Species conservation in the post-2020 Global Biodiversity Framework: Science brief

August 2022

This science brief outlines the key concepts relating to species conservation under discussion in the Post-2020 Global Biodiversity Framework negotiations and addresses frequently asked questions in relation to the outcomes needed and actions required to halt and reverse biodiversity loss to reach the CBD vision of 'Living in harmony with nature'.

Goal A: Key Concepts, Numerical elements and Milestones

There are three complementary components of the status of species, extinction, extinction risk and population abundance. Both 'extinction' and 'extinction risk' are essential, as the former incentivises efforts to prevent irreversible loss of biodiversity, while the latter promotes actions to help recover threatened species. 'Population abundance', is critical to track, as depleted and declining populations will not effectively deliver ecosystem functions and services. To genuinely bend the curve of biodiversity loss[1] by 2050 requires a clear and transparent trajectory to halt and reverse the current population declines, including a 2030 milestone to assess progress towards this.

Human-induced extinctions. Extinctions are irreversible and have wide ranging impacts on ecosystem function. 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[2]. Conceivably, some *natural* extinctions (e.g., driven by unexpected volcanic eruptions or other events) could be unavoidable (See Annex Q.8). A proposed alternative to 'preventing extinctions' is 'reducing the extinction rate'. However, this is both insufficient and challenging to measure owing to difficulties in defining the baseline rate and measuring changes in this. 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 (see Annex Q.7). This would be extremely challenging.

Although the aim of halting human-driven extinctions of known threatened species is ambitious, recent evidence[3] (See Annex Q.8) 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 (i.e. the actions required to meet the various targets of the GBF), halting human-induced global extinctions of known threatened species by 2030 is feasible[4].

Extinction risk. Extinctions are simply the end point of a trajectory of decline. Putting nature on a path to recovery means reducing extinction risk by slowing the rate at which species are moving towards extinction and reversing this trajectory. This is a prerequisite to meeting the 2050 Vision, and demonstrably feasible with transformative change[5]. Therefore, it is important to also include a commitment to reduce extinction risk by 2030 **(**as measured by the Red List Index[6]), as a milestone towards the 2050 Vision (See Annex Q.9 & Q11).

To achieve the 2050 Vision of living in harmony with nature by 2050 means eliminating human-induced extinction risk. Extinction risk must be reduced by at least 20% by 2030 to place us on the required trajectory to eliminate extinction risk by 2050 (See Annex Q.10). The inclusion of a qualifier in the Goal wording specifying the need for immediate

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[1] 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

[2] 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

[3] See [2]

[4] 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.

[5] Bolam *et al.* 2022. Over half of threatened species require targeted recovery actions to avert human-induced extinction. *Frontiers in ecology and the environment* [online] https://doi.org/10.1002/fee.2537

[6] IUCN 2022 Red List Index

action (such as "from now") clarifies that human-induced extinctions should cease immediately – this is both necessary and feasible. If the current number of threatened species was merely halved (as has been suggested by some Parties) by 2050, 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.

Population Abundance. The component on population abundance is critical to track, as depleted and declining populations will not effectively deliver ecosystem functions and services. This element is not adequately encompassed by the concept of extinction risk, because a species' population size may have been reduced by 99%, but still have trivial levels of extinction risk if the population remains moderately abundant, the distribution is fairly widespread, and declines are no longer rapid. A 20% increase in abundance by 2030 is needed to place us on a trajectory to restoring populations to baseline levels by 2050[7]. The indicators available for measuring average species abundance (e.g., the Living Planet Index[8]) are designed so that large increases in abundance of a small number of species do not have an undue influence on the overall trend. An increase in average population abundance does *not* require increasing the abundance of species that do not have depleted populations. A simple model using recent species population trends from the Living Planet Index (see Annex Q.5 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.

Target 4 Key concepts

The focus of Target 4 is to promote actions for threatened species that require targeted species-specific recovery actions to recover. It should be action-oriented, the qualifier by which targets are defined in the theory of change. The following provides the scientific rationale for key concepts to operationalise this.

Targeted action for threatened species. For some threatened species, designating and effectively managing protected and conserved areas, restoring habitats and mitigating threats (such as unsustainable use, pollution, and invasive aliens) is insufficient. Their extinction can only be prevented through also implementing urgent and targeted species-specific recovery actions[4, 9]. Such actions should be sustained for as long as they are required to ensure the species' recovery. In contrast, recovery of non-threatened species is generally enabled by actions taken under the other targets.

In-situ and ex-situ conservation. *In-situ* conservation, the conservation of a species in its natural habitat, is critical and should be the principal action in targeted species recovery. *Ex-situ* conservation, the conservation of a species outside its natural habitat, is most relevant in circumstances where external factors (such as invasive diseases, or some climate change impacts), would threaten its immediate survival. The Global Species Action Plan (GSAP)[10] identifies and provides guidance on the types of actions required to conserve species effectively.

Wild native species. A wild native species is indigenous to a given region or ecosystem and occurs naturally and has not been subject to breeding to alter it from its native state, unlike domesticated and cultivated species. An alien or introduced species is one that has been brought into an area outside its known historic range and is able to survive and reproduce. Invasive alien species are introduced species that dominate and outcompete native species. It is important to avoid incentivising actions favouring domesticated (including landraces)[11], introduced or invasive species, to ensure urgent actions focus on conserving threatened wild native species. The conservation of domesticated species is covered under targets addressing sustainable use.

Frequently Asked Questions relating to species elements of the post-2020 Global Biodiversity Framework

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

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[7] See [3]
[8] WWF and ZSL. 2022. Living Planet Report 2020: Bending the curve of biodiversity loss
[9] CBD.2022. Information Document OEWG3 A Global Species Action Plan: supporting implementation of the post-2020 global biodiversity framework
[10] See [9]
[11] A landrace is a domesticated, locally adapted, traditional variety of an animal or plant species, that has developed over time to suit the conditions of a local area.

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 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[12]**.** The findings of CBD/WG2020/3/INF/11 show that immediate and sustained action is essential to ensure recovery[13].

Q2. Do we need milestones for 2030?

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. Setting ambitious near-term milestones along the way to 2050 will serve to guide our actions and 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). Not having any 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, a 2030 waypoint will be essential to drive accelerated action this decade, adaptively review our progress, make any remedial changes if needed, and importantly to celebrate our successes. In OEWG-3 in Geneva, the decision was made to remove the 2030 milestones as a structural element while recognising the importance of retaining the content of the milestones of Goal A in particular. At OEWG4 in Nairobi, many Parties continued to recognise this, and proposed wording to integrate both 2030 and 2050 steps into Goal A, which is now in the composite text.

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)[14]. 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[15]), and that the abundance of vertebrate populations has on average dropped by more than two-thirds in just over 45 years[16]. 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 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.

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

[12] 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
[13] CBD/WG2020/3/INF/11 https://www.cbd.int/doc/c/5735/c241/efeeac8d7685af2f38d75e4e/sbstta-24-inf-31-en.pdf
[14] Pereira H.M. et al (2013) Essential Biodiversity Variables. *Science* 339, 277-278. https://www.science.org/doi/10.1126/science.1229931
[15] 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
[16] 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/

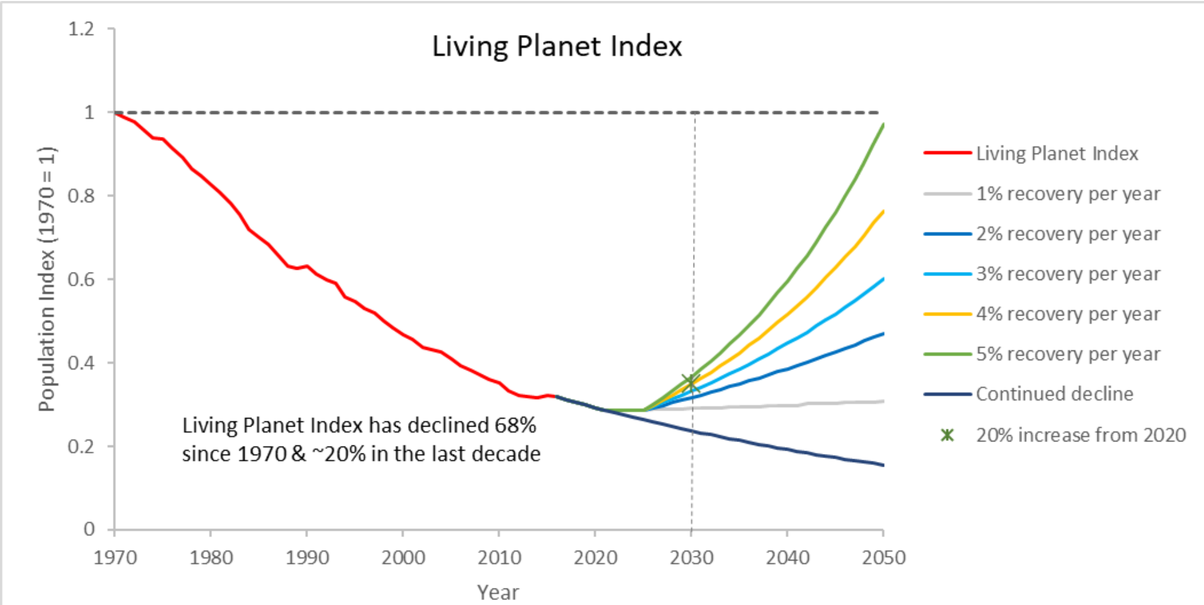
Yes. Technically, this well-respected index measures the average trend in the relative abundance of vertebrate species from across the globe using specially designed methods (http://stats.livingplanetindex.org/ - see[17]). A paper published 2020[18] suggested that the Living Planet Index (LPI) might be especially sensitive to and driven by extreme declines. However, subsequent authors have pointed to limitations in that analysis, arguing that we should not downplay biodiversity loss[19], 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, with the former being the best global index of 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'[20]. 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. 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.**

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.



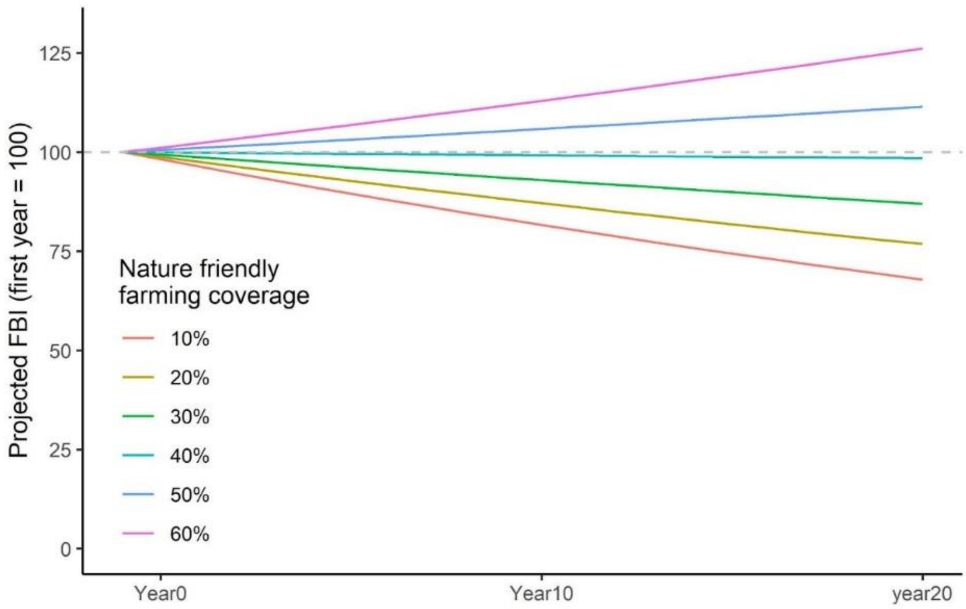
Q6. How realistic are these species recovery trajectories?

[17] 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
[18] Leung *et al.* (2020) Clustered versus catastrophic global vertebrate declines. *Nature* **588,** 267–271. https://doi.org/10.1038/s41586-020-2920-6
[19] Loreau *et al.* (2022) Do not downplay biodiversity loss. *Nature* **601,** E27–E28. https://doi.org/10.1038/s41586-021-04179-7.
[20] 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

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)[21] 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.

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.

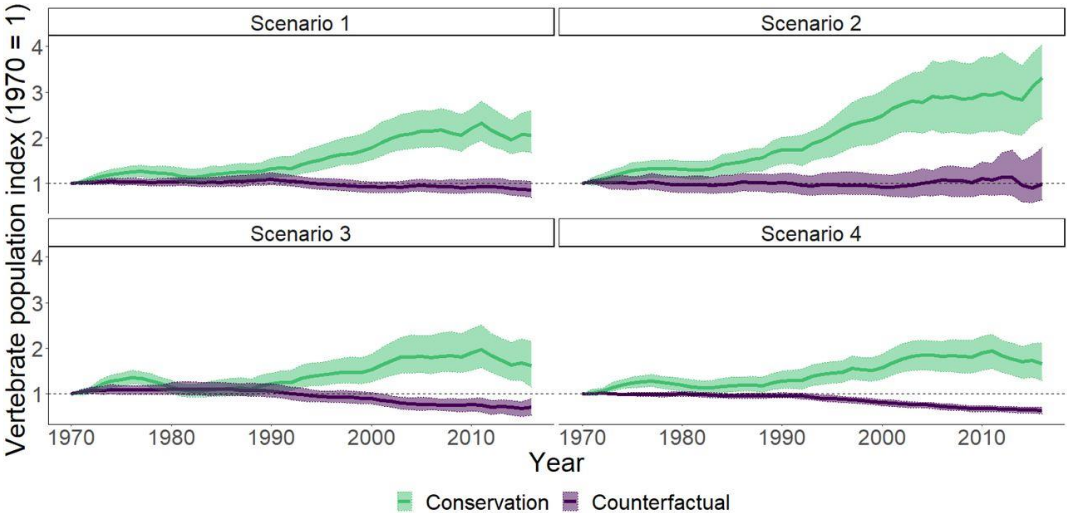


In addition, recent emerging research examining the impact of targeted conservation on global population abundance trends of vertebrate species has revealed that targeted action has delivered very substantial positive effects on species populations over recent decades (see Annex Fig. 3)[22]. This new research demonstrates the power of conservation actions globally to recover species population abundance and bend the curve of biodiversity loss.

[21] 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

[22] 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

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)



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

There are three strong arguments for ensuring a key focus of Goal A is on halting extinctions rather than reducing the rate of extinctions.

- 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. It is recommended that the Goal focuses 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).

Although the aim of halting human-driven extinctions of known threatened species is ambitious, recent evidence[23] 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[24].

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. It is strongly recommended that Goal A contains 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 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?

If we are to achieve the 2050 Vision of living in harmony with nature by 2050, no level of human-induced extinction risk by mid- century would be acceptable. One of the proposals in the composite text from Nairobi OEWG4 speaks to this, proposing that extinction risk is **eliminated by 2050**. Achieving this is feasible if we meet a 20% reduction by 2030, and continue reducing risk by at least that rate until 2050. If the current number of threatened species was halved (as has been previously suggested), 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.

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[25]. 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[26].

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

[23] 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

[24] 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.

[25] 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.

[26] 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.

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)[27] 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 areas or OECMs[28]. Effective conservation of the remainder, including in particular the subset of KBAs highlighted by the 'Alliance for Zero Extinction'[29] 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[30] 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[31]. 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**[32] 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 Aren't some species naturally at risk of extinction?

A very small proportion of species have naturally elevated extinction risk because they have evolved in situations (such as very small islands) where they have extremely restricted distributions and/or extremely small populations rendering them prone to stochastic effects such that they could plausibly become Critically Endangered or Extinct in a very short time period. These species may qualify as threatened on the IUCN Red List (under criterion D2). An example would be a species found only on a tiny volcanic island that could be wiped out by a single volcanic eruption. Such species would not be relevant to the aim of eliminating *human-induced* extinction risk by 2050.

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[33]. 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[34].
- ***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[35]. 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.[36]
- ***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

[27] IUCN (2016) *A global standard for the identification of Key Biodiversity Areas, Version 1.0.* Gland, Switzerland. https://portals.iucn.org/library/node/46259
[28] https://www.keybiodiversityareas.org/
[29] https://zeroextinction.org/
[30] 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
[31] 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
[32] CBD.2022. Information Document OEWG3 A Global Species Action Plan: supporting implementation of the post-2020 global biodiversity framework
[33] 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
[34] 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
[35] 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/
[36] Fisher et al. (2011) Impacts of species-led conservation on ecosystem services of wetlands: understanding co-benefits and trade-offs. *Biodiversity and Conservation.* 20, 2461–2481 https://doi.org/10.1007/s10531-011-9998-y

population increased by 25%)[37]. The agri-environment scheme action for cirl buntings is also delivering proven benefits for a range of taxa[38].

- ***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[39].
- ***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[40].
- ***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[41].
- ***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. Should Goal A and the other goals contain numeric elements or should they be purely aspirational?

In order to be successful, the Goals, Milestones and Targets of the Post-2020 Global Biodiversity Framework need to be 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[42] into progress under the Aichi targets found that the most effective targets and ones making most progress were those that had SMART elements.

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