



THE SCHOOL
FOR FIELD STUDIES

Ecology and Conservation of Southeast Asian Elephants

SFS 3112

Syllabus

The School for Field Studies (SFS)
Center for Environmental Justice and Mekong Ecologies
Siem Reap, Cambodia

6 credits

This syllabus may develop or change over time based on local conditions, learning opportunities, and faculty expertise. Course content may vary from semester to semester.

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COURSE CONTENT SUBJECT TO CHANGE

Please note that this is a copy of a recent syllabus. A final syllabus will be provided to students on the first day of academic programming.

SFS programs are different from other travel or study abroad programs. Each iteration of a program is unique and often cannot be implemented exactly as planned for a variety of reasons. There are factors which, although monitored closely, are beyond our control. For example:

- Changes in access to or expiration or change in terms of permits to the highly regulated and sensitive environments in which we work;
- Changes in social/political conditions or tenuous weather situations/natural disasters may require changes to sites or plans, often with little notice;
- Some aspects of programs depend on the current faculty team as well as the goodwill and generosity of individuals, communities, and institutions which lend support.

Please be advised that these or other variables may require changes before or during the program. Part of the SFS experience is adapting to changing conditions and overcoming the obstacles that they may present. In other words, this is a field program, and the field can change.

Course Overview

This 6-week Special Topics program will focus on the ecology and conservation of the Asian elephant (*Elephas maximus*), finishing with a written report on a specific research project.

Due to a drastic decrease in wild elephant populations, the reality of a world without these charismatic megafauna is becoming a likely possibility. In Asia, this is primarily due to a booming human population and increased demand for space. Elephants are of great scientific interest due to their complex behaviors associated with spatio-temporal memory, intelligence, and complex social interactions, such as forming deep family bonds and displaying empathy. It is also well recognized the role they play in the structure and function of ecosystems. Saving Asian elephants requires improved scientific understanding not only of the species but also the increasingly complex environmental matrix they inhabit.

Asian elephants are an endangered species that occupy a range covering Bangladesh, Bhutan, India, Nepal, and Sri Lanka in South Asia; and Cambodia, Indonesia (Kalimantan and Sumatra), Lao PDR, Malaysia (Peninsular Malaysia and Sabah), Myanmar, Thailand, and Vietnam in South-east Asia; and China in East Asia. There are believed to be only 40,000 – 50,000 Asian elephants remaining (WWF, 2017), of which 15,000 – 20,000 are in captivity. Action plans and conservation strategies have been initiated by government institutions and non-government organizations throughout the Asian elephant range where targeting the interface between humans and elephants is a priority. Different solutions are needed for different areas and often these are continuously changing and evolving.



Elephants in Keo Seima Wildlife Sanctuary, Mondulkiri Province, Cambodia (Lloyd, 2017)

Cambodia

In Cambodia, where the first half of this program is based, there are between 250-600 elephants remaining in the wild (IUCN Redlist, 2008). Elephants have long been a symbol of power and prestige as well as a symbol of tradition in Cambodia. From the Angkorian Empire to contemporary royal traditions, elephants have played a central ceremonial role. Elephants continue to play a role in traditional livelihoods of the indigenous Bunong people in Cambodia's highlands.

The two core populations of elephants in Cambodia are in the Cardamom Mountains Landscape in the southwest and the Eastern Plains Landscape in Mondulkiri and Rattanakiri provinces, with smaller populations scattered throughout other provinces. Some elephant herds in Cambodia are believed to traverse the borders of neighbouring Vietnam and Thailand, hence there are difficulties in accurate population estimates.



Recreation of Angkor Army on Campaign (Tom Chandler/ Monash University)

For the Cambodia portion of this course, students will be based predominantly in Monduliri Province with short periods of time in Siem Reap and Phnom Penh. Monduliri Province borders the provinces of Kratié to the west, Stung Treng to the northwest, Ratanakiri to the north and Vietnam to the east and south. Students will conduct field work in and around one of Cambodia’s great protected areas - the Keo Seima Wildlife Sanctuary. The sanctuary is home to more than 60 species that are globally threatened, near threatened, or data deficient by IUCN criteria. There are many different species of carnivore, including seven species of wild cat such as the Leopard Cat. The area is important for the conservation of primates, Asian elephants, wild cattle (Gaur and Banteng), and many species of birds.

Keo Seima is also home to Bunong indigenous communities, who have a strong link with their natural environment and have depended on the forest economically, culturally, and spiritually for many generations (WCS, 2017). Traditionally, the Bunong practice swidden agriculture and they have a long tradition of elephant keeping. However, there is a strong Bunong belief that breeding in captivity is bad luck and as there are very few elephants left in the wild in Cambodia, the tradition of elephant keeping is disappearing along with traditional knowledge of elephant medicines, ceremonies, and folktales.



Map of Cambodia (Open Development Cambodia, 2017)

Elephant Valley Project

Students will spend the second and third weeks of the course based at the Elephant Valley Project located within and adjacent to Keo Seima Wildlife Sanctuary in Mondulkiri Province. The Elephant Valley Project, located 15 minutes away from the town of Sen Monorom, is run by the Elephant Livelihood Initiative and Environment (E.L.I.E) whose aim is to 'improve the captive elephant's health and welfare situation by the development of an elephant sanctuary while providing province-wide veterinary care and associated social support programs for the Bunong people'. The Elephant Valley Project is an elephant sanctuary that cares for injured and overworked elephants in a landscape where



An elephant at the Elephant Valley Project, Cambodia (Lloyd, 2017)

they forage naturally and roam the surrounding grassy hilltops, lush evergreen, and mixed deciduous forests. Students will spend time each day with the skilled and professional Bunong elephant caretakers, known as Mahouts, who are the core of the sanctuary and have a deep connection with their elephants. You will also join volunteers for meals, and, in your free time, you will have the opportunity to participate in scheduled volunteer activities. Read more about Elephant Valley Project here: <http://www.elephantvalleyproject.org/evp-in-depth/>.

Thailand

The second half of this course will be based in Thailand where there is an estimated population of 7,000 - 8,000 elephants, half of which are wild. Students will spend a few days exploring Bangkok and working with local university students on outreach activities and visit the [Think Elephants International](#) conservation and cognition field site (organised through NYU and Dr Joshua Plotnik) in Kanchanaburi before travelling to Rhuam Thai village near Kuiburi National Park where there is an estimated 230 wild elephants where we will collaborate with 'Bring the Elephants Home'.

Elephants are the national symbol of Thailand and have long been associated with Thai royalty. In the early-1900s there were an estimated 100,000 captive elephants in Thailand (Tipprasert, 2001) and by mid-2007 there were an estimated 3,456 captive individuals left, and roughly a thousand wild elephants. By 2017 the number of captive elephants had risen to an estimated 3,783 and roughly the



Map of Thailand showing Kuiburi National Park <https://www.goway.com/trip/asia/untamed-thailand-hua-hin-kui-buri-khao-sok-more>

same number for wild. The elephant has been an endangered species in Thailand since 1986 (Williams et al. 2020). In Thai society elephants have played a substantial role in manual labor, war, royal iconography, and the tourism industry. For thousands of years, they were captured and trained to be a form of transport and used for heavy labor. Nowadays the tourism industry draws many visitors from all over the world to see captive elephants in Thailand (Buckley et al. 2007).

Human-elephant conflict has escalated since about 2000 with many human and wild elephant casualties as a result. Fatalities to elephants are often from electrocution by live wires strung by farmers to keep elephants from their crops. Besides electric fencing, efforts to keep elephants at bay have included tree barriers, burning tires, loud noise from sirens, fireworks, chili infused fences, and bees (Saenpassa, 2018)

Bring The Elephant Home (BTEH)

Located alongside the KuiBuri National Park, BTEH's mission is to increase chances of survival for elephants and work towards a world in which people and elephants can live in harmony, benefiting from each other's existence. Their conservation projects are rooted in local communities. Usually, the people living near elephants are the most affected, while receiving hardly any benefits from elephant presence. Equitable and sustainable nature conservation respects their knowledge and values and makes the benefits and income that elephants can bring accessible to all. BTEH's work is characterized by three overarching guidelines: local involvement, a healthy ecology, and benefits for people and elephants simultaneously. They lead to shared decision-making, ownership of local communities, sustainability, gender- and social equality, pride, and a peaceful coexistence of people and animals.

BTEH are currently involved in many ongoing research projects such as the Tom Yum Project which involves planting alternative crops that are unpalatable to elephants but can be economically viable to the local community (such as gingers, lemongrass, lime etc.) Their research projects have a strong focus on the development of a mutually beneficial human-elephant coexistence strategy and its implementation (<https://bring-the-elephant-home.org/>)



Dr. Megan English undertaking elephant research with wild elephants in Borneo (English, 2012)

Course Content

In addition to ecology and conservation, this summer course will include components on elephant welfare and management as well as the history of elephants in Asia, both in the wild and in captivity, with particular focus on Cambodia and Thailand. In Cambodia, lectures will be followed by related fieldwork exercises on semi-captive elephants. Students will learn to identify elephant behaviours, as well as their foraging patterns and habitat preferences using both quantitative and qualitative methods. Students will contribute to collecting valuable and informative data whilst directly observing elephants, using continuous and interval sampling. Elephant habitat use will be recorded indirectly based on signs such as footprints, dung and feeding signs which can help to distinguish elephant age, group composition and food-plant preferences. Semi-captive elephants provide an ideal opportunity for students to get close enough to observe elephant behaviour and gather data that can contribute to our knowledge of their wild counterparts. Students will learn about elephant physiology and health assessments from an experienced elephant vet during their time at EVP.

Using the skills students have started to develop in Cambodia, during the Thailand component, they will delve into conservation challenges and conflict associated with the human-elephant interface. This will be explored by interviewing, and staying in the homes of local villagers that are directly affected by wild elephant crop-raiding. This information will be used to inform a research project associated with human-elephant conflict mitigation. Students will spend the three weeks collecting either qualitative or quantitative data, writing up a report that will be shared with our partner BTEH and presenting their results to the local community including those who are directly affected by human-elephant conflict. Students will work in groups of 3-4 for each project.

Learning Objectives

1. Gain in-depth knowledge about the issues facing wild and captive elephants throughout Asia with particular focus on elephants in Cambodia and Thailand.
2. Develop skills for conducting rigorous scientific research using quantitative and qualitative methods.
3. Understand Cambodia's and Thailand's ecosystems and traditional culture associated with human-elephant interactions.
4. Develop and complete a research project that will inform human-elephant conflict mitigation.
5. Gain confidence in both independent and group work activities and public speaking.

Assessment

The evaluation breakdown for the course is as follows:

<i>Assessment Item</i>	Value (%)
Ecosystem engineers assignment	15
Conservation strategies debate	10
Health and welfare quiz	15
Human-elephant conflict research report	40
Research report oral presentation	10
Fieldwork participation	5
Class participation	5
Total	100

Assessment Descriptions

Ecosystem Engineers assignment (15%)

This assignment will be a 3-page report on the importance of elephants as ecosystem engineers. Habitat fragmentation and encroachment on elephant habitat by agricultural crops are the main causes of decline in wild elephant populations. As elephants require around 10% of their body weight of forage each day, they must traverse vast distances to meet these intake needs, sculpting the landscape as they do so. This is becoming increasingly challenging in a human dominated landscape matrix. Students will refer to their lecture material, readings and fieldwork on elephant plant selection and feed intake rates and discuss the impact of elephants on an ecosystem. Questions will be provided for the students to address in their report.

Conservation Strategies debate (10%)

Students will participate in a debate on a topic associated with a conservation strategy that purportedly benefits elephant conservation. Students will be divided to work in four groups (four topics) to prepare several “arguments” in order to foster healthy respectful debate and clear expression of various outlooks and positions. The members of each team should work together to formulate arguments and supporting facts/ examples which strengthen their side of the debate. Each member of each team will have the opportunity to voice the teams’ arguments, in a specific order and two students will be adjudicators/judges of the debate.

Health and Welfare quiz (15%)

This quiz will focus on elephant health and welfare in captivity. Elephants are not considered to be domesticated, even in captivity. Their ecological and biological needs are shaped by conditions experienced by their wild counterparts (Varma *et al.* 2008); as a result, captive elephants can suffer from a variety of physical and psychological ailments. The quiz will be based on information gained from lecture material, readings, and fieldwork experience and involve issues that elephants face in captive environments in Asia.

Human-Elephant Conflict research report (40%)

Students will work in groups of three or four to develop a research project that can be completed in three weeks. Like a Directed Research project, this task will give students an introduction to conducting scientific research – developing a question, collecting and analyzing data, writing a paper, and presenting their findings to members of the public who are affected by human-elephant conflict.

Research report oral presentation (5%)

Each group will give a 15-minute presentation of their research topic to the local community that is impacted by human-elephant conflict in Thailand.

Class and Fieldwork Participation (5%, 5%)

Everybody should be prepared for each academic and fieldwork session. This implies reading assigned materials with enough detail to be able to ask relevant questions, participate in analytical discussions about key issues, and engaging appropriately with fieldwork activities and research partners. Participation will be evaluated during classes and fieldworks sessions, considering quality and quantity of your contributions.

Grading Scheme

A	95.00 - 100.00%	B+	86.00 - 89.99%	C+	76.00 - 79.99%	D	60.00 - 69.99%
A-	90.00 - 94.99%	B	83.00 - 85.99%	C	73.00 - 75.99%	F	0.00 - 59.99%
		B-	80.00 - 82.99%	C-	70.00 - 72.99%		

General Reminders

Readings – You are expected to read and make notes on all the required articles/book chapters prior to each class. Making use of information from required readings will be part of the course assessments. All readings are available as PDFs on the Student Drive or from a common laptop. It is encouraged that ‘optional readings’ be reviewed by students. The reading list might be updated or changed during the program and some readings that are initially listed as ‘optional’ may be changed to ‘required’.

Plagiarism – Using the ideas and material of others, without giving due credit, is cheating and will not be tolerated. A grade of zero will be assigned if anyone is caught cheating or aiding another person to cheat actively or passively. All assignments unless specifically stated should be individual pieces of work.

Deadlines – Deadlines for written and oral assignments are not flexible due to the timing and nature of the program. It is important to respect deadlines to ensure that faculty can review and return assignments in a timely manner. Assignments will be handed back to students after a one-week grading period. Late assignments will incur a 10% penalty for each day that they are late. No assignment will be accepted after three days.

Participation – Since we offer a program that is likely more intensive than you are used to at your home institution, missing even one lecture can have a proportionally greater effect on your final grade simply because there is little room to make up for lost time. Participation in all components of the program is mandatory because your actions can significantly affect the experience you and your classmates have while at SFS. Therefore, it is important that you are prompt for all activities, bring the necessary equipment for field exercises and simply get involved.

Course Content

Locations: **SR:** Siem Reap, **EVP:** Elephant Valley Project, **SM:** Sen Monorom, **PP:** Phnom Penh
B: Bangkok, **TEI:** Think Elephants International, **BTEH:** Bring the Elephant Home

Type: **D:** Discussion, **FL:** Field Lecture, **GL:** Guest Lecture, **L:** Lecture, **O:** Orientation, **FEX:** Field Experience
 *Readings in **Bold** are required.

No	Title and outline	Type	Time (hrs)	Required Readings
1	Orientation (SR) Welcome, introductions, and tour of the Center Cambodian cultural norms, health and safety, SFS rules and policies, and town tour	O	7.0	

No	Title and outline	Type	Time (hrs)	Required Readings
2	Cambodian History Overview (SR) A brief overview of Cambodia's tumultuous history from the Angkorian period to the present	L	2.0	
3	The Angkor Empire (SR) Explore the World Heritage site of Angkor guided by an expert in the history and culture of the great Angkorian Empire including the temples of Angkor Wat, Ta Prom, and Bayon. Students may also get the chance to visit an Angkorian elephant enclosure and marvel at the huge elephant gates and elaborate Elephant Terraces.	FL	4.0	
4	Introduction to course (SR) What to expect from the course and fieldwork components and how student participation will contribute to improved knowledge of wild and captive elephants. Explanation of direct and indirect research methodologies for wild and captive elephants, as well as a brief Introduction about Mondulkiri and the Bunong people.	L	4.0	
5	Evolution & Distribution (SR) We will discuss the worldwide distribution of elephants with specific focus on <i>Elephas maximus</i> and learn what kinds of habitat conditions and threats exist for extant populations.	L	1.5	Maltby & Bourchier (2011).
6	EVP Introduction (EVP) Students will be introduced to the manager of the sanctuary and given a briefing of the safety protocols in place. We will then go to the forest and meet the elephants and their caretakers, learning the history of each elephant prior to being brought to EVP.	GL; FEX	4.0	
7	Ecology (EVP) Students will be taught about elephant habitat use and their role as ecological engineers and keystone species in the various ecosystems that they occupy in Asia. Understand the challenges these megaherbivores face based on their resource requirements and foraging preferences due to human encroachment.	L; FEX	6.0	Campos-Arceiz & Blake (2011). English <i>et al.</i> (2014).
8	Anatomy and Physiology (EVP) Learn about the physical traits of elephants and the differences in these traits between species and sub-species. Sexual dimorphism in	L	2.0	

No	Title and outline	Type	Time (hrs)	Required Readings
	physiology will be explored and related back to variations between male and female resource needs.			
9	Cognition (EVP) Learn about the brain structure of elephants and complex behaviours such as tool-use, problem solving, cooperation, social interactions and spatio-temporal movement patterns.	L	1.5	Plotnik <i>et al.</i> (2010). McComb <i>et al.</i> (2014).
10	Communication (EVP) Explore the four ways elephants communicate to each other: chemical, tactile, olfaction and vocalisations. How studying captive elephants can benefit wild elephant conservation.	L	1.0	
11	Social behaviour (EVP) Learn about close family ties, social complexity and fission-fusion society of elephants and how characteristics of their strong individual personalities affect how they interact with each other and their environment.	L; FEX	3.5	
12	Health & welfare in captivity (EVP) Explore the physical and psychological ailments common for captive elephants such as stereotypic behaviour, PTSD, arthritis, foot problems and dietary deficiencies.	L; GL; FEX	7.5	Simpson <i>et al.</i> (2017). English <i>et al.</i> (2014).
13	Cambodian History (PP) In Phnom Penh you will have the chance to immerse in Cambodian history including visits to the Royal Palace and National Museum. You will also learn about Cambodia's recent troubled past and the Khmer Rouge. You will visit one of the prison sites known as S21.	FL	4.0	
14	Threats to conservation (B, TEI, BTEH) Learn about the leading threats to Asian elephants including habitat destruction and fragmentation, human-population growth, poaching from the wild for captivity and poaching for tusks and body parts.	L; GL; FEX	10.0	Leimgruber <i>et al.</i> (2003).
15	Human-elephant conflict (BTEH) Learn about human-elephant conflict in Asian countries, particularly Cambodia, the impact of rapid human population growth and expansion leading to the destruction of elephant habitat and increasing conflict with people.	L; GL; D; FEX	19.0	Webber <i>et al.</i> (2011).
16	Fieldwork techniques, quantitative and qualitative data analysis, research report (BTEH)	L; D	6.0	

No	Title and outline	Type	Time (hrs)	Required Readings
17	Disorientation (B) How to utilize and continue your SFS experience beyond the program through the Alumni network and campus reps program. Prepare for the return home and reverse culture shock.	L; D	3.0	
	Total contact hours		86	

Reading List

*Readings in **Bold** are required

1. **Campos-Arceiz, A., & Blake, S. (2011).** Megagardeners of the forest—the role of elephants in seed dispersal. *Acta Oecologica*, 37(6), 542-553.
2. **English, M., Gillespie, G., Ancrenaz, M., Ismail, S., Goossens, B., Nathan, S., & Linklater, W. (2014).** Plant selection and avoidance by the Bornean elephant (*Elephas maximus borneensis*) in tropical forest: does plant recovery rate after herbivory influence food choices?. *Journal of Tropical Ecology*, 30(4), 371-379.
3. **English, M., Kaplan, G., & Rogers, L. J. (2014).** Is painting by elephants in zoos as enriching as we are led to believe? *PeerJ*, 2, e471.
4. Fernando, P., Leimgruber, P., Prasad, T. & Pastorini, J. (2012). Problem-Elephant Translocation: Translocating the Problem and the Elephant? *PLOS One*, 7, e50917.
5. IUCN Redlist of threatened species (2008).
<http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T7140A12828813.en>
6. **Leimgruber, P., Gagnon, J. B., Wemmer, C., Kelly, D. S., Songer, M. A., & Selig, E. R. (2003).** Fragmentation of Asia's remaining wildlands: implications for Asian elephant conservation. In *Animal Conservation forum*, 6 (4), pp. 347-359. Cambridge University Press.
7. **Maltby, M. & Bourchier, G. (2011).** Current Status of Asian Elephants in Cambodia. *Gajah*, 35, 36-42.
8. **McComb, K., Shannon, G., Sayialel, K. N., & Moss, C. (2014).** Elephants can determine ethnicity, gender, and age from acoustic cues in human voices. *Proceedings of the National Academy of Sciences*, 111(14), 5433-5438.
9. Open Development Cambodia (2017). <https://opendevelopmentcambodia.net/map-explorer/>.
10. **Plotnik, J. M., de Waal, F., Moore, D., & Reiss, D. (2010).** Self-recognition in the Asian elephant and future directions for cognitive research with elephants in zoological settings. *Zoo biology*, 29(2), 179-191.
11. **Simpson, G., Zimmerman, R., Shashkina, E., Chen, L., Richard, M., Bradford, C. M., & Planet, P. (2017).** Mycobacterium tuberculosis Infection among Asian Elephants in Captivity. *Emerging Infectious Diseases*, 23(3), 513.

12. **Webber, C. E., Sereivathana, T., Maltby, M. P., & Lee, P. C. (2011).** Elephant crop-raiding and human-elephant conflict in Cambodia: crop selection and seasonal timings of raids. *Oryx*, 45(2), 243-251.
13. Wildlife Conservation Society (2017). <https://cambodia.wcs.org/Saving-Wild-Places/Seima-Forest.aspx>
14. World Wildlife Fund (2017). http://wwf.panda.org/what_we_do/endangered_species/elephants/asian_elephants/