

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
1	44	48	Add: "This policy also aims to provide a framework for evaluating the potential impacts and benefits of synthetic biology applications."	Clarifies that the policy not only guides decision-making but also provides an evaluation framework.	Your comment is appreciated, however, stating the purpose of the policy is not part of the Audience statement. The goal of the policy is set out in section C
2	20	22	The line may include, "The attempt of rapid and unplanned development of the developing country" as an another reason.	This is an burning issue for environmental degradation.	The Policy does not mention specific drivers or impacts so as to remain broadly applicable
2	53	53	This clause may included in this line"" and it's ethical and social implications"	Because the probable impact of synthetic biology on the said fields must be observed.	Respectfully disagree. The group does not consider that specific mention of ethical and social implications needs to be mentioned in the Goal statement, but both are explicitly addressed in the Scope and Principles section. We therefore have not changed the text in this instance
2	77	77	The line may be thus"" Protect, restore and grow integrity and diversity of nature.	By Synthesis biology, it is quite possible to grow the diversity.	Comment noted, 'Restore' already captures future adaptations or actions.
3	189	189	Existence, grant and exercise of Intellectual property rights on applications of synthetic biology i	Clarification of scope	Noted with thanks. We agree that this framing was unclear so this paragraph has been reworded.
3	200	200	Public engagement to become "engagement with publics"	A more inclusive approach, recognising diversity of communities, people and views	Comment noted. The requirement for comprehensive and inclusive public engagement implies a need to engage with the diversity of communities, peoples, and views, as outlined in Section F. V.
3	212	212	Suggest add to the end "translation into different language and use of sign language"	More inclusive	Comment noted with thanks. We hold that reference to language and technology with which the public can engage is comprehensive and suitably inclusive.
3	217	217	Impact assessments to be "interdisciplinary integrated impact assessments"	Consistent with the diverse approach taken throughout document	Thanks for the comment. We integrated "adequate" to highlight the necessary breadth of aspects.
4	141	166	Either delete all words that mention benefit assessment and entirely focus on risk assessment, or elaborate a separate brand new and well thought through chapter on benefit assessment	1. benefit assessment is a slippery path; no reasonable methodology has as yet been agreed. Crucial are questions such as if any profit making is already a benefit, or only use values, or job opportunities, or ecological benefits (biodiversity vs climate protection?) etc. With the present text you can expect equations such as: Monsanto makes enormous profit from selling a package herbicide resistant seed plus chemical herbicide this outweighing the risks of loss of plant biodiversity. 2. There is a cultural difference between the US and the EU legal systems concerning risk-benefit weighing. This must be reflected in an IUCN position. See for a first try on that issue the Kent Redford report, chapter on regulation	It is necessary to keep risk assessment and benefit assessment together because, as the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both. We consider that the principles mentioned are relevant for benefit assessment and more detail on methodologies is not possible at this policy level. There are in fact methodologies for benefit assessment in the conservation sector and specifically in the IUCN context (e.g. Protected Areas Benefits Assessment Tool). We have, however, added a sentence in Section F.II to explain the focus of the policy is on risks and benefits in relation to nature conservation. This section has also now been restructured for clarity.
4	152	154	Last sentence 153/154/: These should also consider alternative synthetic biology and non-synthetic approaches, the implications of inaction, and the ability to remediate undesirable consequences.	1. My modification reflects the fact, that the assessment of a range of effects should be distinguished from the choice of alternative techniques applied (and are also to be subjected to a risk assessment. 2. Alternatives are also possible within SynBio, some possibly performing better than others re biodiversity.	Noted and text has been modified to reflect need to also look at other approaches.
5	1	154	Suggestion for Mandatory Feedback Loop in Synthetic Biology Integrations	To ensure the success and continuous improvement of projects involving synthetic biology, it is imperative to mandate a feedback loop protocol for all integrations. This protocol should be a required component of the project management process	We agree that a feedback process is an important component of ongoing adaptive management, review and revision, and have added this component in relation to decision making.
5	1	201	methodology for updating local regional authorities	framework that upholds the rights of communities, promotes ethical practices, and supports the sustainable and respectful use of community-owned resources in synthetic biology.	We feel that this point has been appropriately addressed in the section calling for transparency in communication, education and public awareness
5	3	86	Nature based sustainable solutions as part of of the policy with specific guidelines	To ensure the long-term health and viability of our natural resources, it is imperative that we adopt nature-based economic models. These models should prioritize the careful stewardship of natural resources and adhere to adaptable rules of sustainability as outlined by the International Union for Conservation of Nature (IUCN). The guidelines provided by the IUCN offer a robust framework for integrating sustainable practices into our economic strategies.	This is an interesting point and was discussed in detail. It was felt that providing detail of specific model frameworks sat with implementation strategies, rather than in the more general and high-level policy document. However, the policy has been modified to mention economic aspects.
5	3	89	Suggestion for Monitoring the Application of Synthetic Techniques in Economic Models	To ensure the successful implementation and sustainability of economic models that utilize various synthetic techniques, it is crucial to establish a rigorous monitoring framework. This framework should be guided by a specific set of instructions provided by the International Union for Conservation of Nature (IUCN). The IUCN's guidelines offer comprehensive and scientifically-backed directives that can ensure our models are both effective and environmentally responsible.	This point was discussed in detail, but it was felt that detail of monitoring frameworks is part of an implementation strategy, rather than belonging in the more general and high-level policy document. However, the policy has been modified to mention economic aspects and monitoring is mentioned in relation to general considerations for decision making.
5	4	114	Assess Carrying Capacity: Regularly evaluate the carrying capacity of resources to avoid overexploitation and ensure long-term sustainability. Refer to the IUCN Red List: Utilize the IUCN Red List to identify and prioritize the protection of endangered species and habitats that are most at risk. Ecosystem-Based Approach: Implement comprehensive ecosystem management practices that consider the complex interdependencies within natural environments. Clear Intervention Strategies: Develop and communicate specific, targeted intervention plans to address identified threats and challenges effectively.	To effectively manage our natural resources and implement sustainable solutions, it is essential to consider the carrying capacity of these resources. This approach must be complemented by a thorough examination of the IUCN Red List and the adoption of an ecosystem-based approach to prevent the disintegration of critical landscapes worldwide. Specific intervention strategies should be clearly outlined to ensure precise and impactful action.	We agree that these issues are important in natural resource management in general; the policy calls for best-practice in decision-making, assessment, and communication, but does not detail specific intervention strategies that may be applicable to different situations or applications.
6	81	81	Consider adding the word "agreed" after the published word "informed"	For more inclusiveness.	Comment noted, but no changes made because this is a standardized term used in institutional and UN policies. Please see Annex for references
6	118	118	Consider adding the word "factual" after the word "prior" in line-118 of published draft.	For more clarity.	Comment noted, but no changes made because this is a standardized term used in institutional and UN policies. Please see Appendix for references.
6	130	130	Consider adding the words "for necessary correction" after the end of line-130 of published draft.	For more clarity.	Thank you for your comment, but we think the current text is clear
6	134	134	Consider adding the words "through intensive communication" at the end of line-134 of published draft	For more clarity	We do not consider that this clarifies communication in relation to decision making
6	158	158	Consider including the word "ethical" in line-158 of published draft.	For more perfection.	We consider each of the listed recommendations for consideration to be various aspects of ethical consideration. Therefore we have retained the text as is. This section has been restructured for greater clarity.
6	176	176	Consider adding the word "factual" after the word "prior" in line-176 of published draft.	For more clarity.	FPIC is an established norm and therefore we retain the original text.
6	199	199	Consider adding the word "informative" after the word "early" in line-199 of published draft.	For better conception.	Thanks for the comment. We hold that comprehensive communication implies it would be informative.
6	209	209	Consider adding the words " for consolidation" after the end of line-209 of published draft.	For thoroughness.	Comment noted, yet we hold the current text to be sufficient

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7	97	97	Recommend further elaborating/setting guidelines on how this "In Dubio" principle shall be applied in practice as it is very easy to use against most projects.	It is premature to apply "In Dubio Pro Natura" principle. This is especially because in the era when the scientific world is working on bringing back extinct species. For example, a project on bringing back an extinct mammoth. Here, we are working towards increasing biodiversity, however we do not know the final implications of the project. Applying "In dubio" is extremely difficult as the mammoth was part of nature, yet it is not anymore. It definitely falls into the category of synthesising biology but will improve the elephants' biodiversity. Yet, we do not understand its effect on current flora and fauna. Hence, I recommend further elaborating/setting guidelines on how this "In Dubio" principle shall be applied in practice as it is very easy to use against most projects.	Comment acknowledged. Taking into account the divergent views in the comments around the references to In Dubio Pro Natura, we have (a) retained In Dubio Pro Natura reference in the text because it is specifically relevant to nature conservation, changing 'include' to 'consider' because the principle has not been adopted by governments; and also (b) added a reference to In Dubio Pro Natura into the Appendix.
7	221	224	"A further development and new dimension of modern biotechnology that combines science, technology and engineering to facilitate and accelerate the changes introduced to an organism with modified/synthesised genetic material to understand, design and redesign living organisms and/or biological systems."	A successful case of cloning "Mabrokan", a dead camel variety. Undoubtedly, the case can be differentiated more as reproductive cloning. Still, if matched with the current definition of synthetic biology by CBD, this can be considered a synthetic biology case as we are using and combining science and technology to redesign and manufacture living organisms or redesigning a biological system to produce specific types of camels. Yet, this process has contributed to biodiversity restoration to some extent. Hence, it is important to modify the definition of synthetic biology to reflect "the changes introduced to an organism with modified/synthesised genetic material to understand, design and redesign living organisms and/or biological systems." The proposed definition can be modified as necessary	Comment noted. Yet, this policy refers to the official CBD operational definition of synthetic biology and hence we will not be modifying it.
7	247	250	Clarification/ explanation on adoption of Rio declaration	Rio declaration""CBD is adopting the Rio declaration that ""; lack of full scientific certainty shall not be used as a reason for postponing "";." This is excellent for the scientific community; however, it is important to specify if this consideration is only applied to "cost-effective measures/projects?" The above-mentioned examples fall into an unknown category and are very costly, yet we are still doing them despite not knowing their implications for the present environment.	Comment noted. The Appendix contains reference materials relevant to this policy. Clarifying the interpretation of these documents is beyond the scope of the policy.
8	30	30	to be beneficial AS WELL AS to pose risks	Both the potential have an equal chance to get if it is not managed properly.	We agree. However this sentence has now been deleted.
8	34	34	potential ecological, ethical, socio-economic and cultural impacts.	Economy is one the major component of sustainability.	We agree and have adjusted the text
9	81	81	We recommend changing the wording back to the first draft version which was "Seek Free, Prior and Informed Consent."	A reference to Free, Prior and Informed Consent as a 'right' without any mention of the UN Declaration on the Rights of Indigenous Peoples implies that it is a legally binding obligation and may have a definitive meaning in international law, which it currently does not for Australia and some others.	Comment noted, but no changes made because section F III sets out how this Principle is to be applied, 'in alignment with relevant national and international instruments, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and the CBD.'
9	93	97	Suggest the wording could be altered to read: "Adopt the precautionary approach, such as articulated in the 1992 Rio Declaration (Agenda 21, Principle 15) and by the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Commission on the Ethics of Scientific Knowledge and Technology working definition (2005). Given the fact that all life depends on nature and the scope of this paper is nature conservation, the application of the precautionary principle should consider the In Dubio Pro Natura principle."	The In Dubio Pro Natura principle has not been codified in a treaty and therefore we do not believe it should be included with established internationally accepted instruments like Principle 15 of the Rio Declaration.	Comment acknowledged. Taking into account the many divergent views in the comments around these references, we have (a) retained the Rio Declaration in the text, as a non-binding international agreement signed by 175 countries; (b) removed the UNESCO 2005 reference from the text because it is a technical document that has not been adopted by countries; (c) retained the Rio Declaration and the UNESCO 2005 reference in the Appendix. Further, we have (e) retained the In Dubio Pro Natura reference in the text because it is specifically relevant to nature conservation, but changed 'include' to 'consider' because the principle has not been formally adopted by governments; and also (f) added a reference to In Dubio Pro Natura into the Appendix.
10	1	2	Title should reflect the purpose described on line 40: "Policy on the implications of the use of synthetic biology in relation to nature conservation." Also, clarify if this is a policy to which all members will be held, or a guidance document to decision making about the application of synthetic biology to nature conservation.	The policy is not on synthetic bio, per se, but on its application. Clarifying whether this is a policy (with accountability/repercussions by members versus guidance would be helpful.	The Audience and Goal statements set out that this policy provides guidance for decision-making for IUCN members. The title is intended broadly to reflect Res123
10	17	17	Change A. to Roman Numeral I.	Reviewing stakeholders noted that outlines usually have numbers, not letters, as their highest level and suggested that making that change may be more consistent across languages/styles.	Noted and changed
10	30	31	Remove sentence	Redundant with lines 26-29.	We agree, the change reduces repetition. The text has been changed as suggested.
10	34	34	Encourage insertion of language about the need for/development of high standards of ethical science, social engagement, and strong regulatory pathways.	Examples could include "All research should be done following high standards of ethical science, social engagement, and strong regulatory pathways." OR "While gaps remain, the field of synthetic biology includes social scientists, ethicists, and biologists who are actively engaging in the development and use of strong standards of development and use."	This is the Problem Definition statement and is not intended to start to articulate solutions. The points raised are made later in the document.
10	34	34	Insert comma after "social"	Encourage reviewing use of Oxford comma (or decision not to use it) for consistency throughout document.	Comma has been added
10	40	40	Should this be implications of or applications of?	The document references applications more often than implications.	Here the word "use" refers to applications of synbio; the policy seeks to address the implications of this use
10	53	53	This is unclear. Does this mean IUCN is going to create a statement on the response to how synthetic biology has been, and is being, used in nature conservation?		We have edited the text so that it aligns better with the chapeau and it is clear regarding the scope (and therefore goal) of the policy. This second bullet recognises that the use of synthetic biology in other fields may have implications for nature conservation.
10	58	58	Suggest re-ordering to "agriculture, medicine, or other industry..."	Agriculture and medicine are two types of industry. If something more specific is intended in the use of "industry" that is exclusive of ag and medicine, be more specific.	We respectfully disagree. In the context of synthetic biology, agricultural, medical and industrial applications are distinct. The sentence has been edited for clarity.
10	58	59	This is a very large scope, as social, economic, and cultural impacts will often have direct or indirect impacts on nature. With a scope this big, it will be difficult later to determine what is in or out of bounds for IUCN to weigh in on/all members are bound to by this policy.		The scope of this policy is defined in line with resolution 123. The sentence has been edited for clarity.
10	69	69	Appreciate the desire for an "evergreen" statement and the desire to define the guardrails for utilizing synthetic biology in conservation. However, multiple stakeholder reviewers referenced the broad nature of the statement and several thought it "could be useful toward the start to provide some concrete examples of synthetic biology (here is an overview of some recent ones https://www.nature.com/articles/s41467-020-20122-2) and perhaps even examples that have concretely hurt conservation as well as helped conservation."		We appreciate this point, but listing specific technologies has proved prohibitive from technical and political perspectives. Furthermore, the recommendation of the Citizens' Assembly was to avoid listing any specific technologies, whether known or not. This recommendation has been followed throughout the policy. Consequently, the text has been retained.
10	87	87	Delete comma after values	Confusing grammar. If I understand correctly, the comma after "values" should be deleted.	Accepted, text edited to be more precise.

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10	97	97	A translation of in dubio pro natura, plus examples of these principles would be helpful.		A reference to In Dubio Pro Natura has been added to the Appendix.
10	108	108	Seems like an ethical or ethics-based approach should also be considered.		Thank you for the comment. We agree that consideration of ethics is important. This is explicitly included in Section E on Principles. The comment is also addressed by the amendments to the first two paragraphs of this section.
10	143	144	These principles are not outlined either here or in section E.		Noted. We have deleted the word "outline" which may not have been the most appropriate.
10	162	162	Clarify - does "existing methods" refer to risk and benefit assessment (subject of sentence) or are these existing conservation methods?		This sentence has been edited in line with other comments for clarity. This section has also been restructured for greater clarity.
10	164	166	Remove	Redundant with previous two paragraphs.	This sentence is regarding the use of a participatory and anticipatory process where appropriate and is therefore different from the previous paragraph. This section has been restructured to provide greater clarity.
10	208	209	Remove	Redundant and doesn't need to be reiterated in this section.	Comment noted, yet we have retained this as it makes the point that information flow should be two-way; this point has not been made in the preceding text
10	210	210	Confirm scope of this document. Is this "about synthetic biology in relation" (current title) or "the use of synthetic biology in relation" (purpose statement in line 40)?	Recommend consistency with scope of policy	Comment noted. The wording used here appropriately reflects that of the policy title and scope statement
11	26	27	keep text	It is good to see that there are different types of synbio applications, and keeping a balance language between positive and negative impacts.	Noted with thanks
11	30	32	Keep text on line 30. Delete text on line 31 starting at the word "Synthetic" up until line 32. And introduce the following: Synthetic biology can complement existing efforts to address biodiversity loss.	It's encouraging to see the text acknowledge both the advantages and risks of synthetic biology (synbio) and recognize that it can complement efforts to tackle the causes of biodiversity loss. However, the wording on line 31 could be interpreted negatively, suggesting that synbio does not address the fundamental causes of biodiversity loss. It is essential to emphasize the current and potential contributions of synbio to conservation and the limitations of existing tools, which are not providing solutions at the scale and speed necessary to reverse biodiversity loss. It is important to mention that some of these non-synbio tools may not address the root issues (e.g., bed nets and malaria, rodenticides, and maritime transport). Although synbio is not a cure-all for conservation challenges, it can be part of the solutions toolbox in a complementary manner.	This sentence has been deleted as it repeats the point made above referring to positive and negative impacts and emphasising advantages and risks. We agree that synbio should be viewed as complementary to ongoing efforts.
11	33	36	Delete text from the word "there remain (...)" to the word conservation" Replace with: "As a rapidly evolving field, synthetic biology requires adequate resources to ensure that knowledge gaps can be addressed through research generating peer-reviewed data and traditional knowledge, and that information can be made accessible in an equitable way."	This is negatively framed, as it gives the impression that scientists seem to be not working to address the data and knowledge gaps. It is important to recognise that research is vital to filling the gaps and answering the remaining questions on synbio and its impacts (in a broader sense). The problem is that "synbio" is not a thing in itself. There are some applications of synbio where there are gaps in knowledge and others where the applications are not so new, and there are no such issues. It is important to highlight that impacts cannot be known or evaluated for "synbio" at large "" they will vary for each application and need to be assessed on a case-by-case basis. In addition, it is unclear how guidelines on how synbio and biodiversity interrelate would work, given that this relationship also varies. Citizen Assembly recommendations also highlight the need for equitable access to information. Their recommendations are focused on ensuring this access and having platforms to gather, share, monitor, and evaluate information. Therefore, the text could be replaced.	This is the Problem Definition statement and is not intended to start to articulate solutions. The information relating to equitable access is made later in the document (Section E).
11	34	35	Delete text	It is important to consider that socio-economic considerations are only encouraged at this stage for Environmental Risk Assessment (ERA), and despite the efforts of the CBD AHTEG, there is no clear methodology or emerging body of literature that provides a robust process. However, socio-economic and cultural considerations can be considered through other methodologies, like Environmental, Socio-economic, and Health Impact Assessment (ESHIA), for which IUCN has extensive experience and a set of guidelines. In addition, it is unclear what "cultural" impact would entail, as it has different interpretations and depends on the context.	As a Problem Definition statement this section is not intended to start to articulate solutions but to acknowledge the wide range of issues that may be of concern, including issues that might be contested or poorly defined at present.
11	34	35	Delete text	On top of the rationale provided above for the same lines, the text seems to suggest that further guidance is needed. However, in Resolution 123, IUCN members agreed to "initiate an inclusive and participatory process to develop an IUCN policy on the implications of the use of synthetic biology in nature conservation to be debated and voted on by the next 2024 Conservation Congress". Any additional work on this matter is subjected to further discussion and a vote on a separate motion.	We agree and have adjusted the text to indicate the need for a policy to inform decision making on the implications of synbio applications, rather than implying the policy would guide the applications themselves, and we are not calling for additional guidance.
11	39	41	keep text	The development of this policy can contribute to a better understanding of synthetic biology and the implications of its use in nature conservation. The policy must be neutral and not a "for or against" synthetic biology policy, as articulated in IUCN Resolution 123 ("IUCN DG and Commissions should remain neutral in all matters of synthetic biology. The process should be inclusive and support improved understanding of synthetic biology).	Noted with thanks
11	44	46	Keep text	The text provides a clear target audience. Good to see	Noted with thanks
11	49	54	keep text	It's excellent to see the policy's goal clarified and aligned with other international instruments, goals, frameworks and guidelines.	Noted, with thanks
11	63	67	Keep Text	It is important to maintain alignment with the CBD synbio working definition	Noted, with thanks
11	68	69	Keep Text	It's reassuring that the draft does not focus on specific synbio applications or technologies, acknowledging that such an approach would not be plausible due to its overly narrow scope.	Noted, with thanks
11	70	70	Keep Text	The text is now aligned with IUCN scope. Specifying that the policy is not detailed implementation guidance.	Noted, with thanks
11	86	86	Keep Text	It is very positive to recognize that decision making should be science based.	Acknowledged, text retained.

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11	89	91	Delete the words "Conflict of interest"	Language on "conflict of interest" is outside the scope of IUCN. This is down to IUCN members' governance systems and safeguards. The issue of liability and redress falls under the CBD's Nagoya/Kuala Lumpur Supplementary Protocol to the Cartagena Protocol on Biosafety	Comment noted, but the term 'conflict of interest' is included in the IUCN Statutes.
11	92	92	Keep text	There are various synthetic biology tools for diverse uses and contexts. Thus, they should be evaluated on a case-by-case basis, as highlighted in this sentence. The language is positive and aligns with CBD decisions.	Acknowledged, text retained.
11	93	97	Keep text on the 1992 Rio Declaration, but delete reference to UNESCO and In Dubio Pro Natura The final sentence should only read as follows: "Adopt the precautionary principle, such as articulated in the 1992 Rio Declaration (Agenda 21, Principle 15)." Delete from: "and by the United Nations (...) to In Dubio Pro Natura principle"	The precautionary principle should be applied effectively to balance risk reduction with timely action. It's encouraging to see the reference to the Rio Declaration, which states that "lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." Additionally, the Citizen Assembly proposed an intriguing framing for the precautionary principle, linking it directly to the risk assessment process, including the cost of inaction and alternative interventions. From this perspective, the precautionary principle aligns with the Rio Declaration, balancing risks and the cost of inaction as part of a science-based risk assessment process. While "In Dubio Natura" is similar to the precautionary principle, it's crucial to clarify its interpretation and usage. To prevent misinterpretation, it is best to remove it. The reference to UNESCO is problematic, as it states: "When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm." The term "morally acceptable" is not clearly defined, allowing for different interpretations. By making multiple references to texts with differing content, there is a risk of conflict, making the principle less clear and applicable.	Comment acknowledged. Taking into account the many divergent views in the comments around these references, we have (a) retained the Rio Declaration in the text, as a non-binding international agreement signed by 175 countries; (b) removed the UNESCO 2005 reference from the text because it is a technical document that has not been adopted by countries; (c) retained the Rio Declaration and the UNESCO 2005 reference in the Appendix. Further, we have (e) retained the In Dubio Pro Natura reference in the text because it is specifically relevant to nature conservation, but changed 'include' to 'consider' because the principle has not been formally adopted by governments; and also (f) added a reference to In Dubio Pro Natura into the Appendix.
11	103	106	Delete text from: "As synthetic biology (...) to nature conservation" Replace it with the following suggestion: "Synthetic biology is a fast-developing field that can positively and negatively impact nature. Decision-makers should be able to research and assess relevant synthetic biology developments and applications in relation to nature conservation to ensure an informed decision."	It is important to that research is vital to filling the gaps and answering the remaining questions on synbio and its impacts (in a broader sense). However, the problem is that "synbio" is not a thing in itself. There are some applications of synbio where there are gaps in knowledge and others where the applications are not so new, and there are no such issues. Impacts cannot be known or evaluated for "synbio" at large "" they will vary for each application and need to be assessed on a case-by-case basis. In addition, the sentence is negatively framed.	Comment acknowledged. The point on positive and negative impacts is addressed in the second paragraph of Section A. The spirit of the second proposed sentence has been addressed by replacing 'an overview of' with 'information on'. We consider the sentence to be appropriately balanced.
11	107	110	Keep Text	It is positive to have a science-based approach while also recognising the importance of considering the views and perspectives of different stakeholders.	We agree, we have retained the relevant text in the section.
11	112	113	Delete the word "should" in line 113 and replace it with "encouraged to"	The IUCN cannot mandate actions, so using the word "should" in the phrase is inappropriate.	The rationale for using the word 'should' is that it is stronger than 'encouraged to', but still not a mandate. Many IUCN policies and resolutions do use 'should'.
11	116	117	Delete text, specific words: " this policy" Replace with: " national legislation"	The IUCN scope is to provide guidance and should work under the scope of the Statutes of IUCN. Therefore, the involvement of rights holders and stakeholders should be guided by national legislation, not this policy.	Comment accepted, national legislation was added in the first paragraph of section F.
11	118	118	Keep text	It is crucial to ensure that FPIC aligns with the CBD approach and takes into account national circumstances, as outlined in Section F III. FPIC involves several issues beyond the scope of IUCN, and there is no common agreement on how, if, and when it should be conducted. It's reassuring to see that it aligns with the CBD concept, which states that the FPIC process should consider the national context.	Thank you, text retained.
11	119	120	Delete the words "an early" and replace it by "a"	Acknowledging the need for a case-by-case approach is crucial, as this reflects established best practice, existing CBD decisions and the Cartagena protocol (art 15). It is also essential to refer to the participatory problem formulation process, which was a strong recommendation from the Citizen Assembly report. However, problem formulation for risk assessment can only be done once you have sufficient information about the technology and the specifics of the proposed application "" in which case it's not early, it's on time.	Accepted. The text has been amended.
11	121	124	Edit the text to read as follows: "The assessment of risks and the assessment of benefits should environment take into account the characteristics of the organism or technology and the proposed conditions of its use, as well as the characteristics of the receiving environment."	It is good to see the removal of references to a "broad range of ecological and socioeconomic considerations" that was included in the first draft as it was unclear what this would entail. Note that socioeconomic aspects are considered under well-known methodologies such as ESHA, which can be combined with the Environmental Risk Assessment (ERA) during the decision-making process. In addition, the paragraph mixes different concepts that are not relevant to risk or benefits assessments. When assessing risks, experts consider the number of organisms to be released, how, when, and where the release would happen, etc. It is irrelevant if the organism will be used for commercial purposes; what matters is whether risks are acceptable or not. Lastly, it's unclear what a "conditioned" or "unrestricted release" would entail. It is also not within the IUCN scope/mandate to provide guidance on contained use as IUCN deals with conservation applications and not the research phase.	Accepted. These words have been added to the clause which has been relocated to section F.II. which relates specifically to risk assessment and benefit assessment.

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11	125	130	Add the following text " in accordance with national legislation" after the following clauses e) g) after clause f) ad the following text "as provided for in the Nagoya Kuala Lumpur Supplementary Protocol"	As mentioned above, IUCN can provide advice, strengthen members' institutional capacity, and assist in developing and improving legislation. However, it is not within the scope of the IUCN to determine how the national process should be carried out. See IUCN Statutes, including Rules of Procedure of the World Conservation Congress, and Regulations. Therefore, it is essential to make the changes suggested in line 113: "To encourage" instead of "should". Biosafety and biosecurity requirements, as well as contingency plans, should exist. However, it is not part of the IUCN mandate to define, implement, monitor, or enforce those (e). The same applies to liability and redress (f) and staged consultation and adaptive management (g). A note that the issue of liability and redress is in the scope of the CBD, falling under the Nagoya "" Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety. It is also not within the IUCN scope/mandate of the IUCN to provide guidance on contained use as IUCN deals with conservation applications and not the research phase.	(a) To address this more broadly, a new general phrase was added to the first paragraph of section F: 'in accordance with international and national legislation, and customary law.' (b) The suggestion was incorporated with the phrase: "including as provided for in the Nagoya-Kuala Lumpur Supplementary Protocol"
11	133	134	Add the following words: "relevant authorities" and "according to national requirements" so that it reads as follows: "i) The proponent of a synthetic biology development or application, along with the relevant authorities, is responsible for appropriate public engagement and transparency, according to national requirements."	The policy must note that public engagement requirements are set by national legislation, and public awareness should not be the sole responsibility of the developer.	Noted. We have added the reference to relevant authorities. The chapeau has been revised to be clear that all of the general considerations should be applied "in accordance with international instruments, national legislation, and customary law", such that it is not necessary to make specific reference to "according to national requirements" here
11	135	135	Keep Text	It is crucial that any enforceable provisions in the policy clearly state that they will comply with national legislation and align with national systems. As previously noted, it is beyond the scope of the IUCN to dictate how national processes should be conducted. Refer to the IUCN Statutes, including the Rules of Procedure of the World Conservation Congress, and Regulations. Therefore, it is essential to implement the suggested changes in line 113, where we propose replacing the word "should" with "encourage to."	Noted, with thanks. Please refer back to the response to the original text.
11	138	140	Keep text	It's encouraging to see new language that aligns with the IUCN's scope	Noted, with thanks
11	141	166	Replace throughout the section F the words: "risk assessment and benefit assessment" by "risk and benefit assessment."	The phrase "risk assessment and benefit assessment" implies the decoupling of risks and benefits and suggests that they need to be considered separately. Risks and benefits should not be treated separately. They must be considered together to ensure an informed decision-making process and the most beneficial outcome.	Noted. As the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both. This section has also now been restructured for clarity.
11	145	147	Eliminate the following text: "The assessment of risks and the assessment of benefits should occur independently. Decision-making should then consider both, recognising that risks and benefits are not necessarily proportionally related." We suggest the alternative following text: "The outcomes of risk and benefit assessments should be considered together to ensure an informed decision-making process and the most favorable outcomes."	Risks and benefits cannot be evaluated separately or independently. They are crucial for balancing the pros and cons of an informed decision-making process. In addition, the language on risks and benefits not being "necessarily proportionally related" is vague, presumptive and open to interpretations.	Noted, but we consider that the assessment of risks and assessment of benefits can and should occur independently, with decision-making taking them (i.e. the outcomes) both into account.
11	148	148	Keep text	Adopting a case-by-case approach is plausible given the diverse types of synthetic biology tools and their various uses and contexts, which aligns with CBD decisions.	Noted, with thanks.
11	150	152	In the paragraph make the following edits: Delete "These should include intended and unintended impacts; immediate and delayed impacts; multiple interactions; and cumulative effects of synthetic biology applied directly for nature conservation or with implications for nature conservation" --The inclusion of the ability to remediate undesirable impacts may be used to support arguments that reversibility should be guaranteed. The issues here can be addressed through risk assessment to ensure risks and benefits are balanced, and an informed decision is made.	The paragraph presents a mixture of concepts related to risk and impact assessments, leading to inaccuracies that should be addressed for clarity and precision: --Risks and impacts assessment are different things and the different options described are more common in impact assessment, and in that context the terminology would be "ability to avoid, mitigate and manage negative impacts". -The term "unintended" in the sentence lacks clarity and precision. By definition, an "unintended" impact implies that it could not have been anticipated or foreseen. Therefore, including such impacts in a risk assessment would be inherently challenging, as risk assessments are designed to evaluate foreseeable risks and impacts. If the intention is to refer to "side effects" or "off-target impacts," then the language should be revised to reflect this accurately.	On risk assessment, the focus is looking at potential negative impacts of a proposed project. On benefit assessment, the focus would be on potential positive impacts. We therefore maintain the terminology. On "unintended," the definition we are using is that unintended impacts or consequences are those that are not planned as a purpose, not deliberate - rather than focusing on uncertainty, which is a different concept. The text mentions the need to consider unintended consequences at the risk assessment stage. We have modified the text of the sentence to make this clearer.
11	152	153	Keep text related to the risk of inaction	It's encouraging to see that the drafting group is considering the risks associated with inaction. Assessing both conservation and non-conservation impacts is valuable as well since it will allow decision makers weight the outcomes of their decision.	Noted, with thanks.
11	152	154	Edit the text to include the word "alternative" after "synthetic," add the word "and" after "approaches," and delete "and the ability to remediate undesirable consequences." Add, "Based on the findings from the risk assessment, a risk management plan should be developed." So the sentence reads as follows: "These should also consider non-synthetic alternative biology approaches and the implications of inaction. Based on the findings from the risk assessment, a risk management plan should be developed."	By incorporating the suggested edits, the text promotes a comprehensive evaluation of options, encourages proactive risk management, and maintains a clear and logical structure that supports informed decision-making.	Noted and text has been modified to reflect need to also look at other approaches. Subsection F.I specifically refers to the need for risk management plans.
11	155	156	keep text	It's reassuring to see language here acknowledging the importance of ensuring that risk assessment policies align with national policies, respect national sovereignty, and comply with relevant international agreements. The present rationale aligns with previous comments regarding the scope of IUCN.	Noted with thanks
11	157	158	Delete the entire sentence: " Risk assessment and benefit assessment for decision-making should, as appropriate, incorporate ecological, cultural, socioeconomic, and animal welfare considerations."	Socio-economic considerations are only encouraged at this stage for Environmental Risk Assessment (ERA), and despite the efforts of the CBD AHTEG, there is no clear methodology or emerging body of literature that provides a robust process. However, socio-economic considerations can be considered through other methodologies, like Environmental, Socio-economic, and Health Impact Assessment (ESHIA), for which IUCN has extensive experience and a set of guidelines. In addition, it is unclear what "cultural" impact would entail, as it has different interpretations and depends on the context.	We discuss here general considerations for risk assessment and benefit assessment, not ERAs in particular. Therefore we do not believe this comment applies. We have therefore maintained the text. This section has been restructured for greater clarity.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
11	159	163	Edit the text: - eliminate the word "incorporate" - delete: " and recognize the scale and complexity of introducing new technologies and their applications to nature." - Replace the word "incorporate" and replace it with "consider"; - After the word "knowledge" insert " and benefits of one technology assessed with others used for the same purpose"	The risk and benefit assessment process should be scientifically sound and conducted case-by-case. However, it is key to consider the perspectives of different stakeholders and follow national requirements. When assessing the risks and benefits of any technology, it is vital to build on past experiences, consider the risks of inaction, and follow a comparative approach. However, the text referring to the comparative approach is a bit confusing. It is unclear what is implied by "recognising the scale and complexity of introducing new technologies"" this might apply to any new technology, not just synthetic biology. It would be better to emphasise the need to	The word "incorporate" has been retained as in many cases it is mandatory or advisable to conduct consultations, incorporate stakeholder perspectives, and obtain free and prior informed consent. Because in other cases it may not be required or relevant, the term "as appropriate" is retained. We have now addressed the need to consider alternatives elsewhere in this section. We have also changed language in this sentence to make it clearer. This section has also been restructured for
11	164	166	Delete the following text: ""As appropriate, risk assessments and benefit assessments should, in accordance with national and international legislation, be established in a participatory and anticipatory approach including relevant stakeholders and rights- holders.""	Stakeholder involvement should comply with existing national legislation. The terms "participatory" and "anticipatory" approaches are unclear. Globally recognized methodologies, such as Environmental Risk Assessment (ERA) and Environmental, Socio-economic, and Health Impact Assessment (ESHIA), are already considered best practices for assessing risks and benefits. Therefore, there's no need to develop new methods from scratch. Lines 164-165 are redundant, as they repeat information already stated in lines 159-162, making the additional sentence unnecessary.	We discuss here general considerations for risk assessment and benefit assessment, not ERAs in particular. Different methodologies may be used - engaging stakeholders should be part of any methodology used. Therefore we do not believe this comment applies. We have therefore maintained the text although the section has been restructured to provide greater clarity..
11	169	171	Keep text	It is plausible that the drafting group is recognising that FPIC should align with national and international instruments, including CBD.	Noted, with thanks
11	172	173	Insert the following text after the word impacted: "by the synthetic biology application" and the "considered and" after should be. the sentence should read as follows: "The views and rights of Indigenous Peoples and local communities who might be impacted by the synthetic biology application should be considered and proactively sought."	suggested text improves the language for clarity.	Thanks for the comment: We have amended the text to improve clarity.
11	176	177	Keep text	We support completely the text in these lines as communication and capacity building for IPLCs is crucial	Noted, with thanks
11	179	180	Keep text	It's encouraging to see the text emphasize the importance of capacity building and financial support for research. Capacity building is inherently linked to research, as developing expertise and skills depends on conducting research activities. Moreover, research requires adequate funding to explore new ideas and generate knowledge effectively. Without financial resources, research efforts cannot be sustained, and capacity building initiatives will struggle to achieve their full potential. Equitable access to tools, knowledge, and the sharing of benefits, alongside access to funding for research, ensures that all stakeholders, including Indigenous Peoples and local communities, can actively participate in and benefit from advancements in synthetic biology. This approach not only promotes inclusivity but also enhances innovation and collaboration, ultimately leading to more sustainable and impactful outcomes.	Noted with thanks
11	193	207	General comment for section V.	This section is balanced overall, and it's positive to see the emphasis on the importance of stakeholder engagement, transparent communication, and capacity building. However, it is key to consider the national context and legislation when referring to FPIC and participation in national regulation and policy development.	Thanks for the comment. FPIC is considered in detail in section F III., and the need to consider international instruments and national legislation is mentioned.
11	213	217	insert after the word should "be encouraged to" in line 213. The sentence should read as follows: "Consistent with their scope, responsibilities, and capabilities, all governmental and non- governmental parties engaged in synthetic biology in relation to nature conservation should be encouraged to offer accessible capacity building in particular for rights-holders and stakeholders, including training and technical expertise to support better engagement, understanding, policy making, implementation, monitoring, and impact assessments."	the insertion of the words " Be encouraged to" clarifies the text by promoting flexibility and inclusivity, recognizing diverse capabilities among parties involved, and encouraging active participation in capacity building without imposing mandates.	Thanks for the comment. We consider the policy encourages offering capacity building here, and we have reworded to provide more clarity.
12	31	32	Delete "Synthetic biology should not be seen to replace ongoing and future efforts addressing the drivers of biodiversity loss"	There is no suggestion that synthetic biology is taking over traditional means.	We agree and have adjusted the text along these lines : "Synthetic biology is not to be seen to replace ongoing and future efforts to address biodiversity loss. Synthetic biology could be complementary to these efforts. "
12	32	32	Synthetic biology should be developed in a way to complement and possibly enhance ongoing and future conservation efforts	Replace the current text with this to clarify what it is trying to say without suggesting any 'replacing'	We agree and have adjusted the text along these lines : "Synthetic biology is not to be seen to replace ongoing and future efforts to address biodiversity loss. Synthetic biology could be complementary to these efforts. "
12	33	34	Replace sentence with another that highlights that research and knowledge gaps remain, but need to be filled for each application of synthetic biology and this needs to be disseminated in an equitable way	Synthetic biology is evolving rapidly so there will always be data gaps. Better to provide a solution than sate a problem.	This is the Problem Definition statement and is not intended to start to articulate solutions.
12	37	41	Keep text	This is a solid overview of the role of IUCN in this process.	Noted with thanks
12	50	54	Keep text	This is a nice, clear goal and nicely states how the IUCN policy should harmonize with other guidelines	Noted, with thanks
12	64	67	Keep text	Excellent connection to CBD definition	Noted, with thanks
12	70	70	Keep text	Good to clarify the purpose of the document as implementation is down to national governments to decide	Noted, with thanks
12	86	88	Keep text	Good to mention all these things so all stakeholders and knowledge can be taking into account when implementing	Acknowledged, text retained.
12	92	92	Keep text	Working on a case-by-case basis is important as synthetic biology is not one thing	Acknowledged, text retained.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
12	93	97	Delete " and by the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Commission on the Ethics of Scientific Knowledge and Technology working definition (2005). Given the fact that all life depends on nature, the application of the precautionary principle should include the In Dubio Pro Natura principle."	Referring to two definitions of the precautionary principle leaves the door open to confusion. Keeping the Rio Declaration definition makes the most sense given that it includes the risk of inaction.	Comment acknowledged. Taking into account the many divergent views in the comments around these references, we have (a) retained the Rio Declaration in the text, as a non-binding international agreement signed by 175 countries; (b) removed the UNESCO 2005 reference from the text because it is a technical document that has not been adopted by countries; (c) retained the Rio Declaration and the UNESCO 2005 reference in the Appendix. Further, we have (e) retained the In Dubio Pro Natura reference in the text because it is specifically relevant to nature conservation, but changed 'include' to 'consider' because the principle has not been formally adopted by governments; and also (f) added a reference to In Dubio Pro Natura into the Appendix.
12	116	117	Replace "in accordance with this policy" with 'be guided by this policy and in accordance with national legislation"	IUCN can guide, but ultimately legal frameworks must be abided by	Comment accepted, national legislation was added to the first paragraph of section F.
12	121	124	Delete "have regard to whether the application is for research, contained use, semi-field or field trials, commerce, or conditioned or unrestricted release into the environment" with "take into account the characteristics of the organism or technology and the proposed conditions of its use, as well as the characteristics of the receiving environment"	This process needs to focus on whether the risks are acceptable or not	Accepted in part. These words have been added to the clause which has been relocated to section F.II. which relates specifically to risk assessment and benefit assessment.
12	132	132	Insert "...across jurisdictions, [in line with national policies] and considering international agreements..."	National legislation is missing	We did not include a reference to national policies because this paragraph focuses on cross-jurisdictional considerations.
12	145	145	risk and benefit assessment	Risks and benefits needs to be considered within one process	Noted. As the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both.
12	148	148	risk and benefit assessment	Risks and benefits needs to be considered within one process	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account.
12	153	153	Keep text	It is critical to keep in the risk of inaction when assessing risks	Noted, with thanks
12	157	157	risk and benefit assessment	Risks and benefits needs to be considered within one process	We consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account. This section has been restructured for greater clarity.
12	159	159	risk and benefit assessment	Risks and benefits needs to be considered within one process	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account. There are in fact methodologies for benefit assessment in the conservation sector and specifically in the IUCN context (e.g. Protected Areas Benefits Assessment Tool). This section has been restructured for greater clarity.
12	164	164	risk and benefit assessment	Risks and benefits needs to be considered within one process	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account. This section has been restructured for greater clarity.
13	28	28	"Synthetic biology may have significant impacts on the integrity and diversity of nature, including conservation efforts. Additionally, it may affect sustainable use and the equitable sharing of benefits arising from the utilization of genetic resources, which primarily concern human interests."	"Sustainable use" and "benefit sharing" by humans have different intrinsic values compared to the "integrity and diversity of nature." They should not be mentioned at the same level as they pertain to human benefits rather than the core ecological values.	These aspects, as listed, reflect the pillars of the missions of IUCN and of CBD. Text has been revised.
13	33	33	"While research is ongoing, our understanding of synthetic biology and its potential ecological, ethical, social, and cultural impacts is limited by the vast extent of unknowns. Millions of organisms and ecosystems remain unexplored, and the basic mechanisms of their interactions, including genetic, epigenetic, and metabolic processes, are neither documented nor understood."	The phrase "significant data and knowledge gaps" does not adequately convey the vast extent of unknowns regarding organisms and ecosystems, as well as the fundamental mechanisms of their interactions, including genetic, epigenetic, and metabolic processes. It is crucial to highlight that many organisms and ecosystems are largely unknown to humans, and our understanding of their complex interactions is still rudimentary.	The statement refers to the data and knowledge gaps in relation to synbio and its potential impacts, and does not seek to make a statement here about wider unknowns
13	40	41	"IUCN therefore has decided to develop a policy on the implications of the use of synthetic biology in relation to nature conservation. Given the extremely wide range of technologies and applications subsumed under the term 'synthetic biology,' it is questionable whether there is any such thing as 'synthetic biology per se.' This policy should not be interpreted as supporting or opposing any specific technologies or applications within synthetic biology."	Given the extremely wide range of technologies and applications under the term "synthetic biology," it is questionable whether the concept of "synthetic biology per se" is meaningful or useful. The revision aims to clarify that synthetic biology encompasses a diverse array of technologies and applications, making it difficult to address as a single, unified concept.	We acknowledge the challenges of defining the scope of synbio. The policy has adopted the definition used by the CBD. The diverse nature of potential applications and tools is acknowledged later in the document in the call for case-by-case assessments.
13	44	44	"The audience for this policy includes all constituent parts of IUCN, such as Members, Commissions, Secretariat, and National, Regional, and Interregional Committees, as well as governments and their institutions, scientific institutions, enterprises, and NGOs working in the field of synthetic biology in relation to nature conservation, regardless of their IUCN membership status."	The audience should be expanded to include governments, scientific institutions, enterprises, and NGOs working in the field of synthetic biology, regardless of their membership status with IUCN. This broadens the scope and ensures comprehensive engagement and input from all relevant stakeholders.	Res123 calls for the creation of an "IUCN policy". However, it is acknowledged that this policy "could be informative to a wider audience".
13	53	53	"on the response to synthetic biology in relation to nature conservation, including informing decision-makers and stakeholders on whether or not to allow the application, particularly the deliberate release into the environment, of synthetic biology applications and products. This includes criteria for identifying applications and uses that are not compatible with the precautionary principle and the In Dubio Pro Natura principle."	The goal should explicitly include informing decision-makers and stakeholders about whether or not to allow the application of synthetic biology, particularly the deliberate release into the environment. It should also include criteria for applications and uses that are not compatible with the precautionary principle and the In Dubio Pro Natura principle.	The precautionary principle and In Dubio Pro Natura are explicitly highlighted in the principles section. The policy is intended to be general guidance and is not intended as detailed implementation.
13	54	54	"This policy is founded on key international instruments, goals, and guidelines, explicitly recognizing those with legally binding obligations such as the Convention on Biological Diversity (CBD) and its Cartagena Protocol. These instruments provide the foundational principles upon which this policy is based."	Key international instruments and their goals should be explicitly named, and those with legally binding obligations, such as the CBD and its Cartagena Protocol, should be recognized as foundational to the principles proposed. This adds clarity and authority to the policy by grounding it in established international agreements and obligations.	Section F, introductory paragraph has been updated to clarify that the policy in its entirety, should be interpreted in accordance with international instruments, national legislation, and customary law. Additionally the appendix explicitly references relevant instruments.
13	55	55	see rationale	The current wording and the table assume that various synthetic biology applications, including genetic engineering of wild organisms and gene drives, can be instruments in the conservation sector. This presents synthetic biology for nature conservation as a significant and comparable sector to industry, agriculture, and medicine, which is misleading.	RES123 explicitly recognises that synthetic biology could be used for nature conservation purposes as referenced in the appendix. This is reflected in section D (Scope) that has been updated for clarity.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
13	56	61	"This policy addresses synthetic biology in relation to nature conservation, including applications developed for other sectors such as industry, agriculture, or medicine that may have potential direct or indirect ecological, social, economic, and cultural impacts. To comprehensively assess and manage these cross-sectoral impacts, the policy includes detailed frameworks for evaluating the ecological, social, economic, and cultural effects of synthetic biology applications from various sectors. These frameworks are designed to provide clear guidance on assessing all impacts and ensure they are thoroughly considered and managed."	The current policy document mentions synthetic biology applications from other fields that might affect nature conservation but lacks detailed guidance on assessing and managing these impacts. The policy should include detailed assessment frameworks to evaluate the ecological, social, economic, and cultural impacts of synthetic biology applications from various sectors.	We respectfully disagree. The policy cannot provide such a detailed assessment framework.
13	56	61	See rationale	Delete the table, because by presenting synthetic biology for nature conservation alongside sectors like industry, agriculture, and medicine, the table visually amplifies the idea that "synthetic biology for nature conservation" is a well-established and comparable field. This is misleading because the scale and level of realization of synthetic biology applications in nature conservation are not comparable to those in other sectors.	RES123 explicitly recognises that synthetic biology could be used for nature conservation purposes: Appendix Section I. The table has been found to be useful by many reviewers in clarifying the scope, particularly for decision-makers.
13	62	67	"This policy applies to all applications of tools and technology of synthetic biology in relation to nature conservation. While synthetic biology is broadly understood according to the operational definition of the Convention on Biological Diversity (CBD) (Decision XIII/17), this policy recognizes and categorizes specific applications and technologies, including CRISPR-Cas edited LMOs, genetically engineered gene drives, microorganisms, insects, mammals, plants, LMOs producing targeted RNAi or dsRNA, and LMOs containing new-to-nature DNA and proteins designed by machine learning algorithms. A case-by-case approach by decision makers is required, allowing for the inclusion of future technologies, while known technologies and applications must be specifically addressed and classified."	Referring only to the vague definition of Synthetic Biology provided by the CBD's ad hoc working group in 2016, which was recognized by CBD's COP 13, in its decision XIII/17, as merely a "useful starting point" for discussions, is insufficient for providing guidance on future applications. Nearly a decade later, specific and potentially hazardous new applications of Synthetic Biology have emerged, including CRISPR-Cas edited LMOs, gene drive systems, microorganisms, insects, mammals, plants, and LMOs that produce targeted RNAi (with potentially lethal properties) and dsRNA. These applications also include LMOs with new to nature DNA and proteins, some designed by advanced machine learning algorithms (facing the "black box" phenomenon). It is essential to categorize and classify these applications based on their risks to effectively guide the assessment of their potential impacts on the diversity and integrity of nature. A tailored approach is necessary, allowing for the inclusion of future technologies while also addressing and classifying known technologies and applications in terms of their ecological, socio-economic, and cultural impacts. That way this policy is both future-proof and actionable.	We respectfully disagree. We are not going into detail about specific technologies in order to future proof the policy as recommended by the Citizen's Assembly.
13	68	69	This policy concretely addresses already known applications and technologies, along with the associated challenges and requirements for their precautionary assessment. Starting from a comprehensive assessment of what is presently known, known to be unknown, and unknown to be unknown, this approach will guide the application of principles and allow for their step-by-step revision in light of progressing scientific understanding, data generation, and technological advancements. This method provides a robust first step towards creating future-proof guidance while maintaining flexibility to incorporate new developments in the rapidly evolving field of synthetic biology.	Specifically addressing existing technologies and applications, along with the challenges and requirements for their careful assessment, would be a crucial initial step toward developing guidance that is prepared for the future. Beginning with a thorough evaluation of what is currently understood, what is recognized as unknown, and what is yet to be discovered, can inform the application of principles and their gradual revision as scientific knowledge, data collection, and technology continue to evolve.	We appreciate this point, but listing specific technologies has proved prohibitive from technical and political perspectives. Furthermore, the recommendation of the Citizens' Assembly was to avoid listing any specific technologies, whether known or not. This recommendation has been followed throughout the policy. Consequently, the text has been retained.
13	74	74	"Recognizing the plurality of values of nature and its benefits, the following principles should be integrated into all discussions and decision-making on synthetic biology in relation to nature conservation."	The term "as applicable" introduces ambiguity and can lead to diverging interpretations of the principles. Removing this term ensures that the principles are consistently applied in all relevant contexts, enhancing their reliability and the overall trust in the policy.	Comment addressed by changing the text, including deleting 'as applicable' and changing "integrated" to "considered"
13	77	77	"Protect and restore the integrity and diversity of nature, encompassing the following operational components: a) Safeguard the integrity of organisms, populations, and species. b) Maintain and enhance the integrity of ecosystems. c) Address and mitigate threats to the integrity and diversity of nature. d) Preserve the known and unknown diversity of living organisms over space and time. e) Ensure prerequisites for maintaining biological integrity, including genetic, epigenetic, and metabolic interactions. f) (..... and others that might be missing here)"	This initial principle outlines the broad objective of the exercise, while the subsequent principles detail the methods for achieving this goal. It should be divided into operational elements that describe key aspects of the integrity and diversity of nature. This includes both the necessary conditions and the threats to the integrity of organisms, populations, species, ecosystems, and the known and unknown diversity of living organisms across different regions and time periods.	Comment noted, specification of aspects of nature conservation are already addressed in the A. Problem definition. We consider that the term 'nature conservation' includes all the listed issues.
13	93	93	See rationale	Please provide detailed guidelines on when and how to invoke the precautionary principle, including specific triggers for halting the development or deployment of synthetic biology applications. Providing detailed guidelines ensures that the precautionary principle is applied consistently across different cases and scenarios. It removes ambiguity and provides clear criteria for decision-makers. Specific triggers for halting the development or deployment of synthetic biology applications are crucial for effective risk management.	This policy provides general guidance and is not intended as a detailed implementation guide. Please refer to section D. Scope.
13	97	97	see rationale	Reference to in dubio pro natura is missing (see comment on line 240)	A reference to In Dubio Pro Natura has been added to the Appendix.
13	98	98	see rationale	For specific synthetic biology applications where risk assessment is not feasible, such as gene drives, the policy should include cut-off criteria. Applications that pose significant risks, such as the potential to drive species to extinction or cause irreversible ecological harm, should be subject to a moratorium until robust risk assessment methodologies are developed. Invoking a moratorium aligns with the precautionary principle, which dictates that in the face of significant uncertainty and potential for severe harm, precautionary measures should be taken to avoid or minimize risks. Also establishing clear cut-off criteria and a moratorium builds confidence among the scientific community, policymakers, and the public. It shows a commitment to responsible and cautious advancement in the field of synthetic biology.	Comment addressed by editing F.1.a. to make explicit reference to 'criteria on whether or not to proceed at any stage'.
13	106	106	"Decision-makers should be able to access an overview of relevant synthetic biology developments and applications in relation to nature conservation. Additionally, they should have access to the latest findings on the rapidly evolving scientific understanding of the complexity and interactions between living organisms and their ecosystems. To the extent possible, a clear distinction should be made between technical developments and applications and the authoritative knowledge level of understanding the complexity of life. This is especially important in times when significant gaps may exist between these distinct levels of development."	Add: Access to an overview on the latest findings on the rapidly evolving field of scientific understanding of the complexity and interactions between living organisms and their ecosystems. To the extent possible, a clear distinction should be made between technical developments and applications and the scientific (and other authoritative knowledge) level of understanding the complexity of life addressed. This is especially important in times when there might be significant gaps between these distinct levels of development.	Comment acknowledged, we have specifically included references to the interactions in the complex web of nature and between the different points raised already in the document.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
13	108	108	see rationale	Given the divergent perspectives mentioned in this document, it is recommended to clarify the meaning of "science-based approach." This term should not be confused with the idea that scientists or any predominant group of experts in the field should dictate decision-making by imposing their unique cultural, technical, and economic viewpoints. Instead, "science-based" should strictly refer to the caliber of responses provided to the inquiries posed by all stakeholders involved in the decision-making process.	We acknowledge the importance of other knowledge systems and perspectives in this sentence and these systems have been duly recognized throughout the policy. It reads "...considering other knowledge systems, feedback and perspectives from diverse stakeholders and rights-holders including Indigenous Peoples and local communities, and gender and intergenerational equity."
13	113	113	"Frameworks to evaluate and manage potential risks and benefits of research, development, and applications of synthetic biology in relation to nature conservation should:"	Delete "as appropriate" see comment on line 74	The policy mandates a case by case approach. The term 'as applicable' has been deleted in Section E Principles, but the term 'as appropriate' is retained here because consideration of how specific issues are to be applied when making decisions on particular synbio applications need to be made on a case by case basis.
13	114	114	see rationale	This section should start with a consideration regarding the legitimacy of decision making with respect to space (potentially affected areas and habitats) and time (potential impacts on future generations of humans and other organisms) and representation (what decisions should be made by whom?)	The concept of legitimacy was added to the first paragraph of section F with the link to decision making being in accordance with international and national legislation and customary law.
13	119	119	"Adopt a case-by-case assessment approach. An early, context-sensitive, inclusive, and participatory problem formulation process should also be followed."	Delete "when relevant". By making the point unequivocal, the policy emphasizes the necessity of context-sensitive and inclusive problem formulation in all assessments, enhancing the robustness and fairness of the decision-making process.	We respectfully disagree. The necessity for such conditions needs to be assessed on a case by case basis.
13	122	124	see rationale	Delete "when relevant". By making the point unequivocal, the policy emphasizes the necessity of context-sensitive and inclusive problem formulation in all assessments, enhancing the robustness and fairness of the decision-making process.	We respectfully disagree. The necessity for such conditions needs to be assessed on a case by case basis.
13	127	127	"Ensure risk management plans are in place, and, when necessary, these plans include clear and enforceable conditions relating to containment, monitoring of effects, reporting, recalling, reversibility, contingency plans, and responses to address adverse effects."	Include the terms "recall" and "reversibility". Incorporating "recall" ensures that there are clear protocols for retracting or ceasing the use of synthetic biology applications if they are found to cause harm or pose unforeseen risks. Highlighting "reversibility" emphasizes the importance of ensuring that any actions taken can be undone or mitigated, safeguarding against long-term or irreversible impacts on ecosystems and biodiversity.	These concepts are already addressed adequately by the reference to contingency plans and responses to address adverse effects.
13	128	128	"f) Assess and impose conditions relating to liability and redress."	Delete "when necessary" see comment on line 74	The necessity for such conditions needs to be assessed on a case by case basis.
13	132	132	"h) Address cross-jurisdictional risks and benefits and call for collaboration among relevant parties across jurisdictions, based upon adherence to international agreements such as the Cartagena Protocol."	Replace "considering" with "based upon adherence to international agreements ". Using "based upon adherence to" rather than "considering" emphasizes a stronger commitment to complying with established international agreements. This ensures that policies are not just acknowledging but actively following these agreements.	We have changed the word "considering" to "in line with."
13	132	132	"h) Address cross-jurisdictional risks and benefits and call for collaboration among relevant parties across jurisdictions, based upon adherence to international agreements such as the Cartagena Protocol and the Biological Weapons Convention (BWC)."	Add referenced to Biological Weapons Convention (BWC). Including the BWC ensures that synthetic biology applications adhere to international security standards, preventing misuse and enhancing global safety.	The references are examples and are not intended to be an exhaustive list of considerations; we have only mentioned the most relevant agreements.
13	133	133	"i) Ensure the proponent of a synthetic biology development or application be responsible for full public engagement, transparency, and information."	Replace "appropriate" with "full", add "information". Replacing "appropriate" with "full" and adding "information" emphasizes the need for comprehensive and thorough public engagement, ensuring complete transparency and dissemination of information.	We have added the word information. We respectfully decline to change the term "appropriate" to "full." The reason is that there are different scales and levels of risk, for example, for various applications of synthetic biology. Some may only occur in a fully contained lab. Others may occur in nature. So the public engagement and other related requirements need to be appropriate to the circumstances.
13	138	138	"All parties are encouraged to apply the above provisions, and seek comment or advice from independent relevant expert bodies. Minimal biosafety legislation and competence of public institutions should be explicitly requested as a precondition for respective decision-making, particularly in jurisdictions where there are no pertaining legislative, administrative, or policy measures."	Minimal biosafety legislation and competence of public institutions should be explicitly requested as precondition for respective decision making.	Suggestion noted with thanks, and this point has been edited further to a number of other comments. However, the addition of explicit requests is beyond the scope of what the IUCN can mandate
13	139	139	see rationale	"independent relevant expert bodies" should be specified or else erased.	Given the generality of the considerations laid out here, it would be impossible to list every relevant expert body in this document. No change made.
13	139	139	see rationale	It should be made clear that comments and advice are not replacements for legal and administrative rules and authority.	We agree and think the current wording is consistent with this. The chapeau has been revised to be clear that all of the general considerations should be applied "in accordance with international instruments, national legislation, and customary law", such that it is no longer necessary to make specific reference to "legal and administrative rules and authority" here
13	141	141	"B. Benefit Assessment: a) Critically evaluate claims of benefits, emphasizing the need for empirical evidence. b) Distinguish between speculative benefits and those that are demonstrably achievable. c) Consider alternative non-synthetic biology approaches that might achieve similar benefits with fewer risks. d) Ensure that benefit assessments include a thorough review of ethical, social, and economic implications. e) Identify and mitigate potential conflicts of interest to ensure unbiased assessments."	There is a need to divide this section into two, to cover risks and benefits independently as the promises of synthetic biology often come with claims of significant benefits, but these are frequently speculative and not backed by empirical evidence. The policy should help members critically evaluate these claims.	It is necessary to keep risk assessment and benefit assessment together because, as the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both. We consider that these points are included insofar it is possible in a policy level document (e.g. case-by-case basis and ecological, cultural socioeconomic and other consideration, in line with national policies for risk assessment), but cannot provide more detail. This section has now been restructured for clarity.
13	142	143	see rationale	Delete "as applicable" "" name other principles referring to	We have modified the text for more clarity and to align with new language in the section on principles. Principles are already listed in the relevant section. This section has also now been restructured for clarity.
13	150	150	"These should include intended and unintended impacts; immediate and delayed impacts; multiple interactions; cumulative effects; and known and unknown risks of synthetic biology applied directly for nature conservation or with implications for nature conservation."	Include "known and unknown risks".	We have modified the text in this section to call attention to the need to recognise any potential knowledge gaps.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
13	151	154	"These should include intended and unintended impacts; immediate and delayed impacts; multiple interactions; cumulative effects; known and unknown risks; and the level of knowledge and known as well as unknown uncertainty of synthetic biology applied directly for nature conservation or with implications for nature conservation. These should also include a precise problem description and a description of available and conceivable problem solutions, including their advantages and disadvantages. Additionally, they should consider non-synthetic biology approaches, the implications of inaction, and the ability to remediate undesirable consequences."	Include "precise problem description" and "description of available and conceivable problem solutions including their advantages and disadvantages" and delete "implications of inaction". Highlighting the implications of inaction could promote a bias towards action, even when the risks are not fully understood or assessed. This bias could undermine comprehensive risk assessments by implying that doing nothing is inherently negative or harmful, which may not always be the case in conservation. It risks creating a false dichotomy where inaction is seen as failure, rather than a legitimate and often necessary choice to protect ecosystems.	These are important considerations in risk assessment and benefit assessment processes. We consider this sentence to be balanced and unbiased.
13	157	157	"Risk assessment and benefit assessment should incorporate ecological, cultural, socioeconomic, and animal welfare considerations."	Delete "as appropriate" see comment on line 74	We have retained the original text as not all of the considerations will be appropriate in all cases of synthetic biology. This section has been restructured for greater clarity.
13	161	161	"Risk assessment and benefit assessment should, in accordance with national and international legislation, incorporate feedback and perspectives from diverse stakeholders, including Indigenous Peoples and local communities; build upon past experience and knowledge; be complementary to existing methods; and recognize the scale and complexity of introducing new technologies and their applications to nature."	Delete "as appropriate" see comment on line 74	There may be situations where some of these considerations do not apply thus we retain the original wording. This section has been restructured for greater clarity.
13	164	164	"Risk assessments and benefit assessments should, in accordance with national and international legislation, be established in a participatory and anticipatory approach including relevant stakeholders and rights-holders."	Delete "as appropriate" see comment on line 74	There may be situations where some of these considerations do not apply thus we have retained the original wording while this section has been restructured for clarity.
13	165	165	"Risk assessments and benefit assessments should, in accordance with national and international legislation, be established in a participatory and anticipatory approach including relevant stakeholders and rights-holders, such as farmers, institutional and civil society nature protection actors, environmental, human and women's rights organizations, food, health, and cultural heritage NGOs and institutions, local community leaders, landowners, and nature-related businesses."	"relevant stakeholders and right holders" should be specified and include at least farmers, institutional and civil society nature protection actors, environmental, human and women's rights, food, health, cultural heritage NGOs and institutions, local community leaders, landowners, nature related businesses	The policy does not list specific stakeholders to avoid being overly narrow or prescriptive to specific circumstances. This section has been restructured for greater clarity.
13	169	169	"The principle of Free, Prior and Informed Consent (FPIC) in relation to the application of synthetic biology for nature conservation should be in alignment with relevant national and international instruments, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and the CBD. FPIC affects and protects not exclusively Indigenous Peoples and local communities but initially refers to the right of all people affected and their national and international representatives and governments. Applications of synthetic biology with the potential for cross-border impacts therefore need the consent of all states and communities potentially affected. The views and rights of all these groups should be proactively sought."	The principle of free, prior and informed consent affects and protects not exclusively indigenous peoples and local communities, but initially refers to the right of all people affected and their national and international representatives and governments. Applications of Symbio which have the potential of cross border impacts therefore need the consent of all states and communities potentially affected.	We agree that public involvement is important in decision making and it is addressed in other sections (E. Principles and F.I. General Considerations for Decision Making). For this sections, FPIC is being interpreted in accordance with the named instruments (i.e. UNDRIP and CBD)
13	171	171	"The principle of Free, Prior and Informed Consent (FPIC) in relation to the application of synthetic biology for nature conservation should be in alignment with relevant national and international instruments, including the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the Convention on Biological Diversity (CBD), and the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP). FPIC affects and protects not exclusively Indigenous Peoples and local communities but initially refers to the right of all people affected and their national and international representatives and governments. Applications of synthetic biology with the potential for cross-border impacts therefore need the consent of all states and communities potentially affected. The views and rights of all these groups should be proactively sought."	Include as well the Declaration on the rights of peasants and other people working in rural areas (UNDROP) https://digitallibrary.un.org/record/1650694?view=pdf . This revision ensures that the principle of Free, Prior and Informed Consent is applied broadly to all affected individuals and communities, including considerations for cross-border impacts. The inclusion of UNDROP recognizes and protects the rights of peasants and other people working in rural areas, further strengthening the policy's commitment to inclusivity and protection of rights.	Thanks for the comment: we have included UNDROP to the text and the appendix
13	200	201	"All relevant parties should seek to be aware of the most up-to-date and relevant information about synthetic biology research and applications, about nature protection, scientific understanding, and other authoritative knowledge about the diversity of life and its complex interactions."	Include "about nature protection, scientific understanding and other authoritative knowledge about the diversity of life and its complex interaction" see comment on line 106	Comment noted and issues addressed. See also Section F. I. on general considerations for decision-making.
13	210	210	"Information about synthetic biology in relation to nature conservation, biological diversity, and genetic integrity should be communicated in an accessible manner, including by making use of open source platforms and using clear, easy to understand language, and technology that the public can engage with."	Information about" add "biological diversity and genetic integrity". This enhances the scope of information shared, promoting a broader understanding of the impacts of synthetic biology.	Comment noted. The scope of the policy is synthetic biology in relation to nature conservation, including the issues mentioned.
13	240	240	"IUCN's Environmental Rule of Law (2016) and its 13 principles"	Adding the IUCN's Environmental Rule of Law and its 13 principles ensures that the policy references a comprehensive framework that underpins environmental governance and legal standards. Incorporating these principles provides additional guidance for implementing and adhering to robust environmental laws and policies.	Thanks for the comment. We have added reference to this declaration under the Principles section of the Appendix
14	26	28	Keep text.	It's great to see the text acknowledge both the benefits and risks of Symbio and recognize the various types of applications.	Noted with thanks
14	33	36	Delete text	While research on synthetic biology is ongoing, there are still opportunities to better understand its potential ecological, ethical and social impacts. Synthetic biology encompasses a range of applications, some of which are well-established with minimal issues, while others have significant knowledge gaps. Addressing these gaps requires adequate resources for research, the generation of peer-reviewed data, and the integration of traditional knowledge. Furthermore, impacts should be assessed on a case-by-case basis rather than broadly applying to synthetic biology as a whole, and ensuring that information is accessible in an equitable way is crucial.	This has been retained in modified form to start to frame the rationale for having a policy.
14	39	41	Keep text	Crafting this policy can enhance our understanding of synthetic biology and its impacts on nature conservation. It is essential that the policy remains impartial, avoiding a stance that is either "for" or "against" synthetic biology. As stated in IUCN Resolution 123, "IUCN DG and Commissions should maintain neutrality on all issues related to synthetic biology. The process should be inclusive and foster a better understanding of synthetic biology."	Noted with thanks

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
14	43	61	Keep text	It's encouraging to observe a clear understanding of the target audience and scope, and to see that the policy's objectives are well-defined and aligned with other international standards and guidelines. Utilizing graphics to effectively illustrate the scope is a valuable approach.	Noted with thanks
14	70	70	Suggested edit	This policy provides general guidance and is not intended as a detailed implementation guide.	We have edited the text accordingly
14	70	70	Keep suggested text	It is great that the draft clearly distinguishes the policy as general guidance rather than detailed implementation instructions.	Noted, with thanks
14	86	86	Keep text	Good to clearly state that decision-making needs to be science-based.	Acknowledged, text retained.
14	93	97	Keep text	The precautionary principle is applied in situations where there is scientific uncertainty, with the goal of allowing actions or omissions to prevent potential environmental harm. Implementation of the precautionary principle can vary between countries due to differences in protection levels, socioeconomic contexts, and priorities. Additionally, incorporating the concept of "In Dubio Pro Natura" into the draft is crucial. This approach encourages decision-makers to favor actions that protect and conserve nature, requiring a case-by-case assessment. Actions should not be undertaken if their potential adverse impacts on the environment are disproportionate or excessive compared to the benefits they may provide.	Comment acknowledged
14	103	106	Substitute text	Synthetic biology is advancing rapidly and has the potential to both benefit and harm the natural environment. It is crucial for decision-makers to thoroughly research and evaluate synthetic biology advancements and their applications in the context of nature conservation to make well-informed determinations.	Comment acknowledged. The point on positive and negative impacts is addressed in the second paragraph of section A. The spirit of the second proposed sentence has been addressed by replacing 'an overview of' with 'information on'.
14	116	117	Delete text, specific words: "this policy". Replace with: "National legislation".	The IUCN scope is to provide guidance and not to interfere within national legislation of each country.	Comment accepted, national legislation was added in the first paragraph of section F.
14	133	134	Add language	The proponent of a synthetic biology development or application and relevant authorities should be responsible for appropriate public engagement and transparency, according to national requirements.	Noted. We have added the reference to relevant authorities. The chapeau has been revised to be clear that all of the general considerations should be applied "in accordance with international instruments, national legislation, and customary law", such that it is not necessary to make specific reference to "according to national requirements" here
15	1	1	I fully agree with the text.	I fully agree with the text.	Noted with thanks
16	31	32	Replace "and" behind the comma with "but"	the suggested edit brings better across the point made, ie that it shouldnt replace conservation efforts	We agree and have adjusted the text along these lines : "Synthetic biology is not to be seen to replace ongoing and future efforts to address biodiversity loss. Synthetic biology could be complementary to these efforts. "
16	59	60	The table below illustrates this scope, recognising that there may be overlapping areas that blur the lines between these categories	to use easier language, thus to make the policy more accessible	We have edited this text for clarity
16	131	132	Address cross-jurisdictional risks and benefits and call for collaboration among relevant parties across jurisdictions, considering agreements such as the Cartagena Protocol or the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention)	I think its an important opportunity to raise the profile of the Espoo convention	Indeed, the Espoo Convention may be one of the agreements considered in this context. The policy does not seek to enumerate all relevant agreements and prioritises agreements with broader global focus.
17	77	77	Protect and restore integrity and diversity of nature in a changing climate	Conservation planning approaches that consider the impacts of climate change on goals and actions are essential to ensuring that conservation efforts remain effective into the future and achieve associated adaptation outcomes. A reference to climate change in the principles should be considered.	Comment noted, the policy in its entirety is written in the context of climate change (Problem definition; Section A).
17	112	113	Frameworks to evaluate and manage potential short- and long-term risks and benefits of research, development, and applications of synthetic biology in relation to nature conservation should, as appropriate:	The use of synthetic biology products will often be considered in situations that call for a rapid decision, such as early response to the arrival of a new invasive species or pathogen. This may lead decision makers to "" inappropriately "" pay more attention to the short-term benefits (and risks) than to the long-term risks (and benefits). In section F II the draft Policy mentions the need to consider "immediate and delayed impacts" and "cumulative effects", but this comes late in the document and only in the section discussing approach for conducting risk assessment. We recommend that the need to consider long-term implications is highlighted also in section F. I. about decision making.	Thank you for the comment. We agree that reference to both short and long term effects is important. We have amended the text in the third paragraph of Section F.II. accordingly.
17	193	217	A policy statement (i.e., a new paragraph) should be added to section F V calling for decision makers to systematically communicate and explain their decisions, in a clear, detailed, accessible and comprehensible manners, to all interested and potentially impacted parties.	There is significant reference to information sharing, public awareness, and FPIC in section F V. But all the provisions refer to views, information, data, results, findings, etc. What is missing would be a policy statement regarding communication of the decision-maker's decisions and how information was considered and used in the decision process. Section F I appropriately states that the decision-making process should be transparent, which implies that decisions, once made, will be communicated. However, since tensions regarding the use of synthetic biology have originated, in part, from failures to communicate the basis and rationale for decisions made.	Thanks for the comment. We agree that this is a relevant aspect and have adjusted the text to call for transparency around the rationale for decision-making.
18	50	52	make this one goal	This should be a single goal and one or more additional goals should be added. There needs to be more than decision-making in the policy, especially considering that IUCN will rarely be in a decision-making position, and that there will be many activities that can be influenced by the policy that are not decisions.	The goal, as stated, is "to provide a basis to inform decision making" rather than to suggest the decisions themselves. As such, breaking it into 2 sections is clearer.
18	53	53	To improve understanding and governance of synthetic biology ...	The second bullet point is too vague to be meaningful. The proposed edit adapts res 123 Annex Section I for a more concrete, meaningful goal. It could include the rest of the original sentence.	We therefore have not changed the text in this instance Goal is kept succinct and further elaborated in the policy. On this point, awareness raising and improved understanding are included in Section F.V of the policy. Good decision-making implies appropriate information, understanding and governance. Taking into consideration your comment and other comments received, this text in the policy has been updated for clarity and to better align with the chapeau
18	113	113	add a space after biology	punctuation	Thank you, space added.
18	125	128	replace "when necessary" with "when appropriate"	The determination of necessity suggests a higher threshold than appropriateness, and without some definition of what it means or who is to judge necessity, it is likely to render the measure a nullity.	The 'when necessary' here applies to risk management plans in general, rather than the specific pieces of the plan. The necessity for such conditions needs to be assessed on a case by case basis.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
18	128	128	add "where there is a risk of transboundary harm, including harm to areas beyond national jurisdiction"	The current text is too vague to be useful. Also, (j) refers to national legal systems; it would make sense to use (f) to capture liability for transboundary harm.	The suggestion was incorporated with the reference to: the Nagoya-Kuala Lumpur Supplementary Protocol
18	139	139	replace "pertaining" with "applicable"	Word choice	Noted with thanks. Suggested change made.
18	146	147	replace "proportional" with "commensurate"	Commensurate adds the suggestion of a more general comparison; proportional implies that the comparison is one of size alone.	We consider proportional to be the most accurate word here.
19	1	269	None	Thank you for addressing our previous comments.	Noted with thanks
19	31	32	Replace "and" with "though" in line 32	Sentence reads strangely as it stands.	This sentence has been adjusted for clarity
19	34	36	Replace sentence with this wording: "Over time, further guidance on how synthetic biology applications might interact with nature conservation will enable a better evaluation of the risks and benefits."	The ew sentence included in the second draft is not very clear and reads strangely.	We agree and have adjusted the text to indicate the need for a policy to inform decision making on the implications of synbio applications, rather than implying the policy would guide the applications themselves, and we are not calling for additional guidance.
19	111	113	"biology in"	Typo	Thank you. Corrected.
19	119	119	context-sensitive	Typo	Accepted.
20	17	17	general comment on the section "Problem Definiton"	Suggestion: The actual problem needs to be clearly articulated: Divergent views on synthetic biology in relation to nature conservation particularly concern applications involving the genetic modification of wild organisms, especially those that are claimed to be beneficial for species conservation. As currently worded, the problem statement leaves the reasons for divergent views unclear, which can lead to confusion for those not already familiar with the topic. It is essential to clearly outline the central issues driving these divergent views. This is not about providing excessive detail, but rather ensuring that the document contains the minimal amount of detail necessary to be understandable. Moreover, this approach is entirely consistent with Resolution 123, which calls for a policy on synthetic biology in relation to nature conservation. The most contentious application scenarios, such as wild GMOs and genetic modification for species conservation, are indeed key aspects of synthetic biology that must be addressed.	The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation. Ref L68-69
20	18	24	suggestion	These lines can be supported, but we would suggest a more committed initiative to realise what we consider examples of the most valuable methods in nature conservation.	The text has been kept general on purpose to avoid limiting the inference to specific issues. Reviewing what might be the most valuable methods in nature conservation is beyond the scope of the policy
20	26	29	"Depending on the type of application, synthetic biology may have significant impacts on many aspects of the integrity and diversity of nature."	Suggestion to delete "positive and negative". Removing the qualifiers "positive and negative" from the description of synthetic biology's impacts simplifies the sentence without losing its essence. This change emphasizes the spectrum of impacts rather than labeling them, allowing for a more neutral and objective discussion. Suggestion to delete from "including" onwards. Eliminating the phrase starting from 'including' simplifies the sentence, making it more concise and focused. This portion of the text currently introduces additional concepts that may not be essential for the initial problem statement, potentially leading to confusion.	This was discussed and no change was made because it was felt the use of the words positive and negative are intended to express the true dichotomy of possible impacts. The subsequent list of aspects reflect the pillars of the missions of IUCN and of CBD.
20	30	31	"Applications...people"	Suggestion to delete "Applications have the potential to be beneficial and to pose risks to biodiversity and people". Suggestion to spell out instead the points that it has been suggested to genetically modify wild organisms for the benefit of species conservation, and this is the root of the controversy. It is crucial to explicitly mention that certain synthetic biology applications, such as genetically modified wild organisms and gene drives, have been suggested as potentially beneficial to biodiversity. This is not self-evident and must be clearly stated. Additionally, there is no need to mention impacts on people at this stage. Instead, the problem statement should focus on the central points of contention: the use of GM wild organisms, gene drives, and the compatibility of genetic engineering with the concepts of nature conservation. These points must be clearly articulated to ensure a comprehensive understanding of the issue at hand.	The first sentence has been deleted. The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation
20	35	36	"Further guidance on how synthetic biology applications might interact with nature conservation can support a better evaluation."	Deleting the phrase 'of the risks and benefits' simplifies the sentence and broadens the scope of the discussion, making it less repetitive and more directly focused on how synthetic biology might interact with nature conservation as a whole.	We agree and have adjusted the text to indicate the need for a policy to inform decision making on the implications of synbio applications, rather than implying the policy would guide the applications themselves, and we are not calling for additional guidance.
20	37	37	suggestion	Suggestion to include before this line a very brief description of the divergent views alluded to. The problem statement is otherwise not understandable for people who are not yet familiar with the matter. please see comment on line 17	The second paragraph of section A alludes to the basis of divergent views with reference to the potential for positive and negative impacts, but it was not considered appropriate here to try and capture the wide range of changing views.
20	40	41	"This policy should not be interpreted as supporting or opposing synthetic biology, per se."	We are supporting the inclusion of this sentence, but it is not enough. While the policy explicitly states that it neither supports nor opposes the use of synthetic biology applications, other sections, particularly Section IV, suggest an implicit endorsement by discussing tools, knowledge, and benefits sharing as if the applications are already being utilized. To avoid any misleading implications and ensure the policy remains neutral, it is recommended to remove Section IV to better align with the document's intended stance of neutrality.	For the problem statement this framing is appropriate. The later text has been reviewed to ensure the stance of neutrality is maintained
20	50	54	Delete	Delete 50-54. Restating WCC-2020-Res123.	Respectfully disagree. The resolution does not provide a goal for a policy as RES123 is about the purpose of the process for developing this policy. Therefore, we need an explicit goal statement for this policy. We therefore have not changed the text in this instance
20	56	61	This policy addresses synthetic biology in the context of nature conservation, with a focus on applications such as genetic engineering and engineered gene drives. Although these technologies are primarily developed for industry, agriculture, and medicine, some scenarios propose their use in nature conservation. While such applications represent a small proportion of overall scenarios, they have significant implications for nature conservation due to their potential direct and indirect ecological, social, economic, and cultural impacts.	Delete the table. And reword 56-60. The wording and the table still implicitly assume that (all kinds of) synthetic biology applications, including genetic engineering of wild organisms and including gene drives, can in principle be instruments in the conservation sector. The table would not make sense without this assumption, and it visually amplifies the idea that there is such a thing as "synthetic biology for nature conservation" by giving this hypothetical idea a whole column on the same level as the "other sectors", as if they were comparable in scale or level of realisation. Which is not the case.	RES123 explicitly recognises that synthetic biology could be used for nature conservation purposes: Appendix Section I. The table has been found to be useful by many reviewers in clarifying the scope, particularly for decision-makers.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
20	62	67	no edits	We support using the CBD operational definition. This policy references specific applications and technologies, such as CRISPR-Cas edited LMOs, microorganisms, insect, genetically engineered gene drives, etc.. A case-by-case approach by decision-makers is crucial, adhering to the precautionary principle.	Noted, with thanks
20	68	69	suggestion to elaborate further	Please change to include the introduction of some basic categories of synthetic biology. This could involve just including distinctions: do they involve nucleotide synthesis? Do they involve genetically modified organisms? Do they involve changing the genome of protected species? Do they involve synthetic gene drives? Do they involve the release of genetically modified organisms? Examples are not necessary and might be too much (although we do not generally oppose using examples), but naming some of the essential distinctions/categories is absolutely essential for the policy to be useful. Also, trying to make the policy future-proof in light of the rapidly changing situation too ambitious and also not necessary, as it is after all not a piece of legislation and the CBD processes in this respect are dynamic.	We appreciate this point, but listing specific technologies has proved prohibitive from technical and political perspectives. Furthermore, the recommendation of the Citizens' Assembly was to avoid listing any specific technologies, whether known or not. This recommendation has been followed throughout the policy. Consequently, the text has been retained.
20	70	70	delete	This could be deleted, or else maybe moved to Section C, in which you may want to consider deleting the second part of the sentence. It is not part of the scope, but part of the goal. It is also self-evident in our opinion. The second part of the sentence is one more example (like, e.g., the Table in the same Section) of parts of the draft that in a very indirect way contribute to impression that it is already set that synthetic biology be used for the purpose of nature conservation. Why else would it need to be spelled out that the policy is not giving implementation advice.	Noted. However, we consider that this comment is appropriate in the section on Scope because other commentators have requested the inclusion of details which are beyond the scope of this policy.
20	72	74	"Recognizing the plurality of values of nature and its benefits, the following principles should be integrated into all discussions and decision-making on synthetic biology in relation to nature conservation."	Suggestion: Delete ", as applicable". The principles are generally valid, the addition introduces a relativism that could be instrumentalised to undermine the validity of the principles.	Comment addressed by changing the text, including deleting 'as applicable'
20	92	92	"Adhere to a case-by-case approach as included in the Cartagena Protocol on Biosafety to the CBD."	Suggestion: Replace "Adopt" by "Adhere to". In most cases, the audience of the policy will not be adopting principles, but rather adhering to them.	Comment acknowledged, text changed to 'Apply'. The use of the word 'apply' rather than adhere to is more commonly used regarding the case by case approach.
20	92	92	suggestion	Suggestion: Add recognition that robust case-by-case assessment is only possible when reliable risk assessment instruments are available, also in light of cumulative effects, and there is not too much uncertainty. We strongly support the case-by-case principle. Unfortunately, it reaches its boundaries when reliable risk assessment instruments are not available, and/or in cases with too much uncertainty. This is why case-by-case goes hand in hand with the precautionary principle. We recognise that this aspect is touched upon in section F, but it is so central that it deserves one sentence within the principle, too.	Comment addressed. Applying the case by case approach entails considering issues such as the appropriate status of information. Issues raised on the interconnections among the Principles have now been addressed by an amendment in the first paragraph of Principles.
20	93	96	"Adhere to the precautionary principle, as articulated in the 1992 Rio Declaration (Agenda 21, Principle 15) and by the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Commission on the Ethics of Scientific Knowledge and Technology working definition (2005)."	Suggestion: Replace "Adopt" by "Adhere to". In most cases, the audience of the policy will not be adopting principles, but rather adhering to them.	Comment acknowledged, text changed to 'Apply'. The use of the word 'apply' rather than "adhere" to is more commonly used regarding the precautionary principle.
20	93	97	no further edits	Very strongly support / welcome, especially also that reference to UNESCO and to In Dubio Pro Natura are included. This alignment with well-established international frameworks is indeed crucial for reinforcing the policy's credibility and ensuring it upholds global standards in environmental ethics and precaution.	Comment acknowledged. Taking into account the many divergent views in the comments around these references, we have (a) retained the Rio Declaration in the text, as a non-binding international agreement signed by 175 countries; (b) removed the UNESCO 2005 reference from the text because it is a technical document that has not been adopted by countries; (c) retained the Rio Declaration and the UNESCO 2005 reference in the Appendix. Further, we have (e) retained the In Dubio Pro Natura reference in the text because it is specifically relevant to nature conservation, but changed 'include' to 'consider' because the principle has not been formally adopted by governments; and also (f) added a reference to In Dubio Pro Natura into the Appendix.
20	112	113	"Frameworks to evaluate and manage potential risks and benefits of research, development, and applications of synthetic biology in relation to nature conservation should:"	Suggestion: Delete ", as appropriate". The addition introduces a relativism that could be instrumentalised to undermine the validity of the highly relevant and important message.	The policy mandates a case by case approach. The term 'as applicable' has been deleted in Section E Principles, but the term 'as appropriate' is retained here because consideration of how specific issues are to be applied when making decisions on particular synbio applications need to be made on a case by case basis.
20	119	120	"c) Adopt a case-by-case assessment approach. An early, context-sensitive, inclusive, and participatory problem formulation process should also be followed."	Suggestion: Delete "When relevant, ". This is generally relevant, the addition introduces unnecessary relativism to an important point.	We respectfully disagree. The necessity for such conditions needs to be assessed on a case by case basis.
20	121	124	d1) Assess risks in accordance with section F II. The risk assessment should have regard to whether the application is for research, contained use, semi-field or field trials, commerce, or conditioned or unrestricted release into the environment. It should prioritize understanding and mitigating potential harms, especially in cases of uncertainty, following the precautionary principle. d2) Evaluate claimed benefits to rigorous, independent validation. Benefits must not be based on computer models only and need to be scrutinised for	We suggest to split d) into two distinct sections, that way the policy can provide more precise and rigorous guidance.	We have revised this section in line with this and other comments. We consider that a rigorous approach should be applied to both risk assessments and benefit assessments. The application of the precautionary principle is important and is provided for throughout this document. Independent review is now addressed in F.I.(c)
20	122	124	no further edits	Very much appreciated that these important distinctions are listed here, please retain as is	Thank you.
20	143	144	"Assessments of risks should be guided by the precautionary principle and other principles outlined in section E."	Suggestion: delete "as applicable" and "and benefits". The precautionary principle pertains to explicitly to risks, not to benefits and should always be applied.	We have modified the text for more clarity and to align with new language in the section on principles. Principles are already listed in the relevant section. As the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both.
20	145	145	no edits	We support to clearly distinguish between risks and benefits, as noted in line 145. The promises of synthetic biology often include claims of substantial benefits, but these are often speculative and not supported by empirical evidence. The policy should help members critically assess these claims.	Noted, with thanks.
20	148	150	"Risk assessments should be enacted on a case-by-case basis; be comprehensive and transparent; and include such detail as corresponds with the significance of the risks."	Suggestion: delete "and benefit assessments". The advice contained in lines 145-147 should be followed here, keeping the risk and benefit aspects separate on the assessment level.	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
20	150	152	"These should include intended and unintended impacts; immediate and delayed impacts; multiple interactions; uncertainties; and cumulative effects of synthetic biology applied directly for nature conservation or with implications for nature conservation."	Suggestion: add "uncertainties, ". Uncertainties are an important/central aspect of risk assessment of synthetic biology in relation to nature conservation. Other than that, we support, this section. It effectively emphasizes the need to consider a wide range of impacts, including unintended and cumulative effects, which is crucial for comprehensive risk assessments in synthetic biology.	We have modified the text in this section to call attention to the need to recognise any potential knowledge gaps, which may generate uncertainty.
20	152	154	"These should also consider non-synthetic biology approaches, the implications of conflicting goals, and the ability to remediate undesirable consequences."	Suggestion: replace "consequences of inaction" by "conflicting goals". There is a long tradition in nature conservation of considering whether or not to intervene with particular methods because there are typically conflicting goals, such as avoiding a genomic bottleneck but also allowing evolutionary mechanisms to strengthen a population. "Conflicting goals" addresses this with less bias than "consequences of inaction".	Noted, but we consider "inaction" the more relevant concept. Looking at the implications of inaction is well established in relation to nature conservation. "Conflicting goals" is a different concept, often used to describe lack of coherence in public policies.
20	157	158	"Risk assessment for decision-making should incorporate ecological, cultural, socioeconomic, and animal welfare considerations."	Request: Please delete "and benefit assessment" as well as ", as appropriate, ". Reason: In contrast with the situation for risk assessment, there is no methodological basis for benefit assessment in the context of nature conservation that can be the basis for this kind of statement. Also, risks and benefits need to be kept separate here as stated in Line 145. The qualifier "as appropriate" is inappropriate, as the point contained in the statement is of general validity and should not be weakened.	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account. There are in fact methodologies for benefit assessment in the conservation sector and specifically in the IUCN context (e.g. Protected Areas Benefits Assessment Tool). This section has been restructured for greater clarity.
20	159	163	"Risk assessment should, in accordance with national and international legislation, incorporate feedback and perspectives from diverse stakeholders, including Indigenous Peoples and local communities; build upon past experience and knowledge; be complementary to existing methods; and recognize the scale and complexity of introducing new technologies and their applications to nature."	Request: Please delete "and benefit assessment" . Reason: Risks and benefits need to be kept separate here as stated in Line 145. Please also delete ", as appropriate, ". The qualifier "as appropriate" is inappropriate, as the point contained in the statement is of general validity and should not be weakened.	We consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account. There may also be situations where some of these considerations do not apply thus we retain the original wording. This section has been restructured for greater clarity.
20	167	167	suggestion	We suggest including the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP) in this section as well, as this might be more applicable to some parts of the world. Including both UNDRIP and UNDROP ensures that the policy is inclusive and applicable in various global contexts.	Thanks for the comment: we have included UNDROP to the text and the appendix
20	178	192	delete	We suggest to remove Section IV: General Considerations for Tools, Knowledge, and Sharing of Benefits (Lines 178-192). As deleting this section would help maintain the focus on evaluating the appropriateness and risks of synthetic biology specifically for nature conservation. Especially paragraph 188-192 is premature, it goes into too much detail considering the current state of technological development and discussions on governance.	Noted, yet the policy does not make assumptions about future applications of Synthetic Biology, but does seek to capture the range of issues that would need to be considered if there are any future applications of synbio in relation to nature conservation. The inclusion of this section is seen as part of future-proofing the policy.
20	195	197	"Given the complexity of the topic, all interested governmental and non-governmental parties should make an effort to be transparent, respect diverse views, and encourage accessibility of information and public engagement."	Suggestion: Please delete "and the need for mutual trust". The subsequent points are sufficiently justified by the complexity of the topic. A need for mutual trust is contentious.	Thanks for the comment. We have reworded this paragraph to further contextualise the issue of trust.
20	198	199	"There is a need for awareness of the potential impacts of synthetic biology in relation to nature conservation."	Suggestion: Please replace "risks and benefits" by "impacts". The term "impacts" helps avoid the simultaneous mentioning of risks and benefits.	We have reworded to maintain the independence of risk and benefit
20	200	201	"All relevant parties should seek to be aware of potential impacts of synthetic biology research and applications on nature conservation."	Please replace second half of sentence as suggested.	Thanks for the comment. We have reworded the section for more clarity to ensure relevant entities (replacing: 'parties') and stakeholders are aware of all relevant information about synthetic biology, not only the potential impacts
20	202	207	no edits	We fully support the emphasis on transparency, recognition of biases, and public dissemination of information in lines 202-207. These elements are crucial for fostering an informed, inclusive, and accountable approach to the use of synthetic biology in nature conservation.	Noted with thanks
20	213	217	suggestion to reframe	The current text presupposes the use of synthetic biology applications by encouraging capacity building, training, and technical expertise specifically for synthetic biology. This approach implicitly promotes the acceptance of synthetic biology applications in nature conservation. Additionally, activities that might build acceptance should be avoided to ensure an unbiased evaluation of synthetic biology. Please reframe the text to emphasise critical evaluation and informed decision-making without presupposing the use of synthetic biology applications.	Comment noted. Please refer to the last sentence under Section A. Also the text under F. V. is not presupposing acceptance and calls for a balanced communication on synthetic biology.
21	26	27	None - keep text	Very good to see the text recognise potential positive and negative impacts and to acknowledge the variety of applications	Noted with thanks
21	31	32	Replace "Synthetic biology should not be seen to replace ongoing and future efforts addressing the drivers of biodiversity loss, and it could be complimentary to these efforts." by "Synthetic biology can complement existing efforts to address biodiversity loss"	The text seems to say that Synbio does not address root causes of biodiversity loss. Synthetic biology comes as a complement to existing tools, that have their own limitations and sometimes also do not address the causes of biodiversity loss (e.g. rodenticide to fight invasive alien species). Addressing the moral hazard argument is important, explaining that synbio tools would be complementary to other tools and not a silver bullet should be sufficient to say this, rather than saying that they don't address root causes (as in some cases they could address them - e.g. engineering to make species resistant to pathogens, or more resilient to heat)	We agree and have adjusted the text along these lines : "Synthetic biology is not to be seen to replace ongoing and future efforts to address biodiversity loss. Synthetic biology could be complementary to these efforts. "
21	33	33	"there remain significant data and knowledge gaps about synthetic biology, and biodiversity and nature conservation." by "As a rapidly evolving field, synthetic biology requires adequate resources to ensure that knowledge gaps can be addressed through research generating peer-reviewed data and traditional knowledge, and that information can be made accessible in an equitable way."	The way the sentence is written makes it seem that there is no research ongoing to address those knowledge gaps. Also considering the diversity of synbio applications, it's difficult to paint the whole sector as having those knowledge gaps. I propose framing this in a more positive way and echoing the citizen assembly call for an equitable access to knowledge	This is the Problem Definition statement and is not intended to start to articulate solutions.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
21	34	34	Delete "potential ecological, ethical, social and cultural impacts"	Socio-economic considerations are only encouraged in the environmental risk assessment according to the Cartagena Protocol and despite years of efforts of an AHTEG dedicated to this topic, there is no agreed methodology for that. The socio-economic and cultural considerations can be considered through other methodologies, like Environmental, Socio-economic, and Health Impact Assessment (ESHIA), for which IUCN has extensive experience and a set of guidelines. The ethical considerations are not defined to this day and it is difficult therefore to call for their analysis	As a Problem Definition statement this section is not intended to start to articulate solutions but to acknowledge the wide range of issues that may be of concern, including issues that might be contested or poorly defined at present.
21	34	35	Delete " Further guidance on how synthetic biology applications might interact with nature conservation can support a better evaluation of the risks and benefits. "	The text seems to suggest that further guidance is needed. However, in Resolution 123, IUCN members agreed to "initiate an inclusive and participatory process to develop an IUCN policy on the implications of the use of synthetic biology in nature conservation to be debated and voted on by the next 2024 Conservation Congress". Any additional work on this matter is subjected to further discussion and a vote on a separate motion.	We agree and have adjusted the text to indicate the need for a policy to inform decision making on the implications of synbio applications, rather than implying the policy would guide the applications themselves, and we are not calling for additional guidance.
21	40	41	None - keep text	It is very positive to see the policy being framed in those neutral words as it is not a question of being pro or against but rather supporting members to better understand synthetic biology and the implications of its use in nature conservation	Noted with thanks
21	44	46	None - keep text	It is great to see to have clarity on the target audience.	Noted with thanks
21	49	54	None - keep text	Clear goals, and very good to see the idea of aligning with other international instruments	Noted, with thanks
21	63	67	None - keep text	good to use the CBD working definition which is the most common and accepted one in policy forums	Noted, with thanks
21	68	69	None - keep text	It is good that the draft does not single out specific synbio applications or technologies and acknowledges that this would be an overly narrow scope.	Noted, with thanks
21	70	70	None - keep text	It is great to see the draft clarifying that the policy is general guidance and not intended as detailed implementation guidance. This is in line with the IUCN scope.	Noted, with thanks
21	86	86	None - keep text	Welcoming the fact that the policy wants to ensure decision-making is science-based.	Acknowledged, text retained.
21	92	92	None - keep text	With the diversity of synbio applications and context, the reference to case-by-case is very important and aligned with CBD language	Comment acknowledged, the Principle text was retained, but the word adopt was changed to apply to provide greater clarity in meaning.
21	93	97	Delete the reference to UNESCO and In Dubio Pro Natura	it is very positive to have a reference to the precautionary principle in its Rio original definition and aligns well with the Citizen Assembly framing that links it to the risk assessment and highlights the cost of inaction. The in dubio natura is similar to the precautionary principle and adding another concept that is not as commonly used might lead to confusion in the interpretation, in particular in its relation to the Rio definition of precautionary principle. As for the UNESCO definition, the mention of "morally acceptable" is problematic as this is not a policy term nor is it well defined. This might create further confusion for users of this policy. By having too many texts to support this principle, there is a risk of inconsistency in how they are interpreted which could lead to an inefficient implementation of this principle	Comment acknowledged. Taking into account the many divergent views in the comments around these references, we have (a) retained the Rio Declaration in the text, as a non-binding international agreement signed by 175 countries; (b) removed the UNESCO 2005 reference from the text because it is a technical document that has not been adopted by countries; (c) retained the Rio Declaration and the UNESCO 2005 reference in the Appendix. Further, we have (e) retained the In Dubio Pro Natura reference in the text because it is specifically relevant to nature conservation, but changed 'include' to 'consider' because the principle has not been formally adopted by governments; and also (f) added a reference to In Dubio Pro Natura into the Appendix.
21	104	105	Substitute text: "As synthetic biology is a fast-developing field, and given the intricate web of interactions in nature, coupled with significant knowledge gaps that are being researched to better understand these dynamics, decision-makers should be able to access an overview of relevant synthetic biology developments and applications in relation to nature conservation." by "Synthetic biology is a fast-developing field that can positively and negatively impact nature. Decision-makers should be able to research and assess relevant synthetic biology developments and applications in relation to nature conservation to ensure an informed decision."	Similarly as above, there is an issue in the negative framing of this sentence, and the fact it is painting a whole very diverse field with the same brush. Therefore there is a need to be a bit more specific and again acknowledge the research done to address the gaps when they exist	Comment acknowledged. The point on positive and negative impacts is addressed in the second paragraph of Section A. The spirit of the second proposed sentence has been addressed by replacing 'an overview of' with 'information on'. We consider the sentence to be appropriately detailed and balanced.
21	107	110	None - keep text	Very good to refer to science-based approach while recognising the importance of stakeholders and rightsholders' perspectives	We agree, we have retained the relevant text in the section.
21	116	117	replace "with this policy" with "national legislation"	The involvement and participation of stakeholders and rightsholders is guided by national legislation and it is not within the scope of IUCN to determine how the national process should be carried out.	Comment accepted, national legislation was added in the first paragraph of section F.
21	118	118	None - keep text	FPIC implementation is still very diverse and dependent on national circumstances, therefore the reference to the Section F III which articulates FPIC in that way aligning it with the CBD is very important	Thank you, text retained.
21	119	129	delete "early"	The paragraph is overall very important and engaging stakeholders in this process is critical. However "early" is not defined and in addition, to have a meaningful problem formulation process, sufficient information about the organism, the proposed protocol, and the receiving environment are needed. If you want to keep this notion of timeliness then I would suggest say "timely"	Accepted. The text has been amended.
21	121	124	Delete "have regard to whether the application is for research, contained use, semi-field or field trials, commerce, or conditioned or unrestricted release into the environment" and replace by "take into account the characteristics of the organism or technology and the proposed conditions of its use, as well as the characteristics of the receiving environment"	n addition, the paragraph mixes different concepts that are not relevant to risk or benefits assessments. When assessing risks, experts consider the number of organisms to be released, how, when, and where the release would happen, etc. It is irrelevant if the organism will be used for commercial purposes; what matters is whether risks are acceptable or not. Lastly, it's unclear what a "conditioned" or "unrestricted release" would entail. It is also not within the IUCN scope/mandate to provide guidance on contained use as IUCN deals with conservation applications and not the research phase.	Accepted. These words have been added to the clause which has been relocated to section F.II. which relates specifically to risk assessment and benefit assessment.
21	125	127	add "in accordance with national legislation." at the end of the para	Biosafety and biosecurity requirements, as well as contingency plans, should exist. However, it is not part of the IUCN mandate to define, implement, monitor, or enforce those	To address this more broadly, a new general phrase was added to the first paragraph of section F: 'in accordance with international and national legislation, and customary law.'

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
21	128	128	Add "as provided for in the Nagoya-Kuala Lumpur Supplementary Protocol." at the end	liability and redress falls under this supplementary protocol and it would be helpful for the audience to know that there is a framework and therefore no need to reinvent the wheel	The suggestion was incorporated with the reference to: the Nagoya-Kuala Lumpur Supplementary Protocol
21	129	130	Add "in accordance with national legislation" at the end	this is within the scope of national legislation to define what those consultation stages would be	To address this more broadly, a new general phrase was added to the first paragraph of section F: 'in accordance with international and national legislation, and customary law.'
21	131	132	Change "address" by "consider" and change "considering" by "in line with national policies and"	It would be better to emphasise the need to align with national policies and international agreements like the Cartagena Protocol.	Thank you for your suggestions, we have amended the text for clarity. We did not include a reference to national policies, as this paragraph focuses on cross-jurisdictional considerations.
21	133	134	Add language: "i) The proponent of a synthetic biology development or application and relevant authorities be responsible for appropriate public engagement and transparency, according to national requirements."	public engagement is an important responsibility of the developers but the national authorities have also a role to play in this (as per the article 23 of the Cartagena Protocol) so all activities of public engagement and transparency cannot be the sole responsibility of the proponent.	Noted. We have added the reference to relevant authorities. The chapeau has been revised to be clear that all of the general considerations should be applied "in accordance with international instruments, national legislation, and customary law", such that it is not necessary to make specific reference to "according to national requirements" here
21	135	135	None - keep text	Important to align the accountability with the national legal system to make it actionable	Noted. We have added the reference to relevant authorities. The chapeau has been revised to be clear that all of the general considerations should be applied "in accordance with international instruments, national legislation, and customary law", such that it is no longer necessary to make specific reference to "consistent with relevant national legal systems" here
21	145	145	edit to read "risk and benefit assessment"	the assessment of risk and benefit should be done jointly. They must be considered together to ensure an informed decision-making process and the most beneficial outcome.	Noted. As the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both.
21	145	147	replace text to read "The outcomes of risk and benefit assessments should be considered together to ensure an informed decision-making process and the most favourable outcomes."	Risks and benefits cannot be evaluated separately or independently. They are crucial for balancing the pros and cons of an informed decision-making process. In addition, the language on risks and benefits not being "necessarily proportionally related" is vague, presumptive and open to interpretations.	Noted, but we consider that the assessment of risks and assessment of benefits can and should occur independently, with decision-making taking them (i.e. the outcomes) both into account.
21	148	148	None - keep text	Importance of the case-by-case principle being recognised here considering the variety of organisms, protocols and contexts	Noted, with thanks.
21	150	152	Clarify if the paragraph should focus on risk or impact assessments. If the section is about risk assessment, delete "These should include intended and unintended impacts; immediate and delayed impacts; multiple interactions; and cumulative effects of synthetic biology applied directly for nature conservation or with implications for nature conservation." Edit the rest of the para to read: These should also consider non-synthetic /alternative biology approaches, and the implications of inaction. Based on the findings from the risk assessment, a risk management plan should be developed "	This paragraph mixes risk and impact assessments and a lot of other concepts and is inaccurate: Risks and impacts assessment are different things and the different options described are more common in impact assessment, and in that context the terminology would be "ability to avoid, mitigate and manage negative impacts". It is not clear what is meant by "unintended" in this sentence. By definition, if the impact is unintended, it means it could not be anticipated; hence, it would not be possible to include that in a risk assessment. If what is meant is "side effects" or "off-target impacts", then the language should be changed to be accurate. The inclusion of the ability to remediate undesirable impacts may be used to support arguments that reversibility should be guaranteed. The issues here can be addressed through risk assessment to ensure risks and benefits are balanced, and an informed decision is made.	On risk assessment, the focus is looking at potential negative impacts of a proposed project. On benefit assessment, the focus would be on potential positive impacts. We therefore maintain the terminology. On "unintended," the definition we are using is that unintended impacts or consequences are those that are not planned as a purpose, not deliberate - rather than focusing on uncertainty, which is a different concept. The text mentions the need to consider unintended consequences at the risk assessment stage. We have modified the text of the sentence to make this clearer. Subsection F.I specifically refers to the need for risk management plans.
21	152	154	None - keep text	great to recognise the cost of inaction	Noted, with thanks
21	157	158	delete text	Socio-economic considerations are only encouraged at this stage for Environmental Risk Assessment (ERA), and despite the efforts of the CBD AHTEG, there is no clear methodology or emerging body of literature that provides a robust process. However, socio-economic considerations can be considered through other methodologies, like Environmental, Socio-economic, and Health Impact Assessment (ESHIA), for which IUCN has extensive experience and a set of guidelines. In addition, it is unclear what "cultural" impact would entail, as it has different interpretations and depends on the context.	We discuss here general considerations for risk assessment and benefit assessment, not ERAs in particular. Therefore we do not believe this comment applies. We have therefore maintained the text. This section has been restructured for greater clarity.
21	161	163	edit the text to read: build upon past experience and knowledge; and compare the risks and benefits of one technology assessed with others used for the same purpose."	When assessing the risks and benefits of any technology, it is vital to build on past experiences, consider the risks of inaction, and follow a comparative approach. However, the text referring to the comparative approach is a bit confusing. It is unclear what is implied by "recognising the scale and complexity of introducing new technologies""this might apply to any new technology, not just synthetic biology. It would be better to emphasise the need to assess benefits and risks and ensure the former outweighs the latter.	We have now addressed the need to consider alternatives elsewhere in this section. Nevertheless, we have changed language in this sentence to make it clearer. This section has also been restructured for greater clarity.
21	164	165	delete text "As appropriate, risk assessments and benefit assessments should, in accordance with national and international legislation, be established in a participatory and anticipatory approach including relevant stakeholders and rights-holders."	It is repetitive as it is already articulated in lines 159-162.	This sentence is regarding the use of a participatory and anticipatory process where appropriate and is therefore different from the previous paragraph. This section has been restructured to provide greater clarity.
21	172	173	edit the text to read ""The views and rights of Indigenous Peoples and local communities who might be impacted by the synthetic biology application should be considered and proactively sought."	adds clarity to the para	Thanks for the comment: We have amended the text to improve clarity.
21	176	177	None - keep text	very important to highlight the capacity part	Noted with thanks
21	179	180	None - keep text	very important to highlight the capacity building requirement	Noted with thanks
22	266	266	International trade: CITES, Decisions 19.161 to 19.163 Specimens produced through biotechnology https://cites.org/eng/dec/index.php/44352 E. Principles is missing in the content	As per line 54, this reference will help link discussions between IUCN and international instruments such as CITES.	Thanks for the comment. We have added reference to CITES under Section F. I. General considerations for decision-making and included the reference in the Appendix
23	9	9	E. Principles is missing in the content	The reference to Section E is missing in the content.	Noted and changed
23	93	97	Adopt the precautionary, public trust doctrine, polluters pay, and absolute liability principles	The principles guiding environmental law include the public trust doctrine, the precautionary principle, the polluter pays principle, and sustainable development.	The phrase, 'and appropriate provisions for liability and redress,' covers two of the three suggested principles. The third, the public trust doctrine, is on a different level, and it relates more to institutions, and so has not been added here.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
23	93	97	Adopt the precautionary principle, such as articulated in the 1992 Rio Declaration (Agenda 21, Principle 15) and by the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Commission on the Ethics of Scientific Knowledge and Technology working definition (2005). Given the fact that all life depends on nature, the application of the precautionary principle should include the In Dubio Pro Natura principle. Further, adopt the polluter pays principle, the concept of absolute liability, and the public trust doctrine as applicable to the context.	The principles guiding environmental law include the public trust doctrine, the precautionary principle, the polluter pays principle, and sustainable development. Apart from the precautionary principle, it is suggested that the polluter pay principle, the concept of absolute liability and the public trust doctrine may also be integrated into all discussions and decision-making on synthetic biology in relation to nature conservation, as applicable.	The phrase, 'and appropriate provisions for liability and redress,' covers two of the three suggested principles. The third, the public trust doctrine, is on a different level, and it relates more to institutions, and so has not been added here. In addition, taking into account the many divergent views in the comments around these references, we have (a) retained the Rio Declaration in the text, as a non-binding international agreement signed by 175 countries; (b) removed the UNESCO 2005 reference from the text because it is a technical document that has not been adopted by countries; (c) retained the Rio Declaration and the UNESCO 2005 reference in the Appendix. Further, we have (e) retained the In Dubio Pro Natura reference in the text because it is specifically relevant to nature conservation, but changed 'include' to 'consider' because the principle has not been formally adopted by governments; and also (f) added a reference to In Dubio Pro Natura into the Appendix
24	17	17	General comment: The problem needs to be clearly defined: Divergent views on synthetic biology in the context of nature conservation focus on the genetic modification of wild organisms, particularly those proposed to benefit species conservation. The current problem statement lacks clarity on the reasons for these divergent views, which may confuse those unfamiliar with the topic. It is crucial to clearly outline the core issues driving these differing perspectives. This approach aligns with Resolution 123, which advocates for a policy on synthetic biology in nature conservation. Addressing contentious scenarios, such as wild GMOs and genetic modification for species conservation, is essential to the discussion. There are instances in the text where PDWG use that refer to genetic editing, gene drive applications (e.g. "recognise the scale and complexity of introducing new technologies and their applications to nature" (162-163) ; "scale"; "complexity" to imply the characteristics of organisms that "intentionally persist, propagate and spread in natural populations" (WCC-2020-Res 123) "" that are essentially referring to genetic engineering and engineered gene drives.		The problem definition articulates the broad areas where divergent views might arise, in relation to the potential of synbio applications to have positive and negative impacts. Again the approach has been to adopt a broad future-proofed perspective rather than anticipate all current and future drivers of divergent views.
24	25	25	Support the use of "scale and scope in the field of synthetic biology"	See 17	Noted with thanks
24	27	27	We suggest to refer to applications - genetic engineering and engineered gene drives - directly in the text as it keeps future proofing of the document, and does bring clarity to what the document is speaking about.	See comment 17ff	The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation
24	27	27	Delete: significant positive and negative - no need for the specifics "" still retain the meaning of sentence and use "impacts".	Deleting positive or negative doesn't change the meaning of the sentence. Synthetic biology is often promoted with false promises of benefits, but some of these claims are speculative and not supported by <u>in vivo/empirical evidence. The policy should assist members in examining these statements</u>	This was discussed and no change was made because it was felt the use of the words positive and negative are intended to express the true dichotomy of possible impacts.
24	31	32	Delete sentence beginning with "Application " people".	As it is, the sentence is a bit wordy and superfluous. As pointed out from 17ff, we would suggest to discuss the divergent opinions of synthetic biology, which includes gene drives, GM wild organisms and generally <u>compatibility of genetic engineering with concepts of nature.</u>	This sentence has been deleted
24	32	32	Delete: and it could be complementary to these efforts	This phrasing may be misleading, as it could suggest that synthetic biology is already a well-established and accepted tool in nature conservation. We believe it contributes to the growing narrative around the benefits of synthetic biology in conservation, without providing evidence to support those benefits.	We agree and have adjusted the text along these lines : "Synthetic biology is not to be seen to replace ongoing and future efforts to address biodiversity loss. Synthetic biology could be complementary to these efforts. "
24	35	36	evison of sentence: Further guidance on how synthetic biology applications might interact with nature conservation is necessary to better evaluate not only the risks and potential benefits, but also the uncertainties, the alignment with prevailing values of nature, the compatibility with the overarching aims and potential conflicts inherent in current conservation practices, and the potential impacts on both practices and perceptions of nature conservation	The revision expands the scope of evaluation to include uncertainties and compatibility with values and goals, which are critical for holistic policy development. By articulating these aspects, the policy more comprehensively addresses the complexity of synthetic biology's interaction with conservation efforts. This ensures that stakeholders can consider a wider array of factors, leading to more informed and context-sensitive decision-making. The sentence structure aims to be inclusive yet specific, capturing both practical and theoretical considerations that are vital for a nuanced understanding of the implications of synthetic <u>biology in nature conservation.</u>	We agree and have adjusted the text to indicate the need for a policy to inform decision making on the implications of synbio applications, rather than implying the policy would guide the applications themselves, and we are not calling for additional guidance.
24	36	36	Suggestion to delete sentence 35-36: Further guidance ". risks and benefits.	There is an assumption of using synthetic biology applications on nature conservation.	We have adjusted the text to indicate the need for a policy to inform decision making on the implications of synbio applications. <u>This wording is not intended presume future applications.</u>
24	37	37	Suggested edit: Given the divergent views on synthetic biology, particularly genetic engineering and engineered gene drives, significant data and knowledge gaps persist. This is especially concerning as these organisms have the potential to persist, propagate, and spread within natural populations. The IUCN has a unique role in addressing these critical issues.	PDWG has responded to numerous comments by emphasising the need to "avoid implying an overly narrow scope" and to "future-proof" the policy, given the rapidly evolving field of synthetic biology. However, explicitly mentioning genetic engineering (GE) and gene drives (GD) will not compromise future-proofing; instead, it will bring clarity to the discussion. Similar to CBD documents, IUCN policies are iterative. Including references to gene editing and gene drives is not about being overly narrow; it is about addressing the specific and significant challenges these technologies present within the context of nature conservation. By naming genetic engineering and establishing guidelines and cut-off criteria later in the policy, and by setting guidelines for synthetic biology that may not yet be developed, the PDWG can ensure that this policy is both actionable and future-proof. Alternatively, it could classify or categorize existing and future synthetic biology applications and guide IUCN members through specific assessments for each. By naming genetic engineering and establishing guidelines and cut-off criteria later in the policy, and by setting guidelines for synthetic biology that may not yet be developed, the PDWG can ensure that this policy is both actionable and future-proof. Alternatively, it could classify or categorise existing and future synthetic biology applications and guide IUCN members through specific assessments for each	The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation
24	44	44	Please revise: The audience for this policy includes all constituent parts of IUCN, such as Members, Commissions, Secretariat, and National, Regional, and Interregional Committees, and governments and their institutions.	All relevant stakeholders should be included for the audience of this policy - as IUCN and its policy goes well beyond its members	Res123 calls for the creation of an "IUCN policy". However, it is acknowledged that this policy "could be informative to a wider audience".

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
24	49	54	Delete: "and on the responsible use of synthetic biology in relation to nature conservation;"	Contradictory to the first part of the sentence	We have edited the text so that it aligns better with the chapeau and it is clear regarding the scope (and therefore goal) of the policy. This second bullet recognises that the use of synthetic biology in other fields may have implications for nature conservation
24	62	69	Keep operational definition of the CBD Decision XIII/17. Revise: This policy pertains to all uses of synthetic biology tools and technologies in the context of nature conservation. While synthetic biology is broadly defined according to the operational definition established by the Convention on Biological Diversity (CBD) (Decision XIII/17), this policy delineates and categorises specific applications and technologies. These encompass CRISPR-Cas edited living modified organisms, genetically engineered gene drives, microorganisms, plants, insects and living modified organisms that produce targeted RNA interference (RNAi) or double-stranded RNA (dsRNA). Decision-makers are required to take a case-by-case approach, which allows for the incorporation of emerging technologies while ensuring that established technologies and applications are explicitly addressed	CBD "considers it useful as a starting point for the purpose of facilitating scientific and technical deliberations under the Convention and its Protocols;"	Noted, with thanks
24	74	74	Delete "as applicable"	Superfluous and leaves room for ignoring important principles, such as the precautionary principle	Comment addressed by changing the text, including deleting 'as applicable'
24	92	92	Please reword: In the context of synthetic biology applications related to nature conservation, significant gaps in data and knowledge persist, particularly concerning genetic engineering and engineered gene drives. These applications may result in organisms that can persist, propagate, and spread within natural populations. Therefore, it is crucial to adhere to the precautionary principle during case-by-case approach, as included in the Cartagena Protocol on Biosafety to the CBD.	The case-by-case approach faces challenges when robust risk assessment tools are absent or when uncertainty is high. In the realm of synthetic biology applications for nature conservation, both the policy and WCC-2020-Res-123 recognise substantial data and knowledge gaps, especially concerning genetic engineering and engineered gene drives, which contribute to numerous uncertainties. Thus, it's crucial that these case-by-case assessments adhere to the precautionary principle. Although this is covered in Section F, it remains a core consideration and should be explicitly highlighted within the principles outlined in Section F.	Comment addressed. Applying the case by case approach entails considering issues such as the appropriate status of information. Issues raised on the interconnections among the Principles have now been addressed by an amendment in the first paragraph of Principles.
24	93	93	We support the incorporation of the precautionary principle as outlined in the Rio Declaration and by UNESCO in 2005. Furthermore, we support the reference to the In Dubio Pro Natura principle, as both approaches are	Even if there is no priority in the list of principles, we support, as WCC-2020-Res-123 has pointed out "NOTING that in the context of synthetic biology, the precautionary principle deserves specific attention as some applications of synthetic biology can produce organisms with complex modifications of biological characteristics or organisms that intentionally persist, propagate and spread in natural populations;"	Comment acknowledged. Taking into account the many divergent views in the comments around these references, we have (a) retained the Rio Declaration in the text, as a non-binding international agreement signed by 175 countries; (b) removed the UNESCO 2005 reference from the text because it is a technical document that has not been adopted by countries; (c) retained the Rio Declaration and the UNESCO 2005 reference in the Appendix. Further, we have (e) retained the In Dubio Pro Natura reference in the text because it is specifically relevant to nature conservation, but changed 'include' to 'consider' because the principle has not been formally adopted by governments; and also (f) added a reference to In Dubio Pro Natura into the Appendix.
24	98	98	see rationale	We need a more comprehensive guide for section F. While mentioning framework points are good, this section lacks depth and real guidance. It is unclear what specific types of synthetic biology applications in relation to nature conservation are being discussed. Throughout the document, there are mentions of scale, complexity, etc., which may or may not relate to certain synthetic biology applications like genetic engineering and engineered gene drives. This section does not adequately address the potential irreversibility of these applications or their impacts on ecosystem connections and interconnectiveness. Please include specific types of synthetic biology applications, such as genetic engineering and gene drives, and guidance on how to evaluate and assess them. Explicitly address the potential irreversibility and ecological complexities of synthetic biology applications. Include criteria for halting the development or implementation of synthetic biology applications if certain risk thresholds are exceeded or the precautionary principle would demand its halting or moratoria (eg. because of knowledge gaps).	As explicit in the final two sentences of section D, "This policy does not specify particular applications or technologies in order to avoid implying an overly narrow scope while and aiming to ensure that it is future-proof given the rapidly evolving field of synthetic biology. This policy provides general guidance and is not intended as a detailed implementation guide." We have stated that this policy should be harmonized with international instruments. This policy is intended to be broader than one very specific process, which also future-proofs it.
24	113	113	Delete "as appropriate"	These frameworks are important and relevant for decision-making considerations. Retaining "as appropriate" implies that some of these frameworks are not important in some cases and not in others	The policy mandates a case by case approach. The term 'as applicable' has been deleted in Section E Principles, but the term 'as appropriate' is retained here because consideration of how specific issues are to be applied when making decisions on particular synbio applications need to be made on a case by case basis.
24	121	121	Revise: Evaluate risks as outlined in section F II. The risk assessment should have regard to whether the application involves research, contained use, semi-field or field trials, commercial activities, or conditioned or unrestricted environmental release into the environment. Emphasis should be placed on identifying and mitigating potential harms, particularly in situations of uncertainty, by adhering to the precautionary principle. Additionally, benefit assessments should be subjected to rigorous and independent validation. Benefits should not rely solely on computer models and must be thoroughly evaluated.	Revise this section as it provides necessary guidance for appropriately addressing the varying levels of risk and benefit associated with different applications	We have revised this section in line with this and other comments. We consider that a rigorous approach should be applied to both risk assessments and benefit assessments. The application of the precautionary principle is important and is provided for throughout this document. Independent review is now addressed in F.I.(c)
24	143	143	Delete "benefits"	See line 145 - acknowledging the independence.	As the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both.
24	145	147	Delete sentence.	Guidance on the inclusion of benefits in decision-making processes is unnecessary, as this consideration is inherently integrated into such processes. In environmental and conservation contexts, decision-makers routinely evaluate both the potential positive and negative outcomes of actions. The inherent part of the decision-making process involves a holistic assessment where benefits are naturally weighed alongside risks. Additionally, the primary reason for addressing risks is to safeguard the potential benefits by ensuring that actions do not lead to significant harm or adverse effects. Thus, by focusing on the precautionary principle, which emphasizes the need to mitigate risks, decision-makers are indirectly but effectively accounting for benefits. This dual consideration ensures that the overall outcomes of decisions are favorable and sustainable, aligning with the IUCN's objective of conserving nature.	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account.
24	148	148	Delete benefit	See line 145 - acknowledging the independence of risks and benefits on the assessment level	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
24	150	150	Delete benefit	See line 145 - risks and benefits occur independently	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account.
24	150	152	Keep and support; add unknown risks	This acknowledges the complexity of applications of synthetic biology, including genetic engineering and engineered gene drive	We have modified the text in this section to call attention to the need to recognise any potential knowledge gaps, which may generate uncertainty.
24	157	157	Delete benefit assessment and as appropriate	There is currently no methodological basis for benefit assessment in the context of nature conservation. Also, risks and benefits need to be kept separate here, as in many places, as stated in Line 145	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account. There are in fact methodologies for benefit assessment in the conservation sector and specifically in the IUCN context (e.g. Protected Areas Benefits Assessment Tool). This section has been restructured for greater clarity.
24	159	159	Delete "and benefit assessment"	Same as in line 145	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account. There are in fact methodologies for benefit assessment in the conservation sector and specifically in the IUCN context (e.g. Protected Areas Benefits Assessment Tool). This section has been restructured for greater clarity.
24	164	164	Please delete and benefit assessments	Not needed here	A participatory and anticipatory approach can also be relevant in benefit assessment. If it is not relevant in a particular instance, the term "as appropriate" enables it not to be included. This section has been restructured to provide greater clarity.
24	167	167	We recommend adding the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP) to this section as well,	UNDROP is more relevant to certain regions. Incorporating both UNDRIP and UNDROP ensures the policy is comprehensive and applicable across diverse global contexts.	Thanks for the comment: we have included UNDROP to the text and the appendix
24	179	180	Please revise: When considering synthetic biology, it is important to ensure equitable access to tools, knowledge, and information, including the risks associated with genetic engineering and the creation of gene drive organisms that have complex biological modifications or are designed to intentionally persist, propagate, and spread in natural populations. Additionally, capacity building "particularly in risk assessment" and access to research funding are important	We believe that this section assumes using synthetic biology applications in relation to nature conservation.	Noted, yet the policy does not make assumptions about future applications of Synthetic Biology, but does seek to capture the range of issues that would need to be considered if there are any future applications of synbio in relation to nature conservation. The inclusion of this section is seen as part of future-proofing the policy.
24	216	217	Delete including training and technical expertise to support better engagement	This assumes that synthetic biology applications will be applied to nature conservation	Comment noted. Please refer to the last sentence under Section A. Also the text under F. V. is not presupposing acceptance and calls for a balanced communication on synthetic biology.
25	18	20	Life on Earth faces multiple crises; including approximately a quarter of species facing a high risk of extinction in the wild in the coming decades, and an ongoing loss and disruption of genetic diversity and ecosystems.	The punctuation brings a confusion especially when one reads without background information.	Noted and this sentence has been revised
25	22	24	Nature conservation in this context understood as the human activity dedicated to averting loss of the integrity and diversity of nature and advancing its recovery; has resulted in some notable success. However, biodiversity continues to decline globally.	Proper Punctuation. The word context to replace here sounds better.	We agree and have replaced "here" with "in this context"
25	25	26	The rapid scale and scope in which the field 'synthetic biology' (defined in section D: Scope) is developing; is largely independent of nature conservation efforts.	Punctuation and structure of the sentence is better	This section has been reviewed in the light of your and other comments and has been restructured for clarity
25	26	29	Depending on the type of application, synthetic biology may have significant positive and negative impacts for many aspects of the integrity and diversity of nature including; conservation, sustainable use, and equitable sharing of benefits arising from the utilisation of genetic resources.	Punctuation	The sentence has been revised for clarity.
25	30	31	Application of synthetic biology has the potential of being beneficial but could potentially pose risks to biodiversity and people.	Grammatically the application of synthetic biology are both good and bad. Using and as a joining word could mean that it does the same thing.	This sentence has been deleted
25	31	32	Therefore, synthetic biology should not be seen to replace ongoing and future efforts addressing the drivers of biodiversity loss, but complementary to these efforts.	Therefore used to further explain the point. Replacing and with but because it is grammatically correct.	We agree and have adjusted the text along these lines : "Synthetic biology is not to be seen to replace ongoing and future efforts to address biodiversity loss. Synthetic biology could be complementary to these efforts. "
25	33	34	While research is ongoing, there remain significant data and knowledge gaps about synthetic biology, and its potential ecological, ethical, social and cultural impacts.	removed the word on to sound Grammatical correct	We agree and have adjusted the text
25	37	39	Given divergent views on synthetic biology in relation to nature conservation; IUCN has a unique role to foster dialogue by convening governments, non-governmental organisations and Indigenous Peoples' organisations to build knowledge on this topic.	Punctuation	The punctuation is appropriate.
25	39	40	With these in perspective; IUCN has therefore decided to develop a policy on the implications of the use of synthetic biology in relation to nature conservation.	Words added to highlight IUCN's 'Why'	We feel the word "therefore" adequately captures the "why"
25	56	56	This policy is intended to harmonize synthetic biology in relation to nature conservation with international instruments, goals, and guidelines.	Statement in itself is inadequate	We are unclear why this is inadequate, nevertheless we have edited the text in line with other comments to provide a clear link to the Appendix and foundational decisions therein
25	68	69	This policy does not specify particular applications or technologies to avoid, therefore implying an overly narrow scope that aims to ensure that it is future-proof, given the rapidly evolving field of synthetic biology.	Grammar	We note this is a confusion on what was meant, so the text has been clarified. Thank you.
25	103	106	As synthetic biology is a fast-developing field, and given the intricate web of interactions in nature, coupled with significant knowledge gaps that are being researched to better understand these dynamics; decision-makers should be able to access an overview of relevant synthetic biology developments and applications in relation to nature conservation.	Punctuation	Noted, but a semicolon is not grammatically correct in this instance.
25	150	152	These should include intended and unintended impacts; immediate and delayed impacts, multiple interactions, and cumulative effects of synthetic biology applied directly for nature conservation or with implications for nature conservation.	Punctuation	Noted and change to commas made.
26	1	266	N/A	While the policy is very high level, it is well written and does cover all the aspects that should to though of when deciding on syn bio for use in the conservation of nature.	Noted with thanks
26	18	18	Changing "quarter of species facing a high risk" to "quarter of its species facing a high risk"	Grammatical suggestion.	Noted and changed along these lines
26	19	19	Replace "coming decades, and ongoing loss" with "coming decades, as well as ongoing loss"	Grammatically there are too many "ands" in the sentence that the meaning is lost.	This sentence has been adjusted for clarity.
26	25	26	Change "is developing rapidly, and largely independently"	There are two idea and they need to be joined.	We agree and have joined these ideas with "and"

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
26	27	27	Change "significant positive and negative impacts" to "significant positive [or]and/or] negative impacts	The positive and negative impacts do not always happen at the same time. Some are positive for the ecosystem, some are negative. Some are positive for one aspect of the ecosystem and some are negative for another. They don't always have positive and negative impacts at the same time.	This was discussed and no change was made because it was felt the use of the words positive and negative are intended to express the true dichotomy of possible impacts, irrespective of timing.
26	31	32	Change "Synthetic biology should not be seen to replace ongoing and future efforts addressing the drivers of biodiversity loss, and it could be complementary to these efforts." to " Synthetic biology should not be seen as a replacement to the ongoing and future efforts of addressing the drivers of biodiversity loss, however it could be complementary to these efforts. "	Grammatical edits.	We agree and have adjusted the text along these lines : "Synthetic biology is not to be seen to replace ongoing and future efforts to address biodiversity loss. Synthetic biology could be complementary to these efforts. "
26	33	33	Change remain to remains.	Grammatical edit.	We think the grammar is correct
26	51	51	Change " application" to "applications"	Grammatical edit.	We referring to "a synthetic biology application" thus singular is correct.
26	53	53	"on the response to synthetic biology in relation to nature conservation"	I am not sure what is meant by response. Is it the opinion of the use of syn bio in the conservation of nature or the communication of it to the public? It is not clear what is meant by response.	We therefore have not changed the text in this instance Taking into consideration your comment and other comments received, this text in the policy has been updated for clarity and to better align with the chapeau
26	56	56	Remove the second use of syn bio.	Syn bio is repetitive and doesn't need to be used the second time. It can be removed to simply write " This policy covers synthetic biology in relation to nature conservation; whether applied for the purpose	We have retained the original text to ensure clarity of scope.
27	25	25	We appreciate the mention of scale and scope of the field of synthetic biology. However, we still feel like if synthetic biology will be applied to nature, some of those consequences are irreversible and those released into nature where some of these interconnectedness of relationships are not well understood. The very use of words like scale and scope is implicitly referring to genetic engineering and engineered gene drives. PDWG has stated and replied to many commentors that they want "to avoid implying an overly narrow scope and with the intent to future-proof the policy in light of the rapidly evolving field of synthetic biology. "" We don't understand why this affects the policy being too narrow or preventing it from being future proof when indeed the policy using words like "scale" "scope" "contained use, semi-field or field trials"; conditioned or unrestricted release into the environment" (123-124); "immediate and delayed impacts; multiple interactions; and cumulative effects" (151); "recognise the scale and complexity of introducing new technologies and their applications to nature" (162-163) which all imply the characteristics of organisms that "intentionally persist, propagate and spread in natural populations" (WCC-2020-Res 123) "" all these terms are essentially referring to genetic engineering and engineered gene drives. We therefore suggest to refer to these applications directly in the text as it does not change the "future proofing" of the document, and does bring clarity to what we are speaking about		The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation
27	26	27	Delete "positive and negative"; "for" and replace with " on" and "sustainable use". It reads: Synthetic biology may have significant impacts on many aspects of the integrity and diversity of nature, including conservation and equitable sharing of benefits arising from the utilisation of genetic resources."	Delete "positive and negative"; "for" and replace with " on" and "sustainable use". It reads: Synthetic biology may have significant impacts on many aspects of the integrity and diversity of nature, including conservation and equitable sharing of benefits arising from the utilisation of genetic resources."	We have reviewed the text and believe the original wording captures the intended meaning.
27	26	29	Please revise: "Depending on the application, synthetic biology, including genetic engineering and engineered gene drives, including may affect various aspects of nature's integrity and diversity. It is important to recognise that synthetic biology remains under discussion and scrutiny within the Convention on Biological Diversity (CBD) and other forums."	Delete 26-29. Suggestion to revise. As mentioned in WCC-2020-Res 123, and CBD SBSSTA processes	The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation.
27	30	31	Delete sentence.	It is important to explicitly state that certain synthetic biology applications, like genetically modified wild organisms and gene drives have been proposed as potentially beneficial for biodiversity. This is not immediately apparent and needs to be clearly written. We would suggest that the problem statement could focus on the primary points of debate: the use of GM wild organisms, gene drives and as important, whether genetic engineering aligns with the principles of nature conservation. These key issues must be clearly articulated to ensure a full understanding of the topic.	The first sentence has been deleted. The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation
27	32	32	Please delete: "and it could be complementary to these efforts"	The way the sentence is written might be unclear, as it could imply that synthetic biology is already an established and accepted tool in nature conservation. We believe it amplifies the narrative around the supposed benefits of synthetic biology in conservation. In actuality there is no empirical proof of these so called benefits.	We agree and have adjusted the text along these lines : "Synthetic biology is not to be seen to replace ongoing and future efforts to address biodiversity loss. Synthetic biology could be complementary to these efforts. "
27	35	36	Delete sentence	Reading the sentence presumes the use of synthetic biology applications to nature conservation: Using "on how synthetic biology..."	We have adjusted the text to indicate the need for a policy to inform decision making on the implications of synbio applications. This wording is not intended presume future applications.
27	37	37	Explain divergent views - what does that mean to PDWG?	The policy text contains references like "CBD definition" (64); "contained use, semi-field or field trials; commerce, or controlled or unrestricted release into the environment" (124); "immediate and long-term impact; various interactions; and cumulative effects" (151). These terms are associated with the concerns and risks linked to genetic engineering and engineered gene drives. It would be helpful to clearly include genetic engineering and engineered gene drives when discussing "differing perspectives."	The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation
27	51	52	Delete "and on the responsible....nature conservation."	WCC-2020-Res 123 does not include any mention of developing guidelines for the responsible use of synthetic biology.	Respectfully disagree. This goal statement does is not developing guidelines RES123 mandates for "policy on the implications of the use of synthetic biology..." We therefore have not changed the text in this instance
27	55	57	Policy could be made better if it included practical guidance. Please revise : This policy covers synthetic biology in relation to nature conservation; specifically synthetic biology, including living modified organisms (LMOs), self-propagating genetic material and gene drives, whether applied for the purpose..."	Throughout the policy, it has already hinted to these issues - scale, scope (25); CBD definition (64); contained use, semi-field or field trails (123); multiple reactions, cumulative effects (151). We believe it to be more coherent and clearer if it includes living modified organisms (LMOs), self-propagating genetic material and gene drives.	We are not listing specific technologies in order to future proof the policy as recommended by the Citizen's Assembly

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
27	56	61	While the policy mentions the need for risk assessments, it does not specify how these should be conducted for applications from other fields, such as genetically modified crops in agriculture. The policy should implement robust risk assessment procedures tailored to synthetic biology applications in different sectors, ensuring comprehensive evaluation of potential risks to natural ecosystems and biodiversity.		We respectfully disagree. The policy cannot provide such a detailed assessment framework.
27	61	61	Delete table	Table assumes that the decision to use synthetic biology applications related to nature conservation has already been made.	RES123 explicitly recognises that synthetic biology could be used for nature conservation purposes: Appendix Section I. The table has been found to be useful by many reviewers in clarifying the scope, particularly for decision-makers.
27	62	67	Support to keep operational definition of CBD decision XIII/17		Noted, with thanks
27	92	92	Please mention in the text that thorough case-by-case assessment is feasible only when there are robust risk assessment tools available, especially considering irreversible, cumulative effects. We strongly endorse the case-by-case approach. However, this approach has its limitations when reliable risk assessment tools are lacking or when uncertainty is too great. This is why the case-by-case principle must be paired with the precautionary principle. We recommend that be included here, in addition to section F.		Comment addressed. Applying the case by case approach entails considering issues such as the appropriate status of information. Issues raised on the interconnections among the Principles have now been addressed by an amendment in the first paragraph of Principles.
27	93	96	Support precautionary principle - Rio Declaration and In Dubio Pro Natura principle		Comment acknowledged.
27	113	113	Delete "as appropriate"	All the frameworks are relevant to section F	The policy mandates a case by case approach. The term 'as applicable' has been deleted in Section E Principles, but the term 'as appropriate' is retained here because consideration of how specific issues are to be applied when making decisions on particular synbio applications need to be made on a case by case basis.
27	123	124	Support contained use, semi-field or field trials, commerce or conditioned or unrestricted release"		Thank you.
27	124	124	Delete the environment and replace with "wild"		Accepted in part. The words 'into the environment' here were deleted.
27	143	143	Delete "benefits"	Risk are only relevant to precautionary principle not benefits	As the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both.
27	145	145	The assessment of risks and the assessment of benefits should occur independently.	Guidance is not needed on inclusion of benefits.	As the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both.
27	145	147	Delete sentence		Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account.
27	148	148	Delete benefit	Please adhere to line 145	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account.
27	153	153	Delete "implications of inaction"	The focus on "implications of inaction" might downplay the importance of understanding and mitigating risks associated with synthetic biology applications, therefore we suggest its deletion. It could lead to an underestimation of long-term and cumulative risks, which are critical to address in nature conservation. The urgency to avoid inaction might result in insufficient scrutiny of potential harms, thus compromising ecological integrity.	Looking at the implications of inaction is well established in relation to nature conservation.
27	157	157	Delete "as appropriate"	All risk assessment and benefit assessment should involve ecological, cultural socio-economic and animal welfare consideration.	We have retained the original text as not all of the considerations will be appropriate in all cases of synthetic biology. This section has been restructured for greater clarity.
27	161	161	Delete "as appropriate"	Diminishes the importance of stakeholders' decisions to be well informed and be inclusive	There may be situations where some of these considerations do not apply thus we retain the original wording. This section has been restructured for greater clarity.
27	179	180	Please revise: When addressing synthetic biology, it is crucial to guarantee equitable access to tools, knowledge, and information, particularly regarding the risks associated with genetic engineering and the development of gene drive organisms.		Noted. The original text has been retained and the policy does not mention specific Synthetic Biology applications. This is explained in section D: Scope
27	188	192	Please delete this paragraph	This paragraph presupposes the significance of synthetic biology in relation to nature conservation. It delves into an excessive level of detail given the present stage of technological advancement and the continuing debates on governance.	Noted with thanks. We agree that this framing was unclear so this paragraph has been reworded.
27	198	198	Replace risks and benefits by "impacts"	Risks and benefits need to be independent as stated in line 145	We agree and have reworded to maintain the independence of risk and benefit
27	202	207	support "transparent"; "potential sources of bias"; "conflicts of interest" as this improves inclusivity and an informed process.		Noted with thanks
28	41	41	Potentially delete this sentence or modify to reflect support of exploring synthetic biology applications in a cautious, science-driven, and socially conscious decision making framework.	Given the inevitability of synthetic biology applications, neutrality on the topic seems a bit unrealistic or inconsistent with the decision making framework discussed thereafter. Perhaps it would be truer to the tone or purpose of this document for IUCN to support the cautious, inclusive well-planned, science-based use of synthetic biology.	A neutral stance is seen as appropriate; the need for a science-based approach is dealt with in Section F1
28	56	56	Make the definition of synthetic biology the first sentence of Section D	The document would logically flow better for readers not intimately familiar with the topic if the definition of synthetic biology was moved to the beginning of this section (and I would potentially argue to the beginning of the document)	The policy is not aiming to redefine synthetic biology, thus the key aspect of the Scope section is to outline what is covered by this policy. We reference the CBD working definition to avoid confusion, but not by way of redefining it here.
28	61	61	Delete the table related to the impacts and sectors covered by the document	This table does not add to the comprehensive of the policy. The table is better understood as a prose sentence.	We respectfully disagree. The table has been found to be useful by many reviewers in clarifying the scope, particularly for decision-makers.
28	105	106	Clarify the following statement "decision-makers should be able to access an overview of relevant synthetic biology developments and applications in relation to nature conservation"	It's a bit unclear sure what's being advocated for here in terms of information access and who is responsible for making it available.	Comment acknowledged and has been addressed by replacing 'an overview of' with 'information on'. The reference to decision-makers makes clear that they are themselves responsible for ensuring access to this information.
28	188	191	Clarify what is meant by "intellectual property rights should not be a hindrance to applications..."	Is it suggested that IP for nature conservation applications should not be proprietary?	Noted with thanks. We agree that this framing was unclear so this paragraph has been reworded.

Reviewer	Line start	Line finish	Proposed edit	Édit rationnelle	PDWG response
29	25	25	RAS	Nous apprécions la mention de l'échelle et de la portée du domaine de la biologie synthétique. Cependant, nous avons toujours l'impression que si la biologie synthétique est appliquée à la nature, certaines de ses conséquences sont irréversibles et celles qui sont libérées dans la nature où certaines de ces relations interconnectées ne sont pas bien comprises. L'utilisation même de mots tels que "échelle" et "portée" fait implicitement référence au génie génétique et aux manipulations génétiques. Le PDWG a déclaré et répondu à de nombreux commentateurs qu'il voulait "éviter d'impliquer un champ d'application trop étroit et dans l'intention d'assurer la pérennité de la politique à la lumière de l'évolution rapide du domaine de la biologie synthétique. Nous ne comprenons pas pourquoi cela affecte la politique en la rendant trop étroite ou en l'empêchant d'être à l'épreuve du temps, alors que la politique utilise des mots tels que "échelle", "champ d'application", "utilisation confinée, essais en champ ou en semi-champ...". libération conditionnée ou non dans l'environnement" (123-124) ; "impacts immédiats et différés ; interactions multiples ; et effets cumulatifs" (151) ; "reconnaître l'ampleur et la complexité de l'introduction de nouvelles technologies et de leurs applications dans la nature" (162-163) qui impliquent toutes les caractéristiques des organismes qui "persistent, se propagent et se répandent de manière intentionnelle dans les populations naturelles" (WCC-2020-Res 123) - tous ces termes se réfèrent essentiellement au génie génétique et aux manipulations de gènes. Nous suggérons donc de faire référence à ces applications de manière continue dans le texte, car cela ne change rien à l'avenir du document et clarifie ce dont nous parlons.	Le texte a été volontairement généralisé pour éviter de limiter les conclusions à des questions spécifiques. La politique est destinée à s'appliquer à tous les aspects de la biologie synthétique, telle que définie par la CDB, en relation avec la conservation de la nature.
29	26	29	voir commentaire 25	Suggestion de révision : Selon le type d'application, la biologie synthétique, y compris le génie génétique et l'ingénierie génétique, peut avoir des incidences sur de nombreux aspects de l'intégrité et de la diversité de la nature, notamment la conservation, l'utilisation durable et le partage équitable des avantages découlant de l'utilisation des ressources génétiques. Comprendre que la biologie synthétique, y compris le génie génétique, continue d'être discutée et encouragée dans le cadre de la Convention sur la diversité biologique (CDB) et d'autres forums.	Le texte a été volontairement généralisé pour éviter de limiter les conclusions à des questions spécifiques. La politique est destinée à s'appliquer à tous les aspects de la biologie synthétique, telle que définie par la CDB, en relation avec la conservation de la nature.
29	27	27	Supprimer : significatives positives et négatives. Nous suggérons d'utiliser plutôt "impacts".		Cette question a été débattue et aucun changement n'a été apporté, car il a été estimé que l'utilisation des mots positif et négatif visait à exprimer la véritable dichotomie des impacts possibles.
29	30	31	Supprimer la phrase commençant par "Application ... people".	Comme indiqué à partir de la ligne 25, nous suggérons de discuter des questions litigieuses liées à la biologie synthétique, en particulier les manipulations génétiques, les organismes sauvages génétiquement modifiés et la compatibilité du génie génétique avec les concepts de la nature, comme cela est sous-entendu dans l'ensemble du document.	La première phrase a été supprimée. Le texte a été volontairement conservé dans un sens général pour éviter de limiter les conclusions à des questions spécifiques. La politique est destinée à s'appliquer à tous les aspects de la biologie synthétique, telle que définie par la CDB, en relation avec la conservation de la nature.
29	32	32	Suggestion de supprimer "et il pourrait être complémentaire à ces efforts".	ce type de formulation n'est pas forcément clair. Une lecture rapide de ce texte donne le sentiment que la biologie synthétique en tant qu'outil de conservation de la nature existe déjà et a été acceptée. En fait, nous pensons qu'elle réaffirme le battage médiatique sur les avantages de la biologie synthétique en matière de conservation de la nature, sans que ces avantages existent réellement.	Nous sommes d'accord et avons adapté le texte dans ce sens : « La biologie synthétique ne doit pas être considérée comme remplaçant les efforts actuels et futurs visant à lutter contre la perte de biodiversité. La biologie synthétique pourrait être complémentaire à ces efforts. »
29	36	36	Suggestion de supprimer la phrase 35-36 : "D'autres orientations les risques et les avantages."	Phrase superflue. Une fois de plus, cette phrase suppose que les applications de la biologie synthétique sont compatibles avec la conservation de la nature. L'utilisation de mots tels que risques, avantages, positifs ou négatifs tout au long de la politique n'est pas suffisante, car elle va presque à l'encontre de ce que la politique essaie de faire, à savoir rester neutre et donner la priorité à la conservation de la nature. Comme l'indique le PDWG dans certaines réponses aux commentateurs : "cette politique ne doit pas être interprétée comme soutenant ou s'opposant à la biologie synthétique. "Il ne s'agit pas d'une politique de soutien à la biologie synthétique, mais d'une politique d'utilisation ou de non-utilisation de la biologie synthétique.	Nous sommes d'accord et avons ajusté le texte pour indiquer la nécessité d'une politique visant à éclairer la prise de décision sur les implications des applications de la biologie synthétique, plutôt que de sous-entendre que la politique guiderait les applications elles-mêmes, et nous ne demandons pas de directives supplémentaires.
29	37	37	En ce qui concerne les "points de vue divergents" : Nous recommandons de développer ce concept, car la question en jeu concerne la biologie synthétique, en particulier les OGM dans la nature et les gènes pour la conservation des espèces. Il s'agit de questions cruciales pour la conservation de la nature. Il serait utile de développer la définition du problème, car c'est le cœur de notre discussion. Suggestion de modification : compte tenu des divergences de vues sur la biologie synthétique, en particulier sur le génie génétique et la manipulation de gènes, il subsiste des lacunes importantes en matière de données et de connaissances. Ceci est d'autant plus préoccupant que ces organismes ont le potentiel de persister, de se propager et de se répandre au sein des populations naturelles, et que l'UICN a un rôle unique à jouer..."	L'UICN a répondu à de nombreux commentaires qu'elle souhaitait "éviter d'impliquer un champ d'application trop étroit". L'UICN a répondu à de nombreux commentaires qu'elle souhaitait "éviter d'impliquer un champ d'application trop étroit" et qu'elle avait l'intention d'être "à l'épreuve du temps" à la lumière de l'évolution rapide du domaine de la biologie synthétique. Cela n'a aucun sens - mentionner le génie génétique ou l'ingénierie des gènes n'y changera rien. Comme pour les documents de la CDB, ce document doit être considéré comme itératif. Il est essentiel de veiller à ce que le document contienne juste assez de détails pour être clair et compréhensible. Cette approche est conforme à la résolution 123, qui préconise une politique sur la biologie synthétique en relation avec la conservation de la nature. Les scénarios les plus controversés, comme les OGM sauvages et la modification génétique pour la conservation des espèces, sont des aspects clés de la biologie synthétique qui doivent être abordés.	Le texte a été volontairement rédigé de manière générale afin d'éviter de limiter les conclusions à des questions spécifiques. La politique est destinée à s'appliquer à tous les aspects de la biologie synthétique, telle que définie par la CDB, en relation avec la conservation de la nature.
29	49	54	RAS	Étant donné les applications potentielles de la biologie synthétique, y compris le génie génétique d'organismes sauvages et la libération de gènes modifiés, qui peuvent persister, se propager et se répandre au sein des populations naturelles, cette politique réaffirme l'importance de l'application du principe de précaution. Elle reconnaît également l'existence de lacunes importantes en matière de données et de connaissances concernant les incidences écologiques, éthiques, sociales et culturelles des applications de la biologie synthétique. L'objectif de cette politique est de fournir une base pour éclairer la prise de décision : a) sur l'opportunité d'utiliser les applications de la biologie synthétique pour la conservation de la nature b) sur la réponse à apporter à la biologie synthétique en matière de conservation de la nature.	Noté, avec remerciements

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
29	56	59	Suggestion de réécriture : Cette politique couvre la biologie synthétique en relation avec la conservation de la nature, notamment le génie génétique d'organismes vivants sauvages et la dissémination de gènes modifiés. Les applications de la biologie synthétique sont principalement développées pour être utilisées dans l'industrie, l'agriculture et la médecine, certains scénarios proposant également leur utilisation dans le secteur de la conservation de la nature. Bien que ce dernier ne représente qu'une très faible proportion des scénarios d'application, la conservation de la nature est particulièrement concernée en raison des impacts écologiques, sociaux, économiques et culturels potentiels, directs ou indirects, liés à la nature. Supprimer 59-61 : tableau car ce tableau est déjà expliqué dans le texte ci-dessus (56-59) et le tableau n'est plus mentionné dans le texte de la politique. De plus, nous trouvons le tableau inutilement confus.	La formulation et le tableau supposent encore implicitement différents types d'applications synbio, y compris le génie génétique d'organismes sauvages et la GD pour la conservation des espèces. Libellé tiré du document WCC-2020-Res123	Nous n'entrerons pas dans les détails des technologies spécifiques afin de pérenniser la politique, comme le recommande l'Assemblée des citoyens. Le tableau a été jugé utile par de nombreux examinateurs pour clarifier la portée, en particulier pour les décideurs.
29	56	60	Supprimer le tableau	Le tableau sert d'instrument rhétorique qui soutient subtilement l'idée que la biologie synthétique est un outil de conservation de la nature. Cela va à l'encontre de l'objectif du document, qui est de fournir une discussion équilibrée et impartiale sur le sujet. Il positionne prématurément la biologie synthétique comme un élément accepté des efforts de conservation sans preuves ou consensus suffisants. Par conséquent, veuillez supprimer le tableau.	La RES123 reconnaît explicitement que la biologie synthétique pourrait être utilisée à des fins de conservation de la nature : Annexe Section I. Le tableau a été jugé utile par de nombreux examinateurs pour clarifier la portée, en particulier pour les décideurs.
29	56	61	Le document d'orientation doit fournir des conseils plus détaillés sur la manière d'évaluer et de gérer les incidences des applications de la biologie synthétique provenant d'autres domaines sur la conservation de la nature. Il s'agit notamment d'élaborer des cadres d'évaluation spécifiques, de mettre en oeuvre des procédures d'évaluation des risques solides, d'encourager la collaboration interdisciplinaire, d'aborder les conséquences involontaires potentielles et de mener des évaluations d'impact intersectorielles complètes. Ces ajouts garantiront que les applications de la biologie synthétique sont gérées de manière à soutenir et à renforcer les efforts de conservation, en accord avec les principes et les objectifs de la conservation de la nature.	Ce tableau est déjà expliqué dans le texte ci-dessus (56-59) et il n'y est plus fait référence dans le texte de la politique. Nous estimons que ce tableau est inutilement déroutant.	Nous ne sommes pas d'accord avec cette affirmation. De nombreux examinateurs ont jugé ce tableau utile pour clarifier la portée, en particulier pour les décideurs.
29	59	61	RAS		Noté, avec remerciements.
29	59	61	Suggestion de supprimer 59-61	Ce tableau est déjà expliqué dans le texte ci-dessus (56-59) et il n'y est plus fait référence dans le texte de la politique. Nous estimons que ce tableau est inutilement déroutant.	La RES123 reconnaît explicitement que la biologie synthétique pourrait être utilisée à des fins de conservation de la nature : Annexe Section I. Le tableau a été jugé utile par de nombreux examinateurs pour clarifier la portée, en particulier pour les décideurs.
29	62	67	Soutenir fortement la définition opérationnelle de la décision XIII/17 de la CDB sur la biologie synthétique		Noté, avec remerciements
29	74	74	Suggestion de supprimer "applicable" dans 74 -	Inutile et permettant d'ignorer des principes importants, tels que le principe de précaution.	Commentaire traité en modifiant le texte, y compris la suppression de « le cas échéant »
29	92	92	Nous reconnaissons et soutenons la mention du cas par cas qui figure dans le protocole de Cartagena sur la prévention des risques biotechnologiques relatif à la CDB.	L'approche au cas par cas a ses limites lorsqu'il n'existe pas d'outils fiables d'évaluation des risques ou lorsque l'incertitude est trop grande. Dans le cas de l'application de la biologie synthétique à la conservation de la nature, la politique et la résolution WCC-2020-Res-123 reconnaissent qu'il subsiste d'importantes "lacunes en matière de données et de connaissances, notamment en ce qui concerne le génie génétique et le génie génétique", et qu'il y a donc des incertitudes. Par conséquent, les évaluations au cas par cas devraient être alignées sur le principe de précaution. Même si cet aspect est couvert par la section F, il est fondamental et devrait être explicitement mentionné dans le principe lui-même.	Commentaire traité. L'application de l'approche au cas par cas implique de prendre en compte des questions telles que le statut approprié des informations. Les questions soulevées sur les interconnexions entre les principes ont désormais été traitées par un amendement au premier paragraphe des principes.
29	92	92	Veuillez réécrire : dans le cas des applications de la biologie synthétique en relation avec la conservation de la nature, il existe encore des lacunes importantes en matière de données et de connaissances, en particulier en ce qui concerne le génie génétique et le génie génétique, car ces applications pourraient produire des organismes qui persistent, se propagent et se répandent dans les populations naturelles. Par conséquent, l'adhésion au principe de précaution doit être primordiale lors de l'évaluation au cas par cas		Commentaire traité. L'application de l'approche au cas par cas implique de prendre en compte des questions telles que le statut approprié des informations. Les questions soulevées sur les interconnexions entre les principes ont désormais été traitées par un amendement au premier paragraphe des principes.
29	93	93	Soutenir le principe de précaution mais passer au début même s'il n'y a pas d'ordre de priorité dans la section E.		Le premier paragraphe de la section a été modifié pour montrer que l'ordre de tous les Principes n'implique pas de priorité.
29	93	97	Nous soutenons fermement la mention du principe de précaution énoncé dans la Déclaration de Rio et par l'UNESCO en 2005. Nous soutenons également la mention du principe In Dubio Pro Natura.	Parce que cette approche est cruciale pour faire face aux incertitudes et aux risques potentiels de la biologie synthétique et qu'elle s'inscrit pleinement dans la priorité accordée à notre environnement.	Commentaire pris en compte. Compte tenu des nombreux points de vue divergents dans les commentaires concernant ces références, nous avons (a) conservé la Déclaration de Rio dans le texte, en tant qu'accord international non contraignant signé par 175 pays ; (b) supprimé la référence à l'UNESCO de 2005 du texte car il s'agit d'un document technique qui n'a pas été adopté par les pays ; (c) conservé la Déclaration de Rio et la référence à l'UNESCO de 2005 dans l'annexe. De plus, nous avons (e) conservé la référence à In Dubio Pro Natura dans le texte car elle est particulièrement pertinente pour la conservation de la nature, mais remplacé « inclure » par « considérer » car le principe n'a pas été formellement adopté par les gouvernements ; et également (f) ajouté une référence à In Dubio Pro Natura dans l'annexe.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
29	98	98	RAS	Nous avons besoin d'un guide plus complet pour la section F. Bien que les points mentionnés dans le cadre soient bons, cette section manque de profondeur et d'une véritable orientation. Il n'est pas clair quels types spécifiques d'applications de la biologie synthétique en relation avec la conservation de la nature sont discutés. Tout au long du document, il est fait mention de l'échelle, de la complexité, etc., qui peuvent ou non se rapporter à certaines applications de la biologie synthétique telles que le génie génétique et la manipulation de gènes. Cette section n'aborde pas de manière adéquate l'irréversibilité potentielle de ces applications ou leurs impacts sur les connexions et l'interconnectivité des écosystèmes. Veuillez inclure des types spécifiques d'applications de la biologie synthétique, telles que le génie génétique et les gènes d'entraînement, ainsi que des orientations sur la manière de les évaluer. Aborder explicitement l'irréversibilité potentielle et les complexités écologiques des applications de la biologie synthétique. Inclure des critères pour arrêter le développement ou la mise en œuvre des applications de la biologie synthétique si certains seuils de risque sont dépassés ou si le principe de précaution exige son arrêt ou des moratoires (par exemple, en raison de lacunes dans les connaissances).	Comme cela est explicite dans les deux dernières phrases de la section D, « Cette politique ne spécifie pas d'applications ou de technologies particulières afin d'éviter d'impliquer une portée trop étroite tout en visant à garantir qu'elle soit à l'épreuve du temps compte tenu de l'évolution rapide du domaine de la biologie synthétique. Cette politique fournit des orientations générales et n'est pas destinée à servir de guide de mise en œuvre détaillé. » Nous avons déclaré que cette politique devrait être harmonisée avec les instruments internationaux. Cette politique est destinée à être plus large qu'un processus très spécifique, ce qui la rend également à l'épreuve du temps.
29	113	113	Suggestion de supprimer "le cas échéant".	Ces cadres sont importants et pertinents pour la prise de décision. Si l'expression "le cas échéant" est laissée, il semble que ces cadres ne soient pas essentiels.	La politique impose une approche au cas par cas. Le terme « selon le cas » a été supprimé dans la section E Principes, mais le terme « selon les besoins » est conservé ici car la prise en compte de la manière dont des questions spécifiques doivent être appliquées lors de la prise de décisions sur des applications particulières de la bio-synthèse doit être effectuée au cas par cas.
29	114	114	RAS	Cette section devrait commencer par aborder la légitimité de la prise de décision par rapport à l'espace (les zones et les habitats potentiellement affectés), au temps (les impacts potentiels sur les générations futures d'êtres humains et d'autres organismes) et à la représentation (qui devrait être responsable de la prise de ces décisions ?)	Le concept de légitimité a été ajouté au premier paragraphe de la section F avec le lien vers la prise de décision conforme à la législation internationale et nationale et au droit coutumier.
29	119	119	Suggestion de supprimer "le cas échéant".	Pas nécessaire - Le cas par cas est toujours important, surtout si l'on considère que le principe de précaution est reconnu ci-dessus.	Nous ne sommes pas du tout d'accord avec cette affirmation. La nécessité de telles conditions doit être évaluée au cas par cas.
29	123	124	Soutenez avec beaucoup d'enthousiasme la référence à la "recherche, à l'utilisation confinée, aux essais en milieu semi-ouvert, à la dissémination conditionnée ou non dans l'environnement".	Afin de garantir que les évaluations soient contextuelles et de grande portée, et qu'elles soutiennent ainsi une prise de décision efficace et nuancée, veuillez conserver cette approche.	Merci.
29	125	125	Supprimer "en cas de besoin" et remplacer par "que".	L'évaluation des risques est toujours nécessaire, y compris lors de l'examen des applications de la biologie synthétique en relation avec la conservation de la nature, lorsque le génie génétique et l'ingénierie des gènes sont effectués.	L'expression « lorsque cela est nécessaire » s'applique aux plans de gestion des risques en général, plutôt qu'à des éléments spécifiques du plan. Par conséquent, « que » a été ajouté et « lorsque cela est nécessaire » a été déplacé plus tôt dans la phrase.
29	143	143	"Supprimer "avantages"	"La suppression de ""et des avantages"" du texte est suggérée parce que le principe de précaution concerne fondamentalement l'évaluation, la gestion et l'atténuation des risques associés aux décisions environnementales et écologiques. Ce principe exige que, face à l'incertitude, lorsque des impacts négatifs potentiels sur l'environnement sont identifiés, des mesures de précaution soient prises pour prévenir ou minimiser ces risques, même si certaines relations de cause à effet ne sont pas entièrement établies scientifiquement. L'accent est mis sur la prévention des dommages plutôt que sur l'évaluation des avantages potentiels, ce qui renforce la nécessité de se concentrer uniquement sur les risques lors de l'application du principe de précaution.	Cette phrase couvre non seulement le principe de précaution, mais également d'autres principes de la section E. De plus, comme le dit le projet de politique, l'évaluation des risques et l'évaluation des avantages doivent être effectuées indépendamment, mais la prise de décision doit tenir compte des deux.
29	145	145	"Nous soutenons fermement"	Il est nécessaire de distinguer et de séparer les risques et les avantages car les promesses de la biologie synthétique comprennent souvent des affirmations d'avantages significatifs qui sont souvent spéculatives et manquent de soutien empirique.	Comme le stipule le projet de politique, l'évaluation des risques et l'évaluation des avantages doivent être réalisées de manière indépendante, mais la prise de décision doit tenir compte des deux.
29	150	150	Suggestion de supprimer les avantages.	Même raisonement que pour 145 risques et avantages sont distincts et se produisent de manière indépendante	Cela est vrai, mais nous considérons que l'évaluation des risques et l'évaluation des bénéfices peuvent et doivent toutes deux se faire de manière indépendante, la prise de décision les prenant toutes deux en compte.
29	159	150	Suggestion de suppression : "et l'évaluation des avantages".	L'évaluation des risques et des avantages doit être séparée, comme c'est le cas dans la ligne 145	Nous avons noté que l'évaluation des risques et l'évaluation des bénéfices peuvent et doivent toutes deux être réalisées de manière indépendante, la prise de décision les prenant toutes deux en compte. Il existe en fait des méthodologies d'évaluation des bénéfices dans le secteur de la conservation et plus particulièrement dans le contexte de l'UICN (par exemple, l'outil d'évaluation des bénéfices des aires protégées). Cette section a été restructurée pour plus de clarté.
29	161	161	Supprimer "le cas échéant".	Le GTPD souhaitant rester inclusif et participatif, les peuples et les communautés locales devraient être pris en compte et ce sentiment général devrait être maintenu.	Il peut y avoir des situations où certaines de ces considérations ne s'appliquent pas, c'est pourquoi nous conservons la formulation originale. Cette section a été restructurée pour plus de clarté.
29	163	163	Veuillez ajouter après les nouvelles technologies, y compris le génie génétique et l'ingénierie des gènes.	Le GTPD aborde déjà la question de l'échelle, du champ d'application (25) et de l'échelle et de la complexité (162), ce qui garantit la pertinence pratique du document.	Cette phrase a été modifiée en fonction des autres commentaires pour plus de clarté. Cette section a été restructurée pour plus de clarté.
29	178	192	Suggestion de suppression.	Nous pensons que toute cette section suppose l'utilisation d'applications synbio.	Il est à noter que la politique ne fait aucune hypothèse sur les applications futures de la biologie synthétique, mais cherche à saisir l'éventail des questions qui devraient être prises en compte si de futures applications de la biologie synthétique sont envisagées en relation avec la conservation de la nature. L'inclusion de cette section est considérée comme faisant partie de la pérennisation de la politique.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
30	17	17	Please do consider our suggestions in the problem statement section. In particular, please include wording that makes explicit that the need for a policy comes from controversies particularly around the following two points: I) some of the synthetic biology applications developed for use in the nature conservation sector involve the release into the wild of genetically modified organisms, including such that contain synthetic gene drives; and II) the general compatibility with overarching goals, principles and practices of nature conservation of genetically modifying wild organisms, especially if they contain gene drives, is highly contested. Some suggestions of where this kind of wording could be included are made for Lines 30 and 41.	Two crucial points are missing from the problem statement. Without these two points included the problem statement is unintelligible except for insiders, and thus highly intransparent, if not misleading. The two points are: I) At present, most cases in which there is a problem around synthetic biology in relation to nature conservation concern the release of genetically modified organisms, sometimes including synthetic gene drives. This needs to be spelled out. II) The controversies around synthetic biology in relation to nature conservation in the conservation community primarily pertain to the question whether it is a good idea to develop applications of synthetic biology with the idea of applying these in the conservation sector. The controversies, and this is the connection to point I), are particularly pertinent if the applications that are developed include the release of genetically modified organisms, in some cases including synthetic gene drives, in the wild.	The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation.
30	18	24	Please keep first part of the paragraph, which we consider a very good introduction to the problem statement. At the end of the paragraph, please add "There is thus an urgent need to continue and strengthen efforts to address drivers and causes of biodiversity loss, such as for example: promotion of nature-friendly land use; protection against exploitation of nature and the environment for infrastructure, deforestation, overfishing and industrialised, intensive farming and protection of areas, also in terms of biosafety."	We already argued this in our comments to the first draft. The answer to our comment was that "The text has been modified to express what nature conservation is, without going into specifics since there are very many examples. The need to continue traditional approaches is now captured in the problem statement." Regarding the first point: we see absolutely no problem in adding (some) examples and labelling them accordingly, without the need to make the list exhaustive. The examples in Lines 21-22 work very well and we very much support them. We see the potential for an analogous list here and have made a suggestion to this effect, while it may of course be possible to further improve the fit of the selection to general IUCN policy, if needed. Regarding the second point: We do not see how the need to continue traditional approaches is now captured in the problem statement. If the reply refers to the sentence in Lines 31-32, please note that this is a far too vague statement and only in relation to synthetic biology; this is why we have suggested an alternative here.	The following text has been added at the end of paragraph 1 Section A: "There is thus an urgent need to continue to strengthen efforts to address drivers and causes of biodiversity loss and support its recovery." We believe it is not appropriate here to offer a list of examples of traditional approaches.
30	25	25	Please delete "scale and scope of the" or reword.	We agree that scale and scope of technological options and application plans coming from the field of synthetic biology are developing rapidly, and this point may well be made with a different wording. However, the current wording does not really make sense, as it is not the field itself that rapidly develops in scale. Also, the reference to Section D is to a section that defines synthetic biology and the scope of the policy, but not the "scale and scope" of the field of synthetic biology.	This section has been reviewed in the light of your and other comments and has been restructured for clarity
30	27	27	Please delete "positive and negative".	The sentence "Depending on the type of application, synthetic biology may have significant impacts for many aspects of the integrity and diversity of nature, [...]" stands perfectly well without "positive and negative" spelled out as qualifier for "impacts". We're aware that there is strong interest from some actors in this process to have the term "positive" mentioned here, in order that there is no preconception of "negativeness". However, this is already catered for by using the term "impacts" rather than "risks", "hazards" or "harm". Keeping the seemingly neutral qualifier "positive or negative" at this point rather skews the connotation of the sentence towards "positive" and towards "applications in the conservation sector", which is to our understanding not intended. Surely, at a point in the text where the scope has not yet been addressed, we need a sentence that is broad enough to include applications in other-than-conservation sectors. And these are not expected to be positive for conservation. There is also a need to spell out and explain to those who are not familiar with the issue what it is actually about; this can be done in a concise way in the course of the problem formulation, as suggested below for Lines 30-31.	This was discussed and no change was made because it was felt the use of the words positive and negative are intended to express the true dichotomy of possible impacts, without emphasis of one over the other.
30	27	28	Please keep "integrity and diversity of nature".	We very much agree with your response to some of the comments to the first draft, that the "term [integrity] is used in the Mission Statement of IUCN and is also within Resolution 123 and many other international contexts including the CBD", and we continue to support keeping it.	Noted with thanks
30	28	29	Please consider deleting ", including conservation, sustainable use, and equitable sharing of benefits arising from the utilisation of genetic resources".	The sentence in Lines 27-28 stands perfectly well without this addition, which brings in levels of detail that are not needed in the problem definition, and as pointed out in one of the PDWG replies to the previous rounds of comments, the problem definition is not meant to go into detail too much.	These aspects, as listed, reflect the pillars of the missions of IUCN and of CBD.
30	30	31	Please replace "Applications have the potential to be beneficial and to pose risks to biodiversity and people" by "It has been suggested that some types of synthetic biology applications could be used to benefit species conservation. The compatibility of such approaches with values and principles of nature conservation is contested, especially when they involve the genetic modification of wild living organisms, and with added controversy around genetically modified wild organisms that would include synthetic gene drives. Also, the realisability, effectiveness and robustness of required risk assessment are unclear for some of the approaches."	The policy needs to be transparent on this matter. It is important that the issues are spelled out in a way that enables people outside the core discussion to understand why the discussions are taking place. The following two points have to be made clear for the problem statement to make sense and not mislead readers: I) Most cases in which there is a problem around synthetic biology in relation to nature conservation concern the release of genetically modified organisms. II) In the conservation community, the controversies around synthetic biology in relation to nature conservation are about whether it is a good idea to develop applications of synthetic biology (especially such that involve the release of genetically modified organisms, in some cases including synthetic gene drives, in the wild) with the idea of applying these in the conservation sector.	The first sentence has been deleted. The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation
30	31	31	Please replace "should not be seen to" by "can also in no way be expected to".	While we agree with this important point, it should really be self-evident. Wording it weakly conveys the impression that this could be up for discussion. It is also problematic that it builds on the assumption that benefits of synthetic biology for nature conservation could be realised and that synthetic biology would be compatible with the values of nature conservation. Deletion would therefore be an alternative for us, but only if the remainder of the text does not have connotations that can be read as "synthetic biology could fix this". At the moment, the overall text, unfortunately, still has such connotations, which makes this sentence necessary, and our request is therefore to strengthen it. This point may need to be revisited.	We agree and have adjusted the text along these lines: "Synthetic biology is not to be seen to replace ongoing and future efforts to address biodiversity loss. Synthetic biology could be complementary to these efforts."

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
30	32	32	Please consider deleting ", and it could be complementary to these efforts".	In nature conservation, it is obvious that while it is crucial to address drivers of biodiversity loss, there are also activities that target, for example, genetic bottlenecks in endangered species. This is irrespective of what technologies may play in, so it is unnecessary to specify this for the case that synthetic biology could be applied, especially as the problem formulation is meant to be concise and easy to read. Also, this wording adds to the impression that it is already set that prima facie, synthetic biology applications are compatible with / can be useful for nature conservation.	We agree and have adjusted the text along these lines : "Synthetic biology is not to be seen to replace ongoing and future efforts to address biodiversity loss. Synthetic biology could be complementary to these efforts. "
30	35	36	Please delete "of the risks and benefits".	The sentence stands perfectly well and well-balanced without "of the risks and benefits". Adding "of the risks and benefits" narrows the scope of the evaluations needed, which are not restricted to risks and benefits, but also concern uncertainty, compatibility with concepts of nature and of nature conservation, etc.. These other evaluation categories would need to be added to the list. However, rather than spelling all this out, it can here be kept simple, serving the conciseness of the problem statement.	We agree and have adjusted the text to indicate the need for a policy to inform decision making on the implications of synbio applications, rather than implying the policy would guide the applications themselves, and we are not calling for additional guidance.
30	37	37	Please specify what the divergent views are. This could be very brief, as in, e.g., "While synthetic biology applications in all sectors can have impacts on nature which need to be addressed, and some divergence in views exists on how this should best be accomplished, particularly divergent views regarding synthetic biology in relation to nature conservation are found when the synthetic biology applications involve genetically modifying organisms that live in the wild, and when it is suggested that such applications could be applied in the species conservation sector."	Although the policy cannot provide a comprehensive analysis of divergent views, the readers do need to be told what the divergent views are, if only broadly, and what the main points of contention are.	The second paragraph of section A alludes to the basis of divergent views with reference to the potential for positive and negative impacts, but it was not considered appropriate here to try and capture the wide range of changing views.
30	40	41	Please include something like, for example: "It has been suggested that some types of synthetic biology applications could be used to benefit species conservation. The compatibility of such approaches with values and principles of nature conservation is contested, especially when they involve the genetic modification of wild living organisms, and even more so if these would contain synthetic gene drives. Also, the realisability, effectiveness and robustness of required risk assessment are unclear for some of the approaches."	We appreciate the effort made to find wording for the policy not being biased. However, it can only work if there is some information on the divergent views, with an addition like the one requested as replacement for Lines 30-31. Whether in Lines 30-31 elsewhere, such information is needed to make the sentence in 40-41 understandable and transparent.	The 4th paragraph of section A alludes to the basis of divergent views with reference to the potential for positive and negative impacts, but it was not considered appropriate here to try and capture the wide range of changing views.
30	41	41	Please add "Discussions about the compatibility of the different suggestions for applications of synthetic biology to nature conservation with goals, values and practices of nature conservation have demonstrated substantial conceptual challenges as well as controversy pertaining particularly to applications that involve genetic modification of wild organisms, and particularly if protected species are targeted or synthetic gene drives are included".	These are the central points of controversy and it makes no sense to downplay or even mute them. If similar text is included further up, it may not be necessary here, but it has to be somewhere in the problem statement.	The text has been kept general on purpose to avoid limiting the inference to specific issues. The policy is intended to apply to all aspects of synthetic biology, as defined by CBD, in relation to nature conservation
30	49	53	Please reword to align with the goal as stated in the resolution, specifically also reaffirming the fundamental importance of the precautionary principle. In case the first bullet point is contained in rewording, please delete "a" and "application"	More alignment with the resolution would strengthen the wording in the goal section. The current wording in the first bullet point could be read to imply that the policy cannot provide advice on specific applications, which it cannot, as was also explained in IUCN responses to various comments to the first draft.	The resolution reaffirms the importance of Precautionary Principle, but doesn't link that to the goals. The precautionary principle is explicitly highlighted in the principles section. Regarding deleting "a" and "application", we have previously resolved to work on a case-by-case basis for each application of synbio, rather than asses the whole field of synbio.
30	54	54	Please strengthen the wording to make clear that legal obligations to this effect exist, notably under the CBD and its Protocols, but generally acknowledging the need to comply with such legal obligations.	The current wording does not make the status of international law sufficiently clear.	<u>We therefore have not changed the text in this instance</u> Section F, introductory paragraph has been updated to clarify that the policy in its entirety, should be interpreted in accordance with international instruments, national legislation, and customary law. Additionally the appendix explicitly references relevant instruments.
30	56	60	Please reword to account for the fact that the nature conservation sector, in contrast with the others, is not a sector in which synthetic biology is actually currently applied, and that rather, this is up for discussion.	The current wording conveys the impression that there are already synthetic biology applications for nature conservation in place, and that the potential for applications in this sector is comparable with the others, which is not the case. Also, the wording still implicitly assumes that synthetic biology applications, including genetic engineering of wild organisms and including gene drives (as no differentiation is provided), can in principle be instruments in the conservation sector. This is not an agreed-on point that the policy wording can be based on.	RES123 explicitly recognises that synthetic biology could be used for nature conservation purposes: Appendix Section I.
30	61	61	Please delete the table.	The content to be conveyed by the table can easily be put in the text, thereby avoiding the visual impression conveying the message that there are already synthetic biology applications for nature conservation in place, and that the potential for applications in this sector is comparable with the others, which is not the case.	RES123 explicitly recognises that synthetic biology could be used for nature conservation purposes: Appendix Section I. The table has been found to be useful by many reviewers in clarifying the scope, particularly for decision-makers.
30	62	67	Please retain the CBD operational definition of synthetic biology. Please complement by CP Definition on LMO.	It is essential to make the link between the stated goal of the resolution to address synthetic biology and the plain fact that some applications of synthetic biology lead to LMO, which are covered by the CP.	Noted, with thanks
30	68	69	Please change to include the introduction of some basic categories of synthetic biology. This could involve just including distinctions: do they involve nucleotide synthesis? Do they involve genetically modified organisms? Do they involve changing the genome of protected species? Do they involve synthetic gene drives? Do they involve the release of genetically modified organisms?	Examples are not necessary and might be too much (although we do not generally oppose using examples), but naming some of the essential distinctions/categories is absolutely essential for the policy to be useful and transparent. Reference to GMO / LMO is also essential for making clear the relevance of the already existing international agreements, especially under the Cartagena Protocol. Also, trying to make the policy future-proof in light of the rapidly changing situation too ambitious and also not necessary, as it is after all not a piece of legislation and the CBD processes in this respect are dynamic.	We appreciate this point, but listing specific technologies has proved prohibitive from technical and political perspectives. Furthermore, the recommendation of the Citizens' Assembly was to avoid listing any specific technologies, whether known or not. This recommendation has been followed throughout the policy. Consequently, the text has been retained.
30	70	70	This could be deleted, or else maybe moved to Section C, in which you may want to consider deleting the second part of the sentence.	It is not part of the scope, but part of the goal. It is also self-evident in our opinion. The second part of the sentence is one more example (like, e.g., the Table in the same Section) of parts of the draft that in a very indirect way contribute to impression that it is already set that synthetic biology be used for the purpose of nature conservation. Why else would it need to be spelled out that the policy is not giving implementation advice?	Noted. However, we consider that this comment is appropriate in the section on Scope because other commentators have requested the inclusion of details which are beyond the scope of this policy.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
30	74	74	Please delete ", as applicable."	The principles are generally valid, the addition introduces a relativism that could be instrumentalised to undermine the validity of the principles.	Comment addressed by changing the text, including deleting 'as applicable'
30	92	92	Please replace "Adopt" by "Adhere to".	We think this is more appropriate wording.	Comment acknowledged, text changed to 'Apply'. The use of the word 'apply' rather than adhere to is more commonly used regarding the case by case approach.
30	92	92	Please add ", however recognising that robust case-by-case assessment is only possible when reliable risk assessment instruments are available, also in light of cumulative effects, and there is not too much uncertainty."	We strongly support the case-by-case principle. Unfortunately, it reaches its boundaries when reliable risk assessment instruments are no available, and/or in cases with too much uncertainty. This is why case-by-case goes hand in hand with the precautionary principle. We recognise that this aspect is touched upon in section F, but it is so central that it deserves one sentence within the principle, too.	Comment addressed. Applying the case by case approach entails considering issues such as the appropriate status of information. Issues raised on the interconnections among the Principles have now been addressed by an amendment in the first paragraph of Principles.
30	93	93	Please replace "Adopt" by "Adhere to".	We think this is more appropriate wording.	Comment acknowledged, text changed to 'Apply'. The use of the word 'apply' rather than "adhere" to is more commonly used regarding the case by case approach.
30	93	97	Please retain.	We think this is a very appropriate consideration of the precautionary principle, especially also the Ref to UNESCO and to In Dubio Pro Natura.	Comment acknowledged. Taking into account the many divergent views in the comments around these references, we have (a) retained the Rio Declaration in the text, as a non-binding international agreement signed by 175 countries; (b) removed the UNESCO 2005 reference from the text because it is a technical document that has not been adopted by countries; (c) retained the Rio Declaration and the UNESCO 2005 reference in the Appendix. Further, we have (e) retained the In Dubio Pro Natura reference in the text because it is specifically relevant to nature conservation, but changed 'include' to 'consider' because the principle has not been formally adopted by governments; and also (f) added a reference to In Dubio Pro Natura into the Appendix.
30	113	113	Please delete ", as appropriate".	The addition introduces a relativism that could be instrumentalised to undermine the validity of the highly relevant and important message.	The policy mandates a case by case approach. The term 'as applicable' has been deleted in Section E Principles, but the term 'as appropriate' is retained here because consideration of how specific issues are to be applied when making decisions on particular synbio applications need to be made on a case by case basis.
30	119	119	Please delete "When relevant, ".	This is generally relevant, the addition introduces unnecessary relativism to an important point.	We respectfully disagree. The necessity for such conditions needs to be assessed on a case by case basis.
30	122	124	Please retain.	We think it is very useful that these important distinctions are listed here.	Thank you.
30	125	125	Please replace ", when necessary, " by "that".	This is a generally relevant and very important point that should be strengthened rather than relativised.	The 'when necessary' applies to risk management plans in general, rather than the specific pieces of the plan. Therefore, "that" was added and 'when necessary' was moved earlier in the sentence.
30	134	134	Please delete "appropriate public engagement and", and add, after "transparency", something like: "regarding all aspects of their project that are relevant to the public, including the technologies involved and the interests."	The intention stated in replies to comments to his wording in the first draft is that here, the responsibility of the proponents is clearly limited to project-relevant information. The adapted wording ensures that it cannot be misread to also include opportunities for interest-led public awareness activities.	We have added mention of "relevant authorities" and the sharing of information relevant for decision-making in response to other comments. However, we have retained the phrase "appropriate public engagement" which encompasses the ideas raised by the reviewer but it is broader. So as to be relevant in all cases.
30	141	141	Please consider deleting "and benefit assessment" from the title of this section, possibly allowing for a separate section on benefit assessment.	We're not sure it makes sense to have "and benefit assessment" in the title here, as long as no reference is actually made to benefit assessment principles/methodologies in the text. We are aware that the problem is that they do not really exist. If this policy were about food or medicine, the situation would be different, as methodologies for benefit assessment and risk-benefit assessment have there been developed. They cannot, however, be easily adapted to the nature conservation sector, which has other traditions for decision-making, involving for instance the analysis of conflicts of goals. Nor can benefit assessments - as seems to have been the strategy in this subsection - simply follow the same path as risk assessments. When it comes to benefits, their actual assessment thus lacks a conceptual and methodological basis, as well as experience. Something like this (e.g., a lack of benefit assessment tools for nature conservation) could of course be spelled out. As long as almost nothing is said about benefit assessment in the subsection, the title may, however, not be appropriate.	It is necessary to keep risk assessment and benefit assessment together because, as the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both. We consider that the principles mentioned are relevant for benefit assessment and more detail on methodologies is not possible at this policy level. There are in fact methodologies for benefit assessment in the conservation sector and specifically in the IUCN context (e.g. Protected Areas Benefits Assessment Tool). This section has now been restructured for clarity.
30	143	143	Please delete "and benefits".	The precautionary principle pertains to risks, not to benefits.	This sentence covers not only the precautionary principle but also other principles in Section E. Additionally, as the draft policy says, assessment of risks and assessment of benefits should occur independently, but decision-making must consider both.
30	145	145	Please retain.	We agree with this central observation.	Noted, with thanks.
30	147	147	Please delete this sentence.	Guidance is not needed on inclusion of benefits in decision-making processes; this is an inherent part of processes anyway, and also one of the reasons why risks are addressed at all.	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account.
30	148	148	Please delete "and benefit assessments".	The advice contained in Line 145 should be followed here, keeping the risk and benefit aspects separate on the assessment level. Also, the content of the paragraph do not actually make sense for the assessment of benefits, which require their own comprehensive methodologies.	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account. We consider that the principles mentioned are relevant for benefit assessment and more detail on methodologies is not possible at this policy level. There are in fact methodologies for benefit assessment in the conservation sector and specifically in the IUCN context (e.g. Protected Areas Benefits Assessment Tool).
30	150	150	Please delete "and benefits".	The advice contained in Line 145 should be followed here, keeping the risk and benefit aspects separate on the assessment level.	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account.
30	150	150	After "include" (or elsewhere in the listing), please add "uncertainties, ". Before "immediate", please include "risk characterisation of".	Uncertainties and risk characterisations are an important/central aspect of risk assessment of synthetic biology in relation to nature conservation. Adding them will further strengthen this crucial sentence.	We have modified the text in this section to call attention to the need to recognise any potential knowledge gaps, which may generate uncertainty. This section talks about risk assessment in general (as well as benefit assessment), which includes risk characterisation.
30	150	152	Please retain (nonwithstanding a few additions suggested below).	The concreteness in this listing is very helpful for readability and conveys central content.	Noted, with thanks.
30	153	153	Please replace "consequences of inaction" by "conflicting goals".	There is a long tradition in nature conservation of considering whether or not to intervene with particular methods because there are typically conflicting goals, such as avoiding a genomic bottleneck but also allowing evolutionary mechanisms to strengthen a population. "Conflicting goals" addresses this with less bias than "consequences of inaction". Also, conflicts of goals are an important topic that should be mentioned in this policy.	Noted, but we consider "inaction" the more relevant concept. Looking at the implications of inaction is well established in relation to nature conservation. "Conflicting goals" is a different concept, often used to describe lack of coherence in public policies.

Reviewer	Line start	Line finish	Proposed edit	Edit rationale	PDWG response
30	153	154	Please consider moving "the ability to remediate undesirable consequences" to the list in the previous sentence. You could also consider rewording to include concepts such as "reversability" and "risk management". You may want to include reference to experience with the management of invasive alien species.	The "ability to remediate undesirable consequences" fits better in the list in the previous sentence, because it is part of the direct risk assessment and risk management considerations, and not of the wider picture.	Noted, the phrase has been moved up to the previous sentence.
30	155	156	Please retain this separation of risks and benefits.	We highly appreciate that risks and benefits are kept separate here.	Noted. We consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account.
30	157	158	Please delete "and benefit assessment" as well as ", as appropriate,".	In contrast with the situation for risk assessment, there is no methodological basis for benefit assessment in the context of nature conservation that can be the basis for this kind of statement. Also, risks and benefits need to be kept separate here as stated in Line 145. The qualifier "as appropriate" is inappropriate, as the point contained in the statement is of general validity and should not be weakened.	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account. There are in fact methodologies for benefit assessment in the conservation sector and specifically in the IUCN context (e.g. Protected Areas Benefits Assessment Tool). This section has been restructured for greater clarity.
30	159	159	Please delete "and benefit assessment" and consider adding, instead, reference to benefit assessment at the end of the paragraph.	In contrast with the situation for risk assessment, there is no methodological basis for benefit assessment in the context of nature conservation that can be the basis for this kind of statement. Also, risks and benefits need to be kept separate here as stated in Line 145. However, suggesting that benefit assessment methodology to be developed should also take the points made here into account would be useful, and we've made a suggestion to this effect in reference to Line 163	Noted, but we consider that the assessment of risks and assessment of benefits can and should both occur, in an independent way, with decision-making taking them both into account. There are in fact methodologies for benefit assessment in the conservation sector and specifically in the IUCN context (e.g. Protected Areas Benefits Assessment Tool). This section has been restructured for greater clarity.
30	161	161	Please delete ", as appropriate,".	The qualifier "as appropriate" unduly weakens the point contained in the statement, which is of general validity.	There may be situations where some of these considerations do not apply thus we retain the original wording. This section has been restructured for greater clarity.
30	161	162	Please consider replacing "be complementary to existing methods;" by something like "consider compatibility with established interventions;".	The risk assessment cannot be complementary to existing methods of intervention, it can consider them.	This sentence has been edited in line with other comments for clarity. This section has also been restructured for greater clarity.
30	163	163	Please consider adding something like "methodology to be developed for the assessment of benefits should also take these views into account".	There may be a need to mention benefit assessment methodology explicitly, including the need to develop it, and this could be a suitable place.	There are some methodologies for benefit assessment in the conservation sector and specifically in the IUCN context (e.g. Protected Areas Benefits Assessment Tool). More guidance may be needed, but we do not think this policy is the right place to call for such work. This section has been restructured for greater clarity.
30	164	164	Please delete ", as appropriate,".	The qualifier "as appropriate" is not needed here as reference is already made to national and international legislation which govern the appropriateness in each case.	There may be situations where some of these considerations do not apply thus we have retained the original wording while this section has been restructured for clarity.
30	164	164	Please delete "and benefit assessment,".	The sentence does not make sense for benefit assessments, especially with no methodology at hand.	A participatory and anticipatory approach can also be relevant in benefit assessment. If it is not relevant in a particular instance, the term "as appropriate" enables it not to be included. This section has been restructured to provide greater clarity.
30	188	192	Please delete this paragraph .	The paragraph is premature, it goes into too much detail considering the current state of technological development and discussions on governance.	Noted with thanks. We agree that this framing was unclear so this paragraph has been reworded.
31	112	112	"Frameworks to evaluate and manage potential risks and benefits of research, development, and applications of synthetic biology in relation to nature conservation should, as appropriate:" Suggest replacing with "approaches", which removes a legal context and suggests that all actors within the value chain can engage on the actions within the list, from policymakers to regulators to developers.	As structured, the list below this sentence contains actions that are appropriate the regulatory frameworks (risk assessment, risk management) and that those that exist outside of regulatory frameworks (FPIC, placing responsibility for engagement on developers). The term "framework" indicates a legal structure, which does not seem to fit here.	The policy is intended to apply to both regulatory and other frameworks, so the text has been edited to clarify this.
31	129	129	"Provide project plans that include a staged approach, including staged consultation with relevant parties that might lead to reassessments and adaptive management." To be more direct, suggest "Ensure that projects for product development and release include a staged approach, including consultations with relevant parties that allow for and enable iterative risk management."	From a risk management standpoint, there are issues with how this is phrased.	This policy is broader than just product development and release. These concepts are included in this section and, from our perspective, the current wording is clear
31	133	133	"Ensure the proponent of a synthetic biology development or application be responsible for appropriate public engagement and transparency." Suggest the following, "Ensure the developer of a synthetic or application be informed of the tools necessary for appropriate public engagement and transparency, encouraging them to engage in staged consultations."	What does "be held responsible" mean in this context? This seems to assume an enforcement mechanism that is not included. Similarly, what is a "proponent" of a synbio application? The burden should be on the developer, not on an entity that is merely supportive of the application. In addition, there should be tools provided to the developer for this engagement.	We use the term "proponent" because the technology may already exist. It is the proposal to use this technology in particular circumstances that should be based on sufficient information and public participation. It is up to national policy to determine how the proponent of a synthetic biology application should provide such information or opportunities for public participation.
31	135	136	"Establish, consistent with relevant national legal systems, clear rules providing that those who fail to comply with relevant national frameworks on synthetic biology are held responsible for any harm caused by their use or release of synthetic biology applications."	This is redundant to (f). Suggest deleting, as it does not provide additional clarity that is not already listed in (f).	Comment noted and text extensively revised. The intent of what was point (j) - on responsibility for harm caused by actors failing to comply with regulatory or other frameworks - is actually different from what was point (f), and is now point (i), which concerns liability and redress; and so these two points have not been merged. However, given that what was point (j) does not relate to "regulatory and other frameworks to evaluate and manage research on, development, and applications of synthetic biology", this text has now been removed from the list a - i, and instead inserted as a separate point after the list
31	157	157	"Risk assessment and benefit assessment for decision-making should, as appropriate, incorporate ecological, cultural, socioeconomic, and animal welfare considerations." Suggest that the sentence be rewritten to "Risk management and benefit assessment for decision-making should, as appropriate, incorporate ecological, cultural, socioeconomic, and animal welfare considerations."	Risk assessments are supported by scientific data and evidence, which does not include "ecological, cultural, socioeconomic, and animal welfare considerations", whereas risk management does incorporate these features.	This section is regarding General considerations for risk assessment and benefit assessment for decision-making, therefore we have retained the original wording for consistency and clarity. This section has been restructured for greater clarity.
31	188	192	"Intellectual property rights should not be a hindrance to applications of synthetic biology in relation to nature conservation. Intellectual property rights on applications of synthetic biology in relation to nature conservation should respect the rights of Indigenous Peoples and local communities in relation to genetic resources and associated traditional knowledge, as established by customary laws and international and national legislation." Suggest the following instead "Intellectual property rights should support innovation in applications of synthetic biology..."	"Hindrance" included in this context assumes that IP would be a hindrance.	Noted with thanks. We agree that this framing was unclear so this paragraph has been reworded.