

THE UNIVERSITY OF TEXAS AT EL PASO
COLLEGE OF SCIENCE
Department of Biological Sciences

Course #: BIOL 6312 CRN#26249
Course Title: Biodiversity
Credit Hrs: 3
Term: SPRING 2014
Course Meetings & Location: Biology Bldg. #206, Tuesdays & Thursdays 10:30–11:50 PM

Instructor: Eli Greenbaum, Ph.D.
Office Location: Biology 301 (between Classroom & Biosciences Buildings)
Contact Info: Phone # 747-5553; Fax # 747-5808
E-mail address: egreenbaum2@utep.edu
NOTE: **do NOT email me on Blackboard**
Emergency Contact: (Cell) 785-393-3583 *emergencies only please*

Office Hrs: Mondays and Wednesdays 1:30-3:30 PM, email for other appointment times if necessary

Textbook(s), Materials: Required Sodhi, N. S., B. W. Brook, and C. J. A. Bradshaw. 2007. Tropical Conservation Biology. Blackwell Publishing, Malden, Massachusetts. (I suggest Amazon \$77)
Wilson, E. O. 2002. The Future of Life. Vintage Books, New York, New York, USA. (I again suggest Amazon \$13)
Other readings will be provided via PDF format on Blackboard

Course Objectives (Learning Outcomes): This course is for graduate students interested in biodiversity or conservation biology. Because the vast majority of our planet's biodiversity occurs in tropical regions, we will focus on tropical forests, but we will also discuss coral reefs and tropical savannas. This course is intended to educate students on the state of biodiversity on planet Earth in the 21st century, including issues related to conservation, coevolution, phylogenetic relationships, ecology, and the effects of humans. Additional details are listed below in the course schedule and assigned readings.

Course Activities/Assignments: The graduate students enrolled in the class will be making presentations from assigned readings and the current scientific literature four times per semester, and during these presentations, they will lead the discussion of the issues/science involved therein. Depending on the number of enrolled students, two students may be permitted to present the same topic together. **Please note that presentation Powerpoints should be prepared with a PC computer because the AV system is not compatible with Macintosh.**

Assessment of Course Objectives: Evaluation will be through two lecture examinations (a midterm and final), class participation, and evaluations of individual presentations. Attendance and vocal participation during class are also important.

Grading Policy: **Grading:** Grades will be calculated from the following:
20% - Attendance and participation
60% - Individual student presentations (4 @ 15% each)
10% - Midterm examination
10% - Final Examination

- Make-up Policy: Makeup exams will be offered to students who miss a scheduled exam because of illness, death in the family or university-sponsored activity, **but written documentation must be provided within 2 weeks of the missed exam.** Makeup exams will not conform to the scheduled exam format, and often consist of several essays worth 10–25 points each. **NOTE: Final grades will be submitted within 24 hours after the final exam;** thus, final exam makeups must be completed within 24 hours of the scheduled final exam.
- Attendance Policy: **Attendance and punctuality are a significant portion of your grade in this course.** Valid excuses for tardiness/missing class include illness, vehicle breakdown, death in the family, or university-sponsored activity, but **all valid excuses must be accompanied by written documentation** to receive credit. I will monitor attendance/punctuality on a regular basis throughout the semester.
- Academic Integrity Policy: The UTEP policy on academic honesty can be found at: <http://academics.utep.edu/Default.aspx?tabid=23785>. All students will be expected to adhere to this policy.
- Civility Statement: I expect all students to be actively engaged in taking notes and class activities during the brief time we meet each week. This means that students should not: (1) converse with classmates during lectures; (2) use cell phones during class (including texting); (3) use laptop computers for any purpose other than note taking; or (4) otherwise disrupt your fellow students from learning and active participation.
- Disability Statement: If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass. Requested accommodations must be made 5 working days before an examination.
- Military Statement: If you are a military student with the potential of being called to military service and/or training during the course of the semester, please contact me within the first two weeks of class to arrange in advance for makeup exams, etc.
- A Note About Dropping the Course: Students are cautioned to consider dropping the course if they are performing poorly **BEFORE** the drop deadline. After the drop deadline, I will not sign the faculty drop form unless there are extraordinary circumstances related to a health emergency or similar catastrophe. Students who drop the course after the drop deadline without instructor approval will receive a grade of F.

Course Schedule:

<u>Lecture Schedule</u>	<u>Topic/Exam</u>
T Jan 21	An Introduction to Navjot Sodhi and His Posthumous Book
R Jan 23	The Current State of Biodiversity in the Planet's Tropical Forests
T Jan 28	Deforestation and Human Population Growth Part 1
R Jan 30	Deforestation and Human Population Growth Part 2
T Feb 4	Biodiversity Loss Globally
R Feb 6	Biodiversity Loss in Protected Areas
T Feb 11	Extinction
R Feb 13	Human Use and Misuse of Tropical Forests
T Feb 18	Forest Services
R Feb 20	Forest Fragmentation
T Feb 25	Fire
R Feb 27	Invasive Species
T Mar 4	Synergistic Effects
R Mar 6	MIDTERM EXAM
***** SPRING BREAK MARCH 10-14 *****	
T Mar 18	Emerging Pathogens
R Mar 20	Bushmeat and Hunting
T Mar 25	Coltan
R Mar 27	Coral Reefs
T Apr 1	The Amphibian Extinction Crisis Part 1
R Apr 3	The Amphibian Extinction Crisis Part 2
F Apr 4	***** DROP DEADLINE *****
T Apr 8	Climate Change Part 1
R Apr 10	Climate Change Part 2
T Apr 15	Phylogenetics and Conservation
R Apr 17	Sustainable-Use Forests
T Apr 22	Governance, Business and Conservation
R Apr 24	Conservation Victories
T Apr 29	Ecotourism
R May 1	Captive Breeding Programs
T May 6	Prognosis and Future Speciation
R May 8	Group Discussion of Wilson's <i>The Future of Life</i>
FINAL EXAM:	Thursday May 15th, 10 AM

READINGS

Tuesday January 21: An Introduction to Navjot Sodhi and His Posthumously Published Book

Pandit, M. K. 2013. Remembering Navjot Sodhi: An inspiring mentor, scholar and friend, pp. xxi–xxiv. In: Sodhi, N. S., L. Gibson, and P. H. Raven. *Conservation Biology: Voices from the Tropics*. Wiley Blackwell, West Sussex, UK.

Gibson, L., and P. H. Raven. 2013. Introduction: Giving a voice to the tropics, pp. 1–3. In: Sodhi, N. S., L. Gibson, and P. H. Raven. *Conservation Biology: Voices from the Tropics*. Wiley Blackwell, West Sussex, UK.

Thursday January 23: What is The Current State of Biodiversity in the Planet's Tropical Forests?

Gardner, T. A., J. Barlow, N. S. Sodhi, and C. A. Peres. 2010. A multi-region assessment of tropical forest biodiversity in a human-modified world. *Biological Conservation* 143:2293–2300.

Gibson, L., T. Ming Lee, L. Pin Koh, B. W. Brook, T. A. Gardner, J. Barlow, C. A. Peres, C. J. A. Bradshaw, W. F. Laurance, T. E. Lovejoy, and N. S. Sodhi. 2011. Primary forests are irreplaceable for sustaining tropical biodiversity. *Nature (London)* 478:378–383 + corrigendum.

Tuesday January 28: Deforestation and Human Population Growth Part 1

Sodhi, N. S., B. W. Brook, and C. J. A. Bradshaw. 2007. *Tropical Conservation Biology*. Chapter 1: Diminishing habitats in regions of high biodiversity, pp. 1–32.

Avissar, R., R. Ramos da Silva, and D. Werth. 2006. Impacts of tropical deforestation on regional and global hydroclimatology, pp. 67–79. In: Laurance, W. F., and C. A. Peres (Eds.). *Emerging Threats to Tropical Forests*. The University of Chicago Press, Chicago and London.

Thursday January 30: Deforestation and Human Population Growth Part 2

Ghazoul, J. and D. Sheil. 2010. *Tropical Rain Forest Ecology, Diversity, and Conservation*. Chapter 14: Forests in the Anthropocene, pp. 295–325.

Seto, K. C., B. Güneralp, and L. R. Hutyra. 2012. Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. *Proceedings of the National Academy of Sciences (USA)* 109: 16083–16088.

Tuesday February 4: Biodiversity Loss Globally

Ghazoul, J. and D. Sheil. 2010. *Tropical Rain Forest Ecology, Diversity, and Conservation*. Chapter 16: Biodiversity in a changing world, pp. 356–369.

Hendry, A. P., L. G. Lohmann, E. Conti, J. Cracraft, K. A. Crandall, D. P. Faith, C. Häuser, C. A. Joly, K. Kogure, A. Larigauderie, S. Magallón, C. Moritz, S. Tillier, R. Zardoya, A.-H. Prieur-Richard, B. A. Walther, T. Yahara, and M. J. Donoghue. 2010. Evolutionary biology in biodiversity science, conservation and policy: A call to action. *Evolution* 64–5:1517–1528.

Thursday February 6: Biodiversity Loss in Protected Areas

Jenkins, C. N., S. L. Pimm, and L. N. Joppa. 2013. Global patterns of terrestrial vertebrate diversity and conservation. *Proceedings of the National Academy of Sciences (USA)* 110:E2602–E2610.

Laurance et al. 2012. Averting biodiversity collapse in tropical forest protected areas. *Nature (London)* 489:290–294.

Tuesday February 11: Extinction

Sodhi, N. S., B. W. Brook, and C. J. A. Bradshaw. 2007. *Tropical Conservation Biology*. Chapter 9: Lost without a trace: The tropical extinction crisis, pp. 208–238.

Bellard, C., C. Bertelsmeier, P. Leadley, W. Thuiller, and F. Courchamp. 2012. Impacts of climate change on the future of biodiversity. *Ecology Letters* 15:365–377.

Thursday February 13: Human Use and Misuse of Tropical Forests

Ghazoul, J. and D. Sheil. 2010. *Tropical Rain Forest Ecology, Diversity, and Conservation*. Chapter 15: People of the forest: Livelihoods and welfare, pp. 327–350.

Lenzen, M., D. Moran, K. Kanemoto, B. Foran, L. Lobefaro, and A. Geschke. 2012. International trade drives biodiversity threats in developing nations. *Nature (London)* 486:109–112.

Tuesday February 18: Forest Services

Sodhi, N. S., B. W. Brook, and C. J. A. Bradshaw. 2007. *Tropical Conservation Biology*. Chapter 2: Invaluable losses, pp. 33–52.

Martins, D. J. 2013. People, plants and pollinators: Uniting conservation, food security, and sustainable agriculture in East Africa, pp. 232–238. In: Sodhi, N. S., L. Gibson, and P. H. Raven. *Conservation Biology: Voices from the Tropics*. Wiley Blackwell, West Sussex, UK.

Thursday February 20: Forest Fragmentation

Sodhi, N. S., B. W. Brook, and C. J. A. Bradshaw. 2007. *Tropical Conservation Biology*. Chapter 3: Broken homes: tropical biotas in fragmented landscapes, pp. 53–71.

Rocha, M. F., M. Passamani, and J. Louzada. 2011. A small mammal community in a forest fragment, vegetation corridor and coffee matrix system in the Brazilian Atlantic forest. *PloS ONE* 6:e23312 (8 pp.)

Tuesday February 25: Fire

Sodhi, N. S., B. W. Brook, and C. J. A. Bradshaw. 2007. *Tropical Conservation Biology*. Chapter 4: Burning down the house, pp. 72–88.

Laurance, W. F. 2006. Fragments and fire: Alarming synergisms among forest disturbance, local climate change, and burning in the Amazon, pp. 87–103. In: Laurance, W. F., and C. A. Peres (Eds.). *Emerging Threats to Tropical Forests*. The University of Chicago Press, Chicago and London.

Thursday February 27: Invasive Species

Sodhi, N. S., B. W. Brook, and C. J. A. Bradshaw. 2007. *Tropical Conservation Biology*. Chapter 5: Alien invaders, pp. 89–110.

Corlett, R. T. 2010. Invasive aliens on tropical East Asian islands. *Biodiversity and Conservation* 19:411–423.

Tuesday March 4: Synergistic Effects

Laurance, W. F., and D. C. Useche. 2009. Environmental synergisms and extinctions of tropical species. *Conservation Biology* 23:1427–1437.

Olupot, W., and C. A. Chapman. 2006. Human encroachment and vegetation change in isolated forest reserves: The case of Bwindi Impenetrable National Park, Uganda, pp. 127–142. In: Laurance, W. F., and C. A. Peres (Eds.). *Emerging Threats to Tropical Forests*. The University of Chicago Press, Chicago and London.

Tuesday March 18: Emerging Pathogens

Cunningham, A. A., P. Daszak, and N. G. Patel. 2006. Emerging infectious-disease threats to tropical forest ecosystems, pp. 149–164. In: Laurance, W. F., and C. A. Peres (Eds.). *Emerging Threats to Tropical Forests*. The University of Chicago Press, Chicago and London.

Walsh, P. D. 2006. Ebola and commercial hunting: Dim prospects for African apes, pp. 175–197. In: Laurance, W. F., and C. A. Peres (Eds.). *Emerging Threats to Tropical Forests*. The University of Chicago Press, Chicago and London.

Thursday March 20: Bushmeat and Hunting

Harrison, R. D. 2011. Emptying the forest: Hunting and the extirpation of wildlife from tropical nature reserves. *BioScience* 61:919–924.

Macdonald, D. W., P. J. Johnson, L. Albrechtsen, S. Seymour, J. Dupain, A. Hall, and J. E. Fa. 2012. Bushmeat trade in the Cross-Sanaga rivers region: Evidence for the importance of protected areas. *Biological Conservation* 147:107–114.

Tuesday March 25: Coltan

Nest, M. 2011. *Coltan*. Polity Press, Cambridge, United Kingdom. pp. 1–50.

Thursday March 27: Coral Reefs

Sodhi, N. S., B. W. Brook, and C. J. A. Bradshaw. 2007. *Tropical Conservation Biology*. Chapter 7: Threats in three dimensions: Tropical aquatic conservation, pp. 146–186.

Mumby, P. J., A. Hastings, and H. J. Edwards. 2007. Thresholds and the resilience of Caribbean coral reefs. *Nature* 450:98–101.

Tuesday April 1: The Amphibian Extinction Crisis Part 1

Wake, D. B., and V. T. Vredenburg. 2008. Are we in the midst of the sixth mass extinction? A view from the world of amphibians. *Proceedings of the National Academy of Sciences (USA)* 105:11466–11473.

Collins, J. P., and M. L. Crump. 2009. *Extinction in Our Times: Global Amphibian Decline*. Chapter 1: Declining amphibian populations and the biodiversity crisis, pp. 1–26.

Thursday April 3: The Amphibian Extinction Crisis Part 2

Collins, J. P., and M. L. Crump. 2009. *Extinction in Our Times: Global Amphibian Decline*. Chapter 7: Amphibian chytrid fungus as a cause of declines and extinctions, pp. 159–174.

Becker, C. G., and K. R. Zamudio. 2011. Tropical amphibian populations experience higher disease risk in natural habitats. *Proceedings of the National Academy of Sciences (USA)* 108:9893–9898.

Tuesday April 8: Climate Change Part 1

Sodhi, N. S., B. W. Brook, and C. J. A. Bradshaw. 2007. *Tropical Conservation Biology*. Chapter 8: Climate change: Feeling the tropical heat, pp. 187–207.

La Sorte, F. A., and W. Jetz. 2010. Projected range contractions of montane biodiversity under global warming. *Proceedings of the Royal Society B* 277:3401–3410.

Thursday April 10: Climate Change Part 2

Lewis, S. L. et al. 2006. Impacts of global change on the structure, dynamics, and functioning of South American tropical forests, pp. 15–31. In: Laurance, W. F., and C. A. Peres (Eds.). *Emerging Threats to Tropical Forests*. The University of Chicago Press, Chicago and London.

Moritz, C., and R. Agudo. 2013. The future of species under climate change: resilience or decline? *Science* 341:504–508.

Tuesday April 15: Phylogenetics and Conservation

Purvis, A., P. -M. Agapow, J. L. Gittleman, and G. M. Mace. 2000. Nonrandom extinction and the loss of evolutionary history. *Science* 288:328–330.

Brooks, T. M., J. D. Pilgrim, A. S. L. Rodrigues, and G. A. B. da Fonseca. 2005. Conservation status and geographic distribution of avian evolutionary history, pp. 267–294. In: Purvis, A., J. L. Gittleman, and T. Brooks (Eds.). *Phylogeny and Conservation*. Cambridge University Press, Cambridge, United Kingdom.

Thursday April 17: Sustainable-Use Forests

Fonseca, C. R. et al. 2009. Towards an ecologically-sustainable forestry in the Atlantic forest. *Biological Conservation* 142:1209–1219.

Peres, C. A. 2013. Biodiversity conservation performance of sustainable-use tropical forest reserves, pp. 245–253. In: Sodhi, N. S., L. Gibson, and P. H. Raven. *Conservation Biology: Voices from the Tropics*. Wiley Blackwell, West Sussex, UK.

Tuesday April 22: Governance, Business and Conservation

Ghazoul, J. and D. Sheil. 2010. Tropical Rain Forest Ecology, Diversity, and Conservation. Chapter 17: A matter for scientists and society: Conserving forested landscapes, pp. 371–397.

Peh, K. S. -H. 2013. Governance and conservation in the tropical developing world, pp. 216–225. In: Sodhi, N. S., L. Gibson, and P. H. Raven. *Conservation Biology: Voices from the Tropics*. Wiley Blackwell, West Sussex, UK.

Thursday April 24: Conservation Victories

Waldron, A., R. Justicia, L. Smith, and M. Sanchez. 2012. Conservation through chocolate: a win-win for biodiversity and farmers in Ecuador's lowland tropics. *Conservation Letters* 5:213–221.

Samways, M. J., P. M. Hitchins, O. Bourquin, and J. Henwood. 2010. Restoration of a tropical island: Cousine Island, Seychelles. *Biodiversity and Conservation* 19:425–434.

Tuesday April 29: Ecotourism

Mugisha, A. 2008. Potential interactions of research with the development and management of ecotourism, pp. 115–128. In: Wrangham, R., and E. Ross (Eds.). *Science and Conservation in African Forests: The Benefits of Long-Term Research*. Cambridge University Press, Cambridge, United Kingdom.

Broadbent, E. N. et al. 2012. The effect of land use change and ecotourism on biodiversity: A case study of Manuel Antonio, Costa Rica, from 1985 to 2008. *Landscape Ecology* 27:731–744.

Thursday May 1: Captive Breeding Programs

Oates, J. F. 1999. Myth and Reality in the Rain Forest: How Conservation Strategies are Failing in West Africa. Chapter 8: Can zoos be the ark? pp. 202–228.

Bowkett, A. E. 2009. Recent captive-breeding proposals and the return of the ark concept to global species conservation. *Conservation Biology* 23:773–776.

Tuesday May 6: Prognosis and Future Speciation

Nee, S. 2005. Phylogenetic futures after the latest mass extinction, pp. 387–399. In: Purvis, A., J. L. Gittleman, and T. Brooks (Eds.). *Phylogeny and Conservation*. Cambridge University Press, Cambridge, United Kingdom.

Barraclough, T. G., and T. J. Davies. 2005. Predicting future speciation, pp. 400–418. In: Purvis, A., J. L. Gittleman, and T. Brooks (Eds.). *Phylogeny and Conservation*. Cambridge University Press, Cambridge, United Kingdom.

Thursday May 8: The Future of Life

Wilson, E. O. 2002. *The Future of Life*. Vintage Books, New York, New York, USA. (entire book)