Eight things you should know about the 30x30 nature conservation target

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This year the global community will decide how much of the planet to protect by the end of this decade. Momentum has developed around a target of protecting 30% of land and sea by 2030, but the origins and justification for the target are poorly represented in these discussions. This factsheet summarises the scientific rationale and background to 30x30. It explains why getting 30x30 across the line at COP15 of the UN Convention on Biological Diversity is critical to achieving diverse goals, which range from saving biodiversity and reducing the rate and impacts of climate change, to securing the basic ecosystem goods and services on which human life, prosperity and well-being depend.

1. 30x30 is a scientific, not a political target

30x30 sounds arbitrary, driven more by sloganeering than science. But the number is founded in detailed scientific research[1], unlike previous targets to protect 10% of land and sea by 2010[i] later revised to 10% of sea and 17% of land by 2020[ii] in Aichi Target 11. When the UN Convention on Biological Diversity adopted the present targets, they were set low by politics and pragmatism, having to secure broad political agreement and be feasible to implement. Because terrestrial conservation was more advanced than marine at the time, a higher target was set for land-based ecosystems.

Research has since demonstrated that the 10% and 17% Aichi targets, neither of which was met on time, are insufficient to prevent catastrophic loss of biodiversity and further erosion of ecosystem functioning and services[2]. As of November 2022, 17% of the land and 8.2% of the ocean have been protected. These targets are therefore widely considered as waypoints on the route to a sustainable biosphere, not endpoints. The science now points towards 30% protection of sea and land as the minimum required to deliver long-term viability for nature and people. Protection, as discussed in this fact sheet, encompasses the full spectrum of protected area types. The science has become much clearer in recent years that the heavy lifting in terms of conservation outcomes comes from high levels of protection. However, less highly protected areas are beneficial and necessary too.

2. 30x30 has clear ecological foundations

Ecosystems consist of small to large assemblages of species living in interactive webs, and for component species to survive and thrive they must sustain themselves over the long-term. Species with large populations experience lower rates of loss and extinction than small populations, as do species that are widely distributed and locally and regionally interconnected. Good conditions for survival, growth and reproduction promote population persistence and therefore stability of ecosystem functioning.

[i] https://www.cbd.int/doc/decisions/cop-07/cop-07-dec-30-en.pdf
[ii] https://www.cbd.int/aichi-targets/target/11

The forces of habitat degradation, fragmentation and loss increase mortality, suppress reproduction and growth, reduce population sizes and sever connections among them, leading to progressive loss of biodiversity. Since ecosystem functioning is a product of the species from which they are made, biodiversity loss degrades the goods and services that flow from nature to us, such as clean water and air, fertile soils and productive fisheries. Those flows, we have belatedly realised, are dependent on the quantity and quality of natural capital, that is nature in all its varied forms, held in the biosphere[3].

Few studies have attempted to estimate how much natural capital, and of what quality must be maintained to sustain the upkeep and functioning of the whole biosphere. Considering that uncertainty, common sense suggests a precautionary approach. Protecting only 10% or 17% of the planet cannot be considered precautionary, implying wild nature pushed to the margins of human-dominated land and seascapes. Even 30% is likely at the borderline of sufficiency for a well-functioning biosphere, and for this to be effective, very high levels of ecosystem integrity within protected areas must be delivered through strong protection and good management. What happens in the 70% of land and sea likely to remain outside of protected areas or other effective conservation measures, at least in the medium term, will also be key both for the effectiveness of protective measures and for the level of coverage required.

A pattern that is so widespread in nature it might be called a fundamental law, analogous to the laws of physics, is that larger areas support more species. As area increases, the number of species present grows rapidly at first, then slows down as an asymptotic accumulation curve. The rate of accumulation is represented by the exponent, z, of the equation – $Number\ of\ species = constant\ x\ Area^z$ – which, based on hundreds of studies[4], typically lies between 0.2 and 0.3. The shape of the curve can be used to estimate expected loss of species as habitat is lost[iii]. Taking 0.25 as the middle of the range of values for z, a 70% loss of habitat, if randomly distributed would result in 26% loss of species, while 90% habitat loss would drive 44% of all species extinct. Actual rates of loss could be lower or higher. Some species can survive in human-modified land or seascapes, which would reduce extinction rates, but concentration of habitat loss in hotspots of biodiversity would increase extinctions. But the figures are broadly indicative of the consequences of people destroying and converting habitats.

It is obvious that habitat loss and degradation inevitably result in biodiversity loss. By using strategic design principles in choosing where to put protected areas, the realised species-area curve can be steepened, allowing more species to be protected in less space than if protected areas or other effective conservation measures were randomly placed. Importantly, and based on the equation above, saving a strategic 30% of habitat could push the fraction of species safeguarded from 74% to above 90%[5]. Added to this, good management of habitats outside protected spaces could increase overall persistence by a few percentage points more, providing significant further gains to ecosystem functioning. By contrast, protecting only 10% or 17% of marine and terrestrial area will lead to mass extinction, regardless of whether strategically placed or not.

The world is changing ever faster because of the multiplication and intensification of human activities and influences, including climate change. Ecosystems are changing too, adapting and reconfiguring to the altered conditions. Their ability to persist and restructure rests in the fates of

[iii] This fraction represents long-term species losses and assumes that species cannot persist outside of the habitat being lost/converted. There are more sophisticated ways of estimating species losses over shorter timescales and with different patterns of habitat loss and species persistence in converted/degraded habitats, but the general pattern of this relationship is very robust.

the species from which they are composed. Directional change in conditions driven by climate change, such as rising temperatures, reduced rainfall, or melting sea ice will lead to range shifts among component species.

Networks of protected areas and other effective conservation measures can boost resilience to change by facilitating range shifts, provided protected spaces are close enough for species to move between. Such connectivity rises with protection coverage. Based on movement and dispersal distances of varied forms of marine life, areas up to 40km or so apart are considered close enough to be ecologically connected for most of their component species[6]. But connections will only be sustained if protected spaces are large enough to maintain viable populations of the species they contain. For marine species, areas 10-20km across are often recommended as a minimum[6]. Together, figures for size and spacing produce the required coverage. Protected areas and other effective conservation measures 10 or 20 km across and 40km apart would cover 25-33% of the sea.

Resilience of ecological functioning – a key concern for humanity as life depends on healthy ecosystems – is a product of the diversity of species present. The functioning of an ecosystem in which five species fulfil a particular ecological role will be more robust to species loss or range shifts than one where only a single species fulfils that role. Avoidance of biodiversity loss and facilitation of ecological connectivity are therefore essential to sustain flows of ecosystem goods and services to people. A consequence of this observation is that low diversity ecosystems are more prone to loss of functioning than richer ones. This suggests that to better protect ecosystem functioning, goods and services, we should invert the prevailing logic that richer ecosystems are more deserving of protection. We should also focus on protecting bigger, more reproductive populations which produce more secure ecological connections as population size and the reproductive output of species dictate the number of organisms available to make these connections. Higher coverage levels of protected areas and other effective conservation measures, with stronger protections, therefore also enhance resilience.

3. Climate change mitigation requires greater protected area coverage

As explained above, the ecological science behind 30x30 is clear. However, climate science also agrees that protecting nature is an essential component of the response to climate change[7]. There is now a global consensus that to avoid the worst effects of climate change, greenhouse gas emissions must be held to levels that will produce no more than 1.5°C of warming and certainly less than 2°C. Even at the present 1.1°C of rise there is evidence of widespread environmental disruption and most of the world's coral reefs are at severe risk of loss. Such targets demand strong and urgent action to reduce emissions, but alone, reduced emissions are not enough. Transitional pathways to climate stabilisation at 2°C or lower require nature-based solutions to boost withdrawal of carbon dioxide from the atmosphere and prevent re-release of carbon from existing natural stores, like those in tundra, peat bogs, forests, coastal wetlands and seabed sediments[8]. Such efforts not only require remaining carbon sequestering ecosystems and stores to be protected, but a reversal of past losses of biodiversity and habitat extent through restoration[9]. Protecting 90% of existing terrestrial carbon stores would require 14% greater coverage of protected areas, according to one study, over and above the 17% target for biodiversity protection alone, taking total coverage above 30%[10]. For the sea, another study[5] estimated that carbon stocks could be protected with a strategic coverage of only 3.6%, largely because the vulnerable carbon occurs in nearshore coastal areas, with most open ocean carbon being naturally protected by immense depth. Greater protection of green and blue carbon ecosystems is essential for climate mitigation.

4. We cannot afford <u>not</u> to have greater protection for nature

Government spending on nature conservation has historically been low compared to that for immediate human concerns, such as health, education or defence. This low priority is reinforced when in times of crisis, such as economic recession, pandemics or war, nature conservation budgets are always among the first to be cut. But viewing conservation as luxury rather than necessity, affordable only in good times, is no longer viable now human influence is everywhere and habitat loss and degradation ubiquitous. With human well-being affected by a shrinking area of habitable and productive land and sea, we must do more to prevent and reverse biodiversity loss. If we don't, losses will continue to accelerate, making the world progressively more inhospitable, threatening our own existence.

How much nature protection will safeguard the planetary life-support system upon which our well-being depends? If a fraction of nature must sustain the former functioning of the whole, it can't be small, meaning 10%, or 17% for that matter, are not enough. Even city dwellers need more green space. Based on a range of well-being-related factors, The World Health Organisation recommends 9m^2 of green space per person as a minimum for adequate city living and 50 m^2 as ideal[11]. For a densely populated city like Manila, this equates to 40-200% of its area, or for Paris 19-105%. In reality, only 4% of Manila is green space and 9.5% of Paris. Both cities are much afflicted by poor air quality and urban heatwaves, factors that more green space would help alleviate[12]. Singapore, by contrast, is a garden city ranked highly for liveability. Its 47% green space is comfortably above the 7.5 to 42% required for its population density.

In citing the above figures, we are not suggesting that cities could sustain their natural resource needs from internal green space. Cities demand far more green and blue space to generate the flows of water, clean air and food upon which urban societies depend. Indeed, even meeting their psychological and health benefits may require more space depending on the quality and availability of these green and blue spaces[13]. Moreover, climate change will have severe and lasting impacts on people around the world. Green and blue spaces can help us adapt to these impacts, providing buffers to rising sea level, heatwaves, supporting disaster risk reduction efforts from, for example, flooding and extreme events Some of these services can be provided by converted landscapes and altered seas, but protected space and intact ecosystems are critical to meeting the aggregate demand[14].

5. Paper parks are easy, but weak protection means reduced benefits and greater coverage required

A valid criticism of area-based conservation targets is that they prioritise quantity at the expense of quality. Nature offers benefits to people that are contingent both on the area it occupies and the vigour with which it flourishes. Translated into the terms of 30x30, achieving the coverage target for protected areas and other effective conservation measures is useless without enough protection from destructive and harmful human activities inside those protected spaces.

Unfortunately, a large fraction of the global protected area system, both above and below water, is too underfunded and/or poorly managed to deliver the intended benefits[15]. But even if it were well managed, much is too weakly protected to provide much benefit to nature or, therefore, people. We have not been ambitious enough or sufficiently realistic about the degree to which nature must be shielded from harmful human activities to thrive.

In a recent analysis of the relationship between protection level and outcomes of marine protected areas[16], only high levels of protection from damaging and extractive human activities produced the ecosystem integrity and functioning necessary to deliver desired benefits to nature and people. At

present, only 30% of the global marine protected area system has this level of legal protection (total coverage 8.2%, of which 2.4% is highly and fully protected[iv]), and if regional studies of protected area effectiveness are representative of the whole[15], a paltry 1.1% is managed well enough to produce the intended benefits. On land, one study compiled data from 12,315 protected areas across 152 countries and found that on average protected areas have failed to reduce human pressures when compared with similar areas outside protected areas[17].

This protection deficit means that well managed, well-protected areas are responsible for a large fraction of the overall performance of current marine and terrestrial protected area systems. It is self-evident that a deficit in quality will reduce collective benefits because:

Overall benefit = protected area coverage x quality of protection

If ambitions for protection are too low, or management is poor, then greater coverage will be needed to secure the same benefits. Most studies that attempt to answer the question of how much ocean to protect used the simplifying assumption of full protection from extractive and damaging human activities[1]. Given the reality of lower protection and often insufficient management, greater protected area coverage would be needed to deliver the outcomes documented. Based on a study of the outcomes of partially versus fully protected marine parks[18], 60% coverage of partially protected areas would be required to deliver the benefits a fully protected network of 30% would provide.

Expanding protected areas and other effective conservation measures to reach 30x30 needs to be set within strong qualitative targets and expectations surrounding ecological, practical, social, economic and network criteria of connectivity, adequacy, representativeness, replication, appropriateness, democracy and equity. However, a network covering 30% of land and sea leaves 70% of the planet uncovered. We need to effectively integrate conservation, sustainable use, nature restoration and equity into all human activities across the whole planet, truly embracing the sustainable development goals.

6. Achieving multiple objectives requires more space than meeting single objectives

The scientific literature is replete with examples of protected area network designs produced to achieve narrow goals, such as representing particular groups of species, or those with restricted geographic ranges, or support for a single exploited population. Such studies occasionally suggest that goals can be achieved with protected area coverage as low as single figures. But protected areas must fulfil multiple objectives because there isn't the space or finance to deliver narrow targets with separate networks[v]. Once multiple goals are considered, such as protecting carbon stores, freshwater sources and threatened species, the additive network is always larger than any designed for single goals. This holds true regardless of the multi-objective optimisation methods used to pursue efficient designs. The more objectives there are, the more extensive protected area networks need to be, which rapidly drives coverage into the realms of several tens of percent. The Great Barrier Reef marine park rezoning of 2004 is a well-known example, where managers sought to create a network of fully protected zones encompassing at least 20% of each of the 70 biophysical regions of the park[19]. Achieving just this one goal required a network covering a third of the park.

Optimisation methods have revolutionised academic theorising about protected area network design, spawning thousands of studies over several decades. Their strength is to help find solutions to problems whose complexity overwhelms human capacity to find answers through more

[iv] https://www.protectedplanet.net/en; https://mpatlas.org/ - both accessed September 2022;
[v] The approach has often been tried, for example Special Protection Areas for Birds in Europe.

traditional means, like expert judgement. Their weakness lies in the confrontation between algorithmic simplification and real life. Social, economic and political factors often dominate over biological in protected area placement[20]. One frequent outcome of real-world pragmatism is that protection is put in locations considered sub-optimal by decision-support tools, for example those with less biological or economic value. To achieve the same aggregate benefit, more extensive real-world networks are required compared to those produced by narrowly efficient optimisation methods. Objectives that could on paper be achieved with 25% protected area coverage are likely in practice to require 30 or 40%. What happens in the part of the planet outside of protected spaces also matters when considering required coverage. If surrounding areas are not subject to good management and the underlying causes of biodiversity loss are not addressed, protected spaces will have to work harder to deliver the expected benefits and coverage could even be higher.

7. Protected spaces and human rights can and must co-exist

Protected area establishment has, from the outset, been associated with human rights abuses, notably the forcible displacement of indigenous peoples[21]. It is therefore unsurprising that human rights and indigenous advocates have been among the more vocal critics of the 30x30 target (e.g. Survival International[vi]). Understandably, their criticisms are rooted in fear of repetition of historical injustices, as well as more recent rights infringements[21]. Much of the world's remaining wild land area, as well as being rich in biodiversity and critical natural capital, is inhabited by indigenous peoples. According to a recent study, indigenous peoples manage or have tenure over 25% of the world's land area and 40% of all terrestrial protected areas[22]. However, protected areas do not pose a unique risk to indigenous peoples as abundant examples show how habitat conversion to other economic uses, such as cattle ranching or soya in the Amazon, have violated rights and opportunities for indigenous peoples, often irreversibly[23]. By contrast, protected areas, established in ways that respect and involve local communities, can be protective of their rights, heritage and cultures[24]. Moreover, other effective conservation measures offer an opportunity to recognise areas outside the protected area estate that deliver conservation and societal outcomes through non-traditional conservation tools, and could include territories and areas conserved by indigenous peoples and local communities[25]. No matter how protected spaces are expanded, human rights of all communities should be respected, and approaches should aim to increase inclusivity of land and sea conservation and strengthen co-management towards shared outcomes[25].

Research shows that many of the benefits of protected areas are delivered locally, with examples being fisheries enhancement, ecotourism, recreation and improvements in air quality. Some benefits are distributed more widely and are important at regional, national and international levels. For example, protecting the biodiversity and natural wonder of the Great Barrier Reef are important to the whole global community as well as those that live nearby or rely on the area. While locals can expect to benefit disproportionately from protected areas, they also disproportionately shoulder the costs, such as foregone opportunities for some uses of land or sea, and the expense of management. For some people, economic benefits from not instigating protection are lucrative, but the world needs a balanced portfolio of exploitation and protection, so cost-sharing mechanisms must be sought to reward local communities for wider gains in support of national and international objectives. Examples of cost sharing mechanisms include endowments, debt for nature swaps, or trading of carbon credits[26]. The flow of such financial benefits to local communities and indigenous peoples remains insufficient, meaning new and improved instruments are required.

[vi] https://www.survivalinternational.org/news/12570

8. Whatever target we choose will require continual scrutiny and possible revision

COP15 may not be the final time the target for protected areas and other effective conservation measures is revised. The present upward revisions of the 10% and 17% targets are due to new science as well as increasing awareness of the urgency with which we need to address biodiversity loss and climate change. There is already a credible scientific case for raising the target to 50%, or Half Earth as it is known[27]. The science around 30% does not contradict this higher number, saying instead that we need to protect 'at least' 30%. If more protection is added above 30%, some associated benefits may grow further. For example, research suggests that in the sea fisheries benefits from protected areas would be optimised at around 40% coverage[1]. Higher targets would also be necessary if management is insufficient, protection level too low or if we fail to grapple with the underlying causes of biodiversity loss. Qualitative elements may need to be strengthened as we learn more about what works and why. Any target aiming to address societal challenges will need to be revisited in the future based on new evidence, observed performance and revised objectives. The world and our understanding and experiences of it is constantly evolving. We should always look to re-evaluate our priorities and how we achieve them as it does, making sure that we achieve the best possible outcome for nature as well as ourselves.

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