessment.	The approach to habitats classification is changed to the agreed and approved by the MEP and IPBES Bureau Units of Analysis. They are now described in Ch 1 of the SOD. The approach to Biodiversity (taxons) is now further addressed in the Ch 3 while discussing taxa
Germany	Chapter 3	15	536	16	576	Please use a single, coherent list of habitats throughout the chapter and assessment. Also, please add a methodology for taxa and species diversity - this is missing in the assessment	see above. Comment taken
PESC-3	Chapter 3	15	542			detail what is "the" common classification	matter of the English grammar - delete "the"
Germany	Chapter 3	16	545			The consideration of urban habitats seems interesting in view of global urbanisation.	Thank you for the comment. Agree.
Guy Pe'er	Chapter 3	general comment (see page 16)	560	16	569	The concept of differentiating the review into key systems is overall very good, but there may be a point in also differentiating bioclimatic regions more systematically (e.g. on a map?). This can be done using the Metzger et al 2013 division: Metzger, M. J., R. G. H. Bunce, R. H. G. Jongman, R. Sayre, A. Trabucco, and R. Zomer. 2013. A high-resolution bioclimate map of the world: a unifying framework for global biodiversity research and monitoring. Global Ecology and Biogeography 22:630-638.	Comment taken and reference reviewed. There is no special map included, but information analysed while assessing trends for the units of analysis
Frank Wugt Larsen (IEA input)	Chapter 3	16	573			The authors refer to LTER as source for biodiversity data. They could also also refer to EVS (European Vegetation Survey) and GEO-BON / EU-BON especially the EuMon portal <a href="http://eumon.ckff.si/index1.php">http://eumon.ckff.si/index1.php</a> of EU-BON project collecting monitoring information.	Comment taken. Recommended sources of information are included into the Assessment
Germany	Chapter 3	16	573			The reference to LTER is missing	Note taken
Allan Watt	Chapter 3	16	574			Definitions of terms are needed e.g. structural and functional ecosystem diversity, not necessarily here but probably where first mentioned in a given Chapter.	We will address this in our revisions of SOD
Maximilian Weigend	Chapter 3	16	577	16	584	This temporal baseline sounds sensible to me, but throughout the assessment there is harking back to earlier times, which confuses matters and is of no immediate relevance.	The definition of Past, Current and Future trends is being agreed through the all assessments and approved by MEP and Bureau for the sake of consistency
Germany	Chapter 3	16	577	16	584	Please try to be more coherent and define useful temporal baseline throughout the assessment	see above
Maximilian Weigend	Chapter 3	17	586	17	687	A minor adjustment in the table would make it much more intuitive: if you change "habitat degradation" to "habitat quality", then "down" is consistently "bad". Also, "endangered species" is ambiguous - if there are fewer of them, then this can be because they are extinct, or because they are no longer endangered. If you modify that to "conservation status of endangered species", it becomes unequivocal.	Comment considered. The overall approach to indicators is adjusted to the universal one through the assessments.
Germany	Chapter 3	17	586			Related to Table 3.1: minor adjustment in the table would make it much more intuitive: if you change "habitat degradation" to "habitat quality", then "down" is consistently "bad". Also, "endangered species" is ambiguous - if there are fewer of them, then this can be because they are extinct, or because they are no longer endangered. If you modify that to "conservation status of endangered species", it becomes unequivocal.	"Endangered species" is a universal language internationally used by various organisations and assessments. Therefore it was selected for the purposes of this assessment
Germany	Chapter 3	17	586			Please ensure consistency with chapter 4 when discussing and presenting those drivers. Please also consider whether this information might be better placed in chapter 4.	Note taken. Further coordination with other chapters is on-going
Germany	Chapter 3	17	588			Additionally to the color code, a numbering may be helpful since color separation between 3 and 4 is difficult / subjective and numbering from 0 to 5 is more clear.	Number coding is introduced in the SOD
Maximilian Weigend	Chapter 3	17	590	17	592	At present there seems to be no explicit basis for taxon data - think about how to model once you have decided on the type and amount of data to be used and for which specific purpose.	This comment will be dealt with by the species group discussing future trends
Douglas Nakashima	Chapter 3	17	594	17	596	3.3. Past and current trends of biodiversity and ecosystems	This has been completely rewritten.
Douglas Nakashima	Chapter 3	17	594			Examples of observations of environmental change incorporated into one's life history: From Mustonen 2013. Oral histories as a baseline of landscape restoration - co-management and watershed knowledge in Jukajoki River, Finland. (p82) "The mires were far wetter before. It caused the lake great damages when the ditches were made and mires drained to the lake - these waters went straight into the lake. It caused great damages. They used to be cloudberry mires, and we of course went there constantly." [Snowchange Alavi Oral History Archive 171012 - 80-year-old mail] "I have memories being 10 years [when] old fishing with my grandfather, the father of my father... He used to walk to the lake with a walking stick and I was the rower. My cousin was there and my little sister Liisa, always were together... We made the nets ourselves. The spawning times of broam [lat. abramis brama] was our main fishery prior to midsummer and at the time of midsummer the big beams came to spawn close to the shore and then we got them. Two-three kilogram fish. Our neighbour made so-called ancient fish traps from strips of pinewood. Spawning times of the fish were known well, smaller broam spawned prior to midsummer and on midsummer the big beams started to spawn... When we got the big beams our boat bottom was covered with them, we never had to go to fish and return empty-handed, I do not recall we ever came back empty-handed." (Snowchange Alavi Oral History Archive 171012 - 80 year old man on lake Jukajärvi, view to the fisheries in 1930s and 1940s) (p83) "A piece of paper was circulated in the village where you had to sign your agreement, indicating that you approve of the draining of the lake. I recall my father and a certain Vartiainen... they did not sign the paper even though they went through whole village all the way to Pyhäselkä to collect signatures... There was a need for farmland then. That was the primary reason and it caused benefits to a certain family, they could now make a new road that they could use. They had to travel through the forests prior to the road. Those that signed the letter approved of it. My father and Vartiainen did not protest further but they refused to sign this letter, as they were suspecting that there would be no more fish in the lake as a result. The people from the villages of Heinävaara, Särkivaara and Alavi approved it and then they made needed changes to the river Jukajoki, digging the river up and so forth... and then the waters started to move, it was wintertime. Ice was left on air as more water was drowned out from the lake than was planned... We went to see it and wondered... It caused negative changes as the shoreline we used to have was real good and it was wrecked... At first it was ok, but then water plants and mud arrived to the shores and you could not swim there... Fish disappeared completely after the draining. I do not know if they went to river Pielsjoki or where... Slowly they started to make a comeback and new stocks were brought also from small lakes from Heinävaara, mostly perch and roach which was caught by the local fishermen with a fish trap and brought here..." (Snowchange Alavi Oral History Archive 171012) (male 80 years old) (p83) "Hirvinieimi... when I moved here there used to be a lot of moose here on the move as there was very little human habitation on the opposite shore. The lake used to have a real strong bottom here and it could hold the weight of a moose. In summertime large herds crossed here too. I could see them when they came and ate and then they went over to the Särkivaara area. They fed themselves here, large herds. But then when human habitation increased on the cape the natural crossing point was abandoned. Now they have to go around the lake, and cross the road to Ilomantsi, which means a lot of car crashes on the road. There is a tremendous amount of moose tracks here and territories where there is food, food for them and peace. These are good wintering grounds for them. Around mire Valkeasu they had an aerial surveys for herds and they could spot 200 moose at once on these wintering areas. And towards Riuttavaara it is a good area for calving too." (Snowchange Alavi Oral History Archive 220612) (subsistence fisherman 58 year old from Alavi)	Valuable comment on indigenous and local knowledge. All useful references will be reviewed and included in the respective parts of the Chapter according to the topic (study unit) by ILK experts
Anna Augustyn	Chapter 3	18	605	18	606	Adaptive capacity of species could be added as an indicator	Indicators are approved by the MEP and Bureau. Adaptive capacity is a good one, but hard to collect confident data from the region for the assessment so far
Allan Watt	Chapter 3	18	605			These tables set out very clearly what measures are being assessed. They should be used in the Introduction (see above).	Introduction was shortened and updated
Thomas Brooks (IUCN)	Chapter 3	18	605	18	605	Change "Endangered Species" to "Extinction Risk" in Table 3.3. Also L1089 (Table 3.10), L1137 (Table 3.11), L1324 (Table 3.12), L1480 (Table 3.14), L1536 (Table 3.15), L1595 (Table 3.16), L1633 (Table 3.17), L1714 (Table 3.18), L1900 (Table 3.21), L2016 (Table 3.22), L2556 (Table 3.25), L2738 (Table 3.27), L2804 (Table 3.28), L2862 (Table 3.29), L2873 (Table 3.30), L2992 (Table 3.31), L3047 (Table 3.32), L3159 (Table 3.33), L3202 (Table 3.34), L3203 (Table 3.35), L3203 (Table 3.36). Also, it should be clearer in each table legend what the direction of the arrows means: for example, does an upwards arrow for extinction risk mean that the trend is improving (i.e. extinction risk is decreasing) or that extinction risk itself is increasing?	the tables now read Conservation Status
Maximilian Weigend	Chapter 3	18	607	18	608	Throughout most of the assessment pesticides are hidden under "pollution" - this may be very politically desirable from one perspective, but considering the emerging dramatic effect of pesticides on biodiversity it devalues the entire assessment.	we have discussed at length the role of pesticides in driving trends especially in agricultural areas and freshwater systems
Germany	Chapter 3	18	607	18	608	Throughout most of the assessment pesticides are included in the discussion on "pollution". Considering the emerging dramatic effect of pesticides on biodiversity - see e.g. the SPM on pollution - it's necessary to highlight the issue of pesticides more explicitly. Please consider referencing to the SPM on pollution.	repetition of the above
Thomas Brooks (IUCN)	Chapter 3	18	609	18	611	Good. However, add "assessed as threatened" on L610, because the Red List encompasses all species assessed (i.e. both threatened and non-threatened).	Note taken
Maximilian Weigend	Chapter 3	19	626	19	645	Why were subregions defined, when they are then consistently ignored. Much of the divergent patterns is captured in the subregions, whereas statements about the ECA-region end up being so general, that they have no information value at all.	In the SOD subregional trends and impact of drivers are assessed and summarised in the tables

Douglas Nakashima	Chapter 3	19	633			<p>Indigenous and local knowledge (ILK)</p> <p>ADD Local ecological knowledge and links to TEK - e.g. 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>- Lavrillier et al 2016 (Siberia): Provides a case study of sable hunting among reindeer herders, examining interplaying drivers of change (climate and environmental drivers, economic and political drivers) as well as economic consequences and adaptations.</p> <p>- Sezdebek and Albek 2016 (Kyrgyzstan): "Local knowledge about sacred sites often contains information about how the local environment has been changing over time. This knowledge can be used to tap information about BD and ES for the periods of time and areas where there is not much scientific data (e.g. Kyrgyzstan)."</p> <p>- Varga et al 2016 (Hungary): examines the interplay between conservation managers and herders 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. "The drastic economic, social (and political) changes in the 20th century led to the significant transformation of land use... decrease of biodiversity and an important transformation of landscape structure. Due to the strict regulations of the EU, the local trade of milk products became impossible. In parallel with this, livestock numbers decreased to the level of self-subsistence, while mountainous pastures and the most extensively used and most diverse hay meadows became underused or abandoned"</p> <p>- Kis et al 2016 (Hungary): TEK of traditional Hungarian herders protect pastures "using [their] Using this knowledge they are able to manage and direct livestock to utilize grasslands effectively while preserving or even improving the productivity of their grasslands". Also examines restoration of degraded ecosystem services.</p> <p>- Roturier et al 2016 (Sweden): Sami pasture lands are shrinking due to fragmentation of winter grazing land and loss of old forests and arboreal lichen.</p> <p>- Molnár et al 2016 (Hungary): "Hungarian herders distinguish at least 160 wild plant folk taxa, and about 80 folk habitat types [see figure] and they have a detailed understanding of landscape history, and processes of ecosystem degradation and regeneration. The most general view is that there is not enough grazing livestock, and thus the landscape changes."</p> <p>- Ivaşcu and Rakosv 2016 (Romania): Examines complex management of high nature value farm resources (fields, grasslands, forest etc.) and the use of ecosystem services through the traditional ecological knowledge that they have acquired through inter-generational cultural transmission and practice. "The 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. This traditional knowledge is sometimes coded in beliefs; holidays that transcend the barriers of nature and society; local customs of land use; and management practices." 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.</p> <p>- Demeter 2016 (Ukraine): Examines changing trends in hardwood floodplain forests for local communities in West Ukraine, including biodiversity trends, ecosystem services and indirect factors.</p>	will be done for final doc
Germany	Chapter 3	19	638			The 3.3.1 Introduction refers to 3.2. and seems not relevant here.	Is completely revised in the SOD
Thomas Brooks (IUCN)	Chapter 3	19	649	19	649	Please use "threatened species" rather than "endangered species" here (the latter has a specific technical meaning). Also L1376, L1444.	This section is completely revised in the SOD but this comment was taken in consideration
Mark Snethlage	Chapter 3	20	657			EEA has developed a Marine Trophic Index as part of the SEBI indicator set <a href="http://www.eea.europa.eu/data-and-maps/indicators/marine-trophic-index-of-european-seas/marine-trophic-index-of-european-seas">http://www.eea.europa.eu/data-and-maps/indicators/marine-trophic-index-of-european-seas/marine-trophic-index-of-european-seas</a> that might be an interesting overview reference for biodiversity trends in all (European) seas	This section is completely revised in the SOD but this comment was taken in consideration
Mark Snethlage	Chapter 3	20	661			depending on how one classifies the Caspian and Aral seas (either large lakes or inland seas) should this sentence "with oceanic systems as well as semi-enclosed seas..." not read "with oceanic systems as well as (semi)-enclosed seas", or "with oceanic systems as well as enclosed and semi-enclosed seas..." ?	Taken in consideration when referring to the different marine areas considered
Allan Watt	Chapter 3	20	663	20	664	A useful paragraph but this sentence is confusing. Do you mean that This heterogeneity has led to specific patterns in all components of biodiversity...	This sentence was reviewed
Mark Snethlage	Chapter 3	20	675			Would it be an idea to provide a summary table with some key characteristics for each of the seas (systems) included in this section: area, mean depth, max depth, salinity, number of invertebrate, fish, mammal etc species. If there is too much key info to include in one table, it could be done in two tables, one for the key geographical / abiotic features, and one for the key ecological / biodiversity features. Either at the start or the end (preferred) of this section.	Good idea - implemented (will be in the final SOD)
Allan Watt	Chapter 3	20	684	20		"but" not "while"?	OK
Allan Watt	Chapter 3	20	687	20	688	But are some sub-regions understood better than others?	Yes of course - sentence clarified.
Allan Watt	Chapter 3	20	691	20	696	Evidence needed, either references or links to subsequent sections.	done
Mark Snethlage	Chapter 3	20	696			Is that relevant for chapter 3?	?
Allan Watt	Chapter 3	21	709	21	726	Some editing for readability (too succinct in places) and clarity (what is meant by "alterations of ecosystem functioning") needed.	Text has been revised and edited. An examples for changes in ecosystem functioning has been given.
Allan Watt	Chapter 3	21	709	21	713	Probably more information on this aspect than any other and therefore I would have expected more detail: e.g. how many species monitored, what is the overall change or range in changes etc.	Text length limitations make impossible to provide many details. However, we moved text in this section to be more specific about the number of studies examined. We modified the legend of Fig. 3.1 to make clear that the number of species are indicated in the graph.
Mark Snethlage	Chapter 3	21	722			"(notably the oyster <i>Crassostrea gigas</i> )" -> perhaps easier to understand "(notably the Pacific or Japanese Oyster <i>Crassostrea gigas</i> )"	Modified as "the Asian oyster <i>Crassostrea gigas</i> "
Mark Snethlage	Chapter 3	21	732	21	734	is this not rather something for chapter 6, policy responses?	We agree that this is also relevant in terms of policy but the extent of Marine Protected Areas has been selected as an indicator for marine biodiversity trends
Allan Watt	Chapter 3	21	738			Should information on drivers be in a different Chapter? It is, however, usefully placed here.	Drivers have been kept here as it has been agreed that drivers acting on biodiversity (and explaining the trends) should be indicated in Chapter 3. Chapter 4 is targeting the drivers trends and not their effects on biodiversity
Mark Snethlage	Chapter 3	21	738	22	745	for chapter 4?	Drivers have been kept here as it has been agreed that drivers acting on biodiversity (and explaining the trends) should be indicated in Chapter 3. Chapter 4 is targeting the drivers trends and not their effects on biodiversity
Axel Hochkirch	Chapter 3	21	738	24	745	I do not agree with the major importance of climate change as the driver of biodiversity loss. Particularly overfishing is probably the primary threat to most species (see IUCN Red List).	we agree that overfishing is an important driver of biodiversity loss, especially for explaining past trends. To make it clearer, we added a new section about fishes trends in the "past- and current trends" section and the same in the "drivers" section. We also edited the text to use the word "overfishing" in the text. As stated in the text, exploitation of natural resources (incl. overfishing) has both direct and indirect (e.g. cascading effects due to trawling/dredging); however, note that climate change is revealed in meta-analyses as the most important emerging driver across every taxonomic groups and units. Note also that the IUCN Red list is unfortunately not including most marine invertebrates.
Allan Watt	Chapter 3	22	746			Some of this information is what I thought (see above) was lacking earlier: move up some of it and delete the rest?	We moved up the text.
Maximilian Weigend	Chapter 3	22	753	22	758	This is a very academic way of looking at things. Directionality and effect would be the crucial attributes for an assessment.	This figure and legend provides information requested by other reviewers (e.g. the figure provides number of species with documented changes). Directionality is opposite across species and cannot be documented as such. We included this remark in the text (point 4 in the last paragraph of the "past- and current trends section". Concerning the "effect", effects are actually what the parameters/indicators that are provided in the figure 3.1 are documenting. We however modified the figure and wording (this also answers a comment by another reviewer)
Allan Watt	Chapter 3	22	755			Retain but make the figure clearer.	the figure will be of much better quality in the final version but we already modified the figure, particularly the legend to address another comment
Allan Watt	Chapter 3	23	780			When completed, a description of the method used should be included.	we agree that explaining the method is needed. The method is the same all over the chapter and will be explained in the overall methodology section
Maximilian Weigend	Chapter 3	23	780	23	781	The table needs some serious thinking. What does an upward arrow in "community composition" mean? More community composition? More species? More stability? Either a lot of that is packed into the legend, or the table has to be designed differently.	the table provided in the FOD was incomplete, and the table now provided is still incomplete (Marine Trophic Index needs to be included). The method is the same as in other sections of Chapter 3 and the methods and meanings will be explained in the Methodology section.
Germany	Chapter 3	23	780	23	781	The table needs some serious thinking. What does an upward arrow in "community composition" mean? More community composition? More species? More stability? Either a lot of that is packed into the legend, or the table has to be designed differently.	the table provided in the FOD was incomplete, and the table now provided is still incomplete (Marine Trophic Index needs to be included). The method is the same as in other sections of Chapter 3 and the methods and meanings will be explained in the Methodology section.
Allan Watt	Chapter 3	23	782			Notes, presumably, ignored.	these notes have been modified, shortened and included in the main text as they address other reviewer comments

Douglas Nakashima	Chapter 3	24	789			3.3.2.1.4. Mediterranean sea	We are not sure what the problem here is. The heading was correct (Arctic Ocean)
Douglas Nakashima	Chapter 3	24	789			Maynou et al. 2011. Estimating trends of population decline in long-lived marine species in the Mediterranean sea based on fishers' perception. [Abstract]: "We conducted interviews of a representative sample of 106 retired fishers in Italy, Spain and Greece, asking specific questions about the trends they perceived in dolphin and shark abundances between 1940 and 1999 (in three 20 year periods) compared to the present abundance. The large marine fauna studied were not target species of the commercial fleet segment interviewed (trawl fishery). The fishers were asked to rank the perceived abundance in each period into qualitative ordinal classes based on two indicators: frequency of sightings and frequency of catches (incidental or intentional) of each taxonomic group. The statistical analysis of the survey results showed that both incidental catches and the sighting frequency of dolphins have decreased significantly over the 60+ years of the study period (except for in Greece due to the recent population increase). This shows that fishers' perceptions are in agreement with the declining population trends detected by scientists. Shark catches were also perceived to have diminished since the early 1940s for all species. Other long-lived Mediterranean marine fauna (monk seals, whales) were at very low levels in the second half of the 20th century and no quantitative data could be obtained. Our study supports the results obtained in the Mediterranean and other seas that show the rapid disappearance (over a few decades) of marine fauna. We show that appropriately designed questionnaires help provide a picture of animal abundance in the past through the valuable perceptions of fishers. This information can be used to complement scientific sources or in some cases be taken as the only information source for establishing population trends in the abundance of sensitive species."	Thank you, this will be taken into consideration in the final version of this document
Allan Watt	Chapter 3	24	797	24	798	Delete: drivers discussed later.	moved to drivers. Seems to fit perfectly to that section
Allan Watt	Chapter 3	24	803	24	805	Evidence needed.	Evidences presented just below: look at the lines 806-809, 820-824, 830-831
Allan Watt	Chapter 3	24	810	24		Not clear what is being described here. Arctic vertebrates?	Yes, checked with the citation source and corrected to: There are changes in Arctic vertebrates' demography, abundance, distribution, phenology and community structure also related to these processes
Allan Watt	Chapter 3	24	817			Combine with previous section (i.e. one section on trends) and clarify e.g. why "speculations"? Overall, there is less information in this part than in the previous part on Northeast Atlantic Ocean so perhaps it should start with a sentence such as "Information on the Arctic Ocean is confined to..." or "Information on the Arctic Ocean comprises data on..."	Not sure if I got this comment right...I think these sections are quite combined or even too combined with "specific past trends" continuing "general trends" almost contiguously. Section on general trends starts exactly with explanation why there are much less information on Arctic biodiversity trends comparing to the Northeast Atlantic region... (we are comparing about one of the most studied and one of the least studied regions of the World Ocean). So there are not much general trends proven for the Arctic Ocean, what we have mostly are speculations based on a general knowledge and case studies (ironically, most of the published surveys are done in the Kingsford area, West Spitsbergen, where conditions are more similar to the North Atlantic than to the Eurasian Arctic...). Though line "As the Eurasian Arctic Seas is one of the less studied regions of the World Ocean " added as the first sentence of "general trends" subsection.
Maximilian Weigend	Chapter 3	25	833	25	839	Where and what is the relevance?	Agree that this is not the very representative and readable illustration of "Shrink of multiyear ice causes a major decline in the productivity of sea-ice algae, and related effects e.g. increasing of annual production of open waters and shelf seas (Pabi et al., 2008, Wassman et al., 2010) (Fig. 2 ). ". Probably, shall be removed or, better, replaced by more relevant graph
Germany	Chapter 3	25	833	25	839	Where and what is the relevance?	Agree that this is not the very representative and readable illustration of "Shrink of multiyear ice causes a major decline in the productivity of sea-ice algae, and related effects e.g. increasing of annual production of open waters and shelf seas (Pabi et al., 2008, Wassman et al., 2010) (Fig. 2 ). ". Probably, shall be removed or, better, replaced by more relevant graph
Allan Watt	Chapter 3	24	848			A description of the method used should be included.	Agree, but this is question to the leading authors of the Chapter; the method is the same for each regional subchapter
Maximilian Weigend	Chapter 3	26	848	26	849	The table needs some serious thinking. What does an upward arrow in "community composition" mean? More community composition? More species? More stability? Either a lot of that is packed into the legend, or the table has to be designed differently.	Agree, this should be formulated and described clearly for the entire chapter.
Douglas Nakashima	Chapter 3	26	850			3.3.2.1.3. Northwest Pacific Ocean	done
Douglas Nakashima	Chapter 3	26	850			Mustonen 2005: Observations by Gennady Yakolev, from the Aleut Nation, Commander Islands, Western Siberia, Russia: (p20-21) "Living on the Islands we must hunt marine mammals. They are changing. Some species living close to shore have disappeared completely. Some fish are reappearing again because of protective measures. Sea urchins have disappeared completely. ";	Thank you for this valuable reference. We'll take this into consideration after the review period of SOD.
Allan Watt	Chapter 3	26	854			Split as above into sections on trends and drivers.	Done
Maximilian Weigend	Chapter 3	26	868	27	873	Does make sense to provide a percentage of "9"? Ideally, provide absolute numbers and percentages, where sensible.	Done
Germany	Chapter 3	26	868	27	873	Does make sense to provide a percentage of "9"? Ideally, provide absolute numbers and percentages, where sensible.	Done
Allan Watt	Chapter 3	26	874			From here onwards, the text mostly relates to drivers (but 874-875 can be deleted).	Done
Maximilian Weigend	Chapter 3	27	874	27	875	bit of an isolated statement, here.	re-written
Germany	Chapter 3	27	874	27	875	Bit of an isolated statement, here.	re-written
Maximilian Weigend	Chapter 3	27	877	27	880	What is a "collapsed fish stock" and how can you have 38 of them every 10 years? This should be spelt out.	re-written
Germany	Chapter 3	27	877	27	880	What is a "collapsed fish stock" and how can you have 38 of them every 10 years? This should be spelt out.	re-written
Maximilian Weigend	Chapter 3	27	884	27	888	spell out all major factors and provide absolute numbers and percentages, where sensible.	Done
Germany	Chapter 3	27	884	27	888	spell out all major factors and provide absolute numbers and percentages, where sensible.	Done
Allan Watt	Chapter 3	26	894			Evidence needed.	e.g. Sala et al. 2011, Verges et al 2014
Allan Watt	Chapter 3	26	898			Reads like the start of a section on drivers.	the section was all redone.
Mark Snethlage	Chapter 3	27	898	28	918	section is about drivers and in part also about policy responses. Better to refer to chapters 4 and 6, and perhaps share data and references with authors of these chapters?	part of drivers is also included here connected with the trends
Maximilian Weigend	Chapter 3	27	898	28	918	most of these drivers are not spelt out. What is habitat loss in the Mediterranean sea, when is not aquaculture, climate change or eutrophication of pollution? Give at least some examples. The text, as it now stands, is not intelligible.	What is habitat loss in the Mediterranean sea, when is not aquaculture, climate change or eutrophication of pollution?
Germany	Chapter 3	27	898	28	918	Unfortunately, most of these drivers are not spelt out. What is habitat loss in the Mediterranean sea, when is not aquaculture, climate change or eutrophication of pollution? Please add some examples here.	It is the loss caused by extensive man-made coastal engineering, water diversion (most of the rivers debouch a fraction of their natural capacity), change in sedimentation rate etc. due to enforced space limitation these were not spelled out in full
Allan Watt	Chapter 3	28	912	28	918	Could be deleted...	I beg to differ - bureaucratically chosen dates rather than science-based targets should be viewed for what they are - impediments to realistic management
Allan Watt	Chapter 3	28	919			A description of the method used should be included.	ISP Description included in the tables
Maximilian Weigend	Chapter 3	28	919	29	921	The table needs some serious thinking. What does an upward arrow in "community composition" mean? More community composition? More species? More stability? Either a lot of that is packed into the legend, or the table has to be designed differently. What is "ecosystem alteration" versus "community changes"?	table was reformulated
Germany	Chapter 3	28	919			Table 3.7. The term "introduction" is not clear; can it be replaced by "invasive species"?	replaced by non-indigenous species
Germany	Chapter 3	28	919	29	921	The table needs some serious thinking. What does an upward arrow in "community composition" mean? More community composition? More species? More stability? Either a lot of that is packed into the legend, or the table has to be designed differently. What is "ecosystem alteration" versus "community changes"?	table was reformulated
Allan Watt	Chapter 3	29	928	29	935	Evidence needed.	this section was completely re-written
Jari Niemela	Chapter 3	29	946	32	1032	invasive/alien/introduced species are not mentioned for the baltic sea although there are about 100 of them and they may affect original biodiversity. See e.g. <a href="http://www.eea.europa.eu/publications/report_2002_0524_154909/regional-seas-around-europe/page141.html/#2.6">http://www.eea.europa.eu/publications/report_2002_0524_154909/regional-seas-around-europe/page141.html/#2.6</a>	Invasive taken now fully in consideration
Allan Watt	Chapter 3	30	973	30	975	Reference to HELCOM, 2010?	yes it was given after the sentence.
Allan Watt	Chapter 3	30	981	30	983	Reference(s)?	this section was completely re-written and references were included
Allan Watt	Chapter 3	30	985	30	991	Repeats the first paragraph: combine.	this section was completely re-written
Mark Snethlage	Chapter 3	30	992	31	1020	move and refer to chapter 4?	this section was completely re-written
Allan Watt	Chapter 3	30	1001			Trophic cascades should be defined or mention deleted.	this section was completely re-written
Allan Watt	Chapter 3	31	1005	31	1006	Reference(s)?	this section was completely re-written and references were included
Allan Watt	Chapter 3	31	1018	31	1020	Useful summary, missing from other sections.	this section was completely re-written but this summary was kept
Allan Watt	Chapter 3	31	1021			What is "expert judgement"?	this is mentioned in the table taken from the HELCOM Assessment Report
PESC-3	Chapter 3	32	1034	34	1093	include reference of EEA report "Europe's biodiversity, Seas around Europe- The Caspian Sea" of Mamaev Vladimir; and Book "The Caspian Sea Environment, Kostianoy & Kosarev (2005), Springer	The reference is added

Mark Snethlage	Chapter 3	32	1038			"the volume of water is 78 thousand m3," -> "the volume of water is 78 200 km3," i.e. km3 not m3	Corrected
PESC-3	Chapter 3	32	1038	32	1038	add "km3"	Corrected
Allan Watt	Chapter 3	32	1043	32	1049	Very interesting but delete?	This part is important for understanding of an uncertainty of the driver.
Mark Snethlage	Chapter 3	32	1043			"The Caspian Sea fluctuates with amplitudes limited to -6 m 2,500 years.". Is it necessary to put the minus sign before 6m, as it is the amplitude of a fluctuation, so it goes both ways, up and down, plus and minus.	Corrected: The Caspian Sea fluctuates up and down on decades metres, up to the mark -6 m at the last 2,500 years.
Allan Watt	Chapter 3	33	1064			Very little information on trends in this section. Is there information on trends that can be included? Suggest combining much of this section with the next and shortening.	We are limited by the volume. A geological hypotise will be added.
Mark Snethlage	Chapter 3	34	1072	34	1088	move and refer to chapter 4?	It could be reflected in both chapters. A good solution to reflect it in chapter 4 too.
Allan Watt	Chapter 3	34	1089			A description of the method used should be included.	The methodology will be described at the separate part.
Mark Snethlage	Chapter 3	35	1101			"with area of 67499 thousand km2" -> "with area of 67499 km2" i.e. "thousand" is redundant	Corrected
Mark Snethlage	Chapter 3	35	1103			"the water volume reached 1064 m3" -> "the water volume reached 1064 km3", i.e. km3, not m3	Corrected
PESC-3	Chapter 3	35	1103	35	1103	add "km3"	Corrected
PESC-3	Chapter 3	35	1106	35	1106	add "separated from Large Aral by Kokaral Dam "	Added
PESC-3	Chapter 3	35	1111	35	1111	The Aral Sea fishery potential has been lost because of desiccation and disappearance of wetlands and migration ways for spawning, as well as water quality problems in the Aral Sea, e.g. extremely high salt content. (B. K. Karimov, M. Matthies, B. G. Kamilov. Unconventional Water Resources of Agricultural Origin and Their Re-utilization Potential for Development of Desert Land Aquaculture in the Aral Sea Basin. The Global Water System in the Anthropocene. Springer Water pp 143-159. DOI: 10.1007/978-3-319-07548-8_10.	The references will be used. It takes time to read the papers before.
Allan Watt	Chapter 3	35	1122			Reference(s)?	It is written below: Mirabdullayev et al., 2004
Allan Watt	Chapter 3	39	1126	39	1242	A very superficial treatment of trends in freshwater biodiversity. Most of the section describes biogeographical patterns (not trends) and could be reduced to allow much more detail on freshwater biodiversity.	1126-1140 - this part is not about freshwater systems. The Aral Sea is a saline (sometimes extremely saline) water basin.
Allan Watt	Chapter 3	35	1131	35	1134	Reference(s)?	The references are provided below: Kotlyakov, 1991; Glantz et al., 1993; Zavalov, 2005.
PESC-3	Chapter 3	36	1135	36	1135	Taking into account the current situation in the water sector of Aral Sea Basin it is unlikely that in the near future the health of aquatic ecosystems will be improved	Agree
PESC-3	Chapter 3	36	1136	36	1136	add: Karimov B., Lieth H., Kurambaeva M. and Matsapaeva I. The Problems of Fishermen in the Southern Aral Sea Region. Mitigation and Adaptation Strategies for Global Change 10, No. 1 (2005), 87-103	The references will be used. It takes time to read the papers before.
Allan Watt	Chapter 3	35	1137			A description of the method used should be included.	The methodology will be described at the separate part.
Allan Watt	Chapter 3	35	1139	36	1140	Repetition.	Yes. This is the key conclusion of the part.
Germany	Chapter 3	36	1139			Repetition of L. 1135	Yes. This is the key conclusion of the part.
PESC-3	Chapter 3	36	1141			include a definition on freshwater systems: Water as a habitat includes freshwater, streams, rivers, ponds (seasonal or permanent), also the connectivity and their source (glaciers, aquifers or rainfall). The organisms dependent on water include those permanently in water or only some time in their life cycle.	Done
Douglas Nakashima	Chapter 3	36	1142			3.3.2.2.1. Inland surface waters	Not quite sure what is the issue here?
Douglas Nakashima	Chapter 3	36	1142			Hiltunen et al. 2004 (Northern Sweden) : (p 267-268) observation from a Sami reindeer herder " Earlier, there were many lakes with water horsetail (Equisetum fluviatile), which is also good support fodder for the reindeer, growing in them. " I have noticed that water horsetail doesn't grow in certain lakes the way it used to, and we don't know the explanation for that, either. In certain lakes, the water horsetail grew so robustly that it was practically impossible to row your boat through them during summer, but now, in the last 5-6 years I have noticed that there is no water horsetail growing in there - so, all of a sudden, you can just drive your boat (in the lake), and then there are just lakes that seem to be filled with vegetation, but we found an explanation for that. We believe it is because the lakes were fished a lot with seine [nuotta] in the 1960s and to some extent in the 1970s, but after that it was stopped. And it's obvious that when you fish that way, the net moves along the bottom (but since the net fishing stopped), the plants had a chance to grow back". (Rune Stokke, Udfjås sameby chairman) Mustonen 2013 (Finland): (p86) "[...] surviving elements of local knowledge in the context of Jukajoki as a damaged river and watershed from 1930s to 2010s. Subsistence fishermen continue to make observations that have relevance for the whole river and lake. They also observe throughout their fishing areas anomalies like the lack of oxygen, presence of iron, and unexplainable chemical processes in the form of bubbles. Lastly those in the community who lived through the state-sponsored alteration campaigns of ecosystems, especially mire drainages, reflect on the damages and position themselves as a part of the problem, admitting that mistakes were made."	This is interesting to know. Unfortunately we do not have enough space for including such information
Mark Snethlage	Chapter 3	36	1147	37	1172	Should this section not start with some basic facts about freshwater biodiversity in the ECA region and their trends instead of starting with a discussion of the drivers? This section should perhaps better go to chapter 4?	Partially addressed in the SOD
Germany	Chapter 3	36	1147			Delete "-5"	Done
Allan Watt	Chapter 3	36	1148	37	1171	Substantially reduce in length.	This section has been cut by 50%
Mark Snethlage	Chapter 3	36	1148	36	1150	"Colin Chartres, director of the International Water Management Institute (IWM) said that "agriculture is the biggest user of fresh water, making up 70-90% of the annual water demand for many countries" (Gilbert 2010)." Is it relevant to mention the name and function of Colin Chartres for something (agriculture's use of water) which is not an opinion or interpretation, but a fact that can be checked in various sources? I would leave out: "Colin Chartres, director of the International Water Management Institute (IWM) said that"	Done
Frank Wugt Larsen (EEA Input)	Chapter 3	37	1185			Insert reference: EEA, 2015. European environment — state and outlook 2015 (SOER 2015) <a href="http://www.eea.europa.eu/soer">http://www.eea.europa.eu/soer</a>	Done
Tom West	Chapter 3	38	1194	38	1195	Good ecological status" refers to a technical definition in the EU Water Framework Directive. This is probably worth defining.	The term was defined
Mark Snethlage	Chapter 3	38	1198	39	1225	to chapter 4?	Not quite clear what this comments is referring to.
Allan Watt	Chapter 3	38	1203			Sections on drivers (such as this) could perhaps follow those on trends, as in most sections on marine biodiversity.	We have re-organized these two sections
PESC-3	Chapter 3	38	1209	38	1209	add "salinization"	Done
PESC-3	Chapter 3	38	1210	38	1210	add: M. Cañedo-Argüelles, C. P. Hawkins, B. J. Kefford, R. B. Schäfer, B. J. Dyack, S. Brucet, D. Buchwalter, J. Dunlop, O. Frór, J. Lazorchak, E. Coring, H. R. Fernandez, W. Goodfellow, A. L. González Achem, S. Hatfield-Dodds, B. K. Karimov, P. Mensah, J. R. Olson, C. Piscart, N. Prat, S. Ponsá, C.-J. Schulz, A. J. Timpano. Saving freshwater from salts. - Science 26 Feb 2016, Vol. 351, Issue 6276, pp. 914-916. DOI: 10.1126/science.aad3488.	Done
Germany	Chapter 3	39	1242			Please simplify: "level of incident human water security threat."	Cut by 50%
Kaisu Aapala	Chapter 3	39	1243	39	1243	The title is obviously still under construction, but neither of the alternatives is good. Peatlands would be the most comprehensive as it includes all the other options (mires, bogs, fens). As a general comment on the chapter 3.3.2.2.2, it seems as it has been put together using only a handful of references, more or less listing different aspects but not really trying to be a through assessment of status, trends and future dynamics of peatland biodiversity and ecosystems on ECA. For example it does not say anything about the unique species diversity and its status and trends. All in all the contents and structure is very different from texts about other ecosystem types. Thus the current text does not invite to thorough commenting when so much is still missing. So only some comments below.	Peatland section has been re-written for SOD
Allan Watt	Chapter 3	39	1243			Clearly this section needs much more detail.	Peatland section has been re-written for SOD
Alan Gray / Allan Watt	Chapter 3	39	1245	40	1288	This relies a bit heavily on non-peer reviewed reports (e.g. the Joosten reports). I would probably say that these reports are more useful as resource to pinpoint peer reviewed work rather than being work to be directly cited. The IUCN also completed a fairly comprehensive review on relevant peatland issues it's a bit UK centric and again they are non-peer reviewed reports so probably best used as pointers towards the literature rather than directly citing them. See <a href="http://www.iucn-uk-peatlandprogramme.org/publications/commission-inquiry/work-commission-04/work-commission-04">http://www.iucn-uk-peatlandprogramme.org/publications/commission-inquiry/work-commission-04/work-commission-04</a> bit old but this may also be of use: Lappalainen, E. (1996). Global peat resources, International Peat Society, and the IPS have some country by country summaries here: <a href="http://www.peat-society.org/peatlands-and-peat/global-peat-resources-country">http://www.peat-society.org/peatlands-and-peat/global-peat-resources-country</a> There also seem to be a lack of a logical structure if the aim is to describe the status, trends and future dynamics of biodiversity and benefits to people from peatlands maybe the use of sub-headings would help. In addition, this section does seem to gloss over the fact that many species particularly the peat forming species don't occur in other ecosystems so if you lose the peatland you lose those species to the area so I'd also expect to see quite a bit more discussion on 1) what biodiversity peatlands contains; 2) hydrology as this is a direct people benefit most water catchments in the UK for example are derived from peatland sources; 3) climate change, peatlands are mostly rain fed systems and so climate change will likely influence the ecosystem dynamics and also how will climate change influence wildfire dynamics and also what the implications of climate change to carbon storage may be. There may also be a bit of overlap between peatlands and Boreal Forests which is the next ecosystem, many Boreal Forests are just peatlands with trees so I presume there's some qualification of classification somewhere.	Thank for the references. Peatlands section has been re-written for the SOD.
Kaisu Aapala	Chapter 3	39	1247	39	1249	Mires and fens do not fully represent all peatlands and they are also overlapping as some of the fens are also mires. More relevant way would be to describe what are peatlands and which part of them can be called mires. For the hierarchy see e.g. Joosten & Clark 2002. And then mention the two major types bogs (water and nutrients only from atmospheric deposition) and fens. This is a very general level, but perhaps adequate at this point.	Thank for the references. Peatlands section has been re-written for the SOD.

Kaisu Aapala	Chapter 3	39	1250	39	1252	For the list of ecosystem services provided by peatlands should be included at least some provisioning services, e.g. timber (most common), ingredients for medicine (Drosera spp.) and berries (cloudberry and cranberry). Berries can be considered both as provisioning service (food, ingredients for cosmetics etc.) or as cultural service (recreation connected to berry-picking). Reference e.g. Kettunen, M., Vihervaara, P., Kinnunen, S., D'Amato, D., Badura, T., Argimon, M. and ten Brink, P. (2012) Socio-economic importance of ecosystem services in the Nordic Countries – Synthesis in the context of The Economics of Ecosystems and Biodiversity (TEEB). Nordic Council of Ministers, Copenhagen. Other references to peatland ecosystem services include e.g. Kimmel, K. & Mander, Ü. 2010. Ecosystem services of peatlands: Implications for restoration. Progress in Physical Geography 34: 491–514.; Bonn, A., Holden, J., Parnell, M., Worral, F., Chapman, P.J., Evans C.D., Termansen, M., Beharry-Borg, N., Acreman, M.C., Rowe, E., Emmett, B. and Tsuchiya, A. (2009). Ecosystem services of peat – Phase 1. 137 pp. Department for Environment, Food and Rural Affairs, London.; Bonn, A. et al. 2016. Peatland Restoration and Ecosystem Services. Science, Policy and Practice. Cambridge University Press.;	Thank for the references. Peatlands section has been re-written for the SOD.
Maximilian Weigend	Chapter 3	39	1257	40	1266	This information should be tabulated, indicating the uncertainties in the legends and providing the sources for the individual entries.	Peatlands section has been re-written for the SOD
Germany	Chapter 3	39	1257	40	1266	A better way of presenting this information might be through a table, indicating the uncertainties in the legends and providing the sources for the individual entries.	Peatlands section has been re-written for the SOD
Axel Hochkirch	Chapter 3	40	1261	40	1261	One might add here that in Germany there was indeed originally a large area of peatland, but most of it has been destroyed for agricultural land use and turf (flower soil) production.	Peatlands section has been re-written for the SOD
Maximilian Weigend	Chapter 3	40	1267	40	1281	A temporal axes is entirely absent and it remains unclear how much there was in 1950? Either provide data or make knowledge gap explicit.	Peatlands section has been re-written for the SOD
Kaisu Aapala	Chapter 3	40	1268	40	1268	Define what area Joosten and Clarks figure cover? ECA? Europe? Western Europe?	Peatlands section has been re-written for the SOD
Kaisu Aapala	Chapter 3	40	1269	40	1269	Define what area Lappalainen's figure covers	Peatlands section has been re-written for the SOD
Kaisu Aapala	Chapter 3	40	1270	40	1270	Define what area Selin's figure covers. And is there really not any updates since this? Quite many of the extraction areas used in 1999 have already been abandoned since the 20 years that figure covers, and many new ones have been opened. Have you asked e.g. International Peat Society who's business it is to know these things?	Peatlands section has been re-written for the SOD
Kaisu Aapala	Chapter 3	40	1275	40	1275	"shading... eliminates vegetation" - reference? And surely not all vegetation. If it comes from Laine et al 1995, then it refers to shading excluding the original mire species, not all vegetation.	Peatlands section has been re-written for the SOD
Frederic Lemaitre	Chapter 3	40	1277	40	1278	It is stated that "use of fertilizers increases productivity (of peatlands)"? 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. Long term N deposition combined with warmer climates can lead to a replacement of peat-forming moss by vascular plants, which sequester less carbon and can even invert the carbon storage function of peatlands, making them net contributors (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., Leth 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., Robroek B.J.M. (2014). Plant functional types define magnitude of drought response in peatland CO2 exchange. Ecology 95(1):123-131	Peatlands section has been re-written for the SOD
Axel Hochkirch	Chapter 3	40	1278	40	1281	This is correct, but at least in Germany the conservation started way too late (when all large peat bogs were destroyed).	Peatlands section has been re-written for the SOD
Maximilian Weigend	Chapter 3	40	1282	40	1288	If that is everything there is to know on peatlands, then I wonder whether we need them. BD is a major issue, since peatlands contain some highly endangered species - but not high BD as such. Data should be easy to provide.	Peatlands section has been re-written for the SOD
Germany	Chapter 3	40	1282	40	1288	If that is everything there is to know on peatlands, then I wonder whether we need them. BD is a major issue, since peatlands contain some highly endangered species - but are not known for high BD as such. Please be more specific and expand the discussion here	Peatlands section has been re-written for the SOD
Kaisu Aapala	Chapter 3	40	1285	40	1287	This is obviously in contradiction e.g. with the figures given earlier for forestry, agricultural use and peat extraction (lines 1268-1270). Also reference where this data comes from is missing.	Peatlands section has been re-written for the SOD
Jari Niemelä	Chapter 3	40	1289	45	1382	It would be informative to add some numerical trends and changes in e.g. species vulnerability in forests from national red data books.	Peatlands section has been re-written for the SOD
Andy Purvis	Chapter 3	40	1289	93	2616	Newbold et al. (2016 Science) have estimated how land use and related pressures have affected the Biodiversity Intactness Index (BII; = mean relative abundance of originally-present species relative to an unimpacted baseline) at a fine spatial resolution (30 arc seconds) for the year 2005 globally. They present estimates of BII for each biome and each Conservation International biodiversity hotspot and high-biodiversity wilderness area, and their map can be interrogated to find average values for each country or other polygon of interest. Their estimate is based on data from a very wide and representative set of animal and plant species.	Thank you for the reference. Peatlands section has been re-written for the SOD
Douglas Nakashima	Chapter 3	40	1290			3.3.2.3.1. Temperate and boreal forests and woodlands	Thank you
Douglas Nakashima	Chapter 3	40	1290			Helander 2004 (Finland): (p308) "some berries, such as marsh whortleberries, have almost disappeared. Also, the amount of cloudberry, lingonberry and other berries is much smaller than in the 1970s, for instance. In certain areas where there used to be berries, the berries do not exist anymore (for example in Rassejohka, Utsjoki). Local Sami in Utsjoki also claim that vegetation, for instance, the birch tree, grows faster than before". Kitti et al. 2006 (Sweden and Finland): (p153) "reindeer herders both in Sirkas and Näkkälä agree that there were too many unsupervised reindeer in the 1980s, which contributed to some "overgrazing" problems, mainly loss of lichen cover from the combination of winter grazing and summer trampling (see Chaps. 1,8,9,11-13). The "quality" of the pastures is reported to have begun to recover, which in this case means that lichen cover has increased in some areas beginning in the 1990s (Kumpula et al. 2004). Reasons may include the smaller number of reindeer and the greater efforts via active herding to keep the animals away from lichen grounds in summer." SEE ALSO - Laletin, Parrotta & Domashov (IUFRO) 2011. Traditional forest related knowledge, biodiversity conservation and sustainable forest management in eastern Europe, Northern and Central Asia. - Parrotta, Agnoletti & Johann (IUFRO) 2006. Cultural heritage and sustainable forest management: the role of traditional knowledge	Thank you for the references. ILK is being addressed throughout the chapter
Allan Watt	Chapter 3	40	1291	41	1304	Information presented incomplete and biased towards Russia.	To be completed for grey literature with help of three members of our team from CA region.
Maximilian Weigend	Chapter 3	40	1291	40	1293	Since comparative figures are nowhere provided for other ecosystems, this figures do not provide a perspective. How many percent of all the ECA mammals is that? With an estimated 25 000 plant species in the Mediterranean alone, forests would comprise just above 10% while covering a much larger land area?	You are right. For example, Mediterranean region is more diverse. That's reflected in other chapters.
Maximilian Weigend	Chapter 3	40	1291	40	1297	ancient forests can't occur as "potential vegetation", in general this paragraph needs rewording and there is no differentiation between tree plantations and genuine forests.	Corrected
Germany	Chapter 3	40	1291	40	1293	Since comparative figures are nowhere provided for other ecosystems, these figures do not provide a perspective. How many percent of all the ECA mammals is that? With an estimated 25 000 plant species in the Mediterranean alone, forests would comprise just above 10% while covering a much larger land area?	You are right. For example, Mediterranean region is more diverse. That's reflected in other chapters.
Allan Watt	Chapter 3	42	1309	43	1319	Incomplete review with lack of supporting references. Statements referenced by Forest Europe 2015 should be checked.	We have added more evidences
Allan Watt	Chapter 3	43	1320	43	1321	Reference (an Editorial in Nature) does not support statement.	This part was deleted
Axel Hochkirch	Chapter 3	43	1320	43	1321	I would be careful to state that insect outbreaks are something "unnatural". These have probably happened also in the past and should belong to a natural ecosystem dynamics.	Reformulated
Allan Watt	Chapter 3	43	1324			A description of the method used should be included.	The methods were added.
Maximilian Weigend	Chapter 3	43	1324	44	1342	I find the generalization over all forests (natural and man-made) from the Taiga to the evergreen oaks of the Mediterranean entirely spurious. This has to be broken down first to subregions and then to biomes, otherwise no valid conclusions can be drawn at all - even less can policies be identified, that would "improve" the situation. Moreover, altitudinal shifts may be upward and downwards, depending on whether they are temperature-driven or water-driven. Climate change might have the opposite effect in Norway versus Hungary - this needs to be at least discussed.	To be more clear, the various forest types are now separated in sections on Temperate, Mediterranean and subtropical forests.
Germany	Chapter 3	43	1324	44	1342	The generalization over all forests (natural and man-made) from the Taiga to the evergreen oaks of the Mediterranean might be misleading and hence could be broken down to subregions and then to biomes. Otherwise it will be not possible to draw conclusions or define policy options, that would "improve" the situation. Moreover, altitudinal shifts may be upward and downwards, depending on whether they are temperature-driven or water-driven. Climate change might have the opposite effect in Norway versus Hungary - this needs to be at least discussed.	To be more clear, the various forest types are now separated in sections on Temperate, Mediterranean and subtropical forests.
Axel Hochkirch	Chapter 3	43	1326	45	1358	I generally have the feeling that the impact of climate change receives too much space here (compared to other drivers). Of course, climate change is important, but the current major threats are different.	You are right, also, the importance of drivers is expressed in the form of table where climate change is not the main driving factor. However, this topic is very well studied, so we use evidence-based examples on buffering effect of forest cover. This is quite unique mechanism which should deserve attention.
Maximilian Weigend	Chapter 3	44	1337	44	1342	the causal link with climate change remains unsubstantiated, at least as here presented. Changes in herbivore distribution could equally explain the pattern.	We removed this figure.
Germany	Chapter 3	44	1337	44	1342	this causal link with climate change remains unsubstantiated, at least as here presented. Changes in herbivore distribution could equally explain the pattern. Please check these statements and make them more evident.	We removed this figure.
Allan Watt	Chapter 3	44	1343	44	1351	Projections not trends: delete?	We moved this part to the the chapter on future trends
Maximilian Weigend	Chapter 3	44	1343	44	1351	in the long term, gradual replacements of beech versus oak have always happened, as has a contraction of conifers versus broadleaved trees and vice versa. It should be easy to model the changes in PNV under different climate models and identify ways of mitigation, but there is no indication of how the baseline data for this will be procured, nor does there seem to be an explicit strategy for it. Ecologically (overall biodiversity) oak forests are much richer than beech forests, so this change need not be negative.	You are right, thus the effect of climate change on biodiversity seems to be not so important. See the table with indicators.
Germany	Chapter 3	44	1343	44	1351	in the long term, gradual replacements of beech versus oak have always happened, as has a contraction of conifers versus broadleaved trees and vice versa. It should be easy to model the changes in PNV under different climate models and identify ways of mitigation, but there is no indication of how the baseline data for this will be procured, nor does there seem to be an explicit strategy for it. Ecologically (overall biodiversity) oak forests are much richer than beech forests, so this change might not necessarily be negative.	You are right, thus the effect of climate change on biodiversity seems to be not so important. See the table with indicators.
Allan Watt	Chapter 3	45	1359	45	1382	Relevance to chapter unclear: delete? Text on biodiversity conservation could be challenged anyway e.g. second option could be argued to support species dependent on deadwood (which is an MCPFE indicator).	It should be discussed with Chapter 6, however, I think it has here the place due to its link to biodiversity.
Maximilian Weigend	Chapter 3	45	1359	45	1369	there is no temporal axis provided for the changes described. Is there a reversal of the trend described for 1980s? Was the acidification universal, or restricted to or concentrated to CE and EE? The assessment here takes spatially and temporally non-explicit data and implicitly extrapolates them both temporally and spatially on all ECA-forests. This seems entirely unwarranted.	I agree, it was specified in indicator table.

Germany	Chapter 3	45	1359	45	1369	there is no temporal axis provided for the changes described. Is there a reversal of the trend described for 1980s? Was the acidification universal, or restricted to or concentrated to CE and EE? The assessment here takes spatially and temporally non-explicit data and implicitly extrapolates them both temporally and spatially on all ECA-forests. Please re-check this procedure regarding its scientific validity.	I agree, it was specified in indicator table.
Axel Hochkirch	Chapter 3	45	1370	45	1382	One might add here that due to the different nitrogen input from the air, wilderness will not result into primary forests similar to what existed some hundreds of years ago.	It might sound in that way, therefore it was rewritten
Germany	Chapter 3	45	1375			What is meant by "extensive forest management"; at L. 1518 "agricultural intensification" is used. Rewording or explanations would be helpful.	It was rewritten
Maximilian Weigend	Chapter 3	45	1378	45	1381	The more worrying that hunting as ecosystem management is not as much as mentioned anywhere I can find it. Also the last sentence of the paragraph seems to be a mixture of two entirely independent statements, but at least it's the first time "plantations of exotic tree species" are explicitly referred to - whereas they are usually subsumed under growing forest cover.	reworded by adding 'clear' 'hunting' and 'plantations'
Maximilian Weigend	Chapter 3	45	1383	46	1411	This paragraph is highly contradictory. The terminology is confused and needs sorting out. This is one of many places where one would wish for a clear referencing on which type of vegetation/biome classification is the basis for the entire assessment.	rewritten
Maximilian Weigend	Chapter 3	47	1383	50	1481	The entire section purportedly reports "past and current trends in BD and ES" and this section is dedicated to the forest to the forest to the forest, but is essentially dedicated to a laudation of the Caucasus, with much narrative, but few hard facts. This would be the subregion southern EE, but it is mixed with southern CA and this is again not spelt out, nor is the description balanced. Moreover, much of the most important floristic relics are to be found on the Balkan peninsula - which does not even find explicit mention in the entire document. The "relic flora" of the Caucasus and southern CA needs to be discussed with that of other parts of southern CE and WE to make any general sense in an assessment.	rewritten
Germany	Chapter 3	45	1383	46	1411	This paragraph reads highly contradictory. The terminology is confused and needs sorting out. This is one of the many places where a clear reference to the type of vegetation/biome classification would be extremely valuable	rewritten
Allan Watt	Chapter 3	45	1385	50	1481	Very interesting but excessive detail compared with other forest types in ECA. See Biodiversity evaluation tools for European forests (Tor-Björn Larsson et al.), which covers many forest types.	rewritten
Maximilian Weigend	Chapter 3	47	1412	47	1413	Please show only the vegetation in the ECA-assessment. Since map projection is different from all other maps in the assessment, this is difficult to compare otherwise.	rewritten
Germany	Chapter 3	50	1485			Can heathland be "natural"? Compare with Figure 3.16 and L. 1505 "anthropogenic". The statement of the first sentence seems not relevant for this chapter.	Yes, they can be natural on poor soils. The part about heathlands was eliminated from the text
PESC-3	Chapter 3	50	1495			Erica tetralix instead of Erica vagans?	Erica vagans was in the primary document.
Axel Hochkirch	Chapter 3	50	1498	50	1498	Not quite sure, why <i>Eressus niger</i> is highlighted here - without any Reference. There are probably more highly threatened heathland taxa that exist in northern Spain.	A reference is added. New examples will be added in further work.
PESC-3	Chapter 3	51	1507		1514	delete para- does not add anything useful	This part is important because of no consent in literature of influence of human activities on heathlands.
Allan Watt	Chapter 3	51	1524			Section needs substantial editing and review by Fagúndez (already cited e.g. line 1486) should be consulted and cited here.	The reference will be used. It takes time to read the paper before.
Germany	Chapter 3	51	1530			Lack of grazing may additionally support forest growth, or?	Correct for secondary heathlands.
Allan Watt	Chapter 3	51	1536			A description of the method used should be included.	The methodology will be described at the separate part.
Maximilian Weigend	Chapter 3	52	1539	52	1544	This is fairly cryptic, the fact that all low-land heathlands are man made is missing, and also the implication that they require active ecosystem management since they are not natural climax vegetation. Conversely, the second-last statement is entirely unclear (fire and "grazing" are required for their maintenance) and neither fragmentation nor overexploitation have been made explicit in the paragraphs above.	This statement contradicts to a part of authors
Germany	Chapter 3	52	1539	52	1544	This is fairly cryptic, the fact that all low-land heathlands are man made is missing, and also the implication that they require active ecosystem management since they are not natural climax vegetation. Conversely, the second-last statement is entirely unclear (fire and "grazing" are required for their maintenance) and neither fragmentation nor overexploitation have been made explicit in the paragraphs above.	This statement contradicts to a part of authors
Axel Hochkirch	Chapter 3	52	1542	52	1542	I guess this depends on the locality, but from all what we know from northwestern Europe, grazing and fire in fact increases heterogeneity. Many heathland invertebrates only survived in military training areas, where fires regularly occur, while they became in (unmanaged) nature reserves without fires and grazing. A typical example is <i>Gampsocleis gabra</i> .	Yes. If fires are not frequent, they support biodiversity. If they are frequent - biodiversity declines. That's why this issue is unresolved.
Axel Hochkirch	Chapter 3	52	1545	53	1570	I miss any mentioning of grazing here, which has a very long tradition also in Mediterranean scrubland (particularly goats).	This effect is missed and should be added, if any relevant sources will be found.
Harald Pauli	Chapter 3	52	1552	52	1554	Vegetation and most plant species in NW Caucasus and Northern Turkey are contrastingly different from the Mediterranean region.	This statement contradicts to a part of authors
Maximilian Weigend	Chapter 3	52	1559	52	1560	The figure shows the extent of the mediterranean vegetation, not its diversity. It would be much preferable to have an actual map of diversity. Also, the crucial topic of narrow endemism - both on islands and on the mainland should be spelt out and briefly illustrated with a map or the like.	If more comprehensive map will be available, it will be used. Biodiversity data will be added, it is a gap for now.
Germany	Chapter 3	52	1559	52	1560	The figure shows the extent of the mediterranean vegetation, not its diversity. It would be much more preferable to have an actual map of diversity. Also, the crucial topic of narrow endemism - both on islands and on the mainland should be spelt out and briefly illustrated with a map or the like.	If more comprehensive map will be available, it will be used. Biodiversity data will be added, it is a gap for now.
Thomas Brooks (IUCN)	Chapter 3	52	1561	51	1561	Delete "IUCN" here. The citation for L1564 and L1592 should be Cuttelod et al. (2008), not IUCN (2008).	Corrected
Harald Pauli	Chapter 3	53	1565	53	1570	maquis and garrigues are not distinctly different, but differences are gradual, the former taller growing and more hard-leaved woody species, the latter more soft-leaved but also some hard-leaved ones.	The statement is correct and added into the text. Need to be referenced.
Allan Watt	Chapter 3	53	1571	53	1583	Information on trends missing. Lines 1577-1583 relate to drivers and should be edited into the next section.	A statistic of trends is a gap now. Additional data is needed.
Harald Pauli	Chapter 3	53	1583	53	1583	pasturing by sheep and goats as still important an important factor shaping the Mediterranean vegetation	This information should be added to the chapter. It needs to find data.
Guy Pe'er	Chapter 3	53	1587	54	1596	The impact of agricultural expansion and intensification, as well as (peri-)urban expansion, should likely be listed explicitly since otherwise habitat loss and fragmentation are OUTCOMES and not actual pressures.	It is impossible to do it in the table, but possible in the list. Needed in more references.
Allan Watt	Chapter 3	53	1595			A description of the method used should be included.	In chapter two.
Maximilian Weigend	Chapter 3	54	1601	54	1612	It is good to see some figures, but it should be clarified whether the figures refer to vascular plants, and what Central Asian endemics are (and especially) if they are restricted to the Tugal scrublands, what the relationship to the Georgian Shibliak-vegetation is and also what the exact location and extent of this vegetation type are (map?).	A very good comment. The information about biodiversity is incomplete and needs more data. The connection with Georgian scrubs is not very large, because species are very different.
Germany	Chapter 3	54	1601	54	1612	It is good to see some figures, but it should be clarified whether the figures refer to vascular plants, and what Central Asian endemics are (and especially) if they are restricted to the Tugal scrublands, what the relationship to the Georgian Shibliak-vegetation is and also what the exact location and extent of this vegetation type are (map?).	A very good comment. The information about biodiversity is incomplete and needs more data. The connection with Georgian scrubs is not very large, because species are very different.
Harald Pauli	Chapter 3	54	1607	54	1607	oleaster ( <i>Elaeagnus angustifolia</i> ), generally: please add scientific names; often the English names are not widely known and sometimes ambiguous	The audience of the report is not only scientific. English names are more understandable.
Harald Pauli	Chapter 3	54	1609	54	1609	jungle or house cat ( <i>Felis...</i> )	The audience of the report is not only scientific. English names are more understandable.
Thomas Brooks (IUCN)	Chapter 3	54	1610	54	1610	Change "acclimatized" to "introduced".	Changed
Allan Watt	Chapter 3	53	1633			A description of the method used should be included.	In chapter two.
Harald Pauli	Chapter 3	55	1639	55	1649	needs full revision: Tundra in general, i.e. both arctic and alpine, is not defined as an area with permafrost. Low temperature and short growing seasons are the key-determinants of tundra. Alpine tundra often is without permafrost, but permafrost occurs more commonly above the closed alpine tundra grassland. '...island in the northern part of the Russian'; Kamchatka is not at the Arctic ocean - put Chukotka instead; 'the vegetation belt above the treeline...'; '...to Pamir and Tian Shan to the Spanish Sierra Nevada in the west'. Species numbers of organism groups do not make much sense as long as it not clearly defined what od N and S tundra...'	Tundra belt is maintains is not equal to alpine belt in mountains. Alpine belt will be written separately.
Maximilian Weigend	Chapter 3	55	1639	55	1649	It is nice to have a real descriptive paragraph, extent would be nice and a column indicating how many of the taxa are endemic to versus how many are present in this biome.	A good comment. If such data will be available, it will be added.
Germany	Chapter 3	55	1639	55	1649	It is nice to have a real descriptive paragraph, extent would be nice and a column indicating how many of the taxa are endemic to versus how many are present in this biome.	A good comment. If such data will be available, it will be added.
Harald Pauli	Chapter 3	55	1650	56	1670	sorry to say, but this is insufficient, much is incorrect, confusing and/or misleading. What about the mountain tundra in Europe? Here we should consider the extraordinary plant diversity of Europe's alpine tundra (or alpine life zone), which is estimated to host some 20 % of the continents total number of native higher plants, but the area above timberline in continental Europe only covers some 3% of Europe's surface (Vare et al. 2003 in Nag et al.: Alpine biodiversity in Europe, Springer).	Tundra belt is maintains is not equal to alpine belt in mountains. Alpine belt will be written separately.
Maximilian Weigend	Chapter 3	56	1671	57	1675	It might make sense to restrict the map to the ECA area. Also, there is no reference to this differentiated classification at all in the text. Do the different subtypes correspond to different levels of diversity? Are they of any BD or ES relevance? If so, this needs to be spelt out to help formulate conservation priorities, if not, use a much simpler map.	The map should be adopted for the region and biomes should be in compliance with the text
Germany	Chapter 3	56	1671	57	1675	It might make sense to restrict the map to the ECA area. Also, there is no reference to this differentiated classification at all in the text. Do the different subtypes correspond to different levels of diversity? Are they of any BD or ES relevance? If so, this needs to be spelt out to help formulate conservation priorities, if not, use a much simpler map.	The map should be adopted for the region and biomes should be in compliance with the text
Douglas Nakashima	Chapter 3	57	1676			Tundra - Past and current trends Roturier et al 2016 (Sweden): A shared observation that Sami herders make about winter grazing lands is the decline of winter pasturelands. This concerns ground lichen forests and old-growth forest supporting arboreal lichen, which have almost disappeared from a wide area of their territory. "This is a major concern for Sami reindeer herders because arboreal lichens are critical for reindeer survival when ground lichen becomes inaccessible such as in spring during the early snowmelt, and in winter after thaw weather. It can also have dramatic consequences on reindeer spreading out to find new pasture." ADD information about impacts of economic drivers. Lavrillier et al 2016 (Siberia): Discusses impact of international Sable prices on hunting patterns of the Evenk herders.	These references have to be assessed. The information is partly more relevant for forests.
Allan Watt	Chapter 3	57	1679	57	1685	Reference(s) needed.	IPCC, 2014

Frederic Lemaitre	Chapter 3	57	1683	57	1684	References seem to be lacking for the affirmation "Lemming cycles have changed in some Arctic regions probably due to changes in timing and quality of snow accumulation, with consequent impacts for lemming predators and alternative prey". Also the dampening of lemming cycles across Europe (not only in some Arctic regions) has been demonstrated. Please refer to Cornulier et al. (2013) Europe-wide dampening of population cycles in keystone herbivores. Science 340: 63-66 for this point, and for cascading effects on e.g. predators please refer to Terraube J., Arroyo B.E., Madders M., Mougeot F. (2011) Diet specialization and foraging efficiency under fluctuating food abundance in sympatric avian predators. Oikos 120:234-244 + Millon A., Petty S.J., Little B., Lambin X. (2011) Natal conditions alter age-specific reproduction but not survival or senescence in a long-lived bird of prey. Journal of Animal Ecology 80:968-975 + Terraube J., Arroyo B.E., Bragin A., Bragin E., Mougeot F. (2012) Ecological factors influencing the breeding distribution and success of a nomadic, specialist predator. Biodiversity and Conservation 21:1835-1852 + Schmidt N.M., Ims R.A., Høye T.T., Gilg O., Hansen L.H., Hansen J., Forchhammer M.C., Sittler B. (2012) Response of arctic predator guilds to collapsing lemming cycles. Proceedings of the Royal Society B 279:4417-4422 + Millon A., Petty S.J., Little B., Gimenez O., Cornulier T., Lambin X. (2014) Dampening prey cycle overrides the impact of climate change on predator population dynamics: a long-term demographic study on tawny owls. Global Change Biology 20(6):1770-1781 + Henden J.A., Ims R.A., Yoccoz N.G., Hellström P., Angerbjörn A. (2010) Strength of asymmetric competition between predators in food webs ruled by fluctuating prey: The case of foxes in tundra. Oikos 119:149-157 + Killengreen S.T., Strömberg E., Yoccoz N.G., Ims R.A. (2012) How ecological neighbourhoods influence the structure of the scavenger guild in low arctic tundra. Diversity and Distributions 18:563-574 + Hamel S., Killengreen S.T., Henden J.-A., Yoccoz N., Ims R.A. (2013) Disentangling the importance of interspecific competition, food availability, and habitat in species occupancy: recolonization of the endangered Fennoscandian arctic fox. Biological Conservation 160:114-120	Many useful references which need to be assessed and included.
Allan Watt	Chapter 3	57	1690	57	1693	Move to drivers section.	Chapter 3 is also deal with drivers.
Maximilian Weigend	Chapter 3	58	1704	58	1712	There is no approximation of the area affected relative to the overall area of the biome, or whether it is more relevant to one subregion or the other.	Majority of drivers are relevant to the whole region. The last drivers need to be specified by subregions using references.
Germany	Chapter 3	58	1704	58	1712	There is no approximation of the area affected relative to the overall area of the biome, or whether it is more relevant to one subregion or the other.	Majority of drivers are relevant to the whole region. The last drivers need to be specified by subregions using references.
Allan Watt	Chapter 3	58	1714			A description of the method used should be included.	In chapter two.
Harald Pauli	Chapter 3	58	1716	58	1721	partly misleading - see comment in chapter 1	Unclear. The statement in the chapter is based on literature review.
Harald Pauli	Chapter 3	58	1722	58	1722	the term savanna is not really suitable - it is usually used for seasonally dry tropical grassland, often interspersed with trees	the term savanna is used here as a part of the classification formula (Savannas and natural grasslands) growing out a global classification scheme. In our case only natural grasslands are actually presented
Germany	Chapter 3	58	1722			The following reference related to the grassland section seems of relevance: Veldman et al. (2015) Tyranny of trees in grassy biomes. [doi: 10.1126/science.127.6221.484-c]	will be added. Thanks!
Olivia Barrantes	Chapter 3	58	1722	58	1722	"Alpine grasslands" instead of "Alpine meadows". The term "meadow" is only one part of the natural grasslands, and they are subalpine	will be changed (and mountainous grasslands will be moved to the section on mountain ecosystems)
Germany	Chapter 3	58	1724		1731	This section is unclear	the section revised and rewrite as follow: Non-coastal land which is dry or only seasonally wet (not overwetting), covering by natural vegetation with greater than 30% cover. The vegetation is dominated by herbaceous and shrub plants, not wooded plants (trees).Not included: actively managed grasslands and cultivated lands (see Agricultural section), high-mountainous (alpine) grasslands (see Mountainous ecosystems section), and arid dwarf-shrublands (semi-deserts, see Drylands section).
Harald Pauli	Chapter 3	59	1738	59	1739	Table 3.19: need revision, among others things, e.g. alpine grassland is not necessarily dry; azonal/extrazonal may need more specification and examples	alpine grasslands will be moved to another section; more detailed characteristic will be done for azonal/extrazonal
PESC-3	Chapter 3	59	1738	68		Steppes should be included in semi-arid areas instead of in grassland section	we are not agree. Steppes are grassland by definition and delimitation between steppes and other types of grasslands is not simple. Grasslands' here include all types of grasslands having zonal
PESC-3	Chapter 3	59	1738	68		check classification with WWF definition for steppe and deserts (for Turkey)	We check it. In our opinion, the WWF definition for steppe and deserts in Turkey is not the best guideline for delimitation between these biomes in the region as whole
PESC-3	Chapter 3	59	1738			Table 3: Mountane and zonal steppe ecosystems: include Turkey (Ref)	Thanks. Will be included
Maximilian Weigend	Chapter 3	59	1738	59	1739	This table is valuable, but at least an approximation of the current extent of the different types would be nice, as would be the use of the subregions coded in chapter one. If everything is ECA, why did we define WE, CE, EE and CA there?	we will check the chapter one and harmonize the subregion codes using
Germany	Chapter 3	59	1738	59	1739	This table is valuable, but at least an approximation of the current extent of the different types would be nice, as would be the use of the subregions coded in chapter one. Please use the defined sub-regions WE, CE, EE and CA	we will check the chapter one and harmonize the subregion codes using
Harald Pauli	Chapter 3	59	1744	59	1747	I'm not rather sure if this kind of comparison is informative enough to be included here and I guess, that there would be other ecosystems having similar numbers of species per m <sup>2</sup> , even some types of natural alpine grassland	the paragraph will be revised with more correct estimation of the species richness (Dengler et al 2014, 2016)
Axel Hochkirch	Chapter 3	60	1748	61	1756	I miss the large number of grassland invertebrates here.	some information will be added
Allan Watt	Chapter 3	60	1752	60	1768	Useful information on Red Data species here but noticeably absent elsewhere. Should this be consistently applied across ecosystem types?	will try discuss it with other section authors
Harald Pauli	Chapter 3	60	1769	60	1773	modification of alpine grassland through human landuse may be overestimated, especially in contrast to montane and subalpine grassland	specified for subalpine grasslands
Olivia Barrantes	Chapter 3	60	1770	60	1770	"Hay", instead of "hey"	changed
Olivia Barrantes	Chapter 3	60	1776	60	1778	This knowledge gap should be in the Executive summary	will be moved to the Executive summary
Harald Pauli	Chapter 3	60	1779	65	1899	the influence of livestock grazing certainly is one of the most important factors shaping grassland vegetation. To this respect, the following may be more emphasized: (1) in several European alpine grasslands, including parts of the Alps or the Pyrenees, grazing such as by sheep is particularly strong - probably even detrimental and is enforced e.g. through EU subsidies; (2) grassland at lower elevations which developed through traditional farming is often treated through land abandonment or e.g. in meadows through intensification; (3) in montane to alpine pastures in Middle/Central Asia, e.g. Kyrgyzstan and Tajikistan, large areas are heavily overgrazed by livestock such as sheep, goats, horses, cattle	Agree, the sentence added
PESC-3	Chapter 3	61	1799			lost should be substituted by loss	corrected
PESC-3	Chapter 3	61	1804	61	1807	consistency in english species names- upper and lower case	corrected
PESC-3	Chapter 3	61	1823			Republik should be replaces by Republic	corrected
Maximilian Weigend	Chapter 3	50	1842	51	1503	Again, this very descriptive. Heathlands are spectacularly poor in vascular plant species - it must be possible to find some figures for mosses, lichens, invertebrates in order to compare them to those of other habitats. Claiming "high diversity" for all and sundry habitats mentioned is perhaps not wrong, but certainly not convincing without providing hard figures and some clear indication of how endangered these taxa are - or not. Heathlands have a lot to offer in that respects, especially in birds and invertebrates, but this needs to be spelt out.	Heathlands section is integrated with Mediterranean forest, woodlands and shrub and with Alpine and subalpine grasslands and the issue is addressed
Germany	Chapter 3	50	1842	51	1503	Again, this very descriptive. Heathlands are spectacularly poor in vascular plant species - it must be possible to find some figures for mosses, lichens, invertebrates in order to compare them to those of other habitats. Claiming "high diversity" for all and sundry habitats mentioned is perhaps not wrong, but certainly not convincing without providing hard figures and some clear indication of how endangered these taxa are - or not. Heathlands have a lot to offer in that respect, especially in birds and invertebrates, but this needs to be spelt out.	Heathlands section is integrated with Mediterranean forest, woodlands and shrub and with Alpine and subalpine grasslands and the issue is addressed
Douglas Nakashima	Chapter 3	62	1853			Grasslands – drivers. ADD information about the role of ILK in maintaining and managing cultural landscapes and mountain biodiversity in an Eastern European setting. Roturier et al 2016 (Sweden): "European Union and national regulations, as well as low average incomes often threaten [ILK-based mountain small-scale] farming".	ILK information was missed and will be added for all grasslands, not only for Europe
PESC-3	Chapter 3	62	1858	62	1863	add wind erosion to the list of drivers	wind erosion is minutely small in intact grasslands and significantly rises only after disturbances inducing nudation, as overgrazing and fire. Thus it is a part of some complex drivers, not separate one
Allan Watt	Chapter 3	63	1887			As above: interesting but similar information not included for other ecosystems.	will try discuss it with other section authors
Maximilian Weigend	Chapter 3	65	1892	65	1899	This is a valuable chapter with lots of interesting information, but could be more concise, including the tables, reducing the qualitative information and adding more quantitative information (e.g., extent and percentages). At the same time, the radically different underlying principles between man-made and natural grasslands should be spelt out more clearly, especially when it come to management: alpine grasslands and the natural grasslands of CE, EE and CA are essentially self-sustaining if the herbivore community is adjusted (wild or domestic), man-made grasslands in CE and WE require continuous management to preserve their current status, or even restore them to former glory.	(see also similar comments above). First, the section on agricultural areas has been shortened. Second, headers and footnotes associated to the headers now acknowledge the difference between both grassland types, i.e.: 3.3.2.3.4 = 3.3.2.3.4 Savannas and natural grasslands (e.g. xeric grasslands, alpine meadows), versus 3.3.2.3.7 = Agricultural areas (incl. Managed grasslands) instead of "Productive ecosystems". And this distinction has been made clear throughout the text.
Germany	Chapter 3	65	1892	65	1899	This is a valuable chapter with lots of interesting information, but could be more concise, including the tables, reducing the qualitative information and adding more quantitative information (e.g., extent and percentages). At the same time, the radically different underlying principles between man-made and natural grasslands should be spelt out more clearly, especially when it come to management: alpine grasslands and the natural grasslands of CE, EE and CA are essentially self-sustaining if the herbivore community is adjusted (wild or domestic), man-made grasslands in CE and WE require continuous management to preserve their current status, or even restore them to former status.	(see also similar comments above). First, the section on agricultural areas has been shortened. Second, headers and footnotes associated to the headers now acknowledge the difference between both grassland types, i.e.: 3.3.2.3.4 = 3.3.2.3.4 Savannas and natural grasslands (e.g. xeric grasslands, alpine meadows), versus 3.3.2.3.7 = Agricultural areas (incl. Managed grasslands) instead of "Productive ecosystems". And this distinction has been made clear throughout the text.
Allan Watt	Chapter 3	66	1900			A description of the method used should be included.	Done in SOD
Harald Pauli	Chapter 3	66	1903	66	1912	the crucial factor why plants are prostrate above the treeline is low temperature and (outside of the tropics) a short growing season - the other factors are of secondary importance (compare, e.g. Körner 2012: Alpine treelines, Springer).	Note taken, while the section has been re-formatted and merged with tundra and high mountain grasslands. So, it is called Tundra and Mountain Grasslands (only high elevation grasslands in the SOD)

Allan Watt	Chapter 3	66	1903			Interesting section but information on trends is lacking, an important gap in the assessment given that many people may think that loss of alpine grassland this is an important trend in Europe.	the section has been re-formatted and merged with tundra and high mountain grasslands. So, it is called Tundra and Mountain Grasslands (only high elevation grasslands)
Harald Pauli	Chapter 3	66	1913	66	1921	this is quite a repetition from p. 60; one should distinguish between montane to subalpine grassland, being strongly modified or even developed through traditional pasturing and alpine grassland, which is by far less modified.	the section has been re-formatted and merged with tundra and high mountain grasslands. So, it is called Tundra and Mountain Grasslands (only high elevation grasslands)
PESC-3	Chapter 3	66	1914			hey should be replaced with hay	done in SOD
Allan Watt	Chapter 3	66	1918	66	1924	Repeats text lines 1774 onwards.	Thanks, corrected
Olivia Barrantes	Chapter 3	66	1918	66	1921	Repeated in pag 59 (1744-1747)	Thanks, corrected
Harald Pauli	Chapter 3	66	1928	66	1928	you may add: "...Malanson et al. 2011; Grabherr et al. 2010; ref: Grabherr et al. 2010. Climate change impacts in alpine environments, Geography Compass."	the section has been re-formatted and merged with tundra and high mountain grasslands. So, it is called Tundra and Mountain Grasslands (only high elevation grasslands)
Harald Pauli	Chapter 3	67	1935	67	1935	suggest to add "This is insofar worrying as many Mediterranean mountains host a large number of highly endemic plant species which dwell in the uppermost vegetation zones (e.g. Blanca et al. 2002, Flora amenazada y endémica de Sierra Nevada. Univ. Granada y Junta de Andalucía)." Whereas temperate mountains mainly show increases in species numbers, declines of extreme high-elevation species were already observed even in the Alps (Pauli et al. 2007, Global Change Biology).	the section has been re-formatted and merged with tundra and high mountain grasslands. So, it is called Tundra and Mountain Grasslands (only high elevation grasslands)
Harald Pauli	Chapter 3	67	1936	67	1949	here again it is crucial to distinguish between alpine and subalpine; in alpine areas we often even have an increasing (mostly sheep) grazing impact	the section has been re-formatted and merged with tundra and high mountain grasslands. So, it is called Tundra and Mountain Grasslands (only high elevation grasslands)
Allan Watt	Chapter 3	67	1936	67	1943	Points made here should be carefully checked. Abandonment may indeed lead to conflict (although the term human-wildlife conflict is misleading and the recent literature on conservation conflict should be consulted) but the reference cited does not deal with conflict. Nor does the paper by Strijker deal with "divisive" programs.	the section has been re-formatted and merged with tundra and high mountain grasslands. So, it is called Tundra and Mountain Grasslands (only high elevation grasslands)
Allan Watt	Chapter 3	67	1947			Must be supported by evidence.	the section has been re-formatted and merged with tundra and high mountain grasslands. So, it is called Tundra and Mountain Grasslands (only high elevation grasslands)
PESC-3	Chapter 3	67	1950			Desert instead of dessert	Corrected
Andy Purvis	Chapter 3	67	1950			Deserts not desserts	Corrected
Germany	Chapter 3	68	1975			The year of the publication of the Atlas is needed.	Added 2010
Allan Watt	Chapter 3	68	1983	68	1988	Repetition, although perhaps worth repeating!	It is important to keep the information about Aralkum in two places: in deserts and in aquatic systems. In one case - as a vñshn lake, in other - as a new deserts.
Allan Watt	Chapter 3	68	1989			This section does not deal with any trends in biodiversity associated with deserts, rather focussing on desertification (which is, of course, important and must be dealt with).	This part needs to be added by information from literature.
Axel Hochkirch	Chapter 3	68	1990	68	1990	I am always sceptical with superlatives. I would call it "one of the largest environmental disasters" rather than "the largest...".	The name came from the referenced literature.Changed:"in the region"
Axel Hochkirch	Chapter 3	69	2008	69	2016	I miss overgrazing here, which is a severe threat in many semi-desert ecosystems.	Added.
Germany	Chapter 3	69	2008			Specify "Using land for agriculture and the huge water consumption" by e.g. "The cotton production".	It is not only cotton, but also crops production.
Germany	Chapter 3	69	2010			Specify "Unchecked urbanisation" by e.g. "Limited ..." or "insufficient urban planning"	Changed
Axel Hochkirch	Chapter 3	69	2024	69	2028	The large number of troglodiverts in Europe compared to other continents is most likely biased by research efforts. I wouldn't call it a hotspot of subterranean biodiversity, while the latter part of the sentence is true (that Europe is a hotspot of research into this).	Text on caves and sub-terranian habitats has been re-written
Germany	Chapter 3	70	2043			Figure: 3.20. Caves in Southern Germany are not mentioned and could be added.	Text on caves and sub-terranian habitats has been re-written
Allan Watt	Chapter 3	71	2069			Much of the text should be moved to the drivers section.	Text on caves and sub-terranian habitats has been re-written
Allan Watt	Chapter 3	71	2075			General point, not specific to this ecosystem?	Text on caves and sub-terranian habitats has been re-written
Axel Hochkirch	Chapter 3	71	2080	71	2090	I miss two major threats here: mining/linestone quarrying and touristic exploitation of caves.	Text on caves and sub-terranian habitats has been re-written
Thomas Brooks (IUCN)	Chapter 3	72	2094	72	2096	"Agricultural areas" would be a better term than "Productive systems", because all ecosystems are "productive" in ecological terms.	the header has been modified
Mark Sneathlge	Chapter 3	72	2097	73	2115	This description of the agricultural system as an ecosystemtype (like cropland in the MAES classification) seems indeed to belong in chapter 3.	ok; just: we have modified headers and text so that we now only assess changes in the extent and diversity of these agro-ecosystems, not so much the associated drivers
Sophie Condé	Chapter 3	72	2099	2100		Could be good to have a definition of "agricultural areas"; do pastured (grasslands) include or not?	we have modified headers and text so that we now only assess changes in the extent and diversity of these agro-ecosystems, not so much the associated drivers
Mark Sneathlge	Chapter 3	73	2116	75	2149	With a view of slimming down chapter 3 (as announced in the intro), and avoid duplication, would this section not be better in chapter 4, with one sentence in chapter 3 making reference to it. It does seem to describe agriculture as a driver more than agriculture as an ecosystem.	we have modified headers and text so that we now only assess changes in the extent and diversity of these agro-ecosystems, not so much the associated drivers.
Allan Watt	Chapter 3	75	2157			Studies on the relevance of changes in hedgerow management include: Changes in hedgerow floral diversity over 70 years in an English rural landscape, and the impacts of management (Staley et al., 2013 Biological Conservation 167, 97–105)	this reference is now included and taken into account
Allan Watt	Chapter 3	75	2164	76	2209	Needs to be edited to clearly differentiate the many impacts of management on biodiversity from low-intensive farming to highly intensive agriculture. The statement on Lines 2206-2209 requires clarification and reference(s) presumably the impacts on biodiversity depend on the land use that follows agriculture. In any case, this text could be moved to a drivers section, as elsewhere.	we have modified headers and text so that we now only assess changes in the extent and diversity of these agro-ecosystems, not so much the associated drivers
Germany	Chapter 3	75	2165			The numbers need to be inserted.	the text has been shortened and the number of temporal trends analysed is now indicated
Allan Watt	Chapter 3	77	2213	77	2224	Needs much more supporting evidence, including more recent references, and a more critical assessment. Also out of place: move to a drivers section.	box 2 now includes recent references supporting the text
Tom West	Chapter 3	77	2214	77	2214	Are these agricultural practices really 'new', or just modernised versions of old ones? Consider discussion of GIAHS in Chapter 2.	This has been revised: " During the last decades, alternative agricultural practices and systems to intensive ones have been developed (including new practices or previously widespread ones), such as ..."
Tom West	Chapter 3	77	2223	77	2224	The content of the box does not seem to be about organic farming in the EU, nor about agri-environment schemes, but about a Europe wide farmland biodiversity monitoring scheme.	This has been revised: the text before box 2 refers to organic farming effect, while box 2 focuses on the effect of agri-environment schemes
Allan Watt	Chapter 3	77	2225	77	2240	This is the type of text missing elsewhere for similar tables (to 3.23).	thank you!
Germany	Chapter 3	78	2244			Table 3.23. The Table is complicated to read. The consistency of the color and arrows needs to be checked.	the Table has been simplified, and colour is not used anymore
Axel Hochkirch	Chapter 3	78	2247	78	2247	In the Table, I would classify the trends for "other above-ground invertebrates" species richness and abundance clearly as negative!	As it has been asked to shorten and simplify the tables presenting temporal trends, the trend for other above-ground invertebrates is not included anymore.
Allan Watt	Chapter 3	79	2254		2310	Although summarised in table 3.23, some supporting references should be included.	All references used to build the Table cannot be cited here (over 100 !) but are given in an Appendix
Guy Pe'er	Chapter 3	80	2264			Fig. 3.27: Thank you for taking into consideration my work (Pe'er et al. 2015). Please note that due to copyright reasons you cannot use the figure published by Science, but upon request I can submit the figure as submitted. For the link with other chapters, note also the analysis of farm sizes as well as employment among farmers (Supplementary Material).	Thank you for this comment; the TSU will pay attention to this for all figures to be included in the final version
Frank Wugt Larsen (EEA input)	Chapter 3	80	2264			See also SEBI 001 indicator: <a href="http://www.eea.europa.eu/data-and-maps/indicators/abundance-and-distribution-of-selected-species/abundance-and-distribution-of-selected-2">http://www.eea.europa.eu/data-and-maps/indicators/abundance-and-distribution-of-selected-species/abundance-and-distribution-of-selected-2</a>	this document has been consulted indeed
Frank Wugt Larsen (EEA input)	Chapter 3	80	2271			can link to SEBI 001 ( <a href="http://www.eea.europa.eu/data-and-maps/indicators/abundance-and-distribution-of-selected-species/abundance-and-distribution-of-selected-2">http://www.eea.europa.eu/data-and-maps/indicators/abundance-and-distribution-of-selected-species/abundance-and-distribution-of-selected-2</a> )	this document has been consulted indeed
Allan Watt	Chapter 3	84	2370			Change to a drivers section but include much of this text.	we have modified headers and text so that we now only assess changes in the extent and diversity of these agro-ecosystems, not so much the associated drivers
Frederic Lemaitre	Chapter 3	85	2396	87	2467	Section 3.3.2.3.8 on Urban/Semi-urban environments seems not to address the development of e.g. green spaces in cities, for now it only considers the destruction of habitats to build urban areas. There are large scale studies on the status and trends of biodiversity and green spaces in urban areas, see Kabisch N, Haase D (2013). Green spaces of European cities revisited for 1990–2006. Landscape and Urban Planning 110 p.113-122 and also Larondelle N, Haase D, Kabisch N 2014. Diversity of ecosystem services provisioning in European cities. Global Environmental Change 26, 119-129	This section is completely re-written for SOD
Allan Watt	Chapter 3	85	2396	80	2467	This section requires revision to include the growing knowledge of biodiversity in urban and semi-urban systems. This includes: Biodiversity in cities needs space: a meta-analysis of factors determining intra-urban biodiversity variation (Beninde et al 2015, Ecology Letters 18, 581–592)	This section is completely re-written for SOD
Jari Niemelä	chapter 3	85	2396	87	2467	urbanization can also provide new habitats for species in cities. Thus, the combination of original and human-modified habitats enriches the habitat richness in cities and thereby provides habitats for many species, many of which are introduced. Thus, the species richness of cities may actually be high, see e.g. The Ecology of Urban Habitats by Oliver L. Gilbert	This section is completely re-written for SOD
Axel Hochkirch	Chapter 3	85	2399	85	2404	I am a little bit surprised here that you do not start this section with the overarching effects of constructions of houses, industrial areas, roads etc	This section is completely re-written for SOD
Axel Hochkirch	Chapter 3	85	2410	85	2421	There is a recent paper by Beninde et al. (2015, Ecology Letters), which highlights the idiosyncratic nature of cities. I think that the zonation given here does not fit to all cities and particularly zone C is in many cases not found close to cities (which are often surrounded by agricultural areas).	Thank you for the reference. This section is completely re-written for SOD
PESC-3	Chapter 3	86	2449	86	2454	Ecological disasters caused by increasing salinity, though few in number, have brought about large-scale loss of biodiversity and suffering for human inhabitants affected, as is the case of the fisheries collapse in the Aral Sea and the limited access to safe drinking water in the Amudaryya and Syrardarya rivers deltas in Central Asia (Cañedo-Argüelles et al., 2016).	Thank you for the reference. This section is completely re-written for SOD

Douglas Nakashima	Chapter 3	87	2468			3.3.2.3.9. Snow [everything north of or higher than alpine] Permafrost Mustonen 2011 (Russia): (p7) "Many people reported that continuous permafrost is thawing in a number of sites across Nizhnikolya. Aylora, a local site of fishing activity, has had several lakes disappear, as the permafrost has thawed, opening channels through which the water has drained out. This phenomenon has begun in the past ten years according to community members: * "Several lakes in Aylora are gone. Water went away. This has had impacts on fishing sites and times." (26.3.2005, Alexei Gavrilovich Tretiakov, Andreyushchko, Kolyma) * "River Chukotskaya as many new bushes growing rapidly. Weather is warmer and permafrost has thawed. The River Kolya is eroding fast, the banks of the river are collapsing, and the river is wider than before." (4.3.2006 Piotr Kaugin, Vice Head of the Nomadic Indigenous Community "Turvauringin") * "Changes have taken place on the permafrost. Many lakes have disappeared in the past ten years both in the taiga and tundra zones. We can see this happening in front of our eyes. It is warmer than before. This has impacts to fishing, reindeer herding. One lake disappeared so that the fish in the lake died completely. New holes on the ground have appeared – collapsed zones. We do not move any more so much on the marsh lands." (2.3.2006, Aleksei Nikolayevich Kemili, Chukchi reindeer herder, Reindeer Brigade Number 4, Nomadic Indigenous Community "Turvauringin")			The comment is more relevant to tundra. It is possible to find the similar information in scientific literature. To include the information from the comment it needs to contact the reviewer and ask about references.
Harald Pauli	Chapter 3	87	2471	87	2472	I would say 'are distributed over the Arctic and higher mountains.' Greenland has 1710000 km <sup>2</sup> of glacier (rather than 87126km <sup>2</sup> )!		Note taken, will be further checked	
Harald Pauli	Chapter 3	87	2482	87	2492	this is a kind of mix that needs revision: Nunataks are mountain tops (not really just rocks among glaciers) that are +/- surrounded by glaciers or were so in the Pleistocene, e.g. in the Alps). Species with arctic-alpine distribution are commonly widespread in the Arctic and have their southern outposts as relict populations in European mountains: e.g. Ranunculus glacialis is common in the Scandes, still in the subnival zone of the Alps and the Pyrenees and outstandingly rare in the Sierra Nevada of Spain. Higher plants at their northernmost limits in the Arctic or uppermost on high mountains often form rosettes such as Ranunculus glacialis, Papaver radiculatum of loose (Saxifraga oppositifolia) to dense cushions (e.g. Thylacospermum caespitosum in Tian Shan). High elevation invertebrate animal species include, e.g. collembolas and oribatid mites; a member of the latter, Ceratocetes spitsbergensis, was recently found on a Nunatak in the Alps, first time outside of the Arctic, in a small relict population at 3300m (Fischer et al. 2016, International Journal of Acarology).		The tops of the mountains and the rocks among the glaciers are often exposed and called "nunataks". Other information will be included after assessing of the source	
Harald Pauli	Chapter 3	89	2538	89	2542	polar deserts, however, may gain considerable area through glacier retreat - therefore they may even increase in area in some regions		Added, but need to be referenced	
Sophie Condé	Chapter 3	90	2562	93	2616	This section on PA should be numbered as 3.3.2.4 same level Marine, Freshwater, Terrestrial		this has been addressed	
Allan Watt	Chapter 3	90	2562			This section (which is not numbered) focuses only on coverage of protected areas in relation to KBAs, IBAs and AZEs. Consideration (here or elsewhere) of their importance in relation to ecosystem type, policy (particularly Natura 2000) and various drivers, e.g. climate change, should be included.		thanks for this comment. We agree and we will include in the final document discussion of gaps in coverage for given taxa and illustrate the spatial patterns of gaps (following Maiorano et al. 2015 Conservation Biology)	
Maximilian Weigend	Chapter 3	90	2562	90	2562	For the sake of fairness, it would make much sense to also discuss the PNV-cover for terrestrial habitats, these should be added to the PS for each subregion to clarify the amount of well-preserved ecosystems. This might strongly shift the perspective, especially with regards to CE, EE and CA. Looking at PA only tells you more about society and politics than about the state of the natural world and what is there that should be preserved. This could be nicely illustrated with a map showing an overlay of PAs and near-natural and high-value cultural landscapes.		that is a good point that we will address for the final documents if data is available	
Douglas Nakashima	Chapter 3	90	2562			ONSIDER that indigenous and local community "sacred sites" could also be considered as "protected areas", e.g. Kalkanbekov Sezdebek and Albek Samakov (2016). Sacred sites and biocultural diversity conservation in Kyrgyzstan: co-production of knowledge between traditional practitioners and scholars.		we appreciate the suggestion and we'll add this reference to support a statement that sacred sites are often de facto protected	
Frank Wugt Larsen (EEA input)	Chapter 3	91	2578			Figure 3.32 has no source (this is an example. General problem)		we have proof-read the document to ensure these errors were all addressed	
Germany	Chapter 3	92	2584		2585	Figure 3.34. The abbreviations should be explained.		the acronyms are all explained few lines above in the same paragraph	
Maximilian Weigend	Chapter 3	92	2586	93	2616	Overall, a breakdown as to which habitat types are protected where - pie-charts or tables - would make much sense. Absolute percentages are not use for the formulation of the conservation priorities.		we agree it would be good to have, but this information is presently not available for ECA and there is no scope for additional analyses	
Germany	Chapter 3	92	2586	93	2616	Overall, a breakdown as to which habitat types are protected where - pie-charts or tables - would make much sense. Absolute percentages are not use for the formulation of the conservation priorities.		we agree it would be good to have, but this information is presently not available for ECA and there is no scope for additional analyses	
Germany	Chapter 3	92	2592		2594	Zero or one decimals seems sufficient.		agreed, it will be revised in the final document	
Douglas Nakashima	Chapter 3	93	2617			3.3.3. General trends of taxa		the numbering has been corrected	
Douglas Nakashima	Chapter 3	93	2617			Mustonen, Zavalko et al. 2004 (Kola Peninsula, Russia): (p328) "The changes in the animal species began about 10 years ago. New frogs and viviparous lizards turned up here." Arkady Khodzinsky, 21st April 2002, Reindeer Herder, Reindeer's farm "Tundra", Brigade number 9, Lovozero		thanks for all the valuable sources on ILK, we'll include them as far as possible and when appropriate	
PESC-3	Chapter 3	93	2618			could you include indicators of change for each driver for each taxa (general trends) in a table to provide a link to Chapter 4. In addition, you could then highlight specific examples for each subregion in the text.		our goal here is to discuss their importance in generating these biodiversity trends, not the magnitude of change in drivers (although the two are often strongly correlated unless the taxa become more exposed for these threatening processes over time)	
Thomas Brooks (IUCN)	Chapter 3	93	2620	93	2634	Section 3.3.3.1 is very good.		Thank you	
Douglas Nakashima	Chapter 3	93	2620			3.3.3.1. mammals		Thanks for this ILK will be included in SOD	
Douglas Nakashima	Chapter 3	93	2620			Hiltunen et al. 2004 (Northern Sweden) : (p 266-267) Observations from a Sami reindeer herder: "Last year we had a lot of red foxes (Vulpes vulpes), but may be it was because we had a warm summer and rodents and sucha had survived (the winter) - there were an incredibly large amount of foxes. And bear (Ursus arctos), for example, has increased a lot in these regions. I can tell about something that happened this week - on Monday this week - I saw a bear that lay on top of a reindeer eating, and last night I saw a cadaver of a grown up reindeer and two calves that a bear had killed, so, in fact, there are plenty of bears. And it seems to be the case over the whole county of Norrbotten. A lot of female bears with cubs - two or three of them - they have increased a lot. In the Jokmokk region and also in Arjeplog and towards Älvsbyn.(...) "I don't know about new species of animals, but, for example, beaver (Castoridae) has made an incredible increase (in its population) in the last 20 or 30 years. It was a really rare case if you even saw a beaver thirty years ago, but now they have several communities around Käbdåls. And even all the way up near Naustajaura and Tjaveljakkä. They were sighted up in the summerlands last year, they've never been seen there before. Also otter (Lutra lutra) has increased over the last fifteen years, it is also quite common in this area. you see plenty of tracks, you can even see them in the streams".[Rune Stokke, chairman of Utdja sameby] (p268) ""The arctic fox (Alopex lagopus) has disappeared. It has almost died out, possibly the red fox has gained a larger dominance. It really doesn't belong in the mountains. The same with the lynx (Felix lynx). It's a forest animal and goes after the hare (Lepus timidus). But the forests are being ravaged more and that brings big changes. The number of the hare gets lower and thus the lynx follows after their food and this usually leads up to the mountains. When a lynx eats a reindeer, it only eats the meat. A lynx killed one of my calves and it had only eaten the rump and it felt bad to see that. Lynx has bad teeth and it needs soft meat. Lynx has gained more dominance up in the mountains and the same thing with the bears. Bears have always been found from the mountains but not as high as nowadays". [Gun Aira] (p268) ""The mountain lemmings are rare. We had them a couple years ago, but not the big mountain lemming invasions we had before. The arctic fox has decreased, you can tell. But on the other hand, predators have increased. All Four Great Beasts [bear, wolf, wolverine and lynx] have increased because of the fact that we live in a national park and these are protected areas - hunting for the Four Great Beasts is forbidden, but elk we are allowed to hunt here in Badjelännda [Padjelanta in Swedish]". [Bertil Kielatis, chairman of Sirges sameby]		Thanks for this ILK will be included in SOD	
Douglas Nakashima	Chapter 3	93	2620			Mustonen, Zavalko et al. 2004 (Kola Peninsula, Russia): (p327) "Arkady Khodzinsky raised an extremely interesting issue during an interview on 21st April 2002. He spoke of the arrival of "Scandinavian" wolves to the region. This proves to be a bizarre future challenge to the ecologists, as the numbers of wolves in Scandinavia remain so low that it is very difficult to envision a large migration to the Kola Peninsula. Therefore the presence of the new breed wolves remains an enigma. "The number of wolves grows every year. They are cunning. They are not real wolves, northern wolves. I think they are some kind of Scandinavian species, not the one from around here. Our wolf attacks a reindeer from the front and goes after the throat if it wants to kill the reindeer. But this new kind is just kind of snaps from the rear and front. It is not a wolf, it is a huligan. It is not normal. I think it has arrived from someplace in Scandinavia, it is not from here. Northern wolf is such that it weighs at least 70 kilograms - that is for sure. I know because I have seen them. It is like a machine. But this is more like a dog, it has a brown tail and ears standing upwards. It is not a real wolf. People are saying this is a Scandinavian wolf but not an Arctic Circle wolf. Yes, they have arrived from somewhere else. The northern wolf is rare and very nice to come by." Arkady Khodzinsky, 21st April 2002, Reindeer Herder, Reindeer's farm "Tundra", Brigade number 9, Lovozero." ""There used to be less wolverines. Now there is a massive number of them. They have increased in numbers and should be harvested. They kill a lot of reindeer. No difference to them, old and young alike are killed. Wolves tear and attack the reindeer as well. I think they are increasing as well. Before, when the price of the gasoline as lower, we used to shoot them from helicopters, but no longer. Then we killed wolves from the skidoos. That happens no longer either. I cannot say exactly how many, but the numbers were great. Mostly reindeers are killed by humans though. Human kills everything in front of him." Vladimir Philippov, 9th June 2002, The state farm "Tundra", Reindeer herder of Brigade number 2, Lovozero		Thanks for this ILK will be included in SOD	
Douglas Nakashima	Chapter 3	93	2620			Salin et al. 2004 (Finland): (p278) "Squirrels used to be hunted in the Vuosto region. The main reason was the fur and the price that was paid for it. Now the squirrels have grown less in number. Niila Nikodemus portrays the old times and the change: "We don't see squirrels anymore. Before we used to hunt them all fall. We got the permit in November when the fur had come clean. all the time we hunted there were [squirrels] every fall. I wonder the reason now that we don't hunt them anymore but still their numbers don't increase. If it were like before, we hunted them continuously. The skin was good and we got a fair price on it too. Great fur." (p294) "The predators of the Scandinavian North, especially the arctic fox, have almost disappeared from the Kaldöavil region. They are much less in numbers than in the Kola Peninsula for example. Heikki Länsman spoke of the last observation of an arctic fox and said that it was some 10 or 15 years ago. "I haven't seen the arctic fox in a long time. It has disappeared for sure. They are here no more". (p294) "Wolverines are more plenty as Heikki explained. "I saw three wolverines just a couple of weeks ago. They were travelling together. I see tracks of wolverines every day, I think they come from Norway". (p294) "Nillas Vuolab remembered times when there were a lot of wolves in the area. "After the war there were many wolves here, none really counted them though. But there were several packs plus some couples to add up with few lonley ones too. We had to herd the reindeer constantly because of these predators. If a pack of say, ten wolves would come hunting, with one single attack they could take ten reindeer. Another attack or another pack, and it would be another ten reindeer!"		Thanks for this ILK will be included in SOD	
Douglas Nakashima	Chapter 3	93	2620			Mustonen 2005. (p18) "Andrei Julin a Sami reindeer herder from the tribal community of Piras made the following observations of changes in Kola Peninsula (Sami area) Sámi reindeer herder: The number of fox and wolverines has increased."		Thanks for this ILK will be included in SOD	
Allan Watt	Chapter 3	93	2621	93	2630	This is a very succinct but probably too succinct summary of the status of mammals, with no species mentioned. Some idea, perhaps, of which species are Critically Endangered would be useful and make this more readable. Also the categorisation metric is interesting but population size and/or range estimates might make the situation more understandable to the reader. See also comments on other taxa below: some consistency in reporting would be preferable.		The section has been extensively revised and includes specific cases of declines, e.g. Saiga Antelope, and recoveries, e.g. the European bison, with discussion of the causal mechanisms behind each.	

Andriy-Taras Bashta	Chapter 3	93	2622			Of these, 66 (12%) are threatened...	the percentage will be added in the final draft, which may also have different overall numbers following the ongoing re-assessment of mammals
PESC-3	Chapter 3	93	2623			data deficient species: question the assumption that they all belong to the categories vulnerable or worse	It's not an assumption, but a worse case scenario. Generally data deficient species are found to be vulnerable or worse because they are rare and/or range-restricted, Bland et al (2015) Conservation Biology, 29(1), 250-259. Found that 64% of DD terrestrial mammals globally should be VU or worse.
Andriy-Taras Bashta	Chapter 3	93	2623	93	2624	excl. "...their number.....Vulnerable or worse	I don't understand this
Allan Watt	Chapter 3	90	2631	93	2633	References needed. It might be useful to include an evaluation of the drivers threatening Critically Endangered species (in addition to all species).	the IUCN website is listed as a reference, investigating the threats to CR will be done before SOD
PESC-3	Chapter 3	93	2633			clarify the message on species threatened by hunting and by invasive species	I don't understand this
Allan Watt	Chapter 3	93	2635	95	2690	Clearly a very rough draft of what should be a very comprehensive assessment given the amount known about birds in this region. The issues of habitat preference, migration and geographical patterns are touched upon briefly and need to be expanded. The focus on abundance is useful and should be retained but is in contrast to the previous section, which focuses on threatened status. It would perhaps be useful to include a similar breakdown of species and name some of those most threatened. A separate section on drivers might be useful but needs to be consistently done for all taxa if possible.	We edited the section thoroughly, and it now includes data on threat status. Unfortunately, considering the very broad scope of the assessment and space limitations, we cannot expand more on the themes suggested, although we do agree they are important.
Thomas Brooks (IUCN)	Chapter 3	93	2635	95	2690	Section 3.3.3.2, despite being rather lengthy, is missing text on extinction risk. Recommend using the mammal text (Section 3.3.3.1) as a template on which to base an equivalent section for birds.	We edited the section thoroughly, and it now includes data on threat status.
Douglas Nakashima	Chapter 3	93	2635			3:3.3.2. Birds Hiltunen et al. 2004 (Northern Sweden) : (p 266-267) Observations from a Sami reindeer herder: ""But those, who have increased the most over this period of time, are the swans. When I was little, there were few swans. When you saw a swan... it wasn't exactly a sensation, but when there was a nesting swan, it was news when you came home. But nowadays they are everywhere - yesterday morning we were flying over marshlands (in a helicopter) and I saw fifty of them. We counted them, they were in two lakes. Here they have large marshlands to dwell." "And those, who have actually diminished, are the small birds, that chirp in springtime... I'm not familiar with their names, but... a number of springs have been incredibly quiet - or maybe they have chirped, but they have been so few. It's unknown where it results from, because in these parts there are a lot of marshlands and thus lots of mosquitoes (Aedes) every year, so the birds should have food. It could be something that happens before they arrive here or that the nesting goes wrong or something". On the other hand, there are sightings of new bird species every year. [Rune Stokke, chairman of Uđta sameby Mustonen, Zavalko et al. 2004 (Kola Peninsula, Russia): (p326) "The birds are about the same as they have always been but their numbers are decreasing all the time. Yes, there is very little birds nowadays. It used to be ptarmigans on top of every brush. Nowadays it is not like that anymore and it feels bad. To give you an example, in earlier times I was sitting and watching the herd. I tapped my foot on the ground and a ptarmigan would fly to me. When I would say "Kop kop" to it, it would come so close I could even hold it. Then I said again "Kop kop" and it took off. There is very little goose now. It used to be that they were all over. Before, when we were at the camp and we would see geese we would know the arrival of spring. Nowadays we see no geese. Occasionally one or two flocks fly over but this is a rare event. There are no birds of prey anymore. Very small number of those remain. Every one has disappeared somewhere. We used to see northern goshawks, they would fly high and scream. It was nice to follow them in the sky. All of them have disappeared and I do not know where." Arkady Khodzinsky, 21st April 2002, Reindeer herder, Reindeer's farm "Tundra", Brigade number 9, Lovozero ; (p326) "It is very interesting that we used to have lots of swifs. They are no longer here. Have they disappeared? I think they have. We used to see them always on the beaches. But now they have disappeared somewhere. The same has happened with terns. Near the island of Vitsj they have almost disappeared." Vladimir Phillippov, 9th June 2002, The state farm "Tundra", Reindeer herder of Brigade number 2, Lovozero	We included a general reference to ILK in regard of its use to gain insights on bird trends and threats.
Douglas Nakashima	Chapter 3	93	2635			Salin et al. 2004 (Finland): (p277) "Veiko Magga stressed that small birds seem to have disappeared and have not been seen for "many summers now". Nilla Nikodemus, an Elder, voiced his observations: "There used to be more birds, such as capercaillies, ptarmigan and others. We needed not go far to hunt them. We trapped ptarmigans here on the riverbank. They used to come sit on the field and on the nearby birch trees. But I have not seen them like that for decades. Yeah, I don't know why this has happened. It is not because of hunting. It could be that there are now more roads winding here, more hunters have arrived, massive amounts. As it was only locals hunting before; the numbers stayed. We used to hunt everything; pine martens, squirrels, ermines - everything!"; (p277) "Heikki Hirvasvuopio talked about the disappearance of birds in Kaksilahten. "Especially the ground birds, we could be talking about extermination almost when compared to the past amounts. I used to hunt quite much alongside reindeer herding back in those days so I have a good idea of the stocks. We can not even talk about the same amounts during the same day. This is true especially with ptarmigans, capercaillie and ground birds. With small singing birds the same trend is noticeable. Nowadays it is silent in the forest - they do not sing in the same way anymore. It used to be that your ears would get blocked, as the singing was so powerful before. They [singing birds] have disappeared completely as well!"; (p277) "In Vuosto Sakari Keskitalo and Isakki Magga agree with Heikki Hirvasvuopio's words. Birds have disappeared almost completely particularly in the last 20 to 30 years of time. They remember that in the 1950's you just needed to select the bird to shoot while going outside. There was no need to wander even to the forest. Nowadays you have to walk many kilometers to see them. There used to be hundreds of birds in a flock during fall time. Sakari and Isakki felt that especially grouse birds have diminished in numbers." (p293) "Ilmari Vuolab [reindeer herder at the Kalsoaivi reindeer herding area] had noted that duck birds were increasing again after a time when all kinds of duck birds were disappearing from the region. "But then again, what we call sea birds, like long-tailed ducks, velvet scoters and commons scoters - they are all gone. There used to be great flocks of them and now they are so few."; (p293) "Hans Kittil [lives in the village of Karigasniemi, former reindeer herder, since 1949]] is frightened to notice the change in the volume of birds. "Bird singing has disappeared. In the spring if you go to the mires, it is nothing compared to the old days. There used to be all kinds of birds... it is so empty nowadays. And I don't understand the protective measures applied on species that eat all beneficial game. And beneficial are the fell area species like rabbit and ptarmigan. Now there are only ravens croaking." (p293) "Nillas Vuolab [Former reindeer herder] recalls the nature having lost a lot. "It is poorer now. Summer time migratory birds are so few these days. We can find almost all species, but the numbers are not like in the past. We used to have flocks of sea birds and ducks but not anymore. And it is not that long ago, still after the war the spring migration was great. I don't know why this is so but I think they might be wiped out excessively where they spend the winters, in the south. Maybe that prevents them from returning here. Ptarmigans are less these days too, but we still have them".	We included a general reference to ILK in regard of its use to gain insights on bird trends and threats.
Douglas Nakashima	Chapter 3	93	2635			Nieminen et al. 2004 (Faroe islands, Denmark): (p250) "Another observation concerning people in the Faroe Islands, is the amount of birds. For instance, Rene Hansen has first hand knowledge about the birds, because he has been hunting them for many years. "There's less birds than it used to be. I don't know what's the trouble. We think it's the food [of the birds]". [Rene Hansen]	We included a general reference to ILK in regard of its use to gain insights on bird trends and threats.
Douglas Nakashima	Chapter 3	93	2635			Mustonen 2005 (p18) [observations reported by Kyrill Zavalko, young student and researcher of climate change. Andrei Julin a Sami reindeer herder from the tribal community of Piras made the following observations of changes in Kola Peninsula (Sami area) Sámi reindeer herder: (p18) "The birds of prey have decreased."	We included a general reference to ILK in regard of its use to gain insights on bird trends and threats.
Andriy-Taras Bashta	Chapter 3	93	2636	93	2640	Proposed paragraph change: "Most of the large-scale, long-term studies (Gregory et al. 2007, Rief 2013, Vickery et al. 2014, Lorgensen et al. 2016) as well as many smaller studies report decline in either species richness or populations, and a recent large-scale analysis by the European Bird Census Council revealed overall decline of bird abundance in Europe (EBCC 2013)."	We edited the paragraph as suggested.
Maximilian Weigend	Chapter 3	94	2650	94	2652	here and in other places a time-scale is missing. The major decline of farmland birds in WE surely predates that in CE and EE	We added when necessary information about time scale (e.g. years of trends).
Andriy-Taras Bashta	Chapter 3	94	2650	94	2667	Paragraph 2650-2653 not agreed with the paragraph 2667-2671 concerning "stability"-non-stability? of forest bird communities.	We do not see the disagreement - the paragraph line 2650 mentions relative stability of forest birds between geographical regions, the paragraph lines 2667 reports on local vs. large-scale effects of forest management
Germany	Chapter 3	94	2650	94	2652	here and in other places a time-scale is missing. The major decline of farmland birds in WE surely predates that in CE and EE	We added when necessary information about time scale (e.g. years of trends).
Maximilian Weigend	Chapter 3	94	2659	94	2662	Please specify the hybridization of birds with explicit examples, this is fairly surprising	We provided three examples, unfortunately we cannot expand further.
Frederic Lemaitre	Chapter 3	94	2663	94	2666	While land-use change is recognised as a common driver of declines in terrestrial bird populations, some studies suggest that a the magnitude of range shifts due to climate change is far greater than the impact of land use change, for example with land conversion to woody bioenergy plantations within the European Union: based on a comparative study of climate change effects and land use change due to bioenergy production for 156 European bird species by 2050, and that the mitigation of climate change would reduce the exposition of species (see Meller L, Thuiller W, Pironon S, Barbet-Massin B, Hof A, Cabeza M, 2015. Balance between climate change and bioenergy: conservation implications for European birds. Global Change Biology – Bioenergy, 2015 Jul 1; 7(4): 741–751	We acknowledge the effect of mitigation strategies on biodiversity. However, bioenergy production is indirectly "climate" but directly "land use" - and evidence of the effect is still small compared to the breadth of effect of land-use change.
Allan Watt	Chapter 3	94	2668	94	2672	Silvicultural practices vary greatly: take care in generalising.	Silvicultural practices do vary, but there is definite consensus in the literature about detrimental effect on bird diversity of conversion from unproductive to productive forest.
Frederic Lemaitre	Chapter 3	94	2673	94	2679	Please also consider the climatic debt of species (e.g. birds and butterflies as demonstrated in Europe): yearly change (for 1990–2008) in the community composition in response to climate change of bird and butterflies (respectively 9,490 and 2,130 communities studied across Europe is equivalent to a 37 and 114 km northward shift. However, the northward shift in temperature in Europe was even faster, leaving a "climatic debt" of birds and butterflies corresponding to a 212km and 135 km lag behind climate (by Devictor et al. (2012). Differences in the climatic debt of birds and butterflies at a continental scale, Nature Climate Change 2: 121-124	Climatic debt is an interesting topic, which indeed has been shown to affect bird range-shifts, and will be emphasized in the "future trend" section. However, as mentioned in the assessment, little evidence exists showing that climate has threatened bird populations in the past or recently.
PESC-3	Chapter 3	94	2674			Non-sense sentence	We deleted that sentence, as suggested.
Andriy-Taras Bashta	Chapter 3	94	2674			delete sentence: "Climate-change.....not as often".	This has been completely rewritten.
Allan Watt	Chapter 3	94	2681	94	2682	Are these isolated reports or an assessment of the impact of pesticide use? If the latter, more evidence is needed.	The references point to isolated studies, as no general assessment exists, as far as we know. We welcome suggestions from reviewers.
Andriy-Taras Bashta	Chapter 3	94	2686			incl. the forest grouse (Galliformes). Bashta A.-T., Khymin M. 2008. Kuraki leśne na terenie zachodniej Ukrainy [Forest grouse at the territory of the western Ukraine]. In: Ochrona kuraków leśnych [Conservation of the forest grouses]. Warszawa: Centrum Informacji Lasow Państwowych, 294-303 [in polish].	Disagree. Climate change will cause to some changes in spread of heathlands due to process of vegetation zone shifts. Not more wide spread.
Allan Watt	Chapter 3	94	2687	94	2688	The use of the term "indirect effects" suggests an accidental impact but there is evidence from many studies of deliberate killing of, in particular, birds of prey. A more complete assessment of this threat (and others) should be included.	Added

Allan Watt	Chapter 3	95	2691	95	2707	Another very early draft. General comments above (on mammals and birds) apply here. This section introduces a third source of information on status, the Habitat Directive, further emphasising the need for consistency. I would recommend that all relevant sources of information are included.	A good comment. This issue should be decided by the top management team.
PESC-3	Chapter 3	95	2692			delete first sentence, 1st too general	By the end of the century. Added
Andriy-Taras Bashta	Chapter 3	95	2692	95	2695	delete sentence: "Reptiles are.....of the marine turtles".	By the end of the century. Added
Allan Watt	Chapter 3	95	2693			lizard?	It should be also added. Needs to find references.
Allan Watt	Chapter 3	95	2695			Not 2009 (but see below).	A mistake. Deleted.
Allan Watt	Chapter 3	95	2709	98	2783	A much more detailed draft than the previous ones but requires editing so that (I suggest) the various introductory comments come first, followed by assessments of status on trends, followed by text on drivers. In contrast to previous sections, it is useful to have different sources of information on trends in this section (but it needs to be presented together in the text).	For the structuration of the sub-sections, we leave that to the CLAs to allow consistency throughout the chapter
Thomas Brooks (IUCN)	Chapter 3	95	2709	98	2783	Section 3.3.3.4, despite being rather lengthy, has only one sentence (L2716-2718) on extinction risk. This sentence is good as far as it goes, but recommend using the mammal text (Section 3.3.3.1) as a template on which to base some equivalent text for amphibians.	This section is a general overview. It has now been simplified and cut down where appropriate to make it less lengthy while still remaining a general overview. However, there is a specific section on Amphibians and extinction risk Line 3014.
PESC-3	Chapter 3	95	2712	95	2716	delete first two sentences, too general	Done
Andriy-Taras Bashta	Chapter 3	95	2712	95	2716	delete: "Amphibians are.....(EU, 2009)."	Done
Allan Watt	Chapter 3	95	2714			EU 2009 not in the reference list. Does this refer to the EC report listed?	Removed
PESC-3	Chapter 3	95	2716			explore 22% of amphibians to illustrate threats, butterflies for invertebrates	We are not quite sure to understand the comment. Please specify.
PESC-3	Chapter 3	95	2719			MS should be EU countries	Done
Maximilian Weigend	Chapter 3	96	2722	96	2735	Here and elsewhere pesticides are completely omitted from the causes of the loss of biodiversity. Either this phenomenon is here shamefully hidden under "pollution", which I believe to be incorrect, or it has been completely overlooked. Especially for amphibians pesticides likely are a major factor for their decline. If the authors disagree, they should spell this out.	We have now specify pesticides and separated it from pollution Line 3191. However, there is no current consensus on the actual level of impact of pesticide on amphibians.
Germany	Chapter 3	96	2722	96	2735	Here and elsewhere in the chapter pesticides are not discussed among the causes of the loss of biodiversity. Either the role of "pesticides" is fully covered under "pollution", or this factor deserves a much stronger discussion here. Especially for amphibians pesticides likely are a major factor for their decline. If there are contrasting views, this should be spelled out clearly.	See previous comment
Andriy-Taras Bashta	Chapter 3	96	2729	96	2730	delete: "In fact,.....for reproduction."	Done
PESC-3	Chapter 3	96	2739	95	2748	para is too scientific for stakeholders	The paragraph has been modified to make it more accessible to stakeholders
Maximilian Weigend	Chapter 3	97	2754	97	2758	I can't distinguish the two types of green (11-30 and 31-50 species). To me the map looks like amphibian diversity is identical from Kamtschatka to Portugal - is this the message of the map?	We have included a new map hoping that the colour chart will be easier to see. However, we are constrained by the size of the map we can include. A link is provided to the site where an interactive map can be consulted.
Germany	Chapter 3	97	2754	97	2758	The message of this map is not clear, please reconsider the color codes, especially the two types of green (11-30 and 31-50 species).	See above comment
Thomas Brooks (IUCN)	Chapter 3	97	2755	97	2758	Why present a map of amphibian species richness a) for just Europe, when data are available globally and thus across the ECA region (from the Red List); b) by watersheds, when species by species distribution data are available. Also, recommend using similar maps for each taxonomic group. Finally, species richness is in any case not a very policy relevant metric to map; threatened species richness would be more relevant, or range-size rarity. Recommend either deleting this figure, or replacing it with one that spans the region, uses a raster rather than watersheds, and is consistent with maps used for the other taxa sections in Section 3.3.3 (e.g. Figure 3.36, L2800).	The figure has now been replaced to include the whole of the ECA.
Germany	Chapter 3	97	2768	98	2783	Threats for amphibians. Does any hunting problem exist?	Locally, there are some reports that some amphibian species are collected from the wild. However, in light of the other threats hunting remain across the ECA limited and the impact on population size fairly speculative.
Frederic Lemaitre	Chapter 3	97	2769	97	2774	On the chytrid fungal disease (not "chytrid a fungal disease"), please consider referring to the work of Bosch J, Martinez-Solano I, Garcia-Paris M. (2001) Evidence of a chytrid fungus infection involved in the decline of the common midwife toad (Alytes obstetricans) in protected areas of central Spain. Biological Conservation 97 : 331-337 + as well as Fisher MC, Stajich J, Farrer RA. Emergence of the chytrid fungus Batrachochytrium dendrobatidis and global amphibian declines (2012) in Evolution of Virulence in Eukaryotic Microbes. Eds Heitman J, Sibley D and Howlett B + also acknowledge that this chytrid disease is expanding its range and affecting new taxa as demonstrated by Martel A, Bloor M, Adriaensens C, Van Rooij P, Beukema W, Fisher MC, Farrer RA, Schmidt BR, Tobler U, Goka K, Lips KR, Muletz C, Zamudio K, Bosch J, Lötters S, Wombwell E, Garner TWJ, Cunningham AA, Spitzen-van der Sluijs A, Salvidio S, Ducatelle R, Nishikawa K, Nguyen TT, Kolby JE, Van Bocklaer I, Bossuyt F, Pasmans F (2014). Recent introduction of a chytrid fungus endangers Western Palearctic salamanders. Science Vol. 346 no. 6209 pp. 630-631 DOI: 10.1126/science.1258268	Text edited and reference included. Line 3239
Maximilian Weigend	Chapter 3	98	2777	98	2783	Please sort out the comments on reptiles and move to corresponding chapter.	done
Allan Watt	Chapter 3	98	2784	101	2847	Incomplete: general comments above apply here too. Lack of supporting evidence and/or references notable here e.g. 2837-2847 has no supporting evidence.	We have extensively revised this section and provided supporting references throughout in our revisions.
Thomas Brooks (IUCN)	Chapter 3	97	2785	98	2801	This section is good. For sharks and rays, tarpons and ladyfishes, parrotfishes and surgeonfishes, groupers, tunas and billfishes, hagfishes, angelfishes, blennies, butterflyfishes, picarels, porgies, pufferfishes, seabreams, sturgeon, and wrasses it can be expanded comprehensively across the ECA region (because these taxa have been globally assessed).	thank you
Thomas Brooks (IUCN)	Chapter 3	98	2803	98	2803	Change "amphibians" to "freshwater fish".	Done
Thomas Brooks (IUCN)	Chapter 3	99	2808	99	2808	Add "assessed as threatened" (for Europe, all freshwater fish species have been assessed for the Red List).	Done
Maximilian Weigend	Chapter 3	100	2816	100	2828	Please add a map of range size, showing where the endemic species are located, that are of particular conservation relevance.	The map of Threatened species is presented Line 3296. We think that such information is more relevant than just a map of endemic as some endemic are not threatened and some threaten species are not endemic. However, the Figure 3.38 is highlight quite clearly the are of particular conservation relevance.
Germany	Chapter 3	100	2816	100	2828	Please add a map of range size, showing where the endemic species are located, that are of particular conservation relevance.	See above comment
Thomas Brooks (IUCN)	Chapter 3	100	2817	100	2823	No need for both figures. Figure 3.38 is more comparable and policy relevant, so recommend retaining this and deleting the other one.	This contradict previous comment?
Magali Gerino	Chapter 3	101	2842	101	2844	Now days pollution remains with medical residues and micro-organics pollutants	Agree. We have remove ", in particular in the seventies and eighties." Line 3316
Maximilian Weigend	Chapter 3	101	2844	101	2847	I would expect eutrophication to have a catastrophic effect, and pesticide run-off. This should be spelt out here. Especially in more arid countries, this will compound the water removal etc.	Of course Eutrophication is an issue for freshwater ecosystem. However, as we indicate in the text this is across Europe a much less current issue due to a great deal of effort in improving water quality. It is far from being perfect though. That means that locally, there may not be such eutrophication issue. However, we have mentioned that water quality is more of an issue in the Central Asian part of the regional assessment and we indicated an increase in organic pollution with about 20% of untreated sewage directly discharged in rivers (Koronkevich et al., 2003, Danilov-Danilyan, 2009. However we do not have statistic on impact of eutrofication on FW fishes in Central Asia. I am not sure that such statistics exists. Clarifications have been included Line3322.
Germany	Chapter 3	101	2844	101	2847	What about eutrophication and pesticide run-off? Especially in more arid countries, this will compound the water removal etc. Can you elaborate more on that?	Of course Eutrophication is an issue for freshwater ecosystem. However, as we indicate in the text this is across Europe a much less current issue due to a great deal of effort in improving water quality. It is far from being perfect though. That means that locally, there may not be such eutrophication issue. However, we have mentioned that water quality is more of an issue in the Central Asian part of the regional assessment and we indicated an increase in organic pollution with about 20% of untreated sewage directly discharged in rivers (Koronkevich et al., 2003, Danilov-Danilyan, 2009. However we do not have statistic on impact of eutrofication on FW fishes in Central Asia. I am not sure that such statistics exists. Clarifications have been included Line3322.
Axel Hochkirch	Chapter 3	101	2848	102	2869	Why is the section on invertebrates so much shorter than those on vertebrates. The data has been published in a similar format as for the vertebrates (i.e. European Red Lists for the respective taxa), so I think one can present more information from these sources.	The current section is more or less the same extent as for the freshwater fishes. What could be included is a section on Marine invertebrates.
Douglas Nakashima	Chapter 3	101	2848			3.3.3.6. invertebrates	All subheadings and section numbers were checked carefully.

Douglas Nakashima	Chapter 3	101	2848			Hiltunen et al. 2004 (Northern Sweden): (p268) Observations from Sami reindeer herders: "In 2002 there were surprisingly few mosquitoes in Udtja, "even there where I have my summerplace, although there are so many bogs, small ponds and puddles and everything there." The latest tendency with the occurrence of insects has been that they appear earlier than usually. "Black fly (Simuliidae) and the smallest - I don't know if you have that insect - biting midge (Culicoides), a little devil that bites horribly. The black fly can appear before midsummer and that's a bit unusual. The mosquitoes appear first - that's the usual (occurrence) - and the biting midge last, in August or beginning of September". [Rune Stokke, Udtja sameby chairman] (p268) "" Mosquitoes have always come after the frost and in August the black flies have turned up, but now they start to appear already in June" [Gun Aira] Mustonen, Zavalko et al. 2004 (Kola Peninsula, Russia): (p327) "There is much less mosquitoes, this is great! Mosquitoes have grown less in number, but small flies have increased here. Insects have been changing, there is less now..." - Larisa Pavlovna Avdejeva, 23rd September 2001, Director of the Sami Culture Center, Lovozero. "I cannot comprehend that there are no mosquitoes. I think for two years now there have been no mosquitoes. In recent times they have not troubled us at all. Here in Lovozero it will be soon like down south. Before there were insects and they would sting you, but we no longer need mosquito hats even. The biting midges come in August usually. This year there has not been biting midges nor mosquitoes at all. Of course this is bad. I think they have disappeared from the northland altogether." - Arkady Khodzinsky, 21st April 2002, Reindeer Herder, Reindeer's farm "Tundra", Brigade number 9, Lovozero Salin et al. 2004 (Finland): (p278) ""Last summer was such that there were no mosquitoes nor gadflies during the whole summer" stated Veikko Magga. Niila Nikodemus on the other hand pointed out that the number of insects depended on a particular summer. "If it is a rainy spring time, they will be plenty but if it turns out to be a dry spring, hardly any will come". Heikki Hirvasvuopio had similar observations as Veikko Magga. According to Heikki both mosquitoes and gadflies have disappeared. "Especially this is true with gadflies, nowadays they are very few. Back then when the vermin were aplenty, that was what made the reindeer move up on those big fells." (p294) ""Niillas Vuolab described with a great accuracy the deadly impact of caribou nostril flies and gadflies on the reindeer. Sometimes the impacts had been fatal as the caribou nostril flies blocked the throat of the reindeer. This was affecting especially the calves. Gadflies were not as severe on their effects but in the hot summer air there used to be a yellow cloud following the reindeer as they moved. "Nowadays all insects are so few. I haven't seen too many gadflies during a summer now. Niillas' son Ilmari Vuolab was on the same track. "Gadflies and all insects have diminished a lot. I remember stories how there used to gather clouds of insects on people's yards. You could tell who had cattle, cows and sheep by the amount of insects buzzing around the yard. But I think all insects are less today." (p294) "Hans Kittl has observed disappearance of wasps and decrease of bees. "I miss wasps. In summers I go to places where there used to be wasps, but there are none anymore. I was afraid of wasp stings before but now I'm lucky if I can find one of them. I think butterflies have gone too. We used to have so many different kinds of butterflies, now they are very few". Mustonen 2005 : Observations by Viatcheslav Kemili, a traditional Chukchi reindeer herder from Nutendli, Republic of Sakha-Yakutia, Russian Federation: (p20) "We used to migrate north slowly to reach the sea. Now we reach it very fast because of the mosquitoes that bother the reindeer."; "Observing lots of single polar bears wandering along the shore that used to hibernate."			thank you for these references, they will be included in the final version
Allan Watt	Chapter 3	101	2849	102	2862	Very superficial, even at this stage, given the amount known about this taxon.		the whole section on invertebrates has been entirely rewritten and improved	
Thomas Brooks (IUCN)	Chapter 3	101	2849	101	2858	This section is good. Add a couple of sentences discussing prevalence of extinction risk. What % of species are threatened? What % Data Deficient? A map of threatened species would also be useful.		we'll do that for the final doc. Note that only a small minority of invertebrates have been assessed therefore prevalence of threatened taxa may not be indicative of their overall conservation status which is largely unknown	
Maximilian Weigend	Chapter 3	101	2855	101	2858	due to extensive habitat restoration and conservation in much of WE in the past 20-30 years we need additional explanations. One of them is here: Gilburn AS, Bunnefeld N, Wilson JM, Botham MS, Brereton TM, Fox R, Goulson D. (2015) Are neonicotinoid insecticides driving declines of widespread butterflies? PeerJ 3:e1402 <a href="https://doi.org/10.7717/peerj.1402">https://doi.org/10.7717/peerj.1402</a>		thank you it'll be added	
Germany	Chapter 3	101	2855	101	2858	Due to extensive habitat restoration and conservation in much of WE in the past 20-30 years there are additional explanations. One of them is here: Gilburn AS, Bunnefeld N, Wilson JM, Botham MS, Brereton TM, Fox R, Goulson D. (2015) Are neonicotinoid insecticides driving declines of widespread butterflies? PeerJ 3:e1402 <a href="https://doi.org/10.7717/peerj.1402">https://doi.org/10.7717/peerj.1402</a>		thank you it'll be added	
Frederic Lemaître	Chapter 3	101	2857	101	2857	It should read "Devictor et al. 2012"		thank you	
Allan Watt	Chapter 3	102	2863	102	2869	As above. Recent work done by IPBES could have been easily summarised here.		This comments need to be more specific. We may well have already responded but the comment is currently too vague to provide a specific response.	
Thomas Brooks (IUCN)	Chapter 3	102	2863	102	2870	This section is good. Add a couple of sentences discussing prevalence of extinction risk. What % of species are threatened? What % Data Deficient? A map of threatened species would also be useful.		The publication is not ready yet.	
Allan Watt	Chapter 3	102	2871	103	2912	General comments above also apply here but this is a more complete section, with a more detailed assessment of status presented. Nevertheless, much more information is available and could have been included. The main source of information – IUCN experts – is usefully mentioned, as it should have been elsewhere where relevant.		There are quite statistic included in this section with % of threatened, % of data deficient, also the number of FW crabs, crayfish etc. Do you want a Table?	
Axel Hochkirch	Chapter 3	102	2871	203	2912	This part is much better than those on bees and butterflies!!! I am not quite sure when the publication is planned, but the Red List of Orthoptera will be published by the European Union in September 2016! So, if possible, it should be included!		thank you we'll add information on Orthopteran for the final version	
Thomas Brooks (IUCN)	Chapter 3	102	2871	103	2912	This section is good, although needs some thorough editing. Freshwater caridean shrimps, freshwater crabs, and freshwater crayfish have been assessed comprehensively globally for the Red List, and so for these, comprehensive statistics on prevalence of extinction risk for the full ECA region should be added. What % of species are threatened, what % are Data Deficient, etc? A map of threatened species would also be useful.		There are quite statistic included in this section with % of threatened, % of data deficient, also the number of FW crabs, crayfish etc.	
Allan Watt	Chapter 3	103	2913	104	2932	Clearly very incomplete.		the section on higher plants has been entirely rewritten	
Douglas Nakashima	Chapter 3	103	2913			3.3.3.7. Higher plants Salin et al. 2004 (Finland) : (p294-295) "Pickin 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. Ilmari, though "a lazy berry picker" claimed that "there are less cloudberries when compared to the older times. Last summer [2001] was a good year but there could have been four or five poor cloudberry years. One after another. It is more rare to have a good year." Elina pointed out that generally there is less cloudberry in the areas where they used to grow. " Mustonen, Zavalko et al. 2004 (Kola Peninsula, Russia)(p325) "In September 2001 Larisa Ajedeva spoke to us about the changes in plant life: New species of plants have arrived. We never saw them before. This is what we have observed. New plants have arrived here and on tundra. Even there are arrival species in the river, previously known in middle parts of Russia. This summer and the previous were very hot here. Rivers and lakes are filled with small-flowered a kind of duckweed, and the lake started to bloom. Life of the fish is more difficult and likewise peoples fishing opportunities as lakes grow closed up with the new plants. We have observed that the trees in our village grown much faster. New unknown plant species have arrived here in great numbers. New bird species have arrived here. As well, the birds stay in our village longer than before. Some new beautiful never-before seen birds have arrived." Larisa Pavlovna Avdejeva, 23rd September 2001, Director of the Sami Culture Center, Lovozero" (p326) "For example we have now water lilies in our river Virma. None of that was before. As well we have seen plantains. Here in Lovozero we have many plantains now and none before. Especially on the river and lake shores you can see new species of plants on the tundra." - Larisa Pavlovna Avdejeva, 9th June 2002, Director of the Sami Culture Center, Lovozero		I now wrote the chapter on higher plants for the SOD.	
PESC-3	Chapter 3	103	2914	103	2915	include the extinction risk for higher plants and info on endemic species, hotspots, economically important tree species		I now wrote the chapter on higher plants for the SOD and addressed these points.	
Maximilian Weigend	Chapter 3	103	2914	103	2915	relatively good data bases are available on a global scale, overall patterns of diversity for ECA should be compiled from that. A differential discussion of the taxa of PNV should be made, and forest species should be treated separate from wetland, grassland and aquatic species, so as to permit clear parallels to the respective animal groups (amphibians, butterflies, fish, woodland birds, farmland birds etc.)		I now wrote the chapter on higher plants for the SOD and addressed these points.	
Mark Snethlage	Chapter 3	104	2924	104	2925	Sentence unclear: "Species range changes only started to be documented and are mainly due to change in land use and occurred sometimes southward (Vogt-Schilb et al. 2015)."		As I did not write this section, this comments does not apply to me (Steffen Boch)	
Maximilian Weigend	Chapter 3	104	2927	104	2927	The countries named have orchids largely restricted to man-made habitats, the same is true for Germany. These can be discussed together with the flora of the man-made grasslands. There is only a handful of taxa in PNV, such as Cephalanthera and Neottia in deciduous forests. The situation is similar in CE, but may be completely different in parts of EE and CA and certainly is an entirely different story in the Mediterranean and the alps. So, the topic either has to be elaborated thoroughly, or has to be subsumed under a chapter for the grasslands, woodland orchids should be treated under the woodland flora chapter.		As I did not write this section, this comments does not apply to me (Steffen Boch)	
Germany	Chapter 3	104	2927	104	2927	The countries named have orchids largely restricted to man-made habitats, the same is true for Germany. These can be discussed together with the flora of the man-made grasslands. There is only a handful of taxa in PNV, such as Cephalanthera and Neottia in deciduous forests. The situation is similar in CE, but may be completely different in parts of EE and CA and certainly is an entirely different story in the Mediterranean and the alps. So, the topic either has to be elaborated thoroughly, or has to be subsumed under a chapter for the grasslands, woodland orchids should be treated under the woodland flora chapter.		As I did not write this section, this comments does not apply to me (Steffen Boch)	
Allan Watt	Chapter 3	104	2933	107	3047	Much more complete than other sections and I would not recommend substantial reduction of length: the introductory text (what bryophytes are, how many species etc.) is a good model for other sections.		Thank you, I also think that a short introduction, the number of species occurring in a particular region and the percentage of endangered species for every taxon could be interesting and helpful. However, as all taxon section needed to be harmonized in style and length, I now reduced the length quite a bit. However, I tried not to lose important information. I further split the text into two parts: 1) past and current trend, and 2) future trends.	
Douglas Nakashima	Chapter 3	104	2933			3.3.3.8. Briophytes Salin et al. 2004 (Finland): (p295) "Hans Kittl expressed his worry over the disappearing moss. "It is worth noticing that moss is disappearing. Pollution must have something to do with this. There used to be a thick layer of moss, so thick it was difficult to walk over. Nowadays there are no mosses, it is hard to find any".		The statement in Salin et al. (2004) leaves some questions open, as 1) no particular habitat type is mentioned 2) and the type of pollution is not defined. I can imagine that this is a rather local problem. However, I cited several references pointing out that pollution and land-use related changes are causing decreases of population size and species richness at the subregional level. The cited European Red Data Book of Bryophytes (Hodgetts 2015) used the IUCN criteria, meaning that declining abundances and population sizes are considered.	

Allan Watt	Chapter 3	106	3030	106	3031	Mention of Ellenberg values would require some explanation for the readers and should probably be deleted. Next line should read "...to the diversity..." I presume.	I deleted this part of the sentence, which now reads: "Further future threats also involve other global change components such as climate-warming scenarios. There is already a trend of expanding distribution ranges of warm-loving bryophyte species to the north and to higher altitudes. Across Europe, oceanic bryophytes will be particularly threatened by climate change ..."
Allan Watt	Chapter 3	107	3048	110	3159	Another section that is much more complete than most. Some reduction in length would be sensible (e.g. delete lines 3070-3071).	Thank you again. But also this section needed some shortening without losing important information. Also here, I split the text into two parts: 1) past and current trend, and 2) future trends.
Allan Watt	Chapter 3	110	3160	112	3205	Very rough and requires both editing (see previous sections as examples of how this could be done) and supporting evidence, which is extremely limited here.	The whole section on fungi will be rewritten at the third author meeting
PESC-3	Chapter 3	110	3165	110	3171	It should read: The whole kingdom Mycota is divided in three sections.	The whole section on fungi will be rewritten at the third author meeting
PESC-3	Chapter 3	111	3200			delete sentence	The whole section on fungi will be rewritten at the third author meeting
Sophie Condé	Chapter 3	112	3206	116	3304	Extinction risk: should be added that at regional/national level some species can be threatened and not at Global level and vice-versa	Thank you for the comment. We agree that both sets of informations are valuable, including global threat status in countries/regions where species are least concern/abundant, these countries/regions, hold large responsibilities for globally threatened species. We'll aim to complement this info with national and regional red-list data where possible for the final assessment.
Allan Watt	Chapter 3	112	3206	116	3304	This section overlaps with previous sections to the extent that some information is repeated. It could perhaps be included in an introductory section to the sections on various taxa (from mammals onwards) with repetition removed. However, other data/studies contribute to this assessment and these should be accorded relevant prominence.	We have aimed to eliminate any overlap and use this paragraph to give an overview across all taxa and ECA rather than repeating what said for individual taxa
Thomas Brooks (IUCN)	Chapter 3	112	3206	116	3304	Excellent section! I wonder if it would be worth moving this section up to become the introduction to Section 3.3.3, given that it integrates data from across all taxonomic groups, where these are available ECA-wide?	Good suggestion which we have followed, now this is the intro to the section
Axel Hochkirch	Chapter 3	113	3226	113	3229	I am not sure, why these species are highlighted here - probably because of their flagship function, but I wonder if this is the right publication to name any subjective priorities. It is evident that invertebrates are completely missing, even though some highly charismatic invertebrates are also on the IUCN Red List, like the Crau Plain Grasshopper or the Las Desertas Wolf Spider.	Only comprehensively assessed taxa are considered here, therefore spiders and orthoptera were not an option. Any choice of species would have been arbitrary and the author opted for species that are widely known also to non-experts.
Germany	Chapter 3	114	3249			Figure 3.40. The abbreviations should be explained. The orientation of the columns from East to West or West to East may be good.	The abbreviations are explained in the heading of the paragraphs just below the figure, we therefore felt that this was not needed
Harald Pauli	Chapter 3	115	3252	116	3304	Out of the 2,493 species that are present in the ECA region, of what kind of organism groups you speak here?	These are the species in groups having at least 90% of described species assessed, it is explained in the second sentence of this section
Andy Purvis	Chapter 3	115	3253	116	3304	2493 vertebrate species? Red Listed species? Not clear what these species area	These are the species in groups having at least 90% of described species assessed, it is explained in the second sentence of this section
Andy Purvis	Chapter 3	115	3268	115	3293	Very formulaic writing - might be better as a table?	Good point which we will follow up on for the final document after SOD revisions
Santosh Kumar Mishra	Chapter 3	116	3305	116	3306	Under section 3.4.1 Introduction (Page 116, Line 3306), add the following information before 1st paragraph (starting with sentence: Quantifying the effects of direct and indirect drivers on biodiversity and ecosystems has triggered the.....): Critical processes at the ecosystem level influence plant productivity, soil fertility, water quality, atmospheric chemistry, and many other local and global environmental conditions that ultimately affect human welfare. These ecosystem processes are controlled by both the diversity and identity of the plant, animal, and microbial species living within a community. Human modifications to the living community in an ecosystem - as well as to the collective biodiversity of the earth - can therefore alter ecological functions and life support services that are vital to the well-being of human societies. Substantial changes have already occurred, especially local and global losses of biodiversity. The primary cause has been widespread human transformation of once highly diverse natural ecosystems into relatively species-poor managed ecosystems. Such reductions in biodiversity can alter both the magnitude and the stability of ecosystem processes, especially when biodiversity is reduced to the low levels typical of many managed systems. Reference: Ecological Society of America (1999). Biodiversity and Ecosystem Functioning: Maintaining Natural Life Support Processes. Issues in Ecology, No. 4. Fall 1999, Washington, DC: Ecological Society of America.	thank you for the reference and suggestions. We feel that this is more relevant for the section relating biodiversity with ecosystem functioning (3.4)
Germany	Chapter 3	116	3305	120		This section addresses SDG and Aichi Biodiversity Targets. They appear a bit "unlinked" to the previous content of the chapter. They should have a more prominent role. The scientific findings presented in the biomes and taxa sections should be assessed in relation to these targets.	Aichi and SDG targets have now a stronger role throughout the chapter and are referred to in the executive summary and the SPM.
Mark Sneathlge	Chapter 3	116	3324			"Description of these scenarios, and which archetype they conform to, are in chapter 4." -> "chapter 5" I would think?	the descriptions are in chapter 5
Thomas Brooks (IUCN)	Chapter 3	117	3336	118	3336	A useful and accurate table.	thank you, we decided to move this info to chapter 1 however
Douglas Nakashima	Chapter 3	118	3338			Some studies report how global changes in climate are affecting the predictive capacity of local populations: Mustonen, Zavalok et al. 2004 (Kola Peninsula, Russia): (p328) "When we ask the Elders and reindeerherders for example what kind of summer it will be, how much berries to expect or what kind of fish and how much to expect they answer us that they cannot predict anything because our Sami calendar of yearly cycle has collapsed completely because of the changes that have taken place in the nature. They cannot foresee accurately and with precision. Before we could ask the reindeer herders and the answers would be right to the mark but now the predicted times keep on moving and changing. (...) - Larisa Pavlovna Avdejeva, 23rd September 2001, Director of the Sami Culture Center, Lovozero	thank you this will be added in the final document
Sophie Condé	Chapter 3	119	3373			the two subsections 3.4.2.2 Species distribution and extinction risk and 3.4.2.3 Local and regional functional, taxonomic and phylogenetic diversity are written with a very detailed scientific language, very difficult to get what are the messages (trends at population level and species diversity level)	we have shortened and reworded to simplify the language
Sophie Condé	Chapter 3	119	3373	121	3429	3.4.2.2 Species distribution and extinction risk: range shift and contraction, concurrence and abundance (see comment above) Better to say: Trends of species distribution and extinction risk.	we revised to species distribution and conservation status
Allan Watt	Chapter 3	119	3373	121	3448	Obviously a crucial section but unfortunately, several studies cited are not included in the reference list so cannot be checked and it is impossible to tell how many studies were involved in the assessment, perhaps only those listed. In any case, and particularly if only those cited were included, statements such as "established... evidence" (3387 and 3419) should be carefully evaluated.	we have removed the confidence language. The final document will have a complete reference list
Douglas Nakashima	Chapter 3	119	3373			3.4.2.2. Species distribution and extinction risks: range shift and contraction, concurrence and abundance Mustonen 2011 (Russia): (p8) "He [Alexei Gavrilovich Tretjakov, an Even reindeer herder] has also seen the arrival of sable in the area. Sable is traditionally a species of taiga habitats, but has now spread northwards to the tundra regions. It has replaced squirrel in the border areas between taiga and tundra." Salin et al. 2004 (Finland): (p281) "There are new species in the Vuotos region nowadays that were not common to the area in the past. Different sorts of plants, hay species and animals have migrated to areas where they were not seen before. Heikki Hirvasvuopio talked about the arrivals: " Well, yes we have new species in the area. For example a kind of white boletus has appeared here. I haven't seen it before and no[w?] it is fairly common already. It has spread. And then there are many hay species. They have moved up here from the more southern latitudes. We have minks now too. They have come during my lifetime. In the past we didn't have them at least in the nature. Now it is pretty common here. The first wild mink that I saw was in the mid-1960, it was in the Eastern Karia area. Apparently it has escaped from the Russian side. It is not longer than that; to have mink here." (p295) "Ilmari Vuolab spoke of observing new bird species that have spread from more southern latitudes. "I have hopes for example and other species that are not familiar here. According to Ilmari, mink is the worst of all arrival species. "minks have spread and become more and more common. I believe they come here both from south [of Finland] and from Norway. Minks are real pests; they eat fish from creeks and ptarmigans and whatever they can catch." Taisto Lämsman had similar observations. "I haven't seen mink here before and they are common. Mostly I have seen them here on the banks of the river Puumanki but I don't know where they come from". Mustonen 2005: (p20) Observations by Viatcheslav Kemlil, a traditional Chukchi reindeer herder from Nutendil, Republic of Sakha-Yakutia, Russian Federation: "On grazing grounds, I come across unknown plants.," "There are many dwarf willows growing on the tundra. We use them for bonfires. When I was a kid, we had to search hard for the willows. Today, I don't need to look hard at all. "; "New fish species can be observed in the Kolyma River. Marine species are showing up"; (p7?) "[...] drastic changes in animal populations. New species have come to replace species moving north. [[Eero Murtomäki is a spiritual Elder and hunter from Vaasa, Finland]]";	these are past changes but we'll ensure that these references are captured
Andy Purvis	Chapter 3	120	3407			Refer to "mean abundance of species" rather than "mean species abundance" because the latter is also used to refer to the GLOBIO model, where it has a different specific meaning.	thank you we have revised this
Germany	Chapter 3	120	3411			The quality of Figure 3.41 is low.	figures layout and resolution will be publication-quality for the final document
Allan Watt	Chapter 3	121	3425			Source?	is cited in the text where the figure is quoted
Sophie Condé	Chapter 3	121	3430	122	3454	3.4.2.3 Local and regional functional, taxonomic and phylogenetic diversity (see comment above) Better to say: Trends in local and regional diversity	it has been revised to ecosystem intactness
Andy Purvis	Chapter 3	122	3452	122	3454	In legend to Figure 3.43, clarify baseline = 1	will be done in the final document
Sophie Condé	Chapter 3	122	3455	123	3475	3.4.2.4 Ecosystem function & structure: I expect this section aims to answer to "General trends ... and ecosystem changes" ? Better to say Trends of ecosystems functions and structures	We revised to Ecosystem extent, function and structure
Allan Watt	Chapter 3	122	3455	122	3470	Very brief coverage of huge topic with no introduction, rationale for the choice of studies etc.	
Mark Sneathlge	Chapter 3	122	3457			"whilst Mediterranean, broad-leaved and mixed forests are expected to substantially expand in their footprint area,": what does this mean? Increasing or decreasing?	the section was still work in progress in FOD. In SOD we deal with this primarily by units of analyses
Sophie Condé	Chapter 3	123	3476	125	3537	3.4.2.5 Why one section dedicated to IAS (2 pages) ? If it is due to the only available knowledge, it must be noticed; if not the reader could understand this is the only pressure of importance, I am not sure this is the case.	this was moved to chapter 4
Allan Watt	Chapter 3	123	3476	124	3532	Another very brief section and requires re-evaluation of available knowledge. The first studies cited, for example, do not deal with species introductions. Some interesting examples are given in the text but appropriate reviews should be consulted.	this was moved to chapter 4
Thomas Brooks (IUCN)	Chapter 3	123	3476	125	3537	This section is important, but I was surprised to find it here - it seems that it would fit more logically in Chapter 4 on drivers? Specifically in Section 4.4.3.	this was moved to chapter 5
Mark Sneathlge	Chapter 3	123	3491		3496	This paragraph gives the impression that grey squirrels are aquatic species that enter Europe through the Suez Canal. Suggestion: new paragraph and replacing "As a result, some of these species" by "Some species".	this was moved to chapter 6

Allan Watt	Chapter 3	125	3538	130	3720	Clearly incomplete and not reviewed.	indeed it was stated in the document that this was not ready. An integrated analyses of changes in biodiversity and ecosystem services under different scenarios is now in chapter 5
Thomas Brooks (IUCN)	Chapter 3	125	3538	126	3555	Again, doesn't this belong in Chapter 4 on drivers?	the driver sections talks just about them, not their impact.
Sophie Condé	Chapter 3	126	3556	134	3854	3.4.3 Why nothing on Woodlands and forests, sufficient information exists, I expect it will be included later. Unbalance in the details of some ecosystems, with overlap, they should be merged: 3.4.3.6 Snow or ice dominated systems / 3.4.3.7 Glaciers and Nival Mountain Belt, Polar Deserts / 3.4.3.8 Mountain ecosystems	a section on future trends for each of these units of analyses now exist
Mark Snethlage	Chapter 3	126	3556			Why not integrate the future trends for the major ecosystems with the discussion of the past and current trends (section 3.3.2.)? Some of the information in this section is repeated from section 3.3.2.. If integrated, these repetitions can be avoided, helping reduce the total volume of text.	we decided to keep these separate and avoid duplications of description as we feel that there is a larger division of interest between past and future trends as opposed to interest in specific systems.
Mark Snethlage	Chapter 3	126	3560			Arctic Ocean: Scientific assessments of Arctic Monitoring and Assessment Programme: <a href="http://www.amap.no/documents/18/scientific/21">http://www.amap.no/documents/18/scientific/21</a> : includes projections about the effects of oil and gas exploration, persistent organic pollutants, mercury etc	thank you, we'll make sure this is included in the final document
Axel Hochkirch	Chapter 3	128	3577	128	3577	See above: The drying of the Aral Sea is probably one of the largest ecological crises, but I would be more careful to call it "the largest".	Changed to 'region'
PESC-3	Chapter 3	127	3595			also add seasonal or temporary ponds as a habitat, and climate change as a specific threat for organisms dependent on this type of habitat.	Done. We have added permanent and temporary ponds in the different sections as well as their threats including climate change
Thomas Brooks (IUCN)	Chapter 3	128	3607	128	3608	Not clear why this figure is cropping up here in the scenarios section; should it be moved to Section 3.3.3? Also, presumably the citation should be to the Red List?	The figure has now been removed and replaced by a synthesis of river threats across ECA
Germany	Chapter 3	128	3608			The color code of Figure 3.46 should be checked.	one of the shades of grey has been darkened, thank you.
Sophie Condé	Chapter 3	128	3609	122	3610	"Finally, the majority of studies report a decreasing trend in abundance, richness and diversity <i>DUE</i> to all stressors"	Done but trivial as a stressor by definition is leading to negative impacts.
PESC-3	Chapter 3	128	3621			should read: Climate change will cause the spread of heathlands due to shifts of vegetation zones.	Disagree. Climate change will cause to some changes in spread of heathlands due to process of vegetation zone shifts. Not more wide spread.
Mark Snethlage	Chapter 3	130	3681			Explain that Aralkum is the new desert that has appeared since 1960 on the seabed once occupied by the Aral Sea.	Added
Mark Snethlage	Chapter 3	130	3687	130	3689	In some cases the summary summarises the trends and in some cases it also gives some clues for possible measures to avoid or restore degradedation. Would it be possible to harmonise the summaries, for them either to include the recommendations or not?	A good comment. This issue should be decided by the top management team.
Mark Snethlage	Chapter 3	130	3695	130	3696	"The range of losses depends of climate modelling scenario and varies from 20% to 90% from the 2006 ice volume (IPCC, 2014)." By when?	By the end of the century. Added
Germany	Chapter 3	130	3695			The following sentence is not completely clear: "The range of losses depends of climate modelling scenario and varies from 20% to 90% from the 2016 ice volume (IPCC 2014). Does this mean that "The range of losses during 8 yrs (from 2006 until 2014) depends on the specific climate modelling scenario and varies from 20 to 90% between 2006 and 2014." What does this finding imply for future ice loss?	By the end of the century. Added
Mark Snethlage	Chapter 3	130	3697	130	3699	What about the effects of retreating arctic sea ice on drivers such as increased maritime transport (the North East passage) and mineral resources exploration of the Arctic ocean and their effects on arctic (marine) biodiversity?	It should be also added. Needs to find references.
Germany	Chapter 3	131	3711	131	3712	Repetition of L 3695	A mistake. Deleted.
Sophie Condé	Chapter 3	134	3855	139	4058	3.5.1. All this section is really good with statements and emerging trends clearly expressed. Easy to read and to be caught up by stakeholders	We thank the reviewer for this positive assessment of the chapter
Axel Hochkirch	Chapter 3	134	3855	145	4238	I enjoyed reading this section!	We thank the reviewer for this positive assessment of the chapter
Thomas Brooks (IUCN)	Chapter 3	134	3855	145	4238	This is all very generic - maybe it should be pending for the IPBES global assessment, and replaced here with evidence specific to the ECA region? (i.e. Section 3.5.3)	We agree that the previous version was very generic, with limited specific examples from the ECA region. In the new version, we now put much more this is European examples, especially in subchapter 3.5.3
Magali Gerino	Chapter 3	134	3855	155	4499	In this part Biodiversity is considered on with theoretical terms (species and functional richness, etc.) that is very welcome, but it is missing somewhere a other part focusing on the link between the different Ecosystem Services and the biodiversity involved as ES providers at least at the level of the community or habita. This information is important in order to make the link with the previous part of this chapter. The attribution of the ES Providers as species groups or habitats and each Ecosystem services should be usefull for underlying the mecanisms that support the Ecosystem service provision.	In chapter 3.5.3, we now discuss relationships between biodiversity and ecosystem services for each of the regions major habitat types, which makes the main messages less theoretical and abstract.
Germany	Chapter 3	134	3855	152	4402	The findings of this section do not provide directly useful insights for policy makers. Please try to expand the discussion on the relationship between biodiversity and ecosystem services in a way that more useful conclusions can be drawn for possible policy options.	Although much of the literature on biodiversity and ecosystem services that we assess is rather fundamental, we agree that some important lessons for management and policy can be and should be drawn, which we now summarise in line 601-608
Allan Watt	Chapter 3	134	3856	134	3864	Separating (biodiversity) research into research on ecosystem functioning and ecosystem services is not helpful in the context of this assessment. It suggests that ecosystem functioning is not linked to ecosystem services, which is clearly untrue. Also this section and those that follow it to page 145 present a general, rather than an ECA perspective, which is surely inappropriate for this assessment. I strongly recommend that the approach followed in 3.5 is re-considered.	Well ecosystem functions and services are not the same (the former describe ecosystem processes, while the latter are described as ecosystem properties that provide benefits for human well-being), we agree that they are often closely associated and that discussing them separately is not helpful. In this highly revised version of the chapter, we put a much stronger focus on ecosystem services, while also discussing the ecosystem properties (or ecosystem functions) that are underlying them. In addition, we now also put a much stronger emphasis on ECA case studies, especially in 3.5.3.
Allan Watt	Chapter 3	134	3866	135	3895	See above. In addition, this summary is difficult to follow without examples and it was published over a decade ago.	Due to major text changes, this earlier suggestion has become obsolete
Allan Watt	Chapter 3	135	3896	138	4011	This text appears to have been cut and pasted from Cardinale et al. 2012. It may therefore be criticised as plagiarism.	we now put quoted texts between quotation marks (line 209-278)
Magali Gerino	Chapter 3	135	3909	135	3909	What are the cited organisms ?	Plants, see line 197 in the new ms
Magali Gerino	Chapter 3	136	3921	136	3921	There exist different theoretical theories in the litteratures (ex niche partitionning from Loreau, etc. ), although the demonstration was not always provided	Due to major text changes, this earlier suggestion has become obsolete
Frederic Lemaitre	Chapter 3	137	3994	138	4013	A possible example would be how combined plant and microbial functional diversity have a key role on carbon and nitrogen cycles and associated ecosystem services like biomass production, nitrogen retention and carbon sequestration, and that the extensification of management promotes plant and microbial communities favouring nitrogen retention and carbon sequestration and how a number of trade-offs between ecosystem services at landscape scale, such as nitrogen retention and carbon sequestration, originate from ecological functional trade-offs linked to coupled plant and soil microbial communities (see Grigulis K., Lavorel S., Kraier U., Legay N., Baxendale C., Dumont M., Kastl E., Arnoldi C., Bardgett R., Poly F., Pommer T., Schloter M., Tappeiner U., Bahn M., Clément J.-C. (2013) Combined influence of plant and microbial functional traits on ecosystem processes in mountain grasslands. Journal of Ecology 101:47-57 and also Lamarque P., Lavorel S., Mouchet M., Quétier F. (2014) Plant trait-based models identify direct and indirect effects of climate change on bundles of grassland ecosystem services. Proceedings of the National Academy of Sciences of the USA 111:13751-13756 + Schirpke U., Leitinger G., Tasser E., Schermer M., Steinbacher M., Tappeiner U. (2012) Multiple ecosystem services on landscape level of an Alpine region: past, present, and future. International Journal of Biodiversity Science, Ecosystem Services & Management 9(2):123-135	Our main point here was to emphasize that functional diversity can sometimes be more important than species diversity in explaining ecosystem function. However, in this section about consensus statements, we chose not to put too much emphasis on specific cases, which are highlighted more in other parts of the chapter.
Tom West	Chapter 3	138	4015	138	4028	Is Rockstrom et al.'s concept of Planetary Boundaries ('A safe operating space for humanity' (2009) 461 Nature 472) worth mentioning here as an example of how to compare various environmental threats humanity is facing and the relative severity of the loss of biodiversity?	There is at present still some debate on the methodology of this paper, so we chose not to cite it here, until more conclusive evidence arises on the importance of different factors of different global change drivers
Allan Watt	Chapter 3	139	4059	141	4159	As above.	Due to major text changes, this earlier suggestion has become obsolete
Sophie Condé	Chapter 3	139	4075	139	4075	"The green arrows in Table 3.39 show the ecosystem services"	We removed this table, making this earlier suggestion obsolete
Tom West	Chapter 3	139	4092	140	4115	Given the overarching nature of biodiversity to ecosystem services (ie at the 'supporting service' level), it makes more sense to consider the contribution of biodiversity to total ES rather than doing it ES by ES. Another way of putting this (in monetary terms), is that you need to consider Total Economic Value, rather than the value of only one (or some limited suite) of ES. You also need to make sure that Total Economic Value is defined broadly enough. For example, see Braat & ten Brink (2008) 'The cost of policy inaction: the case of not meeting the 2010 biodiversity target' (European Commission) p11; Science for Environment Policy (2015) 'Ecosystem Services and the Environment' pp9-11, which provide useful sketch graphs that draw out this issue in an excellent way.	While we agree on the usefulness of this approach, there is a present still not that much literature on the relationship between biodiversity and the monetary value of ecosystem services, especially not when it regards ecosystem services which are challenging to express in money, such as the recreational value. Hence, at present we still focus on the non-monetary value of ecosystem services (as monetary value is simply not quantified in most studies), although we agree on the usefulness of monetarizing ecosystem services and we hope that more studies of those become available in the future
Magali Gerino	Chapter 3	140	4106	140	4115	Not clear what is the meaning of the arrow direction	We removed this figure, making this earlier suggestion obsolete
Magali Gerino	Chapter 3	141	4129	141	4129	Please define what is ancillary	We removed this text, making this earlier suggestion obsolete
Magali Gerino	Chapter 3	141	4142	141	4142	According to the information provided here, in the 2 following tables and in the current knowledge in the literature the color of the arrow for water quality here should be yellow, isn't it ? All the bioremediation strategies for water quality are based on biodiversity effects, but probably listed in other type of literature.	We removed this figure, making this earlier suggestion obsolete
Allan Watt	Chapter 3	141	4161	152	4402	Given the problems mentioned immediately above, it is difficult to review the rest of this part of the assessment. It should be written both from an ECA point of view and a policy-relevant perspective	We agree that the previous version was very generic, with limited specific examples from the ECA region. In the new version, we now put much more this is European examples, especially in subchapter 3.5.3
Magali Gerino	Chapter 3	145	4240	152	4402	Too much examples about the biodiversity influence on multifunctionality in this part. Other examples about more simple demonstration of what ES, related to what function and to what biodiversity would be very welcome before getting to the multy function level.	We now provided many more examples of studies on individual ecosystem functions
Germany	Chapter 3	145	4240	152	4402	More case studies from completed and ongoing national or international projects (e.g. from the ERANET "Biodiversa", national projects) related to Biodiversity and Ecosystem Services would be appreciated The case studies provide evidence and credibility. Presently only some pages were allocated to this issue (L. 4240 to 4402)	In the new version, we now put much more emphasis on European (or ECA region in general) examples and case studies, both at international, national and local scales, especially in subchapter 3.5.3
Magali Gerino	Chapter 3	145	4252	145	4258	Not evident to catch this message about biodiversity effect from the provided figure	We removed this figure, making this earlier suggestion obsolete

Magali Gerino	Chapter 3	147	4278	147	4357	This example would be better located before previous example that is more focusing on the multifunctionality	We now sorted examples based on ecosystem types rather than ecosystem service categories, and put grassland examples first
Allan Watt	Chapter 3	152	4403	153	4452	I don't understand why this section is included in this assessment.	The section on values has been removed
Tom West	Chapter 3	152	4403	153	4452	It is important that IPBES has acknowledged nature's intrinsic value. However, its treatment in this report needs more thought, especially in terms of its location and its depth of analysis. Would suggest that early on in the Report a substantial section on the many values dealt with by IPBES would improve the report as a whole.	The section on values has been removed
Tom West	Chapter 3	152	4404	152	4405	(1) It is not correct to state that there is ongoing debate over the existence of intrinsic value in nature. The source cited (Vucetich) notes that "response items that are not prone to mis-classification provide at least a sense that a large majority believe that at least some element of nature possesses intrinsic value" (p325). For discussion and defence of nature's intrinsic value see (eg) Leopold, A Sand County Almanac (OUP 1949); Naess, 'The Shallow and the Deep, Long-Range Ecology Movement' (1973) 16 Inquiry 95; Sylvan, 'Is There a Need for a New, An Environmental, Ethic?' (1973) 1 Proceedings of the XV World Congress of Philosophy 205; Rodman, 'The Liberation of Nature?' (1977) 20 Inquiry 83; Deval and Sessions, Deep Ecology (Gibbs Smith 1985); Taylor, Respect for Nature (Princeton University Press 1986); Rolston III, Environmental Ethics (Temple University 1988); Fox, Toward A Transpersonal Ecology (SUNY Press 1990); Plumwood, 'Nature, Self, and Gender: Environmental Philosophy, and the Critique of Rationalism' (1991) 6 Hypatia 3; Mathews, The Ecological Self (Routledge 1991); O'Neill, 'The Varieties of Intrinsic Value' (1992) 75 The Monist 119; Attfield and Belsey (eds), Philosophy and the Natural Environment (CUP 1994); Varner, In Nature's Interests? (OUP 1998); Callicott, Beyond the Land Ethic (SUNY Press 1999); Light and Rolston III (eds) Environmental Ethics (Blackwell 2003); Morton, The Ecological Thought (HUP 2010); Curry, Ecological Ethics (Polity Press 2011); Gillespie, International Environmental Law, Policy, and Ethics (2nd edn, OUP 2014). (2) Inquiries into the intrinsic value, or dignity, of humans frequently stumble upon the realisation that it is not only humans that can have intrinsic value too, although these are rarely dealt with in significant detail (see Dworkin, Life's Dominion (HarperCollins 1993) 238, 259fn23; Singer, Practical Ethics (OUP 1986) 215, 228; McCrudden, 'Human Dignity and Judicial Interpretation of Human Rights' (2008) 19 EJIL 655, 679-80, 723; Beylved and Brownsword, 'Human Dignity, Human Rights, and Human Genetics' (1998) 61 Modern Law Review 661, 667-68; Jaber, 'Human Dignity and the Dignity of Creatures' (2000) 13 Journal of Agricultural and Environmental Ethics 29, 31; Nussbaum, 'Beyond "Compassion and Humanity"' in Sunstein and Nussbaum (eds), Animal Rights (OUP 2004) 299; Tasioulas, 'Human Dignity and the Foundations of Human Rights' in Christopher McCrudden (ed), Understanding Human Dignity (OUP 2013) 307; Paolo Carozza, 'Human Dignity and Judicial Interpretation of Human Rights: A Reply' (2008) 19 EJIL 931, 934; Rosen, Dignity: Its History and Meaning (Harvard 2012) 10ff; Foster, Human Dignity in Bioethics and Law (Hart 2011) 100). (3) On the other hand, it is fair to say that there is debate over what exactly has intrinsic value: genes, organisms, species, ecosystems etc. It would be good to overview the reasons for these arguments and what this might imply for policy.	The section on values has been removed
Tom West	Chapter 3	152	4408	152	4408	Something having intrinsic value means that it values itself. A human valuing something for what it is (as suggested in the text) is an anthropocentric inherent value, involving an external valuing agent. Not the same as intrinsic value. For the differences between intrinsic and inherent value, see comment on line 430.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Tom West	Chapter 3	152	4411	152	4411	Reference to and engagement with the primary literature on this topic would improve this section.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Tom West	Chapter 3	152	4416	152	4416	To avoid confusion, it may be better to say that intrinsic values are intrinsic to nature rather than inherent to nature. See the difference between inherent and intrinsic value above.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Tom West	Chapter 3	152	4417	152	4419	This acknowledgment demonstrates why it might make sense to consider intrinsic value in Chapter 2. It doesn't really feel like it 'belongs' in this chapter.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Tom West	Chapter 3	153	4426	153	4426	Depending on the worldview or theoretical position.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Tom West	Chapter 3	153	4428	153	4429	1) Examples of authors who hold each of these views would be useful. 2) Is Pachamama appropriate to refer to given the geographical scope of the report? Deep Ecology, Spinozan substance monism, modern European environmentalism, Biophilia, Norwegian friluftsliv or paganism may be more geographically appropriate examples (along with the Gaia Hypothesis).	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Tom West	Chapter 3	153	4430	153	4430	Anthropogenic is not the same as anthropocentric. Anthropogenic may well be meant here - but then there needs to be discussion about whether all value is anthropogenic, or if value can be created by nonhumans (as in intrinsic value, and nonhumans valuing things (such as food) instrumentally). It is possible to be anthropocentric while believing that value is non-anthropogenic (eg nonhumans have intrinsic value, but we should ignore it), and it is also possible to believe that value is anthropogenic, but to believe in a non-anthropocentric ethic (eg only humans can generate value, but we should protect nonhumans for their inherent value). Thus the distinction is an important one.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Tom West	Chapter 3	153	4434	153	4439	1) The World Charter for Nature, the Bern Convention, and the Protocol on Environmental Protection to the Antarctic Treaty (potentially relevant since many ECA countries claim land in the Antarctic) also all acknowledge nature's intrinsic value (see Fosci and West in Bowman (ed), Research Handbook on Biodiversity and Law, Elgar 2016) These values also come through in the Habitats Directive, for example. 2) CITES, and the series of Council of Europe Conventions regarding the welfare of domesticated animals (see <a href="http://www.coe.int/t/e/legal_affairs/legal_co-operation/biological_safety_and_use_of_animals/default.asp">http://www.coe.int/t/e/legal_affairs/legal_co-operation/biological_safety_and_use_of_animals/default.asp</a> ), are also arguably examples of recognition of the intrinsic value of individual organisms in international, and European, law. 3) The Swiss example is geographically relevant (it refers to the 'dignity of living beings' Article 120(2)) - as is the Israeli Supreme Court's decision in Let the Animals Live v. Hamat Gader Spa Village (see McCrudden, 'Human dignity and judicial interpretation of human rights' (2008) 19 EJIL 655).	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Tom West	Chapter 3	153	4445	153	4448	1) Norton's 'convergence hypothesis' is highly relevant to this paragraph - it is potentially in line with the value pluralism endorsed by IPBES see Norton, Toward Unity Among Environmentalists (OUP 1991). 2) It would also be good to have discussion as to what the consequences of intrinsic value might be for policy making - this could include encouragement of natural farming methods, re-introductions, or enhanced legal protection (rights of nature or the crime of ecocide for example) see Fosci and West (previous comment).	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Tom West	Chapter 3	153	4449	153	4452	This paragraph makes a good point - but there is no evidence given of (a) the universality of intrinsic value - this could be achieved when establishing what is meant by intrinsic value, or (b) how intrinsic value is understood in the ECA region. Suggest that its appearance in laws, and Vucetich (cited in Report)/Butler and Acott, 'An Inquiry Concerning the Acceptance of Intrinsic Value Theories of Nature' (2007) 16 Environmental Values 149 are useful sources here, as well as those found in the comment to line 4404.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Allan Watt	Chapter 3	154	4453	155	4499	Presumably incomplete: there are gaps (both known and unknown) for most systems, taxa, ecosystem functions etc.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Thomas Brooks (IUCN)	Chapter 3	154	4453	155	4499	Section 3.7 could be greatly strengthened through consideration of Data Deficient species. Brooks et al. (2016) summarised these data (for all globally comprehensively assessed taxonomic groups from the Red List) for each of the ECA subregions, and for the ECA region overall.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Germany	Chapter 3	156	4500	206	6772	The 50-page reference list (about 25 % of the text) seems quite long. Some papers are of more general nature, you may consider a stronger focus on papers with more explicit findings on status and trends	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Germany	Chapter 3	156	4500	206	6772	The references need to be completed.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Guy Pe'er	Chapter 3	169	5087	169	5087	EEA 2013: note a recent update by van Svaay et al. 2015, also including larger number of countries covered - Van Svaay, C. A. M., A. J. Van Strien, K. Aghababayan, S. Åström, M. Botham, T. Brereton, P. Chambers, S. Collins, M. Doménech Ferrés, R. Escobés, R. Feldmann, J. M. Fernández-García, B. Fontaine, S. Goloshchapova, A. Gracianteparaluceta, A. Harpke, J. Heliölä, G. Khanamirian, R. Julliard, E. Kühn, A. Lang, P. Leopold, J. Loos, D. Maes, X. Mestdagh, Y. Monasterio, M. L. Munguira, T. Murray, M. Musche, E. Öunap, L. B. Pettersson, S. Popoff, I. Prokofev, T. Roth, D. Roy, J. Settele, C. Stefanescu, G. Švitra, S. M. Teixeira, A. Tiitsaar, R. Verovnik, and M. S. Warren. 2015. The European Butterfly Indicator for Grassland species 1990-2013. Wageningen.	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Frederic Lemaitre	Chapter 3	171	5182	171	5182	The reference should be "Field C.D., Dise N.B., Payne R.J., Britton A.J., Emmett B.A., Hellwell 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"	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Frank Wugt Larsen (EEA input)	Chapter 3	198	6402			use correct reference: EEA, 2015. European environment – state and outlook 2015 (SOER 2015) <a href="http://www.eea.europa.eu/soer">http://www.eea.europa.eu/soer</a>	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.
Germany	Chapter 3	207	6773	208	6843	Why is "example" her indicated? This is rather part of the methodology	The section on values has been removed from chapter 3. Elements of this text are in chapter 1 and all comments received have been considered in the revised text.