THE SCHOOL FOR FIELD STUDIES

Endangered Species Conservation
SFS 3752

Syllabus

The School for Field Studies (SFS)
Center for Wildlife Studies and Human Dimensions of Conservation (CWSHDC)
Kimana, Kenya

4 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

Conservation and management efforts in resource management dates back in 19th century with utilitarian principles. Utilitarian conservation advocated for renewable resources that were to be managed in a way that they are not to be exhausted. Species diversity in terrestrial and aquatic ecosystem comprise the majority of the living organisms. We are faced with large contemporary extinction of species, degradation of ecosystems, fragmentation of remaining indigenous vegetation and uncertain fates for many species. It is worth noting that resources that are available to conserve biodiversity must be utilized efficiently. Efficient management is particularly important because current utilization is estimated to be insufficient to conserve the world's biodiversity.

Conservation and management decisions are required for many different circumstances, such as decision about whether species should be listed as threatened, choosing from a set of management strategies for those species, allocating resources such as land, supplemental feeds or permitting development, determining search effort for threatened species requires knowledge about the system being managed, the efficacy of actions and constraints.

Management of threatened and endangered species requires decision making in the face of uncertainty. Foremost, understanding the decision context of threatened species management, and understanding how to make decisions when we do not know everything about them. Effective conservation management relies on managers and conservationists specifying the goals, the threats and opportunities, and alternatives set of management actions available and how they influence vulnerable and endangered species conservation.

The overall goal of the Endangered species conservation course will be to provide students with in-depth understanding on the landscape dynamics of East Africa Savanna Ecosystems and their contribution on vulnerability of wildlife species. It will develop interest in and bring an understanding of the management and conservation efforts regionally and in Kenya, and how Kenya has exerted its conservation efforts in conservation of vulnerable species. Students will have a chance to learn and apply field techniques and approaches to assess and monitor different species that have been classified as vulnerable. A comparative approach to different management systems will be used to determine the effectiveness of species management locally, regionally, and globally. Students will practice the classification criteria for species in the ecosystem. Aspects learned on the course will also be applied to meet the needs and objectives of the Directed Research.

Course Case Study

Across the globe, Kenya is renowned for its rich biodiversity that span the air, water, and land; a key natural wealth that makes the country a conservation hub and tourism destination. Historically, there was less concern about the conservation of the country' biota resources and their habitats, but this has rapidly changed in the last decades, and many species are at risk of being extinct. Some key causes of decline in population of some species are linked to anthropogenic causes such as overhunting or overharvesting, impacts of native species, emergence of diseases, habitat degradation or loss. Other causes for the decline are inherent demographic and genetic phenomena of some species themselves like the cheetah, and more recently climate change. Recent evidence suggests that deforestation and habitat destruction are prime direct and indirect causes of reported rampant decline in numbers of many species in the country. Overexploitation (hunting, bush meat, illegal killing due to human wildlife conflicts, conversion of wildlife dispersal areas and blocking of migration corridors) are also important

drivers of large mammal decline. Countrywide infrastructure and expansion of human settlements have equally become key drivers of species loss.

Kenya's first National Wildlife Census in 2021 revealed that there are dangerously few numbers of some wildlife iconic species, including the black rhino. The census, which lasted three months, established that 5 species are "critically endangered". These are: Tana River Mangabey, with 1,650 individuals, Black Rhinoceros (897 individuals), Hirola antelope (497 individuals), Sable Antelope (51 individuals), and Roan Antelope with 15 individuals. According to the IUCN criteria, this designation corresponds to the highest degree of risk, indicating these species have a 50% likelihood of going extinct within ten years or three generations. The census also established relatively low numbers of 9 species which have been classed as "endangered". These are: African elephant, African lion, Cheetah, White Rhinoceros, Eastern Mountain bongo, Grevy's Zebra, African Wild Dog, Nubian Giraffe and Sitatunga. In the list of species of concern are: Lesser Kudu, hippopotamus, Thomson's gazelle and generally all species of giraffes. The striped hyaena, sitatunga, leopard, white rhino, Lelwel hartebeest and Rothschild's giraffe are also listed in multiple sources as species of conservation concern due to declining numbers. Lions, leopards, and elephants are listed as 'vulnerable' in the IUCN Red List but as endangered according to Kenya's principal conservation law, the Wildlife Conservation and Management Act (Kenya 2013), because of their immense value in conservation and tourism in the country.

This course zooms into endangered large mammals because, in Kenya, these currently dominate political and academic discussions around conservation. For instance, human wildlife conflicts that threaten conservation largely are largely associated with many of these endangered large mammals than in other megafauna and flora. Land tenure transformation that has seen an expanding agriculture in conservation areas tend to affect the habitats and behavior of endangered large mammals. For example, migration of African elephants populates the many policy and academic debates on opening of wildlife corridors. Illegal trade on live wildlife and wildlife parts are often common with the large mammals, including cheetah, rhino, and African elephants. Therefore, while this course will generally look at endangered species, specific attention is given to large mammals because of prevailing discourse around them in Kenya.

The conservation areas of focus in this course are:

1. Amboseli ecosystem, in southwest Kenya, which is home to some of the few remaining large tuskers (African elephants with huge tusks). Maasai rangeland of the Amboseli ecosystem is undergoing major land use changes since land subdivision that gave way to expansion of irrigated agriculture. The Amboseli ecosystem has also seen some of the most vibrant interventions on human-elephant conflicts.
2. Maasai Mara ecosystem, which is one of the key tourist destinations of in Kenya, is home to endangered and iconic species including African lions, cheetah, and black rhino. Unethical tourism in Maasai Mara has direct effect on Cheetah conservation. Maasai Mara ecosystem is home to some of the best community conservancies and demonstrate success stories of involving Maasai communities in conservation. In addition, Maasai Mara is part of the larger Mara-Serengeti ecosystem, and therefore presents a good case for understanding cross-border collaborations in conserving endangered large mammals.
3. Laikipia Conservation area in Central Kenya, where the largest populations of both black and white rhinos can be found in Kenya. Laikipia is home to Kenya's private conservancies. Land tenure in Laikipia is embedded in Kenya's colonial history and therefore adds a different political debate in the conservation of endangered species.

In these diverse landscapes, students will examine how past and contemporary pastoral and agropastoral societies in Kenya (Maasai and Samburu) coexist with endangered species. Learning will also dive into the role of institutions (laws and policies and organizational networks) in shaping present day conservation efforts of endangered species in Kenya. Established and emerging issues including community conservation, human wildlife conflicts, gender dynamics, wildlife enterprises, international crimes, securitization and remilitarization of conservation, animal rights and justice will be explored in relation to endangered species such as Black Rhino, White Rhino, African Elephants, African Lions, Cheetah, Rothchild Giraffes, Chimpanzees etc. Students will examine the influence of traditional beliefs and attitudes in natural resource use and conservation practices to understand the current and future management of natural resources in the region. The influence of modern lifestyle, market capitalism, conservation and management practices, national policies and laws as well as land uses and socio-political and economic changes among the Maasai people will be evaluated.

Learning Objectives

This course introduces conservation and management in developing countries and provides an overview of dynamic conservation. The overall objective of the course is to equip students with knowledge and techniques currently used for wildlife resources. With broad focusses on wildlife and associated resources (plants, space/land, water) as resources that needs to be sustainably managed in the Anthropocene era, this course will look at the management styles and conservation issues facing endangered wildlife**.**

1. Apply the history of conservation management in studying endangered species at local level.
2. Determine the principles of large mammal classification, status, and conservation management of vulnerable and endangered species.
3. Develop using the IUCN individual species local individual species classification. Students will modify the IUCN classification of mammals in ecosystem.
4. Determine the conservation and management practices of waterbirds, primates and mesoherbivores in the ecosystem.
5. Analyze the current and emerging issues at local context with comparison with regional and global Classify the large mammal in ecosystem according to IUCN.

Assessment

The evaluation breakdown for the course is as follows:

Assessment Item	Value (%)
Large Mammal Identification	10
Large Mammal Count	20
Field Ornithology of Endangered Water Birds	10
Plant Monitoring and Vegetation Assessment	20
Participation	10
Final Exam	30
TOTAL	**100**

Large Mammal Identification (10%)

This field exercise will introduce students to identification of large mammal in Amboseli National Park, the main park in the ecosystem. This will also be a comparison with other study sites. Individual students will write a 4-page assignment based on the data collected in the exercise and will be graded.

Large Mammal Count (20%)

In this field exercise, students will use road counts to record the number of large mammals in Amboseli National Park. The data collected will be collated and synthesized during the lab sessions. Students will then write a group assignment which will be graded.

Field Ornithology of Endangered Water Birds (10%)

Students will conduct field identification, count, and identify possible threats that face waterbirds in Amboseli National Park and Nakuru National Park. Students will then compare and contrast while identifying the management efforts by the parks in conservation of the endangered birds in the ecosystems. Students will write up a group paper.

Plant Monitoring and Vegetation Assessment (20%)

After analysis of the field data on vegetation assessment, students will answer short reflective questions on methods of vegetation assessment and their status. The reflection will be an individual 2-page paper.

Participation (10%)

Everybody should be prepared for each academic session. This implies reading the materials for each session with enough detail to be able to ask relevant questions and to participate in analytical discussions about the key issues. Active participation during classes, discussions, assignments, and hikes is expected.

Final Exam (30%)

The exam will have 5 questions that have essays and short answer questions. Students will answer any 3 questions out of the 5 provided.

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 – Assigned readings and hand outs (exercises/assignments) will be available prior to the scheduled activities. Course readings must be read and clarification on issues sought where necessary since ideas and concepts contained in them will be expected to be used and cited appropriately in assigned course essays and research papers.

Plagiarism – Using the ideas or material of others without giving due credit – is cheating and will not be tolerated. A grade of zero will be assigned for anyone caught cheating or aiding another person to cheat either actively or passively (e.g., allowing someone to look at your exam).

Deadlines – Deadlines for written field exercises and other assignments are posted to promote equity among students and to allow faculty ample time to review and return assignments in good time. As such, deadlines are firm, and extensions will only be considered under the most extreme circumstances. Late assignments will incur a 10% penalty for each hour that they are late. This means an assignment

that is five minutes late will have 10% removed. an assignment that is one hour and five minutes late will have 20% of the grade deducted.

Participation – Since we offer a program that is likely more intensive than you might be 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 attending the SFS program. Therefore, it is important that you are prompt for all course activities.

Course Content

Type: L: Lecture, **FL:** Field Lecture, **GL:** Guest Lecture, **FEX:** Field Exercise, **CD**: Class discussion

*Readings in **Bold** are required.

	Title and outline	*Type*	*Time*	*Readings*
1	**Course introduction** This introductory lecture will give an overview on wildlife species vulnerability in Anthropocene era with focus on endangered species globally, regionally and in Amboseli ecosystem, Kenya.	L	1 hour	**Okello *et al.*, (2004).**
2	**Landscape heterogeneity in conservation of endangered species in Amboseli ecosystem** This traveling lecture will identify the landscape distribution and management of wildlife in Amboseli ecosystem and ecological relationships and connectivity.	FL	1 hour 40 min	**Okello and Kioko (2010).** Katayama et al., (2014).
3	**Classification and conservation of wildlife species (IUCN)** This lecture will introduce students to the evolution of wildlife management as a discipline and the conservation changes to endangered species.	L	1 hour 40 min	**Sarkar (1999).** Mace et al., (2008).
4	**Application of camera traps in conservation** The field exercise will provide students with hands-on techniques on how to set up camera traps to assess wildlife species.	FEX	2 hours 30 min	Pimm, S. et al., (2015).
5	**Large mammal identification and social organization** This lecture will introduce students to large mammals and their associated social organization in the Amboseli ecosystem. This will also focus on endangered species in the ecosystem. A follow-up preparatory class on the use of field equipment and group formation.	L	1 hour 40 min	**Estes (1991). Kingdon (2015).**
6	**Large mammal identification** This field exercise will introduce students to large mammals in Amboseli National Park, the main park in the ecosystem that will be compared with other study sites.	FEX	4 hours	**Estes (1991). Kingdon (2015).**
7	**Techniques of large mammal census** With advancement in techniques of animals censuring. This lecture will explore the application of novel	L	1 hour 40 min	**Okello, M. (2005).**

	Title and outline	*Type*	*Time*	*Readings*
	techniques that conservationists can use with minimal interference to wildlife. Students will learn the different census techniques used for large mammals. A follow-up film will show the novel techniques used worldwide in animal censuring.			Greene, K. et al., (2017).
8	**Large mammal count** Students will conduct a field mammal count in Amboseli national park. Transects along the road network will be used to count wildlife in the Amboseli National Park.	FEX	4 hours	Jachmann, H. (2002).
9	**Spatial variation and identification of species using emerging technologies** Students will learn how to identify giraffes based on age and physical characteristics of each individual giraffe.	L	1 hour 40 min	Strauss, M. K. L. (2015).
9	**Field photography in identification of individual giraffe** Students will have practical field experience with Maasai giraffes in the ALOCA conservancies in Amboseli ecosystem.	FEX	3 hours	
10	**Application of giraffe spotter software** Faculty will guide student on photo upload and processing using giraffe spotter software	LAB	2 hours 30 min	Romiti, F. et al., (2017). Strauss, M. K. L. (2015).
11	**Vulnerable and endangered ornithological management and conservation** This lecture will introduce students to endangered aquatic birds' conservation efforts in Amboseli ecosystem and other study sites.	L	1 hour 40 min	Sutherland, et al. (2004). Bennun, et al. (2000).
12	**Field ornithology of endangered aquatic birds** This field exercise will identify the endangered waterbird and count them in Amboseli national park.	FEX	3 hours	Zimmerman D. et al., (2020).
13	**Application of technology in conservation in Maasai Mara ecosystem** This guest lecture will explore the application of technology in conservation of elephants. The lecture will be followed by field exercise on the use of earth range app in the field.	GL; FEX	3 hours	Altmann et al., (2002). Butz, R. J. (2009).
14	**NGO stakeholders' involvement** Involvement and challenges faced in management and conservation efforts of endangered species in Kenya's protected areas in Maasai mara national reserve.	L	2 hours	
15	**Management of Mountain Bongos** The remaining population of Bongos in the wild increasingly face challenges with suitable diet with supplemental feeding assisting the vulnerable group before they are released into the wild. Students will therefore explore the supplemental program for	L	2 hours	Ewen, J. et al., (2015).

	Title and outline	*Type*	*Time*	*Readings*
	mountain bongos works and challenges faced by conservancy in managing the populations of bongos.			
16	**Gorilla conservation: Eastern gorilla survival threats and conservation models** Gorillas are the largest great apes that play a vital ecological role in the forest ecosystem. However, they face many threats that are majorly induced by human activities. This lecture will highlight the current threats facing the Eastern gorilla in Rwanda and the present conservation efforts to conserve them.	L	1 hour 30 min	Ferriss S. et al., (2005).
17	**Gorilla ecosystem biodiversity-methods 1 & 2** Plant monitoring and vegetation & invertebrate sampling	FEX	3 hours	
18	**Gorilla ecosystem biodiversity-methods 1 & 2** Plant monitoring and vegetation & invertebrate analysis	LAB	3 hours	
19	**Conservation science: the value of long-term research & monitoring approaches** This lecture will provide students with background to conservation practices and management strategies conducted in Virunga national park. It will also examine the research and monitoring milestones that the park has embraced in conservation of mountain gorillas and other endangered species.	L	1 hour 30 min	Williamson, E. A., & Fawcett, K. (2008).
20	**Course overview and exam review** Review of the key highlights of the course	L	50 min	
	Total		**50**	
	UMN Instructional Hours*		**60**	

**UMN defines* *an instructional hour as a 50-minute block. SFS syllabi are written in full 60-minute hours for programming purposes. Therefore 50 full hours = 60 UMN instructional hours (for four credit courses) and 25 full hours = 30 UMN instructional hours (for two credit courses).*

Reading List

*Readings in **Bold** are required

1. **Altmann, J., Alberts, S. C., Altmann, S. A., & Roy, S. B. (2002).** Dramatic change in local climate patterns in the Amboseli basin, Kenya. African Journal of Ecology, 40(3), 248-251.
2. Ausden, M. (2007). Habitat management for conservation: A handbook of techniques. Oxford University Press on Demand.
3. Bennun, L. A., Njoroge, P., & Pomeroy, D. (2000). Birds to watch: a red data list for East Africa. Ostrich, 71(1-2), 310-314.
4. **Butz, R. J. (2009).** Traditional fire management: historical fire regimes and land use change in pastoral East Africa. International Journal of Wildland Fire, 18(4), 442-450.
5. **Davis, A. (2011).** 'Ha! What is the benefit of living next to the park?' Factors limiting in-migration next to Tarangire National Park, Tanzania. Conservation and Society, 9(1), 25-34.
6. **Dudley, N., Parrish, J. D., Redford, K. H., & Stolton, S. (2010).** The revised IUCN protected area management categories: the debate and ways forward. Oryx, 44(4), 485-490.
7. Estes, R. D. 1991. Behavioral Guide to African Mammals including Hoofed Mammals, Carnivores and Primates. Awake Forest Studium Book. Russel Friedman Books Publishers. South Africa. 611pp
8. **Estrada, A., & Garber, P. A. (2022).** Principal drivers and conservation solutions to the impending primate extinction crisis: Introduction to the special issue. International Journal of Primatology, 43(1), 1-14.
9. **Francos, M., & Úbeda, X. (2021).** Prescribed fire management. Current Opinion in Environmental Science & Health, 21, 100250.
10. **Frankham, R. (2010).** Challenges and opportunities of genetic approaches to biological conservation. Biological conservation, 143(9), 1919-1927.
11. KBA Standards and Appeals Committee. (2019). Guidelines for using a global standard for the identification of key biodiversity areas. Prepared by the KBA Standards and Appeals Committee of the IUCN Species Survival Commission and IUCN World Commission on Protected Areas.
12. Kingdon, J. 1997. The Kingdon Field Guide to African Mammals. A.P., London. (Suggested Field Guide/Library)
13. **Mace, G. M., Collar, N. J., Gaston, K. J., Hilton-Taylor, C. R. A. I. G., Akçakaya, H. R., Leader-Williams, N. I. G. E. L., ... & Stuart, S. N. (2008).** Quantification of extinction risk: IUCN's system for classifying threatened species. Conservation biology, 22(6), 1424-1442.
14. **Okello, M. M. 2005.** An assessment of the large mammal component of the proposed wildlife sanctuary site in Maasai Kuku Group Ranch near Amboseli, Kenya. South African Journal of Wildlife Research 35 (1): 63-76 (Required)
15. **Okello, M.M. and Kiringe, J.W. 2004.** Threats to Biodiversity and the Implications in Protected and adjacent dispersal areas of Kenya. Journal for Sustainable Tourism. 12(1): 55 – 69
16. **Priesmeyer, W. J., Fulbright, T. E., Grahmann, E. D., Hewitt, D. G., DeYoung, C. A., & Draeger, D. A. (2012).** Does supplemental feeding of deer degrade vegetation? A literature review. In Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies (Vol. 66, pp. 107-113).
17. Rahbek, C. (1993). Captive breeding—a useful tool in the preservation of biodiversity?. Biodiversity & Conservation, 2, 426-437.
18. **Sarkar, S. 1999.** Wilderness Preservation and Biodiversity Conservation: Keeping Divergent Goals Distinct. Bioscience 49 (5): 405 – 411 -

19. Schemnitz, S. D. (1980). Wildlife management techniques manual.
20. Sutherland, W. J., Newton, I., & Green, R. (2004). Bird ecology and conservation: a handbook of techniques (Vol. 1). OUP Oxford.
21. **Wallace, P. Y., Asa, C. S., Agnew, M., & Cheyne, S. M. (2016)**. A review of population control methods in captive-housed primates. Animal Welfare, 25(1), 7-20.
22. Western D. Amboseli National Park: Enlisting landowners to conserve migtratory wildlife. AMBIO 11(5): 302 – 308
23. Zimmerman, D. A., Pearson, D. J., & Turner, D. A. (2020). Birds of Kenya and northern Tanzania. Bloomsbury Publishing.