Mapping our conservation future

Final report of a scientific scoping workshop to underpin scaling up ambition for area-based conservation

6th June 2017
UNEP-WCMC, Cambridge, UK.

1 Background and context

The Strategic Plan for Biodiversity 2011-2020 – and its associated 20 Aichi Targets – has been the largest ever intergovernmental plan for sustaining nature and nature's benefits to people. Achieving the 20 Aichi Targets is core business for countries around the world and for many supporting agencies in civil society and business communities.

In parallel to the emphasis on achieving the Aichi targets, discussions have been initiated on conservation ambitions beyond 2020. These include scaling up effective area-based conservation for biodiversity, natural capital, and ecosystem services, and the various ideas for scaling up such ambitions put forward by the academic community and wider civil society[1]. Over the next two and half years these communities will need to contribute to the Convention on Biological Diversity (CBD) processes that will lead to the adoption of a post-2020 biodiversity strategy. Such a future strategy will need to be fully embedded in the wider social and economic considerations of the broader 2030 development agenda and its Sustainable Development Goals.

There is therefore a unique window of opportunity to inform and underpin this process, in which scaling up area-based conservation ambition for people and nature will be a part. Doing so collectively amongst the conservation community, drawing on multiple scientific disciplines and experiences of real world conservation and related policy will have the greatest impact – and this is of strong and collective interest amongst multiple conservation agencies.

In order to further scope out ideas and advance on the scientific underpinning for scaling up area-based conservation, UNEP-WCMC, working with the Luc Hoffmann Institute, and with financial support from the Leonardo DiCaprio Foundation, convened a scoping workshop on the 6th June 2017 in Cambridge, UK. This workshop brought together a diverse range of scientific, practitioner and policy experts and institutions to discuss how to establish the scientific basis for scaling up area-based conservation in a post-2020 strategy. Rather than addressing specific current and future protected area targets and initiatives, the workshop focussed on the synthesis and forward-looking approaches for combining and disseminating knowledge that will best support the area-based conservation elements of a post-2020 biodiversity strategy. This included options for bringing together existing data on biodiversity, protected areas and other area-based conservation measures to help determine the highest priorities for new protected and conserved areas. See Annexes 1 and 2 for list of participants and workshop agenda.

The workshop discussions were guided by two framing presentations, which summarized the state of knowledge on mapping biodiversity and threats to biodiversity, and the state of knowledge on protected areas and other area-based conservation measures that might complement traditional protected area approaches within a scaled up conservation ambition for the future. These presentations set the scene for facilitated breakout-group discussions around three key questions:

1. How can we provide meaningful data on biodiversity at a scale needed for decision making?

2. What is needed for the biodiversity community to speak with one voice on biodiversity prioritization - i.e. where is important to focus conservation efforts?

3. How can we assess where important biodiversity is, and is not, being effectively managed?

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1 *In recent years various forward-looking conservation/sustainability agendas have emerged, and are being advocated by various constituencies. These include for example 'Planetary Boundaries', 'Half-Earth', 'Nature Needs Half', 'Whole Earth', 'The World in 2050', 'Sustainable Production and Consumption', 'People and Nature', 'Reducing Key Threats' etc. Whilst these approaches provided context for discussions, they were not considered individually at the workshop on June 6th.*

2 Synthesis and conclusions

Detailed outputs from break-out group discussions are presented in Annex 3. These provide a series of responses and considerations from workshop participants to the three key questions posed above, and outline a number of ideas to help the community collectively advance on a common scientific agenda to underpin scaling up of area-based conservation ambition.

A useful framing of the overall mechanism by which scientific information on biodiversity, protected and other conserved areas, and related issues can support political commitments on conservation ambition emerged from discussions at the workshop - see figure 1 below. This schema provides an overview and examples of how different data, information and prioritization layers built on them contribute to the science-policy interface on area-based conservation, and highlights examples of where different constituents contribute across this interface. In doing so, it provides a framework to identify how ongoing and future efforts across the community can contribute to the overall goal of scaling up area-based conservation.

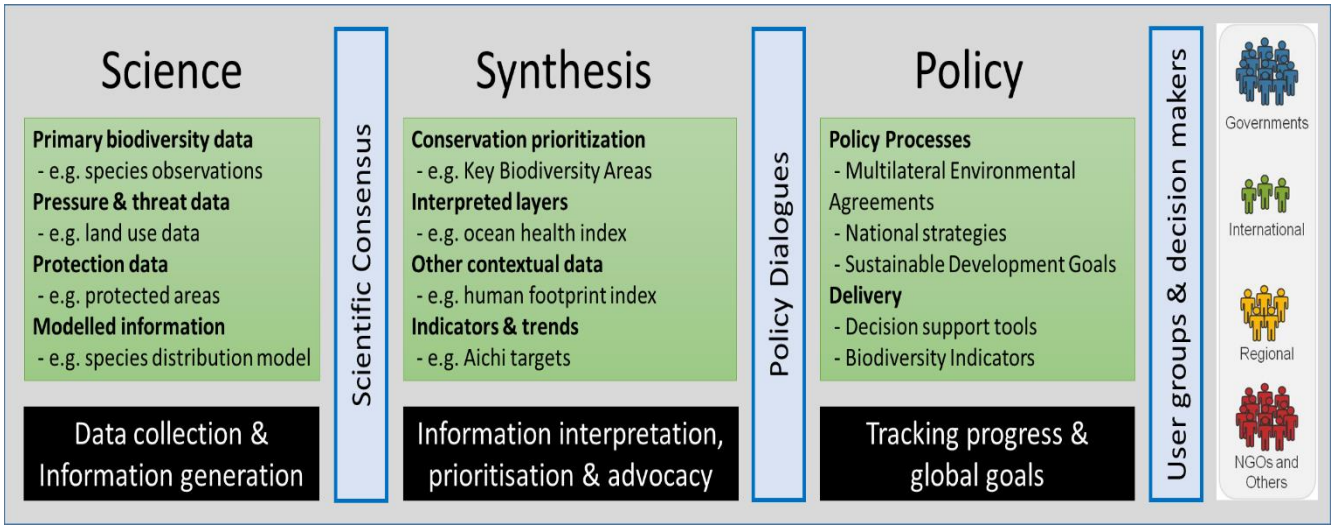

Figure 1: A framing of the science-policy and decision-making workflow underpinning the scaling up of conservation ambition for protected and conserved areas

At the left hand side of the schema is the generation of evidence underpinning any subsequent prioritization for conservation, decision support, and policy. Whilst policy and decision-making needs might prioritize the nature of information gathered, there is limited interpretation or valuation at this stage. Here, science drives the gathering and synthesis of data and development of information in three main areas:

First, the development of spatial, and ideally temporal, quantitative biodiversity information. Ideally this is at a level of detail that can help understand pressures and levels of protection, and can support spatial planning. One major effort involves the collection and mobilization of highly resolved biodiversity data, with GBIF as an established sharing mechanism. A second effort involves species experts organised within specialist groups of the IUCN Species Survival Commission, with their efforts feeding into the IUCN Red List database. Other key contributors to underpinning data include government agencies tasked with biodiversity monitoring, conservation NGOs that mobilize data through field programs (e.g. Wildlife Conservation Society or Conservation International), or data collation around specific taxa or spatial units (e.g. IUCN and BirdLife International), and

taxon/region specific efforts, increasingly supported by the Global Earth Observation Biodiversity Observation Network (GEO BON) and Map of Life (MOL).

Subsequent harmonization and quality control, and models supported by remote sensing and other ancillary data, then enable the development of integrated information in the form of detailed spatial biodiversity layers. Information on functional or evolutionary significance of species assemblages from the research community allows linking with additional biodiversity facets to allow a wider understanding for decision making and spatial planning.

The second area of information relates to the distribution and changes of different types of pressures on biodiversity. Here remote sensing and new initiatives developing land-cover change products from remotely sensed and in-situ data provide key synthesis products. Key efforts here include the various remote sensing agencies (NASA, European Space Agency (ESA)), the Global Land Cover Facility (GLCF) and a range of habitat-specific mapping efforts (urban, water, etc.) undertaken by academic initiatives and organizations such as the EU Joint Research Centre (JRC), World Resources Institute (WRI), UNEP-WCMC and others. Climate variables, and various data relating to pollution, species harvesting, and the presence of invasive alien species are also key.

The third area of information relates to the spatial distribution of conservation measures, such as different reserve types, and estimates of their effectiveness. This is work advanced through UNEP-WCMC and partners in the World Database on Protected Areas (WDPA). New opportunities are arising here from the land-cover change and modelling community to contribute to assessing effectiveness of conservation management.

The first two of these foundational global information layers are characterized in particular by the integration of large and often complex data. These require scientific community and academic initiatives to provide cutting edge science and technology for their development. The third, protection information, is dependent on liaison with national and other contacts to mobilize, manage and integrate reserve data. These three information layers consist mainly of objective, shared, transparent information without any associated value judgements.

In the synthesis part of the above schema, foundational information is used to develop value-added products that may represent a form of interpretation and evaluation. Such products can then be used for decision-support and to inform policy, for example through the development of conservation prioritization maps to support conservation decision-making and policy (such as through hotspots, ecoregions, endemic bird areas, KBAs etc.). Importantly, while the scientific evidence base will only change through improved methods, data and changing status of biodiversity pressures and protection, the nature of prioritization layers varies by organization, and can change over time. Additional interpretation and assessment can also be applied to pressure maps (e.g. human footprint) or protection effectiveness estimates. Such measures often benefit from including socioeconomic information to provide decision-making context. It is the synthesis products that are used for reporting of indicators to the global biodiversity conventions, to the Sustainable Development Goals, and within other intergovernmental bodies, such as IPBES. Finally, synthesis products may be combined with other layers in web tools for communication to a wider audience of interested public and decision-makers. Examples include the Key Biodiversity Areas tool, habitat tools such as Global Forest Watch, syntheses of the worlds protected and conserved areas (Protected Planet and the WDPA), the Digital Observatory of Protected Areas (DOPA), the Integrated Biodiversity Assessment Tool (IBAT). The main developers of synthesis products are non-governmental and international organizations such as UN Environment, UN Development Programme, the EU Joint Research Centre, IUCN etc. Academic initiatives around GEO BON and Future Earth have also recently become active in this area, using models to relate spatial variation in pressures to biodiversity and protection, with examples including the PREDICTS project,

Commonwealth Scientific and Industrial Research Organisation (CSIRO), and Map of Life (MOL) indicators and Map of Life web tools.

Towards the policy end of the spectrum are those who help define and then measure progress towards global, regional or national conservation targets. They are not often primary biodiversity scientists, but are users of the aggregation products and the measures of biodiversity change over time that fit against the politically agreed targets. At the international level, various agencies (often UN agencies or other international organizations) work to package information to monitor progress towards political targets. The same agencies may also directly support governments in helping to shape politically-agreed targets and monitoring systems, although at the national level a myriad of additional institutions are active in monitoring progress towards national targets. The evolution of political ambition and development of associated targets in turn generates the need for new data and innovative syntheses, thereby providing a feedback from the policy to the science and data generation.

In addition to considering the scientific basis for scaling up area-based conservation ambition, and although it was not the focus of discussions, it was also recognized during the workshop that the setting of ambition itself offers the opportunity for the scientific community to bring its capacities to bear. Whilst taking place in a political forum, new targets for area-based conservation will need to be strongly informed by available science if they are to be credible, and effective. There is therefore a clear role for the scientific community to be advocating that future targets are strongly informed by science, and in doing so also to contribute directly to the discussions on the level of ambition that might be captured in any such targets.

Various ideas emerged during the workshop on how the scientific community might collaborate to contribute further to scaling up ambition on area-based conservation - including through innovative approaches for generating, combining and disseminating knowledge tailored to support the area-based conservation elements of a post-2020 biodiversity strategy. The following key considerations and conclusions from the workshop present additional opportunities to support progress (and assessment of progress) towards existing conservation targets; inform conservation decision-making across scales; and strengthen the foundation for scaling up area-based ambition within a post-2020 biodiversity strategy.

Biodiversity data and related information underpinning decision making.

Available biodiversity distribution data at global scale, whilst being far from complete, are nonetheless sufficient to inform an understanding of broad patterns in global, regional and national distribution of species in various animal and plant taxa in terrestrial systems, and to a lesser degree for marine species. Standard measures for representing such understanding include those of species richness, range rarity (endemism), and richness of threatened species. At a broad level, patterns in the distribution of ecosystems, or at least land cover types, are also reasonably well known, although land-use data beyond protected areas, agriculture and infrastructure are relatively poor. The wider understanding of spatial distribution of genetic diversity is nascent, although measures of phylogenetic diversity are now emerging. Various direct and indirect threats to biodiversity can be mapped at broad scales, although there are major gaps in data relating for example to harvesting/off-take, and on invasive species. Beyond biodiversity, spatial data on natural capital and ecosystem services are emerging, although at a global scale are currently limited beyond biodiversity to data on carbon stock, and water-related services.

Mostly derived from a fairly narrow range of data and information, various indices have been developed to support decision makers, with some gaining significant resonance in the biodiversity policy community. However, despite the various disparate and coordinated efforts, the biodiversity community is collectively failing to meet the demand from decision makers across sectors and scales for data and information in useful and accessible formats. Furthermore, the required investments

have not been realized to ensure the sustainability and maintenance of the core underpinning biodiversity data such that they are not just the best-available, but also the best-possible data.

More targeted and detailed information is needed for decision makers in response to international and national biodiversity-related targets (both existing and future targets). One possible opportunity would be *to develop a multidimensional biodiversity index (analogous to the multidimensional approaches to poverty, development and economic indices)*. It is recognized that there is a *clear need for those parts of the community engaged with policy and decision makers to work more closely with those parts of the community developing data, information and analysis in order to co-design effective mechanisms for meeting decision makers' biodiversity data and information needs*. The basis for such collaboration was established during the workshop.

In order to support effective integration of data to meet decision makers' needs, *standards are required to underpin integration of data and information streams into synthesized products to inform across constituencies and users of biodiversity data* (e.g. in agriculture, climate change, infrastructure development, finance sectors). Such standards would need to cover the data developed through a range of remote sensing, modelling and in-situ observations, and underpin new global approaches to biodiversity monitoring, as well as better support integration between local and global data sources.

There are also many opportunities to strengthen existing initiatives that generate, manage, collate, compile and analyze biodiversity data. This includes emerging *opportunities to automate the collection, collation, and updating of various core biodiversity datasets*. Such automation might be achieved through the wider application of monitoring technologies, and also through the use of more advanced computational powers for data analysis. An *assessment of the potential for such technologies to be deployed across the range of biodiversity datasets that currently underpin decision making is a key next step*.

Prioritizing important areas for biodiversity

The greatest potential for the biodiversity community to add insight to effect positive conservation outcomes is in identifying spatial conservation priorities. Coming together with one voice on conservation priorities, using a clear framework to identify those elements of priority on which agreement can be reached would enable the conservation community to engage more coherently with decision makers. This would in turn transform the ability of decision makers to focus resources on priority conservation outcomes based on spatially-explicit priorities. *Agreement on a framework for prioritization and approaches for supporting decision making based on such a framework would transform the ability to credibly and effectively scale-up targets for area-based conservation*.

Biodiversity prioritization efforts currently focus predominantly on the persistence of biodiversity. Whilst these have some existing traction in the policy community, there is considerable additional value in developing and applying a wider framework for biodiversity spatial prioritization, which might include elements relating to:

- Persistence of biodiversity (priorities for conserving species/genetic diversity/ecosystems)
- Ecosystem services (or the underlying natural capital from which they are derived)
- System properties (e.g. through measures of connectivity, intactness, or vulnerability).

Agreement on a framework for prioritization would also allow measures to be determined that respond more directly to a range of decision maker's needs – ultimately any biodiversity prioritization approach and the units that underpin it depend on the objectives and constituency, i.e. priority for what, and for whom? Biodiversity priorities are also dependent on values, which change through space and time, and a framework for prioritization would enable these dynamic values to be recognized. A wider review of biodiversity prioritization approaches would need to be undertaken as a basis for developing such a framework.

Within such a framework, efforts are also required to agree on measures that respond to the various elements of priority. In the meantime, using additional measures relating to persistence will ensure buy-in from the wider conservation and policy communities and better reflect available measures for biodiversity prioritization.

Beyond the framework and measures required as above, *the importance of biodiversity prioritization as an approach needs to be communicated in a manner that resonates with decision makers across different sectors, and more widely in civil society*. Such efforts will require a similar coming together of the biodiversity community to agree on a common set of messages for dissemination. They might also draw on public engagement opportunities, such as 'adopt a pixel' type approaches that might, in addition to drawing attention to areas of high global priority, support prioritization efforts at other scales, and associated improvements in data and information related to those areas.

Effective protected and other conserved areas

Assessing where important biodiversity is, and is not, being effectively managed, requires an understanding of the spatial distribution both of important biodiversity and of measures for its effective conservation. Such measures might include protected areas, other conserved areas, and other areas where management is controlled such that there are positive outcomes for biodiversity. Whilst good data are available on the global coverage of protected areas, much less is known about the coverage or effectiveness of conserved areas other than officially designated protected areas. *Efforts therefore need to be focussed on strengthening the availability and collation of spatial data on other conserved areas (including territories and areas conserved by indigenous peoples and local communities, and privately conserved areas).*

Measures of coverage of protected and other conserved areas are insufficient to understand the effectiveness of their management to benefit biodiversity and sustain ecosystem services. There are various approaches deployed to assess management effectiveness of protected areas, with many based on subjective score-card approaches, and very few consistent assessments beyond state-managed protected areas. In addition to the need to scale up the coverage of assessments, most assessments to date focus on input data (resources deployed, planning processes etc), and a more robust understanding of management effectiveness would result from such assessments focussing on conservation outcomes – i.e. changes in status of biodiversity, and on governance. *Harmonised protocols for determining the effectiveness of management are needed for protected and other conserved areas, which then need to be deployed across areas of biodiversity importance.* In parallel, efforts need to be made at local scales to improve biodiversity monitoring (including the monitoring of threats) such that assessments of management outcomes can be more robust. The deployment of technologies may be an important approach to scaling up such monitoring.

Beyond assessment at individual sites, the effectiveness of networks of protected and other conserved areas is an important basis for determining overall effective management of biodiversity. Considering the connectivity of protected and conserved areas – along with the extent to which sites and networks are equitably managed - provides additional insight into their sustainability and resilience. Robust assessment of management effectiveness will therefore require both site assessments and their peer-to-peer review/lesson sharing (e.g. among site managers) as well as broader, multi-scale assessments of effectiveness across networks of protected and conserved areas. *Measures of connectivity and equitable management of protected and other conserved areas therefore need to be further developed and scaled up in support of improved management effectiveness*.

3 Policy context and next steps – the road to 2020 and beyond

The existing policy framework provided by the Sustainable Development Goals (SDGs), and Aichi biodiversity targets within the context of the Convention on Biological Diversity (CBD) recognize the need to understand and monitor the effectiveness of protected areas in conserving important sites for biodiversity. With the expectation that area-based conservation targets will be revised in a post-2020 biodiversity strategy, and the level of ambition raised in that process, there is a 2-year window of opportunity for the biodiversity community to come together and inform this process with the best available science, and insight. There is a slightly longer window of opportunity to ensure that monitoring frameworks are in place to respond to and track progress towards any new targets adopted.

The workshop provided a basis for collaboration amongst those present and other interested constituents on the above areas of priority focus for the community. Beyond the workshop participants, linkages urgently need to be made also with other sectors both on spatial data and on analysis, to inform a post-2020 biodiversity strategy in the context of sustainable development.

The following priority activities emerge from discussions at the workshop and its conclusions:

1) Complete a rapid assessment of the opportunities for cutting edge science and novel technologies to further support the collection, collation, and integration of biodiversity datasets and information. Implement assessment findings and recommendations, for example through development of operational agreements between relevant scientific and technology communities driving forward such advances and the communities involved in data collection and mobilization.

2) Enhance collaboration between relevant and interested organizations and efforts (eg GEO BON, Map of Life, Future Earth, GBIF, IUCN, and the wider conservation NGO science community) on approaches to further develop spatial ranges for species containing measured probabilities of occurrence across ranges, and on validating such models.

3) Strengthen spatial data collation on territories and areas conserved by indigenous peoples and local communities, and on privately conserved areas.

4) Develop harmonized protocols for determining the effectiveness of management of protected and other conserved areas, and deploying these across areas of biodiversity importance.

5) Develop and scale up measures of connectivity and equitable management of protected and other conserved areas in support of overall improved effectiveness of area-based conservation.

6) Develop relevant community standards to support integrating data and information streams into synthesized products to inform decision makers across sectors such as agriculture, climate change, infrastructure development, finance.

7) Further explore and act on potential for development of a 'multidimensional biodiversity index', bringing together different measures of biodiversity and testing implications of different combinations of biodiversity values and weightings.

8) Undertake a review of current biodiversity spatial prioritization approaches as input to the development of a broader framework for biodiversity spatial prioritization, and evaluate the use of the framework as a tool to underpin scaled-up area-based conservation targets.

9) Further expand the use of a range of approaches (including KBAs[2], which are used as part of the SDG indicator on areas of importance for biodiversity that are protected) to determine additional areas contributing significantly to the global persistence of biodiversity.

10) Develop and implement communications and outreach to provide decision makers and the wider public with i) digestible measures of biodiversity and protected area change based on currently available datasets, ii) insight into the consequences of changes in these measures for nature and people, and iii) understanding of the importance of biodiversity prioritization as an approach to underpinning sustainable development.

11) Develop an options paper, contributed to and endorsed by interested workshop participants and wider community, and made available to the CBD CoP in 2018 that sets out the biodiversity conservation and other implications of:

    a. Increasing coverage of protected and other conserved areas from current coverage and representation to eg 20%, 25%, 33% and 50% of the Earth's land and sea surfaces.
    b. More formally recognising and including in the coverage statistics those lands already protected by Indigenous Peoples and Local Communities, and within privately conserved areas.
    c. Enhancing the effectiveness of management of the protected and conserved estate, alongside increasing the coverage of land and sea areas under conservation.

Annex 1: List of participants

Name	Organization	Country
José Quintero	Alexander von Humboldt Institute	Colombia
Stuart Butchart	Birdlife International	UK
Tania Urquiza-Haas	CONABIO	Mexico
Paula Ehrlich	E. O. Wilson Biodiversity Foundation	USA
Gregoire Dubois	EC-Joint Research Centre	Italy
Erle Ellis	Future Earth / University of Maryland	USA
Tim Hirsch	GBIF	Denmark
Carsten Meyers	German Centre for Integrative Biodiversity Research	Germany
Tom Brooks	IUCN	Switzerland
Stephen Woodley	IUCN WCPA	Canada
Mark Mulligan	Kings College	UK
Karl Burkart	Leonardo DiCaprio Foundation	USA
Jon Hutton	Luc Hoffman Institute	Switzerland
Alejandro Coutino	Luc Hoffman Institute	UK
Alex Tait	National Geographic Society	USA
Healy Hamilton	NatureServe	USA
Eric Dinerstein	RESOLVE	USA
Deshni Pillay	South African National Biodiversity Institute (SANBI)	South Africa
Maxwell Gomera	UN Environment	Kenya
Neville Ash	UNEP-WCMC	UK
Neil Burgess	UNEP-WCMC	UK
Naomi Kingston	UNEP-WCMC	UK
Val Kapos	UNEP-WCMC	UK
Nina Bhola	UNEP-WCMC	UK
Samantha Hill	UNEP-WCMC	UK
Craig Mills	Vizzuality	UK
Ted Schmitt	Vulcan Foundation	USA
John Robinson	WCS	USA
Tom Evans	WCS	UK
Joe Walston	WCS	USA
Rebecca Shaw	WWF	USA
Walter Jetz	Yale Center for Biodiversity and Global Change	USA

Annex 2: Agenda

Time	Focus	Action
09:00	Opening and round table introductions	Overview of objectives and meeting plan by: ○ Chair, Neville Ash (Director, UNEP-WCMC) ○ Jon Hutton (Director, Luc Hoffman Institute)
09:30	Knowledge overview – short presentations and discussion	○ Biodiversity and threats to biodiversity – state of spatial knowledge ○ Area-based conservation measures – state of knowledge
11:00	Facilitated breakout discussions	Four informal breakout groups addressing the following questions: 1. How can we provide meaningful data on biodiversity at a scale needed for decision making? 2. What is needed for the biodiversity community to speak with one voice on biodiversity prioritization (i.e. where is important to focus conservation efforts)? 3. How can we assess where important biodiversity is (and is not) being effectively managed?
12:30	Lunch	
14:30	Feedback from breakout groups, reflections and plenary discussion	Focus around the three questions
15:30	What is possible?	Examples of data visualisation tools
16:00	Bringing it all together – towards an action and implementation plan to inform scaling up area-based conservation ambition in a post-2020 biodiversity strategy	Discussion/planning on key actions necessary (small groups or plenary)
17:30	Close	

Annex 3: Key outputs from small group discussions

Note that these outputs do not necessarily represent the viewpoints of the full workshop.

How can we provide meaningful data on biodiversity at a scale needed for decision making?

- Despite the many disparate and coordinated efforts, the biodiversity community is collectively falling short of meeting the demand for the right data in the right format for various decision makers – ranging from countries and large investment corporations, to local communities and individuals.
- Data and information disaggregation are needed for different decision makers, to ensure that users get the information they need in the format they need at the scale they need. Some common needs/typologies across users and scales can be identified that would facilitate data dissemination and the ability of the community to respond efficiently to identified user needs.
- Although clear global and national targets help to identify data needs, existing targets have not provided the impetus for biodiversity data and monitoring to advance significantly – potentially due to the lack of scientific credibility of those targets.
- There are key differences between the climate (UNFCCC) process and biodiversity (CBD) process for target setting, and a simple target and subsequent metric for biodiversity prioritization is unlikely to be appropriate or achievable. The concept of a multidimensional biodiversity index (analogous to the multidimensional approaches to poverty indices (or GDP or HDI) should be further explored.
- There's a strong need for the community that delivers information to decision makers to work more closely and coherently with the community developing data, information and analysis. The basis for such collaboration(s) was established at the meeting and should be pursued.
- Standards are needed on ways to integrate data and information streams into synthesised products, and agreement is needed on these across communities. This would be facilitated by partnering with other constituencies/users of biodiversity data (e.g. in agriculture, climate change, infrastructure development, finance).
- There are considerable emerging opportunities to deploy technologies to automate the collection and regular updating of core biodiversity datasets. These opportunities need rapid assessment across the range of biodiversity datasets that currently underpin decision making.
- There are considerable opportunities to further use existing products and technology –from remote sensing, modelling and in-situ data – in new integrative ways.
- Specifically, there is a need to understand and unpack biodiversity data for more refined metrics, e.g. across the targets of the Sustainable Development Goals and other global targets. Indicators also need to represent a wider set of values, such as intrinsic values.
- A general consensus exists in the biodiversity community about what is *possible* to monitor, although further consideration needs to be given to what *should* be monitored. How to technically deliver and resource the delivery of such monitoring requires considerable additional progress.
- Scaling up (and down) data and information remains problematic. Need to further develop two-way links between local and global data sources to enhance the utility of both.
- There is a need to recognize the skills and capacities across the biodiversity community in relation to building and maintaining the most robust primary biodiversity layers, undertaking national or eco-regional planning, and promoting knowledge products that are derived from primary biodiversity data.

- Data interpretation – and in particular simplification - is required in order to ensure available data resonate with decision makers. For example, simplified spatially-explicit visualizations of areas of importance for biodiversity need to be based on a range of available data, but presented as clear areas of priority from the community.
- The biodiversity community also needs to (present and) respond to a range of scenarios, for example around different levels of ambition in targets, and better articulate the consequences/outcomes of those scenarios for biodiversity.
- The key measure of success in ensuring the right data are available for decision making will be sustained demand for, use of, and resources available for the underlying data and derived information on biodiversity.

What is needed for the biodiversity community to speak with one voice on biodiversity prioritization?

- Biodiversity prioritization and associated unit(s) of analysis and presentation depends on the question, objectives and audience, i.e. Priority for what, and for whom?
- Having been adopted globally, the biodiversity elements of the SDG targets and indicators (as well as the broader SDG framework) provide a clear focus of the community for biodiversity prioritization.
- There is a widespread perspective that the conservation community lets itself down by being unable to agree on biodiversity prioritization. However, biodiversity priorities are also dependent on values, which change through space and time. Recognizing these dynamic values will be key to widespread engagement in biodiversity prioritization.
- It would be extremely helpful to elaborate an umbrella concept/framework for aspects of priority, even though there may be differing approaches for addressing the components. Such a prioritization framework might capture:
    - Persistence of biodiversity
    - Ecosystem services (e.g. through bundles of ecosystem services or the underlying natural capital from which they are derived)
    - System properties (e.g. through measures of connectivity, intactness, vulnerability).
- Although on prioritization remains challenging, a wider review of biodiversity prioritization approaches would help inform the development of such a prioritization framework.
- One of the most globally-consistent datasets for biodiversity prioritization focussed on biodiversity persistence is that of KBAs (which is used in the SDG indicators as a metric of areas of importance for biodiversity). Although it is currently limited in coverage, and dominated by areas of importance for birds, if scaled up according to the KBA standard, it would provide a robust basis for prioritization on biodiversity persistence, and for understanding protected and conserved area coverage of key sites for biodiversity persistence. Additional measures are likely to be required to ensure community buy-in and to better reflect available measures for biodiversity prioritization.
- The importance of biodiversity prioritization needs to be translated into the language that resonates with different sectors and more widely in civil society (e.g. IFC standards, and through public campaigns).
- There are many opportunities to further engage with the public, eg through 'adopt a pixel/tile' type approaches that might support sub-national prioritization efforts and associated improvements in data and information related to those areas.
- An agreement in the biodiversity community on a framework for multiple measures of biodiversity importance would be of considerable value in underpinning scientifically-informed future biodiversity targets.

How can we assess where important biodiversity is (and is not) being effectively managed?

- The biodiversity community has worked hard to generate good data on coverage of protected areas, but has limited coverage data beyond this – eg for indigenous and community conserved areas, and privately conserved areas.
- It is widely agreed that we need to move beyond protected area coverage to understand effectiveness of management. There are currently differing approaches to assessing management effectiveness of protected areas, with many based on subjective score card approaches, and there are very few consistent assessments beyond state-managed protected areas.
- Effectiveness assessments need to focus on outcomes – i.e. reflect changes in status of biodiversity. Most assessments to date focus on input data (resources deployed, planning processes etc)
- Harmonised protocols for determining management effectiveness are needed
- However, there remains a paucity of data on status of biodiversity through which effectiveness of protected and conserved areas can be measured. Proxies are therefore deployed, often based on input data, although further collation of available data coupled with deployment of new technologies would help fill gaps.
- Issues of connectivity and management equity are linked to sustainability and therefore effectiveness of protected and conserved areas through time, but these are poorly measured and approaches to do this are only under development.
- A focus on biodiversity threats could be helpful to understand effectiveness. Effective management addresses threats. Good governance underpins effective management, and the ability to address threats.
- Scaling up *in situ* monitoring of state, pressure and response in conjunction with remote sensing information on status is likely to lead to new insights.
- Robust assessment of management effectiveness will likely require peer-to-peer review/lesson sharing (e.g. among site managers) and broader, multi-scale assessments of effectiveness.

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in collaboration with

and with support from the Leonardo DiCaprio Foundation.