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Supplementary Materials for

The positive impact of conservation action

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The PDF file includes:

Materials and Methods
Figs. S1 to S6
Tables S1 to S5
References

Materials and Methods

Literature search

We conducted a Rapid Evidence Assessment following the steps outlined in (*45*). We searched Web of Science in May 2021 for all papers published through 2020 using a standardized search protocol and set of keywords separated by Boolean operators. The structure of the Boolean search query for each category of intervention was as follows:

> (*response search terms*) AND (*pressure/state search terms*) AND (*scope search terms*) AND (*impact search terms*)
>
> with individual search terms in parentheses separated by the operator OR.

The *response* search terms included specific actions to address threats to or conserve biodiversity (e.g. eradication, management). The *pressure/state* search terms captured the specific pressure on biodiversity (e.g. overfishing, agriculture) or the specific aspect of biodiversity (e.g. threatened species, genetic diversity) that the response was targeting. Response and pressure/state keywords were chosen to correspond primarily with Aichi Targets 5-11 in the Strategic Plan for Biodiversity 2010-2020. Assessment of climate change mitigation, root causes and indirect drivers of biodiversity loss, ecosystem service benefits of conservation, and enabling conditions, were beyond the scope of this review.

The *impact* search terms were designed to identify papers that robustly evaluated the impact of conservation action (e.g. impact, counterfactual, outcome). These were standardized across all of the intervention categories, while the response and pressure/state search terms varied by conservation intervention. The *scope* search terms (wildlife, biodiversity, nature) were only used for the pollution and climate change intervention categories, because of the very large number references falling outside the scope of this paper returned by the search terms when not using them (i.e. papers evaluating impacts of these interventions on humans rather than on nature).

Our paper includes co-authors with expertise in areas related to the different Aichi targets and these experts developed the keywords that they thought would be most appropriate. The full set of keywords employed under all searches is given in Table S2. Searches were conducted in English language.

Relevance screening

The literature searches returned an aggregated 33,225 hits. A team of reviewers (JWB, JLO, JC, SC, WF, JG, MH, JH-M, TL, ZM, SP, BP, KS, JES, KS, JW, SW), divided up by conservation intervention, examined the titles and abstracts of each returned reference to identify those that were assessing the impact of one or more conservation actions on biodiversity relative to a counterfactual or control indicating an absence of intervention. We considered the following study designs:

- Experimental – Studies that have random assignment to intervention and non-intervention (control) groups with replication;
- Quasi-experimental – Studies that do not have random assignment to intervention and non-intervention (control) groups but that account for any systematic differences between

them by using techniques such as propensity score matching to create comparison groups that have very similar ecological, geographic, socio-economic and institutional factors;

- Before-after-control-intervention (BACI) -- Studies using both before vs. after and control vs. intervention in their design but not that did not use statistical matching;
- Control vs. intervention -- Studies that compare the value of a variable in a control group to an intervention group at a particular time;
- Before vs. after -- Studies that compare the value of a variable after an intervention takes place to a pre-intervention baseline.

Thus, we grouped a variety of different reference points (true counterfactuals, experimental controls, alternative scenarios) together under the general grouping of 'counterfactuals' for the purpose of this study. Our dataset of studies goes back many years, and over that time the way that impact evaluation has been discussed (and counterfactuals labeled) in the literature has changed, further justifying a generalized approach to treating studies as using counterfactuals/controls.

To meet the criteria for relevance, each paper also needed to have one or more dependent variables measuring biodiversity state at the genetic, species, or ecosystem (habitat) level. For example, for species-level biodiversity we used abundance-based measures such as species biomass and density or rates of population change such as mortality rate and reproductive success. At the ecosystem level we used area-based measures such as vegetation cover, ecosystem extent and avoided deforestation.

After removing duplicates, a total of 1,265 papers returned by our Web of Science search met the criteria for relevance in our Rapid Evidence Assessment. This hit rate of 5% is on par with the <10% recommended for ecological systematic review (*46*), suggesting that our search terms were successful in reducing errors of omission (i.e. little relevant literature missed – high sensitivity), at the expense of generating many errors of commission (i.e. much irrelevant literature included – low specificity) which had to be filtered out by the team of reviewers. We used a large number of search terms, many of which are quite broad, in attempt to capture as much of the relevant literature as possible through the initial Web of Science search.

To capture more potentially relevant studies, we used a supplementary search strategy to identify any additional relevant studies that our initial search had omitted, gathering new relevant references until the numbers started to tail off. This involved scanning the (a) 'reference' and (b) 'cited by' lists of the papers found through the standardized Web of Science search for new sources, and (c) soliciting input from experts within the IUCN Commissions, in particular the Chairs of the relevant specialist groups of the Species Survival Commission (e.g. Climate Change Specialist Group, Sustainable Use and Livelihoods Specialist Group). This process yielded an additional 170 papers, for a total of 1,435 papers that went on to the next stage. A PRISMA diagram (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (*47*) for our Rapid Evidence Assessment is presented in Fig. S1.

<u>Meta-analysis criteria</u>

The 1,435 papers were then subjected to a full text screening to identify those that met the criteria for inclusion in the meta-analysis and to ensure consistency. The overarching criterion at this stage was the possibility of calculating a rate of change in the intervention and in a counterfactual or control representing no intervention.

Papers were excluded according to the following criteria:

1. No counterfactual (scenario or comparison group in which the conservation intervention did not occur);
2. No specific intervention, intervention(s) that are not conservation actions, or modeled interventions only;
3. Studies only measuring the impact of an intervention on people (e.g. human behavior, livelihoods) or on non-native species (e.g. invasive alien species) were excluded as our focus was native biodiversity other than people, corresponding to Aichi Targets 5-11. Studies only looking at species richness were also excluded. Local species richness is a poor measure of conservation importance because it is heavily driven by the commonest and most widely distributed species (*48*) and has been discredited as a biodiversity metric because of a lack of scalability;
4. Data reported for only one time point (or two time points in the case of before vs. after studies) or data averaged over the study timeframe, making it impossible to calculate rate of change;
5. Meta-analyses or literature reviews because they did not contain appropriate data needed for the calculation of rate of change and effect sizes;
6. Global analyses, to avoid double counting with papers looking at impact of interventions at sub-global scales;
7. Overlapping geography, timeframe or data with other papers assessing the same intervention; in these cases, we took the study with the more rigorous study design or that was more comprehensive, to avoid double counting;
8. Data processed into own metrics, because there was too much room for error in calculating rate of change;
9. Unclear start or end dates, and therefore study duration;
10. Published in languages other than English.

Although several of these criteria were applied during the first evaluation stage, for relevance (criteria 1, 2, 10), sometimes it was not possible to exclude papers based on these criteria until the full texts were screened. A total of 188 papers met the criteria for inclusion in the meta-analysis; two papers were later excluded because of a division by zero issue in the rate of change formula or effect size could not be calculated, as described below, leaving 186 papers. Of these, 133 papers were found by our keywords in the Web of Science search and 53 were from our supplemental search (Fig. S1).

Data extraction

The following information was extracted for each study by a small team (PFL, JWB, MNF, MGM, JLO) and then double checked and improved where needed by the lead author for consistency: intervention category, specific intervention, dependent variable (e.g. forest cover, fish biomass), level of ecological organization of biodiversity targeted, study design or type of comparison, geographic focus (UN region and country), start year, end year, values of the dependent variable at the beginning and end of study, display item or page number from which data were extracted, and sample size of the intervention. Our dataset also transparently states what constituted the counterfactual for each comparison (*49*). We used the open access tool WebPlotDigitizer (*50*) to extract precise data from figures where relevant.

Intervention sample size was determined as the number of independent interventions: for example, the number of protected areas or number of invasive species removal sites. Counterfactual sample size was determined as the number of independent comparisons to the intervention. Where a sample size was not given or was not clear, we assumed a sample size of 1, to be conservative (affected $N_{studies}$=6). Where studies compared protected areas to the intervening landscape, we assumed the counterfactual sample size to be the number of protected areas.

Many of the papers assessed the impact of one or more interventions on multiple dependent variables (e.g. bird abundance, habitat extent) and/or on multiple species or taxonomic groups. These were extracted as separate trials nested within the study. However, when the paper reported more than one dependent variable measuring essentially the same biodiversity element in different ways that were directly proportional to each other (e.g. number of individuals and biomass), we extracted data only for the dependent variable that we considered the most appropriate measure of biodiversity at the species, ecosystem or genetic level using our expert judgment.

Where papers reported data for an aggregated group (e.g. fish density) and for individual species (e.g. density of species X), we used the aggregated measurement. We did not aggregate data if the paper did not, in order to avoid introducing errors. Where studies used two different methods or data sources to measure the same dependent variable, we took the more rigorous method or the higher resolution data (e.g. matched versus unmatched data).

If multiple counterfactuals were used, we extracted data for the most rigorous comparison according to our expert judgement, for example, if the comparison used matching to define comparison groups. If there was insufficient information to evaluate this, we extracted the data as separate trials (i.e. one intervention compared to multiple counterfactuals). Where protected area studies used more than one buffer zone distance to create a family of counterfactuals, we used the one with the shortest distance to the protected area as our counterfactual. The rationale was that the shorter the buffer distance from the protected area, the proximity would mean a lower likelihood that the ecology and socio-economic conditions would differ substantially, typically making this the most representative counterfactual. While we acknowledge the likely importance of leakage of impacts outside of protected areas, we make the assumption that study authors have in most cases chosen buffer distances that allow leakage effects to be at least partially taken into account.

Where the start and end dates were reported as a range (e.g. 1995-2000 and 2000-2005), we took the midpoint of each time window (e.g. 1997.5 and 2002.5).

<u>Rate-of-change calculation</u>
For each row of data, where possible we computed the relative annual rate of change (C_R) in the intervention and in the counterfactual (*19*):

$$C_R = 100\frac{\left(\frac{V2 - V1}{V1}\right)}{d}$$

where V1 and V2 are the values of the dependent variable at the start and at the end of the study, respectively, and *d* is the duration of the study in years.

Where rate of change could not be calculated for either the intervention or the control because the starting value was zero, creating a division by zero problem, these comparisons were excluded from the analysis. This affected 85 trials of data across 18 papers.

For most of the quasi-experimental papers, which used statistical techniques such as matching to identify appropriate comparison groups, the comparison between the intervention and counterfactual was presented as a single value representing the average treatment effect on the treated, such as avoided deforestation (*51*). The figures represent the expected difference in the dependent variable between the intervention and the counterfactual representing no intervention. Because we deemed these among the most statistically rigorous study designs in our dataset, and thus rather than exclude these 12 papers (31 trials), we set the counterfactual rate of change to zero and thus could use the recorded percent change/duration of the difference between the treatment and matched control as the rate of change for the intervention.

Similarly, for another 27 papers (103 trials), the start and end values of the dependent variables were not provided, preventing us from calculating relative annual rate of change using the formula above, but data on percent change divided by duration or rate of change calculated using a similar formula representing linear change over time were provided for both the intervention and the counterfactual (we retained the one qualifying study that used geometric rate of change because it did not affect the results). In these cases, we inserted these figures directly as the rate of change.

Excluding those trials of data with a division by zero problem meant that two papers dropped out entirely. One paper with one trial also dropped out because the sample size and study duration were both one, which meant that an effect size could not be calculated. Our final dataset thus included 665 trials of data from 186 papers.

In both the calculation of rate of change, and of effect sizes (see below), we defined the effect direction as positive for cases where the dependent variable was more favorable under the intervention than the counterfactual, and negative where the dependent variable was less favorable under the intervention than the counterfactual.

As described in the main paper, we report the simple proportion of papers fitting into impact categories (i.e. absolute positive impact, relative positive impact, relative negative impact, absolute negative impact). However, the results in main paper give more focus to effect sizes, because effect sizes are more robust than the simple assessment of the proportion of studies showing positive or negative outcomes, as such ‘vote counting’ can yield biased results (*52*). Nonetheless, we defined absolute positive impacts of conservation action when interventions generate gains in the state of biodiversity compared with a counterfactual in which biodiversity declines, stays the same, or improves to a lesser degree than the intervention (Fig. 1a). We define relative positive impacts of conservation action when biodiversity declined, but the intervention slowed the decline compared with the counterfactual (Fig. 1b). Conversely, we define relative negative impacts of conservation action when biodiversity improves, but the counterfactual reveals greater improvements than the intervention (Fig. 1c), and we define absolute negative impacts of conservation when biodiversity declines in the intervention, while it improves, stays the same, or declines to a lesser degree in the counterfactual (Fig. 1d). These four categories are mutually exclusive.

Meta-analysis

To assess the efficacy of conservation interventions, we calculated the Hedges' g effect size of the standardized mean difference in the rate of change between intervention and counterfactual.

We calculated Hedges' g (*52,53*) using:

$$g = \frac{\bar{X}_{counterfactual} - \bar{X}_{intervention}}{s_{pooled}} J$$

s_{pooled} is defined by:

$$s_{pooled} = \sqrt{\frac{(n_{counterfactual} - 1)SD^2_{counterfactual} + (n_{intervention} - 1)SD^2_{intervention}}{n_{counterfactual} + n_{intervention} - 2}}$$

J is defined by:

$$J = 1 - \frac{3}{4(n_{counterfactual} + n_{intervention} - 1)}$$

Where:

g	Effect size
$\bar{X}$	Mean of the sample rate of change
SD	Standard deviation of the sample rate of change
n	Sample size
J	Bias correction
s_{pooled}	Pooled standard deviation

We used a fully random-effects model because we did not expect there to be one true effect size, due to the diversity of metrics used across the studies (e.g. different studies investigated dependent variables and interventions). The model thus accounted for both within- and between-study variance (*52, 53*). As many studies provided multiple trials of data, we accounted for the potential non-independence of these by nesting them within each study, computing a mean effect size for each study, with the exception of one study which spanned two intervention classes.

As we calculated the rate of change from two time points (the start and end of the study), to enable us to calculate Hedges' g, we also conservatively estimated the standard deviation of the rate of change from the square root of the rate of change divided by the sample size, doing so separately for intervention and counterfactual. In 18 trials, the rate of change was zero, and therefore the standard deviation of the rate of change was also zero, so Hedges' g could not be calculated without an adjustment. Therefore, to enable us to calculate an effect size, we changed this to 0.01 because imputing such values outperforms omitting such data (*54*). To check for the sensitivity of this approach, we also conducted our effect size analyses with these trials removed (Fig. S4), which demonstrated that imputing these zero values did not affect the findings of our study, because, even with these omitted, the results are more or less unchanged (only minor differences in the values and the figure looks near identical). We weighted the studies by their duration, with more weight given to studies conducted over longer timeframes. We defined the effect direction as positive for cases where the dependent variable was more favorable under the intervention than counterfactual, and negative for cases where the dependent variable was less favorable under the intervention than counterfactual. Therefore, a positive effect size indicates that the intervention performed better than the counterfactual, in terms of the outcome for biodiversity. Effect sizes were considered significant if the confidence interval did not overlap zero (*52*, *55*).

We firstly calculated the mean effect size for all studies (Overall). Total heterogeneity in this overall model was high (Q_t=56419, df=193, p<0.001, I^2 = 99.7), indicating that nearly all of the observed variance in effects are due to differences in conservation outcomes among studies, and therefore further exploratory analyses of the moderators were warranted. So, next we calculated the mean effect size for each of the moderator variables (intervention type, ecological organization, geographic region, and study design). Where moderators were represented by five or fewer trials, we did not display these on the effect size figures (Fig. 2), however all studies contributed to the calculation of the Overall effect size.

We conducted meta-regressions of effects sizes against year of publication to explore whether the impacts of conservation action have increased over the last century (Fig. 4), and also with duration of study to explore potential relationships between study duration and conservation impact (Fig. S3).

We undertook several sensitivity analyses to test the impact of different methodological considerations on our results, specifically, imputing the rate of change when it was zero in either the intervention or counterfactual; nesting trials within studies; and undertaking a supplemental literature search (Fig. S4). Our results remain largely unchanged.

We conducted a cumulative-meta analysis of effect sizes, sorting the studies in chronological order by publication date. The analysis calculates an effect size for the first study alone, then adds the next study (in order of publication year), and then recalculates the mean effect size, doing so until all studies have been included (*52*, *53*). This showed that our results are affected less and less by the addition of newer studies. Thereby, sorting the studies chronologically shows that effect sizes begin to stabilize after studies published from approximately 2011 onwards (Fig S5).

To test our dataset for publication bias, we followed Nakagawa et al. 2017 (*47*). We calculated the Classic (Rosenthal's) Fail-safe N which was 1,280, meaning that we would need to locate and include 1,280 trials with an effect size of zero in order to overturn the result (*53*). We also plotted two types of funnel plot and calculated the associated Kendall's tau (Fig. S6). The symmetrical nature of our funnel plots, combined with the Fail-safe N, lead us to conclude that any publication bias in our dataset was minimal.

All meta-analyses were conducted in Comprehensive Meta-analysis v 4.0 - Biostat (*56*) and all of our forest plots were developed using that software and edited for visual aesthetic in graphical software. We used GGPLOT2 in R to make our scatterplots.

Data limitations

The geographic bias of studies located by our search protocol (Fig. 3) is unfortunately typical in the conservation science literature (*57*) and likely reflects the concentration of conservation resources worldwide (*40*). However, our literature search was conducted in English, and so we may have missed relevant papers published in other languages. Studies in our review were strongly biased towards terrestrial over marine and freshwater ecosystems. Clearly, more effort is needed to evaluate the impact of conservation interventions in aquatic systems and in regions outside of North America and Europe.

We were unable to locate every relevant study assessing the impact of conservation action using a counterfactual approach, likely because our keywords did not comprehensively cover the universe of conservation actions undertaken to conserve biodiversity. Notable gaps in our dataset include studies evaluating species-specific conservation actions before and after a particular intervention (e.g. reintroduction), efforts to control invasive pathogens, and legislation and policy to reduce habitat loss. We also used impact keywords that were most likely to return studies that compared one or more conservation actions using a counterfactual approach such as 'impact', 'outcome; and 'counterfactual', and we did not include keywords used in some other studies such as 'effectiveness' or 'success' (*15*) which were not specific enough for our analysis.

Finally, because this was a Rapid Evidence Assessment, we only evaluated the papers found directly through our search protocol, and therefore we did not evaluate the reference lists of all studies included in our analysis. As described above, scanning of the reference lists to find additional papers was done where possible at the stage of relevance screening. Similarly, we did not evaluate individual studies considered under the meta-analyses returned by our search protocol unless those individual papers were themselves returned through our own keyword search; the rationale being that we considered it more appropriate to maintain fidelity to the search method we designed, over which we had control and to ensure replicability of our results. In any case, these published meta-analyses were used during the interpretation and discussion of our results, so the information contained in those was not entirely excluded.

These data limitations are mitigated by a number of factors including (a) that our dataset is large, containing data from 186 studies and 665 trials; (b) we utilized strict and defensible inclusion criteria for studies; (c) our results are not impacted by the methodological considerations evaluation (Fig. S4); and (d) the effect sizes of our meta-analyses (Fig. 2) are often large and significant.

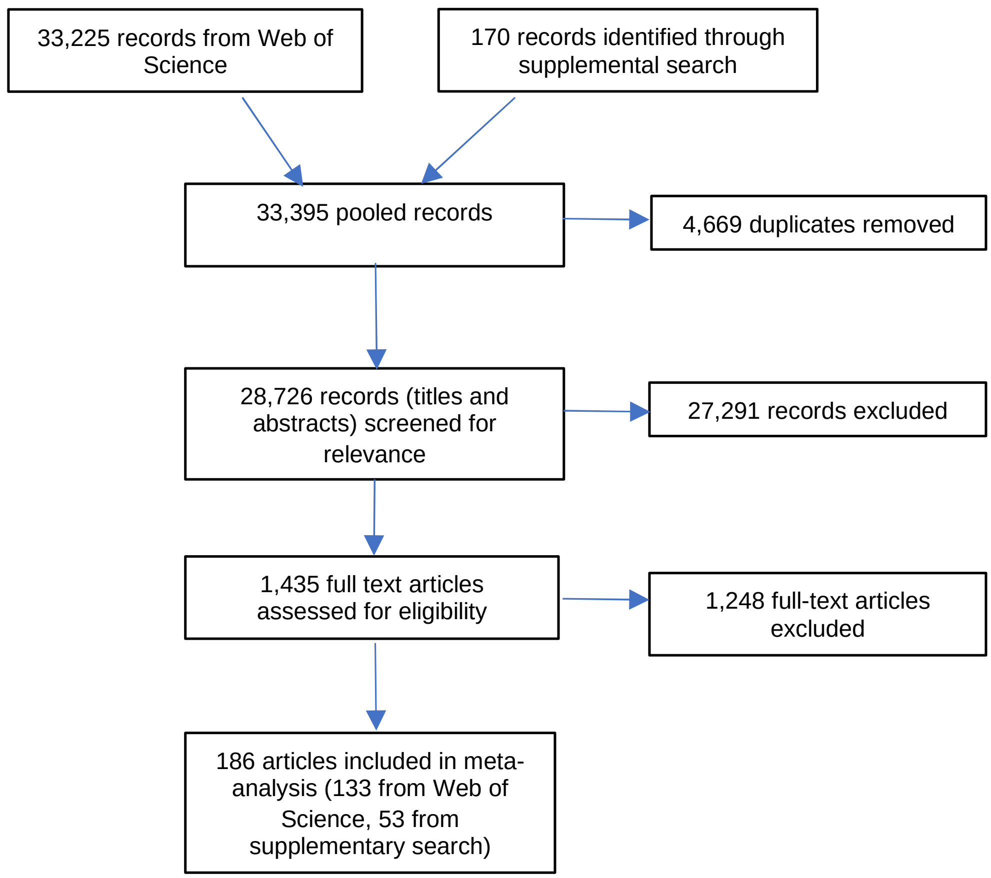

Fig. S1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram. For details of the search approach see Methods.

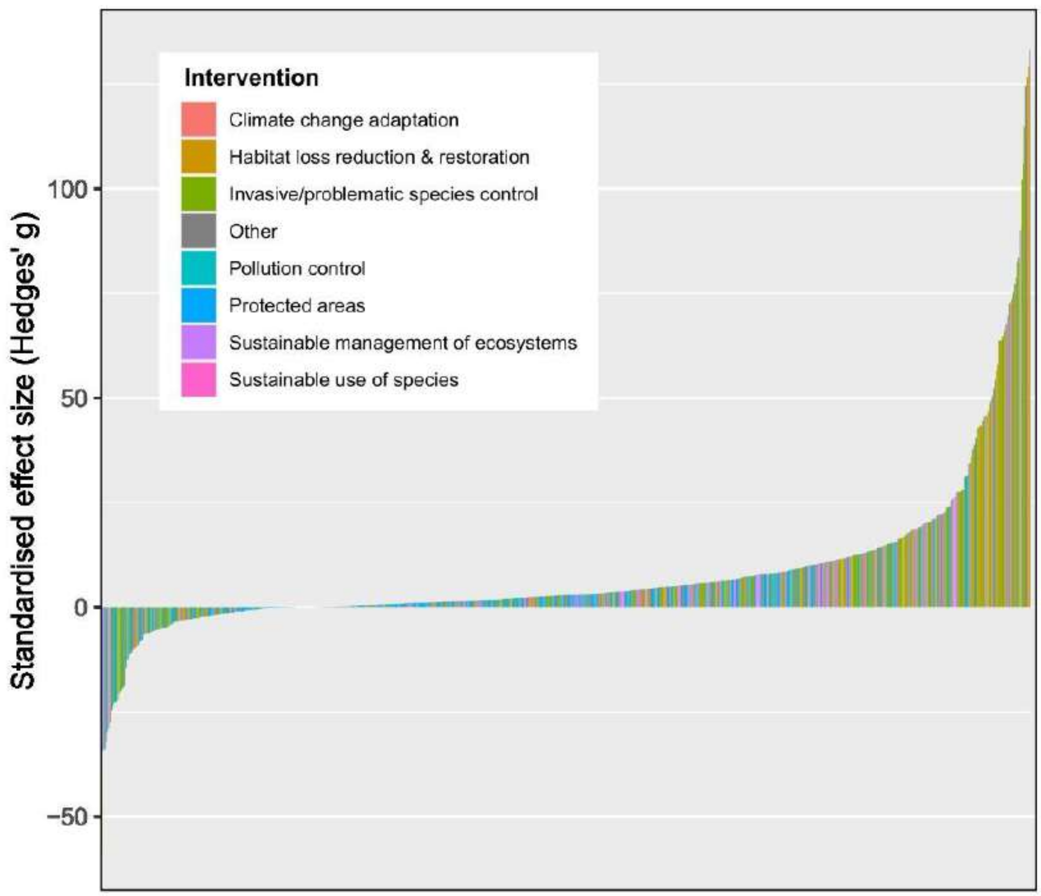

Fig. S2. Standardized effect size (Hedges' g) for each trial colored by intervention type. Above the zero line indicates a better outcome for biodiversity compared with the counterfactual.

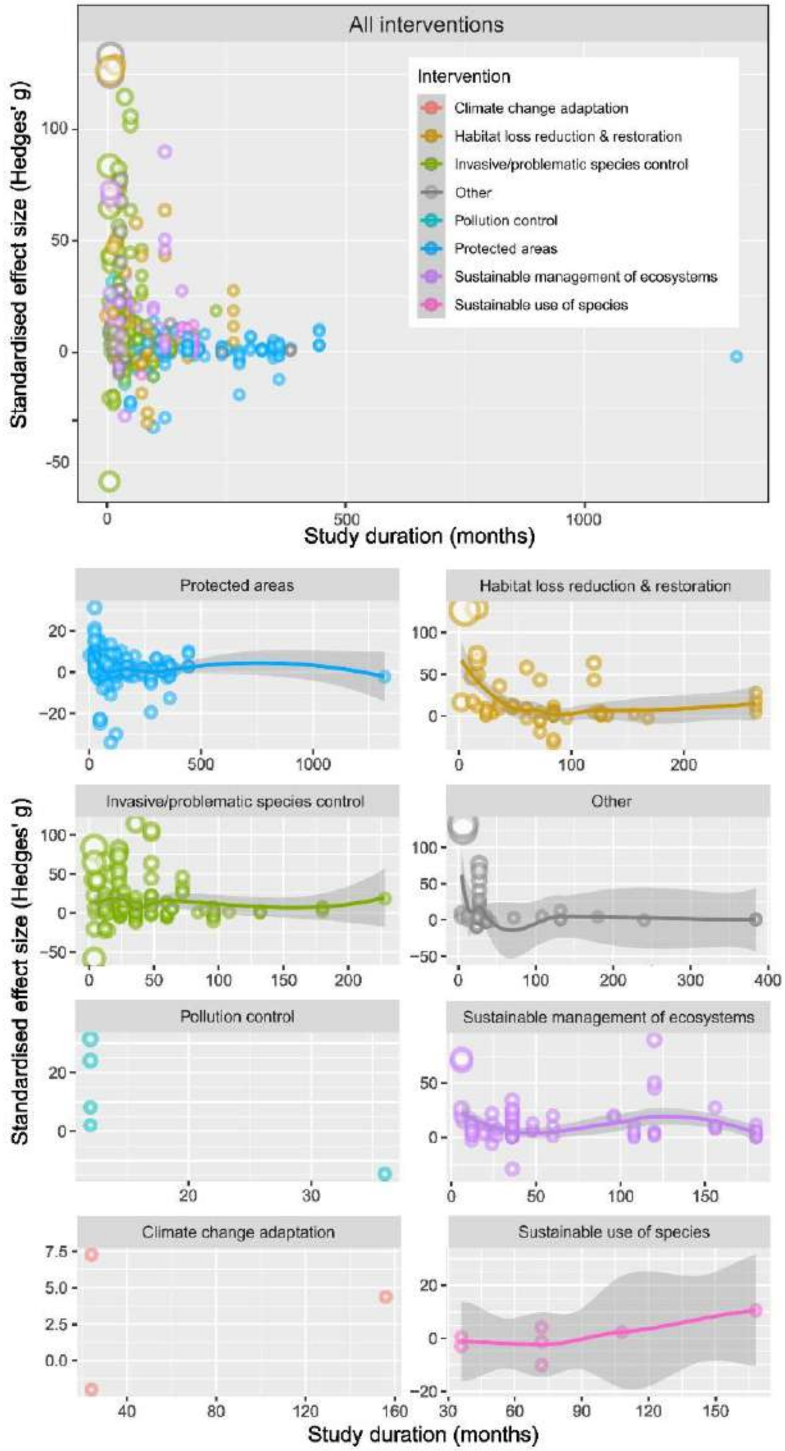

Fig. S3. Effect size vs. study duration. Relationship between the standardized effect sizes (Hedges' g) and study duration (months) for all trials (upper) and by intervention (lower panels). Points are colored by intervention, and trendlines in the lower panels use polynomial regression for locally estimated scatterplot smoothing (LOESS). The sizes of the points represent the trial variance, with larger points showing greater variance.

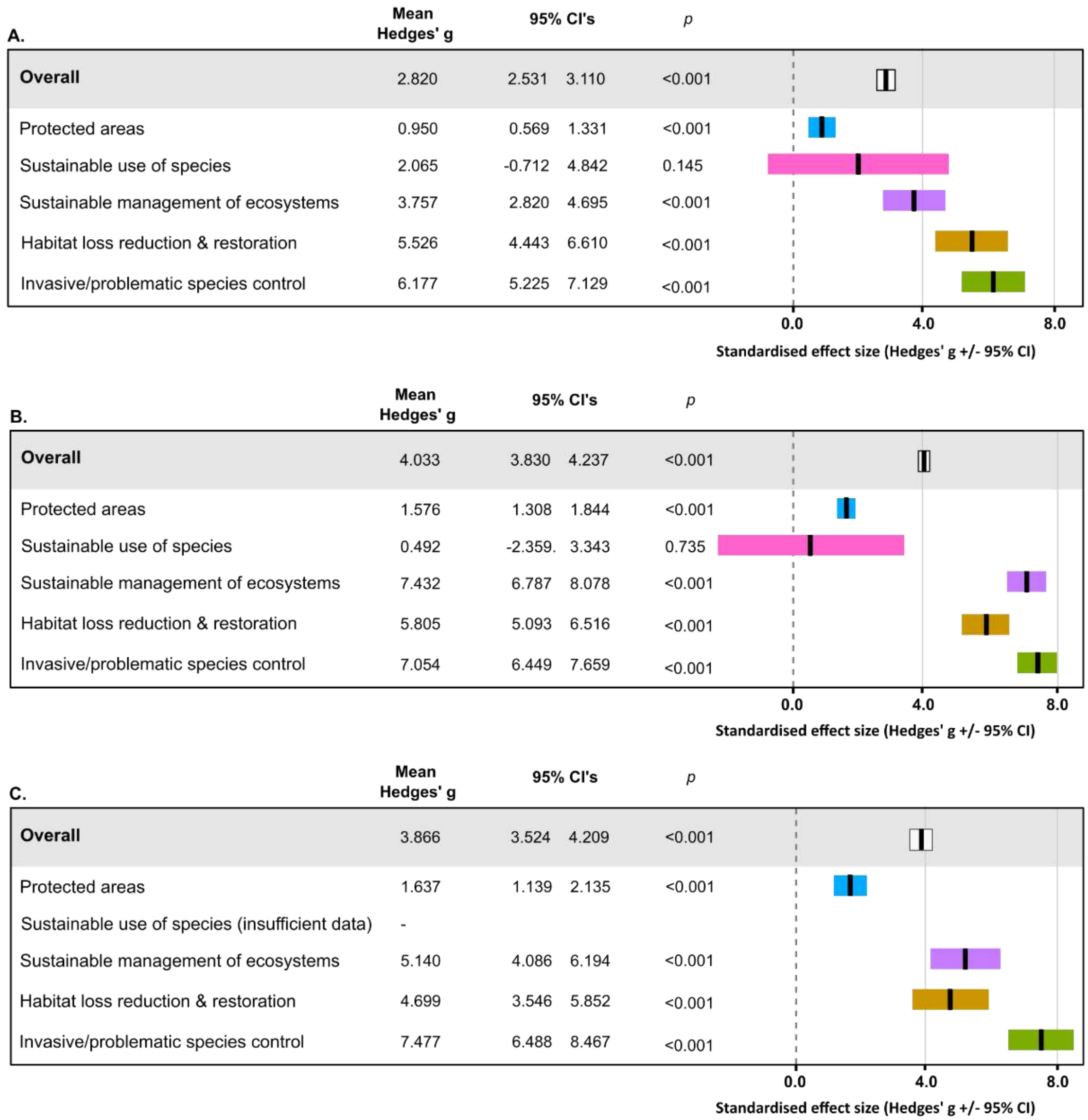

Fig. S4. Sensitivity analysis of effect sizes by intervention. **(A)** Omitting trials where we imputed the rate of change, or standard deviation of the rate of change because it was zero; (B) with only one randomly selected trial from each study; and **(C)** omitting studies that were located through our supplemental literature search. Shows effect sizes of conservation interventions Overall, and by intervention class separately. Mean standardized effect size (Hedges' g) is indicated by the vertical line, and 95% confidence intervals are represented by the colored bar width. Where the confidence intervals do not overlap zero, the effect size is significant. Vertical dashed lines show zero effect, whilst effect sizes to the right indicate that the intervention is more successful than the counterfactual. Interventions with five or fewer trials (pollution control, climate change adaptation, sustainable use of species (in C), and those classified as 'other'), are not shown, but do contribute to the calculation of the Overall effect size.

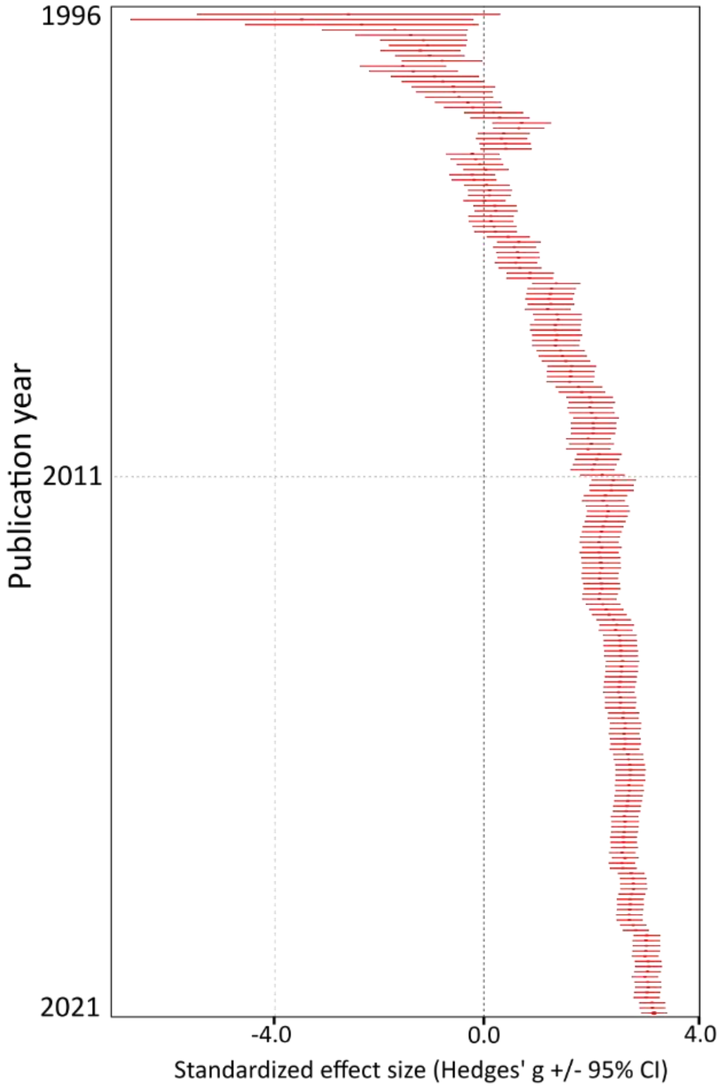

Fig. S5. Cumulative meta-analysis of study effect sizes ordered by publication year.

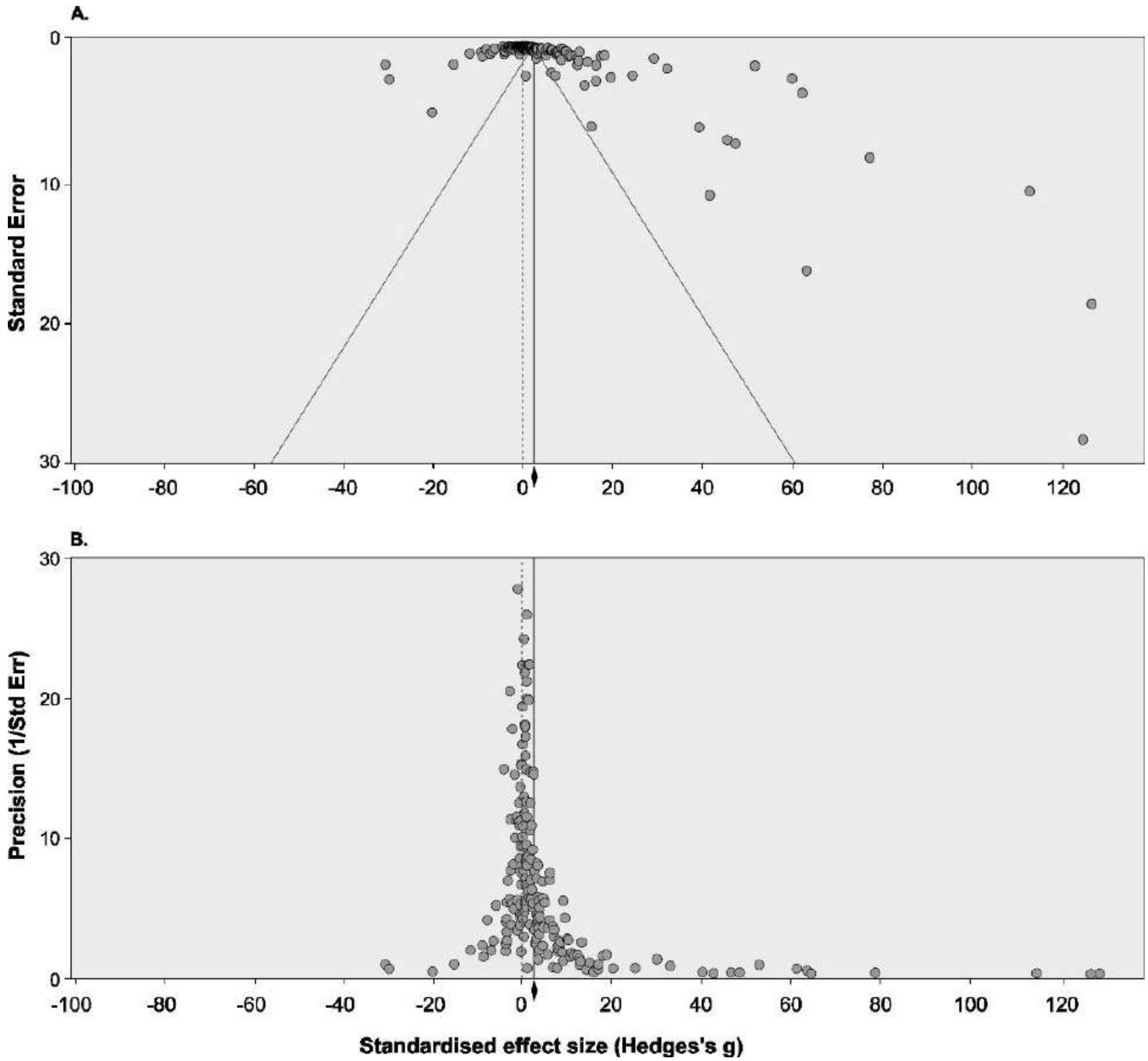

Fig. S6. Assessments of publication bias in the meta-analysis. A. Funnel plot of the relationship between the mean effect size and standard error for each study. B. Funnel plot of the relationship between the mean effect size and the precision of each study. Kendall's tau = 0.14, p = 0.004. Solid vertical line and diamond show the mean Overall effect size, dashed line shows zero line.

Table S1. Alignment of intervention types with intergovernmental environmental agreements.

Intervention category	Aichi Biodiversity Targets (Strategic Goals B and C)	Kunming-Montreal Global Biodiversity Framework Targets & Goals	Sustainable Development Goal (SDG) Targets	Other relevant conventions
Habitat loss reduction & restoration	5, 14, 15	1, 2, Goal A (in part)	6.6, 14.2, 14.5, 15.1, 15.4	UNFCCC, UNCCD, CMS
Sustainable use of species	6	5, 9	14.4, 14.6, 15.7	CITES
Sustainable management of ecosystems	7	10	15.2, 15.3	UNFCCC, UNCCD
Control of pollution	8	7	12.4, 14.1	Rotterdam, Basel, and Stockholm Conventions on chemicals, Minamata Convention on Mercury
Eradication and control of invasive alien (and problematic native) species	9	6	15.8	International Plant Protection Convention
Climate change adaptation	10	8	14.3	UNFCCC, UNCCD
Establishment and management of protected areas	11	3	6.6, 14.2, 14.5, 15.1, 15.4	Ramsar Convention on Wetlands, World Heritage Convention
Species conservation	12	4 (in part), Goal A (in part)	15.5	CMS, CITES, Bern Convention

Genetic conservation	13	4 (in part), Goal A (in part)	2.5	International Treaty on Plant Genetic Resources for Food and Agriculture

Table S2. Keywords used for literature search.

Aichi Target	Intervention	Response key words	Pressure/state keywords	Scope keywords	Impact key words
5, 14, 15	Habitat loss reduction & restoration	"restoration" OR "connectivity" OR "offset" OR "REDD"	“habitat loss” OR “deforestation” OR “habitat degradation” OR “biodiversity”	NA	“impact” OR “counterfactual” OR “outcome*” OR “BACI” OR “meta-analysis” OR “metaanalysis”
6	Sustainable use of species	"regulation" OR "conservation" OR "sustainable use" OR “rights based management” OR “individual transferable quotas" OR “eliminator trawl” OR "fishing gear" OR "by-catch exclusion" OR “no fish zones” OR “sustainability certification schemes" OR "harvest seasonal closures" OR "regulation of harvest regimes" OR "Marine Stewardship Council" OR "legislation and law enforcement" OR "community based conservation" OR "education" OR "capacity building" OR "Programme for the Endorsement of Forest Certification" OR "Forest Stewardship Council" OR “rights based management” OR "PES schemes" OR "eco-tourism" OR “ecotourism” OR "community based natural resource management" OR "joint forestry measurement" OR “devolution” OR “community management” OR “participatory approaches” OR “wildlife ranching” OR “game cropping” OR “trophy hunting” OR “game ranching” OR “wildlife-based land uses” OR “wildlife tourism” OR “mixed wildlife/livestock”	“overfishing” OR “overharvest” OR “poaching” OR “fishing” OR “hunting”	NA	
7	Sustainable management of ecosystems	“certification” OR “sustainable management” OR “sustainable forest management” OR “sustainable land management” OR “agri-environment scheme” OR “buffer strip” OR “fairtrade” OR “no till” OR “organic” OR “set aside”	“farming” OR “forestry” OR “aquafarming” OR "agriculture" OR “silviculture” OR "aquaculture”	NA	
8	Control of pollution	“policy” OR “treatment” OR “remediation” OR “restoration” OR “mitigation” OR “removal” OR “reduction”	“nitrogen” OR “phosphorus” OR “nitrate” OR “phosphate” OR “fertilizer” OR “eutrophication” OR “pesticide*” OR “contaminant*” OR “heavy metal*” OR “microplastic*” OR	“wildlife” OR “biodiversity” OR “nature”	

			“plastic*” OR “noise” OR “light” OR “pollut*”		
9	Eradication and control of invasive species	"eradication" OR "control" OR "management" OR “prevention” OR “biosecurity” OR “early warning”	"invasive species" OR "invasives" OR “non-native” OR “alien”	NA	
10	Climate change adaptation	“managed retreat” OR “managed realignment” OR “coastal retreat” OR “coastal realignment” OR “retreat” OR “realignment” OR “soft engineering” OR “stabilisation” OR “nourishment” OR “mangroves” OR “natural defence” OR “engineer*” OR “modification” OR “management” OR “temperature regulation” OR “impact mitigation” OR “shading” OR “emergency response” OR “lime” OR “limestone” OR “calcite” OR “CaCO3” OR “chalk”	“climate change” OR “sea level” OR “coastal erosion” OR “temperature” OR “precipitation” OR “drought” OR “flood” OR “storm” OR “hurricane” OR “heat wave” OR “acidification”	“wildlife” OR “biodiversity” OR “nature”	
11	Establishment and management of protected areas	“protected area*” OR “conservation area*” OR “nature reserve” OR “private reserve*” OR “site protection” OR “habitat protection”	“biodiversity” OR “species population” OR “key biodiversity area” OR “extinction risk”	NA	
12	Species conservation	“conservation” OR “population management” OR “protection” OR “planning” OR “reintroduction” OR “legislation” OR “education” OR “restoration”	“threatened species” OR “declining species” OR “endangered species” OR “extinction risk” OR “endangerment” OR “population trend”	NA	
13	Genetic conservation	“conservation” OR “management” OR “restoration” OR "translocation" OR "reintroduction" OR “genetic rescue” OR "corridor"	"genetic diversity" OR "heterozygosity" OR "inbreeding" OR “bottleneck” OR “founder effect” OR “genetic fitness” OR “genetic variability”	NA	

Table S3. Studies included in meta-analysis. The full dataset is available at (*44*).

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
58	Adams, P.R., Orr, D.B., Arellano, C. & Cardoza, Y.J. Soil and foliar arthropod abundance and diversity in five cropping systems in the coastal plains of North Carolina. Environmental Entomology 46, 771-783 (2017).	Western Europe and Others	Experimental	Other	Species
59	Alados, C.L. et al. Variations in landscape patterns and vegetation cover between 1957 and 1994 in a semiarid Mediterranean ecosystem. Landsc. Ecol. 19, 543-559 (2004).	Western Europe and Others	Before vs After	Protected areas	Ecosystem
60	Alemany, D., Iribarne, O.O. & Acha, E.M. Effects of a large-scale and offshore marine protected area on the demersal fish assemblage in the Southwest Atlantic. ICES J. Mar. Sci. 70, 123-134 (2013).	Latin America and Caribbean	BACI	Protected areas	Species
61	Allen, D.C., Galbraith, H.S., Vaugh, C.C. & Spooner, D.E.A. Tale of two rivers: implications of water management practices for mussel biodiversity outcomes during droughts. Ambio 42, 881-891 (2013).	Western Europe and Others	Control vs intervention	Climate change adaptation	Species
62	Alo, C.A. & Pontius, R.G., Jr. Identifying systematic land-cover transitions using remote sensing and GIS: the fate of forests inside and outside protected areas of Southwestern Ghana. Environ. Plan. B Plan. Des. 35, 280-295 (2008).	Africa	Control vs intervention	Protected areas	Ecosystem
63	Al-Zankana, A.F.A., Matheson, T. & Harper, D.M. Secondary production of macroinvertebrates as indicators of success in stream rehabilitation. River Research and Applications 37, 408-422 (2021).	Western Europe and Others	Control vs intervention	Habitat loss reduction & restoration	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
64	Ament, J.M. & Cumming, G.S. Scale dependency in effectiveness, isolation, and social-ecological spillover of protected areas. Conserv. Biol. 30, 846-855 (2016).	Africa	Quasi-experimental	Protected areas	Ecosystem
65	Andam, K.S., Ferraro, P.J. & Hanauer, M.M. The effects of protected area systems on ecosystem restoration: a quasi-experimental design to estimate the impact of Costa Rica's protected area system on forest regrowth. Conserv. Lett. 6, 317-323 (2013).	Latin America and Caribbean	Quasi-experimental	Protected areas	Ecosystem
66	Arriagada, R.A., Echeverria, C.M. & Moya, D.E. Creating protected areas on public lands: Is there room for additional conservation? PLOS One 11, e0148094 (2016).	Latin America and Caribbean	Quasi-experimental	Protected areas	Ecosystem
67	Balme, G.A., Slotow, R. & Hunter, L.T.B. Impact of conservation interventions on the dynamics and persistence of a persecuted leopard (Panthera pardus) population. Biol. Conserv. 142, 2681-2690 (2009).	Africa	Before vs After	Sustainable use of species	Species
68	Bellingan, T.A. et al. Rapid recovery of macroinvertebrates in a South African stream treated with rotenone. Hydrobiologica 834, 1-11 (2019).	Africa	BACI	Invasive & problematic species control/eradication	Species
69	Bennion, L.D., Ferguson, J.A., New, L.F. & Schultz, C.B. Community-level effects of herbicide-based restoration treatments: structural benefits but at what cost? Restoration Ecology 28, 553-563 (2020).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Species
70	Berejikian, B.A. & Van Doornik, D.M. Increased natural reproduction and genetic diversity one generation after cessation of a steelhead trout (Oncorhynchus mykiss) conservation hatchery program. PLOS One 13,	Western Europe and Others	Before vs after	Other	Genetic

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
	e0190799 (2018).				
71	Beresford, A.E. et al. Protection reduces loss of natural land-cover at sites of conservation importance across Africa. PLOS ONE 8, e65370 (2013).	Africa	Quasi-experimental	Protected areas	Ecosystem
72	Bhaskar, D., Easa, P.S., Sreejith, K.A., Skejo, J. & Hochkirch, A. Large scale burning for a threatened ungulate in a biodiversity hotspot is detrimental for grasshoppers (Orthoptera: Caelifera). Biodiversity and Conservation 28, 3221-3237 (2019).	Asia-Pacific	Experimental	Habitat loss reduction & restoration	Species
73	Bickel, T.O. & Closs, G.P. Impact of partial removal of the invasive macrophyte Lagarosiphon major (Hydrocharitaceae) on invertebrates and fish. River Res. Appl. 25, 734-744 (2009).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
74	Bird, T.L.F., Bouskila, A., Groner, E. & Bar Kutiel, P. Can vegetation removal successfully restore coastal dune biodiversity? Applied Sciences-Basel 10, 2310 (2020).	Asia-Pacific	Experimental	Habitat loss reduction & restoration	Species
75	Biro, M., Boloni, J. & Molnar, Z. Use of long-term data to evaluate loss and endangerment status of Natura 2000 habitats and effects of protected areas. Conservation Biology 32, 660-671 (2018).	Eastern Europe	Control vs intervention	Protected areas	Ecosystem
37	Blackman, A., Pfaff, A. & Robalino, J. Paper park performance: Mexico's natural protected areas in the 1990s. Glob. Environ. Change 31, 50-61 (2015).	Latin America and Caribbean	Quasi-experimental	Protected areas	Ecosystem

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
76	Blyth-Skyrme, R.E., Kaiser, M.J., Hiddink, J.G., Edwards-Jones, G. & Hart, P.J.B. Conservation benefits of temperate marine protected areas: variation among fish species. Conserv. Biol. 20, 811-820 (2006).	Western Europe and Others	Control vs Intervention	Protected areas	Species
77	Bobiles, R.U., Soliman, V.S. & Nakamura, Y. Partially protected marine area renders non-fishery benefits amidst high fishing pressure: A case study from eastern Philippines. Regional Studies in Marine Science 3, 225-233 (2016).	Asia-Pacific	Control vs intervention	Protected areas	Species
78	Bonnaud, E. et al. Top-predator control on islands boosts endemic prey but not mesopredator. Anim. Conserv. 13, 556-567 (2010).	Western Europe and Others	Before vs after	Invasive & problematic species control/eradication	Species
79	Bos, A.B. et al. Global data and tools for local forest cover loss and REDD plus performance assessment: Accuracy, uncertainty, complementarity and impact. International Journal of Applied Earth Observation and Geoinformation 80, 295-311 (2019).	Latin America and Caribbean	Before vs after	Habitat loss reduction & restoration	Ecosystem
80	Bosch-Serra, A.D., Padro, R., Boixadera-Bosch, R.R., Orobitg, J. & Yague, M.R. Tillage and slurry over-fertilization affect oribatid mite communities in a semiarid Mediterranean environment. Appl. Soil Ecol. 84, 124-139 (2014).	Western Europe and Others	Experimental	Sustainable management of ecosystems	Species
81	Bosu, P.P., Apetorgbor, M.M., Nkrumah, E.E. & Bandoh, K.P. The impact of Broussonetia papyrifera (L.) vent. on community characteristics in the forest and forest-savannah transition ecosystems of Ghana. Afr. J. Ecol. 51, 528-535 (2013).	Africa	Experimental	Invasive & problematic species control/eradication	Ecosystem
82	Bourg, N.A., McShea, W.J., Herrmann, V. & Stewart, C.M. Interactive effects of deer exclusion and exotic plant removal on deciduous forest understory communities. AOB Plants 9 plx046 (2017).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
83	Brandt, J.S., Butsic, V., Schwab, B., Kuemmerle, T. & Radeloff, V.C. The relative effectiveness of protected areas, a logging ban, and sacred areas for old-growth forest protection in southwest China. Biol. Conserv. 181, 1-8 (2015).	Asia-Pacific	Quasi-experimental	Protected areas	Ecosystem
84	Brenes, C.L.M., Jones, K.W., Schlesinger, P., Robalino, J. & Vierling, L. The impact of protected area governance and management capacity on ecosystem function in Central America. PLOS One 13, e0205964 (2018).	Latin America and Caribbean	Quasi-experimental	Protected areas	Ecosystem
85	Brereton, T.M., Warren, M.S., Roy, D.B. & Stewart, K. The changing status of the Chalkhill blue butterfly Polyommatus coridon in the UK: the impacts of conservation policies and environmental factors. J. Insect Conserv. 12, 629-638 (2008).	Western Europe and Others	Control vs intervention	Sustainable management of ecosystems	Species
86	Bried, J. & Neves, V.C. Habitat restoration on Praia Islet, Azores Archipelago, proved successful for seabirds, but new threats have emerged. Airo 23, 25-35 (2015).	Western Europe and Others	Before vs after	Invasive & problematic species control/eradication	Species
87	Brink, A.B., Martinez-Lopez, J., Szantoi, Z., Moreno-Atencia, P., Lupi, A., Bastin, L. & Dubois, G. Indicators for assessing habitat values and pressures for protected areas-an integrated habitat and land cover change approach for the Udzungwa Mountains National Park in Tanzania. Remote Sensing 8, 862 (2016).	Africa	BACI	Protected areas	Ecosystem
88	Bro, E., Mayot, P. & Reitz, F. Effectiveness of habitat management for improving grey partridge populations: a BACI experimental assessment. Anim. Biodivers. Conserv. 35(2), 405-413 (2012).	Western Europe and Others	BACI	Other	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
89	Brooke, J.M., Basinger, P.S., Birckhead, J.L., Lashley, M.A., McCord, J.M., Nanney, J.S. & Harper, C.A. Effects of fertilization and crown release on white oak (Quercus alba) masting and acorn quality. Forest Ecology and Management 433, 305-312 (2019).	Western Europe and Others	Experimental	Sustainable management of ecosystems	Species
90	Brower, L.P. et al. Quantitative changes in forest quality in a principal overwintering area of the monarch butterfly in Mexico, 1971–1999. Conserv. Biol. 16, 346-359 (2002).	Latin America and Caribbean	Before vs After	Protected areas	Ecosystem
91	Bruggeman, D., Meyfroidt, P. & Lambin, E.F. Impact of land-use zoning for forest protection and production on forest cover changes in Bhutan. Applied Geography 96, 153-165 (2018).	Asia-Pacific	Quasi-experimental	Protected areas	Ecosystem
92	Cardoso, P.G., Raffaelli, D., Lillebo, A.I., Verdelhos, T. & Pardal, M.A. The impact of extreme flooding events and anthropogenic stressors on the macrobenthic communities' dynamics. Estuar. Coast. Shelf Sci. 76, 553-565 (2008).	Western Europe and Others	Before vs after	Pollution control	Species
93	Carranza, T., Balmford, A., Kapos, V. & Manica, A. Protected area effectiveness in reducing conversion in a rapidly vanishing ecosystem: the Brazilian Cerrado. Conserv. Lett. 7, 216-223 (2014).	Latin America and Caribbean	Quasi-experimental	Protected areas	Ecosystem
94	Cavallo, B., Merz, J. & Setka, J. Effects of predator and flow manipulation on Chinook salmon (Oncorhynchus tshawytscha) survival in an imperiled estuary. Environ. Biol. Fishes 96, 393-403 (2013).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
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96	Chatelain, C., Bakayoko, A., Martin, P. & Gautier, L. Monitoring tropical forest fragmentation in the Zagne-Tai area (west of Tai National Park, Cote d'Ivoire). Biodivers. Conserv. 19, 2405-2420 (2010).	Africa	Control vs intervention	Protected areas	Ecosystem
97	Christensen, T.K. & Hounisen, J.P. Managing hunted populations through sex-specific season lengths: a case of the common eider in the Baltic-Wadden Sea flyway population. Eur. J. Wildl. Res. 60, 717-726 (2014).	Western Europe and Others	Before vs After	Sustainable use of species	Species
98	Clark, N.E., Boakes, E.H., McGowan, P.J.K., Mace, G.M. & Fuller, R.A. Protected areas in South Asia have not prevented habitat loss: a study using historical models of land-use change. PLOS ONE 8, e65298 (2013).	Asia-Pacific	Control vs intervention	Protected areas	Ecosystem
99	Claudet, J., Pelletier, D., Jouvenel, J.Y., Bachet, F. & Galzin, R. Assessing the effects of marine protected area (MPA) on a reef fish assemblage in a northwestern Mediterranean marine reserve: identifying community-based indicators. Biol. Conserv. 130, 349-369 (2006).	Western Europe and Others	BACI	Protected areas	Species
100	Crates, R. et al. Sustained and delayed noisy miner suppression at an avian hotspot. Austral Ecology 45, 636-643 (2020).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
101	Coleman, M.A., Palmer-Brodie, A. & Kelaher, B.P. Conservation benefits of a network of marine reserves and partially protected areas. Biol. Conserv. 167, 257-264 (2013).	Western Europe and Others	Control vs intervention	Protected areas	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
35	Crone, E.E., Marler, M. & Pearson, D.E. Non-target effects of broadleaf herbicide on a native perennial forb: a demographic framework for assessing and minimizing impacts. J. Appl. Ecol. 46, 673-682 (2009).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Species
102	Cuenca, P., Arriagada, R. & Echeverria, C. How much deforestation do protected areas avoid in tropical Andean landscapes? Environmental Science & Policy 56, 56-66 (2016).	Latin America and Caribbean	Quasi-experimental	Protected areas	Ecosystem
103	Curran, L.M., Trigg, S.N., McDonald, A.K., Astiani, D. & Hardiono, Y.M. Lowland forest loss in protected areas of Indonesian Borneo. Science 303, 1000 (2004).	Asia-Pacific	Control vs intervention	Protected areas	Ecosystem
104	Cushman, S.A. & Wallin, D.O. Rates and patterns of landscape change in the Central Sikhote-alin Mountains, Russian Far East. Landsc. Ecol. 15, 643-659 (2000).	Eastern Europe	Control vs intervention	Protected areas	Ecosystem
105	Ding, C.Z. et al. Fish assemblage responses to a low-head dam removal in the Lancang River. Chinese Geographical Science 29, 26-36 (2019).	Asia-Pacific	BACI	Habitat loss reduction & restoration	Species
106	Dornbusch, M.J., Limb, R. & Sedivec, K.K. Alternative grazing management strategies combat invasive grass dominance. Natural Areas Journal 40, 86-95 (2020).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Ecosystem
107	Eguiguren, P., Fischer, R. & Gunter, S. Degradation of ecosystem services and deforestation in landscapes with and without incentive-based forest conservation in the Ecuadorian Amazon. Forests 10, 442 (2019).	Latin America and Caribbean	Before vs after	Habitat loss reduction & restoration	Ecosystem

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
108	Engeman, R.M. et al. Dramatic and immediate improvements in insular nesting success for threatened sea turtles and shorebirds following predator management. J. Exp. Mar. Biol. Ecol. 395, 147-152 (2010).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
109	Engst, K. et al. Functional community ecology meets restoration ecology: Assessing the restoration success of alluvial floodplain meadows with functional traits. J. Appl. Ecol. 53, 751-764 (2016).	Western Europe and Others	Experimental	Habitat loss reduction & restoration	Ecosystem
110	Epstein, G., Foggo, A. & Smale, D.A. Inconspicuous impacts: Widespread marine invader causes subtle but significant changes in native macroalgal assemblages. Ecosphere 10, e02814 (2019).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Species
51	Ferraro, P.J. et al. More strictly protected areas are not necessarily more protective: evidence from Bolivia, Costa Rica, Indonesia, and Thailand. Environ. Res. Lett. 8, 25011 (2013).	Latin America and Caribbean	Quasi-experimental	Protected areas	Ecosystem
111	Ferraro, P.J., McIntosh, C. & Ospina, M. The effectiveness of the US endangered species act: an econometric analysis using matching methods. J. Environ. Econ. Manage. 54, 245-261 (2007).	Western Europe and Others	Quasi-experimental	Other	Species
112	Ferreira, A., Alves, A.S., Marques, J.C. & Seixas, S. Ecosystem response to different management options in Marine Protected Areas (MPA): A case study of intertidal rocky shore communities. Ecological Indicators 81, 471-480 (2017).	Western Europe and Others	Control vs intervention	Protected areas	Species
113	Field, R.H., Benke, S., Badonyi, K. & Bradbury, R.B. Influence of conservation tillage on winter bird use of arable fields in Hungary. Agric. Ecosyst. Environ. 120, 399-404 (2007).	Eastern Europe	Control vs intervention	Sustainable management of ecosystems	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
114	Flesch, A.D. & Esquer, A. Impacts of riparian restoration on vegetation and avifauna on private and communal lands in northwest Mexico and implications for future efforts. Air, Soil and Water Research 13 (2020).	Latin America and Caribbean	BACI	Habitat loss reduction & restoration	Ecosystem
115	Flores, L. et al. Effects of wood addition on stream benthic invertebrates differed among seasons at both habitat and reach scales. Ecological Engineering 106, 116-123 (2017).	Western Europe and Others	BACI	Habitat loss reduction & restoration	Species
116	Foo, Y.S. & Numata, S. Deforestation and forest fragmentation in and around Endau-Rompin National Park, Peninsular Malaysia. Tropics 28, 23-37 (2019).	Asia-Pacific	BACI	Protected areas	Ecosystem
117	Forrest, J.L. et al. Patterns of land cover change in and around Madidi National Park, Bolivia. Biotropica 40, 285-294 (2008).	Latin America and Caribbean	Control vs intervention	Protected areas	Ecosystem
118	Fowler, S.V. Biological control of an exotic scale, Orthezia insignis Browne (Homoptera: Ortheziidae), saves the endemic gumwood tree, Commidendrum robustum (Roxb.) DC. (Asteraceae) on the island of St. Helena. Biol. Control 29, 367-374 (2004).	Western Europe and Others	Before vs After	Invasive & problematic species control/eradication	Species
119	Fox, S., Potts, J.M., Pemberton, D. & Crosswell, D. Roadkill mitigation: trialing virtual fence devices on the west coast of Tasmania. Australian Mammalogy 41, 205-211 (2019).	Western Europe and Others	Control vs intervention	Other	Species
120	Fujitani, M.L., Fenichel, E.P., Torre, J. & Gerber, L.R. Synthesizing ecological and human use information to understand and manage coastal change. Ocean & Coastal Management 162, 100-109 (2018).	Latin America and Caribbean	BACI	Protected areas	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
121	Gaveau, D.L.A. et al. Evaluating whether protected areas reduce tropical deforestation in Sumatra. J. Biogeogr. 36, 2165-2175 (2009).	Asia-Pacific	Quasi-experimental	Protected areas	Ecosystem
122	Gaveau, D.L.A., Wandono, H. & Setiabudi, F. Three decades of deforestation in southwest Sumatra: have protected areas halted forest loss and logging, and promoted re-growth? Biol. Conserv. 134, 495-504 (2007).	Asia-Pacific	Control vs intervention	Protected areas	Ecosystem
123	Gaveau, D.L.A. et al. Reconciling forest conservation and logging in Indonesian Borneo. PLOS ONE 8, e69887 (2013).	Asia-Pacific	Control vs Intervention	Protected areas	Ecosystem
124	Giudice, R., Borner, J., Wunder, S. & Cisneros, E. Selection biases and spillovers from collective conservation incentives in the Peruvian Amazon. Environmental Research Letters 14, 45004 (2019).	Latin America and Caribbean	Quasi-experimental	Habitat loss reduction & restoration	Ecosystem
125	Gonsalves, L., Law, B. & Blakey, R. Experimental evaluation of the initial effects of large-scale thinning on structure and biodiversity of river red gum (Eucalyptus camaldulensis) forests. Wildlife Research 45, 397-410 (2018).	Western Europe and Others	BACI	Sustainable management of ecosystems	Species
126	Gorman, D. & Turra, A. The role of mangrove revegetation as a means of restoring macrofaunal communities along degraded coasts. Science of the Total Environment 566, 223-229 (2017).	Latin America and Caribbean	Control vs intervention	Habitat loss reduction & restoration	Species
127	Green, J.M.H. et al. Deforestation in an African biodiversity hotspot: extent, variation and the effectiveness of protected areas. Biol. Conserv. 164, 62-72 (2013).	Africa	Quasi-experimental	Protected areas	Ecosystem

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
128	Hagglund, R. et al. Restoration measures emulating natural disturbances alter beetle assemblages in boreal forest. Forest Ecology and Management 462, 117934 (2020).	Western Europe and Others	Experimental	Sustainable management of ecosystems	Species
129	Hanford, J.K., Webb, C.E. & Hochuli, D.F. Management of urban wetlands for conservation can reduce aquatic biodiversity and increase mosquito risk. Journal of Applied Ecology 57, 794-805 (2020).	Western Europe and Others	Control vs intervention	Invasive & problematic species control/eradication	Species
130	Hannan, L., Le Roux, D.S., Milner, R.N.C. & Gibbons, P. Erecting dead trees and utility poles to offset the loss of mature trees. Biol. Conserv. 236, 340-346 (2019).	Western Europe and Others	Experimental	Other	Species
38	Harasti, D., Martin-Smith, K. & Gladstone, W. Does a no-take marine protected area benefit seahorses? PLOS ONE 9, e105462 (2014).	Western Europe and Others	Control vs intervention	Protected areas	Species
131	Hardt, E. et al. Does certification improve biodiversity conservation in Brazilian coffee farms? For. Ecol. Manag. 357, 181-194 (2015).	Latin America and Caribbean	BACI	Sustainable management of ecosystems	Ecosystem
132	Hartman, K.M. & McCarthy, B.C. Restoration of a forest understory after the removal of an invasive shrub, Amur honeysuckle (Lonicera maackii). Restor. Ecol. 12, 154-165 (2004).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Species
133	Henden, J.A., Ehrich, D., Soininen, E.M. & Ims, R.A. Accounting for food web dynamics when assessing the impact of mesopredator control on declining prey populations. J. Appl. Ecol. 58, 104-113 (2021).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
134	Hervieux, D., Hebblewhite, M., Stepnisky, D., Bacon, M. & Boutin, S. Managing wolves (Canis lupus) to recover threatened woodland caribou (Rangifer tarandus caribou) in Alberta. Can. J. Zool. 92, 1029-1037 (2014).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
135	Hess, M.A. et al. Supportive breeding boosts natural population abundance with minimal negative impacts on fitness of a wild population of Chinook salmon. Mol. Ecol. 21, 5236-5250 (2012).	Western Europe and Others	Control vs intervention	Other	Genetic
136	Hilborn, R. et al. Effective enforcement in a conservation area. Science 314, 1266 (2006).	Africa	Before vs after	Protected areas	Species
137	Hinkson, K.M. & Richter, S.C. Temporal trends in genetic data and effective population size support efficacy of management practices in critically endangered dusky gopher frogs (Lithobates sevosus). Ecol. Evol. 6, 2667-2678 (2016).	Western Europe and Others	Before vs after	Other	Genetic
138	Hochstedler, W.W., Slaughter, B.S., Gorchov, D.L., Saunders, L.P. & Stevens, M.H.H. Forest floor plant community response to experimental control of the invasive biennial, Alliaria petiolata (garlic mustard). J. Torrey Bot. Soc. 134, 155-165 (2007).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Ecosystem
139	Hostetler, J.A., Onorato, D.P., Jansen, D. & Oli, M.K. A cat's tale: the impact of genetic restoration on Florida panther population dynamics and persistence. J. Anim. Ecol. 82, 608-620 (2013).	Western Europe and Others	Control vs Intervention	Other	Genetic

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
140	Huang, L., Shao, Q.Q. & Liu, J.Y. Assessing the conservation effects of nature reserve networks under climate variability over the northeastern Tibetan plateau. Ecological Indicators 96, 163-173 (2019).	Asia-Pacific	Control vs Intervention	Protected areas	Ecosystem
141	Huang, X.F., Zhao, F., Song, C., Chai, Y., Wang, Q. & Zhuang, P. Larva fish assemblage structure in three-dimensional floating wetlands and non-floating wetlands in the Changjiang River estuary. Journal of Oceanology and Limnology 39, 721-731 (2021).	Asia-Pacific	Experimental	Habitat loss reduction & restoration	Species
142	Igual, J.M., Forero, M.G., Gomez, T., Orueta, J.F. & Oro, D. Rat control and breeding performance in Cory's shearwater (Calonectris diomedea): effects of poisoning effort and habitat features. Anim. Conserv. 9, 59-65 (2006).	Western Europe and Others	Before vs After	Invasive & problematic species control/eradication	Species
143	Ito, T. et al. Responses of soil nematode community structure to soil carbon changes due to different tillage and cover crop management practices over a nine-year period in Kanto, Japan. Appl. Soil Ecol. 89, 50-58 (2015).	Asia-Pacific	Quasi-Experimental	Sustainable management of ecosystems	Species
144	Jimenez, J. et al. Restoring apex predators can reduce mesopredator abundances. Biological Conservation 238, 108234 (2019).	Western Europe and Others	Quasi-experimental	Other	Species
145	Johnston, G.R. Drought increases the impact of introduced European foxes on breeding Australian pelicans. Wildlife Research 43, 507-514 (2016).	Western Europe and Others	Before vs after	Invasive & problematic species control/eradication	Species
146	Jones, L.J., Ostoja, S.M., Brooks, M.L. & Hutten, M. Short-term response of Holcus lanatus L. (common velvetgrass) to chemical and manual control at Yosemite National Park, USA. Invasive Plant Sci. Manag. 8, 262-268 (2015).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Ecosystem

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
36	Kamalakannan, B., Jeevamani, J.J.J., Nagendran, N.A., Pandiaraja, D. & Chandrasekaran, S. Impact of removal of invasive species Kappaphycus alvarezii from coral reef ecosystem in Gulf of Mannar, India. Curr. Sci. 106, 1401-1408 (2014).	Asia-Pacific	Before vs After	Invasive & problematic species control/eradication	Ecosystem
147	Kayal, M. et al. Marine reserve benefits and recreational fishing yields: The winners and the losers. PLOS One 15 e0237685 (2020).	Western Europe and Others	Control vs intervention	Protected areas	Species
148	Kennedy, T.A., Finlay, J.C. & Hobbie, S.E. Eradication of invasive Tamarix ramosissima along a desert stream increases native fish density. Ecol. Appl. 15, 2072-2083 (2005).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Species
149	Kerns, B.K. & Day, M.A. Prescribed fire regimes subtly alter ponderosa pine forest plant community structure. Ecosphere 9, e02529 (2018).	Western Europe and Others	Experimental	Sustainable management of ecosystems	Ecosystem
150	Khalyani, A.H., Mayer, A.L., Webster, C.R. & Falkowski, M.J. Ecological indicators for protection impact assessment at two scales in the Bozin and Marakhil protected area, Iran. Ecol. Indic. 25, 99-107 (2013).	Asia-Pacific	Control vs intervention	Protected areas	Ecosystem
151	Kinnaird, M.F., Sanderson, E.W., O'Brien, T.G., Wibisono, H.T. & Woolmer, G. Deforestation trends in a tropical landscape and implications for endangered large mammals. Conserv. Biol. 17, 245-257 (2003).	Asia-Pacific	Control vs intervention	Protected areas	Ecosystem
152	Koenen, M.T., Utych, R.B. & Leslie, D.M., Jr. Methods used to improve least tern and snowy plover nesting success on alkaline flats. J. Field Ornithol. 67, 281-291 (1996).	Western Europe and Others	Control vs Intervention	Climate change adaptation	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
153	Lachish, S., McCallum, H., Mann, D., Pukk, C.E. & Jones, M.E. Evaluation of selective culling of infected individuals to control Tasmanian devil facial tumor disease. Conserv. Biol. 24, 841-851 (2010).	Western Europe and Others	BACI	Other	Species
154	Laughlin, D.C. et al. The hierarchy of predictability in ecological restoration: are vegetation structure and functional diversity more predictable than community composition? Journal of Applied Ecology 54, 1058-1069 (2017).	Western Europe and Others	Experimental	Habitat loss reduction & restoration	Ecosystem
155	Laughton, R., Cosgrove, P.J., Hastie, L.C. & Sime, I. Effects of aquatic weed removal on freshwater pearl mussels and juvenile salmonids in the River Spey, Scotland. Aquat. Conserv. Mar. Freshw. Ecosyst. 18, 44-54 (2008).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
156	Linke, M.G., Godoy, R.S., Rolon, A.S. & Maltchik, L. Can organic rice crops help conserve aquatic plants in southern Brazil wetlands? Appl. Veg. Sci. 17, 346-355 (2014).	Latin America and Caribbean	Quasi-Experimental	Sustainable management of ecosystems	Species
157	Liu, J. et al. Ecological degradation in protected areas: the case of Wolong Nature Reserve for giant pandas. Science 292, 98-101 (2001).	Asia-Pacific	Before vs. after	Protected areas	Ecosystem
158	Lundberg, A., Kapfer, J. & Maren, I.E. Reintroduced mowing can counteract biodiversity loss in abandoned meadows. Erdkunde 71, 127-142 (2017).	Western Europe and Others	Experimental	Sustainable management of ecosystems	Ecosystem
159	Marchante, H., Freitas, H. & Hoffmann, J.H. Post-clearing recovery of coastal dunes invaded by Acacia longifolia: is duration of invasion relevant for management success? J. Appl. Ecol. 48, 1295-1304 (2011).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Ecosystem

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
160	Marks, J.C., Haden, G.A., O'Neill, M. & Pace, C. Effects of flow restoration and exotic species removal on recovery of native fish: lessons from a dam decommissioning. Restor. Ecol. 18, 934-943 (2010).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
161	Marquez, C., Gibbs, J.P., Carrion, V., Naranjo, S. & Llerena, A. Population response of giant galapagos tortoises to feral goat removal. Restor. Ecol. 21, 181-185 (2013).	Latin America and Caribbean	Control vs intervention	Invasive & problematic species control/eradication	Species
162	Martelloni, T. et al. Artificial soft sediment resuspension and high density opportunistic macroalgal mat fragmentation as method for increasing sediment zoobenthic assemblage diversity in a eutrophic lagoon. Marine Pollution Bulletin 110, 212-220 (2016).	Western Europe and Others	BACI	Pollution control	Species
163	Mashavakure, N. et al. Soil dwelling beetle community response to tillage, fertilizer and weeding intensity in a sub-humid environment in Zimbabwe. Applied Soil Ecology 135, 120-128 (2019).	Africa	Experimental	Sustainable management of ecosystems	Species
164	Mateos-Molina, D., Scharer-Umpierre, M.T., Appeldoorn, R.S. & Garcia-Charton, J.A. Measuring the effectiveness of a Caribbean oceanic island no-take zone with an asymmetrical BACI approach. Fish. Res. 150, 1-10 (2014).	Western Europe and Others	BACI	Protected areas	Species
165	Martinez-Abrain, A. et al. Assessing the effectiveness of a hunting moratorium on target and non-target species. Biol. Conserv. 165, 171-178 (2013).	Western Europe and Others	Before vs after	Sustainable use of species	Species
166	Mau-Crimmins, T.M. Effects of removing Cynodon dactylon from a recently abandoned agricultural field. Weed Res. 47, 212-221 (2007).	Western Europe and Others	Before vs After	Invasive & problematic species control/eradication	Ecosystem

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
167	McAlpine, K.G., Lamoureaux, S.L., Timmins, S.M. & Wotton, D.M. Native woody plant recruitment in lowland forests invaded by non-native ground cover weeds and mammals. New Zealand Journal of Ecology 41, 65-73 (2017).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Species
168	Mendoza, E. & Dirzo, R. Deforestation in Lacandonia (southeast Mexico): evidence for the declaration of the northernmost tropical hot-spot. Biodivers. Conserv. 8, 1621-1641 (1999).	Latin America and Caribbean	Control vs intervention	Protected areas	Ecosystem
169	Merkohasanaj, M. et al. Assessing the environmental effectiveness of the Spanish marine reserve network using remote sensing. Ecological Indicators 107, 105583 (2019).	Western Europe and Others	Control vs intervention	Protected areas	Ecosystem
170	Messina, J.P., Walsh, S.J., Mena, C.F. & Delamater, P.L. Land tenure and deforestation patterns in the Ecuadorian Amazon: conflicts in land conservation in frontier settings. Appl. Geogr. 26, 113-128 (2006).	Latin America and Caribbean	Control vs intervention	Protected areas	Ecosystem
171	Miranda, J.J., Corral, L., Blackman, A., Asner, G. & Lima, E. Effects of protected areas on forest cover change and local communities: evidence from the Peruvian Amazon. World Dev. 78, 288-307 (2015).	Latin America and Caribbean	Quasi-experimental	Protected areas	Ecosystem
172	Monti, F. et al. The price of success: integrative long-term study reveals ecotourism impacts on a flagship species at a UNESCO site. Animal Conservation 21, 448-458 (2018).	Western Europe and Others	Control vs intervention	Protected areas	Species
173	Moos, J.H., Schrader, S., Paulsen, H.M. & Rahmann, G. Occasional reduced tillage in organic farming can promote earthworm performance and resource efficiency. Applied Soil Ecology 103, 22-30 (2016).	Western Europe and Others	Experimental	Sustainable management of ecosystems	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
174	Moreno-Opo, R. et al. Is it necessary managing carnivores to reverse the decline of endangered prey species? Insights from a removal experiment of mesocarnivores to benefit demographic parameters of the Pyrenean capercaillie. PLOS ONE 10, e0139837 (2015).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
175	Morsing, J., Kepfer-Rojas, S., Baastrup-Spohr, L., Rodriguez, A.L. & Raulund-Rasmussen, K. Litter legacy after spruce plantation removal hampers initial vegetation establishment. Basic and Applied Ecology 42, 4-14 (2020).	Western Europe and Others	Experimental	Habitat loss reduction & restoration	Ecosystem
176	Mumby, P.J. & Harborne, A.R. Marine reserves enhance the recovery of corals on Caribbean reefs. PLOS ONE 5, e8657 (2010).	Latin America and Caribbean	Control vs intervention	Protected areas	Ecosystem
177	Mwangi, M.A.K. et al. Tracking trends in key sites for biodiversity: a case study using Important Bird Areas in Kenya. Bird Conserv. Int. 20, 215-230 (2010).	Africa	Control vs intervention	Protected areas	Ecosystem
178	Nagendra, H., Pareeth, S., Sharma, B., Schweik, C.M. & Adhikari, K.R. Forest fragmentation and regrowth in an institutional mosaic of community, government and private ownership in Nepal. Landsc. Ecol. 23, 41-54 (2008).	Asia-Pacific	Control vs intervention	Protected areas	Ecosystem
179	Narvarte, M., Gonzalez, R. & Fernandez, M. Comparison of Tehuelche octopus (Octopus tehuelchus) abundance between an open-access fishing ground and a marine protected area: evidence from a direct development species. Fish. Res. 79, 112–119 (2006).	Latin America and Caribbean	Control vs intervention	Protected areas	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
43	Nepstad, D. et al. Inhibition of Amazon deforestation and fire by parks and indigenous lands. Conserv. Biol. 20, 65-73 (2006).	Latin America and Caribbean	Control vs intervention	Protected areas	Ecosystem
180	Nolte, C., Agrawal, A., Silvius, K.M. & Soares-Filho, B.S. Governance regime and location influence avoided deforestation success of protected areas in the Brazilian Amazon. Proc. Natl Acad. Sci. USA 110, 4956-4961 (2013).	Latin America and Caribbean	Quasi-experimental	Protected areas	Ecosystem
181	Nowak, S. & Myslajek, R.W. Response of the wolf (Canis lupus Linneaus, 1758) population to various management regimes at the edge of its distribution range in western Poland, 1951-2012. Applied Ecology and Environmental Research 15, 187-203 (2017).	Eastern Europe	Before vs after	Sustainable use of species	Species
182	Nummi, P. et al. Alien predation in wetlands - the raccoon dog and waterbird breeding success. Baltic Forestry 25, 228-237 (2019).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
42	O'Brien, M. & Wilson, J.D. Population changes of breeding waders on farmland in relation to agri-environment management. Bird Study 58, 399-408 (2011).	Western Europe and Others	BACI	Sustainable management of ecosystems	Species
183	Osborne, M.J., Carson, E.W. & Turner, T.F. Genetic monitoring and complex population dynamics: insights from a 12-year study of the Rio Grande silvery minnow. Evol. Appl. 5, 553-574 (2012).	Western Europe and Others	Before vs after	Other	Genetic
184	Ottichilo, W.K., De Leeuw, J., Skidmore, A.K., Prins, H.H.T. & Said, M.Y. Population trends of large non-migratory wild herbivores and livestock in the Masai Mara ecosystem, Kenya, between 1977 and 1997. Afr. J. Ecol. 38, 202-	Africa	Control vs intervention	Protected areas	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
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185	Paice, R.L., Chambers, J.M. & Robson, B.J. Outcomes of submerged macrophyte restoration in a shallow impounded, eutrophic river. Hydrobiologia 778, 179-192 (2016).	Western Europe and Others	Control vs intervention	Habitat loss reduction & restoration	Species
186	Painter, L. et al. Reconciliation of cattle ranching with biodiversity and social inclusion objectives in large private properties in Paraguay and collective indigenous lands in Bolivia. Agricultural Systems 184, 102861 (2020).	Latin America and Caribbean	Before vs after	Sustainable management of ecosystems	Ecosystem
187	Pereda-Briones, L., Tomas, F. & Terrados, J. Field transplantation of seagrass (Posidonia oceanica) seedlings: Effects of invasive algae and nutrients. Marine Pollution Bulletin 134, 160-165 (2018).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Species
188	Peterson, P.G., Merrett, M.F., Fowler, S.V., Barrett, D.P. & Paynter, Q. Comparing biocontrol and herbicide for managing an invasive non-native plant species: Efficacy, non-target effects and secondary invasion. J. Appl. Ecol. 57, 1876-1884 (2020).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Ecosystem
189	Pfaff, A., Santiago-Avila, F. & Joppa, L. Evolving protected-area impacts in Mexico: Political shifts as suggested by impact evaluations. Forests 8, 17 (2017).	Latin America and Caribbean	Quasi-experimental	Protected areas	Ecosystem
190	Pham, L., Jarvis, M.G., West, D. & Closs, G.P. Rotenone treatment has a short-term effect on New Zealand stream macroinvertebrate communities. New Zealand Journal of Marine and Freshwater Research 52, 42-54 (2018).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
191	Ramler, D. & Keckeis, H. Effects of large-river restoration measures on ecological fish guilds and focal species of conservation in a large European river (Danube, Austria). Science of the Total Environment 686, 1076-1089 (2019).	Western Europe and Others	BACI	Habitat loss reduction & restoration	Species
192	Reidy, J.L., Thompson, F.R., Schwope, C., Rowin, S. & Mueller, J.M. Effects of prescribed fire on fuels, vegetation, and Golden-cheeked Warbler (Setophaga chrysoparia) demographics in Texas juniper-oak woodlands. Forest Ecology and Management 376, 96-106 (2016).	Western Europe and Others	Experimental	Habitat loss reduction & restoration	Species
193	Ren, G. et al. Effectiveness of China's national forest protection program and nature reserves. Conserv. Biol. 29, 1368-1377 (2015).	Asia-Pacific	Control vs intervention	Habitat loss reduction & restoration	Ecosystem
194	Robley, A., Gormley, A.M., Forsyth, D.M. & Triggs, B. Long-term and large-scale control of the introduced red fox increases native mammal occupancy in Australian forests. Biol. Conserv. 180, 262-269 (2014).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
195	Rohal, C.B., Cranney, C., Hazelton, E.L.G., & Kettenring, K.M. Invasive Phragmites australis management outcomes and native plant recovery are context dependent. Ecology and Evolution 9, 13835-13849 (2019).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Ecosystem
196	Roopsind, A., Sohngen, B. & Brandt, J. Evidence that a national REDD plus program reduces tree cover loss and carbon emissions in a high forest cover, low deforestation country. Proc. Natl Acad. Sci. USA 116, 24492-24499 (2019).	Latin America and Caribbean	Quasi-experimental	Habitat loss reduction & restoration	Ecosystem

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
197	Rudolphi, J., Jonsson, M.T. & Gustafsson, L. Biological legacies buffer local species extinction after logging. J. Appl. Ecol. 51, 53-62 (2014).	Western Europe and Others	BACI	Sustainable management of ecosystems	Species
198	Rumm, A., Foeckler, F., Deichner, O., Scholz, M. & Gerisch, M. Dyke-slotting initiated rapid recovery of habitat specialists in floodplain mollusc assemblages of the Elbe River, Germany. Hydrobiologia 771, 151-163 (2016).	Western Europe and Others	BACI	Habitat loss reduction & restoration	Species
199	Russ, G.R., Miller, K.I., Rizzari, J.R. & Alcala, A.C. Long-term no-take marine reserve and benthic habitat effects on coral reef fishes. Mar. Ecol. Prog. Ser. 529, 233-248 (2015).	Asia-Pacific	BACI	Protected areas	Species
200	Sader, S.A., Hayes, D.J., Hepinstall, J.A., Coan, M. & Soza, C. Forest change monitoring of a remote biosphere reserve. Int. J. Remote Sens. 22, 1937-1950 (2001).	Latin America and Caribbean	Control vs intervention	Protected areas	Ecosystem
201	Sanchez-Reyes, U.J., Nino-Maldonado, S., Barrientos-Lozano, L. & Trevino-Carreon, J. Assessment of land use-cover changes and successional stages of vegetation in the natural protected area Altas Cumbres, Northeastern Mexico, using Landsat satellite imagery. Remote Sensing 9, 712 (2017).	Latin America and Caribbean	BACI	Protected areas	Ecosystem
202	Sanderson, F.J. et al. Assessing the performance of EU nature legislation in protecting target bird species in an era of climate change. Conserv. Lett. 9, 172-180 (2015).	Western Europe and Others	BACI	Other	Species
203	Schultz, C.B. & Ferguson, J.A. Demographic costs and benefits of herbicide-based restoration to enhance habitat for an endangered butterfly and a threatened plant. Restoration Ecology 28, 564-572 (2020).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
204	Serrouya, R., McLellan, B.N., van Oort, H., Mowat, G. & Boutin, S. Experimental moose reduction lowers wolf density and stops decline of endangered caribou. Peer J 5, e3736 (2017).	Western Europe and Others	Before vs after	Invasive & problematic species control/eradication	Species
205	Seytre, C. & Francour, P. A long-term survey of Posidonia oceanica fish assemblages in a Mediterranean marine protected area: emphasis on stability and no-take area effectiveness. Mar. Freshw. Res. 65, 244-254 (2014).	Western Europe and Others	Control vs Intervention	Protected areas	Species
206	Shearman, P. & Bryan, J.A. Bioregional analysis of the distribution of rainforest cover, deforestation and degradation in Papua New Guinea. Austral Ecol. 36, 9-24 (2011).	Asia-Pacific	Control vs intervention	Protected areas	Ecosystem
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208	Shimeta, J., Saint, L., Verspaandonk, E.R., Nugegoda, D. & Howe, S. Long-term ecological consequences of herbicide treatment to control the invasive grass, Spartina anglica, in an Australian saltmarsh. Estuarine, Coastal and Shelf Science 176, 58-66 (2016).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Species
209	Shumba, T., De Vos, A., Biggs, R., Esler, K.J., Ament, J.M. & Clements, H.S. Effectiveness of private land conservation areas in maintaining natural land cover and biodiversity intactness. Global Ecology and Conservation 22, e00935 (2020).	Africa	Control vs intervention	Protected areas	Ecosystem

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
210	Siraw, Z., Bewket, W. & Degefu, M.A. Effects of community-based watershed development on landscape Greenness and Vegetation Cover in the Northwestern Highlands of Ethiopia. Earth Systems and Environment 4, 245-256 (2020).	Africa	Control vs intervention	Sustainable management of ecosystems	Ecosystem
211	Small, M.P., Currens, K., Johnson, T.H., Frye, A.E. & Von Bargen, J.F. Impacts of supplementation: genetic diversity in supplemented and unsupplemented populations of summer chum salmon (Oncorhynchus keta) in Puget Sound (Washington, USA). Can. J. Fish. Aquat. Sci. 66, 1216-1229 (2009).	Western Europe and Others	BACI	Other	Genetic
212	Smart, J. et al. Managing uplands for biodiversity: do agri-environment schemes deliver benefits for breeding lapwing Vanellus vanellus? J. Appl. Ecol. 50, 794-804 (2013).	Western Europe and Others	BACI	Sustainable management of ecosystems	Species
213	Songer, M., Aung, M., Senior, B., DeFries, R. & Leimgruber, P. Spatial and temporal deforestation dynamics in protected and unprotected dry forests: a case study from Myanmar (Burma). Biodivers. Conserv. 18, 1001-1018 (2009).	Asia-Pacific	Control vs intervention	Protected areas	Ecosystem
214	Southworth, J., Nagendra, H., Carlson, L.A. & Tucker, C. Assessing the impact of Celaque National Park on forest fragmentation in western Honduras. Appl. Geogr. 24, 303-322 (2004).	Latin America and Caribbean	Control vs intervention	Protected areas	Ecosystem
215	Stoner-Osborne, B. The effects of marine protected areas on populations of commercial reef fishes in Moorea, French Polynesia. Marine Policy 121, 104177 (2020).	Asia-Pacific	BACI	Protected areas	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
216	Tabor, K., Burgess, N.D., Mbilinyi, B.P., Kashaigili, J.J. & Steininger, M.K. Forest and woodland cover and change in coastal Tanzania and Kenya, 1990 to 2000. J. East Afr. Nat. Hist. 99, 19-45 (2010).	Africa	Control vs intervention	Protected areas	Ecosystem
217	Taylor, M.E. & Morecroft, M.D. Effects of agri-environment schemes in a long-term ecological time series. Agric. Ecosyst. Environ. 130, 9-15 (2009).	Western Europe and Others	BACI	Sustainable management of ecosystems	Species
218	Tesitel, J., Mladek, J., Fajmon, K., Blazek, P. & Mudrak, O. Reversing expansion of Calamagrostis epigejos in a grassland biodiversity hotspot: Hemiparasitic Rhinanthus major does a better job than increased mowing intensity. Applied Vegetative Science 21, 104-112 (2018).	Eastern Europe	Experimental	Invasive & problematic species control/eradication	Ecosystem
219	Tonkin, Z. et al. Does localized control of invasive eastern gambusia (Poeciliidae: Gambusia holbrooki) increase population growth of generalist wetland fishes? Austral Ecol. 39, 355-366 (2014).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
220	Trentini, C.P. et al. Thinning of loblolly pine plantations in subtropical Argentina: Impact on microclimate and understory vegetation. Forest Ecology and Management 384, 236-247 (2017).	Latin America and Caribbean	Experimental	Sustainable management of ecosystems	Ecosystem
221	Tritsch, I., Le Velly, G., Mertens, B., Meyfroidt, P., Sannier, C., Makak, J.S. & Houngbedji, K. Do forest-management plans and FSC certification help avoid deforestation in the Congo Basin? Ecological Economics 175, 106660 (2020).	Africa	Quasi-experimental	Sustainable management of ecosystems	Ecosystem
222	Truong, T.T.A. et al. Impact of a native invasive weed (Microstegium ciliatum) on regeneration of a tropical forest. Plant Ecology 222, 173-191 (2021).	Asia-Pacific	Experimental	Invasive & problematic species control/eradication	Species

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
223	Van Den Hoek, J., Ozdogan, M., Burnicki, A. & Zhu, A.X. Evaluating forest policy implementation effectiveness with a cross-scale remote sensing analysis in a priority conservation area of Southwest China. Appl. Geogr. 47, 177-189 (2014).	Asia-Pacific	Before vs after	Habitat loss reduction & restoration	Ecosystem
224	Vesk, P.A. et al. Demographic effects of habitat restoration for the grey-crowned babbler Pomatostomus temporalis, in Victoria, Australia. PLOS ONE 10, e0130153 (2015).	Western Europe and Others	Control vs intervention	Habitat loss reduction & restoration	Species
225	Wan, L., Zhang, Y., Zhang, X., Qi, S. & Na, X. Comparison of land use/land cover change and landscape patterns in Honghe National Nature Reserve and the surrounding Jiansanjiang Region, China. Ecol. Indic. 51, 205-214 (2015).	Asia-Pacific	Control vs intervention	Protected areas	Ecosystem
226	Wang, W. et al. Effectiveness of nature reserve system for conserving tropical forests: a statistical evaluation of Hainan Island, China. PLOS ONE 8, e57561 (2013).	Asia-Pacific	Quasi-experimental	Protected areas	Ecosystem
227	Watts, C. et al. Invertebrate community turnover following control of an invasive weed. Arthropod-Plant Interact. 9, 585-597 (2015).	Western Europe and Others	Experimental	Invasive & problematic species control/eradication	Species
228	Webb, K.M., Schultz, R.E. & Dibble, E.D. The influence of invasive aquatic plant removal on diets of bluegill in Minnesota lakes. Journal of Aquatic Plant Management 54, 37-45 (2016).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Ecosystem

Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
229	Weisse, M.J. & Naughton-Treves, L.C. Conservation beyond park boundaries: The impact of buffer zones on deforestation and mining concessions in the Peruvian Amazon. Environmental Management 58, 297-311 (2016).	Latin America and Caribbean	Control vs intervention	Protected areas	Ecosystem
230	Wendland, K.J., Baumann, M., Lewis, D.J., Sieber, A. & Radeloff, V.C. Protected area effectiveness in European Russia: a postmatching panel data analysis. Land Econ. 91, 149-168 (2015).	Eastern Europe	Quasi-experimental	Protected areas	Ecosystem
231	Western, D., Russell, S. & Cuthill, I. The status of wildlife in protected areas compared to non-protected areas of Kenya. PLOS ONE 4, e6140 (2009).	Africa	Control vs intervention	Protected areas	Species
232	Wittmann, M.E. et al. Harvesting an invasive bivalve in a large natural lake: species recovery and impacts on native benthic macroinvertebrate community structure in Lake Tahoe, USA. Aquat. Conserv. Mar. Freshw. Ecosyst. 22, 588-597 (2012).	Western Europe and Others	BACI	Invasive & problematic species control/eradication	Species
233	Yao, X.X., et al. Effects of long term fencing on biomass, coverage, density, biodiversity and nutritional values of vegetation community in an alpine meadow of the Qinghai-Tibet Plateau. Ecological Engineering 130, 80-93 (2019).	Asia-Pacific	Experimental	Sustainable management of ecosystems	Ecosystem
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Reference number	Paper	Geographic focus (UN Region)	Study design	Intervention Class	Ecological Organization
235	Zanzarini, V., Zanchetta, D. & Fidelis, A. Do we need intervention after pine tree removal? The use of different management techniques to enhance Cerrado natural regeneration. Perspectives in Ecology and Conservation 17, 146-150 (2019).	Latin America and Caribbean	Experimental	Habitat loss reduction & restoration	Ecosystem
236	Zhuravleva, I. et al. Satellite-based primary forest degradation assessment in the Democratic Republic of the Congo, 2000–2010. Environ. Res. Lett. 8, 24034 (2013).	Africa	Control vs Intervention	Protected areas	Ecosystem

Table S4. Mean effect sizes by geographic region.

UN geographic region	N studies	N trials	$\bar{x}$ Hedges's g	Lower CI	Upper CI	p
Western Europe and Others	94	385	4.39	3.93	4.84	<0.001
Latin America and Caribbean	35	121	1.85	1.28	2.42	<0.001
Asia-Pacific	32	106	2.56	2.01	3.12	<0.001
Africa	19	41	3.42	2.08	4.76	<0.001
Eastern Europe	6	12	1.47	0.2	2.73	0.024

Table S5. Mean effect sizes by study design. Experimental - Studies that have random assignment to intervention and non-intervention (control) groups with replication. Quasi-experimental - Studies that do not have random assignment to intervention and non-intervention (control) groups but that account for any systematic differences between them by using techniques such as propensity score matching to create comparison groups that have very similar ecological, geographic, socio-economic and institutional factors. Before-after-control-intervention (BACI) - Studies using both before vs. after and control vs. intervention in their design but not that did not use statistical matching. Control vs. intervention - Studies that compare the value of a variable in a control group to an intervention group at a particular time. Before vs. after - Studies that compare the value of a variable after an intervention takes place to a pre-intervention baseline.

Study design	N studies	N trials	$\bar{X}$ Hedges's g	Lower CI	Upper CI	p
Experimental	38	196	7.72	6.79	8.64	<0.001
Before vs after	24	40	3.73	2.56	4.9	<0.001
Quasi-experimental	25	53	4.14	3.22	5.07	<0.001
BACI	40	194	3.25	2.71	3.79	<0.001
Control vs intervention	59	182	0.75	0.31	1.18	0.001

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