



S F S THE SCHOOL
FOR FIELD STUDIES

Techniques in Wildlife Management

SFS 3710

4 credits

The School for Field Studies (SFS)
Center for Wildlife Management Studies
Rhotia, Tanzania

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 may present. In other words, the elephants are not always where we want them to be, so be flexible!

Course Overview

This course involves learning about the interface between ecology and wildlife management. It uses scientific principles as well as human dimensions to explain current strategies/techniques for managing wildlife resources. A good example is how principles of resource selection by wild animals are used not only to manage wildlife-habitat interactions but also to guide tourism and management activities in a protected area. Another is how local communities and land use activities influence wildlife dispersal and distribution in critical migration corridors and the implications of this at a landscape level. This course then blends field and laboratory (computer) techniques to examine field collected data, using analytical techniques - core skills a wildlife manager needs when managing wildlife resources in a protected area.

The course encourages and promotes field-based learning by students with or without the faculty. Techniques in large wild mammal identification and counting, and natural history assessment, including social organization and interactions among large mammals, will be taught throughout the semester.

Field trips will be made to Lake Manyara National Park, Manyara Ranch and Mto wa Mbu game-controlled area (the latter two areas combine pastoralism with wildlife conservation as multiple land uses), a multiple-day expedition to Tarangire National Park and an expedition to Serengeti National Park. There will be travelling lectures that provide students with the opportunity to observe and synthesize, analyze and discuss key environmental, land use and wildlife conservation/management issues in the Tarangire-Manyara ecosystem (TME). The trips to protected areas offer additional opportunities for students to learn core issues in ecology and management of wildlife resources in East Africa.

Data collected in the field will be analyzed to determine animal densities, habitat preferences/selection and species diversity. The students will also examine the wildlife conservation/ management philosophy, its evolution and application in the real-world situation. In East Africa, most protected areas follow the Park Model (Category II of IUCN classification) that was pioneered in Yellowstone National Park in 1870s. However, following international agreements on diversifying strategies and conservation models to conserve as much representative diversity (inside or outside) protected areas as possible, other models of conservation, their characteristics and management styles have been proposed. It is imperative to appreciate and examine the alternative conservation models because they are critical in expanding a network of protected areas for biodiversity conservation and in ameliorating some of the emerging challenges of the widely applied Park Model. Finally, the course will offer discussion forums that examine alternative approaches in mitigating wildlife conservation threats.

Learning Objectives

The overall objective of the course is to equip students with adequate knowledge on various wildlife management/conservation issues in Tanzania. These issues will be used to identify conservation/management (actual & potential) problems that will then form the basis for directed research projects for the students. The course therefore has the following specific objectives:

1. To identify and classify common large wild African mammals in Tarangire-Manyara ecosystem
2. To examine basic wildlife management and research techniques applicable to Tarangire - Manyara ecosystem
3. To determine wildlife-human interactions in Tarangire-Manyara ecosystem
4. To evaluate the challenges facing wildlife conservation approaches in East Africa.
5. Examine rangeland health in wildlife conservation areas in Tarangire-Manyara ecosystem

Case Study Overview and Background

Overview

The grasslands of northern Tanzania (Maasai steppe) comprise extensive areas of land, which is home to the Maasai community. The area is characterized by a diversity of landscapes and habitats used by migratory wildlife species from Lake Manyara and Tarangire national parks. Apart from a few scattered permanent rivers and springs, most of this region is arid or semi-arid, with mean annual rainfall in the range of 300-800 mm. The landscape has been used traditionally by the Maasai pastoral community to graze livestock on a communal basis, but this has rapidly changed in the last decades. There has been a steady shift in land use from purely pastoral to mixed agro-pastoral systems driven by multiple factors, including changing demographics, emerging economic opportunities, increasing tourism demands, climate variability/change and access to markets. Land use changes in the wildlife dispersal areas between protected areas compromises the ecological and environmental integrity and quality as habitats for a wide variety of wildlife species, especially large mammals like the African elephant, generally posing a serious challenge to human livelihood in this region. Human-Wildlife interactions in the region have generated some antagonism between the dual goals of promoting local livelihoods and wildlife conservation.

The issues affecting and influencing wildlife conservation, local livelihoods and co-existence of humans and wildlife in the Tarangire-Manyara ecosystem (TME) present a showcase for students and SFS faculty to explore the best strategy of promoting wildlife conservation whilst improving local livelihoods. The course will use multiple learning approaches, including conducting research on specific issues that have a bearing on the drivers of changes in these wildlife rich landscapes, and their impacts on local livelihoods, wildlife and other critical natural resources. The SFS-CWMS (Tanzania) program is geared towards preparing students to answer the following case study question:

How can wildlife conservation and socio-economic conditions be enhanced in a changing socio-ecological system within the Tarangire-Manyara ecosystem?

Background

The Tarangire-Manyara ecosystem is one of the key wildlife conservation areas in Tanzania, and part of the Northern tourist circuit including the famous national parks of Serengeti, Lake Manyara, Tarangire, Arusha and Mt. Kilimanjaro, and the Ngorongoro conservation area. TME is estimated to comprise about 35,000 km². Tarangire and Lake Manyara national parks are the core protected areas in the TME exclusively designated for photographic tourism (non-consumptive wildlife utilization). Other forms of protected areas in TME include Wildlife Management Areas (WMA) managed by local communities for tourism investment, game-controlled areas (GCAs) and game reserves (GRs) managed by the Tanzania Wildlife Division in which consumptive utilization such as trophy hunting is allowed. Consumptive utilization is also allowed in open areas that fall under the village lands designated as hunting blocks. All protected areas in the TME have porous boundaries, thus, wildlife migrate freely between protected areas and dispersal areas in community village land. This leads to high levels of human-wildlife interactions and the ensuing human-wildlife conflicts. For many decades, the primary inhabitants of TME have been pastoralist Maasai communities with low human population density. However, over the past three decades there has been a rapid increase in human population mainly due to immigration with consequent changes in land use leading to expansion of agriculture and human settlement. This has resulted into blockage of migratory wildlife routes (such as into Simanjiro plains and to Lake Manyara National park through Kwakuchinja Corridor) and habitat fragmentation, and has created more

opportunities for human-wildlife conflicts resulting into increasing threats to wildlife conservation in the TME. The TME is also faced with multiple threats ranging from land use changes, tourism proliferation, human population increase, climate variability/change and general ecological changes. The parks are renowned for their biodiversity in a relatively dry landscape, but their future is in jeopardy due to insularization. There are growing land use changes, such as large scale farming, unplanned settlements and increase in human population in the dispersal areas, migratory routes and corridors, which are necessary for the free movement of large mammalian species. Moreover, uncontrolled tourist activities and accommodation (such as camp sites and curio shops) around the parks create more insularization of the parks. Uncontrolled hunting of wildlife in the dispersal and game control areas outside the parks is prevalent, hence endangering critical wildlife species. Human-wildlife conflicts are equally rampant, further compromising the future of wildlife conservation, local livelihoods and harmonious co-existence between locals and wildlife.

Other wildlife management challenges facing TME include tourism impacts, ecological changes, rampant poaching of wildlife due to inadequate law enforcement, and overall wildlife population declines. Unplanned settlements and increase in human population lead to insularization of Tarangire and Lake Manyara national parks. Unplanned development of tourist accommodation facilities (such as camp sites and lodges) around the parks, although benefiting the local communities, exert a high demand on water, reducing quantity of water discharge into Lake Manyara, reducing water quality due to potential pollution from sewerage and domestic effluents. Poorly regulated hunting of wildlife in dispersal and game control areas outside the parks threaten populations of critical wildlife species. Expanding irrigation in nearby rice farms in Mto wa Mbu town, heavy siltation, pesticide application, pollution caused by erosion and depletion of vegetation due to farming in the highland catchment areas affect the ecology and biodiversity of Lake Manyara and the adjacent wetlands. This is compounded by an increase in the human population in the catchment areas. Students' directed research projects will focus on assessing wildlife ecosystem health, providing comparative assessments of wildlife in different conservation areas, critical analysis and investigation of current wildlife management regimes with the aim of providing information to contribute towards sustainable wildlife resource utilization and livelihood improvement for local communities within the TME.

Assessment

The evaluation breakdown for the course is as follows:

Assessment Item	Value (%)
African Large Mammal Identification and Social Organization Report	15
Road count survey	15
Rangeland health assessment	20
Participation	10
Final Exam	40
TOTAL	100

African Large Mammal Identification and Social Organization Report (15%)

This exercise will enable students to identify common large mammals in conservation areas including distinguishing between male and female of species and identifying social organization. Students will write individual reports on findings with the help of Kingdon & Estes field guidebooks.

Road Count Survey (15%)

Students will create a scientific poster that presents findings from the road count survey.

Rangeland Health Assessment (20%)

Students will estimate standard parameters used in describing wildlife habitat selection in different types of conservation areas in Tanzania and assess rangeland health. Results will be used to write a field report.

Participation (10%)

This assessment strategy seeks to encourage students to actively participate in class discussion, and to motivate students to do the background reading and preparation for a class session. Active participation will encompass active learning in class, lab, field exercises, during expeditions, and group work.

Final Exam (40%)

Students will undertake a written exam that accounts for 40% of their final grade. The main objective of the final exam is to build study skills, assess developed skills, build capacity, and evaluate performance.

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

Honor Code/Plagiarism – SFS places high expectations on their students and we hold students accountable for their behaviors. SFS students are held to the honor code below. SFS has a zero-tolerance policy towards student cheating, plagiarism, data falsification, and any other form of dishonest academic and/or research practice or behavior. Using the ideas or material of others without giving due credit is cheating and will not be tolerated. Any SFS student found to have engaged in or facilitated academic and/or research dishonesty will receive no credit (0%) for that activity.

“SFS does not tolerate cheating or plagiarism in any form. While participating in an SFS program, students are expected to refrain from cheating, plagiarism and any other behavior which would result in a student receiving credit for work which they did not accomplish on their own. Students are expected to report any instance of cheating or plagiarism by others.”

Deadlines – Deadlines for written and oral assignments are instated to promote equity among students and to allow faculty ample time to review and return assignments before others are due. As such, deadlines are firm; extensions will only be considered under extreme circumstances. Late assignments will incur a penalty of 10% of your grade for each day you are late. After two days past the deadline, assignments will no longer be accepted. Assignments will be handed back to students after a one-week grading period. Grade corrections for any assessment item should be requested in writing at least 24 hours after assignments are returned. No corrections will be considered afterwards.

Content Statement – Every student comes to SFS with unique life experiences, which contribute to the way various information is processed. Some of the content in this course may be intellectually or emotionally challenging but has been intentionally selected to achieve certain learning goals and/or showcase the complexity of many modern issues. If you anticipate a challenge engaging with a certain topic or find that you are struggling with certain discussions, we encourage you to talk about it with faculty, friends, family, the HWM, or access available mental health resources.

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 course is mandatory, it is important that you are prompt for all activities, bring the necessary equipment for field exercises and class activities, and simply get involved.

Course Content

Type- **L:** Lecture, **FL:** Field lecture, **FEX:** Field Exercise, **Lab:** Lab exercise, **GL:** Guest lecture

No	Title and outline	Type	Time (hrs)	Required Readings
1	Overview of wildlife management and conservation in Tarangire-Manyara ecosystem The current status of wildlife conservation reality in the TME and issues that need to be addressed for wildlife resources conservation/management and wildlife ecosystem health in the area.	L	2.0	Msoffe, F., et al. (2011).
2	Introduction to Wildlife Management The origins of wildlife management from game management to current conservation issues, and will give a general outline of the course.	L	2.0	
3	Introduction to African Large Mammals This lecture will explore basic taxonomy for most common large mammals that will be seen in the field, and highlight radiation of species, especially within the family <i>Bovidae</i> .	L	2.0	Field Guides: Estes, R. D. (1991). Kingdon, J. (1997).
4a	African large mammal ID and social organization Learn how to identify common large mammals, distinguish (where possible) between male and female of each species in the field, and observe and document various social organizations and associations of common large mammals and highlight links between animal behavior and conservation issues.	L	2.0	Kiffner et al. (2014). Field guide: Kingdon, J. (1997).
4b	African large mammal ID and social organization This exercise will enable students to be able to: identify common large mammals in wildlife conservation areas; distinguish between male and female of each species in the field and identify each species social behavior.	FEX	3.0	Field Guides: Estes, R. D. (1991). Kingdon, J. (1997).

No	Title and outline	Type	Time (hrs)	Required Readings
5	East African large wild mammal count techniques An overview of different techniques used to count large wild mammals in East Africa.	L	2.0	Norton-Griffiths (1978). WWF Wildlife Counting Manual (2000).
6	East Africa natural vegetation classification Students will learn how to classify the main types of East African rangeland vegetation	L	2.0	Pratt & Gwynne 1977.
7a	Field vegetation sampling techniques Students will learn different vegetation sampling procedures used in wildlife management.	L	2.0	Louhaichi, Mounir & Gamoun, Mouldi & Hassan, Sawsan. (2022).
7b	Field vegetation sampling techniques Students will identify and describe common vegetation types and associated key wildlife species, learn, and apply a common field vegetation sampling technique used for estimating plant abundance and cover.	FEX	3.0	Najma Dharani Field Guide to Common Trees & Shrubs of East Africa (Kindle Edition)
8	Techniques for assessing resource selection Learn the difference between resource usage and selection and introduce key concepts for measuring habitat preferences.	L	2.0	Jacobs J. (1974). Richard E. Strauss (1979).
9a	Road count survey prep Introduction to the road count survey technique. A follow up exercise counting large mammals using will be done in Tarangire National Park.	L	1.0	
9b	Road count survey prep Preparation for large mammal count using road count survey technique in Tarangire NP.	L	1.0	
10	Road count survey During these exercises, students will conduct actual road count surveys. The students, in groups, will learn practically how to count animals, and determine age, sex, behavior and habitat usage by large mammal species in Tarangire NP.	FEX	3.0	Field guide: Kingdon, J. (1997).
11	Land use changes and their consequences in Selela-Engaruka-Lake Natron plains This travelling lecture will introduce the students to environmental challenges facing Selela-Engaruka-Lake Natron plains associated with human settlements, pastoralism and climate change and their impacts on wildlife management.	TL	2.0	
12	Intro to rangeland/habitat health assessment Students will examine the concept of rangeland/habitat health and learn how to assess rangeland health.	L	1.5	Mwasi & Acker (2015).

No	Title and outline	Type	Time (hrs)	Required Readings
13	Preparation for foot count and grid sampling in Lake Natron Students will be taken through the field procedure to be used for foot counts by the faculty.	FL	1.0	
14	Wildlife conservation models in East Africa This field lecture will expose students to different conservation models practiced in East Africa and their pros and cons.	FL	2.0	Caro et al. (2009). Wilfred (2010).
15	Assessment of wildlife-abundance and habitat selection in Engaruka-Ngoisuk- plain This FEX will estimate the abundance and habitat selection by wildlife in the Engaruka-Ngoisuk plain.	FEX	3.0	Mwasi & Fisher (2018).
16	Habitat health assessment in Selela-Engaruka- Lake Natron plains Students will acquire preliminary skills/techniques in assessing the health of wildlife habitats using grid sampling. Data collected will be processed to develop a field report which will be graded.	FEX	3.0	
17	Assessing wildlife habitat and rangeland health Students will estimate standard parameters used in describing wildlife habitat selection in different conservation areas in Tanzania and assess rangeland health.	Lab	4.0	
18	Introduction to scientific poster presentation Discuss creating concise and visually appealing scientific posters using information from analyses on road count survey data from a protected area.	L	1.5	
19	Tourism and wildlife Students will assess tourist behavior towards different wildlife species in Serengeti National Park.	FEX	3.0	
20	Management challenges facing wildlife conservation This lecture will highlight the history, significance and management challenges of national parks in East Africa. Students will explore management challenges and practices of protected areas through own observations and discussions with staff.	FL	2.0	
21	Wildlife diseases and conservation This lecture will provide background information on the importance of diseases in wildlife conservation linking this to the issues of climate change.	GL	2.0	
		Total	52	
		UMN Instructional Hours*	62.4	

*[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

1. Caro et al. (2009). Assessing the effectiveness of protected areas: paradoxes call for pluralism in evaluating conservation performance. *Diversity and Distributions*, 15, 178-182.
2. 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
3. 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
4. Jacobs J. (1974). Quantitative Measurement of food selection: A modification of the forage ratio and Ivlev's electivity index. *Oecologia*, 14, 413-417.
5. Kiffner et al. (2014). Seasonal patterns of mixed species groups in large East African Mammals. *PLoS ONE* 9(12): e113446
6. Kingdon, J. (1997). The Kingdon Field Guide to African Mammals. A.P., London
7. Louhaichi, Mounir & Gamoun, Mouldi & Hassan, Sawsan. (2022). Guide for rangeland inventorying, monitoring and assessment of arid and semi-arid rangeland ecosystems
8. Msoffe, F. et al. (2011). Spatial correlates of land-use change in the Maasai-Steppe of Tanzania: Implications for conservation and environmental planning. *International Journal of Biodiversity and Conservation* 3, 280-290.
9. Mwasi, S. M. & Acker, K. (2015). Assessment of habitat condition in Kilitome and Nailepo wildlife sanctuaries in south-western Kenya. *African Journal of Ecology*, 53, 595-598. DOI: 10.1111/aje.12200
10. Mwasi, S. M. & Fisher, E. (2018). Seasonal Resource Use Interactions between Wildlife and Livestock in
11. Najma Dharani Field Guide to Common Trees & Shrubs of East Africa (Kindle Edition)
12. Norton-Griffiths (1978). Counting Animals by M. (AWL Foundation) 1-2nd Edition .
13. Pratt & Gwynne (1977). Rangeland management and ecology in East Africa
14. Richard E. Strauss (1979) Reliability Estimates for Ivlev's Electivity Index, the Forage Ratio, and a Proposed Linear Index of Food selection (Optional reading)
15. Wildlife Sanctuaries in The Amboseli Ecosystem, Kenya. *Africa Environmental Review Journal*, 3(1), 175-187.
16. Wilfred, P. (2010). Towards sustainable wildlife management areas in Tanzania. *Tropical Conservation Science* 3: 103-116.
17. WWF (2000) Wildlife Counting Manual