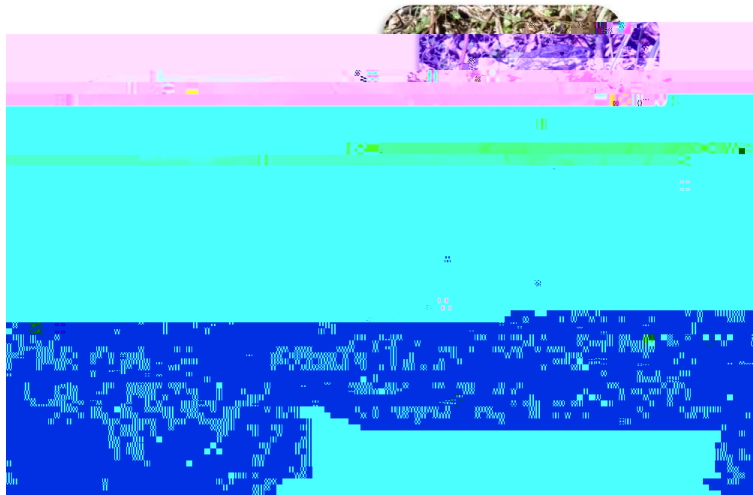




FACULTY OF SCIENCE  
SCHOOL OF BIOLOGICAL EARTH AND ENVIRONMENTAL SCIENCES

# BIOS3601

## ADVANCED FIELD BIOLOGY



TERM 1, 2022

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## 1. Information about the Course

Year of Delivery

## TEACHING STAFF

### Prof. MIKE LETNIC

My research and teaching is focused on the conservation and management of ecosystems. I am particularly interested in improving understanding of landscape and continental-scale processes that influence the structure of terrestrial ecosystems and threaten biodiversity. I am currently investigating the role that top predators play in sustaining biodiversity, improving the reintroduction success of endangered mammals, the ecology and biology of crocodiles and landscape scale approaches to control the impacts of invasive species, particularly, cane toads and foxes.

### Assoc. Prof. LEE ROLLINS

I joined UNSW in 2017 and in my role as a Scientia Fellow, am primarily research-focused. My group uses genetic and epigenetic approaches to examine population and evolutionary processes. Specifically, I am interested in using molecular data to explain the mechanisms underlying rapid evolution often seen in invasive populations and improve the management of invasive and conserved species.

### Assoc. Prof. WILLIAM CORNWELL

Will Cornwell grew up in California, studied at Cornell, Cambridge, and Stanford. He worked doing research in Canada (UBC), Holland (VU), and now in Australia (UNSW). His research is on plant diversity and how it affects ecosystem processes. He is especially interested in ecological processes on tiny scales that affect the carbon cycle and indirectly the global climate.

### GIULIA FERRETTO

I always loved the sea and looking after the marine environment has been my dream since I was a child. I became a SCUBA diver at a very young age and from that moment my passion for the sea increased, so I decided to study marine biology. I undertook my undergraduate and Master's degrees in Italy. After some working experiences in Norway and

### 3. Course Details

Course Description (Handbook Entry)	An advanced practical training in diversity, systematics, biology and identification of terrestrial animals and plants and aquatic invertebrates. The course is run principally as an intensive one (1) week course, which will be run in 2022 at the Sydney Institute of Marine Science Field Station at Chowder Bay, Mosman during O-week. Students will receive theoretical and practical training in current methods of trapping, collecting and identifying animals and plants, estimation of population size, biodiversity, the conduct of animal surveys, and data analyses. The course coverage will include both vertebrate and invertebrate animals and plants.
Course Aims	The course aims to: 1) Provide skills and knowledge in ecological research, including posing research questions, designing experiments and collecting and analysing data for a range of animals and plants and; 2) Provide understanding of issues in experimental design and sampling; 3) Develop skills in field observation, data analysis and presentation of findings in presentations and reports.
Student Learning Outcomes	



## 5. Course Schedule

Week	Week start date	Workshops	Assessment Tasks **See Section 6 for more details
Week 0	7 <sup>th</sup> February	FIELD TRIP 7 <sup>th</sup> -11 <sup>th</sup> February ±SIMS, Chowder Bay	
Week 1	14 <sup>th</sup> February	Workshop 1: Statistics with Mike Letnic 2-5pm Thursday 17 <sup>th</sup> February, Bioscience Bldg, G29	
Week 2	21 <sup>ST</sup> February	Workshop 2: Statistics with William Cornwell 2-5pm Thursday 24 <sup>th</sup> February Bioscience Bldg, G29	
Week 3	28 <sup>TH</sup> February	Workshop 3: Individual projects development 2-5pm Thursday 3 <sup>rd</sup> March, Mathews 312, K-F23312	
Week 4	7 <sup>th</sup> March	No class	
Week 5	14 <sup>th</sup> March	No class	
Week 6	21 <sup>st</sup> March	No class	Field trip report due (40%) due 4pm, 25 <sup>th</sup> March, BEES office
Week 7	28 <sup>th</sup> March	Workshop 4: Statistics 2-5pm Thursday 31 <sup>st</sup> March, Bioscience Bldg, G29	
Week 8	4 <sup>th</sup> April	Workshop 5: Natural history exhibition 2-5pm Thursday 7 <sup>th</sup> April. Alan Wilton Tea Room, Samuels Building Rm 113.	Natural history project (10%) due 4pm 6 <sup>th</sup> April.
Week 9	11 <sup>th</sup> April	No class	
Week 10	18 <sup>th</sup> April	Workshop 6: Independeh h 11h	





## FIELD-TRIP TIMETABLE

	EARLY MORNING <u>6:00-8:15</u>	MORNING SESSION (8:15-
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### Assessment

Your natural history study will be assessed on its presentation, the curation and documentation of the study i.e. is there a structured theme, taxonomic catalogue or habitat catalogue that provides observational insight.

Due date Week 8, Wednesday 6<sup>th</sup> April, 4pm, 3 UR I H V V R U 0 L Office RM Q105 Samuels Building  
Show and tell exhibition: Week 8, Thursday 7<sup>th</sup> April, 2-5 pm Alan Wilton Tea Room, Rm 113 Samuels Building

Curation/documentation	Presentation	Zing	Total
5	2.5	2.5	10

### FIELD REPORT

Field Report from field trip (40%)

You are required to provide a scientific report with Introduction, Methods, Results and Discussion using one of the data-sets collected during the AFB field trip. Your choice of the field course module to report on can be made in consultation with AFB staff. The Introduction should provide a brief background on the subject studies with reference to previous literature. The report should be 1000-1500 words (including references) and should be typed, double-spaced, on one side of the paper, with a 25mm margin all round. The report should be submitted in hard copy and on a CD-ROM. The report should be submitted to the AFB office, Room Q105, Samuels Building, University of Exeter, Exeter, Devon, EX4 4RJ. The report should be submitted by 4.00pm on the day of the field trip. The report should be submitted in hard copy and on a CD-ROM. The report should be submitted to the AFB office, Room Q105, Samuels Building, University of Exeter, Exeter, Devon, EX4 4RJ. The report should be submitted by 4.00pm on the day of the field trip.

## INDIVIDUAL PROJECTS

### Individual Project Report (40%)

You are required to undertake a field sampling exercise to answer a basic question in biology/ecology and write a report on your results in the format of a scientific paper. You will be using skills obtained during the field trip in terms of understanding methods and problems in field sampling. The introduction should use literature to set the context for the research question being addressed. It will help if you find a paper you like from a good journal and model your report on the style and structure.

Working in groups of 3-5 you will undertake the research into the best method, clearly define your question, undertake necessary sampling and analyse the data. Each person will write up their own report on the data which will be worth 40% of the final mark, but group work is encouraged for all other aspects of t







## 9. 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	Last Review Date	Comments or Changes Resulting from Reviews
Major Course Review	NA	This course has run for more than decade, with a break in 2011. It has been running in its current format since 2012 and has undergone regular CATEI assessment, but not a major course review.
CATEI/MyExperience	2012 2013 2014 2015 2016 2017 2018	The CATEI/MyExperience process in 2012 and 2013 was used to modify the teaching approach to include workshops on statistics and on the assessment tasks was clarified within the manual and marks were reassigned based on student feedback of workload. Based on previous years feedback the File trip report due date has been moved forward to facilitate earlier feedback on marks. Evaluation will be undertaken again in 2019.



## 10. Administration Matters

Expectations of Students	Attendance on the field trip is compulsory, and attendance at workshops is highly recommended. Please remember that you pay fees to study at UNSW, and attending all classes will help you get the most out of your financial investment. In general, a minimum rate of 80% attendance is required to fulfil the course requirements.
Assignment Submissions	Unless otherwise specified, submitted assignments are to be placed in the

## 11. UNSW Academic Honesty and Plagiarism

What is Plagiarism?





Point counts involve an observer remaining stationary at an observation point and counting and recording all birds observed, within a specified period of time. During our point counts will conduct targeted surveys for some small birds by

Tree density will be measured by counting the number of woody stems (>10 cm diameter at breast height) within four, 20 x 20 m quadrats adjacent to the transect line. The value taken will be the mean for each transect.

## Background & Aim

The world has urbanized rapidly for the last several centuries, and in some heavily populated areas, like Sydney, there are only small fragments left. Understanding the effect on biodiversity is an important goal. Figure 1 (from Williams et al. 2009) lays out the major filters that affect biodiversity in urban areas. Habitat transformation, fragmentation, urban environmental factors like pollution, and the idiosyncratic human choices for land use may all have profound effects on biodiversity (Duncan et al. 2011). In this practical exercise we focus on

## References:

Duncan, Richard P., et al. "Plant traits and extinction in urban areas: a meta-analysis of 11 cities." *Global Ecology and Biogeography* 20.4 (2011): 509-519.

Falster, Daniel, et al. "AusTraits, a curated plant trait database for the Australian flora." *Scientific data* 8.1 (2021): 1-20.

Jin, Chao, et al. "Functional traits change but species diversity is not influenced by edge effects in an urban forest of Eastern China." *Urban Forestry & Urban Greening* 64 (2021): 127245.

Williams, N. S., Schwartz, M. W., Vesk, P. A., McCarthy, M. A., Hahs, A. K., Clemants, S. E., ... & McDonnell, M. J. (2009). A conceptual framework for predicting the effects of urban environments on floras. *Journal of ecology*, 97(1), 4-9.





issues are important and how to address them. We will then collectively decide on a sampling strategy to test our hypotheses.

Briefly, you will collect samples of macroalgae (and the communities that are in them) from different habitats.

Back in the lab we will determine biodiversity in all the samples and key traits of the foundation species.

Examples of macroalgae (left) and invertebrates associates to macroalgae (right). Credits: John Turnbull and Alistair Poore.

A similar approach can be applied to investigate the deposits of algae and seagrass that are washed up after

perspective of many beach users, the deposits of wrack are an essential food supply for the sandy beach fauna (mostly small invertebrates), which are themselves important food for vertebrate consumers (e.g., shorebirds).

#### References and Recommended Reading

Dayton, P. K. Toward an understanding of community resilience and the potential effects of enrichments to the benthos

## Background and Aims

DNA analyses can be used to investigate ecological and evolutionary processes in wild populations including dispersal, population demographics and connectivity, animal behaviour, mating systems, phylogenetic relationships and cryptic taxonomy. Genetic analyses also are a key component of wildlife forensics. But in order to conduct these analyses, it is vital that samples are collected in a manner that maximised their utility for a variety of genetic analyses. Importantly, these possible uses and collection practices should be considered BEFORE starting any field project to maximise the potential of these approaches. In this module, we will discuss best practices for DNA collection. Then we will use a (non-) DNA to demonstrate how environmental conditions degrade DNA and discuss why DNA quality matters.

A body farm is a facility that enables the study of decomposition. The original idea was to use cadavers donated to science to recreate decomposition under a variety of natural conditions to assist human forensic scientists to better identify the manner and timing of death. These facilities have greatly advanced the field of forensic science. Body Farm Whiting is a riveting read!



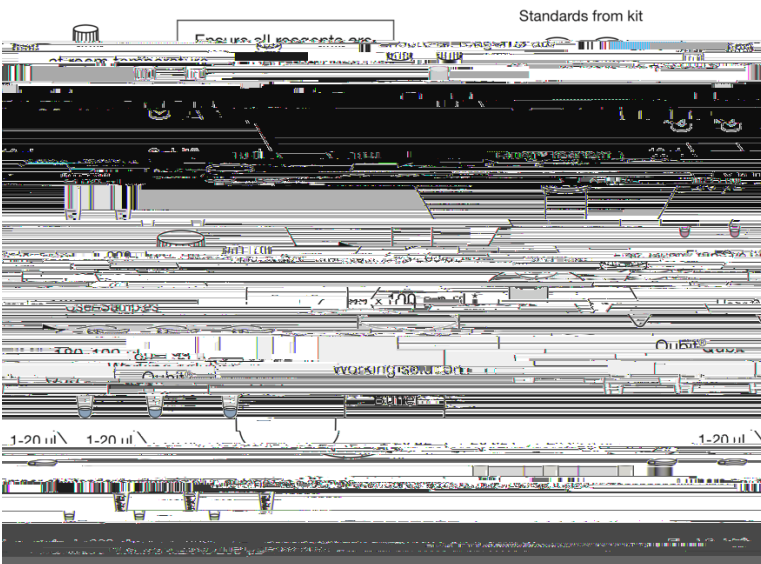
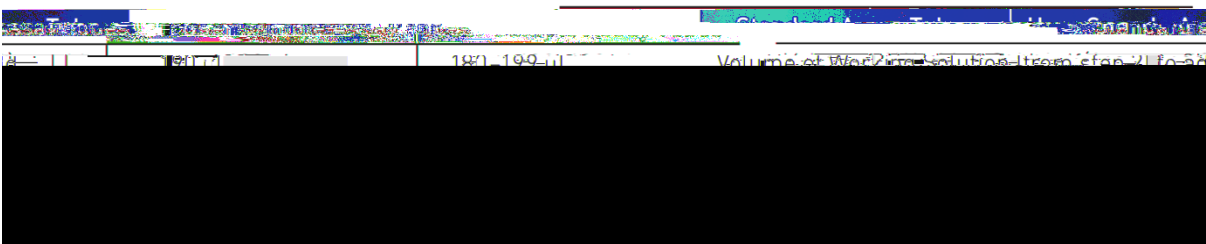
## DNA extraction protocol

This protocol is for purification of genomic DNA from 5. 10 mg fresh or frozen solid tissue using the Gentra Puregene Tissue Kit.

1. Dissect tissue sample quickly and preserve.
2. Chop tissue into ~1ml pieces and place in a 1.5 ml tube with 250 ul of Cell Lysis Solution. Add 1.5 ul of 0 ul of

## Qubit quantification

NOTE: For best results, store the dye and the buffer



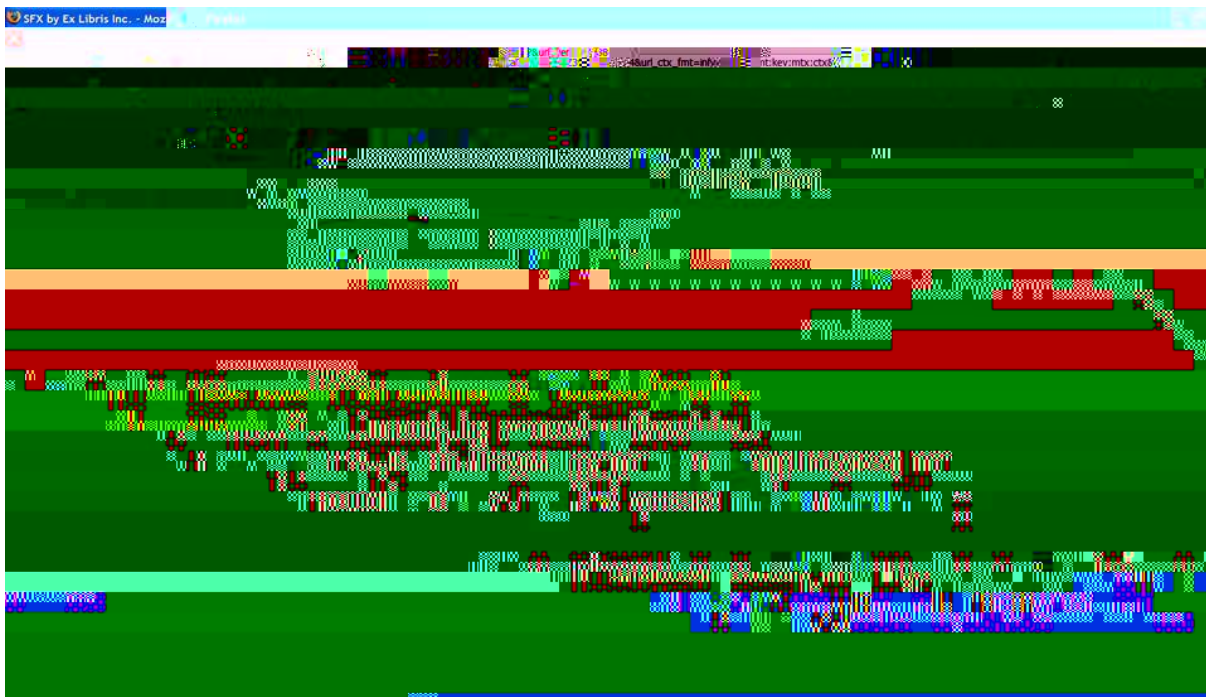
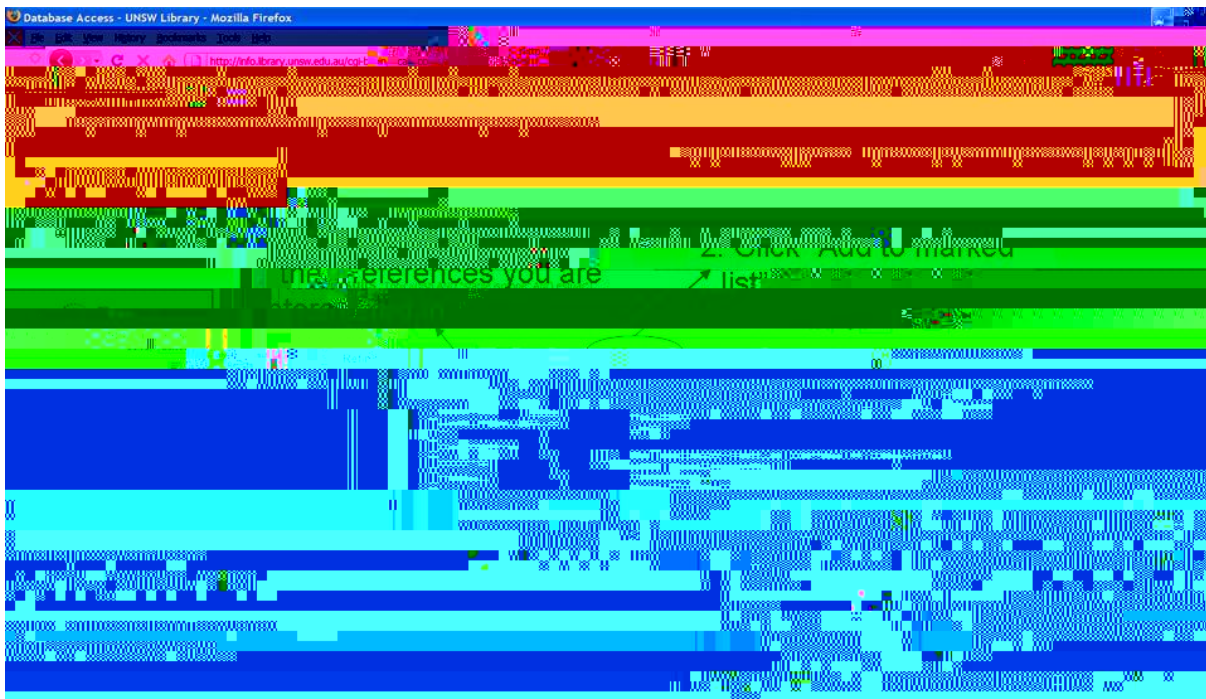
### 13. Literature searches, Endnote and referencing

Endnote is a powerful tool for collecting, organising, managing and using information derived from your literature searches. Endnote removes the need to ever manually type in reference details, as the information is imported onto your hard-drive from databases on the www, and inserted into your papers and assignments (in MS Word) automatically by using Endnote. Endnote is a great resource for scientific writing, and developing these skills will benefit you for the remainder of your career.

Endnote is available free to all undergraduate students, postgraduate students, and staff at the University of NSW, and can be downloaded from the UNSW IT software distribution website

<http://www.it.unsw.edu.au/>

UNSW Library offers tutorials of on how to search databases <http://www.library.unsw.edu.au/HowDoI/databases.html>







5. Your reference is then imported, in the correct format, and has the .pdf linked to it permanently. You can now get rid of the saved .pdf if you desire (i.e. 2999.pdf)
6. It is important to check that the references are imported without any errors. If errors are present they will be copied to your MS Word document when you insert the reference, which makes for tedious changes later.

#### Using Endnote in MS Word

1. To ensure the correct output style to be used in the bibliography in MS Word, you must ensure the template style is activated in Endnote;
2. In Endnote, select Edit>Output styles>Open Style Manager and check the box next to the style you desire. If you have a custom style, download your desired style and save it to this location on the C (or main) drive: Program Files>Endnote>Styles;
3. Close Endnote and open it again, navigate to Style Manager, and click the checkbox next to the reference you just imported;
4. In Endnote, select Edit>Output styles and select your desired output style which should now be present