Protected area targets post-2020

OVERLINE

Protected area targets are needed to achieve biodiversity goals.

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In 2010, Parties to the Convention on Biological Diversity (CBD) adopted the Strategic Plan for Biodiversity 2011–2020, and its 20 Aichi Biodiversity Targets, to catalyze national and international conservation efforts and reverse negative biodiversity trends. With the plan nearing an end, and attention turning toward a post-2020 biodiversity framework, it is timely to assess the strengths, weaknesses, and effectiveness of the Aichi Targets. Target 11, concerned with establishing effective and representative networks of protected areas (PAs) by 2020, has attracted considerable interest, due to widespread recognition of the pivotal role that appropriately situated and well-managed PAs have in conserving biodiversity (1). Substantial advances have been made toward the ar- eal components of Aichi Target 11, with the PA estate increasing by 2.3% on land and 5.4% in the oceans since 2010, and now covering 15% of land and inland freshwater globally and 7% of the oceans (2). However, species population abundance within and outside PAs continues to decline (1), the placement and resourcing of the majority of PAs has been poor (2, 3, 4) and over half of PAs established prior to 1992 have suffered increasing human pressure (5). We discuss four problems with Aichi Target 11 that have contributed to its limited achievement and propose a formulation for a target for site- based conservation beyond 2020 aimed at overcoming them.

PERVERSE PERCENTAGES

Aichi Target 11 calls for effective conserva- tion of 17% of land and inland waters and 10% of coastal and marine areas, and many countries have used these numbers as the sole basis for describing their progress, in- stead of reporting the biodiversity impacts of conservation areas. While some have argued that percentage targets have motivated countries to designate more PAs, there is no evidence for this. In fact, the rate of designa- tion and total extent of additional PAs between 2010 and 2014, after establishment of the Aichi Targets, was half that in the previ- ous five years (3). Focus on the percentage coverage of PAs generates perverse out- comes (6), with many new PAs being estab- lished in locations that are disproportionately unimportant for biodiversity (3) This pattern of protection of remote areas, often very large but not immediately threatened and with little conservation value, extends to the oceans (7). Continuing to protect areas of low opportunity costs for human uses, es- pecially agriculture, in order to cover 17% of land, will have negligible biodiversity bene- fits (2, 3, 8). By contrast, if PAs were strategi- cally sited to protect underrepresented threatened species, 30 times more species could be adequately represented with the same extent of PAs (8).

Moreover, thousands of PAs, many of which are important for conservation (1), have been downsized or degazetted (no longer protected by law or formal agreement) (9). Targets that are set around total percentage area legitimize such downsizing and degazettment if an equal amount of less important area for conservation is protected elsewhere. Finally, percentage area targets disregard the quality of what is being repre- sented, with degraded ecosystems given the same value as those that are still functionally intact (and therefore more valuable from a conservation perspective).

WHAT COUNTS AS PROTECTED?

Many PAs are inadequately managed or re- sourced (1), do not abate any of the threats to their biodiversity (5), and as such are simply ‘paper parks’ that do not meet the PA defini- tion “managed for the long-term conserva- tion of nature”. Such areas are currently given equal value to those PAs that are well- sized and well-managed, which inflates the progress nations are apparently making towards Aichi Target 11.

To improve outcomes and avoid designa- tion of “paper-parks”, Aichi Target 11 re- quires PAs to be “effectively and equitably managed”. A large database of information relating to Protected Area Management Ef- fectiveness (PAME) now exists, and PAME scores appear to be increasing over time (10). However, they are marginally corre- lated with biodiversity outcomes, measured as animal population trends (11). This is not surprising: PAME metrics are not measures of biodiversity outcomes (status trends) but rather inputs (staff and equipment) and outputs (law enforcement, type of management) (12). This suggests that current management effectiveness metrics are not a good surro- gate for biodiversity outcomes, and that the desired biodiversity outcome should be an integral part of a site-based conservation tar- get, with associated indicators.

REPRESENTATIVE OF WHAT?

Target 11 requires the PA network at all scales from national to global to be ecologi- cally representative, with recommendations that ecoregions, which contain characteris- tic, geographically distinct assemblages of natural communities and species, are the ap- propriate level of representativeness. While ecoregion representation within PAs in- creased from 1954 to 2013 (13), species rep- resentation increased much less (3). Increas- ing ecoregional representation does not equate to increasing species representation because ecoregions are too broad to capture variability in species composition and ende- nomenclature (4), as well as other core elements of biodiversity as defined by the CBD, such as genetic variation and ecological and evolu- tionary processes. To be truly representa- tive, site-based conservation targets should encompass all elements of biodiversity.

DO NATIONAL TARGETS ADD UP?

The Strategic Plan was designed to be a flexi- ble framework allowing nations to deter- mine their own implementation actions and ambition based on the local and national opportunities. However, a common challenge for all international agreements is interpret- ing targets at the national or sub-national
level and allocating responsibilities to meet
global targets. This was especially difficult
elements of Target 11 related to repre-
sentation, coverage of important biodiver-
sity areas, and connectivity, for which a uni-
versal percentage across nations would have
been inappropriate in light of the unequal
distribution of biodiversity and of area-
based conservation needed to protect it.

A comparison of national interpretations
of Target 11 with the amount of additional
PAs needed in order to meet particular com-
ponents of the target found that 35 of 79 na-
tional PA commitments were insufficient to
meet a subset of target components (4). This,
we argue, is due to the difficulty in partition-
ing the global ambition of Aichi Target 11 at
the national level. Targets and indicators
need to be scalable across biogeographic and
administrative levels, and should be explic-
itly quantified at the national scale so that na-
tional ambitions and contributions can be
summed to assess the total global ambition
and achievement.

A NEW PROTECTED AREA TARGET

These four shortcomings of Aichi Target 11
may have contributed to global biodiversity
loss, by shifting attention away from effec-
tive protection of sites of global significance
for conservation, which continue to be
threatened. To overcome these shortcom-
ings, we propose an alternative approach for
a post-2020 PA target based on outcomes:
"The value of all sites of global significance
for biodiversity, including key biodiversity
areas, is documented, retained and restored
through protected areas and other effective
area-based conservation measures". By bio-
diversity value we mean all biodiversity ele-
ments (populations, ecosystems, ecological
processes), for which a site has been identi-
fied as being of global biodiversity signifi-
cance, which we argue could be kept in fa-
vorable conservation status (FCS).

Sites are individual units of land or sea
that can be managed individually by particu-
lar authorities or entities, for example, indi-
vidual PAs, or community-managed re-
serves. Manageability depends on the
specific socio-economic context of the area,
such that in some regions even relatively
large areas may be manageable (e.g., sites im-
portant for their ecological integrity but cur-
rently not immediately threatened by hu-
man activities).

This target focuses explicitly on the spe-
cific locations (areas delineated as actual or
potentially manageable units) that have
been identified as important for the persis-
tence of biodiversity. A global standard for
defining such key biodiversity areas (KBAs)
was recently published (14). The standard
specifies how sites can qualify as KBAs under
quantitative criteria relating to threatened
species and ecosystems, geographically re-
stricted species and ecosystems, ecological
integrity, biological processes (e.g. aggrega-
tions), and irreplaceability. It can be applied
through national processes to all macro-
scopic taxonomic groups and ecosystems.

While over 15,000 KBAs have been docu-
mented to date, sites have not been compre-
hensively identified for all taxa and ecosys-
tems. Filling these gaps is a high priority for
the coming decade. Given this, and the recog-
nition that further application of the stand-
ard may reveal that modifications are neces-
sary to identify sites of global significance to
biodiversity comprehensively, our proposal
is not restricted to KBAs and encourages ef-
flective conservation of all sites of docu-
mented global significance for biodiversity.
These could include sites systematically
identified for their global biodiversity im-
portance under national and international
legislation and conventions, for instance,
Ecologically or Biologically Significant Ma-
rine Areas (EBSMs) that have been identified
at the site scale, Natura 2000 sites in the EU,
natural and mixed World Heritage Sites
listed under the World Heritage Convention,
and Wetlands of International Importance
identified under the Ramsar Convention, or
sites of high ecological integrity and high bi-
odiversity importance with a quantitative ra-
tionale for their biodiversity significance.

The biodiversity value to be retained or
restored (if lost since the time of designation)
is, by definition, known and specific to the
area as it is defined by the criteria invoked to
identify the area as important for biodiver-
sity. This facilitates the assessment of pro-
gress towards the proposed area-based con-
servation target. For instance, in all Natura
2000 sites, habitats and species of European
Community Importance should be moni-
tored and maintained in FCS as defined by
the EU Habitats Directive. Guidelines to de-
fine habitats and species in FCS provide a
consistent monitoring and reporting frame-
work that could be replicated globally.

MONITORING AND REPORTING

The proposed target calls for systematic
monitoring across all important sites to de-
termine if the current management regime is
effective in retaining or restoring a site's bio-
diversity value. To some degree this can be
achieved through remote sensing (e.g. using
trends in tree cover to assess deforestation
and evaluate impacts on forest-dependent

species), while large networks of camera
traps, acoustic sensors, and other remote
sensing tools can monitor occupancy, abun-
dance, vegetation extent, structural composi-
tion and intactness, and threats to species
and ecosystems. Such methods can be com-
plemented by systematic in situ monitoring
approaches applicable across large networks
of sites. Reference values, systematic moni-
toring, and regularly updated status reports
exist for several networks of areas of biodi-
versity importance (e.g. for Natura 2000
sites in the EU), and there are historical data
to establish baseline and trends.

A potential challenge lies in identifying
appropriate indicators of progress towards
this target, noting that a given site could hold
multiple biodiversity elements defining its
global importance that are trending in oppo-
site directions. We propose two metrics to
track progress towards achieving biodiver-
sity outcomes: the mean distance from the
reference value for each element (measured,
e.g., using population abundance or habitat
extent and condition) and the proportion of
elements below reference value. These indi-
cators can be reported at multiple geo-
graphic scales, and aggregated taxonomi-
cally or by other ecological units, e.g.
ecoregions, functional groups, etc. The target
is achieved for a given site, country, ecore-
geomorph or globally, where all biodiversity ele-
ments are at least at their reference value in
the network of conservation areas.

In addition, we propose a third metric to
track progress toward the identification of
sites of global significance: Percentage of tax-
onomic classes and ecosystem types for
which KBAs and other sites of global biodi-
versity significance have been identified
comprehensively.

The target and indicators laid out here
are only concerned with outcomes, not im-
acts (commonly defined as the difference in
outcomes with and without a PA). This is an
important distinction that simplifies moni-
toring and reporting, as measuring the coun-
terfactual world without protection requires
experimental or quasi-experimental design
that may discourage or delay adoption of im-
pact-related targets and indicators without
providing added benefits to biodiversity
compared to an outcome-related target.
However, conservation actions taken within
or outside the network of sites of global sig-
nificance should be, as much as possible, de-
signed to maximize impacts.

ONE SINGLE CURRENCY

Unlike the current Aichi Target 11, achieve-
ment of this target is unlikely to have per-
verse outcomes (problem 1, above). For ex-
ample, the target could not be met if coun-
tries fail to resource or secure PAs ade-
ately, as it will expose ‘paper parks’ that are
protected in name only and do not retain
the biodiversity values for which they are
important. It will also ensure that detri-
mental downsizing or degazettement of sites
of significance for biodiversity influence the
potential to achieve the target. Importantly,
the target formulation is simple and less sus-
cceptible to misinterpretation. Our proposed
indicators also address the issue of partial vs.
complete coverage of important sites. The
value of such sites is unlikely to be retained
through protected or conserved areas that
incompletely cover each site, incontrolling
expansion of such areas to ensure the full
value is retained.

The proposed target and indicator set is
designed to motivate impact, while not being
prescriptive about the specific policies and
actions required (problem 2). Any form of
governance or management that provides
clearly defined, desired biodiversity out-
comes and ongoing monitoring of biodiver-
sity values may be appropriate.

PAs and Other Effective Area-Based Con-
servation Measures, which deliver positive
and sustained biodiversity outcomes, but
unlike PAs, are not specifically managed for
biodiversity objectives), can contribute to
achievement of this target (through comple-
tmentary networks and hence building on the
existing Target 11), but their effectiveness
must be documented and monitored rather
than assumed. Similarly, unlike Target 11,
our proposed target does not require speci-
fying particular desirable characteristics of
PAs such as spatial connectivity and social
equity; to be effective, area-based ap-
proaches must inherently address these is-
sues, but rather than focusing on the mecha-
nisms, which are context-dependent, the
target focuses on the outcomes.

This target recognizes the importance of
quality of habitat and the need for represen-
tation to occur across all levels of biodiver-
sity, from genes, to populations, species and
ecosystems and large-scale ecological pro-
cesses (problem 3). The target has one single
currency, which is the biodiversity value
across the network of important sites, where
the value is identified and monitored for
each individual site. Progress towards the
target can therefore be assessed at any geo-
graphic and administrative level (problem
4). Trends in progress towards the target are
driven by the loss, retention or restoration of
this biodiversity value.

To achieve the goal of halting biodiversity
loss, our proposed target will need to be
complemented by others; in particular, ad-
dressing the retention of ecosystem extent
and condition (as an inheritor to Target 5),
of ecosystem services (as an inheritor to Target
14), and of climate change mitigation (as an
inheritor to Target 15), which we suggest
should undergo similar revision processes.

This target naturally links area-based con-
servation measures with biodiversity
status and trends that they are meant to
maintain and improve. It allows nations to
act locally but frame their actions within a
global biodiversity agenda. Our proposed
target and indicators also allow nations to set
national and regional targets aimed at the re-
tention of biodiversity of importance at sub-
global levels. Indeed, a broader alternative
formulation could be “The value of sites of
significance for biodiversity, including all key
biodiversity areas of international im-
portance is documented, retained and re-
stored [...]”. This would encourage buy-in by
the widest possible set of countries and rec-
ognise that sites of international (but not
necessarily global) importance play an im-
portant role in national conservation strate-
gies and are already used by nations to as-
sess progress in PA coverage under
Sustainable Development Goal 15.

The evidence-base accumulated since the
adoption of the 2010-2020 strategic plan
suggests that specific, measurable, ambiti-
ous, realistic, unambiguous and scalable
targets are more effective and associated
with greater progress (15). We therefore ex-
pect that this target would galvanize greater
and more effective and efficient efforts than
previous area-based conservation targets or
alternative proposals that are not based on
conservation outcomes.

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Proportion of features at reference level: 0/2 = 0  Mean distance from reference level = 15.5%.

**Figure 1** An example of how the biodiversity value of a Key Biodiversity Area (the Wetlands of western Almería, Spain, highlighted in green in the map), can be monitored over time. The site qualifies as a KBA because of its global significance for two bird species: Audouin’s gull *Larus audouini* under KBA criterion D1a (≥1% of the global population size supported during one or more key stages of its life cycle, in this case the non-breeding season) and white-headed duck *Oxyura leucocephala* (globally Endangered according to the IUCN Red List) under KBA criteria A1c (≥0.1% of the global population and ≥5 reproductive units, i.e. pairs) and D1. Source [http://datazone.birdlife.org/site/factsheet/wetlands-of-western-almer%E2%80%93IBA-IBA-Spain/details](http://datazone.birdlife.org/site/factsheet/wetlands-of-western-almer%C3%ADa-iba-spain/details). Photos: Ron Knight & Massimiliano Sticca, Flikr.