



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)
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 may be 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 Fall 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 2	NRM 2 Wildlife identification techniques	10
NRM 16	Water and soil conservation techniques	15
NRM 20	Tourism valuation in protected areas	15
NRM 22	Challenges facing biodiversity conservation in protected areas in East Africa	10
	NRM Examination	40
	Academic participation	10
	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

No. and Type	Title and description	Readings
(FL/1.0 hr)	NRM 1: Introduction to natural resource management. This lecture will introduce students to definition, classification of natural resource, concepts and techniques in natural resources management.	None
(L/1 hrs)	NRM 2: Wildlife identification skills: Large mammals and birds of Kimana Sanctuary I. In this lecture students will learn about the common large mammals and birds in Amboseli region and how to identify them and how this is important vital skill in management.	Dale A. Z, Donald A. T, and David J. P. 1996. Birds of Kenya and Northern Tanzania (Required Field Guide) Kingdon, Jonathan: The Kingdon Field Guide to African Mammals; Academic Press, 1997.
(FE/3 hrs)	NRM 3: Wildlife identification skills: Large mammals and birds of Kimana Sanctuary II. In this field exercise students will learn how to identify and identify the common large mammals and birds in Amboseli region.	Dale A. Z, Donald A. T, and David J. P. 1996. Birds of Kenya and Northern Tanzania (Required Field Guide) Kingdon, Jonathan: The Kingdon Field Guide to African Mammals; Academic Press, 1997.
(L/FE 1.5 hrs)	NRM 4: Management challenges facing natural resource conservation in East Africa. This lecture will highlight the key management challenges facing wildlife conservation in East Africa.	Kideghesho JR, Rija AA, Mwamende KA, Selemani IS (2013) Emerging issues and challenges in conservation of biodiversity in the rangelands of Tanzania. Nature Conservation 6: 1–

		29. doi: 10.3897/natureconservation.6.5407
(L, 1.0 hr)	NRM 5: Wildlife management policy in Kenya. In this lecture students, will learn about the policy on wildlife management Kenya and its implication for wildlife conservation.	None
(L/ 3 hrs)/	NRM 6: Techniques and approaches in managing human natural resource conflicts I. Students will be guided through a selection of papers to prepare a presentation on topical issues on how human natural resource conflicts can be solved.	See a list of papers in academic folder for NRM course
(L/l hr)	NRM 7: Techniques and approaches in managing human natural resource conflicts II. In this section, students in groups of 2 will undertake 10-minute presentation on topics the techniques for on how human natural resource conflicts can be solved.	None
(L/ 1.5 hr)	NRM 8: Application of wildlife survey and census in management of wildlife. In this lecture different survey and census methods for wildlife and how this is useful in wildlife management will be taught. Students learn how to set up camera traps as a way of monitoring night life.	Plumptre, Andrew & Sterling, Eleanor & T. Buckland, Stephen. (2013). Primate census and survey techniques. 10.1093/acprof:oso/9780199659449.003.0002.
(FE/3.0 hrs)	NRM 9: Wildlife survey and census: Students will get a chance to learn how to plan and conduct a total large mammal count in Amboseli National Park.	None
(FE/3)	NRM 10: Wildlife survey and census: Total counts: Night surveys: This will be a field exercise where students will undertake a night wildlife census of nocturnal wildlife species in Kimana Sanctuary.	None
(FE, 4 hrs)	NRM 11: Sustainable natural resource conservation skills: Making paper from elephant Poop. Students will learn how to make paper from elephant dung. This is a set of natural resource entrepreneurship skills vital for sustainable natural resource conservation.	BBC, 2016. Don't pooh-pooh it: Making paper from elephant dung - BBC News https://www.bbc.com/news/business-36162953
(L, 1.5 hr)	NRM 12: Wildlife habitat management techniques: In this lecture, the main techniques for managing wildlife habitat will be taught and how this is being applied in the Amboseli Ecosystem. The focus will be on vegetation management techniques.	Kie, J.G., V.C. Bleich, A.L. Medina, J.D. Yoakum and J.W. Thomas. 1994. Managing rangelands for wildlife. Pages 663-668 in T.A. Bookhout. Editor. Research and management techniques for wildlife and habitats. The Wildlife Society, Bethesda, Maryland, USA.
FE, 3 hrs)	NRM 13: Wildlife and habitat management practices within Amboseli National Park. This will be a travelling where students will get exposed to various management	None

	practices in Amboseli National Park. These will include visits to habitat, water and tourist sites.	
(FE, 4 hrs)	NRM 14: Natural resources conservation initiatives in the Amboseli Ecosystem: Student will visit different project/initiatives dealing with conservation of natural resources within ATE and evaluate how these initiatives are performing.	George N K. Soil and Water Conservation Measures and Challenges in Kenya; a Review. Curr Inves Agri Curr Res 2(5)- 2018. CIACR.MS.ID.000148. DOI: 10.32474/CIACR.2018.02.000148.
(FL/2 hrs)	NRM 15: Law enforcement in combating illegal Natural Resource Utilization. Students will learn illegal natural resource utilization is being managed in the Amboseli Ecosystem. This will be an interactive section between students and law enforcement agents in ATE.	Spira, Charlotte & Kirkby, Andrew & Plumptre, Andrew. (2019). Understanding ranger motivation and job satisfaction to improve wildlife protection in Kahuzi–Biega National Park, eastern Democratic Republic of the Congo. Oryx. 10.1017/S0030605318000856.
(L/3 hrs)	NRM 16: Water and soil management and conservation techniques: Students will read topical papers and prepare a power point and present during a student’s seminar as a way to understand broad issues in water and soil management and the inherent challenges.	See a list of papers in academic folder for NRM course
(L/1/hr)	NRM 17: Water management and conservation techniques and challenges. Students will undertake presentations to share with peers the broad issues in water management and the inherent challenges.	None
(D/ 2 hrs)	NRM 18. Management of community wildlife sanctuaries in Amboseli and the role they play in biodiversity conservation. Students will get a chance to learn about formation and management of sanctuaries and the role they in natural resource conservation.	
(L, 1.5 hr)	NRM 19: Role of wildlife veterinary practice in management of human- wildlife interface: In this lecture, students will learn the work of vets techniques in managing the human-wildlife interface such as human wildlife conflict and in managing wildlife health	none
(FE 3 hrs/JK)	NRM 20: Tourism management: Evaluation of tourist attractions in Tsavo West. This field exercise will be used to showcase to students some of the tourist attractions within the parks and the importance of tourism diversification in protected areas. Students will evaluate each of the attractions in terms of appeal to visitors and level of management. The feedback will be given to the park management on how to best improve the facilities.	none
(L/FE, 3 hrs)	NRM 21: Endangered species management: Case of Black Rhino in Kenya. Students will learn about use of sanctuaries in endangers species management.	1. BBC 2018. Northern white rhino: New hopes for IVF rescue - BBC News.

		https://www.bbc.com/news/science-environment-46109393 2. <i>Scientific American: RIP Sudan, the Last Male Northern White Rhino</i> ; https://blogs.scientificamerican.com/extinction-countdown/rip-sudan-the-last-male-northern-white-rhino/
(L/FE 2 hrs)	NRM 22: Challenges facing biodiversity conservation in protected areas in East Africa. Student will through own observations and discussions with park officials and SFS staff explore management challenges and practices in each of the protected areas. A short presentation will be undertaken.	none
(FE/4 hrs)	NRM 23: Birding and waterfowl count in Amboseli National Park: This is part of long-term waterfowl monitoring program. It is a way for students to appreciate the role of birding as a tourism product.	None
(FE/3.5)	NRM 24: Wildlife survey and census: Students will get a chance to learn how to plan and conduct a total large mammal count in Kimana Sanctuary.	
(L/FE, 2 hrs)	NRM 25: Endangered species management: Case of Black Rhino in Kenya. Students will learn about use of sanctuaries in endangers species management.	1. BBC 2018. Northern white rhino: New hopes for IVF rescue - BBC News. https://www.bbc.com/news/science-environment-46109393 2. <i>Scientific American: RIP Sudan, the Last Male Northern White Rhino</i> ; https://blogs.scientificamerican.com/extinction-countdown/rip-sudan-the-last-male-northern-white-rhino/
(L/1/ hr)	NRM 26: Bird count and identification methods: Students will learn the main major bird identification and census methods	
(FE/4hrs)	NRM 27: Birding and waterfowl count in Amboseli National Park: This is part of long-term waterfowl monitoring program. It is a way for students to appreciate the role of birding as a tourism product.	None
60	Total hours	

Reading List

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.

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

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.

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>.

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

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

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