



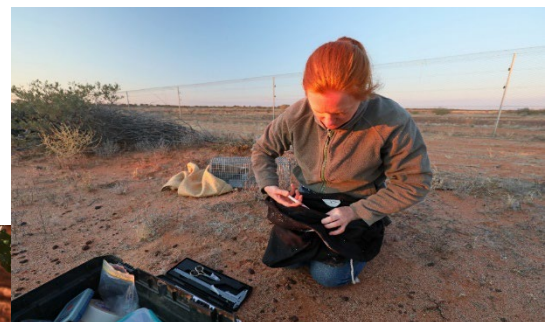
FACULTY OF SCIENCE

School of Biological, Earth and Environmental Sciences

BEES3223

Restoration and Translocation Ecology

Field
Course
Manual
2023



1. Information about the Course – BEES3223

Year of Delivery	2023	
<u>Course Code</u>	BEES3223	
Course Name	Restoration and Translocation Ecology	
Academic Unit	School of Biological, Earth and Environmental Sciences	
Level of Course	2 nd or 3 rd Year	
Units of Credit	6	
Session(s) Offered	1 x field trip of 10 days which contains 3 x lectures, 3 x workshops and daily field experience	
Assumed Knowledge, Prerequisites or Co-requisites		
Hours per Day	8 hours	
Number of Days/Weeks	10 days	
Commencement Date	28 August 2023	
Summary of Course Structure (for details see 'Course Schedule')		
Component	Hours	Location
<i>Lectures</i>	3	<i>Field</i>
<i>Fieldwork</i>	76	<i>Field</i>
<i>Group project</i>	3	<i>Field</i>
TOTAL	80	
Special Details	A field trip is run in T2C. Estimated cost of field trip, including accommodation and catering will be approximately \$360 payable in advance. All costs are included except return travel from Sydney to Broken Hill (usually by train).	
<p>University policy requires students to attend <u>at least</u> 80% of lectures and labs in order to qualify for course credit. Full attendance of the field course is essential for success in this course. Attendance will be taken.</p> <p>Students should check <i>Moodle</i> regularly for content, instructions and announcements. Grades will be posted on Moodle.</p>		

2. Staff involved in the course

Staff	Role	Name	Contact Details
Course Convenors (UNSW)		Richard Kingsford Rebecca West Katherine Moseby	richard.kingsford@unsw.edu.au rebecca.west@unsw.edu.au k.moseby@unsw.edu.au
Additional Teaching Staff	Lecturers & Demonstrators	Reece Pedler Dympna Cullen Brianna Coulter	r.pedler@unsw.edu.au d.cullen@unsw.edu.au brianna.coulter@student.unsw.edu.au

3. Field Trip Teaching Staff



Dr Rebecca West (Course convener)

Rebecca is the Principal Ecologist for the Wild Deserts project. Rebecca oversees the ecological research and monitoring for the Wild Deserts project and leads this field course. Rebecca is an early career researcher whose research focuses on reintroduction ecology and its role in ecosystem restoration. Rebecca has over ten years' experience working on arid zone reintroduction projects within and outside fenced feral-proof reserves



Associate Professor Katherine Moseby (Course convener)

Katherine lives and works in Australia's arid zone and is passionate about conserving our desert ecosystems. Katherine is an ARC Future Fellow and Scientia Fellow at the University of New South Wales and a member of the Wild Deserts Executive Management Committee. Katherine's research focuses on threatened species translocations, feral predators and large scale field experiments.



Dr Reece Pedler

Dr Reece Pedler is the Project Coordinator for the Wild Deserts project. Reece is an arid zone ecologist and field practitioner with a strong interest in threatened species conservation and ecosystem restoration. Reece's research has focussed on arid zone waterbirds and terrestrial threatened fauna. Reece has lived and worked in the Australian arid zone for over 15 years, where he enjoys the boom-bust climatic cycles, outback community and

remote lifestyle.



Professor Richard Kingsford (Course convener)

Professor Richard Kingsford is a river ecologist and conservation biologist who has worked extensively across the wetlands and rivers of the Murray-Darling Basin and Lake Eyre Basin. His research has influenced the policy and management of rivers in Australia, including through involvement on state and federal advisory committees. He also leads the ecosystem restoration project, Wild Deserts, in Sturt National Park (NSW).

4. Course Details

<p><u>Course Description</u></p>	<p>This course (6 units of credit) is an intensive field-based course focused on Restoration and Translocation Ecology, located at Wild Deserts, a UNSW ecosystem restoration project in the far north-west of New South Wales (near Tibooburra). The Wild Deserts project lies in the Strezlecki Dunefields region of Sturt National Park, where feral species are being eradicated and seven locally extinct mammals translocated to initiate restoration of the degraded arid ecosystem. The course will examine the principles and practices needed to restore terrestrial ecosystems, with a focus on the use of translocation. Lectures and workshops will be delivered during the week exploring the ecological principles of restoration and translocation. You will get opportunities to learn a range of ecological survey techniques used to measure the success of restoration and monitor management actions (including cage trapping, camera trapping and animal handling). Students will contribute to the collection of long-term data used to evaluate the success of ecosystem restoration and to inform adaptive management and practice.</p> <p>This course involves compulsory field-work at Wild Deserts. There will be a cost of approx. \$360 to cover travel to and from Broken Hill to Wild Deserts and food and accommodation for the week. Students will be responsible for their travel to and from Sydney to Broken Hill (usually by train). The course will run in T2C (28 August – 5 September) with limited capacity. Preference will be given to high performing students in relevant Programs or Majors. When you apply, you will need to submit your academic record and a short paragraph of 100 words as to why you would like to do the course.</p>
<p><u>Course Aims</u></p>	<p>The aims of the course are to:</p> <ul style="list-style-type: none"> • Provide students with the opportunity for advanced training in ecosystem restoration and management using the Wild Deserts project as a case study • To consider the principles and practices surrounding conservation translocation • To gain practical experience in survey techniques and animal handling used to monitor the outcomes of translocation projects and to evaluate ecosystem restoration techniques
<p><u>Student Learning Outcomes</u></p>	<p>On successful completion of the course students will be able to:</p> <ol style="list-style-type: none"> 1. Explain and apply the key principles underpinning ecological restoration using translocation 2. Identify and describe appropriate restoration goals and evaluation strategies 3. Understand how translocation biology can be used to restore ecosystems 3. Use monitoring and analysis techniques to assess the condition of, and threats to, an ecosystem through fieldwork and desktop activities 4. Use monitoring and analysis techniques to evaluate the outcomes of ecosystem restoration

Graduate Attributes Developed in this Course ⁵		
Science Graduate Attributes	0 = NO FOCUS 1 = MINIMAL 2 = MINOR 3 = MAJOR	Activities / Assessment
Research, inquiry and analytical thinking abilities	3	<ul style="list-style-type: none"> Data sheets Presentations Report including Figures & Critique Research Report
Capability and motivation for intellectual development	3	<ul style="list-style-type: none"> Research proposal Paper discussions Report including Figures & Critique Presentation and engagement
Ethical, social and professional understanding	1	<ul style="list-style-type: none"> Interaction with local community Research Report Discussion topics
Communication	3	<ul style="list-style-type: none"> Research proposal Presentations Reports including Figures & Critique Research Report
Teamwork, collaborative and management skills	2	<ul style="list-style-type: none"> Research proposal Data sheets Presentations Research Report
Information literacy	2	<ul style="list-style-type: none"> Research proposal Paper discussions Report including Figures & Critique Research Report

Major Topics (Syllabus Outline)	<ul style="list-style-type: none"> How to define ecological restoration The types of, and reasons for, restoration; the scope and scale of restoration required at local, landscape, regional and global scales, factors that contribute to degradation of ecosystems; The role of translocation in restoration How we determine the original ecosystem state e.g. historical records, museum specimens, photopoints, similar ecosystems, exclusion projects The threats to desert ecosystems and how can we restore them The types of translocation and their uses Translocation planning and principles Success and failure rates in translocation and their reasons Case studies from Wild Deserts translocations How we evaluate restoration activities Before-After-Control-Impact designs and how they can be used to evaluate restoration, using WD as a case study Using experimental protocols in restoration/translocation The role of strategic adaptive management/ governance
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Relationship to Other Courses within the Program

This course is an intensive field-based course which is run at the remote UNSW Wild Deserts Field Station, in Sturt National Park

It is intended for 2nd and 3rd year students pursuing a major in biology (or other students with an interest and adequate background in biology) and interested in learning skills associated with independent research and field work.

5. Rationale for the inclusion of content and teaching approach

Rationale for learning and teaching in this course	<p>There are few opportunities for undergraduate students to experience longer, more intensive field work situations, under unique and challenging working and learning conditions, which expose them to realities and practicalities of conservation management. UNSW is in a unique position in having a remote field station within Sturt National Park, NSW with a world leading ecosystem restoration project with a strong track record in ecosystem research and management. 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.</p> <p>BEES3223 will teach applied practical skills required in ecosystem restoration management as well as asking students to apply acquired knowledge to practical challenges in this field and to data synthesis and analysis. This includes using collected field data to test hypotheses related to ecosystem restoration.</p> <p>The field work component of BEES3223 will be held in T2C. Furthermore, most of this course is taught during the intensive field course and on-line, with assessment. This will alleviate pressures on university resources and students during peak periods in semester.</p>
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6. Teaching Strategies

Teaching Strategies	<p>Lectures will present and discuss theoretical issues relevant to course content. They will draw on real examples from ecosystem restoration programmes and will include reference to examples of current research. Lectures will be given during the field course with particular focus applied to the case study of the Wild Deserts project. Practical exercises and formative assessments will require the active use and application of critical thinking skills in a variety of contexts. These activities will be developing skills in research and survey techniques (including cage trapping, animal handling, use of remote cameras and vegetation quadrats); use of appropriate techniques and variables; report writing; understanding of adaptive management frameworks and team work. Written assessments will allow students to demonstrate information research skills and application of their critical and analytical skills and integrative thinking.</p>
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7. UNSW Academic Honesty and Plagiarism Policy

PLEASE READ CAREFULLY

What is Plagiarism?

Plagiarism is the presentation of the thoughts or work of another as one's own. *Examples include:

- **direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;**
- **paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;**
- **piecing together sections of the work of others into a new whole;**
- **presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and**
- **claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†**

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does *not* amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via: www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle

† Adapted with kind permission from the University of Melbourne.

8. BEES Academic Honesty and Plagiarism Policy

In addition to the UNSW Policy on Academic Honesty and Plagiarism, the School of Biological, Earth and Environmental Sciences (BEES) also considers any work submitted that has been produced outside of a given course in a given year to be plagiarism i.e:

- Work produced for a third party e.g. your place of employment, is considered intellectual property of the third party, and, as such, if such work is submitted in place of a required course work, it is deemed plagiarism.
- All work submitted for assessment must be created specifically for the given assessment task in the given year. Work produced in previous years or for other assessments is not acceptable.

9. Course Schedule

(Please check Moodle regularly for content and instructions)

Date	Activity	Notes
Day 1 (Monday 28 th August 2023)	Travel Sydney to Broken Hill via train (depart 06:18, arrive 19:10). Stay overnight in Broken Hill.	Students must book and pay for their own travel to Broken Hill
Day 2 (Tuesday 29 th August 2023)	AM - Early departure at 7am from Broken Hill to arrive at Wild Deserts Field Station for lunch. Unpack and set up camp	You will be collected by course demonstrators and travel in 4WD cars to Wild Deserts
	PM - Induction to site and safety Presentation: Introducing the Wild Deserts project and itinerary for week Set up camera traps on dune behind house	
Day 3 (Wednesday 30 th August 2023)	5.30-9 AM - All groups head out to clear cage traps. Morning tea in the field with tour of project area	
	2 PM – Lesson 1: Restoration of desert ecosystems using translocation	4 students will deliver their pre-prepared presentations
Day 4 (Thursday 31 st August 2023)	5.30 - 8 AM – all groups assist in clearing cage traps 8 – 11 AM Macropod grazing surveys	
	2 PM – Lesson 2: Translocation principles and practices	4 students will deliver their pre-prepared presentations
Day 5 (Friday 1 st September 2023)	5.30 - 8 AM – all groups assist in clearing cage traps 8 – 11 AM Collect in camera traps	
	2 PM – Lesson 3: Evaluating ecosystem restoration	4 students will deliver their pre-prepared presentations
Day 6 (Saturday 2 nd September 2023)	5.30 - 8 AM – all groups assist in clearing cage traps	
	10 AM – Lesson on how to process camera images. Remainder of afternoon used to process camera trap data	Laptop computer required for this workshop. See Moodle for the program which should be downloaded in advance
Day 7 (Sunday 3 rd September 2023)	AM – students working in lab to collate datasets and process images. Review assessment requirements	
	PM – Assessment 2 quiz. Wrap up discussion.	
Day 8 (Monday 4 th September 2023)	Pack up camp, drive to Broken Hill, overnight in Broken Hill	Drive back to Broken Hill in 4WD cars
Day 9 (Tuesday 5 th September 2023)	Train Broken Hill to Sydney departs 07:45, arrives 21:38	Students must book and pay for their own transport from Broken Hill back to Sydney

10. Additional Resources and Support

Text Books	Recommended texts (bookshop and UNSW library): Armstrong, D., Hayward, M., Moro, D., & Seddon, P. (2015). <i>Advances in reintroduction biology of Australian and New Zealand fauna</i> . Csiro Publishing. Moseby, K., Nano, T., & Southgate, R. (2009). <i>Tales in the sand: a guide to identifying Australian arid zone fauna using spoor and other signs</i> . Ecological Horizons.
Course Manual	Available in print and as a pdf file on Moodle
Required and Supplementary Readings	Discussion papers will be announced and available on Moodle Reintroduction and role in restoration paper IUCN Guidelines for Reintroductions and other Conservation Translocations
Recommended Internet Sites	Society for Ecological Restoration website

11. Course Evaluation and Development

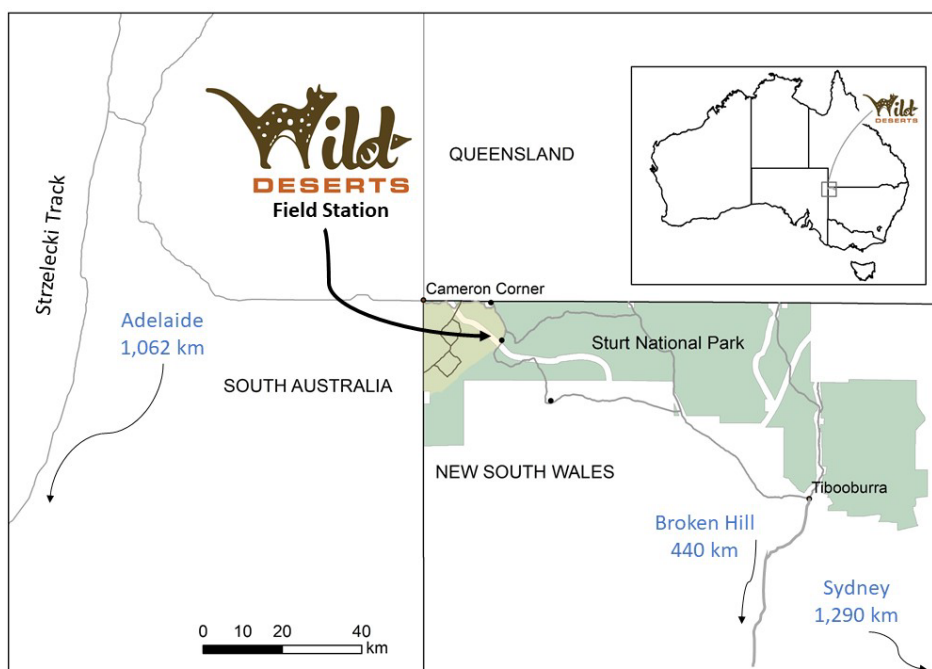
Student feedback is gathered periodically by various means. Such feedback is considered carefully with a view to acting on it constructively wherever possible. This course outline conveys how feedback has helped to shape and develop this course.

Mechanisms of Review	Next Review Date	Comments or Changes Resulting from Reviews
Major Course Review	2024	Major revision of the course will occur within two years of running the course.
CATEI ¹	2023	Student comments on CATEI evaluations will contribute to course revisions, along with other comments provided verbally and in writing throughout the course.
More/Less/Start	2023	During course term, students can submit anonymous requests for 'more' or 'less' of any content, as well as request a 'start' of content not available.
Other	2023	<p>Student feedback, provided via email or verbally, is always encouraged. Please feel free to provide suggestions on how course content, structure and teaching might be improved. The following questions are intended as a guide:</p> <ol style="list-style-type: none"> (1) What topics did you find most interesting? (2) What exercises did you find most enjoyable? (3) What additional topics would you have liked to see covered? (4) What aspects of the course did you find most challenging? (5) What aspects of teaching did you find most effective? (6) What aspects of teaching did you find least effective? (7) Did you think there was a good balance between field and lecture activities? (8) Do you have any suggestions on how the course could be improved?

¹ Science CATEI procedure: <http://www2.science.unsw.edu.au/guide/slatig/catei.html>

12. Field Course

Location: Wild Deserts, Sturt National Park, NSW



12.1 Background

UNSW runs the Wild Deserts Field Station where this course will be conducted. There are two 20 km² predator exclosures from which introduced predators and rabbits have been eradicated. Four of seven locally extinct mammal species have been translocated into these exclosures to date to establish functioning healthy ecosystems. The success of the Wild Deserts project is being tested through the implementation of a BACI (before, after, control, impact) experimental design across key management areas (impact – inside exclosures, compared to control - outside). This design offers the opportunity to test the success of the restoration process by comparing ecological variables within and outside the exclosures.

Students will acquire an advanced understanding of the principals underpinning ecological restoration, how to identify appropriate restoration goals and evaluation strategies and how to assess the condition of, and threats to, an ecosystem through fieldwork and desktop activities. Students will learn the principals of translocation biology and how to assess the success of a translocation using capture mark recapture techniques through participation in the Wild Deserts annual cage trapping survey. Students will implement camera trapping and analysis techniques to determine occurrence and distribution of translocated species. Students will also use the established treatment design to measure vegetation and scat indicators inside and outside the exclosures and use these data to determine the influence of macropod populations in the success of the restoration process.

12.2 Overview

When

Arrive in Broken Hill by the evening of Monday 28th August 2023. You will return to Broken Hill by the evening of Monday 4th September and be able to travel home on Tuesday 5th September 2023.

Getting there

Students will need to arrange their travel to Broken Hill, NSW. Usually this will involve purchasing a return train ticket. Students will be collected from Broken Hill in 4WD vehicles to travel to the Wild Deserts field station. Accommodation will be camping

Additional costs: On top of the train ticket an additional approx. \$360 dollars will be necessary to cover food, accommodation and travel to Wild Deserts

Travel insurance: Covered as with normal UNSW Field Work Courses

12.3 Required Equipment and Training

<p>Equipment Required</p>	<p>Research equipment and materials:</p> <p>Students must bring a laptop computer and have downloaded in advance the MapView Professional program before arrival. https://www.reconyx.com/software/mapview</p> <p>Please contact rebecca.west@unsw.edu.au if you do not have a laptop available to bring</p> <p>Personal equipment:</p> <ol style="list-style-type: none"> 1. Sturdy closed-toe walking boots 2. Long pants and long-sleeved shirts to protect skin from sun and abrasions 3. Clothing suitable for outdoor wear in cold and warm weather (average August/September minimum temperatures are 0 to 10°C overnight and 15 to 25°C during the day) 4. Broad-brimmed hat 5. Wind Jacket 6. Sunblock 7. Insect repellent 8. Water bottle and daypack/backpack 9. Head torch/torch 10. Swimmers (optional) 11. Field notebook 12. Datasheets, pencils, clipboard 13. Personal medication and toiletries 14. Laptop for data entry 15. Binoculars and camera (optional) <p>*** Please bring your own towel. Sleeping bags are provided but students can bring their own if preferred</p>
<p>Enabling Skills, Training Required to Complete this Course</p>	<p>Understanding of Health & Safety requirements in the field environment. Please see Moodle for links to necessary H&S documents.</p>

12.4 Wild Deserts Field Station Amenities

Accommodation: Individual tents are provided with a camp stretcher, inflatable mattress, sleeping bag and liner, pillow. There are shared toilet and shower facilities and a large kitchen and dining area where meals and lessons will be held.

Other resources: There is no mobile phone access at Wild Deserts. There is limited Wi-Fi available at the field station and a landline telephone that can be used to make calls.

For further information on the Wild Deserts Field Station read the *Wild Deserts Induction Plan* on the Moodle page.

13. Assessment details

Assessment Summary

There will be 3 key assessments of this course as detailed below

	Task	% of Total Mark	Due Date	How to Submit
1	Presentation on restoration or translocation	15	During the course	Students will present an individual 3-minute talk during the field course (topic and details will be assigned in advance)
2	Field skills and identification of species and spoor	35	End of course	Quiz
3	Scientific report on findings with figures	50	4 weeks after the completion of course	Moodle

Assessment 1: Presentation on restoration or translocation (individual)

As students register for the course, they will be provided with a paper that gives an example of a restoration or translocation project. Students must prepare a 3-minute presentation to be delivered to the group to summarise the paper. 3 – 4 students will deliver their presentation each lesson.

15% of total mark.

Assessment 2: Field skills and identification of species and spoor (Individual)

Students will undertake a quiz on the last day of the course to assess their identification skills learnt during the week. The quiz will be a series of photographs of animals, tracks and scats

35% of total mark

Assessment 3: Scientific report

During the week students will collect class datasets. On the last day the group will discuss hypotheses related to the restoration of the ecosystem and how the datasets could be used to test the hypotheses. Students will select one of the datasets to present their findings in the form of a scientific report which will include at least two scientific figures. This will be due within four weeks of completing the field course. Students will receive further guidance during the course on the content of this assessment and the marking scheme.

50% of total mark.

Assessment mark schemes

Assessment 1 – Research Presentation

For this assessment you will give a 3-minute presentation (plus two minutes for answering questions) on a research paper that was assigned to you prior to the field course. You will need to prepare 3 PowerPoint slides that explain the research and present it as an oral presentation to the class during the field course. The presentation is worth 15 % of the total course mark.

Your presentation will be assessed according to the following criteria

Sub-heading	Outline	Marks
Accuracy and clarity	Accurate summary of the study aims, outcomes and the author's interpretation of the results. Information clearly presented and easy to understand.	10
Understanding of the topic	Own opinions provided and justified. Suggestions for future research provided. Questions from the audience answered appropriately and accurately.	10
Presentation and delivery	Aesthetically pleasing slides (not too much writing, good use of photos or graphics). Delivery of oral presentation (clear, appropriate speed, eye contact, engaging style, story telling)	5
Total		/25

Assessment 2 – Quiz

For this assessment you will answer 15 questions in a quiz on the last day of the field course. The quiz will test your knowledge of the theory and field methods you have learnt during the week. The quiz will be answered individually and marked directly afterwards. The quiz is worth a total of 30 marks and worth 35 % of the overall course mark.

Assessment 3 – Scientific report

For this assessment you must submit a scientific report (approximately 2500 words) on the macropod grazing class dataset collected during the field course at Wild Deserts. The report is worth 50 % of the total course mark and is due 1 week after field course completion).

On the final day of the field course, you will be given the collated class dataset for the macropod grazing quadrats. As a group we will discuss potential questions that could be asked using this dataset. Choose a question and then formulate a hypothesis and write a report outlining how you have tested your hypothesis and the outcome of your research.

Your report should have the sub-headings as outlined below:

Sub-heading	Outline	Marks
Introduction	Provide the background and context of your study (include references to previous work). Define any concepts or terms that you will use. Outline the aims of the study and the hypotheses to be tested. Approximately 500 words.	10
Methods	Describe the study site (include a map if necessary) and how the study was conducted i.e., sample sizes, how the data were collected and analysed (include statistical methods used). Photographs may be included in this section to depict methods. Approximately 500 words.	5
Results	Present the results of the study. This section should include at least 1 figure (graph) and can also include tables. Approximately 500 words.	15
Discussion	Discuss the results of the study, whether or not they support your hypothesis and how this relates to other previous studies (include references). Outline any recommendations for future research. Approximately 1000 words.	15
References	Include a list of the papers referenced in the following format: Kingsford, R.T., Biggs, H.C. and Pollard, S.R. (2011). Strategic adaptive management in freshwater protected areas and their rivers. <i>Biological Conservation</i> 144, 1194-1203 (minimum 10 references).	5
Total		/50