

# The Top 100 Science Hits from a Decade of TNC Research, 2001-2010

The Nature Conservancy has always used science to guide its actions. But in recent years, the Conservancy has placed increasing emphasis on publishing the lessons it has learned and on the results of its scientific analyses. Collected below are my personal top 100 favorite pieces of Conservancy-authored research from 2000 onward — selected either for their impact as gauged by number of science citations (in parentheses after the older articles) or because I personally think they are particularly innovative and warrant attention. Because of copyright laws, we cannot simply distribute the PDF's of all of these articles, but most are available for free or purchase at the links below. The names of Conservancy authors are in **bold**. We will endeavor to update the list as newer papers come to clearly warrant inclusion.

If you would like to learn more about TNC science, contact me ([pkareiva@tnc.org](mailto:pkareiva@tnc.org)) or our director of science communications, Bob Lalasz ([rlalasz@tnc.org](mailto:rlalasz@tnc.org)).

—Peter Kareiva, chief scientist, The Nature Conservancy

## 2001

Beck, MW, KL Heck, Jr., KW Able, DL Childers, et al. 2001. [The identification, conservation, and management of estuarine and marine nurseries for fish and invertebrates](#). *Bioscience* 51(8):633-641. (567)

Beck, MW, and M Odaya. 2001. [Ecoregional planning in marine environments: Identifying priority sites for conservation in the northern Gulf of Mexico](#). *Aquatic Conservation: Marine and Freshwater Ecosystems* 11(4):235-242. (68)

Boersma, PD, **P Kareiva**, WF Fagan, JA Clark, and **JM Hoekstra**. 2001. [How good are endangered species recovery plans?](#) *Bioscience* 51(8):643-649. (81)

Harding, EK, EE Crone, BD Elderd, **JM Hoekstra** et al. 2001. [The scientific foundations of habitat conservation plans: A quantitative assessment](#). *Conservation Biology* 15(2):488-500. (31)

## 2002

Baron, JS, NL Poff, PL Angermeier, CN Dahm, PH Gleick, NG Hairston Jr., RB Jackson, CA Johnston, **BD Richter**, and AD Steinman. 2002. [Meeting ecological and societal needs for freshwater](#). *Ecological Applications* 12:1247-1260. (240)

Blaustein, AR, and **Kiesecker, JM**. 2002. [Complexity in conservation: Lessons from the global decline of amphibian populations](#). *Ecology Letters* 5(4):597-608. (309)

Clark, JA, **JM Hoekstra**, PD Boersma, and **P Kareiva**. 2002. [Improving U.S. Endangered Species Act recovery plans: Key findings and recommendations of the SCB Recovery Plan Project](#). Conservation Biology 16(6):1510-1519. (69)

Groves, CR, DB Jensen, LL Valutis, KH Redford, ML Shaffer, JM Scott, **JV Baumgartner**, **JV Higgins**, **MW Beck**, and **MG Anderson**. 2002. [Planning for biodiversity conservation: Putting conservation science into practice](#). Bioscience 52(6):499-512. (254)

**Hoekstra, JM**, JA Clak, WF Fagan et al. 2002. [A comprehensive review of Endangered Species Act recovery plans](#). Ecological Applications 12(3):630-640. (53)

**Kiesecker, JM**. 2002. [Synergism between trematode infection and pesticide exposure: A link to amphibian limb deformities in nature?](#) PNAS 99(15):9900-9904. (246)

Roberts, CM, CJ McClean, JEN Veron, JP Hawkins...**M Spalding** et al. 2002. [Marine biodiversity hotspots and conservation priorities for tropical reefs](#). Science 295(5558):1280-1284. (450)

Ruckelshaus, MH, P Levin, JB Johnson, and **PM Kareiva**. 2002. [The Pacific salmon wars: What science brings to the challenge of recovering species](#). Annual Review of Ecology and Systematics 33: 665-706. (116)

## 2003

**Beck, MW** et al. 2003. The role of nearshore ecosystems as fish and shellfish nurseries. Issues in Ecology 11:1-12. (53)

**Kareiva, P**, and M Marvier. 2003. Conserving biodiversity coldspots. American Scientist 91:344-351. (136)

O'Connor, C, M Marvier, and **P Kareiva**. 2003. [Biological versus social, economic and political priority-setting in conservation](#). Ecology Letters 6: 706-711. (45)

Parrish, J, **D Braun**, and **R Unnasch**. 2003. [Are we conserving what we say we are? Measuring ecological integrity within protected areas?](#) Bioscience 53:851-860. (141)

Poff, NL, JD Allan, MA Palmer, DD Hart, **BD Richter** et al. 2003. [River flows and water wars: Emerging science for environmental decision making](#). Frontiers in Ecology and the Environment 1:298-306. (197)

Richter, BD, R Mathews, DL Harrison, and R Wigington. 2003. [Ecologically sustainable water management: Managing river flows for ecological integrity](#). Ecological Applications 13:206-224. (317)

## 2004

Brooks, TM, MI Bakarr, **T Boucher**, GAB DaFonseca, C Hilton-Taylor, **JM Hoekstra** et al. 2004. [Coverage provided by the global protected-area system: Is it enough?](#) Bioscience 54(12):1081-1091. (112)

**McDonald, RI**, and DL Urban. 2004. [Forest edges and tree growth rates in the North Carolina Piedmont](#). Ecology 85(8):2258-2266. (35)

McDonald, RI, and DL Urban. 2004. [Spatially varying rules of landscape change: Lessons from a case study](#). *Landscape and Urban Planning* 74(1):7-20. (35)

Marvier, MA, P Kareiva, and MG Neubert. 2004. [Habitat destruction, fragmentation, and disturbance promote invasion by habitat generalists in a multispecies metapopulation](#). *Risk Analysis* 24:869-879. (78)

Sabo, J, E Holmes, and P Kareiva. 2004. [The efficacy of simple viability models in ecological risk assessment: Does density dependence matter?](#) *Ecology* 85:328-341. (41)

## 2005

Harvey, C and P Kareiva. 2005. Community context and the influence of non-indigenous species on juvenile salmon survival in a Columbia River reservoir. *Biological Invasions* 7:651-663.

Hoekstra, JM, TM Boucher, TH Ricketts et al. 2005. [Confronting a biome crisis: Global disparities of habitat loss and protection](#). *Ecology Letters* 8(1):23-29. (314)

Marty, JT. 2005. [Effects of cattle grazing on diversity in ephemeral wetlands](#). *Conservation Biology* 19:1626-1632. (68)

McDonald, R, et al. 2005. [Species compositional similarity and ecoregions: Do ecoregion boundaries represent zones of high species turnover?](#) *Biological Conservation* 126(1):24-40. (31)

Pyke, CR, and Marty, J. 2005. [Cattle grazing mediates climate change impacts on ephemeral wetlands](#). *Conservation Biology* 19:1619-1625. (28)

Tear, TH, P Kareiva, et al. 2005. [How much is enough? The recurrent problem of setting measurable objectives in conservation](#). *Bioscience* 55: 835-849. (97)

Yuan-Farrell, C, M Marvier, D Press and P Kareiva. 2005. Conservation easements as a conservation strategy: Is there a sense to the spatial distribution of easements? *Natural Areas Journal* 25: 282-289.

## 2006

Armsworth, P, G Daily, P Kareiva and J Sanchirico. 2006. [Land market feedbacks can undermine biodiversity conservation](#). *PNAS* 103:5403-5408. (80)

Lawler JJ, JE Aukema, J Grant, B Halpern, P Kareiva, CR Nelson, K Ohleth, JD Olden, MA Schlaepfer, B Silliman, and P Zaradic. 2006. [Conservation science: a 20-year report card](#). *Frontiers in Ecology and the Environment* 4: 473-480. (35)

Marshall, AJ, Nardiyono, LM Engstrom, B Pamungkas, J Palapa, E Meijaard, and SA Stanley. 2006. [The blowgun is mightier than the chainsaw in determining population density of Bornean orangutans \(\*Pongo pygmaeus morio\*\) in the forests of East Kalimantan](#). *Biological Conservation* 129(4):566-578. (30)

Tallis, H, and **P Kareiva**. 2006. Shaping global environmental decisions using socio-ecological models. Trends in Ecology and Evolution 21: 562-568.

Ziegler, T, C Abegg, **E Meijaard**, D Perwitasari-Farajallah, L Walter, JK Hodges, and C Roos. 2006. [Molecular phylogeny and evolutionary history of Southeast Asian macaques forming the \*M. silenus\* group](#). Molecular Phylogenetics and Evolution 42(3):807-816. (30)

## 2007

Airoldi, L, and **MW Beck**. 2007. [Loss, status, and trends for coastal marine habitats of Europe](#). Annual Review of Marine Biology and Oceanography 45:347-407. (139)

**Baker, BB**, and **RK Moseley**. 2007. [Advancing treeline and retreating glaciers: implications for conservation in Yunnan, PR China](#). Arctic, Antarctic and Alpine Research 39(2):200-209. (50)

Harrison, D, **JJ Opperman**, and **B Richter**. 2007. Can hydro power be sustainable? Water Power & Dam Construction 59(10):22-25.

**Hoekstra, JM**, KK Bartz, MH Ruckelshaus, JM Moslemi, and T Harms. 2007. [Quantitative threats analysis for management of an imperiled species – Chinook salmon \(\*Oncorhynchus tshawytscha\*\)](#). Ecological Applications 17:2061-2073.

**Kareiva, P**, S Watts, **R McDonald**, and **T Boucher**. 2007. [Domesticated nature: Shaping landscapes and ecosystems for human welfare](#). Science 316(5833):1866-1869. (197)

Marvier, M, C McCreedy, J Regetz, and **P Kareiva**. 2007. [A meta-analysis of effects of Bt cotton and maize on nontarget invertebrates](#). Science 316:1475-1477. (158)

**Meijaard, E** and D Sheil. 2007. [Is wildlife research useful for wildlife conservation in the tropics? A review for Borneo with global implications](#). Biodiversity and Conservation 16(11):3053-3065. (22)

**Morrison, SA**, N Macdonald, K Walker, **L Lozier**, and **MR Shaw**. 2007. [Facing the dilemma at eradication's end: Uncertainty of absence and the Lazarus effect](#). Frontiers in Ecology and the Environment 5:271-276. (31)

Murdoch, W, Polasky, S, Wilson, KA Possingham, HP, **Kareiva, P**, and **R Shaw**. 2007. [Maximizing return on investment in conservation](#). Biological Conservation 139:375-388. (87)

Rissman, AR, **L Lozier**, **T Comendant**, **P Kareiva**, **JM Kiesecker**, **MR Shaw**, and AM Merenlender. 2007. [Conservation easements: Biodiversity protection and private use](#). Conservation Biology 21(3): 709-718. (39)

Soininen, J, **R McDonald**, and H Hillebrand. 2007. [The distance decay of similarity in ecological communities](#). Ecography 30(1):3-12. (136)

**Spalding, MD**, HE Fox, GR Allen, N Davidson, **ZA Ferdana** et al. 2007. [Marine ecoregions of the world: A bioregionalization of coastal and shelf areas](#). Bioscience 57(7):573-83. (169)

Wilson, KA, EC Underwood, **SA Morrison** et al. 2007. [Conserving biodiversity efficiently. What to do, where, and when.](#) *PLoS Biology* 5(9):e223. (131)

## 2008

**Fargione, J**, J Hill, D Tilman, S Polasky, and P Hawthorne. 2008. [Land clearing and the biofuel carbon debt.](#) *Science* 319(5867):1235-1238. (1273)

**Girvetz, EH**, JH Thorne, AM Berry, and JAG Jaeger. 2008. [Integration of landscape fragmentation analysis into regional planning: A statewide multi-scale case study from California, USA.](#) *Landscape and Urban Planning* 86(3-4):205-218. (29)

Goldman, RL, H Tallis, **P Kareiva** and GC Daily. 2008. [Field evidence that ecosystem service projects support biodiversity and diversify options.](#) *PNAS* 105: 9445–9448. (47)

Graham, NAJ, TR McClanahan, MA MacNeil...**MD Spalding** et al. 2008. [Climate warming, marine protected areas and the ocean-scale integrity of coral reef ecosystems.](#) *PLoS ONE* 3(8):e3039. (71)

Helpern, BS, S Walbridge, KA Selkoe....**M.Spalding** et al. 2008. [A global map of human impact on marine ecosystems.](#) *Science* 319(5865):948-952. (569)

**Kareiva, P**, A Chang, and M Marvier. 2008. [Development and conservation goals in World Bank projects.](#) *Science* 321:1638-1639. (22)

**McDonald, RI**, **P Kareiva**, and RTT Forman. 2008. [The implications of current and future urbanization for global protected areas and biodiversity conservation.](#) *Biological Conservation* 141(6):1695-1703. (66)

**McRae, BH**, BG Dickson, TH Keitt, and VB Shah. 2008. [Using circuit theory to model connectivity in ecology, evolution and conservation.](#) *Ecology* 89:2712–2724. (77)

**McRae, BH** et al. 2008. [A multi-model framework for simulating wildlife population response to land-use and climate change.](#) *Ecological Modelling* 219(1-2):77-91.

**Molnar, JL**, RL Gamboa, **C Revenga**, and **MD Spalding**. 2008. [Assessing the global threat of invasive species to marine biodiversity.](#) *Frontiers in Ecology and the Environment* 6:485-492. (78)

Tallis, H, **P Kareiva**, M Marvier, and A Chang. 2008. [An ecosystem services framework to support both practical conservation and economic development.](#) *PNAS* 105:9457-9464. (77)

Underwood, EC, **MR Shaw**, KA Wilson, **P Kareiva**, et al. 2008. [Protecting biodiversity when money matters: Maximizing return on investment.](#) *PLoS ONE* 3(1):e1515. (31)

## 2009

Airoldi, L, D Balata, and **MW Beck**. 2009. [The gray zone: Relationships between habitat loss and marine diversity and their applications in conservation.](#) *Journal of Experimental Marine Biology* 366(1-2): 8-15. (36)

Bakker, VJ, DF Doak, GW Roemer, DK Garcelon, TJ Coonan, **SA Morrison** et al. 2009. [Incorporating ecological drivers and uncertainty into a demographic population viability analysis for the island fox](#). *Ecological Monographs* 79:77-108. (17)

**Girvetz, EH, C Zganjar**, GT Raber, EP Maurer et al. 2009. [Applied climate-change analysis: The climate wizard tool](#). *PLoS ONE* 4(12):e8320. (12)

Lawler, JJ, SL Shafer, D White, **P Kareiva**, EP Maurer, AR Blaustein, and PJ Bartlein. 2009. [Projected climate-induced faunal change in the Western Hemisphere](#). *Ecology* 90:588-597. (76)

**McDonald, RI, J Fargione, J Kiesecker**, WM Miller et al. 2009. [Energy sprawl or energy efficiency: Climate policy impacts on natural habitat for the United States of America](#). *PLoS ONE* 4(8):e6802. (26)

**McLeod, E, R Salm, A Green**, and **J. Almany**. 2009. [Designing marine protected area networks to address the impacts of climate change](#). *Frontiers in Ecology and the Environment* 7:362–370. (40)

**Morrison, SA**, and WM Boyce. 2009. [Conserving connectivity: Some lessons from mountain lions in Southern California](#). *Conservation Biology* 23:275-285.

Nelson, E, G Mendoza, J Regetz, S Polasky, H Tallis, DR Cameron, KMA Chan, GC Daily, J Goldstein, **PM Kareiva**, E Lonsdorf, R Naidoo, TH Ricketts, and **MR Shaw**. 2009. [Modeling multiple ecosystem services, biodiversity conservation, commodity production, and tradeoffs at landscape scales](#). *Frontiers in Ecology & the Environment* 7:4-11. (183)

Palumbi, SR, PA Sandifer, JD Allan, **MW Beck** et al. 2009. [Managing for ocean biodiversity to sustain marine ecosystem services](#). *Frontiers in Ecology and the Environment* 7(4):204-211. (39)

Ramsey, DSL, J Parkes, and **SA Morrison**. 2009. [Quantifying eradication success: The removal of feral pigs from Santa Cruz Island, California](#). *Conservation Biology* 23:449-459. (15)

Underwood, EC, **KR Klausmeyer, RL Cox, SM Busby, SA Morrison, and MR Shaw**. 2009. [Expanding the global network of protected areas to save the imperiled Mediterranean biome](#). *Conservation Biology* 23(1):43-52. (18)

Zaradic, PA, ORW Pergams, and **P Kareiva**. 2009. [The impact of nature experience on willingness to support conservation](#). *PLoS ONE* 4: e7367.

## 2010

**Anderson MG**, and CE Ferree. 2010. [Conserving the stage: Climate change and the geophysical underpinnings of species diversity](#). *PLoS ONE* 5(7): e11554.

Beger, M, S Linke, **ET Game**, IR Ball, M Watts, and HP Possingham. 2010. [Incorporating asymmetric connectivity into spatial decision making for conservation](#). *Conservation Letters* 3(5):359-368.

**Copeland, HE, SA Tessman, EH Girvetz, L Roberts, C Enquist, A Orabona, S Patia, and JM Kiesecker**. 2010. [A geospatial assessment on the distribution, condition, and vulnerability of Wyoming's wetlands](#). *Ecological Indicators* 10:869-879.

- Drummond, SP, K Wilson, **E Meijaard**, M Watts, R Dennis, L Christy, and HP Possingham. 2010. [Influence of a threatened-species focus on conservation planning](#). *Conservation Biology* 24:441-449.
- Fargione, JE**, RJ Plevin, and JD Hill. 2010. [The ecological impact of biofuels](#). *Annual Review of Ecology, Evolution, and Systematics* 41:351-77.
- Fletcher, RJJ, BA Robertson, JS Evans, **PJ Doran et al.** 2010. [Biodiversity conservation in the era of biofuels: Risks and opportunities](#). *Frontiers in Ecology and the Environment* doi: 10.1890/090091.
- Graham, NAJ, **MD Spalding**, and CRC Sheppard. 2010. [Reef shark declines in remote atolls highlight the need for multi-faceted conservation action](#). *Aquatic Conservation: Marine & Freshwater Ecosystems* 20 (5):543-548.
- Haisfield, KM, HE Fox, S Yen, **S Mangubhai**, and PJ Mous. 2010. [An ounce of prevention: Cost-effectiveness of coral reef rehabilitation relative to enforcement](#). *Conservation Letters* 3:243-250.
- Heiner, M, JV Higgins**, X Li and B Baker. 2010. [Identifying freshwater conservation priorities in the Upper Yangtze River Basin](#). *Freshwater Biology* 56(1):89-105.
- Herbert, ME, PB McIntyre, **PJ Doran**, JD Allan, and R Abell, 2010. [Terrestrial reserve networks do not adequately represent aquatic ecosystems](#). *Conservation Biology* 24(4):1002-1011.
- Howard J, and M Merrifield**. 2010. [Mapping groundwater dependent ecosystems in California](#). *PLoS ONE* 5(6): e11249.
- Hunter, M, E Dinerstein, **J Hoekstra**, and D Lindenmayer. 2010. [Conserving biodiversity in the face of climate change: A call to action](#). *Conservation Biology* 24:1169-1171.
- Kareiva, P.** 2010. If our messages are to be heard. *Science* 327:34-35.
- Khoury, M, J Higgins**, and R Weitzell. 2010. [A freshwater conservation assessment of the Upper Mississippi River Basin using a coarse-and fine-filter approach](#). *Freshwater Biology* 19(2):432-445. (94)
- Kiesecker, JM**, AR Blaustein, et al. 2010. [Complex causes of amphibian population declines](#). *Nature* 410:681-684. (515)
- Kiesecker, JM, H Copeland, A Pocewicz, and B McKenney**. 2010. [Development by design: Blending landscape-level planning with the mitigation hierarchy](#). *Frontiers in Ecology & the Environment* 8:261-266. (22)
- Krosby, M, J Tewksbury, NM Haddad, and **J Hoekstra**. 2010. [Ecological connectivity for a changing climate](#). *Conservation Biology* 24(6):1686-1689.
- Lawler, JJ, TH Tear, C Pyke, MR. Shaw, P Gonzalez, P Kareiva, L Hansen, L Hannah, K Klausmeyer, A Aldous, C Bienz, and S Pearsall**. 2010. [Resource management in a changing and uncertain climate](#). *Frontiers in Ecology & the Environment* 8:35-43. (37)
- Luedeling, E, M Zhang, and **EH Girvetz**. 2010. [Climatic changes lead to declining winter chill for fruit and nut trees in California during 1950-2099](#). *PLoS ONE* 4(7):e6166. (24)

- McDonald, RI**, RTT Forman, and **P Kareiva**. 2010. [Open space loss and land inequality in United States' cities, 1990-2000](#). *PLoS One* 5:e9509.
- McLeod E**, B Poulter, J Hinkel, E Reyes, and **R Salm**. 2010. [Sea-level rise impact models and environmental conservation: A review of models and their applications](#). *Ocean & Coastal Management* 53 (9):507-517.
- McDonald-Madden, E, PWJ Baxter, RA Fuller, TG Martin, **ET Game**, **J Montambault**, and H Possingham. 2010. [Monitoring does not always count](#). *Trends in Ecology and Evolution* 10:547-550.
- Murdoch, WM, J Bode, **J Hoekstra**, **P Kareiva**, S Polasky, HP Possingham, and KA Wilson. 2010. [Trade-offs in identifying global conservation priority areas](#). In Leader-Williams, N, WM Adams and RJ Smith (eds), *Trade-offs in Conservation: Deciding What to Save* (ch. 3). Chichester, UK: Wiley-Blackwell.
- Parker, SS**, and JP Schimel. 2010. [Invasive grasses increase nitrogen availability in California grassland soils](#). *Invasive Plant Science and Management* 3:40-47.
- Parkes, J, DSL Ramsey, N Macdonald, K Walker, S McKnight, BS Cohen, and **SA Morrison**. 2010. [Rapid eradication of feral pigs \(\*Sus scrofa\*\) from Santa Cruz Island, California](#). *Biological Conservation* 143:634-641.
- Rothlisberger, JD, WL **Chadderton**, J. McNulty, and DM Lodge. 2010. [Aquatic invasive species transport via trailered boats: What is being moved, who is moving it, and what can be done](#). *Fisheries Bulletin* 35:121-132.
- Smith, JAM**, LR Reitsma, and PP Marra. 2010. [Moisture as a determinant of habitat quality for a nonbreeding Neotropical migratory songbird](#). *Ecology* 91(10): 2874-2882.
- West, PC**, HK Gibbs, C Monfreda et al. 2010. [Trading carbon for food: Global comparison of carbon stocks vs. crop yields on agricultural land](#). *PNAS* 107(46): 19645-19648. (13)
- West, PC**, GT Narisma, CC Barford et al. 2011. [An alternative approach for quantifying climate regulation by ecosystems](#). *Frontiers in Ecology and the Environment* 9:126-133.

## BOOKS PUBLISHED BY CONSERVANCY AUTHORS

- Spalding, M**, C Ravilious, and EP Green. 2001. [World Atlas of Coral Reefs](#). Berkeley, USA: University of California-Berkeley Press.
- Groves, C**. 2003. *Drafting a conservation blueprint: a practitioner's guide to planning for biodiversity*. Island Press.
- Postel, S, and **BD Richter**. 2003. *Rivers for life: Managing water for people and nature*. Washington, DC: Island Press.
- Kareiva, P**, and S Levin (eds). 2003. *The Importance of Species: Perspectives on Expendability and Triage*. Princeton University Press. Princeton Monograph Series. Princeton, NJ.

KR Crooks and **M Sanjayan** (eds). 2006. *Connectivity conservation*. Cambridge, UK: Cambridge University Press.

**Hoekstra, JM, JL Molnar, M Jennings, C Revenga, MD Spalding, TM Boucher, JC Robertson, TJ Heibel,** and K Ellison 2010. *The Atlas of Global Conservation: Changes, Challenges, and Opportunities to Make a Difference*. University of California Press, Berkeley, USA.

**Spalding, MD,** M Kainuma, and L Collins. 2010. *World Atlas of Mangroves*. Earthscan, with International Society for Mangrove Ecosystems. Food and Agriculture Organization of the United Nations, UNEP World Conservation Monitoring Centre, United Nations Scientific and Cultural Organisation, United Nations University, London, UK.

**Kareiva, P,** G Daily, T Ricketts, H Tallis, and S Polasky. 2011. *The Theory & Practice of Ecosystem Service Valuation in Conservation*. Oxford University Press, New York, NY.

**Kareiva, P,** and M Marvier. 2011. *Conservation Science: Balancing the Needs of People and Nature*. Roberts & Co.