FACULTY OF SCIENCE

School of Biological, Earth and Environmental Sciences

BIOS 6723

River Basin Ecosystem Management

Field Course Manual
Session 2, 2019

Contents

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3. Field Trip Teaching Staff

Professor Richard Kingsford (Course Convener)
I am a conservation biologist, working in river basin management and conservation. I am particularly interested in the effects of river flows on wetland ecology, waterbirds and long-term sustainability of rivers. I have also worked on adaptive management of river basins and am involved in a number of advisory committees for governments in Australia. I am also part of the Lake Eyre Basin Partnership which has an agreement with the Okavango River Basin Commission to learn about different models of river management.

Dr Neil Jordan
I have a joint position between UNSW and the Taronga Conservation Society Australia, and broad research interests across the field of applied animal behaviour. From meerkats to wild dogs, behavioural ecology to conservation management, much of my work has focused on scent communication in wild carnivores. My current focus in applying behavioural ecology to conservation management, particularly in understanding and resolving human-wildlife conflicts.

Dr Keith Leggett (Director of Fowlers Gap Research Station)
In 2009, after 20 years in Africa, I became the Director of Fowlers Gap Arid Zone Research Station, a field station of UNSW. Throughout most of my research career I have studied large mammals in Southern Africa, including studies on elephant, cheetah and lions. My current field of study looks at the seasonal and annual fluctuations in small mammal populations in response to climatic conditions. I currently have 2 PhD students studying in Botswana, one studying giraffe and the other hippos.

Dr Michael Chadwick (Department of Geogr aphy, King's College London) . I

4. Course Details

Course Description [2]	This course is an intensive field-based course located in Botswana's Okavango Delta, one of the world's hotspots of biodiversity and a UNESCO World Heritage site. It has extensive wetland systems with diverse waterbird populations, vegetation communities, the largest population of elephants in Africa and large predators, including lions and leopards. This diverse ecosystem lies at the end of one of the world's last few large free-flowing rivers. This course will involve non-government and government managers involved in practical concepts of river basin ecosystem conservation, management and governance. This course covers human and social dimensions of ecosystem conservation such as community based natural resource management (CBNRM) sustainable tourism, and community livelihoods. Students will acquire an advanced understanding of the politics, governance and management of river basin ecosystem science, by unpacking the geopolitical constraints and considerations shaping the Delta's management. It receives most of its water from Angola with the Okavango River then flowing through Namibia to Botswana. Participants will gain skills in field methods, ecosystem scale landscape analyses and their application to human/wildlife interactions. They will contribute to long-term collection of data for the management of the river basin. The overall aim of the course is to tackle a global challenge in a developing country of the world, focusing on sustainability of biological and abiotic processes within the context of human drivers of development. It uses the Okavango River Delta as a case study but compares this to Australian systems, particularly the Lake Eyre Basin. In addition the course will encourage a holistic view of river basin ecosystem management by covering, hands-on, the challenges associated with an international approach to ecosystem conservation management. It will include the roles played and challenges faced by governments and communities catchment-wide. Students will work directly with UNSW academics and industry partners from NGOs, local government. This co-operative learning approach between UNSW, university partners, non-government partners and government itself places UNSW at the forefront of river basin ecosystem management and education, and provides insight into the multi-faceted approach that river basin conservation requires. This course allows students to gain invaluable experience and course credit in real-life conservation contexts and provides contacts for future higher-degree learning opportunities (i.e. Honours or PhD programs). The course also aims to provide a social dividend through the inclusion of Botswana students from the University of Botswana. It is also part of the PLuS Alliance http://www.plusalliance.org/ involving UNSW, Kings College London and Arizona State University.
Course Aims [3]	The course will offer a globally unique opportunity to expose PLuS Alliance students to international and cross-border issues associated with ecosystem conservation and management. This course has been specifically designed to address a need in the School of BEES relating to Program 3965 Environmental Management: this is the second course that specifically focuses on environmental management. The aims of BIOS6723 "River Basin Ecosystem Management" are: 1) To provide students with the opportunity for advanced training in river basin conservation

Graduate Attributes Developed in this Course [5]	
Science Graduate Attributes [5]	0 = NO FOCUS 1 = MINIMAL 2 = MINOR

	BIOS1301 (Ecology, Sustainability & Environmental Science), BIOS2123 (River Ecosystem Conservation and Management); BEES2041 (Data Analysis for Life and Earth Sciences).

5. Rationale for the inclusion of content and teaching approach

Rationale for learning and teaching in this course [6],	In recent years, there have been too few places available to offer all undergraduate students the experience of longer, more intensive field work situations, under unique and challenging working and learning conditions, which expose them to realities and practicalities of environmental management. UNSW is in a unique position in having long-term relationships with Botswana non-government organisations and a strong track record in ecosystem research and management. This course fills that gap and proceeds and complements a second year elective course BIOS2123, which includes aspects of river ecosystem conservation and management in Australia. The course is supported by the Centre for Ecosystem Science, one of the four major centres in the School of Biological, Earth and Environmental Sciences. It has a strong applied ecology and environmental science focus. BIOS6123 will teach applied practical skills required in river basin management, policy and governance as well as asking students to apply acquired knowledge to a practical challenges in this field and governance challenges for managing large river basins. These include developing a river basin ecological monitoring plan. Students will also acquire a clear understanding of river basin ecosystem science, governance and management by completing field-based tasks including conducting field surveys of river basin ecosystem indicator species. This course allows students to apply academically taught concepts to actual conservation management strategies and will produce well-rounded, industry-ready graduates. The field work component of BIOS6123 will be held out of session, before the beginning of Semester 2. Furthermore, the majority of this course is taught during the intensive field course and on-line, with assessment. This will alleviate pressures on university resources

6. Teaching Strategies

Teaching Strategies	Lectures will present and discuss theoretical issues relevant to course content. They will draw on real examples from river basin management programmes and will include reference to examples of current research. Lectures will be given during the field course with particular focus applied to the Cubango-Okavango catchment, with parallels being drawn with the Lake Eyre and Murray-Darling Basins in Australia and the Everglades, Colorado River and other international rivers. Conservation practitioners, particularly from local non-government organisations such as OKACOM (Okavango River Basin Commission), Government Departments, USAID, Elephants Without Borders, and scientists from the Okavango Research Institute of the University of Botswana, will present lectures relevant to these aspects of the course. Practical exercises and formative assessments will require the active use and application of critical thinking skills in a4Lakl9-6.7(7(rc)2)1(c)

7.

9. Course Schedule

(Please check Moodle regularly for content and instructions)

	Date(s)	Activity	Content

extent of inundation, testing of methodology (habitat types, functional response groups,)

x River environment (vehicle survey) – land/ water interface, birds and mammals, interactions between land and water – habitat types, functional response groups, testing of methodology

Lunch time lecture –Dr Claire McWilliams – Sustainable tourism

x Project work (13:00-17:00)

pm
Lecture Keith Leggett (Elephant Research/Community Based Natural Resource Management Programmes)

x Nocturnal survey

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			bias)Nocturnal survey – diversity/ abundance		

am

- Terrestrial environment (surveying tracks, birds and vegetation), and (habitat types) – testing of survey methodology
- River environment (boat survey) – birds, mammals, habitats, water quality, fish
- River environment (vehicle survey) – land/ water interface, birds and mammals, interactions between land and water

Also each group will be assigned an aspect of the social-ecological system for integration of flows, flooding and resource pulses

5th July 2019 Field Camp

Lunch time lectures – Dr Tempe Adams - Human and Elephant conflict

Dr. Janet Catford – Environmental changes through the lens of aquatic plants

- Project work (13:00-17:00)

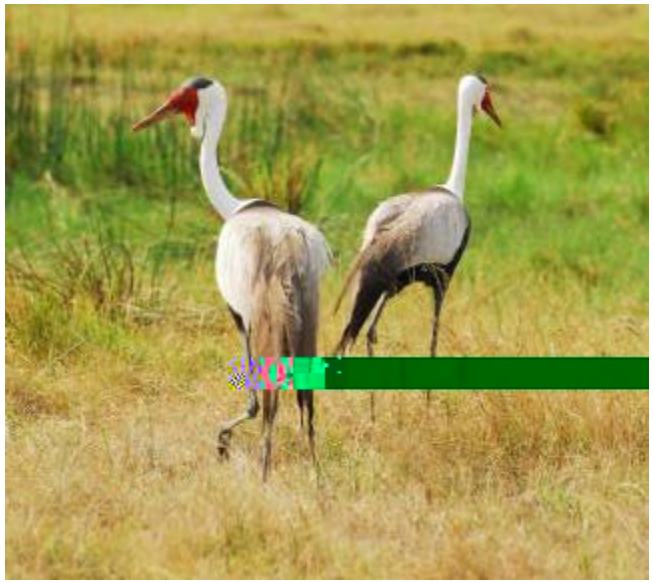
Data collection will also underpin the main project of designing the basin environmental flow monitoring plan

pm

- Nocturnal survey – diversity/ abundance and survey methodology (habitats, functional response groups, bias)Nocturnal survey – diversity/ abundance

Each group will separately do one of the activities on each morning of the field camp.

pm
x Analysis of data
x



10. Additional Resources and Support

Text Books

11. Course Evaluation and Development

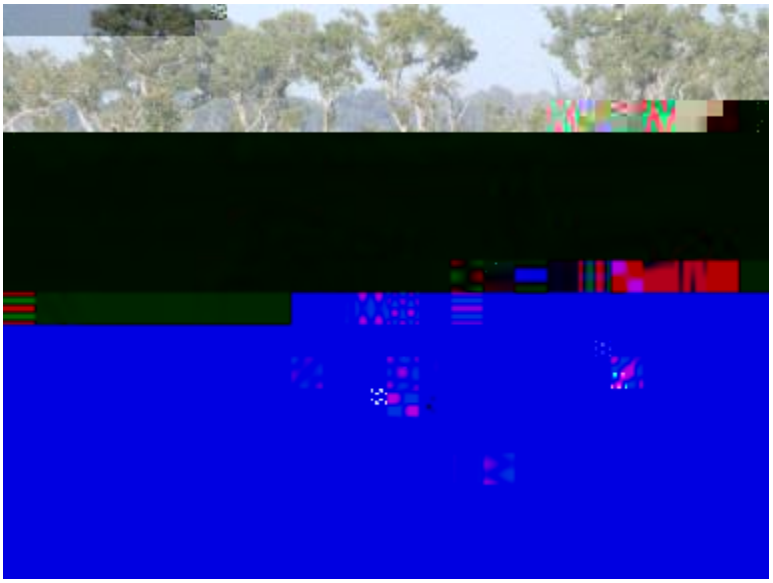
Student feedback is gathered periodically by various means. Such feedback is considered carefully with a view to acting on it constructively wherever possible. This course outline conveys how feedback has helped to shape and develop this course.

Mechanisms of Review	

12. Field Course

Additional Costs : We estimate that on top of airfares an additional $1360 dollars will be necessary to cover food, accommodation, equipment and transport.

Travel insurance : Covered as with normal UNSW Field Work Courses. Though any additional travel will be needed to be covered by the individuals insurance.



13. Assessment details

Assessment Summary.

Task	% of Total Mark	Due Date	How to Submit
13.1. Organisms, processes and people of the Okavango River basin (Individual presentations)	10	First 3 days	Assessment – involving individual 3 minute talks
13.2. River basin environmental management plan (Individual)	50	4 weeks after the completion of course	Moodle
13.3. Design and completion of field surveys of river basin ecosystem indicator species (group)	30	End of course	Continuous Assessment
13.4. Field Trip skills (independent)	10	End of course	0.5-1hr test

13.1 [illegible]

To be nominated before arrival in Botswana and consists of a 3 minute presentation in the first 3 days of the course on any topic associated with the ecological, socioeconomic or governance of the Okavango River Basin. The topic chosen must reflect the current situation in the basin management area. Some suggested topics of discussion would be (please nominate one topic before arriving in Botswana), You will need to email your topic to k.leggett@unsw.edu.au so that we can ensure only one topic per person :

- Why is river flooding important? And how does the flood regime of the Okavango vaka

13.2 R [illegible]

Structure (1500 words, not including references).

1. Context (300 words)

This should describe catchment, source of water, human dependencies and include information about seasonality and the behaviour of the river and the wetland. The potential threats to the river ecosystem should also be identified.

2. Governance (200 words)

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effects of development on their particular aspect of the ecosystem as well as the need for poverty alleviation upstream, using water.

Key factors to consider for each of the particular parts of the ecosystem (people, aquatic organisms, terrestrial organisms):

- Potential cost and benefits to the particular part of the ecosystem that the group is measuring
- Potential impacts on the socio-economics of the system, including costs and benefits up and down the river system.
- Describe the effect on changing flooding regime on allocated parts of the ecosystem for your group (e.g. abundances, diversity).
- Identify potential indicator species and methods for tracking changes over time.

Group presentations will be marked and each person in the group will receive the mark for the group

25% of total mark.

13.4 [illegible]

This is a practical exercise, involving surveying particular ecosystem indicator species which will assist in management of the river basin. You will be introduced to field survey techniques and equipment in tutorial format, where you will take an active role in designing and conducting these surveys in small groups. You will be assessed on your engagement and practical skills throughout the planning and execution of these surveys

5% of total mark.

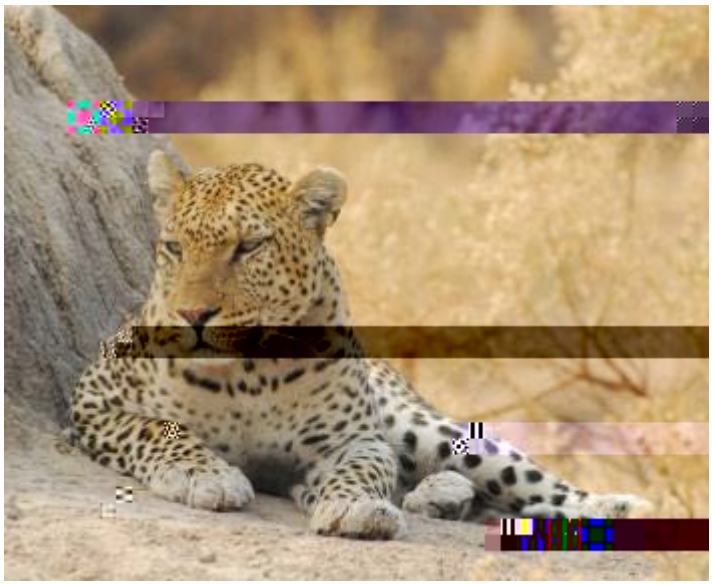
c) briefly describe three important things you learnt about the constraints placed on river basin management strategies (and the organisations that implement them). Please rank these (with no.1 being the most important).Provide a brief justification why you ranked them in this order;
d) write one or two sentences each day describing the most outstanding thing you learnt that day;
e) write a paragraph describing the role of science in management of the river basin;
f) write a maximum of two paragraphs describing your practical experience during this field trip (e.g. collection of field data, leadership) and what you learned about working in a group;
g) describe three important things you learnt during the field component of the course. Please rank these (with no. 1 being the most important to either your personal or professional development). Provide a brief justification on why you ranked them in this order.

This assignment should be short (no more than 2 pages using size12 font and standard margins).
Feedback will be given individually on each report, given on last day of course. Submit on Moodle.

10% of total mark.

13.6 [illegible]

You will be assessed on your abilities to identify between 20-30 plant and animal species throughout the fieldwork component of the course. jus1.81dce003 T0fiee003 T0[illegible]80 be 10%g 65¡CnÂ.65¡C~Â.65¡CajF Õ£ ` 4à 5à ›@35



14. Administration Matters

Expectations of Students	http://www.bees.unsw.edu.au/current/ugradguidelines.html
Assignment Submissions	Unless otherwise advised, assignments must be submitted through the BEES student office (see http://www.bees.unsw.edu.au/current/studentoffice.html), fulfilling the conditions of the BEES Assignment cover sheet (see http://www.bees.unsw.edu.au/school/docs/assignmentcover.doc) which must be attached. The BEES assignment cover sheet lists penalties for late submission. For further information about the school see http://www.bees.unsw.edu.au/
Occupational H ealth and Safety [8]	For information on relevant Occupational Health and Safety policies and expectations at UNSW see www.riskman.unsw.edu.au/ohs/ohs.shtml and for BEES specific requirements see http://www.bees.unsw.edu.au/ohs/indexohs.html.
Assessment Procedures	If illness or misadventure intervenes to prevent a student meeting an assessment deadline or class meeting then he/she should contact the lecturer in charge of the assessment. The conditions for special consideration are given at Http://www.bees.unsw.edu.au/current/ugradguidelines.html.
Equity and Dive rsity	Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course Convenor prior to, or at the commencement of, their course, or with the Equity Officer