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

Course #:	BIOL 6312/5301 CRN#27901
Course Title:	Biodiversity
Credit Hrs:	3
Term:	Spring 2021
Course Meetings & Location:	**ONLINE:** Mondays & Wednesdays 1:30–2:50 PM
Instructor:	Eli Greenbaum, Ph.D.
Office Location:	Biology 301 (between Classroom & Biosciences Buildings). During the pandemic, the professor can be reached online via Blackboard or email.
Contact Info:	Phone # 747-5553; Fax # 747-5808 E-mail address: egreenbaum2@utep.edu Emergency Contact: (Cell) 785-393-3583 *emergencies only please*
Office Hrs:	Office hours with the TA or professor are on-demand for your convenience! Pre-arranged meetings via phone can be requested via email Monday-Friday from 9 AM to 5 PM (except on days of quizzes or exams)- allow 24 hours for a response.
Textbook(s), Materials:	Required Sodhi, N. S., B. W. Brook, and C. J. A. Bradshaw. 2007. ***Tropical Conservation Biology***. Blackwell Publishing, ISBN 1405150734. Greenbaum, E. 2017. ***Emerald Labyrinth: A Scientist's Adventures in the Jungles of the Congo*****.** ForeEdge (imprint of University Press of New England), ISBN 1512600970. Mann, C. C. 2018. ***The Wizard and the Prophet: Two Remarkable Scientists and Their Dueling Visions to Shape Tomorrow's World***. Knopf, ISBN 0307961699. **NOTE:** this book is 640 pages and will be discussed at the end of the semester- do not leave it for that last minute. Other readings will be provided via PDF format on Blackboard
Course Objectives (Learning Outcomes):	This course is for graduate students interested in biodiversity and 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:	Depending on enrollment, the graduate students in the class will be making presentations from assigned readings and the current scientific literature 2–4 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 many UTEP AV systems are 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 (2–4* @ 15–30% each)
10% - Midterm examination
10% - Final Examination
*Number of presentations depends on enrollment

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 1 week 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 48 hours after the final exam**; thus, final exam makeups must be completed within 48 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.

Netiquette: Students are expected to communicate with the professor and each other in a professional and respectful manner at all times—failure to do so can result in penalties to the final grade, or in extreme cases, reporting to the UTEP Office of Student Conduct and Conflict Resolution. Students should be mindful that their actions are being recorded on Lockdown browser, and to avoid penalties, they should avoid taking their eyes off the computer screen, talking to other people (nobody else should be in the room), using cell phones, or otherwise engaging in behavior that could give the impression of academic misconduct.

Academic Integrity Policy: The UTEP policy on academic honesty can be found at: https://www.utep.edu/student-affairs/osccr/student-conduct/academic-integrity.html. 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 https://www.utep.edu/student-affairs/cass/. Requested accommodations must be made 3 working days before an examination. **All students requesting disability accommodations must request an office hours phone call with the professor to discuss the details before they will be implemented, preferably at the beginning of the semester.**

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:

Lecture Schedule		Topic/Exam
W	Jan 20	Biodiversity in Central Africa: Model Lecture
M	Jan 25	The Current State of Biodiversity in the Planet's Tropical Forests
W	Jan 27	Deforestation and Human Population Growth Part 1
M	Feb 1	Deforestation and Human Population Growth Part 2
W	Feb 3	Biodiversity Loss Globally
M	Feb 8	Biodiversity Loss in Protected Areas
W	Feb 10	Extinction
M	Feb 15	Human Use and Misuse of Tropical Forests
W	Feb 17	Forest Services
M	Feb 22	Forest Fragmentation
W	Feb 24	Fire
M	Mar 1	Invasive Species
W	Mar 3	**MIDTERM EXAM**
M	Mar 8	Synergistic Effects
W	Mar 10	Emerging Pathogens
**********SPRING BREAK MARCH 15–19**********		
M	Mar 22	Bushmeat and Hunting
W	Mar 24	The Ivory Trade and Terrorism
M	Mar 29	Coral Reefs
W	Mar 31	The Amphibian Extinction Crisis Part 1
Thur	Apr 1	**********DROP DEADLINE**********
M	Apr 5	The Amphibian Extinction Crisis Part 2
W	Apr 7	Climate Change Part 1
M	Apr 12	Climate Change Part 2
W	Apr 14	Phylogenetics and Conservation
M	Apr 19	Sustainable-Use Forests
W	Apr 21	Governance, Business and Conservation
M	Apr 26	Conservation Victories
W	Apr 28	Ecotourism
M	May 3	Captive Breeding Programs
W	May 5	Group Discussion of Mann's *The Wizard & the Prophet*
W	May 12	**FINAL EXAM, time TBA**

READINGS

NOTE: In general, students are responsible for reading the ENTIRE assigned chapter and/or paper shown below. When in doubt, email me.

Wednesday January 20: Biodiversity in Central Africa: Model Lecture
On the first day of class I will give a lecture about my own work in Central Africa, both to inform you and to demonstrate the way to present a lecture. The reading below can be done after class.

Greenbaum, E. 2017. ***Emerald Labyrinth: A Scientist's Adventures in the Jungles of the Congo.*** *ForeEdge* (imprint of *University Press of New England*), ISBN 1512600970.
You do NOT need to read this entire book, nor do you need to buy it. A copy of the book is available on reserve at the library, and it can also be accessed as an ebook via the UTEP library website. I would like you to focus on the parts of the book that deal with the science, so please read these pages: pp. 73–74, 77–83, 88–90, 177–180, 105–113, 221–224, and Chapter 11. Below I have assigned some of these relevant pages to the topics we will cover later in the semester, so feel free to read them as the topics come up.

Monday January 25: 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.

Wednesday January 27: 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.

Monday February 1: 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.

Emerald Labyrinth: pp. 257–259

Wednesday February 3: Biodiversity Loss Globally

Ghazoul, J. and D. Sheil. 2010. Tropical Rain Forest Ecology, Diversity, and Conservation. Chapter 16: Biodiversity in a changing world, pp. 351–369.

Moritz, C. 2002. Strategies to protect biological diversity and the evolutionary processes that sustain it. Systematic Biology 51:238–254.

Monday February 8: 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.

Wednesday February 10: 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.

Monday February 15: 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.

Wednesday February 17: 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.

Emerald Labyrinth: pp. 105–113

Monday February 22: 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.)

Wednesday February 24: 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.

Monday March 1: 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.

Lionfish New York Times video: http://www.nytimes.com/video/science/1248069362582/an-exotic-predator-threatens-the-keys.html?hp&action=click&pgtype=Homepage&modref=HPVideoRefer&module=photo-spot-region&region=top-news&WT.nav=top-news

Monday March 8: 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.

Wednesday March 10: 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.

Guernier, V., M. E. Hochberg, and J.-F. Guégan. 2004. Ecology drives the worldwide distribution of human diseases. PLoS Biology 2:0740–0746.

Tavernise, S. 2015. Unraveling the relationship between climate change and health. New York Times website, accessible at: http://www.nytimes.com/2015/07/14/health/unraveling-the-relationship-between-climate-change-and-health.html?_r=0.

Monday March 22: Bushmeat and Hunting

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.

Cronin, D. T., S. Woloszynek, W. A. Morra, S. Honarvar, J. M. Linder, M. Katherine Gonder, M. P. O'Connor, and G. W. Hearn. 2015. Long-term urban market dynamics reveal increased bushmeat carcass volume despite economic growth and proactive environmental legislation on Bioko Island, Equatorial Guinea. PLoS ONE 10:e0134464.

Wednesday March 24: The Ivory Trade and Terrorism

Maisels, F., S. Strindberg, S. Blake, G. Wittemyer, J. Hart, E. A. Williamson, R. Aba'a, G. Abitsi, R. D. Ambahe, F. Amsini, P. C. Bakabana, T. Cleveland Hicks, R. E. Bayogo, M. Bechem, R. L. Beyers, A. N. Bezangoye, P. Boundja, N. Bout, M. Ella Akou, L. Bene Bene, B. Fosso, E. Greengrass, F. Grossmann, C. Ikamba-Nkulu, O. Ilambu, B.-I. Inogwabini, F. Iyenguet, F. Kiminou, M. Kokangoye, D. Kujirakwinga, S. Latour, I. Liengola, Q. Mackaya, J. Madidi, B. Madzoke, C. Makoumbou, G.-A. Malanda, R. Malonga, O. Mbani, V. A. Mbendzo, E. Ambassa, A. Ekinde, Y. Mihindou, B. J. Morgan, P. Motsaba, G. Moukala, A. Mounguengui, B. S. Mowawa, C. Ndzai, S. Nixon, P. Nkumu, F. Nzolani, L. Pintea, A. Plumptre, H. Rainey, B. Bokoto de Semboli, A. Serckx, E. Stokes, A. Turkalo, H. Vanleeuwe, A. Vosper, and Y. Warren. 2013. Devastating decline of forest elephants in Central Africa. PLoS ONE 8:e59469.

Gao, Y., and S. G. Clark. 2014. Elephant ivory trade in China: Trends and drivers. Biological Conservation 180: 23–30.

Ivory Funded Terrorism Video: http://www.lastdaysofivory.com/

Warlords of Ivory, National Geographic Explorer Video: https://www.youtube.com/watch?v=J8jB_rwo9lU

Beardsley, E. 2014. France takes a stand, crushing ivory beneath the Eiffel Tower. NPR News, Weekend Edition Sunday. Accessible at: http://www.npr.org/2014/02/09/274075393/france-crushes-ivory-beneath-the-eiffel-tower.

McConnell, T. 2015. The ivory-funded terrorism myth. New York Times website, accessible at: http://www.nytimes.com/2015/10/30/opinion/the-ivory-funded-terrorism-myth.html?_r=0.

Emerald Labyrinth: 250–251.

Monday March 29: 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.

Wednesday March 31: 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.

Monday April 5: 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.

Wednesday April 7: 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.

Monday April 12: 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.

Emerald Labyrinth: 264–270.

Wednesday April 14: 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.

Emerald Labyrinth: 254–257.

Monday April 19: 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.

Wednesday April 21: 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.

Monday April 26: 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.

Wednesday April 28: 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.

Monday May 3: 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.

Emerald Labyrinth: 259–264.

Wednesday May 5: Book Discussion- Dr. Greenbaum will lead Discussion

Mann, C. C. 2018. ***The Wizard and the Prophet: Two Remarkable Scientists and Their Dueling Visions to Shape Tomorrow's World***. Knopf, ISBN 0307961699.