February 2022

Species conservation in the post-2020 Global Biodiversity Framework

The post-2020 Global Biodiversity Framework must include clear species outcomes and actions to ensure we are nature-positive by 2030. The inclusion of commitments on species is critical given they are fundamental units of biodiversity, the building blocks of ecosystems, are well monitored and have substantial public resonance. We welcome and recognise the importance of the species component of Goal A and the inclusion of Target 4 on species recovery actions, but we have some specific recommendations for their improvement. This third update of our species position (first produced in September 2019) covers the species elements of the First Draft of the post-2020 Framework (Goal A, Target 4 and related indicators) and now also includes a detailed Annex addressing a series of technical questions, including those posed by the Co-chairs of the post-2020 Open-Ended Working Group in November 2021.

Critical Elements and Justifications

For **Goal A** we need:

1) A **retention of measurable milestones**, or outcomes, for 2030 which are a fundamental component of the framework, as a means to assess whether 2030 action targets are leading us towards the 2050 goals.
2) A **more ambitious reduction in extinction risk by 2030, increasing the figure from 10% to 20% in comparison with 2020 levels** to bring us in line with the 2050 vision of a world living in harmony with nature.
3) A renewed commitment to **halt human-driven extinctions of known threatened species**. Evidence demonstrates this is achievable. Simply reducing the extinction rate is both inadequate and more challenging to measure.
4) **An increase in the ambition to increase the population abundance of species by at least 20% by 2030 in comparison with 2020 levels,** to ensure abundant and resilient populations of all species by 2050.

Goal A Text Suggestion

The integrity of all ecosystems is enhanced, with an increase of at least 15 per cent in the area, connectivity and integrity of natural ecosystems, supporting **abundant** and resilient populations of all species, **human-driven** extinctions **of known threatened species are halted**, the risk of species extinctions across all taxonomic and functional groups is **eliminated,** and genetic diversity of wild and domesticated species is safeguarded, with at least 90 per cent of genetic diversity within all species maintained.

Milestone A.2. **Human-driven extinctions of known threatened species are** halted, extinction risk is reduced by at least **20 per cent**, with a decrease in the proportion of species that are threatened, and the **average population** abundance of **native** species **is increased by at least 20 per cent.**

Goal A Indicators

- Retain the **Red List Index** as a headline indicator (A.0.3) to track overall extinction risk.
- Re-insert the **Living Planet Index** as a headline indicator measuring population abundance.
- To track extinctions, add indicators: **Trends in number of species becoming extinct or qualifying for uplisting to Critically Endangered** and **Number of extinctions prevented owing to conservation actions.**

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For **Target 4** we need:

1) A **focus on wild species only** - the inclusion of domestic species in the target is a distraction from the urgent actions needed to conserve wild species.
2) **Focus on action for threatened species** - the conservation of which need species-specific recovery actions to recover. Recovery of non-threatened species is enabled by actions under the other targets.
3) **Focus on species conservation** - human-wildlife conflict is unrelated to species conservation and would be better dealt with in relation to biodiversity benefits to people, either through a standalone target, or under Target 9 or 5.

Target 4 Text Suggestion

Ensure active management actions to enable the recovery and conservation of **threatened wild** species **and their** genetic diversity, including through ex situ conservation.

Target 4 Indicators

- Add Headline indicator: **Proportion of species requiring intensive recovery actions to avoid extinction that are under active recovery management**
- Reword component indicator 4.1.1 to: **Number of species for which recovery has been documented using 'Green Status of Species' assessments on the IUCN Red List**
- Add component indicator: **Mean % of each Key Biodiversity Area identified for globally threatened species that is covered by protected areas or other effective area-based conservation measures (OECMs)**
- Add component indicator: **Proportion of Key Biodiversity Areas identified for globally threatened species in 'favourable condition'**
- Add component indicator: **Number of threatened species for which global or national action/recovery plans are i) up to date, and ii) being implemented**

To deliver the 2050 vision of 'living in harmony with nature' we must halt and start to reverse biodiversity loss by 2030. With the current rapid rate of decline, any chance of success relies on transformative action now.

Recent research examining the impact of targeted conservation on global population trends of vertebrate species has revealed that targeted action has delivered very substantial positive effects over recent decades.

- ***Over 70 bird species have qualified for down-listing to lower categories of threat on the IUCN Red List as a result of genuine improvements in their status*** following the implementation of conservation action. Examples include Guam Rail and California Condor, once Extinct in the Wild, but successfully reintroduced back into the wild, and Rodrigues Warbler, whose population has grown from <150 individuals in 1999 to nearly 4,000 individuals following habitat protection and reforestation.
- ***Some countries already show positive Red List Index trends following implementation of conservation actions***. For example, national Red List Indices for birds in the Seychelles and Mauritius have both increased in value since 1988, indicating reductions in extinction and progress towards recovering populations of threatened species through conservation action.
- ***Similar examples exist for a range of other taxonomic groups as highlighted in our full position.***

To note, the delivery of the species elements should be supported by a dedicated species programme of work.

GOAL A ON CONSERVATION OF ECOSYSTEMS, SPECIES AND GENETIC DIVERSITY

Current Text

The wording of Goal A in the First Draft of the Global Biodiversity Framework is as follows (with orange font indicating the problematic components discussed below):

Goal A.

"The integrity of all ecosystems is enhanced, with an increase of at least 15 per cent in the area, connectivity and integrity of natural ecosystems, supporting healthy and resilient populations of all species, the rate of extinctions has been reduced at least tenfold, and the risk of species extinctions across all taxonomic and functional groups, is halved, and genetic diversity of wild and domesticated species is safeguarded, with at least 90 per cent of genetic diversity within all species maintained.

2030 Milestones

- (A.1) Net gain in the area, connectivity and integrity of natural systems of at least 5 per cent.
- (A.2) The increase in the extinction rate is halted or reversed, and the extinction risk is reduced by at least 10 per cent, with a decrease in the proportion of species that are threatened, and the abundance and distribution of populations of species is enhanced or at least maintained.
- (A.3) Genetic diversity of wild and domesticated species is safeguarded, with an increase in the proportion of species that have at least 90 per cent of their genetic diversity maintained."

BirdLife recommended text

We propose the following revised text for Goal A (with bold, underlined font indicating revised wording). The milestones here relate to the reference year of 2020:

Goal A

"The integrity of all ecosystems is enhanced, with an increase of at least 15 per cent in the area, connectivity and integrity of natural ecosystems, supporting **abundant** and resilient populations of all species, **human-driven** extinctions **of known threatened species are halted**, the risk of species extinctions across all taxonomic and functional groups is **eliminated**, and genetic diversity of wild and domesticated species is safeguarded, with at least 90 per cent of genetic diversity within all species maintained.

2030 Milestones

(A.1) Net gain in the area, connectivity and integrity of natural **eco**systems of at least 5 per cent.
(A.2) **Human-driven extinctions of known threatened species are** halted, extinction risk is reduced by at least **20 per cent**, with a decrease in the proportion of species that are threatened, and the **average population** abundance of **native** species **is increased by at least 20 percent**.
(A.3) Genetic diversity of wild and domesticated species is safeguarded, with an increase in the proportion of species that have at least 90 per cent of their genetic diversity maintained."

Justification

1. **Halt human-driven extinctions of known threatened species**

Goal A text and Milestone A.2 text. The current wording in the 2050 Goal stating that "the rate of extinctions has been reduced at least tenfold" and the 2030 Milestone stating that "the increase in the extinction rate is halted or reversed" is insufficiently ambitious given that global extinctions are irreversible. If we are to "put nature on the path to recovery by 2030" and truly "live in harmony with nature by 2050" we must halt further human-driven extinctions of known threatened species, as we cannot afford to lose any more. Given that conceivably some

natural extinctions (e.g. driven by unexpected volcanic eruptions) could be unavoidable, the goal should specify **human-driven** extinctions. The goal should also focus on **known threatened** species because it would be very challenging to prevent extinctions of species that have not yet been assessed in terms of their extinction risk (or even described to science). We note that Parties already committed to this through Aichi Target 12, and recent evidence[1] demonstrates that preventing the extinction of threatened species is feasible (see Annex Q8). Extinctions have considerable public resonance, and 'halting human-driven extinctions' is also much easier to understood and communicate than 'reversing the increase in rate'. Finally, the wording in the first draft would require assessing the current extinction rate (i.e. over a recent baseline period yet to be defined) with sufficient precision that we could detect by 2030 if the rate has been stabilised or reduced. Given the challenges in quantifying recent global extinction rates precisely, this would be extremely difficult (see Annex Q7). We therefore recommend revising the wording of both the 2050 Goal and the 2030 Milestone to "**human-driven extinctions of known threatened species are halted**".

2. Strengthen ambition in reducing extinction risk

Goal A text: the current wording in the 2050 Goal stating that "the risk of species extinctions across all taxonomic and functional groups is halved" implies that in 2050 there will still be substantial risk of extinctions. For example, if the current number of threatened species was halved, 20,042 species would still be threatened, or the current 40,084 threatened species would have only moved halfway towards Least Concern status. Such substantial levels of extinction risk are inconsistent with the 2050 Vision of a world living in harmony with nature. We therefore recommend revising this wording to "the risk of species extinctions across all taxonomic and functional groups is **eliminated**". Note that this refers to known threatened species, and human-induced extinction risk. With these clarifications, evidence suggests that eliminating such extinction risk (as measured using the IUCN Red List) by 2050 is feasible, with transformative change (see Annex Q11 and Q12).

Milestone A.2 text: the current wording in the 2030 Milestone stating that "the extinction risk is reduced by at least 10 per cent" is insufficient if we are to eliminate extinction risk by 2050 (see Figure 1 and Annex Q10). We therefore recommend revising this wording to: "**extinction risk is reduced by at least 20 per cent"** (in comparison with 2020 levels).

3. Simplify and increase ambition to restore the abundance of species

Milestone A.2 text. The current wording in the 2030 Milestone stating that "the abundance and distribution of populations of species is enhanced or at least maintained" is not 'SMART[2]', and is insufficiently ambitious in order to achieve "healthy and resilient populations of all species" by 2050, as called for in the Goal (note that we believe the ambiguous wording of "healthy" should be replaced with "**abundant**", which is a specific description of species state and better aligns with the milestones). Instead, average population abundance of species must increase by at least **20% by 2030** compared with 2020 levels in order to restore baseline levels (1970 has been suggested as an appropriate baseline) by 2050, as shown in Figure 2 below (see also Annex Q5 and Q6). "Enhanced" should be removed because it is too vague and not SMART. "Distribution" should be removed because species distributions can increase even if species populations are decreasing, so its insertion here is unhelpful and could be contrary to the ambition. "Populations of" should be removed because it distracts from a focus on the overall abundance of each species, noting that some populations may increase while others decrease – it is the overall abundance trend that is important. The word "**native**" should be added because we could perversely achieve the milestone as currently worded if populations of invasive alien species were to increase very strongly. This, of course, is not the objective of the CBD and GBF, quite the reverse. We therefore recommend revising the wording to: "**the average population abundance of native species is increased by at least 20 per cent**" (in comparison with 2020 levels).

Additional lower priority recommendations: The clause in Goal A on safeguarding genetic diversity is redundant given the following clause on maintaining 90% of genetic diversity. The clause in milestone A.2 on decreasing the proportion of species that are threatened is somewhat redundant given the preceding clause on reducing extinction risk. In addition: (i) perversely, it could be achieved by allowing species to go extinct, (ii) it could also be achieved even if most

[1] Bolam et al. (2020) How many bird and mammal extinctions has recent conservation action prevented? *Conservation Letters.* 14, e12762 https://conbio.onlinelibrary.wiley.com/doi/10.1111/conl.12762

[2] Green et al. (2019) Relating characteristics of global biodiversity targets to reported progress. *Conservation Biology.* 33, 1360-1369. https://doi.org/10.1111/cobi.13322

currently threatened species substantially deteriorate in status, and (iii) the proportion of threatened species will mostly change owing to improved knowledge (of currently assessed species, and addition of newly assessed species) and revised taxonomy. By contrast, the risk of species extinctions can be measured using an existing indicator (the Red List Index) which factors out such non-genuine change to show overall trends driven only by genuine improvement or deterioration in the status of species.

Indicators for measuring progress to Goal A

Population abundance and extinction risk are two distinct and complementary dimensions of the species component of biodiversity (see Annex Q3) and hence it is critical that both are measured through headline indicators for Goal A. The **Red List Index**, an existing, well-respected indicator, should remain as a Headline indicator to ensure that extinction risk is effectively measured. However, we are concerned that the latest draft of the monitoring framework does not include any high-quality, well-established and well-respected headline indicators for species' population abundance. This is a significant and critical gap, given that species population abundance is an Essential Biodiversity Variable[3]. While an additional indicator on genetic diversity is desirable, this should not be at the expense of dropping an existing, well-established and informative indicator of population abundance. We therefore **recommend re-inserting the Headline indicator "Living Planet Index"[4]** (See Annex Q4) to complement measuring trends in extinction risk through Headline indicator A.0.3 "Red List Index".

For the Component indicators, we also recommend moving a.42 "Wild bird Index" from Complementary to Component level. The Wild Bird Index is an additional population abundance metric which is based on standardised and systematic monitoring schemes that are designed to address potential biases and deliver representative metrics, which complements the Living Planet index. We also recommend moving a.39 to become a component indicator and re-wording it as "Percentage of threatened species that have improved in status since 2020" to make it clearer.

Further, effectively track progress on halting human-induced extinctions of known threatened species it is important to measure both i) trends in the number of species becoming extinct or being uplisted to Critically Endangered, and ii) the number of extinctions prevented owing to conservation action. We propose indicators of these as follows:

(a) **Trends in number of species becoming extinct or qualifying for uplisting to Critically Endangered** (i.e. species classified as Extinct, Extinct in the Wild, or Critically Endangered)

1. Critically Endangered species are included here because they can be regarded in some senses as 'functionally extinct', as they typically have such low population sizes that they no longer fulfil the ecological functions that they formerly delivered before human impacts threatened them so severely that they qualified as Critically Endangered

2. The advantage of including Critically Endangered in this metric is that it is much easier to detect the movement of species from lower threat categories to Critically Endangered than it is to detect species becoming extinct. This new indicator is feasible to develop rapidly from IUCN Red List data, and would be produced by IUCN and BirdLife International.

(b) **Number of extinctions prevented owing to conservation actions**. This is an existing indicator produced by IUCN and BirdLife International, feasible to update in 2030 at the end of the period for the target.

[3] Pereira et al. (2013) Essential Biodiversity Variables. *Science*. 339, 277-278. https://www.science.org/doi/10.1126/science.1229931

[4] The Living Planet Index is the best-known global indicator of population abundance, is based on a body of peer-reviewed research, and comprises data on nearly 28,000 populations of nearly 5,000 species spanning five decades. The index is built from high quality annual time-series of population sizes (or proxies) for species from terrestrial, freshwater, and marine habitats around the world. The data sources are listed for each data set and are checked and verified before use. Data comes primarily from scientific studies of species and habitats, or from national species monitoring programmes. See https://livingplanetindex.org/home/index.

TARGET 4 ON SPECIES CONSERVATION ACTIONS

Current Text

The wording of Target 4 in the First Draft of the Global Biodiversity Framework is as follows (with orange font indicating the problematic components discussed below):

> **Target 4.**
>
> "Ensure active management actions to enable the recovery and conservation of species and the genetic diversity of wild and domesticated species, including through ex situ conservation, and effectively manage human-wildlife interactions to avoid or reduce human-wildlife conflict."

BirdLife recommended text

We propose the following revised text for Target 4 (with bold, underlined font indicating revised wording):

> **Target 4**
>
> "Ensure active management actions to enable the recovery and conservation of **threatened wild** species **and their** genetic diversity, including through ex situ conservation."

Justification[5]

1. **Focus on wild species**
   The addition of domesticated species to this target is a worrying distraction from the urgent actions needed to conserve wild species. We recommend that conserving the genetic diversity of domesticated species is covered under Target 10 on sustainable agriculture, and hence that the words "and domesticated" are deleted here.

2. **Focus on threatened species**
   The purpose of this target is to promote the species-specific recovery actions needed to prevent extinctions, improve the conservation status and recover the abundance of threatened species for which mitigating threats (the focus of other targets) will be insufficient to achieve this. Recovery and conservation of non-threatened species will typically be achieved not through "active management actions" but through reducing threats (targets 5-8), transitioning to more sustainable production systems (target 10), and conserving and restoring natural habitats (targets 1-2) and important sites for biodiversity (target 3). We therefore propose the insertion of the word "threatened".

3. **Focus on species conservation**
   The issue of human-wildlife conflict is conceptually distinct from the issue of recovery actions for threatened species, so it is best dealt with elsewhere in the Framework, either through a standalone target, or under Target 9 or 5. Wording on this issue needs appropriate caveats to ensure that actions to avoid and resolve such conflict do not impact the viability of wild populations of native species.

   Note it should be clearly understood that *in-situ* conservation is critical and should be the principal action in targeted species recovery.

Indicators for measuring progress to Target 4

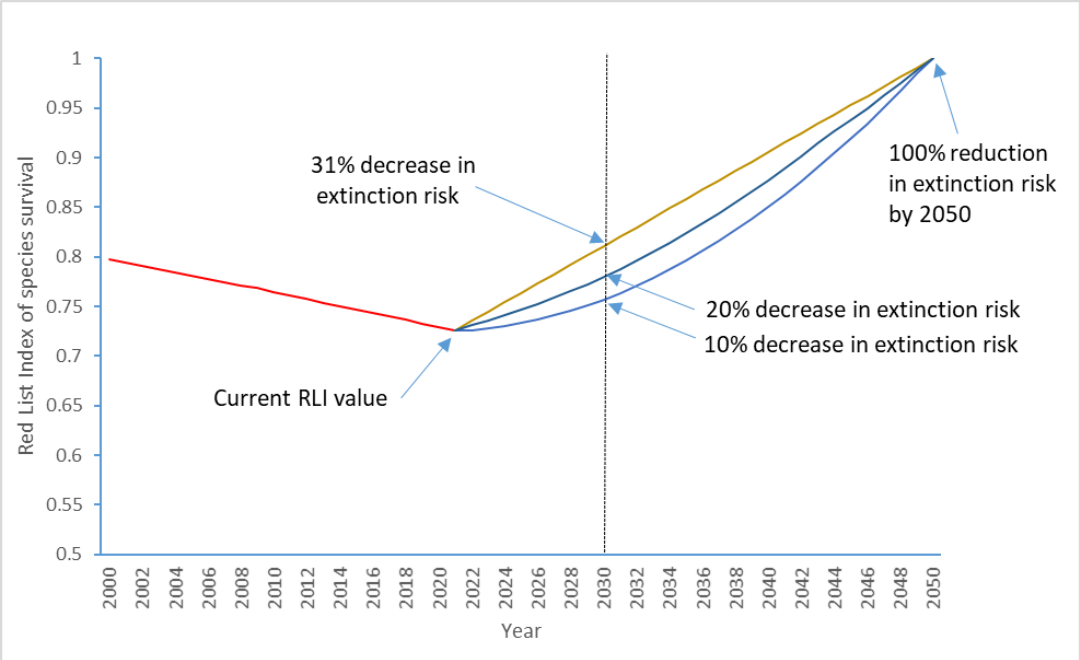
Neither of the proposed Headline indicators (on human-wildlife conflict and plant genetic resources for food and agriculture) address the primary focus of the target (active management actions to ensure the recovery of species). We therefore propose the addition of (or replacement with) a **Headline indicator "Proportion of species requiring intensive recovery actions to avoid extinction that are under active recovery management".** This would be feasible

[5] For further details, see Bolam et al. (in review), available here: https://www.biorxiv.org/content/10.1101/2020.11.09.374314v1

to develop from data in the IUCN Red List and other sources. See information in Annex Q11 on a *Global Species Action Plan* to provide guidance to Parties on the actions needed to achieve Target 4.

For the component indicators, we recommend rewording component indicator 4.1.1 to "Number of species for which recovery has been documented using 'Green Status of Species' assessments on the IUCN Red List". We also recommend adding three component indicators which would further help to measure the impact of species recovery actions: 1) "Mean % of each Key Biodiversity Area identified for globally threatened species that is covered by protected areas or other effective area-based conservation measures (OECMs)"[6]; 2) "Proportion of Key Biodiversity Areas identified for globally threatened species in 'favourable condition'"[7]; 3) "Number of threatened species for which global or national action/recovery plans are i) up to date, and ii) being implemented"[8].

Figure 1. Recent trends in the Red List Index (red line, showing recent declines of 4-5% per decade), and illustrative trajectories towards zero extinction risk by 2050, including linear trends (yellow line) and convex trend curves (dark and light blue lines). Dotted line indicates 2030. A reduction in extinction risk of 20% by 2030 is plausible given recent trends and given time-lags in species recovery, while enabling 100% reduction by 2050 to be achievable.

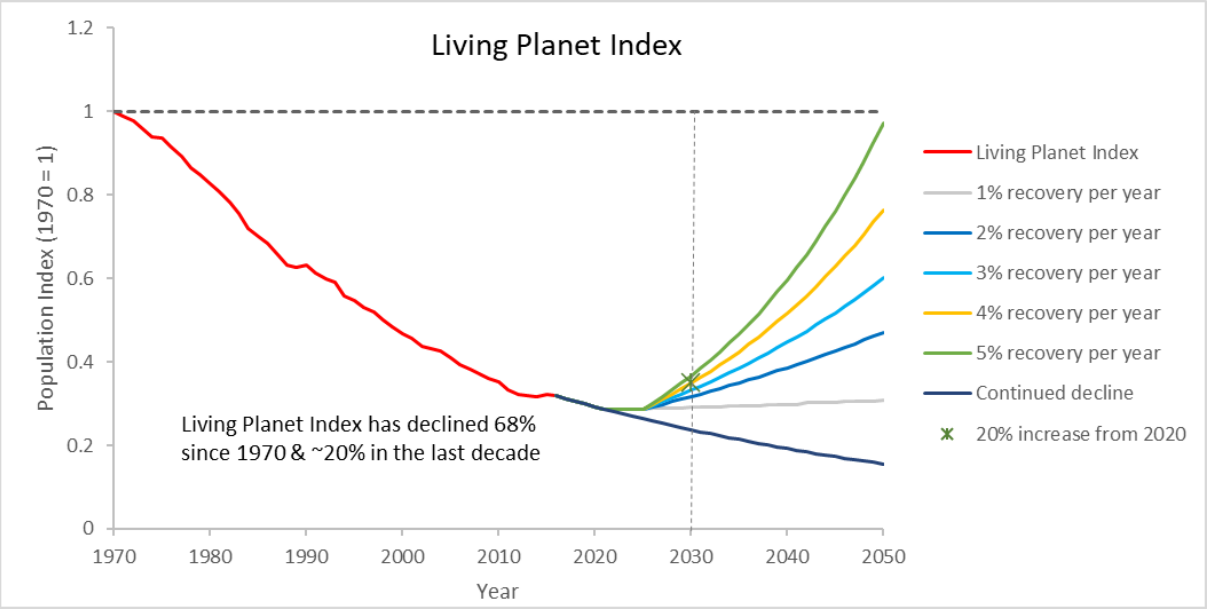


[6] This new indicator could be immediately developed by BirdLife International and the KBA Partnership using existing data in the World Database of KBAs. Key Biodiversity Areas are sites of significance for the global persistence of biodiversity. Over 16,000 KBAs have been identified to date, spanning all countries and terrestrial, freshwater and marine environments. About two-thirds of these (10,352) have been identified as important because of the populations of globally threatened species that they support. Effectively conserving these sites is key to the conservation of these species. On average, 38.5% of each KBA identified for threatened species is covered by protected areas, with 12.9% (1,337) completely covered, 50.6% (5,243) partially covered and 36.4% (3,772) lacking any coverage by protected areas. Appropriate milestones may therefore be to reach 50% by 2025 (including 100% of sites holding the sole population of any highly threatened species), 70% by 2030 and 100% by 2050. The coverage of unprotected KBAs by OECMs is not known, but preliminary data for 10 countries indicates that 76% of such sites are at least partially covered by candidate OECMs. To date, only a tiny number of countries have submitted any data on OECMs to the World Database of OECMs -these areas are included in the calculation of the indicator. Alliance for Zero Extinction sites are KBAs holding the last remaining population of any highly threatened species; a total of 853 have been identified as of May 2019. Comprehensive data on other systematic site networks for threatened species are not yet available.

[7] This new indicator would be feasible to develop by BirdLife International and the KBA Partnership using data in the World Database of KBAs, but expanded monitoring efforts are required. Currently, 35.6% of Key Biodiversity Areas identified for threatened species are in favourable condition (out of 1,212 with relevant data). Appropriate milestones may therefore be to aim for this proportion to exceed 50% by 2025, 60% by 2030, 80% by 2040 and 100% by 2050. A KBA monitoring protocol with definitions and methods for determining favourable condition is in development.

[8] These may include individual species, multi-species or site-based plans. This new indicator would be feasible to develop from data in the IUCN Red list and other sources.

Figure. 2 Projected modelled trends in the Living Planet Index 2016-2050. In this simple model the index declines at its current decadal rate from 2016-2021, then stabilises to 2025, before increasing at average population growth rates of between 1% and 5% per year, or at the current decadal rate of decline if current conditions persisted. The asterisk indicates an index increase of 20% from 2020 by 2030.



ANNEX

Questions and answers relating to species elements of the post-2020 Global Biodiversity Framework

Q1. What level of ambition is required to meet the 2050 vision?

It is clear that biodiversity is in crisis (see Q3), and with it, the ability for all people to thrive on this planet. In the face of this, the CBD has set an incredibly ambitious vision of "Living in Harmony with Nature" by 2050. This means we must halt and start to reverse biodiversity loss by 2030. With the current rapid rate of decline, any chance of success relies on transformative action now[9]**.** The findings of CBD/WG2020/3/INF/11 show that immediate and sustained action is essential to ensure recovery[10]. Considerable progress is needed this decade in order to ensure that we: 1) act before it's too late; and 2) give biodiversity the time that it needs to recover. That means we need to set ourselves accordingly ambitious near-term milestones along the way to 2050 which will serve to guide our adaptive actions and allow us to assess progress.

Q2. Do we need milestones for 2030?

Yes: the 2030 milestones are fundamental to enable the tracking of implementation and progress towards the 2050 vision. We cannot manage or improve what we cannot measure, so assessment of progress at 2030 is vital to the coherence of the Global Biodiversity Framework (GBF). Removing the 2030 milestones would undermine the opportunity to promote delivery and would risk slippage in the delivery of action required to meet the 2050 Vision. It would also remove accountability and transparency from the GBF, which are essential to ensuring we stay on track to meet the shared ambition. For species components of Goal A especially, it is vital that we have a 2030 waypoint to drive accelerated action this decade, adaptively review our progress, make any remedial changes if needed, and importantly to celebrate our successes.

Q3. Why focus on both species' extinction risk and species' population abundance in Goal A?

Species' population abundance and species' extinction risk are two complementary, foundational metrics that describe the status of species and reflect different aspects of the state of biodiversity. Species represent the most basic tangible unit of biodiversity that resonates and connects with people and their lives, so species can act as an excellent communication tool. The two metrics helpfully capture different dimensions of the species component of biodiversity: species' population abundance describes the numerical profusion of species populations, while extinction risk describes the probability of a species persisting into the future (typically considered at a global or national scale).

Species populations, and specifically species population abundance, is recognised as an Essential Biodiversity Variable (EBV)[11]. Both abundance and extinction risk are critically important to understand and use for tracking progress towards halting and then reversing biodiversity loss (i.e. bending the curve of loss). Both are also useful dimensions of biodiversity for communicating on the state of nature to a range of audiences. **Extinctions** resonate with the public, with global extinction being the ultimate irreversible loss of biodiversity and unique genetic material, while the concept of **abundance** conveys a sense of a plentiful, numerical profusion of nature and is easy to grasp and understand.

Decision-makers and others can easily understand that around 1 million animal and plant species are estimated to be threatened with global extinction (more than ever before in human history[12]), and that the abundance of vertebrate populations has on average dropped by more than two-thirds in just over 45 years[13]. Furthermore, while there may be particular interest in socio-economically, culturally or functionally important species, retaining a broad focus is important given our poor and incomplete understanding of the relative contributions of different species to ecosystem

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[9] Leclère, D. *et al.* (2020) Bending the curve of terrestrial biodiversity needs an integrated strategy. *Nature* **585,** 551–556. https://doi.org/10.1038/s41586-020-2705-y

[10] CBD/WG2020/3/INF/11 https://www.cbd.int/doc/c/5735/c241/efeeac8d7685af2f38d75e4e/sbstta-24-inf-31-en.pdf

[11] Pereira H.M. et al (2013) Essential Biodiversity Variables. *Science* 339, 277-278. https://www.science.org/doi/10.1126/science.1229931

[12] IPBES (2019) Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. https://doi.org/10.5281/zenodo.3831673

[13] WWF (2020) Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland. https://livingplanet.panda.org/en-gb/

function and hence ecosystem service delivery. Indeed, millions of species on Earth have yet to be described by science and we know nothing about them or their functional importance.

For species' population abundance, the priority should be to restore the populations of **native** wild species (not invasive alien species). The focus should be on species that have been depleted in numbers over recent decades, particularly those that are not yet threatened with extinction but declining (given that threatened species are covered in the preceding element of the Goal). We suggest this detail is specified in wording of the Goal itself by stating 'native species'.

Q4. Does the Living Planet Index measures changes in species' population abundance?

The answer is a resounding yes. Technically, this well-respected index measures the average trend in the relative abundance of vertebrate species from across the globe using specially designed methods (http://stats.livingplanetindex.org/ - see[14]). However, a paper published 2020[15] suggested that the Living Planet Index (LPI) might be especially sensitive to and driven by extreme declines, but subsequent authors have pointed to limitations in that analysis, arguing that we should not be downplaying biodiversity loss[16], and recognising the commendable role of the LPI in summarising the status of global wildlife populations.[4] Of course, the underlying data on species' population abundance is far from perfect or complete and many have argued for the need for improved monitoring of populations of diverse groups globally.[4]

In summary, composite indices like the LPI (and the Red List Index) are still some of the best overall metrics we have for describing the global state of nature. The LPI being the best index of global species' population abundance.

Q5. How much must we increase abundance by 2030 in order to achieve the 2050 vision?

Goal A currently sets a 2050 outcome of "healthy and resilient populations of all species", which aligns with the 2050 vision of a world of "Living in harmony with nature". Practically, to achieve this aim, and to genuinely bend the curve of biodiversity loss, would involve the recovery of the average population abundance of species to 1970s levels, among other indicators of success. This is a vision of nature recovery first elaborated in an influential study by Georgina Mace et al. in 2018, coining the term of 'bending the curve of biodiversity loss'[17]. Given that most biodiversity lost since pre-human times has been lost in the last few decades, it is argued that 1970 is a reasonable and pragmatic reference point and baseline to use. Furthermore, this is a time when systematic and representative biodiversity monitoring began to be established in many nations and across the globe. To achieve that goal within the next 30 years requires a clear and transparent trajectory to halt and reverse the current population declines, not simply "at least maintaining" populations by 2030, as in the current GBF draft. A goal to "at least maintain" species populations is not consistent with the ambitions of the Kunming Declaration, nor of the post-2020 GBF. A simple model using recent species population trends from the Living Planet Index (see Annex Fig. 1 below), indicates that we would need to **increase average population abundance of species by at least 20% by 2030 compared to 2020 levels to set it on a positive upward trajectory towards recovery and the vision of the GBF.**

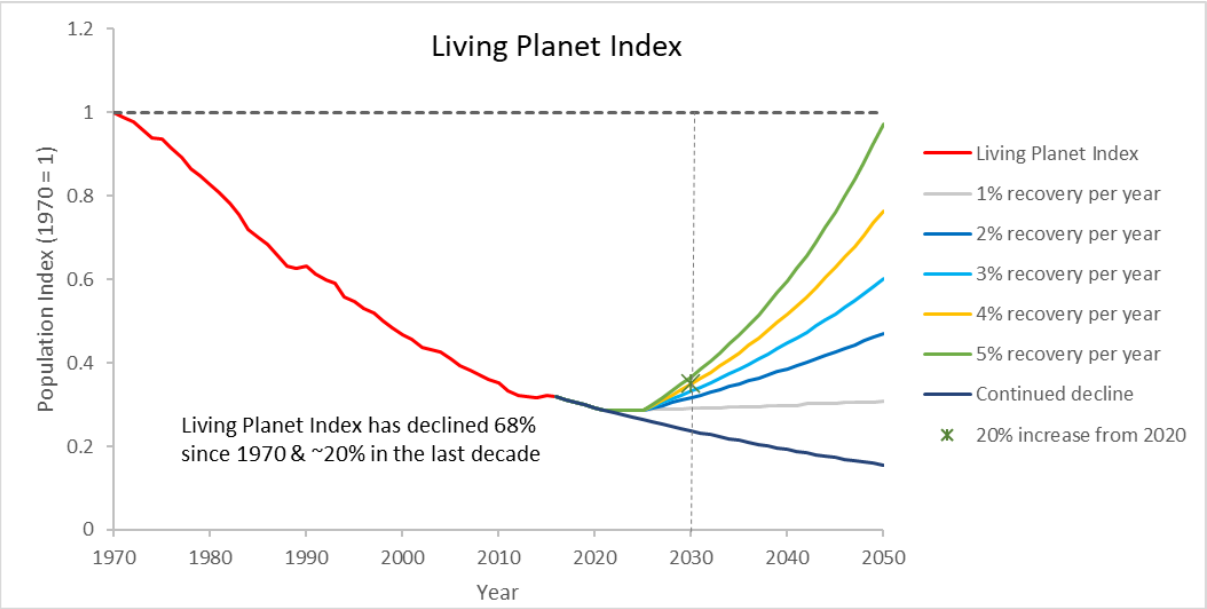
[14] Puurtinen et al. (2022) The Living Planet Index does not measure abundance. *Nature* **601,** E14–E15. https://doi.org/10.1038/s41586-021-03708-8

[15] Leung *et al.* (2020) Clustered versus catastrophic global vertebrate declines. *Nature* **588,** 267–271. https://doi.org/10.1038/s41586-020-2920-6

[16] Loreau *et al.* (2022) Do not downplay biodiversity loss. *Nature* **601,** E27–E28. https://doi.org/10.1038/s41586-021-04179-7.

[17] Mace, G.M. *et al.* (2018) Aiming higher to bend the curve of biodiversity loss. *Nat Sustain* **1,** 448–451. https://doi.org/10.1038/s41893-018-0130-0

Annex Fig. 1 Projected modelled trends in the Living Planet Index 2016-2050. In this simple model the index declines at its current decadal rate from 2016-2021, then stabilises to 2025, before increasing at average population growth rates of between 1% and 5% per year, or at the current decadal rate of decline if current conditions persisted. The asterisk indicates an index increase of 20% from 2020 by 2030.



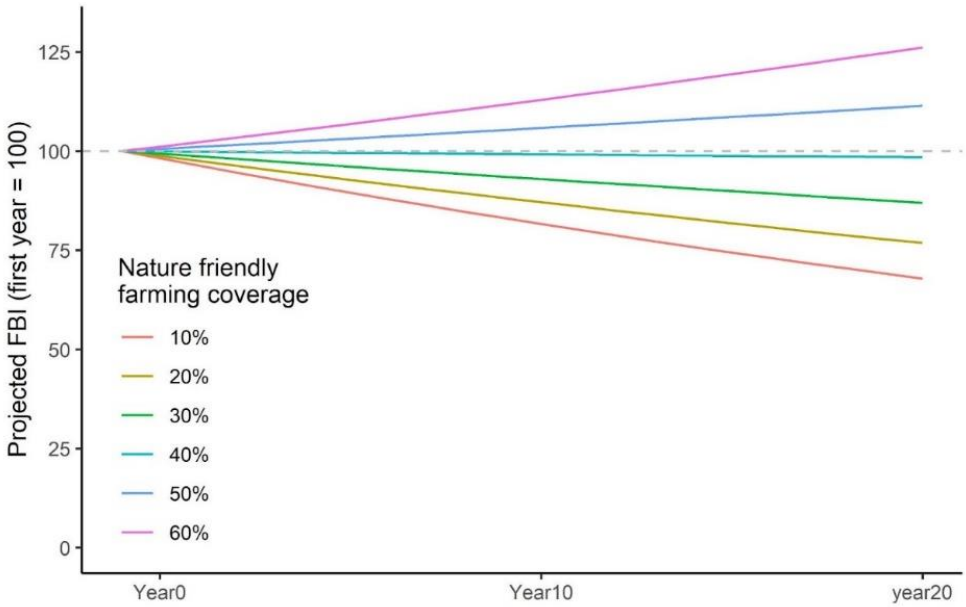
Q6. How realistic are these species recovery trajectories?

In the example in Annex Fig.1, modelling of the Living Planet Index shows how increasing the ambition in terms of the average rate of increase in species populations from an average of 1% per annum to 5% per annum, bends the curve of biodiversity recovery upwards. There is good evidence to show that these levels of population increase are biologically plausible and reasonable with concerted conservation action – many examples are documented in nature. Such levels of population increase are evidenced by the recorded recovery of individual species and groups of related species: 1-3% per annum is commonly seen while rates of 10% per annum are rarely observed in nature, but not inconceivable in local settings and over short time periods. ***See examples of recovery in the response to Q12 below.***

Furthermore, the detailed mechanistic modelling of Leclère et al. (2020)[18] demonstrates how we might realistically recover biodiversity globally (using the Living Planet Index among other metrics) under a scenario of integrated conservation actions. As a national example, in England, recent work by RSPB/CEH/Defra has modelled how farmland birds, and by extension farmland wildlife, might respond to the roll out of nature-friendly farming methods. In this case, Burns et al. (in prep) quantified individual bird species' responses to conservation actions in the field experimentally, and showed that if over 40% of farms in England adopted nature-friendly farming methods (covering just 10% of their land), farmland bird populations would recover over coming decades (see Annex Fig.2). More broadly this evidence-based example shows how targeted conservation actions can be translated into desired conservation outcomes. Examples of this kind of study are rare because rarely do we have robust information on species-specific responses to conservation actions for a group or community of species.

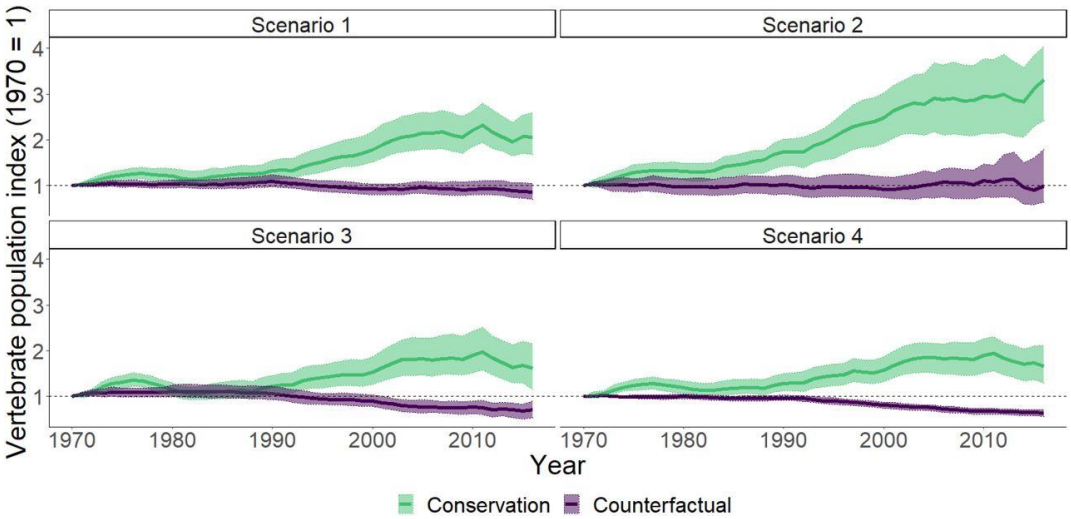
[18] Leclère, D. *et al.* (2020) Bending the curve of terrestrial biodiversity needs an integrated strategy. *Nature* **585,** 551–556. https://doi.org/10.1038/s41586-020-2705-y

Annex Fig. 2. The figure shows a projected multispecies Farmland Bird Index (FBI) in England under different future scenarios of nature-friendly farming provision in the landscape, showing the predicted change in the multispecies indicator over 20 years for a range of coverage levels. Coverage level remains constant throughout the scenario in this model.



In addition, recent emerging research examining the impact of targeted conservation on global population abundance trends of vertebrate species has revealed that targeted action has delivered very substantial positive effects on species populations over recent decades (see Annex Fig. 3)[19]. This new research demonstrates the power of conservation actions globally to recover species population abundance and bend the curve of biodiversity loss.

Annex Fig. 3. Global vertebrate population trends for species subject to conservation actions or responses (in green – upper lines) and not targeted by conservation responses (in purple - lower lines) representing counterfactual species trends taken from the Living Planet database. The figure illustrates four separate scenarios to define counterfactual trends from Jellesmark et al. (2021)



[19] Jellesmark et al. (2021 preprint) Assessing the global impact of targeted conservation actions on species abundance. https://www.biorxiv.org/content/10.1101/2022.01.14.476374v1

Q7. Should Goal A aim to *reduce the rate* of extinctions or to *halt* extinctions?

The current wording of Goal A states that "the rate of extinctions has been reduced at least tenfold" by 2050, and Milestone A.2 states that "the increase in the extinction rate is halted or reversed" by 2030. There are three strong arguments for replacing these draft commitments with an aim to "**halt human-induced extinctions of known threatened species**" immediately.

- Firstly, global species extinctions are irreversible – if we are to "put nature on a path to recovery by 2030" we must halt further human-driven extinctions of known threatened species as we cannot afford to lose any more.
- Secondly, it is very difficult to measure extinction rates in a timely manner. Using 'rate' would require assessing the current extinction rate (i.e. over a recent baseline period yet to be defined) with sufficient precision to enable us to detect by 2030 if the rate has been stabilised or reduced. Confirming the death of the last individual of a species can often only be inferred some years later, particularly for less well-known species. Therefore, it may be very difficult by 2030 to know the precise extinction rate in the preceding decade. Similarly, reducing the rate or halting the increase in the rate requires a robust estimate of the current rate of extinctions. At present, only one confirmed or strongly suspected extinction is known to have occurred in the period 2010-2020 among birds and mammals, which are far better documented than other groups. It may be many more years before we have high certainty about the extinction rate at the point when the post-2020 GBF is adopted, let alone whether it has been reduced by 2030.
- Thirdly, from a communications perspective, global extinctions have considerable public resonance, and halting human-driven extinctions is much easier to understand and communicate than reversing the increase in extinction rate.

Q8. Is it feasible to halt extinctions by 2030?

Yes, if we specify *human-driven* extinctions of *known threatened species*. While extinction is a natural process, virtually all documented extinctions in recent centuries have been caused directly or indirectly by human activities, and all could arguably have been prevented. Conceivably, some *natural* extinctions (e.g. driven by unexpected volcanic eruptions or other events) could be unavoidable. The Goal should focus on *known threatened species* (of which 40,000 are documented on the IUCN Red List), because it would be very challenging to prevent extinctions of species (particularly of plants and invertebrates) that have not yet been assessed in terms of their extinction risk (or even described to science). Hence, the wording in both the 2050 Goal and the 2030 Milestone should specify that **"human-driven extinctions of known threatened species are halted"**.

Although the aim of halting human-driven extinctions of known threatened species is ambitious, recent evidence[20] suggests that it is achievable, and that even the most highly threatened species could still be saved with concerted action and political will. For birds and mammals, 15 confirmed or strongly suspected bird and mammal extinctions were documented since 1993 (when the CBD came into force), while 28–48 extinctions were prevented. Since 2010, the equivalent numbers are 1 extinction and 11-25 extinctions prevented. While it is likely that additional extinctions for 2010-2020 will be retrospectively confirmed in the coming years, the ratio of these numbers indicates that with plausibly more effort, halting human-induced global extinctions of known threatened species by 2030 is feasible[21].

Q9. Is it necessary for Goal A to set ambition for both extinctions and extinction risk?

Yes. Global species extinctions are irreversible, and this has considerable resonance with the public. If we are to "put nature on a path to recovery by 2030", we must halt further human-driven extinctions of known threatened species. Goal A should therefore contain a commitment to halt *human-driven* extinctions of *known threatened species* from the point at which the post-2020 Framework is adopted. However, extinctions are simply the end point of a trajectory of decline. Putting nature on a path to recovery means slowing the rate at which species are moving towards

[20] Bolam et al. (2020) How many bird and mammal extinctions has recent conservation action prevented? *Conservation Letters.* 14, e12762 https://conbio.onlinelibrary.wiley.com/doi/10.1111/conl.12762

[21] An alternative proposal to reduce the overall extinction rate (including natural extinctions) to 20 per year for the next 100 years is also relatively simple and fairly ambitious but it would be more difficult to measure progress against this target through time.

extinction, and reversing this trajectory. Therefore, it is important to also include a commitment to reduce extinction risk by 2030, as a milestone towards the 2050 Vision.

Q10. How much must we reduce extinction risk by?

The current wording of Goal A states that "the risk of species extinctions across all taxonomic and functional groups is halved" by 2050. This implies that in 2050 there will still be substantial risk of extinctions. If the current number of threatened species was halved, 20,042 species would still be threatened, or the current 40,084 threatened species would have only moved halfway towards Least Concern status. Such substantial levels of extinction risk are inconsistent with the 2050 Vision of a world living in harmony with nature. We therefore recommend revising this wording to **"the risk of species extinctions across all taxonomic and functional groups is eliminated"** (see Q8 above regarding clarifications on 'human-induced' and 'known threatened species').

The current wording of Milestone A.2 states "the extinction risk is reduced by at least 10 per cent" by 2030. This level of ambition would make it considerably harder to eliminate the risk of human-induced species extinctions for known threatened species by 2050, which is necessary to meet the Vision of living in harmony with nature, as argued above. Reducing extinction risk by 10% leaves 90% of the job left to do in the two decades remaining till 2050.

As shown in Figure 1., for the most relevant global indicator of extinction risk — the Red List Index —a linear trend between its current value (0.73) and a value of 0 in 2050 suggests a reduction in extinction risk of 31% is required by 2030[22]. However, a convex curve is more plausible given that there are often policy and ecological time-lags before species' populations and distributions increase (and hence extinction risk decreases) following implementation of actions to reduce threats and remove barriers to recovery. Furthermore, the Red List Index shows that extinction risk has been increasing by 4-5% per decade since 2000, so action is required first to halt this growth and then reduce extinction risk. Therefore, a target of reducing extinction risk by 20% appears to be an appropriate and plausible value to aim for while being compatible with a longer-term goal of zero extinction risk by 2050, as shown in Figure 1, whereas a reduction of only 10% by 2030 would require much greater progress to be achieved during 2030-2050. Reducing extinction risk requires implementing actions to improve the status of threatened and/or Near Threatened species sufficiently to 'down-list' them to lower categories of threat on the IUCN Red List. Based on the taxonomic groups included in the Red List Index currently, a 20% reduction in extinction risk measured using the Red List Index equates to down-listing approximately 50% of threatened and Near Threatened species each by one category of risk, or down-listing approximately 30% of threatened species to non-threatened status[23].

We therefore recommend revising the wording in Milestone A.2 to **"the extinction risk is reduced by at least 20 per cent".**

Q11. Is a 20% reduction in extinction risk feasible, and what actions are required to reduce extinction risk and prevent human-induced extinctions?

While reducing extinction risk by 20% by 2030 and halting human-driven extinctions now are ambitious aims, they are feasible through transformative action. For example, at UNFCCC COP26, over 140 governments committed to halting deforestation. Given that a third of Near Threatened species are threatened by logging and half are threatened by agriculture (the two biggest drivers of deforestation), if governments take action to halt forest loss, this will halt or substantially reduce declines in a huge proportion of species. Similarly, action to effectively conserve 30% of land and seas through protected and conserved areas would substantially reduce extinction risk if such areas were targeted at Key Biodiversity Areas (KBAs)[24] and other important sites for biodiversity. KBAs are sites of significance for the global persistence of biodiversity. They are identified nationally through bottom-up multi-stakeholder processes. Over 16,000 KBAs have been identified to date, and over 60% are already completely or partially covered by protected

[22] The % reduction in extinction risk is calculated as the % reduction in the inverse of the Red List Index value, with the latter calculated using weights of 5 for Extinct, 4 for Critically Endangered, 3 for Endangered, 2 for Vulnerable and 1 for Near Threatened, following Butchart et al (2007) *PLoS ONE 2: e140.*

[23] Calculations assume that the number of species down-listed to Near Threatened from each of the three threatened categories (Critically Endangered, Endangered and Vulnerable) is proportional to the number of species in that category, and the same proportion of Near Threatened species is down-listed to Least Concern. See also endnote 5.

[24] IUCN (2016) *A global standard for the identification of Key Biodiversity Areas, Version 1.0.* Gland, Switzerland. https://portals.iucn.org/library/node/46259

areas or OECMs[25]. Effective conservation of the remainder, including in particular the subset of KBAs highlighted by the 'Alliance for Zero Extinction'[26] as holding the last remaining population of any highly threatened species, would make a huge contribution to reducing species' extinction risk. For example, Boyd et al. 2008[27] showed that for 82% of threatened vertebrates, site-scale action (such as conservation of KBAs) is the most urgent priority. As one further example, eradication or control of invasive alien species can have spectacular benefits for threatened native species. At least 596 populations of 236 native terrestrial animal species on islands have benefitted from 251 eradications of invasive mammals on 181 islands[28]. Achievement of draft Target 6 in the post-2020 Framework would scale up these impacts, and make a further substantial contribution to reducing overall species extinction risk. A **Global Species Action Plan**[29] is currently being developed by IUCN to outline the actions needed under each target in the post-2020 Framework, in order to achieve the commitments on species conservation in Goal A.

Q12. What are some examples of high ambition being delivered in practice?

Recent research examining the impact of targeted conservation on global population trends of vertebrate species has revealed that targeted action has delivered very substantial positive effects over recent decades[30]. This new research demonstrates the power of conservation to recover global species populations. The examples below also serve to reveal how population recovery is feasible in practice:

- ***Raptors and waterbirds, North America**:* Rosenberg et al. (2019) show the recovery of raptors and waterbirds in North America since 1970, which they associate with both improved species and site protection[31].
- ***Bittern, UK**:* Following near extinction in the UK due to habitat loss and degradation, bitterns are now recovering well thanks to targeted reedbed habitat creation and improvement projects[32]. In 1997 there were just 11 males, and now there are nearly 200 males at almost 100 sites. It is a prime example of moving from diagnosis, through solution testing, to population recovery.[33]
- ***Cirl bunting, UK:*** From dramatic declines in the 1970s, leading to the cirl bunting becoming the UK's rarest farmland songbird by the 1980s, conservation action (including agri-environment agreements) has resulted in the population beginning to recover, standing at over 1000 pairs in 2016 (between 2009 and 2016 alone, the population increased by 25%)[34]. The agri-environment scheme action for cirl buntings is also delivering proven benefits for a range of taxa[35].
- ***Stone Curlew, UK:*** Agri environment schemes have led to the rise of stone curlew numbers (which had declined steadily from the 1930s to 1980s), with for example the population in Wessex, England rising from 50 pairs in 1994 to 136 breeding pairs in 2010. Research shows that this management for stone curlews has considerable value for other farmland biodiversity[36].

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[25] https://www.keybiodiversityareas.org/

[26] https://zeroextinction.org/

[27] Boyd et al. (2008) Spatial scale and the conservation of threatened species. *Conservation letters,* 1, 37-43. https://conbio.onlinelibrary.wiley.com/doi/10.1111/j.1755-263X.2008.00002.x

[28] Jones et al. (2016) Invasive mammal eradication on islands results in substantial conservation gains. *Proc. Nat. Acad. Sci USA.* 113: 4033-2038. https://doi.org/10.1073/pnas.1521179113

[29] IUCN Global Species Action Plan: https://www.iucn.org/theme/species/our-work/influencing-policy/global-species-action-plan

[30] Jellesmark et al. (2021 preprint) Assessing the global impact of targeted conservation actions on species abundance. https://www.biorxiv.org/content/10.1101/2022.01.14.476374v1

[31] Rosenberg, K.V. et al. (2019), Decline of the North American avifauna. *Science*, 366, 120-124. https://www.science.org/doi/10.1126/science.aaw1313

[32] White et al. () Brining Reedbeds to Life: creating and managing reedbeds for wildlife. RSPB, Sandy
RSPB, Bittern Conservation https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/safeguarding-species/case-studies/bittern/

[33] Fisher et al. (2011) Impacts of species-led conservation on ecosystem services of wetlands: understanding co-benefits and tradeoffs. *Biodiversity and Conservation.* 20, 2461–2481 https://doi.org/10.1007/s10531-011-9998-y

[34] Jeffs et al. (2018) The UK Cirl Bunting population exceeds one thousand pairs. *British Birds.* 111, 144-156

[35] MacDonald et al. (2012) Effects of agri-enviroment management for cirl buntings on other biodiversity. *Biodiversity and Conservation.* 21, 1477-1492. https://doi.org/10.1007/s10531-012-0258-6

[36] MacDonald et al. (2012) Effects of agri-environment management for stone curlews on other biodiversity. *Biological Conservation.* 148, 134-145. https://doi.org/10.1016/j.biocon.2012.01.040

- ***Green turtle, US:*** Thanks to sustained conservation efforts including legislation and fishery management efforts, the Green Turtle population in places such as Florida is rebounding, with green turtle nests increasing 80-fold since 1989[37].
- ***European bison, Europe:*** Hunting, habitat destruction and fragmentation led to European Bison going extinct in the wild in the 1920s, however through reintroduction into Eastern Europe from captive populations along with a large-scale coordination effort across countries has led to the Bison's improving in status on the Red List from Vulnerable to Near Threatened, with over 6,200 now in the wild.
- ***Humpback whale, South Atlantic:*** Severe hunting pressure drove western South Atlantic humpback whales to the brink of extinction, but thanks to the banning of commercial whaling, research suggests a strong population recovery to 93% of its pre-exploitation size[38].
- ***Majorcan Midwife Toad, Majorca****:* This toad was down-listed from Critically Endangered to Vulnerable following successful conservation efforts to reintroduce it and establish new breeding populations.
- ***Over 70 bird species have qualified for down-listing to lower categories of threat on the IUCN Red List as a result of genuine improvements in their status*** following the implementation of conservation action. Examples include Guam Rail and California Condor, once Extinct in the Wild, but successfully reintroduced back into the wild, and Rodrigues Warbler, whose population has grown from <150 individuals in 1999 to nearly 4,000 individuals following habitat protection and reforestation.
- ***Some countries already show positive Red List Index trends following implementation of conservation actions****.* For example, national Red List Indices for birds in the Seychelles and Mauritius have both increased in value since 1988, indicating reductions in extinction and progress towards recovering populations of threatened species through conservation action.

Q13. Question from the Co-Chairs[39]: Is the concept and/or wording of Goal A too complex and if so how could it be simplified?

Yes, the wording of Goal A is currently unnecessarily complicated, as well as lacking in ambition and not being SMART. To simplify the wording of the species-related elements, the extinction-related pieces should be refined to focus on halting human-induced extinctions of known threatened species and reducing extinction risk by a specific percentage (rather than including both risk and rate and including the redundant clause of decreasing the 'proportion of species threatened'). The abundance related components should be refined to focus on increasing average species' population abundance (rather than confusingly and unhelpfully also incorporating distribution) and clarified to include a specific percentage increase in average species' population abundance by 2030. We suggest that species' population abundance should be 20% higher in 2030 compared with 2020.

Q14. Question from the Co-Chairs: Should this and the other goals contain numeric elements or should they be purely aspirational?

It is vital that the Goals, Milestones and Targets of the Post-2020 Global Biodiversity Framework are SMART – Specific, Measurable, Ambitious, Realistic and Timebound. To ensure the first of these two points especially, the Goals and Targets must have quantifiable elements against which to measure progress and to direct action towards. Recent research[40] into progress under the Aichi targets found that the most effective targets and ones making most progress were those that had SMART elements.

Q15. Question from the Co-Chairs: Should Goal A be (re)split into 3 parts addressing each component of biodiversity?

We preferred the earlier approach which more clearly split out the three parts (making it less confusing and more straightforward to assign clear indicators). Nevertheless, it is vital that if it remains as a single Goal A, this is strengthened by more clearly setting out SMART targets for species and ecosystems, and adopting the improvements recommended above.

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[37] Florida Fish and Wildlife Conservation Commission, Indexing Nesting Beach Survey Totals (1989-2021) https://myfwc.com/research/wildlife/sea-turtles/nesting/beach-survey-totals/

[38] Zerbini et al. (2019) Assessing the recovery of an Antarctic predator from historical exploitation. *Royal Society* https://doi.org/10.1098/rsos.190368

[39] CBD/WG2020/3/6 https://www.cbd.int/doc/c/2f74/dda0/270258bf5deaab47fbc43da4/wg2020-03-06-en.pdf

[40] Green et al. (2019) Relating characteristics of global biodiversity targets to reported progress. *Conservation Biology*. 33, 1360-1369. https://doi.org/10.1111/cobi.13322