

# **DHP P253: Conserving Biological Diversity**

Spring 2004

*T-Th: 1:20-2:35pm: Room M235*

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## **Overview**

The Earth's diverse assemblage of genes, species and ecosystems are diminishing worldwide at a rapidly expanding rate. This course examines the causes and consequences of this loss of biological diversity—or “biodiversity”—and assesses the prospects for stemming this loss by integrating conservation science with effective economic and environmental policies. Although domestic initiatives will be covered, the course focuses on international efforts to conserve biodiversity.

More specifically, this lecture course examines biodiversity from seven broad perspectives. First we will examine the causes of **biodiversity loss** (classes 2-4), specifically those of habitat loss, habitat fragmentation, habitat degradation (including climate change), overexploitation, and invasive species. The second perspective will review several themes under the rubric of **biodiversity conservation** (classes 5 & 8-9), including protected areas, marine ecosystems, and focal species. Third, we will examine the issue of economic and non-economic **biodiversity valuation** (classes 6-7). The fourth perspective will cover several issues under the rubric of **conservation effectiveness** (classes 10-14), with particular focus on contemporary efforts to assess whether and how conservationists have “made a difference” in halting biodiversity loss. Fourth, we will examine the challenges and opportunities of **bioprospecting** (classes 15-16), with a particular focus on Costa Rica and Yellowstone National Park. Fifth, **conservation diplomacy** (classes 17-21) will take a more historical look at international biodiversity conservation, beginning with 19<sup>th</sup> century bilateral efforts to protect marine mammals and concluding with the “north-south” debate over carbon sequestration and forests. Sixth, we will look at contemporary efforts on the part of **transborder civil society** (classes 24-26) in protecting biodiversity in transborder ecosystems. [NOTE: Class scheduling has been adjusted during the semester, as reflected in the reading list that follows.]

Classes will center around lectures, but discussion and questions will be encouraged. Six guest speakers will present case studies of specific conservation issues.

Students will write four short “creative policy” papers (60% of grade) and one longer term paper (30% of grade). The short papers (approximately 500 words each) will require students to assimilate scientific and theoretical issues into a “real world,” policy-relevant context. Students will pick the topic of their term papers (<5000 words) subject to the two constraints that (1) the topic is framed as a policy relevant question, and (2) the topic is in some way transborder or transnational in character. A student exercise, the form of which is to be determined, will be held during two class periods (classes 22-23; 10% of grade).

The course assumes no previous background in conservation biology or ecology.

## **Office hours**

*Immediately following class period and by appointment.*

# DHP P272: Conserving Biological Diversity

## Course Outline

### Class 1 (January 22)

#### Course overview and the meaning of biodiversity

- Jeffries, Mike J. 1997. Biodiversity and conservation. New York: Routledge. Chapter 1 (“Biodiversity: From concept to crisis,” pp. 3-38).
- Marsh, George Perkins. 1965 (1864). *Man and nature*. Cambridge: Belknap Press of Harvard University Press. Chapter II (“Transfer, modification, and extirpation of vegetable and of animal species,” pp. 53-112).
- Takacs, David. 1996. *The Idea of Biodiversity: Philosophies of Paradise*. Baltimore: Johns Hopkins University Press. Chapter 2 (“The making of biodiversity,” pp. 9-40).
- Revkin, Andrew C. 2003. How Much Nature Is Enough? *New York Times*, November 11, D13.

### Class 2 (January 27)

#### Biodiversity loss I: Habitat loss, fragmentation, and degradation

- Krimsky, Sheldon. 2000. Hormonal chaos: The scientific and social origins of the environmental endocrine hypothesis. Baltimore: Johns Hopkins University Press. Chapter 1, pp. 1-54.
- Newmark, William D. 1995. Extinction of mammal populations in western North American national parks. *Conservation Biology* 9, no. 3: 512-526.
- Root, Terry L. and Stephen H. Schneider. 2002. Climate Change: Overview and Implications for Wildlife. In *Wildlife responses to climate change: North American case studies*, ed. Stephen Henry Schneider and Terry Louise Root, 1-56. Washington D.C.: Island Press.
- Stedman-Edwards, Pamela. 2000. A framework for analysing biodiversity loss. In *The root causes of biodiversity loss*, ed. Alexander Wood, Pamela Stedman-Edwards and Johanna Mang, 11-35. London: Earthscan.

### Class 3 (January 29)

#### Biodiversity loss II: Overexploitation - *Guest Lecturer David Wilkie*

- Bennett, E. L., H. E. Eves, J. G. Robinson, and D. S. Wilkie. 2002. Why is eating bushmeat a biodiversity crisis? *Conservation Biology in Practice*, 28-29. 3.
- Bodmer, Richard E., James W. Penn, Pablo Puertas, Luis Moya I., and Tula G. Fang. 1997. Linking conservation and local people through sustainable use of natural resources: Community-based management in the Peruvian Amazon. In *Harvesting wild species: Implications for biodiversity conservation*, ed. Curtis H. Freese, 315-358. Baltimore: Johns Hopkins University Press.
- Upton, Harold F. 1997. Striped bass management and conservation along the Atlantic Coast of the United States. In *Harvesting wild species: Implications for biodiversity conservation*, ed. Curtis H. Freese, 575-625. Baltimore: Johns Hopkins University Press.
- Wilkie, David S. and J. F. Carpenter. 1999. Bushmeat hunting in the Congo Basin: An assessment of impacts and options for mitigation. *Biodiversity and Conservation* 8: 927-955.

### Class 4 (February 3)

#### Biodiversity loss III: Invasive species, Part A

- Elton, Charles S. 2000 (1958). *The ecology of invasions by animals and plants*. Cambridge: Harvard University Press. Chapter 1, pp., 15-32.
- McNeeley, Jeffrey A. 2000. The future of alien invasive species: Changing social views. In *Invasive species in a changing world*, ed. Harold A. Mooney and R. J. Hobbs, 171-189. Washington, D.C.: Island Press.
- Sapp, Jan. 1999. *What is natural? Coral reef crisis*. New York: Oxford University Press. Chapter 14, pp. 203-216.
- Rosenzweig, Michael L. 2001. The four questions: What does the introduction of exotic species do to diversity? *Evolutionary Ecology Research* 3: 361-367.

## Class 5 (February 5)

### Biodiversity conservation I: Key concepts of conservation biology - *Guest lecturer: Dan Perlman*

- Perlman, Dan L. and Glenn Adelson. 1997. *Biodiversity: Exploring values and priorities in conservation*. Malden, Mass.: Blackwell Science. Chapter 6, pp. 102-124.
- Quammen, David. 1996. *The song of the dodo: Island biogeography in an age of extinctions*. New York: Scribner. Chapter VII, pp. 451-498.
- Soulé, Michael and Reed Noss. 1998. Rewilding and Biodiversity: Complementary Goals for Continental Conservation. *Wild Earth*, 18-28. 8: no. 3. Available at: <http://www.rockies.ca/y2y/science/conservation/conbio/rewilding.asp>.
- Diamond, Jared. 1992. Must we shoot deer to save nature? *Natural History*, August.
- Review:
  - + Simberloff, Daniel S. and Lawrence G. Abele. 1976. Island Biogeography Theory and Conservation Practice. *Science* 191, no. 4224: 285-286.
  - + Diamond, Jared M. et al. 1976. Island Biogeography and Conservation: Strategy and Limitations. *Science* 193, no. 4257: 1027-1032.

### 5pm, February 8 (Sunday): 1st short paper due

## Class 6 (February 10)

### Biodiversity loss III: Invasive species, Part B

- See readings for class 4.

## Class 7 (February 17)

### Biodiversity valuation

- Heal, Geoffrey M. 2000. *Nature and the marketplace: Capturing the value of ecosystem services*. Washington, D.C.: Island Press. Chapter 7, 111-131.
- Johnson, Kirk. 2003. Counting the costs of growth with a forest of formulas. *New York Times*, 23 November, Week in Review: Section 4; Page 12; Column 1.
- Ehrenfeld, David W. 1978. *The arrogance of humanism*. New York: Oxford University Press. Pp.176-211.
- Morton, James Parks. 1997. Religion and Sustainability. In *Nature and human society: The quest for a sustainable world*, ed. Peter H. Raven, 443-454. Washington: National Academy Press.

## Class 8 (February 19)

### Biodiversity conservation II: Marine and aquatic ecosystems - *Guest Lecturer Carly Shumway*

- Ludwig, D.R. Hilborn and C. Walters. 1993. Uncertainty, resource exploitation, and conservation: Lessons from history. *Science* 260: 17, 36.
- Jackson, J.B.C. et al. 2001. Historical overfishing and the recent collapse of coastal ecosystems. *Science* 293: 629-638.
- Yaffee, S.L. 1997. Why environmental policy nightmares recur. *Conservation Biology* 11: 328-337.
- Holling, C.S. and G.K. Meffe. 1996. Command and control and the pathology of natural resource management. *Conservation Biology* 10: 328-337.

## Class 9 (February 24)

### Biodiversity conservation III: Bats

- Kunz, Thomas H. and Elizabeth D. Pierson. 1994. Bats of the world: An introduction. In *Walker's bats of the world*, ed. Ronald M. Nowak, 1-46. Baltimore: Johns Hopkins University Press.
- Ackerman, Diane. 1991. The moon by whale light and other adventures among bats, penguins, crocodilians, and whales. London: Phoenix. Chapter 1 ("In praise of bats," pp. 3-59).
- Mickleburgh, Simon P., Anthony M. Hutson, and Paul A. Racey. 2002. A review of the global conservation status of bats. *Oryx* 36, no. 1: 18-34.
- Morton, Patricia A. and Mari J. Murphy. 1995. Comprehensive approaches for saving bats. In *Conserving wildlife: International education and communication approaches*, ed. Susan Kay Jacobson, 103-118. New York: Columbia University Press.

## 5pm, February 25 (Wednesday): Term paper topic due

### Class 10 (February 26)

#### Conservation effectiveness I: Making an NGO work

- Allen, Thomas B. 1987. *Guardian of the wild: The story of the National Wildlife Federation, 1936-1986*. Bloomington: Indiana University Press. Chapter 2, pp.18-40.
- Cronin, John and Robert Francis Kennedy. 1997. *The riverkeepers: Two activists fight to reclaim our environment as a basic human right*. New York, NY: Scribner. Chapter 4, pp. 117-136.
- Dowie, Mark. 1995. *Losing ground: American environmentalism at the close of the twentieth century*. Cambridge: MIT Press. Chapter 8, pp. 205-257.
- Fischer, Hank. 1995. *Wolf wars*. Billings: Falcon Press Publishing Co. Chapter 9, pp.97-107.

### Class 11 (March 2)

#### Conservation effectiveness II: Metrics, yardsticks, apples & oranges

- Bruner, Aaron G, Raymond E. Gullison, Richard E. Rice, and Gustavo A.B. da Fonseca. 2001. Effectiveness of parks in protecting tropical biodiversity. *Science* 291: 125-128.
- Johns, David M. 1999. If there were a cookbook for conservation [book review of *Measures of Success* by Richard Margoluis and Nick Salafsky]. *Conservation Biology* 13, no. 5: 1228-1229.
- Kleiman, Devra G. , Richard P. Reading, Brian J. Miller, Tim W. Clark, J. Michael Scott, John Robinson, Richard L. Wallace, Robert J. Cabin, and Fred Felleman. 2000. Improving the Evaluation of Conservation Programs. *Conservation Biology* 14, no. 2: 356-365.
- Salafsky, Nick and Richard Margoluis. 1999. Threat reduction assessment: A practical and cost effective approach to evaluating conservation and development projects. *Conservation Biology* 13, no. 4: 830-841.

### Class 12 (March 9)

#### Conservation effectiveness III: Protected areas, national parks, biosphere reserves & “integrated conservation and development projects”

- Wright, R. Gerald and David J. Mattson. 1996. The origin and purpose of national parks and protected areas. In *National Parks and Protected Areas: Their Role in Environmental Protection*, ed. R. Gerald Wright, 3-14. Cambridge, Massachusetts: Blackwell Science.
- Simpson, R. David. 1995. Why integrated conservation and development projects may achieve neither goal. Washington: Resources for the Future. Discussion paper 95-20.
- van Schaik, Carel, John Terborgh, Lisa Davenport, and Madhu Rao. 2002. Making Parks Work: Past, Present, and Future. In *Making parks work: Strategies for preserving tropical nature*, ed. John Terborgh, Carel van Schaik, Lisa Davenport and Madhu Rao Terborgh, 468-481. Washington, DC: Island Press.
- Wilshusen, Peter R., Steven R. Brechin, Crystal L. Fortwangler, and Patrick C. West. 2002. Reinventing a Square Wheel: Critique of a Resurgent "Protection Paradigm" in International Biodiversity Conservation. *Society & Natural Resources* 15, no. 1: 17 - 40.

### Class 13 (March 16)

#### Conservation effectiveness IV: Endangered species lists, hot spots, and triage

- Possingham, H. P. and S. J. Andelman, Burgman, M. A., Medellin, R. A., Master, L. L., Keith, D. A. 2002. Limits to the use of threatened species lists. *Trends in Ecology and Evolution* 17: 503-5.
- Lamoreaux, J., Akcakaya, R., Bennun, H., Collar, N. J., Boitani, L., Brackett, D., Brautigam, A., Brooks, T. M., da Fonseca, G. A. B., Mittermeier, R. A., Rylands, A. B., Gardenfors, U., Hilton-Taylor, C., Mace, G., Stein, B. A., Stuart, S. 2003. Value of the IUCN Red List. *Trends in Ecology and Evolution* 18: 214-215.
- Kareiva, Peter and Michelle Marvier. 2003. Conserving biodiversity coldspots: recent calls to direct conservation funding to the world's biodiversity hotspots may be bad investment advice. *American Scientist*, July-August 344-351. 91: no. 4.
- Norton, Bryan G. 1987. *Why preserve natural variety?* Princeton: Princeton University Press. Chapter 13. pp. 258-271.

## Class 14 (March 18)

### Conservation effectiveness V: Conservation innovation and the Boston Common - *Guest*

#### *Lecturer James Levitt*

- Levitt, James N. 2002. Networks and nature in the American experience. In *Conservation in the Internet age*, ed. James N. Levitt, 11-49. Washington, D.C.: Island Press.
- Levitt, James. 2003. *Palladium of the people*. Cambridge, Massachusetts: Rappaport Institute for Greater Boston, John F. Kennedy School of Government, Harvard University. 1 December. Working Paper 10.
- Levitt, James N. 2004. Landscape-scale conservation: Grappling with the green matrix. *Land Lines*, January. 16: no. 1.
- Cronon, William. 1983. Changes in the land: Indians, colonists, and the ecology of New England. New York: Hill and Wang. Chapter 2: "Landscape and patchwork."

## **5pm, March 19 (Friday): 2nd short paper due**

## Class 15 (April 1)

### Conservation diplomacy I: Origins

- 1933 Convention Relative to the Preservation of Fauna and Flora in their Natural State ("London Convention").
- Dorsey, Kurkpatrick. 1998. *The dawn of conservation diplomacy: U.S.-Canadian wildlife protection treaties in the progressive era*. Weyerhaeuser Environmental Books. Seattle: University of Washington Press. Chapter 1 ("Introduction: The intersection of diplomacy and conservation," pp. 3-18).
- Heijnsbergen, P. van. 1997. *International legal protection of wild fauna and flora*. Washington, DC: IOS Press. Chapter 2, pp. 9-41.
- Mander, Linden A. 1941. *Foundations of modern world society*. Stanford University, California: Stanford University Press. Chapter 8, pp. 379-407.

## **5pm, April 2 (Friday): 3<sup>rd</sup> short paper due**

## Class 16 (April 6)

### Conservation diplomacy II: 1900-1990

- Aron, William, William Burke, and Milton Freeman. 1999. Flouting the convention. *Atlantic Monthly*, May 22-29.
- Harland, David. 1994. *Killing game: International law and the African elephant*. London: Praeger. Chapters 5 & 11
- Norton, Bryan G. 1998. Biological Resources and Endangered Species: History, Values, and Policy. In *Protection of global biodiversity: Converging strategies*, ed. Lakshman D. Guruswamy and Jeffrey A. McNeely, 247-264. Durham, North Carolina: Duke University Press.

## Class 17 (April 8)

### Bioprospecting I

- Castree, Noel. 2003. Bioprospecting: From theory to practice (and back again). *Transactions of the Institute of British Geographers* 28: 35-55.
- Janzen, Daniel. 1999. Gardenification of tropical conserved wildlands: Multitasking, multicropping, and multiusers. *Proceedings of the National Academy of Sciences* 96: 5987-5994.
- Posey, Darrell A. 1996. Protecting indigenous peoples' rights to biodiversity. *Environment*. 38: 8. October: 6.
- National Biodiversity Institute of Costa Rica (INBio). 2003. 2002 Annual Report.

## **All day, April 9 (Friday): Field trip to Manomet Center for Conservation Sciences and the Kendall Whaling Museum**

## Class 18 (April 13)

### Bioprospecting II

- Doremus, Holly. 1999. Nature, Knowledge and Profit: The Yellowstone Bioprospecting Controversy and the Core Purposes of America's National Parks. *Ecology Law Quarterly* 26, no. 3: 401.
- Schullery, Paul. 1997. *Searching for Yellowstone: Ecology and wonder in the last wilderness*. Boston: Houghton Mifflin. Introduction, pp. 1-5.
- Shiva, Vandana. 1997. *Biopiracy: The Plunder of Nature and Knowledge*. Boston: South End Press. Chapter 7, pp. 119-126.
- ten Kate, Kerry and Sarah A. Laird. 1999. *The Commercial Use of Biodiversity*. London: Earthscan. Chapter 1, pp. 1-12.

## Class 19 (April 15)

### Transborder conservation I: Historical background

- Westing, Arthur H. 1998. Establishment and management of transfrontier reserves for conflict prevention and confidence building. *Environmental Conservation* 25, no. 2: 91-94.
- U.S. Senate. 1932. Establishment of Waterton-Glacier International Peace Park. Calendar No. 494. 72<sup>nd</sup> Congress, 1<sup>st</sup> Session. Report No. 460.
- O'Connor, Geoffrey. 1997. Amazon journal: Dispatches from a vanishing frontier. New York: Dutton. Chapter 9 (pp. 94-105).
- Zbicz, Dorothy C. 1999. Transboundary cooperation in conservation: A global survey of factors influencing cooperation between internationally adjoining protected areas. Ph.D. Thesis, Duke University. Chapter 6 ("Conclusion," pp. 267-302).

## 5pm, April 18 (Sunday): 4<sup>th</sup> short paper due

## Class 20 (April 20)

### Biodiversity Conservation IV: Restoring scientific integrity in policy-making: Implications for climate change and biodiversity - *Guest Lecturer Peter Frumhoff*

- Glanz, James. 2004. Scientists say Administration distorts facts. *New York Times*, February 19, A18.
- Malakoff, David. 2004. White House rebuts charges it has politicized science. *Science* 304: 184-185.
- New York Times. 2004. Uses and Abuses of Science. February 23, A20.
- Union of Concerned Scientists. 2004. *Scientific integrity in policymaking: An investigation into the Bush Administration's misuse of science*. Cambridge, Massachusetts. March.
- Marburger III, John H. 2004. *Statement of the Honorable John H. Marburger, III on scientific integrity in the Bush Administration*. April 2.
- Satel, Sally. 2004. Science fiction: The Bushies aren't perfect, but the scientists are worse. *Weekly Standard*, April 12-19. 9: no. 30.

## Class 21 (April 22) **Double session: begins at 12pm in the Crow Room, Ginn Library**

### Transborder conservation II: The International Sonoran Desert Alliance and the Yellowstone to Yukon Conservation Initiative

- Loeffler, Jack. 1997. Stewart Udall: Sonoran Desert National Park. Interview by. *Journal of the Southwest* 39, no. 3 & 4: 315-320.
- Shoumatoff, Alex. 1997. *Legends of the American desert: Sojourns in the Greater Southwest*. New York: Knopf. Chapter "Adaptations," pp. 55-71.
- U.S. National Committee for Man and the Biosphere, Antoinette J. Condo, and Sarah H. Bishop. 1995. The International Sonoran Desert Alliance. In *Biosphere reserves in action: Case studies of the American experience*. Washington, D.C.: U.S. Man and the Biosphere Program, U.S. MAB Secretariat, U.S. Department of State. June. Department of State Publication 10241.
- Williams, Florence. 1994. On the borderline. *High Country News*, March 21, 1+.
- Boyd, Diane K., et al. 1995. Transboundary movements of a recolonizing wolf population in the Rocky Mountains. In *Ecology and Conservation of Wolves in a Changing World*, ed. Ludwig N. Carbyn, et al., 135-140. Edmonton, Alberta: Canadian Circumpolar Institute Occasional Publication 35.
- Hornaday, William Temple. 1906. *Camp-fires in the Canadian Rockies*. New York: C. Scribner's Sons. Chapter XII ("Notes on the grizzly bear," pp. 172-180).
- Kemmis, Daniel. 2001. *This sovereign land: A new vision for governing the West*. Washington, D.C.: Island Press. Chapter 1, pp. 1-18.
- Locke, Harvey. 1994. Preserving the wild heart of North America. *Borealis*, Spring 18-24: no. 15.

## Class 22 (April 27)

### Conservation diplomacy III: The Convention on Biological Diversity (CBD) - *Guest Lecturer Calestous Juma*

- Juma, Calestous and Gudrun Henne. 1997. Science and Technology in the Convention on Biological Diversity. In *Nature and human society: The quest for a sustainable world*, ed. Peter H. Raven, 387-397. Washington: National Academy Press.
- Glowka, Lyle, Françoise Burhenne-Guilmin, and Hugh Synge. 1994. *A Guide to the Convention on Biological Diversity*. Gland: IUCN - The World Conservation Union. Environmental Policy and Law Paper No. 30. Introduction (pp. 1-7).
- Schlickeisen, Rodger. 1992. Protecting the Earth's genetic library. *Washington Post*, May 24, C7.
- Hendricks, Brent. 1998. Transformative Possibilities: Reinventing the Convention on Biological Diversity. In *Protection of global biodiversity: Converging strategies*, ed. Lakshman D. Guruswamy and Jeffrey A. McNeely, 360-375. Durham, North Carolina: Duke University Press.

## Class 23 (April 29)

### Transborder conservation III: Transborder nongovernmental regimes and the future of biodiversity conservation

- Redford, Kent H., et al. 2003. Mapping the conservation landscape. *Conservation Biology* 17, no. 1: 116-131.
- Frank, David John, et al. 1999. The rationalization and organization of nature in world culture. In *Constructing world culture: International nongovernmental organizations since 1875*, ed. John Boli and George M. Thomas, 81-99. Stanford, California: Stanford University Press.
- Humphreys, David. 1996. Regime theory and non-governmental organisations: The case of forest conservation. *Journal of Commonwealth & Comparative Politics* 34, no. 1: 90-115.
- Wilson, Edward Osborne. 2002. *The future of life*. New York: Alfred A. Knopf. Chapter 7, pp. 149-189.

## **5pm, May 3 (Monday): Term papers due**