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RESPONSE OF THE ECOLOGICAL SOCIETY OF AMERICA TO THE DRAFT CHAPTERS OF THE BIODIVERSITY AND CLIMATE CHANGE ASSESSMENT

The Ecological Society of America (ESA), founded in 1915, is the world's largest community of professional ecologists and a trusted source of ecological knowledge, committed to advancing the understanding of life on Earth. The 8,000-member society publishes six journals and a membership bulletin and broadly shares ecological information through policy, media outreach and education initiatives.

ESA fully supports the development of the Biodiversity and Climate Change Assessment as a vital tool for understanding the intricate relationship between climate change and biodiversity loss. Policymakers need the BCCA to gain insights for developing strategies that mitigate the impacts of climate change on ecosystems and their services. It also can identify opportunities to leverage biodiversity as a tool for climate adaptation. Ultimately, the assessment underscores the importance of addressing these interconnected challenges simultaneously to ensure a sustainable future.

The breadth and scope of the assessment is large. ESA commends the authors for developing the chapters and our comments are short. Most of the topics ESA finds relevant are covered throughout the report.

Members of ESA contributed to these comments on the draft chapters of the BCCA. This document serves as a record of comments for ESA. Comments listed below correspond with the draft chapter page and line numbers in the official BCCA document.

ESA Comments for the draft BCCA chapters

1. *Pages 7-994, Lines 224-36714:* ESA commends the authors for the breadth and depth of material covered in this draft. Acknowledging that the report's great scope makes cohesion a challenge, here are a few suggestions for improving its overall coherence and usability.

First, any opportunities to condense and shorten the text should be considered.

Second, chapters could more frequently reference one another; for example, linking Chapter 4's framing of biodiversity drivers to Chapter 1's conceptual framework (Figures 1.1, 1.2), would enhance the narrative flow.

Similarly, aligning the structure of subsections, particularly those of Chapter 8 (especially 8a, 8b and 8c), would ensure uniformity of presentation and help readers find the information they seek.

Each chapter should include an executive summary modeled on IPBES' assessment reports, offering a concise and accessible synopsis (ideally in multiple languages).

Additionally, some chapters address the issue of scientific uncertainty more directly and thoroughly than others; dedicated subsections on knowledge gaps within each chapter would improve the report's cohesiveness and help spotlight where research is needed.

Likewise, consistent treatment of Indigenous knowledge and practices across the chapters would enhance the report's balance and inclusivity. Altogether, these refinements would improve clarity, usability and accessibility for a broader audience.

2. *Pages 7-994, Lines 224-36714:* ESA hopes that data associated with the assessment report will be made publicly available and accessible while also balancing the need for open data with respect for the data sovereignty and rights of Indigenous communities. Honoring these principles fosters trust, supports collaboration and acknowledges the invaluable knowledge and stewardship of Indigenous peoples.
3. *Pages 7-994, Lines 224-36714:* "Biodiversity" is well defined in Chapter 1, and the assessment largely succeeds in adhering to the same definition throughout

the report. The authors should take care to avoid conflating biodiversity with green infrastructure (e.g. Chapter 4.3.2.1, lines 13567-13628), natural resources or the broader natural world. These concepts are all related but are not equivalent.

4. *Pages 7-994, Lines 224-36714*: Case studies are valuable in providing concrete, place-based examples that illustrate broader concepts, highlight real-world challenges and solutions and make the assessment more relatable for diverse audiences. ESA encourages the authors to include diverse geographical and cultural examples among the case studies as they finalize the report.
5. *Pages 266-268, Lines 9837-9921*: This section offers a valuable discussion of how Indigenous knowledge can contribute to understanding and addressing the impacts of climate change on biodiversity. It would benefit from a stronger statement about Indigenous concepts of kinship and reciprocity, as well as climate adaptation as cultural revitalization (for example see [Whyte \(2017\)](#)).
6. *Page 268, Lines 9922-9965*: Ecological forecasting is a rapidly developing field. This section would benefit from citing [Warren et al. \(2018\)](#); the authors may also want to consider including [Araújo et al. \(2019\)](#) as well as [Franklin \(2023\)](#).
7. *Pages 326-389, Lines 12605-15041*: Many of the drivers discussed in the assessment have had, or will have, significant negative impacts on biodiversity. Chapter 4 could also acknowledge that climate change may not only amplify some drivers of biodiversity loss but, in certain cases, may dampen others. These outcomes will vary depending on the specific driver, taxa and site, as highlighted in research such as [Sorte et al.'s 2013 meta-analysis](#) demonstrating variability in non-native species' responses to future climatic conditions.
8. *Page 331, Lines 12786-12798*: This paragraph offers an inspiring perspective on reestablishing human relationships with nature and highlights the importance of Indigenous knowledge and nature-based solutions. However, its framing appears overly simplistic and may not fully reflect the complexities of biodiversity, historical human-nature interactions or the challenges posed by climate change in the modern world. To strengthen its scientific rigor, it would be helpful to present a more nuanced discussion of variability in historical and contemporary relationships with nature, as well as potential solutions for addressing the current biodiversity and climate crises.
9. *Page 335, Lines 12891-12909*: Climate change can indirectly affect biodiversity by influencing non-climatic drivers, as highlighted in this paragraph. A particularly compelling illustration is the threat to Hawaiian honeycreepers

posed by climate-driven shifts in non-native mosquito populations, as detailed in [Benning et al.'s 2002 study](#). The authors might consider substituting this into the text as an example of indirect climate-biodiversity interactions.

10. *Pages 600-677, Lines 23031-25746*: This draft chapter frequently acknowledges the role of socio-political flows but could expand on how inequities in climate change impacts specifically affect marginalized communities. For example, how might environmental justice issues arise in cross-border resource management?
11. *Pages 602-603, Lines 23161-23196*: In this section describing a typology of transboundary flows, the authors might consider including a map illustrating biodiversity impacts and proposed/potential conservation corridors.
12. *Page 603, Lines 23185-23196*: Altered avian migration is a good choice to illustrate climate-driven changes to transboundary flows, but lights out programs do not in and of themselves address the problem of altered migration patterns. A better management response would be adapting local land management to limit stressors during the new migratory periods.
13. *Pages 614-634, Lines 23683-24495*: This draft section on climate change impacts on cross-boundary flows would benefit from a table summarizing the findings from prior assessments and literature reviews. Such a table, with columns for "Flow Type," "Climate Impact" and "Recommended Actions," would offer a digestible summary of the authors' work.
14. *Pages 619-620, Lines 23925-23976*: Altered drought regimes will have major impacts on transboundary flows of freshwater biodiversity, as the final paragraph of this section mentions. ESA suggests explicitly including drought in this opening paragraph and elaborating on its impacts elsewhere in the section.
15. *Page 621, Lines 23998-24004*: The chapter authors may want to provide more context for this mention of the AMOC, explaining its relevance and relation to other currents and to the climate system itself.
16. *Pages 628-629, Lines 24299-24312*: This discussion of integrating Indigenous knowledge into international biodiversity policy should be updated to add the recent COP16 decisions surrounding Article 8(j) of the Convention on Biological Diversity. The adoption of a new program of work and establishment of a new subsidiary body designed to promote participation by Indigenous peoples was a major accomplishment of the conference.

17. *Page 642-643, Lines 24730-24735:* (Figure 7.5.2) In this diagram illustrating actions that can be taken to respond to altered transboundary flows, actions for the lower left quadrant (opportunities to resist flow) could include agreements to maintain conditions that keep harmful flow low and exploring economic opportunities to prevent future changes in flow.
18. *Page 663-664, Lines 25259-25335:* To complement this overview of knowledge gaps regarding biodiversity and climate change in an international context, the chapter authors might consider including a discussion of ecological forecasting.
19. *Page 791, Lines 29220-29222:* This executive summary may want to touch on the need for caution with respect to new technological tools for conservation and climate change mitigation/adaptation. Such tools always have limitations, and the potential exists for exploitation.
20. *Page 807, Lines 29548-29553:* An additional barrier to consider is the mounting number of challenges that policy and decisionmakers face. Overwhelmed with multiple pressing problems, individuals and organizations may feel forced to triage problems that can be tackled.