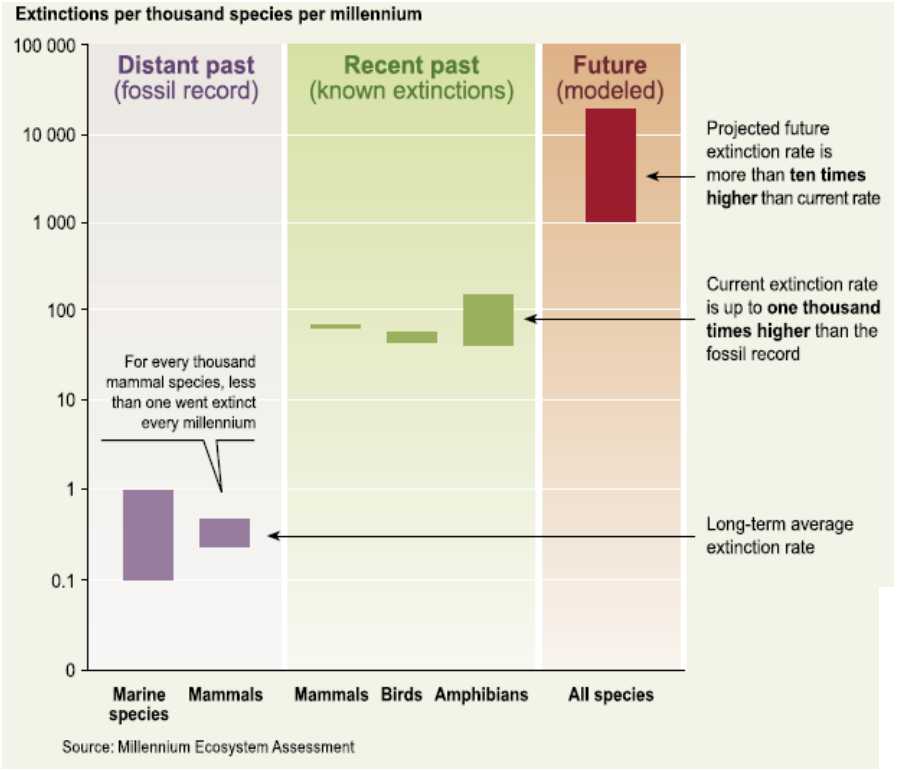
Opportunities and conflicts in hands-off management of forest reserves – examples from the National Park Bavarian Forest, Germany

Claus Bässler

Nationalpark Bayerischer Wald

Execution of the order



… for different reasons

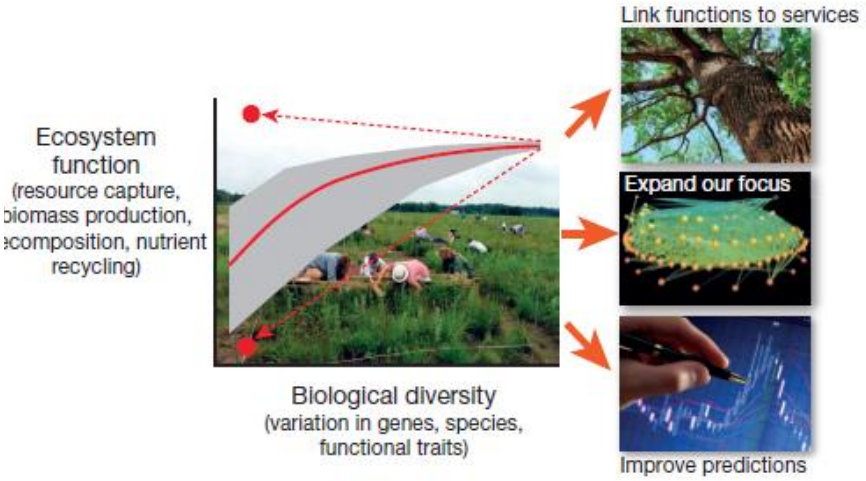
„Beside[…] ecological, economical, social and cultural reasons to enhance biodiversity there are also ethical reasons“

REVIEW

doi:10.1038/nature11148

Biodiversity loss and its impact on humanity

Bradley J. Cardinale[1], J. Emmett Duffy[2], Andrew Gonzalez[3], David U. Hooper[4], Charles Perrings[5], Patrick Venail[1], Anita Narwani[1], Georgina M. Mace[6], David Tilman[7], David A. Wardle[8], Ann P. Kinzig[5], Gretchen C. Daily[9], Michel Loreau[10], James B. Grace[11], Anne Larigauderie[12], Diane S. Srivastava[13] & Shahid Naeem[14]



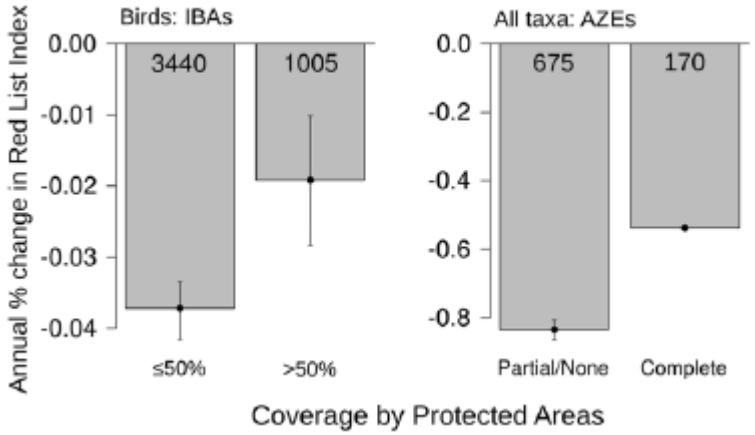
Instruments – protected areas – useful?

OPEN ACCESS Freely available online

PLoS one

Protecting Important Sites for Biodiversity Contributes to Meeting Global Conservation Targets

Stuart H. M. Butchart[1,2*], Jörn P. W. Scharlemann[2], Mike I. Evans[1], Suhel Quader[3¤a], Salvatore Aricò[4], Julius Arinaitwe[5], Mark Balman[1], Leon A. Bennun[1], Bastian Bertzky[2], Charles Besançon[2], Timothy M. Boucher[6], Thomas M. Brooks[7,8,9], Ian J. Burfield[1], Neil D. Burgess[10,11], Simba Chan[12], Rob P. Clay[13], Mike J. Crosby[1], Nicholas C. Davidson[14], Naamal De Silva[15], Christian Devenish[13¤b], Guy C. L. Dutson[16], David F. Día z Fernández[17], Lincoln D. C. Fishpool[1], Claire Fitzgerald[2], Matt Foster[18], Melanie F. Heath[1], Marc Hockings[19], Michael Hoffmann[2,15,20], David Knox[21], Frank W. Larsen[15], John F. Lamoreux[18], Colby Loucks[11], Ian May[1], James Millett[22,23], Dominic Molloy[23], Paul Morling[23], Mike Parr[24], Taylor H. Ricketts[25], Nathalie Seddon[26], Benjamin Skolnik[24], Simon N. Stuart[2,15,20,27,28], Amy Upgren[15], Stephen Woodley[29]



Biological Conservation 161 (2013) 230–238

Contents lists available at SciVerse ScienceDirect

Biological Conservation

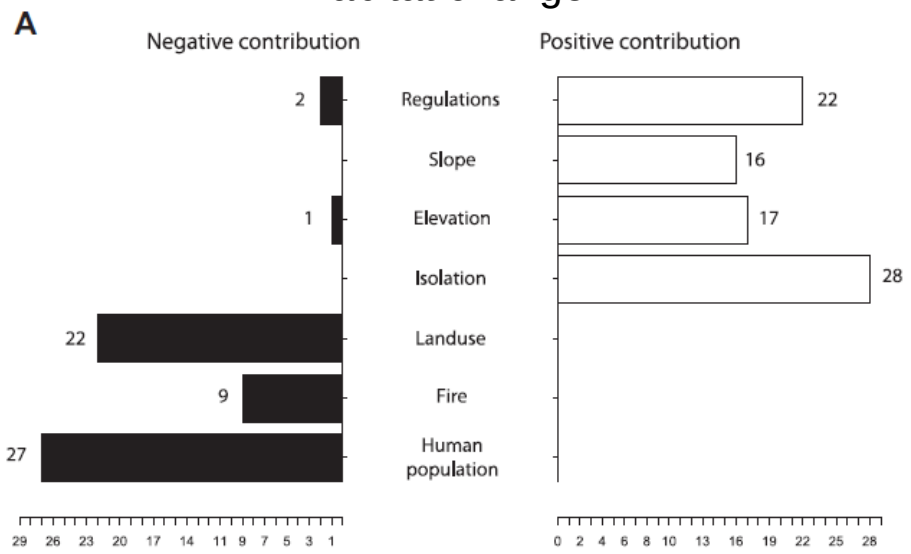
journal homepage: www.elsevier.com/locate/biocon

Systematic review

Effectiveness of terrestrial protected areas in reducing habitat loss and population declines

Jonas Geldmann [a,*], Megan Barnes [b,c], Lauren Coad [d], Ian D. Craigie [e], Marc Hockings [b], Neil D. Burgess [a,f]

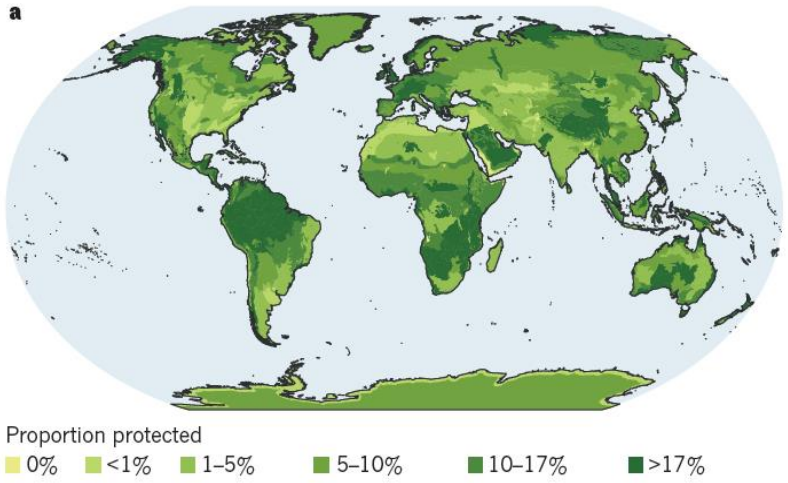
Habitat change



Contribution of the effectiveness of PAs

Protected areas – state of the art

CBD 2000-2010 – 10%
2010-2020 – 17%
(Aichi target 11)



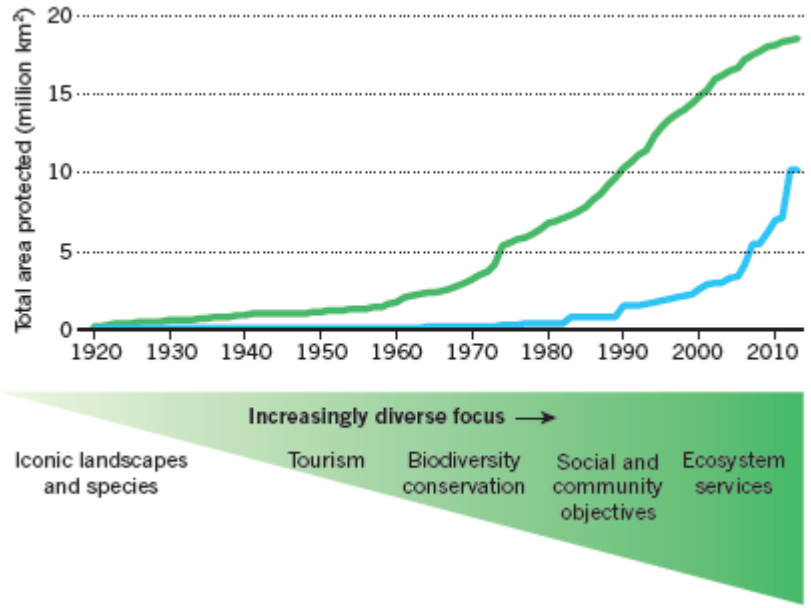
As of 2014 …

1. *300 ecoregions (36%) have more than 17% coverage*
2. *68 (8%) having less than 1% coverage*
3. *237 (29%) of all ecoregions having less than 5% coverage*

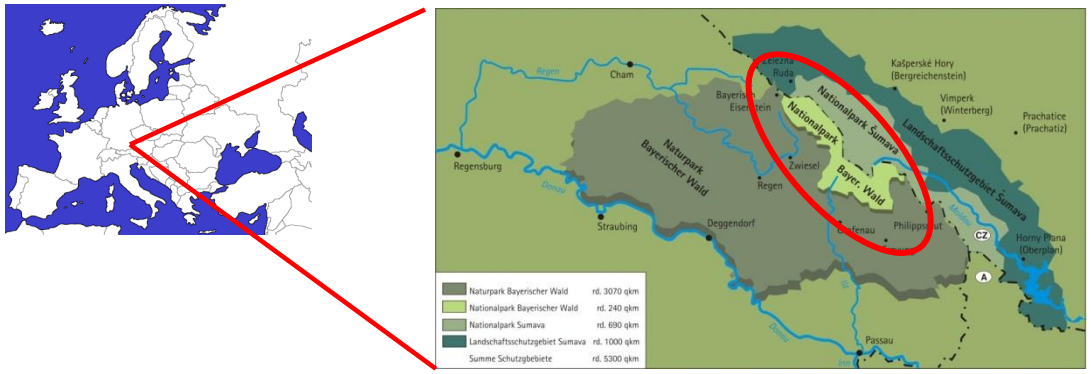
nature International weekly journal of science
REVIEW
doi:10.1038/nature13947

The performance and potential of protected areas

James E. M. Watson[1,2,3], Nigel Dudley[1,4], Daniel B. Segan[2,3] & Marc Hockings[1,5]



The National Park Bavarian Forest



1864
Yosemite Grant Act and first formal protected area

1872
First national park (Yellowstone) established

1948
IUCN founded

1958
IUCN establishes provisional National Parks Commission

1970

1962
First World Parks Congress

1972
UNEP founded, World Heritage Convention established

1982
Third World Parks Congress

1992
Fourth World Parks Congress

2004
CBD PoWPA

2010
2020 CBD Strategic Plan and Aichi targets

A cultural landscape

„…the unsustainable management of forests: a 5000-year European Experiment…“

Annu. Rev. Ecol. Syst. 2002. 33:1–23
doi: 10.1146/annurev.ecolsys.33.010802.150507

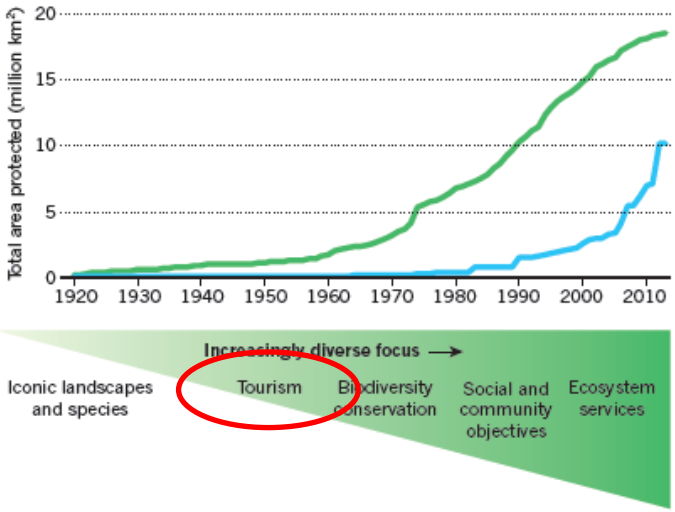
First published online as a Review in Advance on August 6, 2002

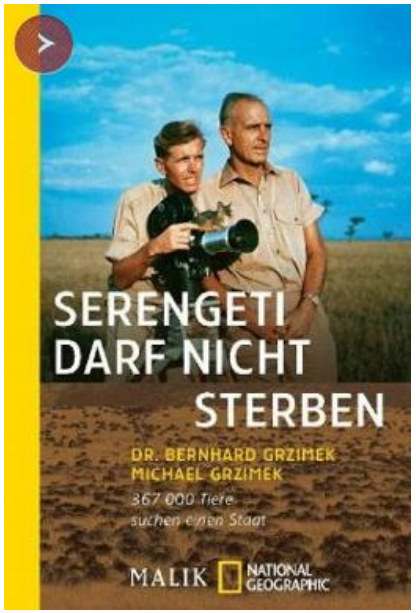
SAPROXYLIC INSECT ECOLOGY AND THE SUSTAINABLE MANAGEMENT OF FORESTS

Simon J. Grove

First simple forest inventories ca. 1840: „80% of the area primeval character“

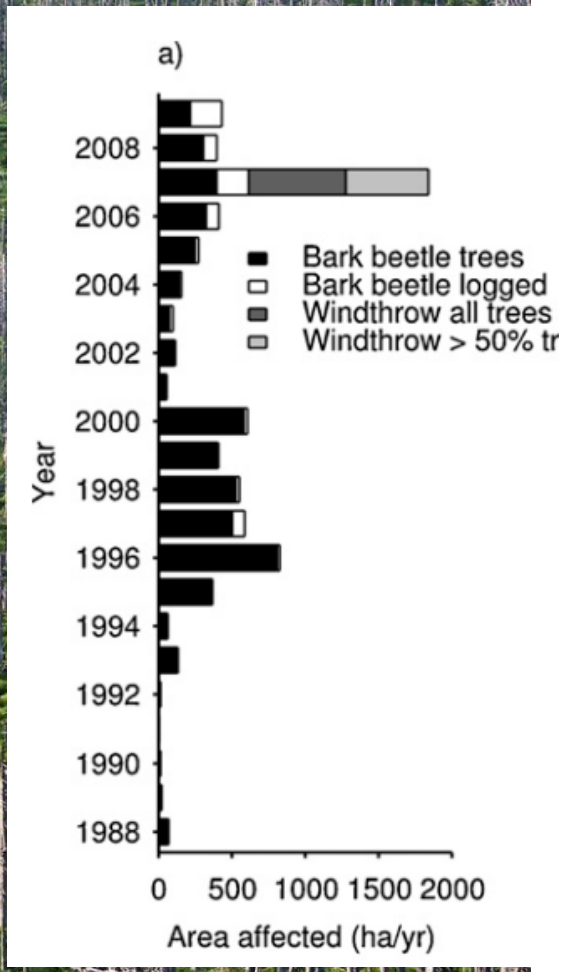
Political compromises





The Park and its characteristics

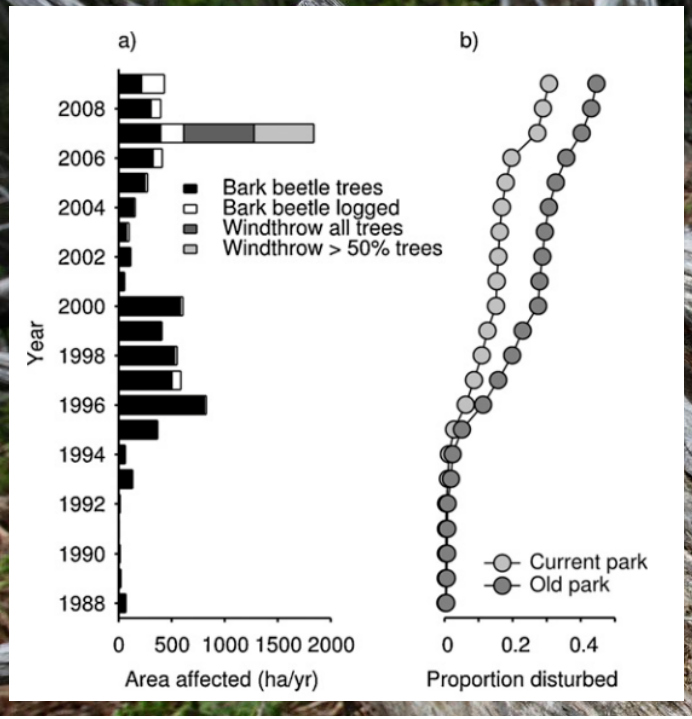
Ips typographus

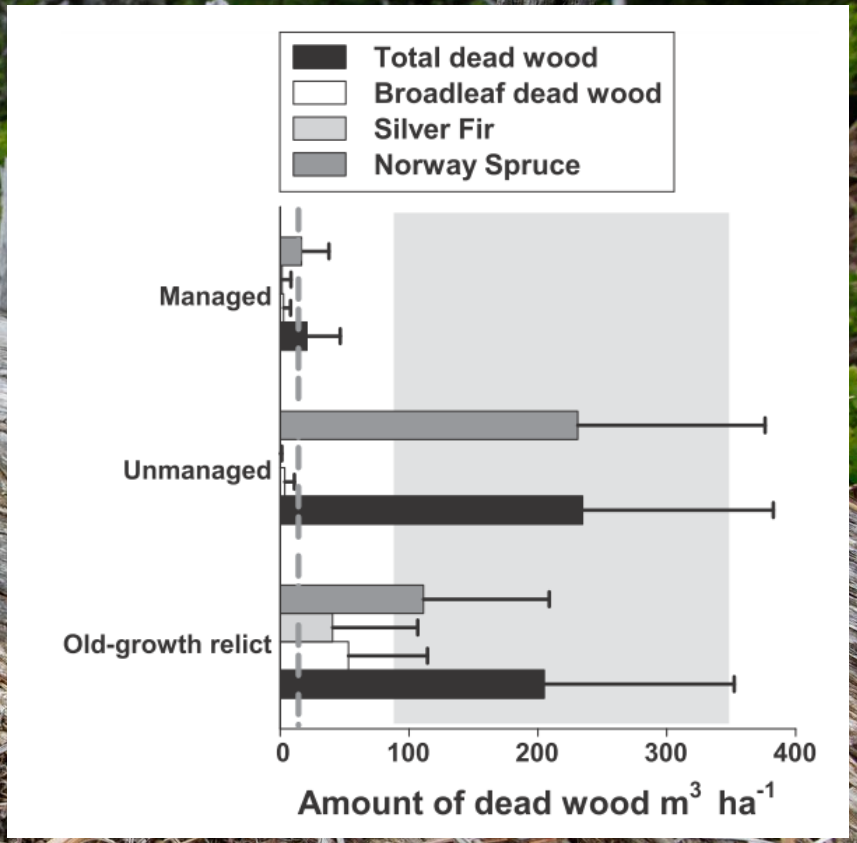


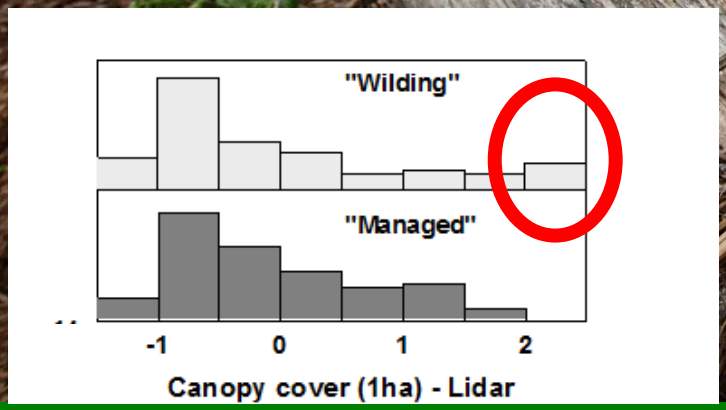
Emotions …


„… an ecological desert…“
Nationalpark Bayerischer Wald
Aus dem ehemals »grünen Dach Europas« ist ein gigantischer Baumfriedhof geworden. Ungehindert breitet sich der Borkenkäfer aus. Die Anwohner protestieren gegen überzogenen Naturschutz. Auch um andere Nationalparks in Deutschland ist ein Glaubenskrieg entbrannt.
Kaputtgeschützt

Increased habitat diversity



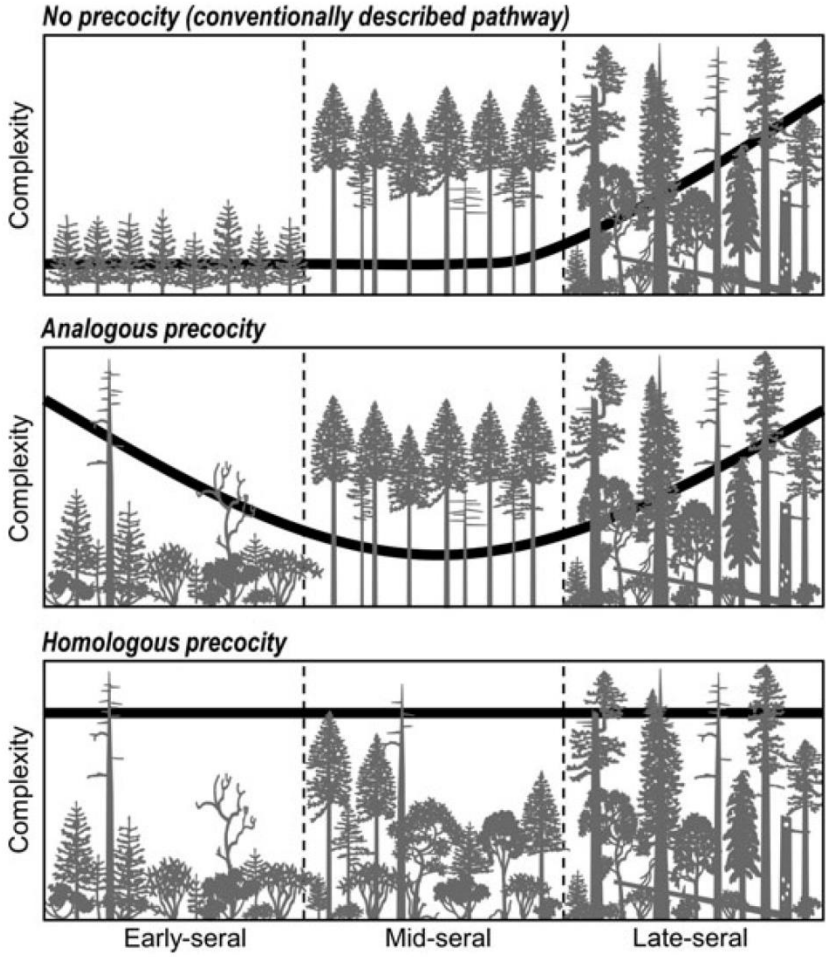




Disturbance increased rapidly habitat diversity in terms of openness and dead wood amount in the former commercial forest of the national park area

Müller et al (2010) Biological Conservation Lehnert et al (2013) J Nature Conservation

Disturbance and the habitat diversity



During the last 15 years the discussion (in forest community) circled around the question „Do forests naturally regenerate on disturbed areas?“ Now we discuss where forests do not regenerate – ***or which is the pathway (sensu Donato) we have to expect?***

Donato et al (2012) J Veg Science

Effects on rare species

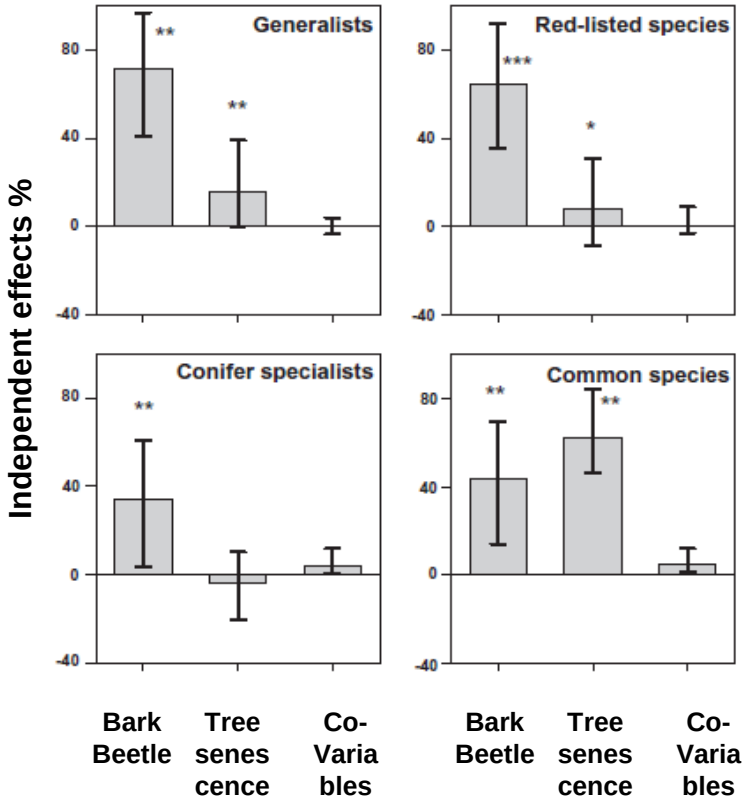
Ostoma ferruginea

>100 individuals

Ampedus auripes

>300 individuals

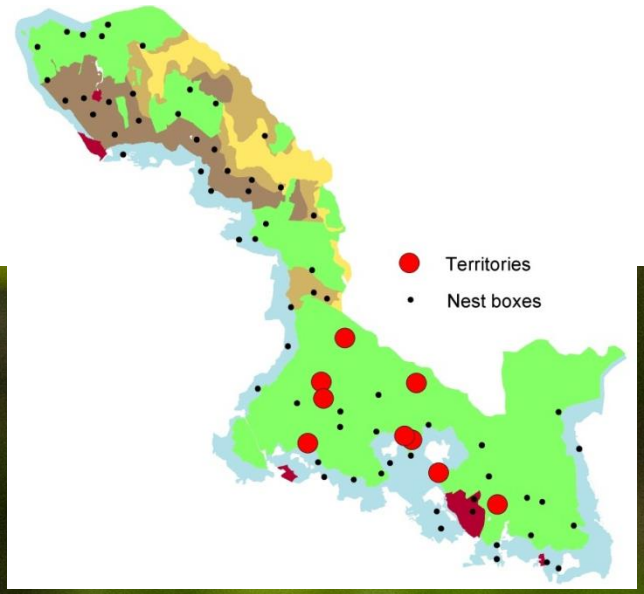
1. *Restoration of population densities*
2. *Amount of dead wood should exceed 60m^3 ha^{-1} (at present ~ 15m^3 ha^{-1})*



Effects on rare species

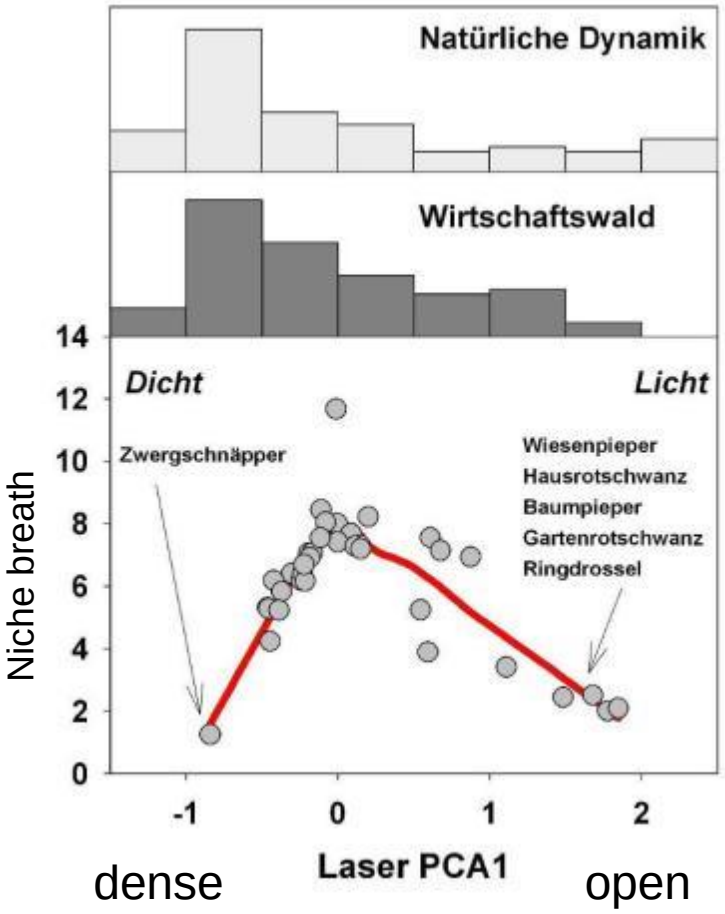
Ural owls are breeding only on high stumps now

Recovery of ecological features after 40 years



Strix uralensis

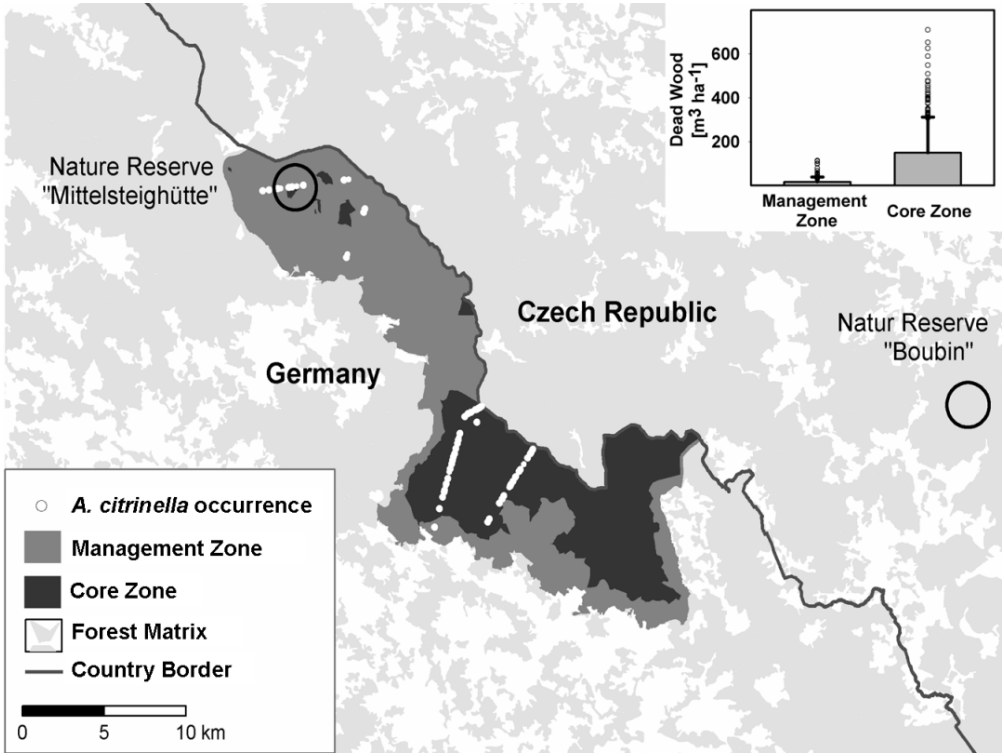
Effects on rare species



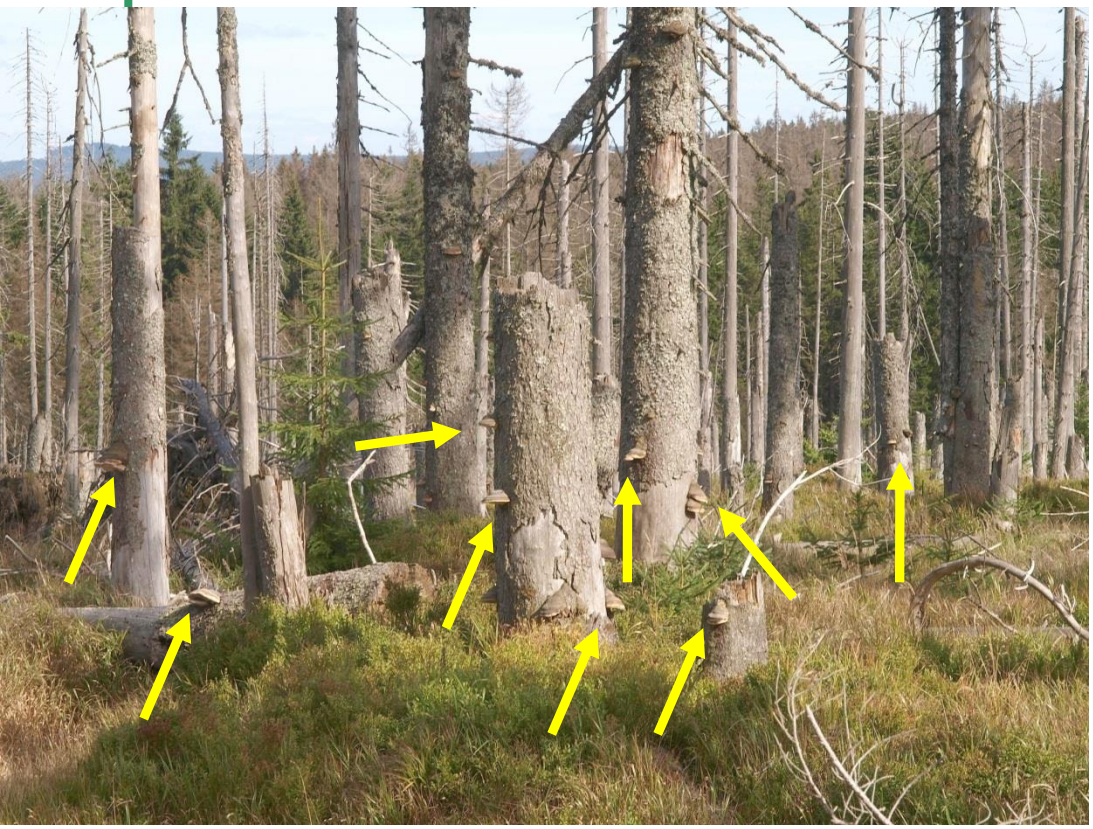
Ficedula parva
Red breasted flycatcher

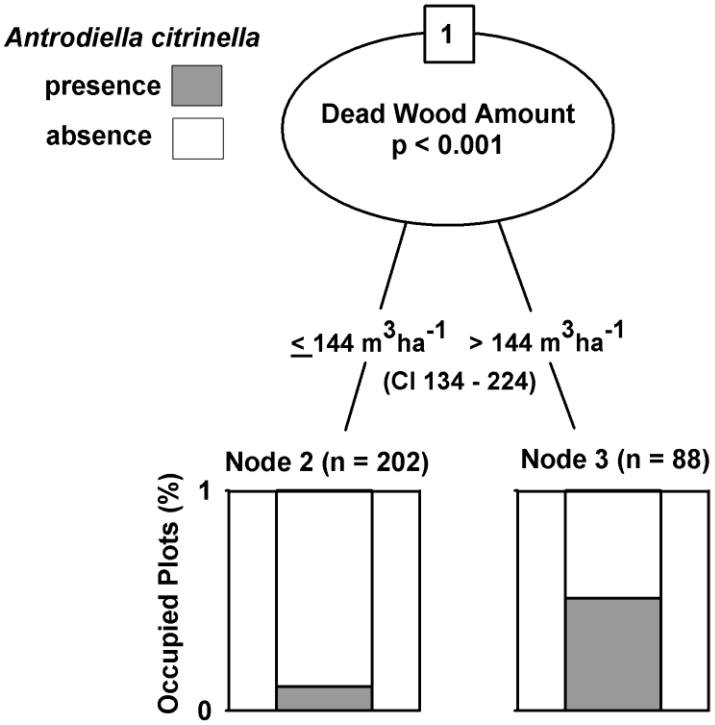
Phoenicurus phoenicurus
Red Start

Recovery of rare species



Recovery of rare species





A. citrinella	Volume of dead wood		Stage of decomposition	
	Estimator	Independent effect	Estimator	Independent effect
Abundance (Poisson)	1.28***	92.6 %	0.60***	7.4 %
Probability (Binomial)	1.80***	90.7 %	1.31***	9.3 %

Some things are still missing

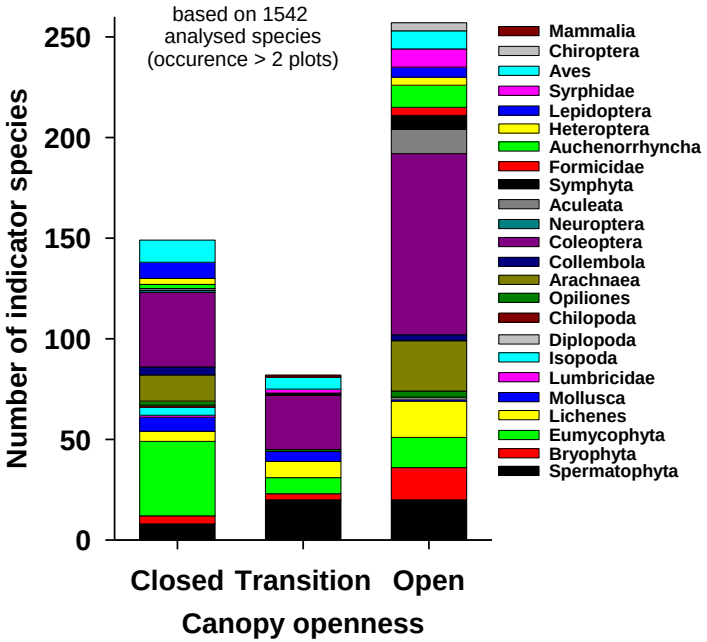
Jagdkäfer
Peltis grossa

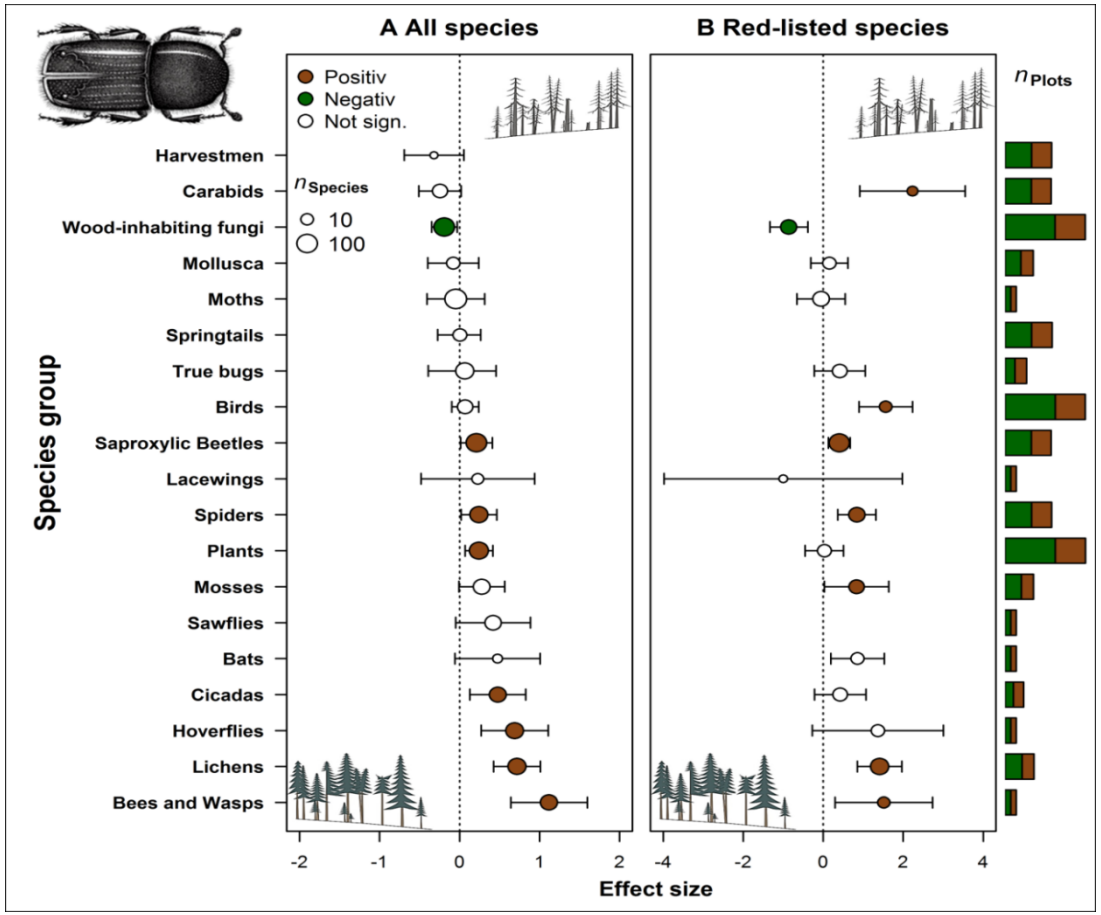
Living death

Hennevogel (1905) Beiträge zur Insektenfauna Böhmen Weslin et al (2012) Journal of Animal Ecology
Bässler et al (2011) Biodiversity and Conservation

To sum up – species diversity

The overall species diversity increased by disturbance, the pest species shifts to a keystone species!





Lehnert et al (2013) J Nature Conservation

Beudert et al (2015) Conservation Letters

Effects of protection – Meta-analysis

Conservation Biology

Review

Biodiversity Differences between Managed and Unmanaged Forests: Meta-Analysis of Species Richness in Europe

YOAN PAILLET,[1,2] LAURENT BERGÈS,[1,20] JOAKIM HJÄLTÉN,[3] PÉTER ÓDOR,[4] CATHERINE AVON,[1] MARKUS BERNHARDT-RÖMERMANN,[5] RIENK-JAN BIJLSMA,[6] LUC DE BRUYN,[7,8] MARC FUHR,[2] ULF GRANDIN,[9] ROBERT KANKA,[10] LARS LUNDIN,[9] SANDRA LUQUE,[2] TIBOR MAGURA,[11] SILVIA MATESANZ,[12] ILONA MÉSZÁROS,[13] M.-TERESA SEBASTIÀ,[14,15] WOLFGANG SCHMIDT,[5] TIBOR STANDOVÁR,[4] BÉLA TÓTHMÉRÉSZ,[16] ANNELI UOTILA,[17] FERNANDO VALLADARES,[12] KAI VELLAK,[18] AND RISTO VIRTANEN[19]

Table 2. Effect of forest management on total species richness and species richness of different taxonomic groups in European forests[a]

Taxa	*Average* d d_+ *or* d_{++}	*Bootstrap CI* −	+	n	Q_T	$p(Q_T)$	*Variation (%)*
All	−0.24*	−0.48	−0.03	120	183.41	<0.0001	−6.8
Vascular plants[b]	0.47*	−0.01	0.91	28	39.64	0.06	12.7
Bryophytes	−0.46*	−0.97	−0.04	14	18.51	0.14	−21.0
Lichens	−0.40*	−0.79	−0.10	13	12.35	0.42	−8.6
Birds	−0.21	−0.52	0.36	8	10.48	0.16	−7.7
All arthropods	0.12	−0.63	1.10	5	4.44	0.35	1.6
Acari oribatids	−0.25	−1.08	0.51	3	2.03	0.36	−8.3
Carabids	−1.98*	−3.34	−0.56	8	7.45	0.38	−29.8
Saproxylic beetles[c]	−0.67*	−1.19	−0.25	17	17.43	0.36	−17.5
Nonsaproxylic beetles	0.37	−0.29	0.97	8	5.91	0.55	8.4
Fungi	−0.65*	−1.25	−0.13	12	14.77	0.19	−17.5

[a] *One study gave the Shannon index in place of species richness but was included anyway (Vellak & Paal 1999, see Supporting Information). Average* d, *Hedges'* d *effect size;* d_{++}, *grand mean;* d_+, *mean of a taxonomic group; bootstrap CI, 95% bootstrap confidence interval calculated with 999 iterations;* n, *number of individual comparisons;* Q_T, *total heterogeneity.* $p(Q_T)$, *heterogeneity tested against a chi-square distribution; variation, difference in species number between managed and unmanaged forests expressed as a percentage calculated with the log response ratio; *, marginally significant effect and significant effect.*

[b] *Includes ferns.*

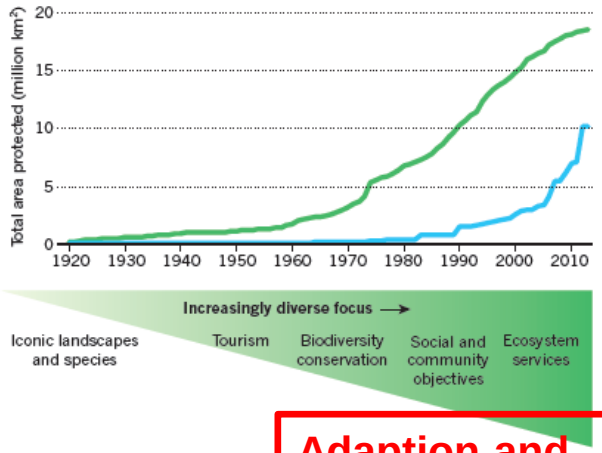
[c] *Includes bark beetles.*

Challenge climate change

nature International weekly journal of science
REVIEW
doi:10.1038/nature13947

The performance and potential of protected areas

James E. M. Watson[1,2,3], Nigel Dudley[1,4], Daniel B. Segan[2,3] & Marc Hockings[1,5]



Adaption and mitigitation climate change

Ecology Letters, (2009) 12: 420–431 doi: 10.1111/j.1461-0248.2009.01297.x

LETTER

Projected impacts of climate change on a continent-wide protected area network

David G. Hole,[1,2] Stephen G. Willis,[1]* Deborah J. Pain,[3†] Lincoln D. Fishpool,[4] Stuart H. M. Butchart,[4] Yvonne C. Collingham,[1] Carsten Rahbek[5] and Brian Huntley[1]

"Rigorously defined networks can play a key role in mitigating the worst impacts of climate change on biodiversity."

Ecology Letters, (2011) 14: 484–492 doi: 10.1111/j.1461-0248.2011.01610.x

LETTER

Climate change threatens European conservation areas

Miguel B. Araújo,[1,2*†] Diogo Alagador,[1,3†] Mar Cabeza,[1,4] David Nogués-Bravo[1,5] and Wilfried Thuiller[6]

"The risk is high that ongoing efforts to conserve Europe's biodiversity are jeopardized by climate change."

Reorganization of communities


Biogeographische Betrachtung
des Rachel

zum Zwecke der Darlegung, wie das Leben diesen Raum in vertikaler Richtung besetzt hat.

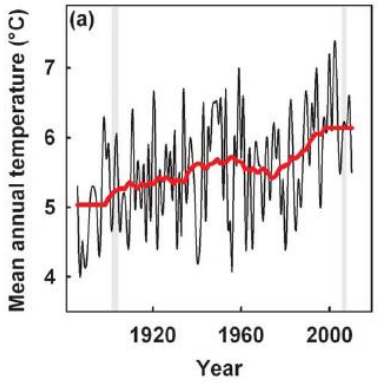
(Lebenszonen, Lebensgrenzen.)

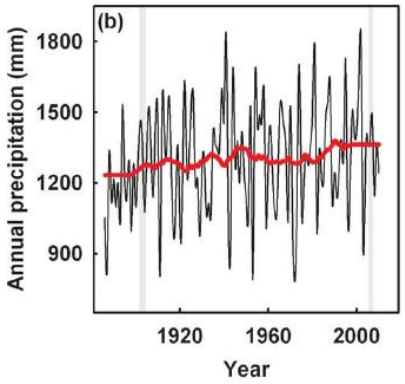
Von **Friedrich Max Thiem** aus Plauen i. V.

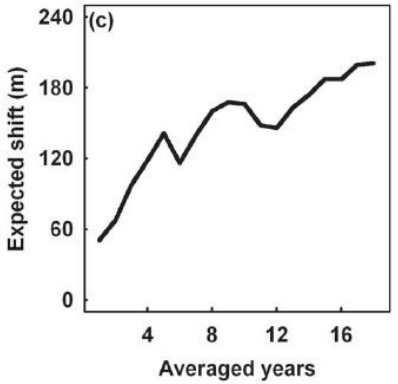
Nürnberg.

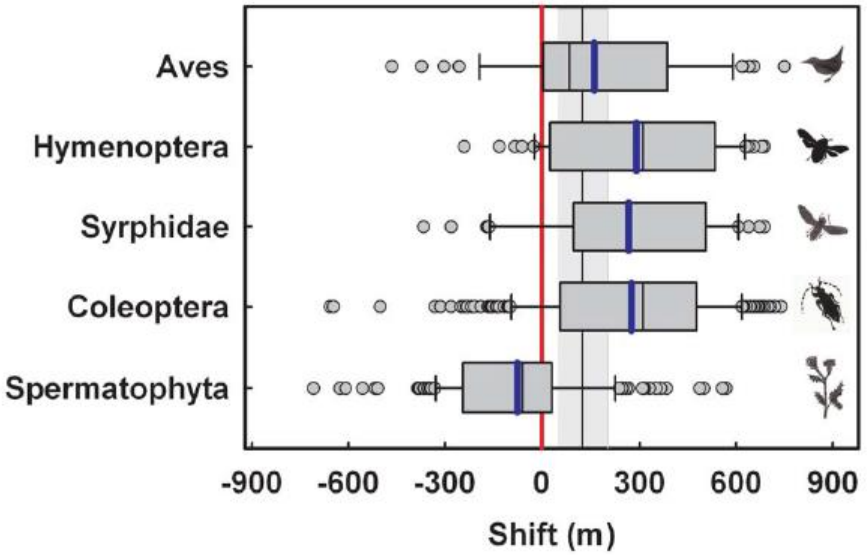
Gedruckt bei U. E. Sebald.

1906.



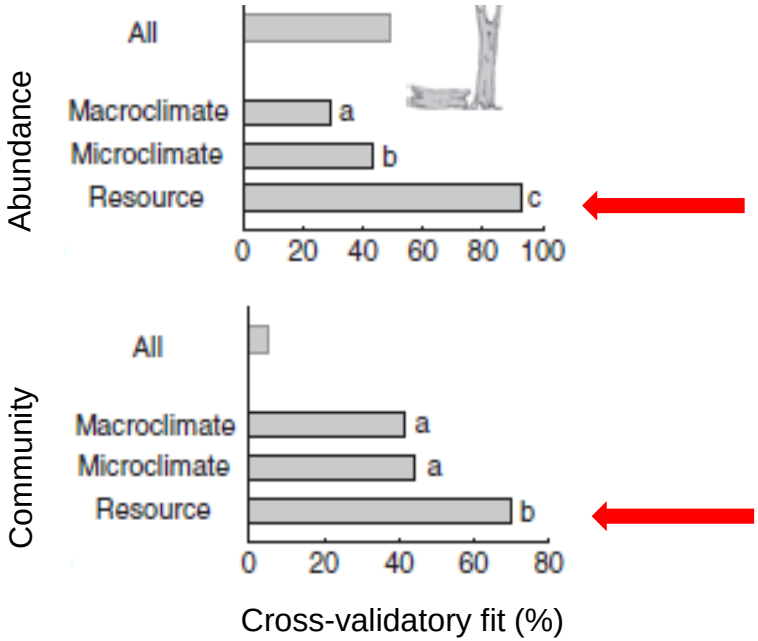






Different response among taxonomic groups suggests an interruption of communities across lineages

Different levels of sensitivity



Natural forest structure (dead wood) might act as a buffer in times of climate change

… Expectation

nature Vol 448|2 August 2007

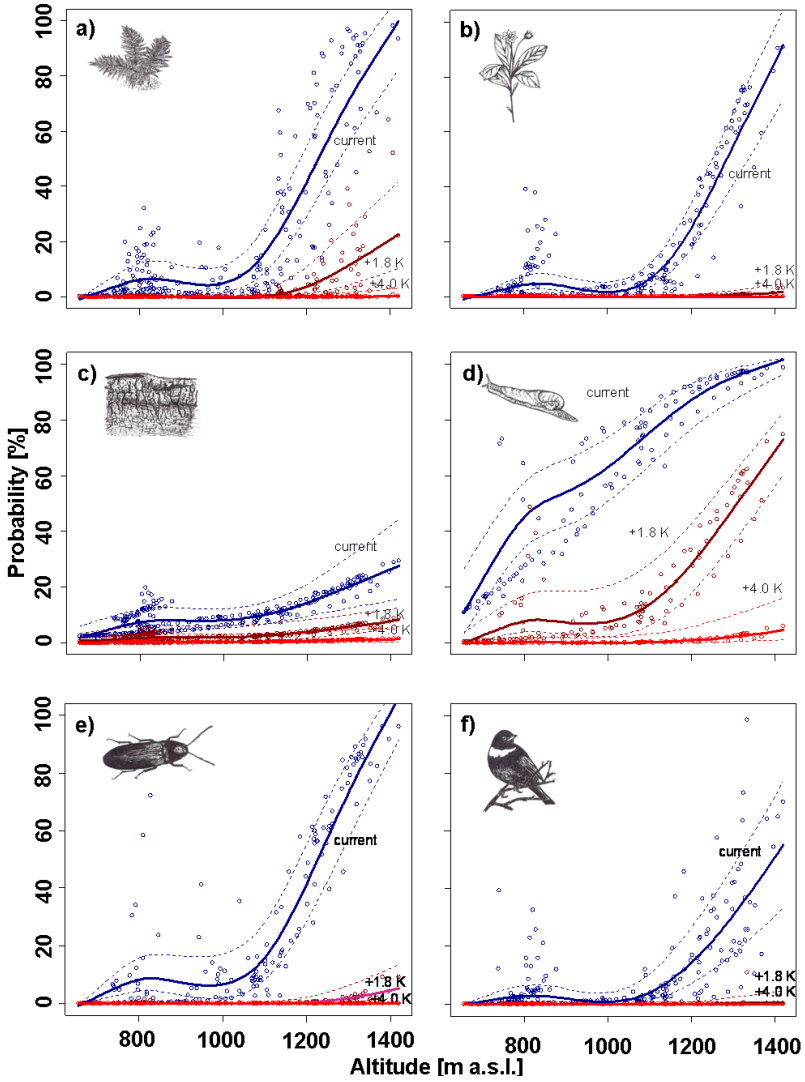
Q&A

BIODIVERSITY

Climate change and the ecologist

Wilfried Thuiller

„Species from mountains are disproportional sensitive to climate change. There are some obvious cases of species that with climate change should lose parts of their range“



Towards a mechanistic understanding

SCIENCE'S COMPASS • REVIEW
REVIEW: ECOLOGY

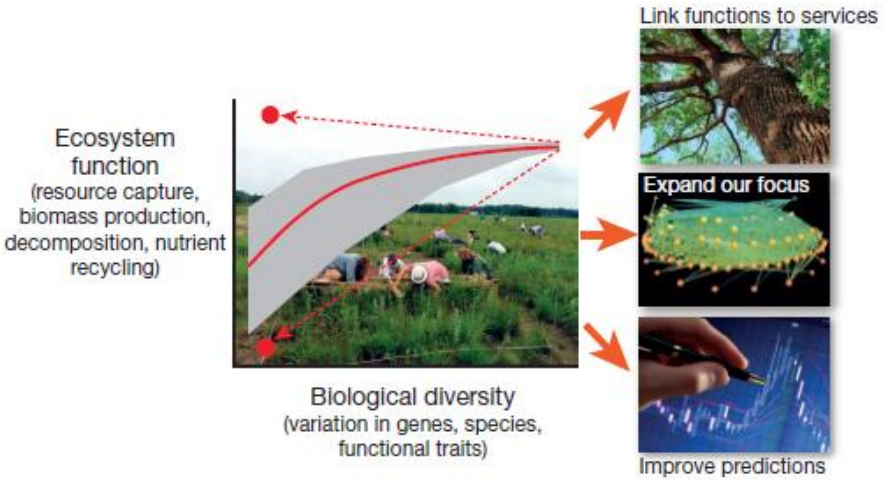
Biodiversity and Ecosystem Functioning: Current Knowledge and Future Challenges

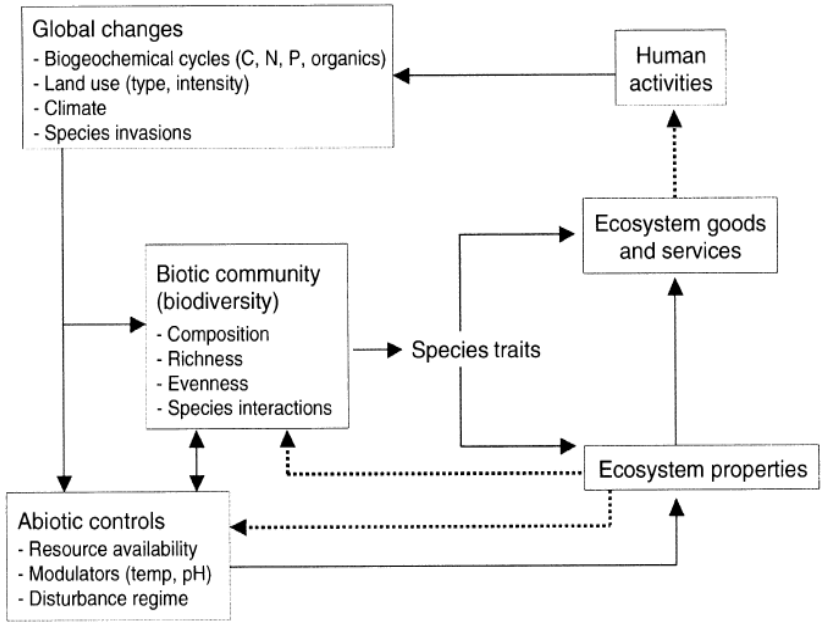
M. Loreau,[1*] S. Naeem,[2] P. Inchausti,[1] J. Bengtsson,[3] J. P. Grime,[4] A. Hector,[5] D. U. Hooper,[6] M. A. Huston,[7] D. Raffaelli,[8] B. Schmid,[9] D. Tilman,[10] D. A. Wardle[4]

ESA Report

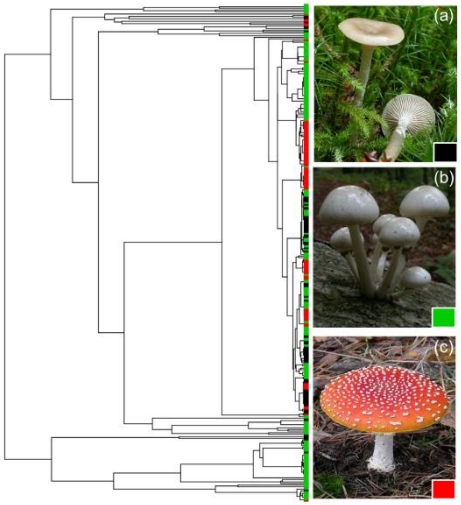
EFFECTS OF BIODIVERSITY ON ECOSYSTEM FUNCTIONING: A CONSENSUS OF CURRENT KNOWLEDGE

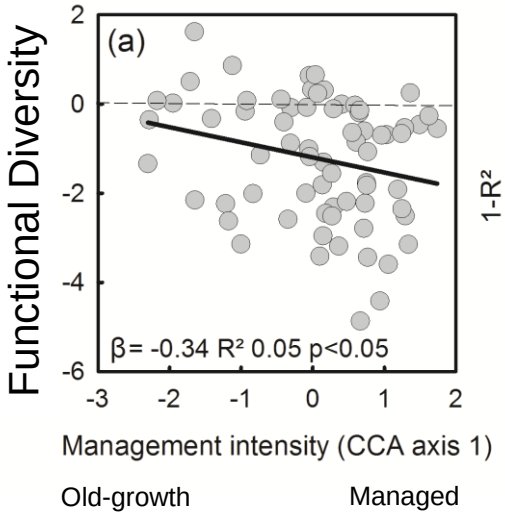
D. U. Hooper,[1,16] F. S. Chapin, III,[2] J. J. Ewel,[3] A. Hector,[4] P. Inchausti,[5] S. Lavorel,[6] J. H. Lawton,[7] D. M. Lodge,[8] M. Loreau,[9] S. Naeem,[10] B. Schmid,[6] H. Setälä,[11] A. J. Symstad,[12] J. Vandermeer,[13] and D. A. Wardle[14,15]

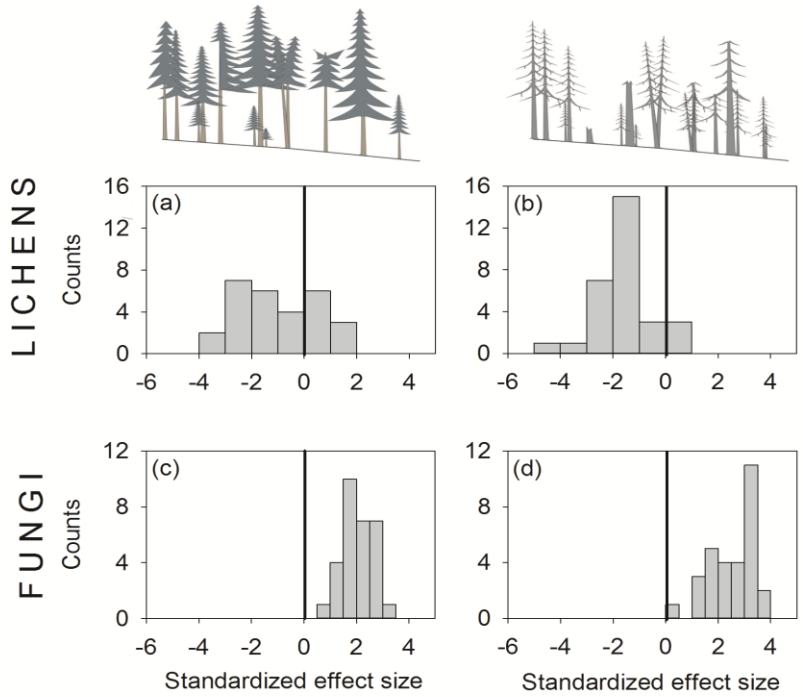




Towards a mechanistic understanding







Forest management intensity changes the forces responsible for assembly

but not natural disturbance

Ecosystem services

Low range mountains in Europe: Habitats, Tourism, drinking water, CO_2-storage

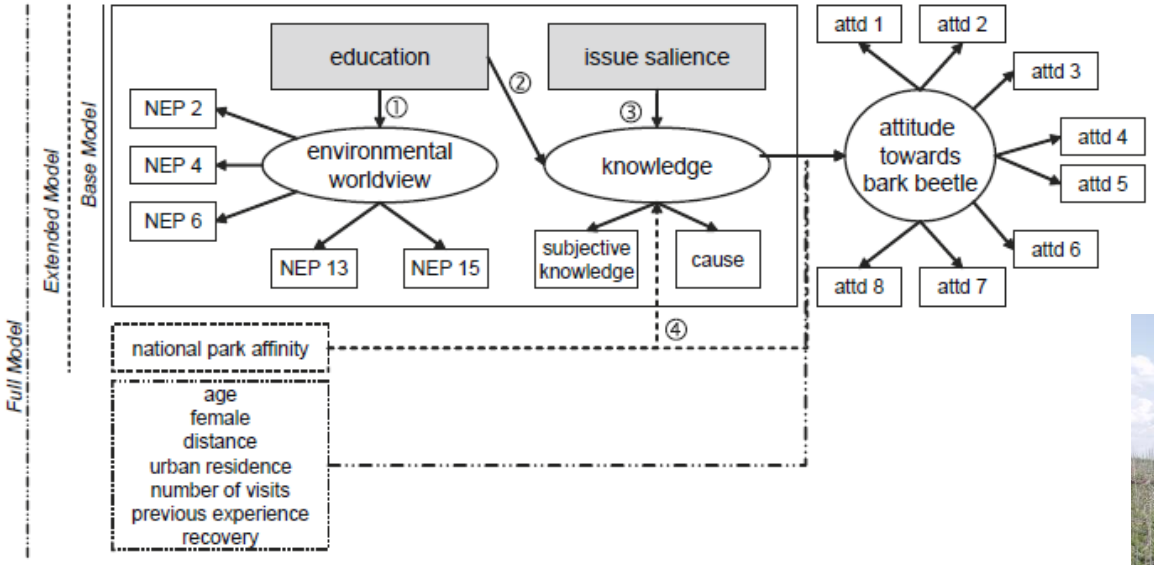
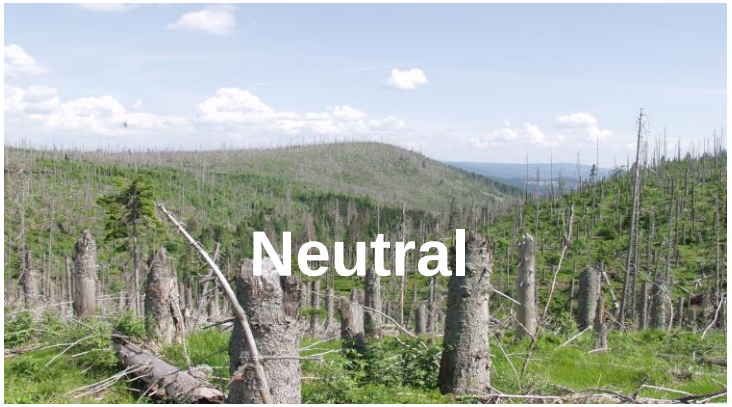


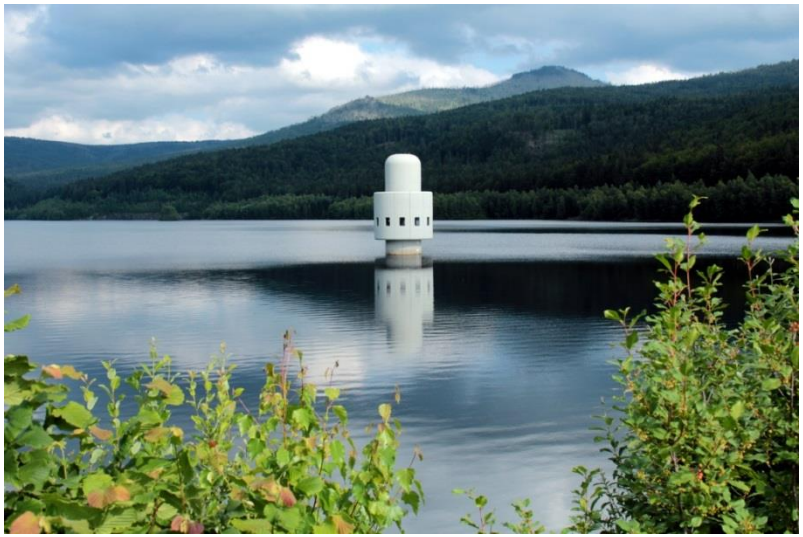
Fig. 1 – Base, extended and full conceptual models for attitude towards the bark beetle.



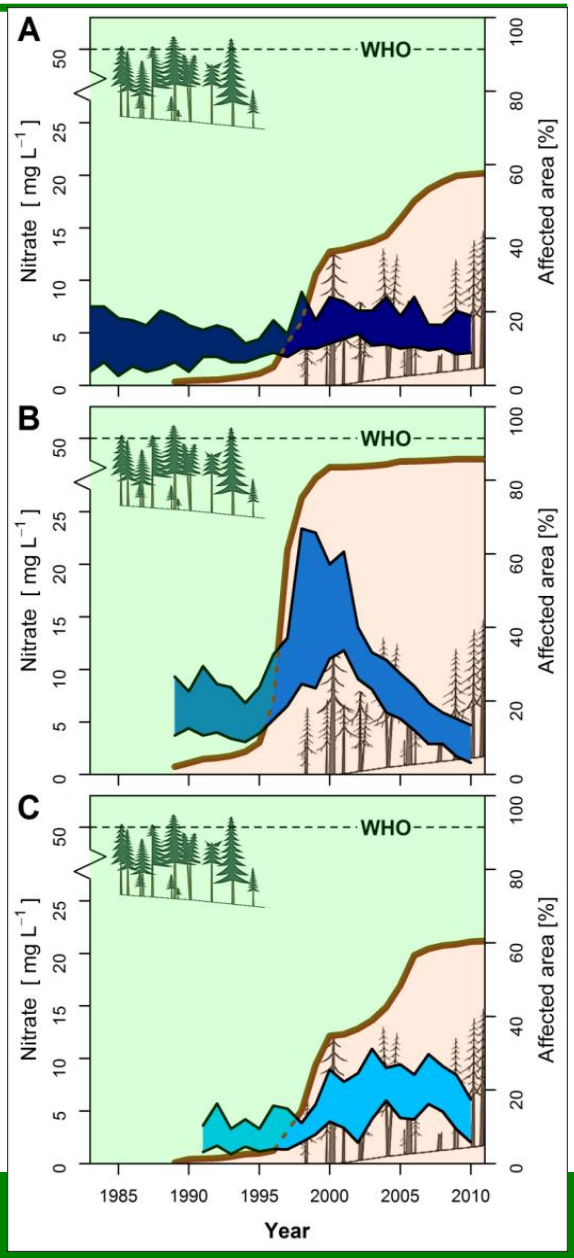
Tourists with higher affinity for the national park and a better knowledge about the bark beetle have a significantly more positive attitude.

Ecosystem services

Low range mountains in Europe: Habitats, Tourism, drinking water, CO_2-storage

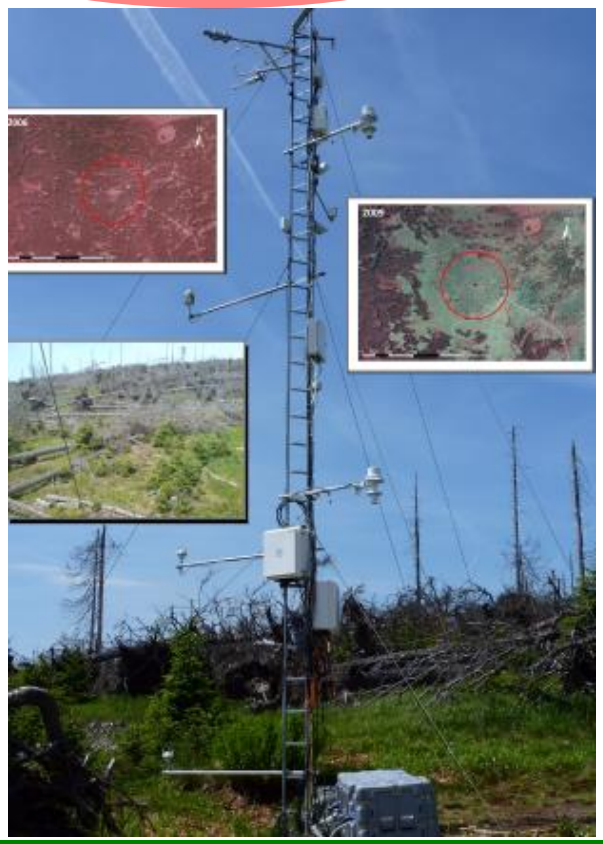


No negative effect on drinking water quality



Ecosystem services

Low range mountains in Europe:
Habitats, Tourism, drinking water,
CO_2-storage

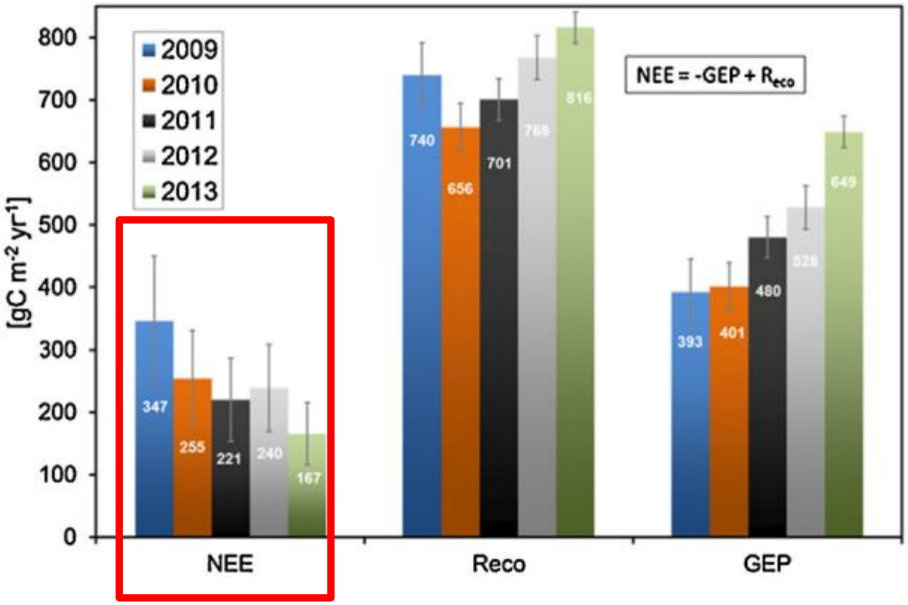


Vol 455|11 September 2008|doi:10.1038/nature07276 nature

LETTERS

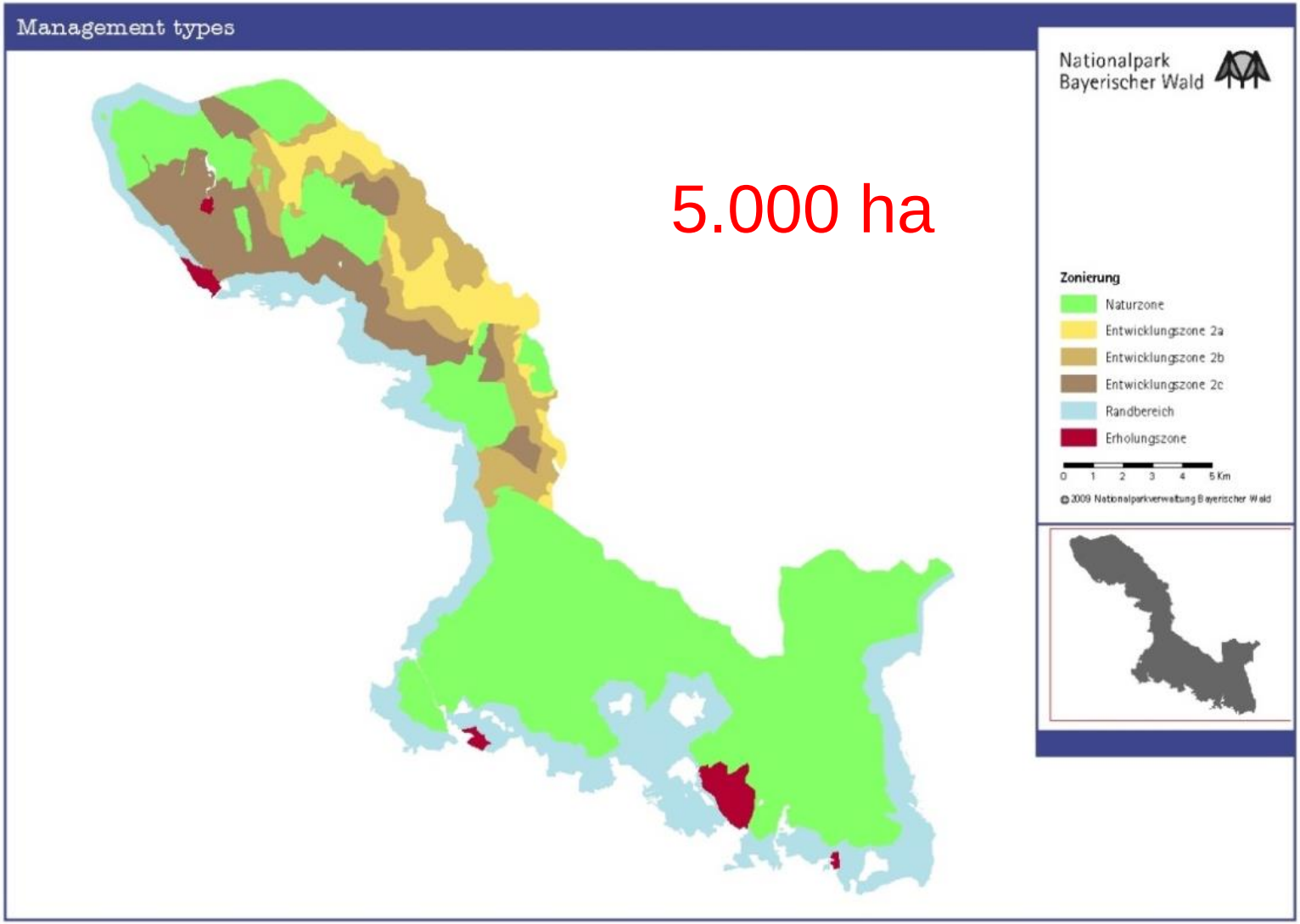
Old-growth forests as global carbon sinks

Sebastiaan Luyssaert[1,2], E. -Detlef Schulze[3], Annett Börner[3], Alexander Knohl[4], Dominik Hessenmöller[3], Beverly E. Law[2], Philippe Ciais[5] & John Grace[6]



Break-even (NEE = 0) after~10 Jahren

Management zone – a place to learn…



Next steps – Experiments

METSÄHALLITUS

Ecological restoration and management in boreal forests

– best practices from Finland

Maarit Similä and Kaisa Junninen (eds)

5,000 ha …

(1) A research playground to obtain a deeper (causal) understanding and to improve concepts for commercial forests

(2) For active conservation activities

A place for discussions

Guided Tours for local people

PERSPECTIVES

THE ROBERT H. MACARTHUR AWARD LECTURE

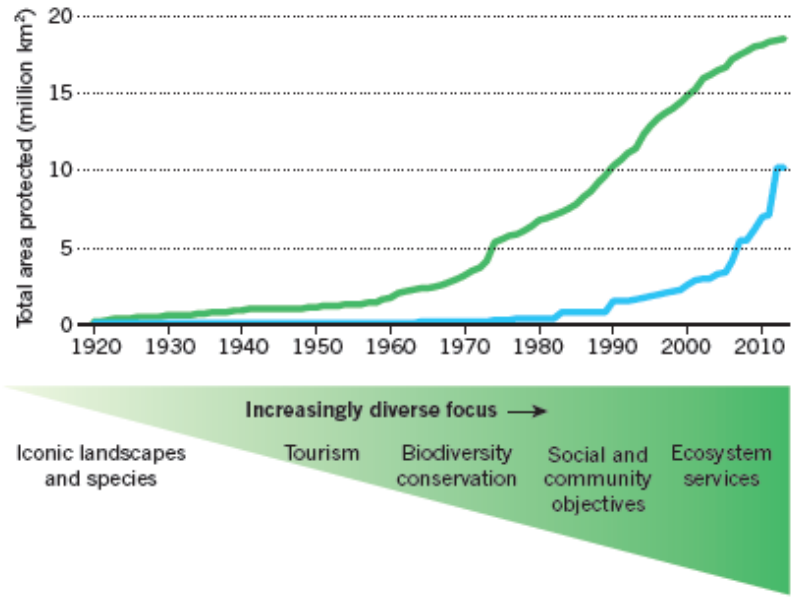
Ecology, 91(10), 2010, pp. 2833–2849

Disturbance and landscape dynamics in a changing world[1]

Monica G. Turner[2]

Disturbance conference
Bavarian Forest 2013

Future perspectives – global scale



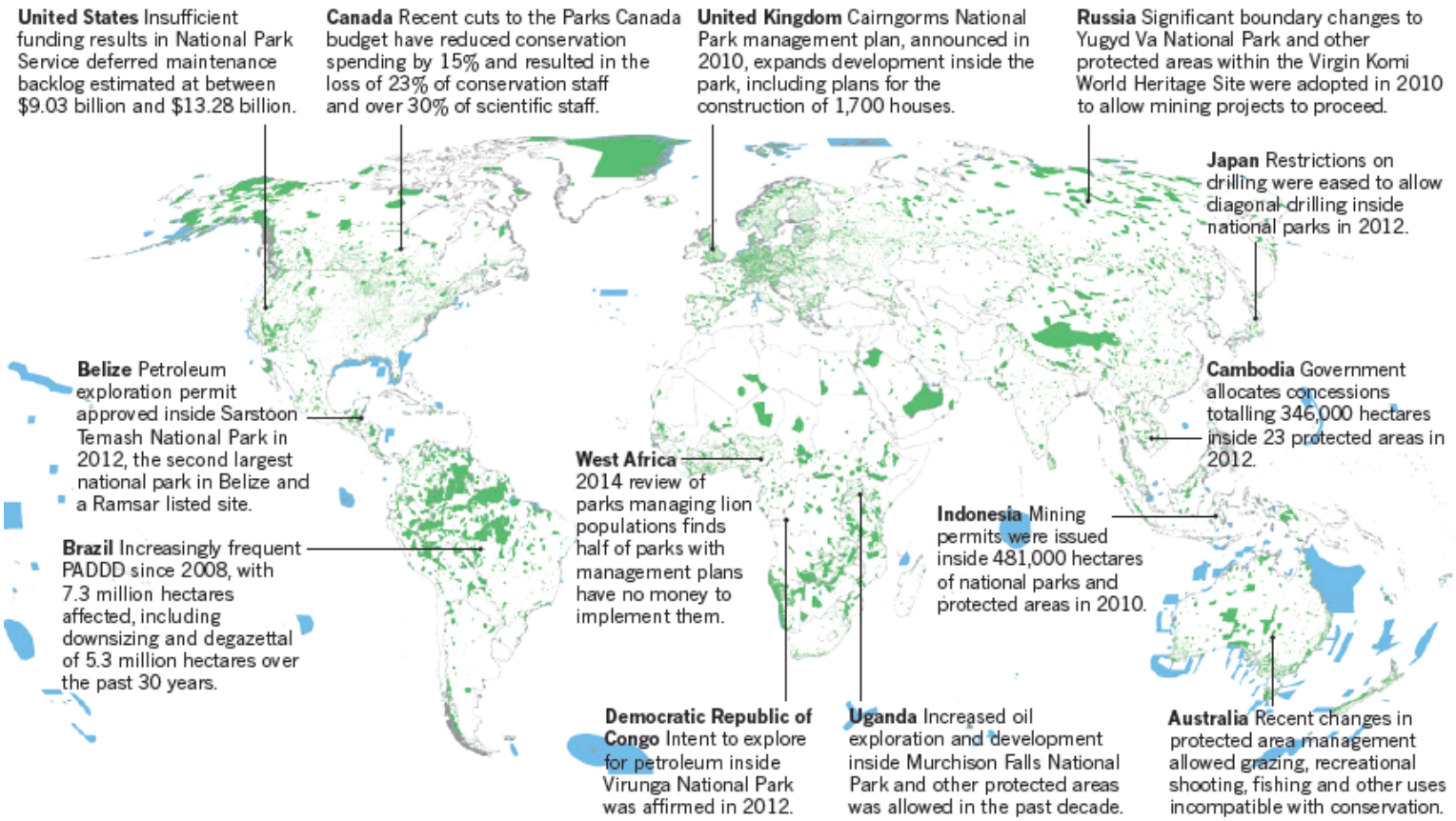
1. Among key biodiversity areas, only 28% of Important Bird Areas and 22% of Alliance for Zero Extinction sites are adequately covered by existing protected areas.

2. 17% of all threatened birds, amphibians and mammals are not found in a single protected area and 85% do not have sufficiently large populations in protected areas to give them a reasonable chance of long-term survival.

3. In comparison, a decade ago 20% of globally threatened terrestrial birds, mammals and amphibians were not found in a single protected area and 89% were inadequately represented.

No progress in the last decades in achieving ecological representation and this is likely to have serious ramifications when it comes to threats such as climate change

Future perspectives – global scale



REVIEW

doi:10.1038/nature13947

The performance and potential of protected areas

James E. M. Watson[1,2,3], Nigel Dudley[1,4], Daniel B. Segan[2,3] & Marc Hockings[1,5]

Declining support for protected areas

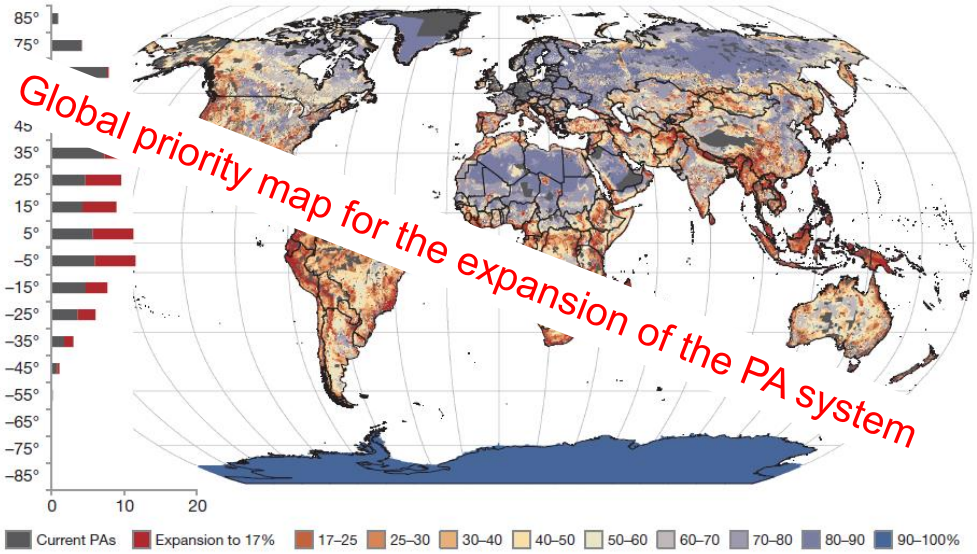
Future perspectives – global scale

LETTER

doi:10.1038/nature14032

Global protected area expansion is compromised by projected land-use and parochialism

Federico Montesino Pouzols[1]†*, Tuuli Toivonen[1,2]*, Enrico Di Minin[1,3], Aija S. Kukkala[1], Peter Kullberg[1], Johanna Kuusterä[1,4], Joona Lehtomäki[1], Henrikki Tenkanen[2], Peter H. Verburg[5] & Atte Moilanen[1]



1. With a coordinated global protected area network expansion to 17% of terrestrial land, average protection of species ranges and ecoregions could triple.

2. If projected land-use change by 2040 takes place, it becomes infeasible to reach the currently possible protection levels, and over 1,000 threatened species would lose more than 50% of their present effective ranges worldwide.

3. There is a major efficiency gap between national and global conservation priorities. Further biodiversity loss is unavoidable unless international action is quickly taken to balance land-use and biodiversity conservation.

Future perspectives – national scale

Evidence based setting up (objective criterias)

[e.g., Schultze et al 2014

Space (completeness and connectivity)

Time (habitat continuity and persistence)

Function (naturalness, rarity/threat, representativenss)]

From the National Park Bavarian Forest as a case study we can learn that decisions on the implementation of protected forest areas should not be driven by fear leading to foul political compromises at the expense of conservation needs.


Thank you!!!!