

1 AIMING HIGHER – BENDING THE CURVE OF BIODIVERSITY LOSS

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52 **Short title:**

53 Aiming higher – bending the curve of biodiversity loss

54 **Standfirst:**

55 The development of the post 2020 strategic plan for the Convention on Biological Diversity provides
56 a vital window of opportunity to set out an ambitious plan of action to restore global biodiversity. The
57 components of such a plan, including its goal, targets and some metrics already exist and provide a
58 roadmap to 2050.

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60 The UN Convention on Biological Diversity (CBD) outlines an ambitious vision: “*By 2050,*
61 *biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services,*
62 *sustaining a healthy planet and delivering benefits essential for all people*”. In November 2018 the
63 196 countries that are parties to the CBD will meet to start work on a new strategic plan for the period
64 after 2020. These deliberations come in the wake of the well-publicised failure to meet the 2010 target
65 to significantly reduce biodiversity loss, and evidence that the ambition of the plan for 2020 (the Aichi
66 Targets) will also not be achieved¹. Far from it: biodiversity continues to decline steeply. Without a
67 substantial change in approach and ambition, these successive failures will almost certainly be
68 repeated.

69 The degradation of nature is among the most serious issues that the world faces, but current targets
70 and consequent actions amount, at best, to a managed decline. What is required now are bold and
71 well-defined goals and a credible set of actions to restore the abundance of nature to levels that enable
72 both people and nature to thrive. Crucially, given pressing needs to simultaneously avoid dangerous
73 climate change, feed a growing population, and restore biodiversity, we need cross-cutting solutions
74 that enable our land and oceans to support all three objectives effectively and equitably, while
75 recognising the interactions and interdependencies between them that offer opportunities as well as
76 risks.

77 Here we argue that achieving the next CBD vision must be supported by well-defined, ambitious, and
78 measurable targets, and we propose three indicators which would together measure the required
79 progress in biodiversity recovery.

80 ***THE PROBLEM***

81 Over twenty-five years have passed since the 1992 Rio Earth Summit where the first global
82 commitment for biodiversity conservation was agreed. Despite numerous international scientific
83 studies and policy agreements confirming that conservation and sustainable use of biological diversity
84 is a global priority, worldwide trends in biodiversity continue to decline. The Living Planet Index,
85 based on trends in vertebrate population sizes, reports an estimated 58% decline since 1970², current
86 rates of species extinction are 100 to 1000 times higher than the background rate³ and, while net
87 changes in local species diversity reflect a variable mix of extirpation and introductions⁴,
88 approximately 13% of local species diversity has been lost on average across the world since 1500⁵.

89 This declining trend must not only be halted but also reversed if the Agenda 2030 Sustainable
90 Development Goals (SDGs) are to be achieved. Nature has a critical role to play in mitigating climate
91 change⁶, adapting to climate impacts⁷, maintaining the quality of soil, air and water, and supporting a

92 resilient basis for the food, fuel and fibre that future generations of people will need⁸. Failure to
93 address these challenges will hit the poorest hardest and most immediately.

94 Without a dramatic change in efforts to reverse the ongoing decline, our persistent failure to meet
95 conservation and biodiversity targets (Figure 1) is likely to continue beyond 2020, the end-date for the
96 current round of international commitments for biodiversity.

97 *LEARNING FROM OTHERS*

98 A productive target-setting approach used by recent international environmental policy agreements
99 has been to establish ambitious globally-agreed goals advised by science, to build progressively upon
100 national responses, and to encourage interest and engagement from the multiple sectors where change
101 is needed – from business and investment institutions, community groups and individuals. For
102 example, the process that delivered the Paris Agreement of the UN Framework Convention on
103 Climate Change (UNFCCC) is based upon an explicit goal (a maximum average global warming of
104 1.5 to 2°C), agreed internationally. The science-based target is then devolved to national governments
105 for implementation through multi-actor actions, and mutual reporting and monitoring. The SDG
106 process has similarly focused on motivating societal engagement around its 17 goals. Both
107 agreements explicitly recognize that the *status quo* is not an option and instead set necessarily hard-
108 hitting global targets to reverse business-as-usual trends.

109 There are also lessons to be learned about practical implementation of targets. In climate change
110 policy, future targets are based on scenario analyses that identify the most impactful suite of actions to
111 achieve the goal. For example, the climate stabilisation wedges⁹ were developed as a portfolio of
112 available technologies that could collectively achieve the necessary cuts in greenhouse gas emissions
113 over a 50-year period. This approach demonstrated how focussed deployment and timely
114 implementation could enable an aggressive emissions target to be achieved. The CBD can build upon
115 such approaches to develop its biodiversity goals and obtain national commitments with appropriate
116 levels of ambition.

117 We suggest three necessary steps in a roadmap for the post-2020 agenda: (1) clearly specify the goal
118 for biodiversity recovery, (2) develop a set of measurable and relevant indicators of progress, and (3)
119 agree a suite of actions that can collectively achieve the goal in the required timeframe.

120 *PROPOSAL FOR A BIODIVERSITY ROADMAP: 2020 TO 2050*

121 The first step in the development of a roadmap is to specify the goal, analogous to the UNFCCC 1.5
122 to 2°C target. International biodiversity agreements already commit to sustaining a healthy
123 planet that delivers essential benefits to all people by 2050. Governments have also agreed to
124 specific targets, such as tackling the extinction of threatened species by 2020 and halting
125 biodiversity loss by 2030 (see Box 1 and Supplementary Information). Given the extensive
126 consultative and technical processes behind these commitments, and bearing in mind the
127 multiple dimensions and diverse values of biodiversity, we propose adopting the CBD vision as
128 a goal. Achieving this goal will then require a new set of targets beyond 2020.

Box 1: Global biodiversity commitments enshrined in the CBD and SDG frameworks

CBD vision: “By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, **sustaining a healthy planet and delivering benefits essential for all people.**”

CBD Aichi target 12: *By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.*

SDG 14 is to “Conserve and sustainably use the oceans, seas and marine resources”. **SDG 15** is to “Sustainably manage forests, combat desertification, halt and reverse land degradation, **halt biodiversity loss**”. **Target 15.5:** *Take urgent and significant action to reduce the degradation of natural habitats, **halt the loss of biodiversity and, protect and prevent the extinction of threatened species***” (By 2030)

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130 The second step is to identify indicator metrics capable of measuring progress towards the goal. In
131 contrast with progress under the Paris climate agreement, which can be tracked using atmospheric
132 greenhouse gas concentrations, biodiversity measurement is complicated, requiring multiple measures
133 across different spatial scales and ecological dimensions. We suggest that for the goal and targets in
134 Box 1, progress can be adequately represented using metrics that are already widely applied in the
135 scientific and policy communities (Figure S1 and supplementary information). For example,

- 136 (1) Near-future global losses of species (extinctions) may be estimated using the Red List Index
137 (RLI)¹⁰.
- 138 (2) Trends in the abundance of wild species are reflected by population-level indicators such as
139 the Living Planet Index (LPI)²
- 140 (3) Changes in terrestrial biotic integrity (the biota’s “health”) can be estimated and mapped
141 globally using the Biodiversity Intactness Index (BII)¹¹

142 These indicators were developed for different policy applications, so there is still a need for better
143 representativeness, integration and data coverage if they are to support concrete global action,
144 including in marine areas. We suggest that a clear policy process would stimulate improved metrics.
145

146 Figure 2 shows the trajectories required for each of these three indicators to meet the policy goals and
147 targets in Box 1 (see Supplementary Information for more detail on how the three indices map onto
148 goals and targets, and for other potential indicators in the same categories). The RLI and LPI are
149 measured across the Earth as a whole and reflect the diversity and abundance of species globally. The
150 BII is based on estimates of the average abundance of originally-present species for any defined area
151 relative to their abundance in undisturbed habitat. Estimates are mapped and averaged within spatial
152 units, providing an appropriate metric of biosphere intactness for the CBD 2050 vision¹¹. We suggest
153 analysis at both medium-scale (ecoregions) and large-scale (biomes). The BII can assess the
154 proportion of these spatial units that show biodiversity above 'safe' levels for biotic integrity. There is
155 uncertainty about what this level should be¹² but we here set it above 90%, the precautionary level
156 proposed in the planetary boundaries framework¹³. We suggest that 100% of biomes and 70% of
157 ecoregions should meet the 90% target in 2050.

158 The third step will be to identify actions to deliver the required biodiversity improvements.
159 Traditional biodiversity conservation interventions such as protected areas and species conservation
160 planning remain crucial but actions must also address major drivers of biodiversity loss and
161 ecosystem change. Here there are inevitable trade-offs and conflicts because of demand for land for
162 climate mitigation (biofuels and sequestration) and food production. For example, conservation
163 efforts aimed narrowly at protecting biodiversity hotspots from land conversion (SDG 15) can result

164 in food price-spikes that undermine other SDGs. However, insights emerging from modelling
 165 scenarios for meeting the SDGs have also shown that combinations of societal actions can deal with
 166 problematic trade-offs¹⁴. Integrative policies for sustainable consumption and production (such as diet
 167 shifts) can benefit biodiversity, climate, and food supply, especially if underpinned by the shifts in
 168 underlying demographic and economic conditions that the SDGs require. With a more comprehensive
 169 approach, different combinations of economic, technological and behavioural changes can be
 170 identified that contribute to meeting multiple SDGs simultaneously, avoiding trade-offs and
 171 emphasizing win-win actions¹⁵.

172 *AN AGENDA FOR ACTION*

173 The global goals to halt species loss and restore biodiversity need to be supported by a new and more
 174 ambitious work plan.

175 Success will depend upon greater ambition, but crucially this must be underpinned by new analytical
 176 and modelling work informing policies and decisions of business and government, and testing them
 177 against the range of identified indicators. Many sectors must take urgent action if we are to bend the
 178 curve of biodiversity decline:

- 179 • *Governments*: will play a central role in defining and agreeing the goals (step 1). They will
 180 also need to commit to specific nationally defined actions that can collectively achieve the
 181 goal.
- 182 • *The business and finance sectors*, increasingly visible biodiversity actors, have the potential
 183 to become drivers of positive change. Their reach is global and their decisions can address
 184 biodiversity impacts across the entire value chain, and in all aspects of investment.
- 185 • *Researchers* can deliver improvements to integrated assessments to better represent the
 186 ecological processes and biodiversity indicators needed to identify plausible pathways to
 187 achieve the goals. More comprehensive models are also needed to identify potential win-win
 188 solutions – and strategies to avoid negative consequences of siloed policy responses.
 189 Foundations for this work are underway through the IPBES modelling and scenarios task
 190 force and the climate-change oriented Inter-Sectoral Impact Model Intercomparison Project ,
 191 but will need to be scaled up and broadened.
- 192 • *The conservation community* should come together around clear key messages related to
 193 biodiversity goals, and the actions that are required to deliver them. With their broad societal
 194 reach in communications and on-the-ground engagement, they can play a powerful role
 195 moving beyond the notion that single solutions can be enough, and instead promoting and
 196 supporting combinations of actions that long-term sustainability requires.

197

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244 **Figure legends**

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246 **Figure 1**

247 Biodiversity declines have continued despite repeated policy commitments aimed at slowing or
248 halting the rate of loss. The Strategic Plan for the Convention on Biological Diversity (2010-2020)
249 includes the 20 Aichi targets to be achieved by 2020. Recent projections suggest that this is unlikely
250 for most of the targets¹. Yet the 2050 vision requires a much more ambitious goal which will
251 necessitate recovery of biodiversity and bending the curve by 2030.

252 **Figure 2**

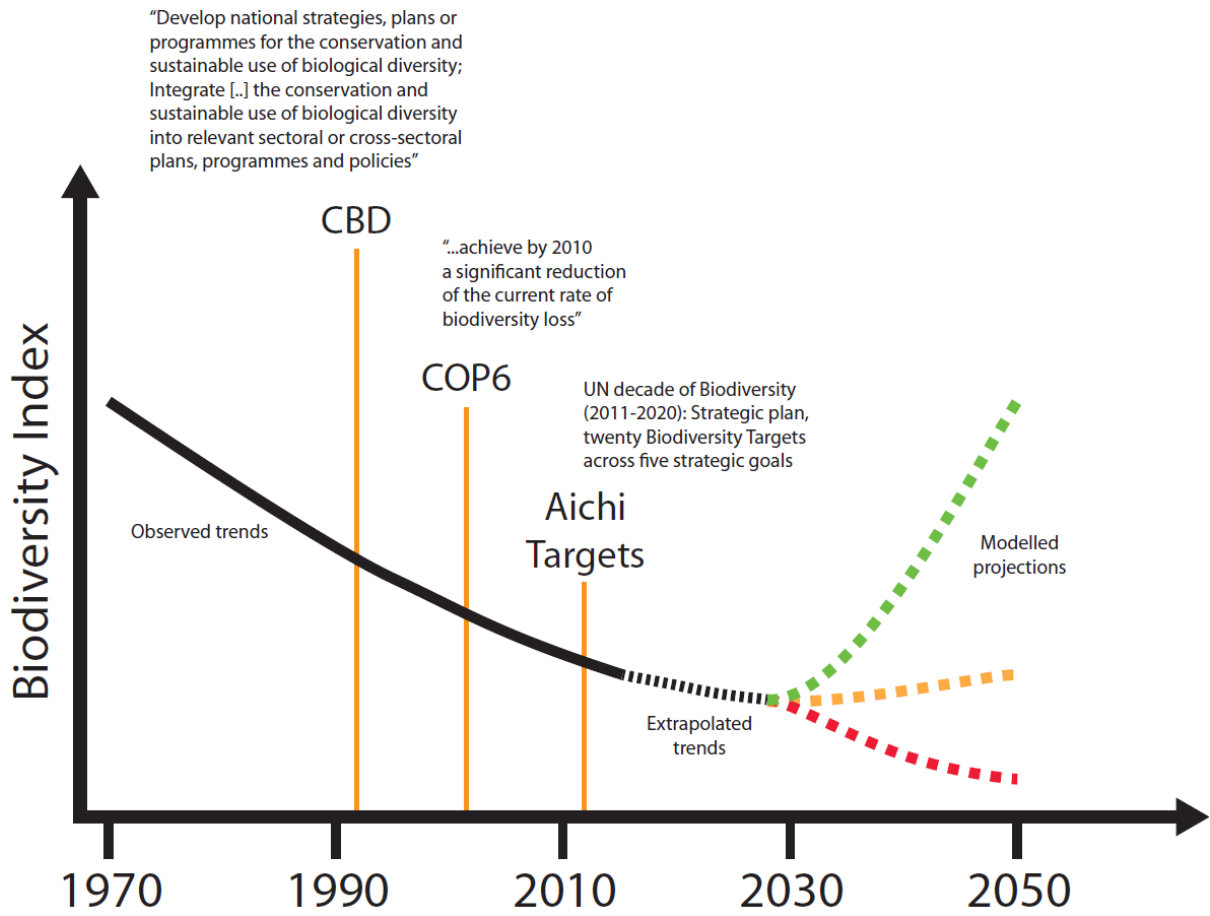
253 Required trajectories for three biodiversity indicators reflecting conservation status (i.e. global
254 extinction risk), population trend (changes to average population abundance) and biotic integrity
255 (changes to local, functional diversity) from the present to 2050, based on the commitments shown in
256 Box 1. See Supplementary information for justification of trends and details of potential indicators.

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259 Figure 1

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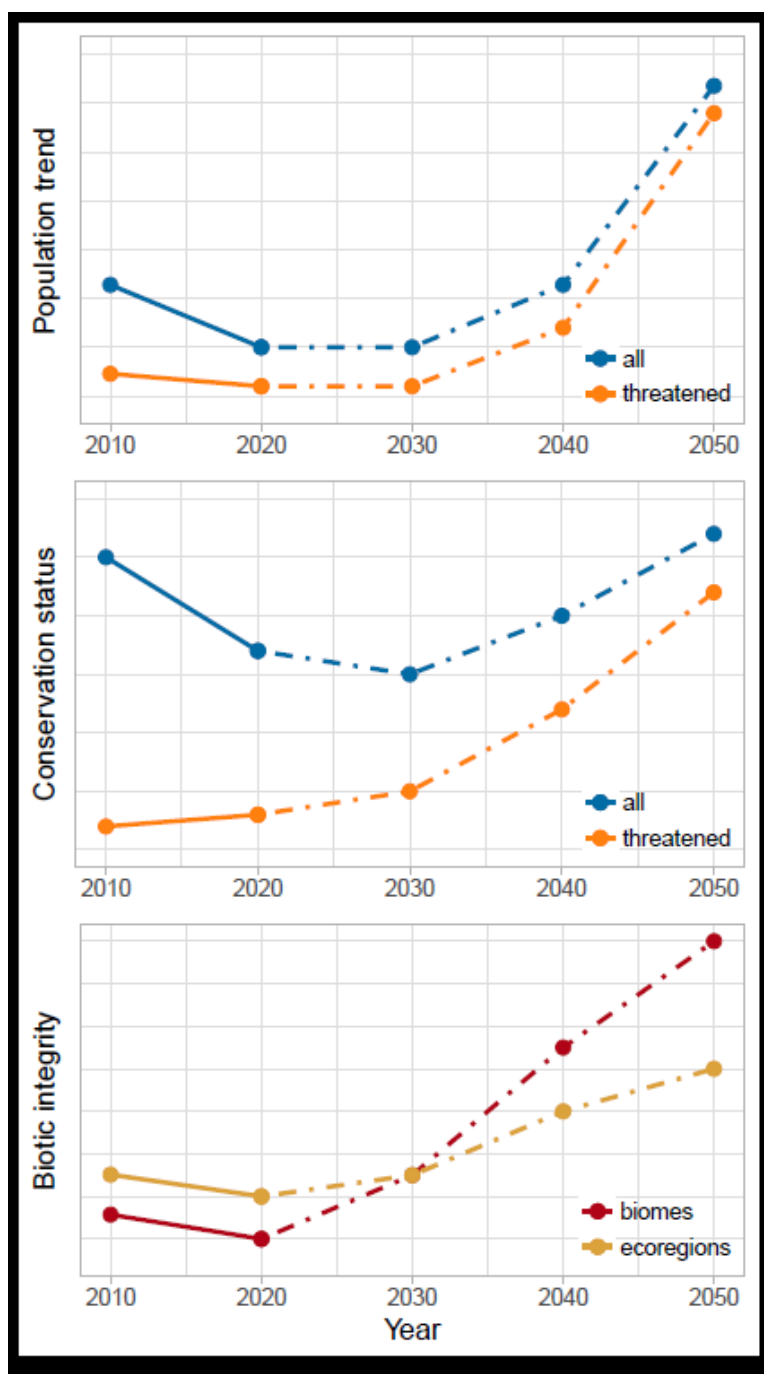


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263 Figure 2

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