

Oil Palms and Orangutans: Forest Conservation in Malaysian Borneo *An Interdisciplinary Experiential Learning Course*

Undergraduates: FES 499, OIL PALMS AND ORANGUTANS POLICY (3 credits) **AND**
FES 499, OIL PALMS AND ORANGUTANS FIELD STUDY (3 credits)

Graduates: FES 599, OIL PALMS AND ORANGUTANS IN BORNEO (3 credits)

Credits: 6 for undergraduate students, 3 for graduate students

Offered: June 22 – July 6, 2023

Course Instructors: Dr. Mark Needham, Dr. Ian Munanura, and Dr. Jessica Hightower,
Department of Forest Ecosystems and Society, College of Forestry, Oregon State University.

Course Description

Conversion of forests to oil palm plantations across Southeast Asia is among the most pressing conservation challenges today. At-risk are millions of acres of primary and secondary tropical forests, and the ecosystem services they provide. At the same time, global populations and their demand for timber products continue to escalate. Forestry practices have the potential to degrade existing forested lands and lead to species decline. This course explores the complex ecological, social, economic, and political dimensions of tropical forest deforestation and degradation through an immersive experience in the Malaysian state of Sabah on the island of Borneo.

To understand the complexities of forestry and biodiversity conservation, this course will include elements of both ecology and social science. Students will learn the fundamentals and key concepts of field ecology, wildlife biology, conservation social science, and ecotourism.

Catalogue Description

With the explicit goal of enhancing global learning, this field-based course immerses students in the challenges and opportunities of forest conservation in the heart of Malaysian Borneo. Students learn from hands-on experiences related to conserving tropical forests. The global context of forest management, exploitation, and conversion is emphasized to prepare students to critically analyze global conservation issues.

Student Learning Outcomes

Upon completion of this course, students will be able to:

1. Articulate interconnections between local conditions and global ecological, social, political, and economic trends.
2. Demonstrate understanding of the sustainable livelihoods concept and implications to wildlife conservation and human wellbeing.
3. Demonstrate understanding of fundamental concepts from tropical forest ecology, wildlife ecology, landscape ecology, conservation, and ecotourism.
4. Demonstrate understanding of their own cultural lenses in contrast to other cultural lenses, including an ability to compare and contrast U.S. and Malaysian cultural values and perspectives pertaining to conservation and community wellbeing.

Prerequisites

To register for this course, students must:

1. Have achieved at least sophomore standing.

2. Be nominated by faculty.
3. Submit a complete application including nomination, resume, and statement of interest.
4. Be interviewed by course instructors.

Student Learning Assessment

Students must have read all required readings and watched the required videos before arriving in Borneo, and should have access to the readings (electronic and/or hardcopy) while in Borneo. Students will be assessed through the following categories:

1. ***Field Notebook.*** Each student is required to spend about one hour per day completing their field notebook entries. Field notebook entries will follow the field journaling system developed by Joseph Grinnell for the Naturalist's Field Journal. This method of field journaling provides a structured system for detailing field observations. The instructors will provide some quick initial feedback on these notebooks a few days into the course, and then a complete evaluation for grade at the end of the course. In this notebook, students must do all of the following (***please see additional guidelines at the end of this syllabus and an example on Canvas***):
 - a. Each day, document the date, arrival / departure times, location, route, and weather.
 - b. Each day, provide a species list (all animals and plants that you can identify).
 - c. Each day, briefly describe: (i) the habitat, (ii) any interesting observations, and (iii) at least one animal or plant species. It must be a new species each day (i.e., do not repeatedly focus on the same animal or plant species throughout the trip).
 - d. Each day, briefly explain how this: (i) habitat, and (ii) one animal or plant species (from "c" above) may be adversely affected by human-induced environmental changes.
 - e. Each day, include at least one sketch that illustrates this species (animal or plant from "c" above) or habitat (e.g., logged forest, oil palm plantation), or include a detailed map of the site. These sketches can be included in any section of your field notebook, but they must be of a different thing each day.
 - f. Each day, list at least one new word or phrase from the local languages and write what the word or phrase means in English. Students must list a different word or phrase each day.
 - g. Each day, write a reflective journal entry. This entry is intended to facilitate deep reflection and internalization of the experiences during the day and information received from the hosts, instructors, and fellow students. ***Students must also write how these reflections each day may connect to the readings / videos.***
 - h. At least two times during the trip, ask a different thoughtful question to the entire group (hosts, instructors, fellow students) and then in this notebook:
 - write each of these questions,
 - synthesize responses from the group, and
 - write a clear and concise answer to each question based on these responses and your own thoughts.
 - i. On the second-to-last day in Borneo, answer all of the following questions at the end of this notebook:
 - what are your overall thoughts and opinions of this trip?
 - what was the most interesting thing you learned on this trip and why was it interesting?
 - what surprised you the most on this trip and why did it surprise you?
 - what one animal or plant species in Borneo do you identify with the most (i.e., kinship, similar to you) and why (some people call this a "spirit animal" although this phrase is controversial)?

2. ***Participation***. Students are expected to actively participate in discussions, contribute by asking thoughtful questions, and interact with the hosts, instructors, and fellow students. Students must do ***all*** of the following:
 - a. After lunch or dinner conversations. Engage in conversations and ask questions after lunch and/or dinner.
 - b. Transit conversations. Engage in conversations and ask questions during travel times (e.g., vehicle transfers from one location to another).
 - c. Host and instructor presentation and interaction questions. Ask hosts / instructors questions during their presentations and/or while interacting with them in the field.
 - d. ***Integrate the readings / videos into these discussions, questions, and interactions as much as possible.***

Evaluation of Student Performance

Field notebook (e.g., species, words, reflections, question syntheses, integrate readings):	70%
Participation (e.g., conversations, ask questions, integrate readings):	30%
Total	100%

Grades will be allocated as follows:

Grade	Percent (%)	Grade	Percent (%)
A	94 – 100	C	74 – 76
A –	90 – 93	C –	70 – 73
B +	87 – 89	D +	67 – 69
B	84 – 86	D	64 – 66
B –	80 – 83	D –	60 – 63
C +	77 – 79	F	< 60

Readings and Videos

Required (must read / watch before arriving in Borneo)

- Adams, W. M., Aveling, R., Brockington, D., et al. (2004). Biodiversity conservation and the eradication of poverty. *Science*, 306(5699), 1146-1149.
- Ayompe, L. M., Schaafsma, M., & Egoh, B. N. (2021). Towards sustainable palm oil production: The positive and negative impacts on ecosystem services and human wellbeing. *Journal of Cleaner Production*, 278, 123914.
- Betts, M. G., Wolf, C., Ripple, W. J., et al. (2017). Global forest loss disproportionately erodes biodiversity in intact landscapes. *Nature*, 547, 441–444.
- Donald, R. (2022). *As Malaysian state resumes log exports, Indigenous advocates warn of fallout*. Mongabay.
- Fitzherbert, E. B., Struebig, M. J., Morel, A., et al. (2008). How will oil palm expansion affect biodiversity? *Trends in Ecology & Evolution*, 23(10), 538-545.
- Gokkon, B. (2023). *As Indonesia’s new capital takes shape, risks to wider Borneo come into focus*. Mongabay.
- Jong, H. N. (2018). *RSPO fails to deliver on environmental and social sustainability, study finds*. Mongabay.
- Lefeuvre, N. B., Keller, N., Plagnat-Cantoreggi, P., et al. (2022). The value of logged tropical forests: A study of ecosystem services in Sabah, Borneo. *Environmental Science & Policy*, 128, 56-67. (summary of article on Mongabay: <https://news.mongabay.com/2022/02/even-degraded-forests-are-more-ecologically-valuable-than-none-study-shows/>)

- Malhi, Y., Riutta, T., Wearn, O.R., et al. (2022). Logged tropical forests have amplified and diverse ecosystem energetics. *Nature*, 612, 707–713. (summary can be read here: <https://www.nature.com/articles/d41586-022-04356-2>)
- Meijaard, E., Brooks, T. M., Carlson, K. M., et al. (2020). The environmental impacts of palm oil in context. *Nature Plants*, 6, 1418–1426.
- Runting, R. K., Griscom, B. W., Struebig, M. J., et al. (2019). Larger gains from improved management over sparing–sharing for tropical forests. *Nature Sustainability*, 2(1), 53–61.
- Stronza, A. L., Hunt, C. A., & Fitzgerald, L. A. (2019). Ecotourism for conservation? *Annual Review of Environment and Resources*, 44, 229–253.
- Wilcove, D. S., Giam, X., Edwards, D. P., et al. (2013). Navjot's nightmare revisited: Logging, agriculture, and biodiversity in Southeast Asia. *Trends in Ecology & Evolution*, 28(9), 531–540.
- Zielinski, S., Kim, S. I., Botero, C., & Yanes, A. (2020). Factors that facilitate and inhibit community-based tourism initiatives in developing countries. *Current Issues in Tourism*, 23(6), 723–739.

Videos: See Canvas for short videos that will be posted.

National Geographic Field Notes: Orangutan Nest Watch with Sol Milne
(<https://fieldnotes.nationalgeographic.org/expedition/orangutannestwatch>)

Strongly Encouraged (students should bring at least one of these species identification field guides, but coordinate who brings what guide because not all students need each of these guides and sharing would be fine. The instructors may also bring some of these guides)

Phillipps, Q., & Phillipps, K. (2016). *Phillipps' Field Guide to the Mammals of Borneo and their Ecology: Sabah, Sarawak, Brunei, and Kalimantan*. Princeton NJ: Princeton Field Guides. (This is best for general ecology. This is a book, so it is not on Canvas)

Plus one of the following two field guides:

Myers, S. (2016). *Birds of Borneo*. 2nd Edition, Helm Field Guides. London, UK: Christopher Helm Publishing. (Preferred bird field guide and the most up to date. This is a book, so it is not on Canvas)

Phillipps, Q., & Phillipps, K. (2009). *Phillipps' Field Guide to the Birds of Borneo*. Oxford: Beaufoy Publishing. (Useful to identify birds you see on the trip. This is a book, so it is not on Canvas)

Encouraged

Ancrenaz, M., Dabek, L., & O'Neil, S. (2007). The costs of exclusion: Recognizing a role for local communities in biodiversity conservation. *PLoS Biology*, 5(11), e289.

Betts, M. G., Phalan, B. T., Wolf, C., et al. (2021). Producing wood at least cost to biodiversity: Integrating Triad and sparing–sparing approaches to inform forest landscape management. *Biological Reviews*, 96(4), 1301–1317.

Betts, M. G., Wolf, C., Pfeifer, M., et al. (2019). Extinction filters mediate the global effects of habitat fragmentation on animals. *Science*, 366, 1236–1239.

Burivalova, Z., Game, E.T., Wahyudi, B., et al. (2020). Does biodiversity benefit when the logging stops? An analysis of conservation risks and opportunities in active versus inactive logging concessions in Borneo. *Biological Conservation*, 241, 108369.

de la Torre, J. A., Cheah, C., Lechner, A. M., et al. (2022). Sundaic elephants prefer habitats on the periphery of protected areas. *Journal of Applied Ecology*, 59, 2947–2958.

Edwards, D. P., Gilroy, J. J., Woodcock, P., et al. (2014). Land-sharing versus land-sparing logging: Reconciling timber extraction with biodiversity conservation. *Global Change Biology*, 20(1), 183–191.

- Garbutt, N., & Prudente, J. C. (2006). *Wild Borneo: The wildlife and scenery of Sabah, Sarawak, Brunei, and Kalimantan*. Boston, MA: MIT Press. (This is a book, so it is not on Canvas)
- Gokkon, B. (2017). Extreme concern: Report gives glimpse into scale of Kalimantan bird trade. Mongabay.
- Guharajan, R., Abrams, J. F., Abram, N. K., et al. (2023) Determinants of sun bear *Helarctos malayanus* habitat use in Sabah, Malaysian Borneo and its predicted distribution under future forest degradation and loss. *Biodiversity Conservation*, 32, 297–317.
- Hughes, A. C. (2018). Have Indo-Malaysian forests reached the end of the road? *Biological Conservation*, 223, 129-137.
- King, V. T. (1993). *The peoples of Borneo*. Cambridge, MA: Wiley–Blackwell. (This is a book, so it is not on Canvas)
- Kricher, J. (2011). *Tropical ecology*. Princeton, NJ: Princeton University Press. (This is a book, so it is not on Canvas)
- Kurz, D. J., Connor, T., Brodie, J. F., et al. (2023). Socio-ecological factors shape the distribution of a cultural keystone species in Malaysian Borneo. *NPJ Biodiversity*, 2, 4.
- McShane, T. O., Hirsch, P. D., Trung, T. C., et al. (2011). Hard choices: Making trade-offs between biodiversity conservation and human well-being. *Biological Conservation*, 144(3), 966-972.
- Moran, D., & Kanemoto, K. (2017). Identifying species threat hotspots from global supply chains. *Nature Ecology & Evolution*, 1(1), 1-5.
- Orams, M. (1995). Towards a more desirable form of ecotourism. *Tourism Management*, 16, 3-8.
- Phalan, B., Onial, M., Balmford, A., & Green, R. E. (2011). Reconciling food production and biodiversity conservation: Land sharing and land sparing compared. *Science*, 333(6047), 1289-1291.
- Seaman, D. J. I., Voigt, M., Bocedi, G., et al. (2021). Orangutan movement and population dynamics across human-modified landscapes: Implications of policy and management. *Landscape Ecology*, 36, 2957-2975.
- Sebele, L. S. (2010). Community-based tourism ventures, benefits and challenges: Khama Rhino Sanctuary Trust, Central District, Botswana. *Tourism Management*, 31, 136-146.
- Spencer, K. L., Deere, N. J., Aini, M., et al. (2023). Implications of large-scale infrastructure development for biodiversity in Indonesian Borneo. *Science of the Total Environment*, 866, 161075.
- van Wyhe, J. (2014). *The annotated Malay Archipelago by Alfred Russel Wallace (1869)*. Singapore: National University of Singapore Press. (This is a book, so it is not on Canvas)
- Wadley, R. L. (2005). *Histories of the Borneo environment: Economic, political and social dimensions of change and continuity*. Leiden, The Netherlands: KITLV Press. (This is a book, so it is not on Canvas)
- Wolf, C., Levi, T., Ripple, W. J., et al. (2021). A forest loss report card for the world’s protected areas. *Nature Ecology & Evolution*, 5, 520–529.
- Yi, M. C. K., Kaicheen, S. C., Brodie, J. F., & Mohd-Azlan, J. (2022). Direct comparisons of logging and agroforestry influence on tropical mammals in Sarawak, Borneo. *Biotropica*, 54(4), 1061-1070.
- Videos: The 2 episodes from “*Judi Dench's Wild Borneo Adventure*.” (can be viewed on Discovery+ if you have access to it)

Additional Guidelines for the Field Notebook

Observations are a critical part of the scientific process and a field notebook is where you can keep a detailed record of observations and experiences. By using a more systematic journaling method, you can quickly find important data, draw comparisons between locations, and develop

different questions and hypotheses about the world around you. As the course progresses, your notebook entries should become more detailed and you should start to come up with questions, hypotheses, and reflections regarding things that you observe and experience. For example, if you note differences in habitat and species in a selectively logged forest versus an unlogged forest, you might then come up with different ideas (hypotheses) about why those differences may occur. Your notebook provides the observations to formulate those questions, hypotheses, and reflections.

You will keep a field notebook using a recording system based off the Grinnell method of field journaling. This requires daily entries that record all of the following details:

- Date.
- Arrival and departure times.
- Location (e.g., place, GPS coordinates, sketched map).
- Route (e.g., hike along river, night drive).
- Weather.
- General description of habitat (e.g., type of forest, riparian edge, hillslope, oil palm), along with general impressions and interesting observations.
- List of all species that you could identify (animals and plants). This does not have to be extensive, but you should show improvement throughout the course as you learn more about the species in Borneo.
- Briefly describe at least one animal or plant species. It must be a new species each day (i.e., do not repeatedly focus on the same animal or plant species throughout the trip).
- Explain how this habitat and one animal or plant species may be adversely affected by human-induced environmental changes.
- Include at least one sketch that illustrates this species (animal or plant) or habitat (e.g., logged forest, oil palm plantation), or include a detailed map of the site. This can be included in any section of your field notebook, but the sketches must be different each day.
- At least one new word or phrase from the local languages and what it means in English.
- Reflective journal entry that must also connect to the readings / videos (more on this below).

This reflective journal entry is designed to help you think deeply about your daily learning experience during the field course. It is intended to help you bring together theory and practice and get a better understanding of the course material. Specifically, it will help you to see your strengths and weaknesses as a learner, understand the methods of learning that suit your own learning style, and notice how you can improve your learning in the future.

Reflect on your process of learning by recording any observations, experience, thoughts, and insights about the daily interactions with hosts, instructors, and fellow students that are significant to you as a person. The following prompts are suggested to stimulate your reflective thinking:

- What are some markers that distinguish some species you saw from others?
- What do you think is interesting about the habitat and behavior of some species you saw?
- What are the most important questions you heard and what responses were most insightful?
- What are the most important things you heard from hosts, instructors, and fellow students?
- What did you learn from the readings discussed?
- What are some concepts you learned about that you feel most confident about? Write as much about this as you can.
- What are some concepts or information that you do not feel confident about? Write as much about this as you can (what you know, do not know). Use information to formulate questions you can ask the next day and see if you can get it clearer after these discussions.

- What personal connections can you find between the daily experiences (e.g., from field experiences, readings, conversations) and your past experiences and feelings?
- How do you intend to use the knowledge gained to influence positive change in the conservation of forests and their inhabitants (e.g., wildlife) and/or wellbeing of humans?
- How do your reflections connect to the readings / videos?

Reflect and note down these important things and if you were confused, try to pinpoint the moment when you were confused and try to see if you can figure out why and how to address these from experiences during the course. You may also use this opportunity to form questions you may ask the hosts, instructors, and fellow students the next day to get more clarity.

You are required to make one reflective journal entry per day. You are advised to continue adding to your journal entries regularly during the course. You should aim to broaden your journal entries with information from daily interactions, readings, and personal experiences during the course.

Important! Your field notebook must also include at least two thoughtful questions that you posed to the entire group (hosts, instructors, fellow students) during the course, a synthesis of their responses to each of these questions, and clear and concise answers to each of these questions based on their responses and your own thoughts.

Important! At the end of your field notebook, you must answer all of the following questions on the second-to-last day in Borneo:

- what are your overall thoughts and opinions of this trip?
- what was the most interesting thing you learned on this trip and why was it interesting?
- what surprised you the most on this trip and why did it surprise you?
- what one animal or plant species in Borneo do you identify with the most (i.e., kinship, similar to you) and why (some people call this a “spirit animal” although this phrase is controversial)?

The instructors will provide some quick initial feedback on your notebook a few days into the course. ***Your final notebook is due on the second-to-last day in Borneo, and the graded notebook will be returned to you on the last day of the trip before leaving.***

Student Wellbeing and Academic Support: <https://experience.oregonstate.edu/resources>

Academic Calendar

All students are subject to the registration and refund deadlines as stated in the Academic Calendar: <https://registrar.oregonstate.edu/osu-academic-calendar>

Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations, but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Inclusivity Statement

OSU and the College of Forestry strive to create an affirming climate for all students, including underrepresented and marginalized individuals and groups. Diversity encompasses differences in age, color, ethnicity, national origin, gender, physical or

mental ability, religion, socioeconomic background, veteran status, sexual orientation, and marginalized groups. We believe diversity is the synergy, connection, acceptance, and mutual learning fostered by the interaction of different human characteristics.

Religious Holidays

OSU strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please contact us immediately so that we can make alternative arrangements.

Student Bill of Rights

OSU has 12 established student rights. They include due process in all university disciplinary processes, an equal opportunity to learn, and grading in accordance with the syllabus: <https://asosu.oregonstate.edu/advocacy/rights>.

Reach Out for Success

University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it is important to reach out. Consider discussing the situation with an instructor or academic advisor. Learn about resources that assist with wellness and academic success at oregonstate.edu/ReachOut. If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255).

Reporting

Please be aware that we need to report incidents you disclose to us that involve gender or sex-based harassment, violence, or discrimination (including your name) to the Office of Equal Opportunity and Access (EOA). For more information on how EOA responds to reports, please visit their website at <https://eoa.oregonstate.edu>. However, if you wish to make a confidential disclosure and receive information on resources and services, please contact the Survivor Advocacy and Resource Center (SARC) by telephone (541-737-2030), by e-mail (survivoradvocacy@oregonstate.edu), or visit them in the Plageman Building. EOA and SARC can assist with academic accommodations.

Student Conduct Expectations

Student conduct is governed by the university's policies, as explained in the Code of Student Conduct at <https://beav.es/codeofconduct>.