



THE SCHOOL
FOR FIELD STUDIES

Techniques in Natural Resource Management SFS 3751

Syllabus

The School for Field Studies (SFS)
Center for Water, Wildlife and Community Studies (CWWCS)
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.



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, the elephants are not always where we want them to be, so be flexible!

Course Overview

The course will introduce the ongoing discourse and the underlying scientific principles on natural resource management as well explain the current techniques being applied in managing and studying natural resources. The course will in particular emphasis on water and wildlife resources. In order to enhance a broad understanding of natural resource management, the course will be taught through a juxtaposition of field based experiential learning through hands on activities and interactions with expert persons. The training emphasizes self-learning with guidance from a resident faculty.

Student learning activities will be centered within the socially and ecologically unique environment in the Amboseli-Tsavo Ecosystem (ATE) of southern Kenya and in the Tarangire-Manyara Ecosystem (TME), Ngorongoro-Serengeti ecosystem (NSE) of northern Tanzania. The broad objective of the course is to expose students to the realm of biodiversity conservation in East Africa in context of the status, management strategies and the challenges. This will be achieved through a case study approach in ATE, TME and NSE. While much of the learning will be done in Kenya, Tanzania offers a chance for comparison of management policies and approaches in natural resources in the two countries.

Specific courses are designed to offer students knowledge on; natural resource assessments, monitoring, planning and management, and strategies for sustainable natural resource management. The mode of field learning will include classes at base camp, field exercises and self or guided lab sections.

Learning Objectives

The overall objective of the course is to equip students with knowledge on techniques for managing natural resources. The case study dwells on water and wildlife as a focal natural resources of importance in ATE. The specific objectives are to help students;

1. gain knowledge on techniques in natural resource management and conservation
2. learn the techniques for assessment of natural resources
3. understand the status and challenges for natural resource conservation in ATE

Case Studies

Overview

Natural resource management is broad, and requires a multi-faceted approach. This is necessary because most natural resources face enormous pressure from multiple direct and indirect human effects, often with delirious consequences for human and natural life. This requires sustainable management as most natural resources are limited or fragile. Most parts of East Africa face severe water stress due to the seasonal and low rainfall regime. In the ATE, TME and NSE wetlands are the lifeline of the entire ecosystem. Apart from a few scattered permanent rivers and springs, most of the region is largely arid or semi-arid, with mean annual rainfall of 300-800 mm. The wildlife ecological dynamics are entirely dependent on these wetlands. The wetlands are the predominant dry season dispersal areas as water and forage elsewhere diminishes. Consequently management of water resources is a major conservation and livelihood issue. While water quality and availability are underlying issues, of significance are the consequences are the conflicts associated with water use for humans and wildlife. Reconciling those conflicts is a major preoccupation of wildlife managers in the area. In a nutshell, the challenges facing natural resource conservation in ATE entail reconciling rural development with wildlife and water conservation. Understanding this complexity is the core of this course.

In this course, we apply a case study approach. The approach is ideal for studying complex interrelated issues within ecosystems. It presents students with an opportunity to analyze broad issues using a systematic and interactive approach. Here students will be able to analyze the interplay between development and natural resource conservation. In order to focus our learning, this case study focusses on water resources and wildlife due to their paramount in the case study areas. While the key case study area is ATE in Kenya, TME and NSE in Tanzania provides comparison due to differences in social-ecological contexts across the ecosystem. Within fall and spring semesters, learning will revolve around a case study question that will be answered through learning based on class room lectures, field exercises, and interactive sessions with field experts and analysis of some of the data collected. The case study question will be:

“How can natural resources be sustainable managed so as to safeguard wildlife resources and livelihoods in the ATE”

Case Study Background in Kenya

The basis for this case study is Ecosystem approach. This approach appreciates the spatial-temporal nature of natural resource interrelationships. Student learning will be largely done in the Amboseli-Tsavo Ecosystem in southern Kenya. This will be enriched by a two week long field trip to TME and SNE in northern Tanzania.

The Tsavo –Amboseli Ecosystem (ATE), Kenya

ATE comprises of several protected areas (Amboseli, Tsavo West and Chyulu hills National parks, and several wildlife sanctuaries/conservancies) and the adjacent community lands. These areas are hot spots for biodiversity conservation in southern Kenya, hosting the “big five” large mammal species (buffalo, rhino, elephants, lions and leopards, and a rich abundance and diversity of other wildlife. The adjacent communities use the area mainly for livestock keeping and agriculture. The areas outside the core protected areas face intense interactions between human and wildlife, mostly inform of human wildlife conflicts and, competition for pasture and water. While water is uniquely scarce due to the semi-arid nature of ATE, it is arguably the most important natural resource as it supports most life systems including humans. The major sources of water in ATE are perennial and semi-perennial wetlands, mostly associated with Mt. Kilimanjaro. These wetlands have undergone immense pressure with effects on water quality and quantity due to combined direct human use and climate change. This has had delirious effects on wildlife in the area, particularly the migratory species and the species directly dependent on water. Agricultural activities within the core wetlands have led to water over-abstraction and degradation. These activities coupled with severe climatic changes have contributed to drying or reduced water in most of the wetlands. The outcome has been a growing human-wildlife and livestock-agriculturists conflicts, leading to a water crisis, particularly in the dry season.

The Tarangire Manyara Ecosystem (TME) and Ngorongoro-Serengeti Ecosystems (NSE), Tanzania

Northern Tanzania region hosts some of the world’s most renowned protected areas. These protected areas are found within the The Tarangire-Manyara Ecosystem (TME) and Ngorongoro Serengeti Ecosystem. These include Serengeti, Ngorongoro and Lake Manyara, Tarangire, which together with Arusha and Mt. Kilimanjaro make the Northern tourism circuit. The northern circuit is a major tourist hub in East Africa. Except, Mt. climbing on Mt Kilimanjaro, much of the tourism activities involve game viewing and photography. Like the case of ATE, all the protected areas have open boundaries, thus wildlife move freely in and out of the protected areas into the adjacent community village lands.

Similar to ATE, the region was traditionally occupied by the Maasai people, who are mostly pastoralists. The area is however currently inhabited by numerous other communities. This has led to expansion of agricultural activities and a rapid spread of peri-urban areas. Due to these changes in land tenure and land use, the area now faces daunting conservation challenges. These challenges are in form of loss of wildlife habitat due to habitat fragmentation, blockage of wildlife corridors and the ensuing human wildlife conflicts.

Of interest will be conservation of Lake Manyara National Park, like most soda water lakes, the lake is rich in bicarbonate and carbonate nutrients, and thus highly productive natural ecosystems. Those nutrients support a rich concentration of phytoplankton food for massive population of flamingoes. However due to the closed and shallow nature of the lake, they are prone to small changes in water quality and quantity. These changes affect the abundance and composition of phytoplankton and zooplankton, and the subsequently the health and number of flamingoes and other aquatic life forms. The catchment for Lake Manyara is area of intense farming, thus, making conservation of wildlife associated with the lake huge challenge due to due to incompatible land use resulting to alterations in the hydrological regime of the catchment, contamination from pesticide and heavy metals.

Assessment

No.	Assessment Item	Value (%)
NRM 7	Natural history of Amboseli region	12.5
NRM 17	Contemporary issues in Water Management	12.5
NRM 23	Valuation of tourism resources in National parks in Kenya	12.5
NRM 24	Comparative protected area management systems in Kenya and Tanzania	12.5
NRM Examination		50
TOTAL		100

Grading Scheme

A	95.00 – 100.00%	B+	86.00 – 89.99%	C+	76.00 – 79.99%	D	60.00 - 69.00%
A-	90.00 – 94.99%	B	83.00 – 85.99%	C	73.00 – 75.99%	F	59.99 - 0.00%
		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 at CWMS. Therefore, it is important that you are prompt for all course activities.

Course Content

Type- L: Classroom lecture, **FL:** Field lecture, **FEX:** Field Exercise, **D:** Class discussions, **Lab:** Lab exercise, **SP:** Students Presentation

<i>Title and Description Course</i>	<i>Type</i>	<i>Time (hrs)</i>	<i>Readings</i>
NRM 1: Case study model, academic life and SFS-CWMS program. This will be introduction to the SFS model, academic life and schedule and the underlying case study focus in context of ATE.	L/FL/ ALL	1	None
RM 2: Introduction to natural resources, and protected area conservation models. Field discussions with faculty during travelling lectures will be undertaken. Students will get exposed to natural resources and protected area conservation models based on ATE.	FL	1	IUCN Unknown date: Types and categories of MPAs
NRM 3: Wildlife Conservation and management in Kenya In this, lecture students, will learn about the legal aspects of wildlife management and conservation in Kenya through analysis of the wildlife management and conservation act, 2013.	L,	1.5	Wildlife Direct 2015.
NRM 4: Water quality assessment Water quality is the physical, chemical, and biological characteristics of water in association to the set of	L, FE	2	Mohsin et al., 2015.

standards. These parameters directly related to the safety of the drinking water to human use. Students will learn how to conduct a water analysis in the field.			
NRM 5: Management of Birds: Bird assessment and conservation strategies: In this lecture, students will learn the techniques for monitoring and managing birds, with emphasis on Kenya. Thereafter students will go to the field and learn one of the techniques and assess threat to birds in Kimana villages	L, FL	4	None Dale A. Z, Donald A. T, and David J. P. 1996. Birds of Kenya and Northern Tanzania (Required Field Guide)
NRM 6: Large mammal natural history and its relevance in natural resource conservation: In this lecture, students will learn large mammal natural history and the relevance in wildlife conservation.	L	1.5	Estes R. D. 1999.
NRM 7: Natural history of major wildlife species in ATE: Students will visit Kimana Sanctuary and learn about the large mammals in the sanctuary, and their conservation status and threats.	L/FE	3	None
NRM 8: Community Wildlife Sanctuary management: Using the case of Osupuko community wildlife sanctuary, students will evaluate the success, challenges for managing a community wildlife sanctuary by having a discussion with the leaders.	L, FL	4	AWF 2013
NRM 9: Conservation of primates in Kenya In this lecture, students will learn the primate research techniques and the ongoing conservation programs in Kenya. Students will also learn the primate species found in Kenya.	L	1.5	De Jong, Y.A. & Butynski, T.M. 2010.
NRM 10: Natural Resource Utilization. Students will learn the causes and effects of illegal natural resource utilization, and the current techniques in managing wildlife poaching. This will be an interactive section between students and game scouts in ATE.	L	1	Knapp, E. J. 2012.
NRM 11: Natural Resource Utilization: This will be a field lecture where students will discuss with various stakeholders, the scope of illegal natural resource utilization and the on-going mitigation measures for illegal resource use. Through this field lecture students will be able to understand the challenges in combating illegal wildlife utilization in ATE.	FL	3	see above
NRM 12: Management and care of orphaned elephants. The David Sheldrick Wildlife Trust operates the world's most successful orphan elephant rescue and rehabilitation program. Students will have a talk about the care of orphaned elephants.	FL	2	National geographic 2011. Orphans no more.

NRM 13 Wetland studies: What can waterfowl counts tell us about climate change? Long term waterfowl counts can be vital in detecting the influence of climate change on wildlife using waterfowl counts to assess cha counts: Implications for climate change.	FL	3	
NRM 14: Techniques for studying natural resources: Large mammal counts. This lecture will introduce to students the common techniques used to conduct large mammal census.	L	2	None
NRM 15: An assessment of large mammals in Amboseli National Park. Using distance sampling method or total count students will undertake a wildlife count in ANP. The data will be tabulated and presented to park management.	FE	3	
NRM 16: Water resource management in Kenya This lecture will highlight the current water management framework in Kenya.	L	1	None
NRM 17: Contemporary issues in water management: Students will read topical papers and prepare a power point and present during a students seminar.	L	2 hr presentation	Assorted 10 articles on water management issues in Kenya and Africa in general.
NRM 18: Wildlife crime scene investigation: techniques, tools and technology: Crimes against wildlife encompass a wide range of offences, from the illegal trade in endangered plant and animal species to the persecution of birds of prey or the cruelty inflicted on some wild animals for sport. The investigation of wildlife crime has developed significantly in recent years.	FE/L	3	Yadav and Dixit, 2016.
NRM 19: Implications of wildlife diseases in wildlife management. Techniques for studying and managing human—wildlife disease interface: Case studies from Kenya. In this lecture, students will learn the current techniques in managing the human-wildlife disease interface. Students will learn the epidemiology of zoonotic and anthropogenic diseases of importance in ATE.	L	1.5	None
NRM 20 An assessment of large mammals in Kimana Sanctuary. Using distance sampling method or total count students will undertake a wildlife count in ANP, and will tabulate the data and present to park management.	FE	6	None
RM 21: Managing wildlife overabundance. In this lecture students will visit elephant enclosure plots in Amboseli National Park and learn about the impacts of large elephant populations in a small area. The role of enclosure plots in biodiversity management will be explored	FL	1.5	None

NRM 22: Introduction to field expeditions. A briefing on the specific field expedition.	L	1	Video on Man-Eaters of Tsavo on the Night before expedition. Platt, J. 2017.
NRM 23: Park management: Evaluation of Tourists attractions in Tsavo West and Amboseli National Parks. This field exercise will be used to showcase to students some of the tourist attractions within parks and the importance of tourism diversification in protected areas. Students will evaluate each of the attractions in terms of appeal to visitors. The feedback will be given to the park management on how to best improve the facilities.	FE	3	None
NRM 24:Comparative protected area management systems in East Africa. Student will get firsthand information on day to day management of a protected area and the main challenges in managing a park. In the lecture, students will learn the process and components of the park management.	FL	3	None
NRM 25: Black Rhino conservation in Kenya. Case of Ngulia Rhino Sanctuary. At the base of Ngulia Hills, this 90-sq-km area is surrounded by a m-high electric fence and provides a measure of security for around 80 of the park's highly endangered black rhinos. Here students will learn the daily activities of a rhino management team.	L	2	None
NRM 26: Conservation models in East Africa: This will be an introduction to lecture on wildlife conservation in Tanzania with focus on TME when students visit Tanzania.	L	1.5	None
NRM 27: Lion Conservation in East Africa. This will be a lecture that will showcase the status of lions, the threats and the current conservation strategies in East Africa. Students will visit a lion research camp and how a research camp is managed In Tanzania.	FL	15	None
NRM 28: Protected area management in East African National Parks case of Ngorongoro-Serenget Ecosystem, Tsavo Amboseli – Chyulu Ecosystem Challenges for integrating nature conservation and human use. Student will learn about NCA as a multiple use areas. They visit NCA, and Ngorongoro C.A. There will be an overview of history of the PAs and the aspects of management planning.	L	3	None
NRM 29: Impact of tourism on wildlife in Serengeti National Park. Students will undertake a field exercise in Serengeti National Park where they will evaluate the dynamics between wildlife and tourists. This exercise aims to enlighten students how one can assess the effect of tourism on wildlife through field observations, and how this can be well managed.	FE	2	None

NRM 30: Case study closure: Natural resource conservation dimensions in Kenya and Tanzania. Faculty, guided discussion on topical conservation issues		0.5	None
Total Hours		66	

Reading List

AWF 2013: Community Payment for ecosystem services in the Amboseli Ecosystem: leasing land for livelihoods and Wildlife. Formation of sanctuaries.

Black Simon, A. , Groombridge, J J.and Jones , C. G. Leadership and conservation effectiveness: finding a better way to lead. Conservation Letters (2011) 329–339.

De Jong, Y.A. & Butynski, T.M. 2010. List of the Primates of Kenya. Website: www.wildsolutions.nl

Estes R. D. 1999.The Safari Companion. A Guide to Watching African Mammals Including Hoofed Mammals, Carnivores, and Primates.

Fallding, M. 2000. 2008. What makes a good natural resource management plan? Ecological Management and Restoration

GLOWS-FIU. 2007. Water Quality Baseline Assessment Report, Mara River Basin, Kenya/Tanzania. Global Water for Sustainability Program, Florida International University. 61 pp.

IUCN Unknown date: Types and categories of MPAs

KNA . 2018. Over 300 Families Evicted from Maasai Mau Forest. <http://kenyanewsagency.gon/?p=126622>.

Knapp, E. J. 2012. Why poaching pays: a summary of risks and benefits illegal hunters face in Western Serengeti, Tanzania. Kairu, P. 2018. Kenyans eating giraffe meat disguised as beef, conservationists say. <https://www.nation.co.ke/news/beef-looks-like-giraffe-meat/1056-4866036-nvkdha/index.html>

Mohsin et al., 2015. Assessment of Drinking Water Quality and its Impact on Residents Health in Bahawalpur. International Journal of Humanities and Social Vol. 3 No. 15; August 2013 City Science

National geographic 2011. Orphans no more

None Dale A. Z, Donald A. T, and David J. P. 1996. Birds of Kenya and Northern Tanzania (Required Field Guide)

Olingo, A. 2018. Kenya loses eight black rhinos in translocation mishap, The East African.

Simpson, N. O. Stewart, K. M.*, and Bleich, V. C. 2011. What have we learned about water developments for wildlife? Not enough! California Fish and Game 97(4):190-209. Sunday Nation. March 4 2018. Wildlife in major game reserves face threat as Mara River dry. <https://www.nation.co.ke/counties/narok/Drying-Mara-River>.

Smith-Godfrey, Simone. (2016). Defining the Blue Economy. Maritime Affairs: Journal of the National Maritime Foundation of India. 12. 1-7. 10.1080/09733159.2016.1175131.

Video on Man-Eaters of Tsavo on the Night before expedition. Platt, J. 2017. The strange history of the man-eating lions of Tsavo. The lions reportedly killed up to 135 people in 1898, but does the truth live up to the myth?

Yadav and Dixit, 2016. Forensic approaches in the solution of wildlife crime.

Wildlife Direct 2015. A GUIDE TO THE WILDLIFE ACT OF KENYA (WCMA 2013).