THE SCHOOL FOR FIELD STUDIES

Endangered Species Conservation
SFS 3752

Syllabus
4 Credits

The School for Field Studies (SFS)
Center for Endangered Species Conservation

Kimana, Kenya

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. Lake Nakuru National Park, in Rift Valley, which borders Nakuru city, is a closed ecosystem where rhinos are conserved and bred.
4. 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	20
Large Mammal Count	15
Field Ornithology of Endangered Water Birds	15
Supplementary Feeding Programs Reflection Paper	10
Participation	10
Final Exam	30
TOTAL	**100**

Learning objective	Evaluation Level	Assessment
Apply the history of conservation management in studying the endangered species at local level	Apply	• Class and group discussion • Short quizzes on management styles • Exam
Determine the principles of large mammal classification, status and conservation management of endangered species.	Apply	• Field exercise on mammal identification and counts • Field ornithology of endangered water birds • Field IUCN individual species criteria
Develop using the IUCN induvial species local individual species classification. Student will modify the IUCN classification of mammals in ecosystem	Create	• Class on IUCN classification • Field IUCN species classification exercise • Exam
Determine the conservation and management practices of waterbirds, primates and mesoherbivores in the ecosystem.	Evaluate	• Short quizzes during travel lectures to study sites • Reflection essay on supplemental feeding program
Analyze the current and emerging issues at local context with comparison with regional and global Classify the large mammal in ecosystem according to IUCN	Analyze	• Class discussion • Group presentations • Exam

Large Mammal Identification (20%)

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 (15%)

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 to contribute 15% of the course grade.

Field Ornithology of Endangered Water Birds (15%)

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 which will be graded to 15% of the course grade.

Supplementary Feeding Programs Reflection Paper (10%)

After the travel lecture on concepts, challenges of supplementary feeding on Llamas, chimpanzees, students will write an individual 2-page reflection that will comprise 10% to the overall grade.

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 (10%)
The exam will have 5 questions that have essays and short answer questions. Students will answer any 3 questions out of the 5 provided. The exam will contribute to 30% of the overall curse grade.

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	**Introduction to endangered species** This introductory lecture will give an overview on wildlife species vulnerability in the Anthropocene era with a focus on endangered species globally, regionally and in Amboseli ecosystem in Kenya.	L	1 hour, 20 min	**Okello, M.M. and Kiringe, J.W. (2004).**
2	**Introduction to wildlife management and conservation of endangered species** This lecture will introduce students to evolution of wildlife management as a discipline and the conservation changes to endangered species.	L	1 hour, 20 min	**Sarkar, S. (1999).**
3	**Landscape heterogeneity in conservation of endangered species in Amboseli ecosystem** This lecture will identify the landscape distribution and management of wildlife in AE and understand ecological relationships and connectivity	FL	1 hour, 40 min	
4	**Large mammal identification and social organization** This lecture will introduce students to large mammals and their associated social organization in the Amboseli ecosystem.	L	1 hour, 20 min	Estes, R. D. (1991). Kingdon, J. (1997).
5	**Prep for mammal identification and social organization** This preparatory class will explore the forms of recording animal sightings and social organization.	L	1 hour, 20 min	Estes, R. D. (1991). Kingdon, J. (1997).
6	**Large mammal identification FEX** 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 student will write up of 4-page assignment based on the data collected in the exercise will be graded.	FEX	4 hours, 20 min	
7	**Techniques of large mammal census** Understanding the advancement in techniques of animals censuring will help in application of novel techniques that conservationists can use with minimal interference to wildlife. Students will learn the different census techniques used for large mammals. Students will also be shown a film of the novel techniques used worldwide in animal censuring.	L	3 hours, 30 min	**Okello, M. M. (2005).**
8	**Large mammal count FEX** Using road counts, students will count wildlife in the Amboseli national park.	FEX	5 hours	

	Title and outline	*Type*	*Time*	*Readings*
9	**Species diversity** Students will use this lab session to synthesize large mammal count data collected during the FEX.	CD	2.0	
9	**IUCN classification categories of wildlife** This lecture will explore the IUCN classification considerations and importance to ESC.	L	1 hour, 40 min	**Mace, G. M., et al. (2008).** **Dudley, N., et al. (2010).**
10	**Species criteria for key biodiversity area** This preparatory lecture will help students to identify single specie using the IUCN criteria for key biodiversity area This field lecture will guide students to assess the individual species in the camp for key biodiversity area.	FL	1 hour, 30 min	KBA Standards and Appeals Committee. (2019).
11	**Field individual species criteria** individual species classification assessment using IUCN criteria will involve student doing a field exercise in the park or in the conservancy.	FEX	4 hours	
12	**Vulnerable and endangered ornithological management and conservation** This lecture will introduce students to endangered birds' conservation efforts in Amboseli ecosystem and other study sites.	L	1 hour, 30 min	Sutherland, W. J., et al. (2004). Bennun, L. A., et al. (2000).
13	**Field ornithology of endangered waterbird** This field exercise will identify the endangered waterbird and count them in Amboseli national park	FEX	3 hours, 30 min	Zimmerman, D. A., et al. (2020).
14	**Zoos and breeding programs as conservation tools** This lecture will focus on the various conservation tools that are applicable for vulnerable and endangered species in Kenya, with focus for mountain bongo, Grevy zebra, chimpanzees in study sites	FL	2 hours	Rahbek, C. (1993).
15	**Current and emerging issues in conservation of endangered species** This class discussion will explore the current and emerging issues that are affecting the endangered species in AE, Kenya with comparative study to US issues	CD	2 hours, 40 min	**Altmann, J., et al. (2002).** **Butz, R. J. (2009).** **Davis, A. (2011).**
16	**Applied genetics in conservation of endangered species** This lecture will explore the concept of applied genetics and its implication of conservation of endangered species. It will also look at how genetics has been used as recovery program for the rhinos in Kenya	FL	1 hour, 30 min	**Frankham, R. (2010).**
17	**Drivers and conservation efforts of endangered primate species in Kenya** Nonhuman primates are facing extinction crisis with over 65% listed as vulnerable to endangered. This lecture will examine the state of the primate conservation, the drivers to their vulnerability and present conservation	FL	1 hour, 40 min	**Estrada, A., & Garber, P. A. (2022).**

	Title and outline	*Type*	*Time*	*Readings*
	efforts on endangered primates (Mantled Colobus and Chimpanzees in Kenya's protected area.			
18	**Behavioral response of primates in captivity** Field lecture that will explore the reproductive program of primates using the family planning practice in Ol Pejeta conservancy.	FL; GL	1 hour, 40 min	**Wallace, P. Y., et al. (2016).**
19	**Habitat manipulation for conservation** This is an introductory lecture that will examine the different habitat improvements/manipulations that have been approved for recovery of endangered species.	L	1 hour, 40 min	Schemnitz, S. D. (1980). Ausden, M. (2007).
20	**Fire as a management technique for the habitat** This field exercise will be conducted to examine the effect of prescribed burning on the habitat.	FEX	1 hour, 40 min	**Francos, M., & Úbeda, X. (2021).**
21	**Supplementary feeding programs** This travel lecture will examine the different feeding supplementary programs for wildlife species in captivity. The lecture will explore the feeding of the llamas, chimpanzees, African Lynx.	FL; GL	2 hours, 40 min	**Priesmeyer, W. J., et al. (2012).**
22	**Management and conservation of endangered meso-herbivores** This lecture will identify the current management and conservation efforts among the meso-herbivores with focus on Grevy zebra, mountain bongo.	FL	1 hour, 40 min	
23	**Course overview and exam review** This session will involve review of the key highlights of the course and a review on how the students will be examined	L	50 min	
	Total		**51.5**	

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.