

## SYLLABUS

### BIOL 3626.03: FIELD STUDIES OF MARINE MAMMALS, AUGUST

**Instructors:** Deborah Austin ([daustin@dal.ca](mailto:daustin@dal.ca)) & Damian Lidgard ([damian.lidgard@dal.ca](mailto:damian.lidgard@dal.ca))

**Office:** LSC Room 4087

**Office phone:** 494-2564, cell phone: 902-240-9031 (Deborah), 902-802-4575 (Damian)

**TA:** TBA

**Field TA:** TBA

**Classroom:** Ecology Lab LSC 4009

**Materials:** There is no textbook for the course. Handouts/PDFs will be available for most of the lectures and there are many books on 2 hour reserve (see below) at the Killam Library.

#### Marking scheme:

Assignment/test	Value
Hypothesis and data protocol	10
Necropsy lab report	10
“Midterm” quiz	10
Field book	10
Final exam	20
Oral presentation	10
Final report	30

#### Grading scale (Dalhousie standard):

A+	90-100
A	85-89.9
A-	80-84.9
B+	75-79.9
B	70-74.9
B-	65-69.9
C+	62-64.9
C	58-61.9
C-	55-57.9
D	50-54.9
F	<50

**BRIEF DESCRIPTION OF ASSIGNMENTS**

**Project Proposal and Justification** (10%): Provide a clearly formulated one or two sentence hypothesis, indicating the question you intend to examine. Give a brief synopsis of previous studies that have examined similar questions, and based on your research and a theoretical understanding of your subject, state WHY your question is important. Further, given the existing published information on your subject, tell me why you expect certain results. Your data collection protocol should outline what data you will collect, when it will be collected and how it will be collected. Include a full list of methods and materials required, sufficient such that anyone could follow your methods and collect the data. Datasheets should also be submitted to indicate how you will record the data in the field. Depending on overall class size, projects will be done in groups of four or five, one project outline per group is required (however, project reports will be done individually). AN IMPORTANT DETAIL: do not make the spaces for recording data on your data sheet too small, give yourself a row height of at least 25 points.

**Necropsy lab report** (10%) You will be expected to label the given diagrams and answer short questions about the necropsy.

**Midterm Exam** (10%) Short answer, true/false and/or multiple choice. Focus will be on field methods and techniques, and species identification. Will be done during the field trip, date TBA based on our field schedule and weather conditions, but you will be given at least 2 days notice.

**Field book** (10%): Everyone will be given a weatherproof field book. Emphasis will be placed on clearly presented, neat, legible recordings. Always date each page and provide a synopsis of prevailing weather conditions and any other comments relevant to that study day. Be thorough!

**There are two separate tasks that you are required to enter into your field book:**

- 1) **BACK OF THE BOOK, GIVE SPECIES DESCRIPTIONS:** For each new species of marine mammal and seabird encountered, you must provide a detailed description of their physical appearance and behavioural observations. For example: note the body parts observed (head, fin, etc), note the direction they are swimming, any vocalizations, numbers in a group, etc. Well-labelled sketches should be used to make note of physical appearances and are a useful tool and exercise. You can update this description with any other observations about this species throughout the rest of the field trip. The end result should be a detailed description of each species encountered in the field, one that you could read in the future to help you identify a marine mammal in the field. Remember, you can update your original entry with any other important observations you may have missed the first time- sometimes these animals give you only very small glimpses!
- 2) **FRONT OF THE BOOK, GIVE A DETAILED TIME LOG:** Each time you encounter a marine mammal or seabird, the time, species and number of individuals should be recorded. Based on these observations, you should update

your description of the species. Any notes relating to your project (that don't fit on your data sheets) should also be recorded in your field book in this section.

The key here is that you must remain vigilant at all times while on the boat- always be scanning for sightings of marine mammals and seabirds, even if this is not relevant to your project area.

**Oral presentation (10%):** Give a short (10-15 minute) presentation on your research project using Power Point as a group. Outline your hypothesis or question, the background to the questions asked (rationale), how you conducted your research (methods), what you found and what your results indicate about marine mammals in the Bay of Fundy area. Done as a group project, and your group will receive a single mark. You will be marked on Presentation (5 marks) and Content (5 marks).

**Final exam (20%):** Short answer and essay questions.

**Final report (30%):** Written report in journal style. Follow EXPLICITLY the guidelines for Canadian Journal of Zoology ([http://pubs.nrc-cnrc.gc.ca/eng/journals/forauthors\\_cjz.html](http://pubs.nrc-cnrc.gc.ca/eng/journals/forauthors_cjz.html)). Prepare your report as if you were planning on submitting your manuscript to Canadian Journal of Zoology using *Canadian English* throughout. Look at past articles for ideas on what information should be included. Must have abstract, introduction, materials and methods, results and discussion sections as well as literature cited (see handout on Canadian Journal of Zoology format for more details). Report must be typed, double-spaced, written individually (each group member is responsible for producing their own report, emphasis on OWN) although there will be collaboration on data collection and results. Figures/Tables can be shared amongst the group, as long as all members have participated in their design.

**Library resources (2 hour reserve):**

- Gaskin, DE. The ecology of whales and dolphins. QL 737 C4 G24 1982  
 Reeves, RR et al. The Sierra Club Handbook of seals and sirenians. QL 737 P6 R44 1992  
 King, JE. Seals of the World. QL 737 P6 K5 1983  
 Ridgeway, SH and Harrison, R. Hand book of marine mammals (volumes 1 – 6). QL 713.2 H354 v. 1-6.  
 Riedman, M. The pinnipeds: Seals, sea lions and walruses. QL 737 P6 R54 1990  
 Evans, PGH. The natural history of whales and dolphins. QL 737 C4 E93 1987  
 Berta, Annalisa. Marine Mammals: evolutionary biology QL 713.2 B47 1999  
 Evans, Peter G.H. and Raga, J.A. (eds) Marine Mammals Biology and Conservation. QL 713.2 M354 2001  
 Boyd, I. (ed) Marine mammals: advances in behavioural and population biology QL 1Z8 1992  
 Perrin, W.F., Wursig, B., Thewissen, J.G.M. (eds) Encyclopedia of Marine Mammals. QL 701.2 E3 2002  
 Hoelzel, R. (ed). Marine Mammal Biology: an evolutionary approach, QL 713.2 M37 2002

**Key Journals to use as references:**

Marine Mammal Science  
Canadian Journal of Zoology  
Canadian Field Naturalist (especially COSEWIC status reports)  
Reports of the International Whaling Commission  
Aquatic Mammals  
Marine Ecology Progress Series  
Ecology  
Oikos  
Oecologia  
Proceedings of the Royal Society of London  
Polar Biology  
Journal of Zoology  
Journal of Animal Ecology  
Polar Biology  
Behavioral Ecology  
Behavioural Ecology and Sociobiology

**Article Searches via Dalhousie Online Databases:**

Do not use Google and expect a thorough return of published material. Please use the following:

ASFA – Aquatic Sciences and Fisheries Abstract is decent for marine mammal research although few behavioural studies

Web of Science – Abstracts from many relevant journals

Biological Abstracts: A good place to start, though fewer direct journal links.

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## FIELD WORK AND FIELD PROJECTS

The main focus of the course is to conduct your own research project on marine mammals in the Bay of Fundy off Long Island from formulating your hypothesis, to collection of data, analysis of data, writing a scientific paper and providing a scientific presentation. There will be five groups, each with four to five people, and each group will take on one of the projects outlined below. Each project idea listed below can only be assigned to one group. Data should be collected jointly in the group. Note, you will be observed in the field and in the lab to ensure that the work is shared EQUALLY amongst all group members.

Groups and project ideas (no two groups can do the same topic) must be chosen and approved by 1 PM on Sunday Aug 18<sup>th</sup>. Then decide what data you should collect and how you should collect it (see Proposal above for more details).

### Project ideas

From one of the project ideas below, each of which addresses a particular question, formulate a hypothesis that you want to test.

- 1) Distribution of marine mammals in the Bay of Fundy: Marine mammals in the Bay tend to be observed in particular spots. What characterizes these locations (i.e. depth, tide, temperature, slope of bottom) and why are marine mammals likely to be observed in these spots?
- 2) Associations between seabirds and cetaceans: Seabirds are sometimes observed in association with cetaceans. Investigate which species associates with each other and why they might be associating (i.e., what common resource or habitat might they both share?).
- 3) Photo-identification of cetaceans and seals: Can you use photographic-id techniques to individually identify marine mammals in the Bay of Fundy? Are all species suitable for this technique? Can you match individuals with those from existing photo- id databases (e.g. humpbacks, right and pilot whales), and from those identified in previous years of the course?
- 4) Marine mammals and ecotourism: Do whale watching boats influence the behaviour of marine mammals in the Bay of Fundy? Which behaviours can be observed from the boat and do they change in nature or frequency with proximity to the boat? Are animals stressed in the presence of a boat(s)? How would you determine whether an animal is stressed?
- 5) Marine mammal diving behaviour: What are the surfacing intervals and dive patterns of the different marine mammals observed in the Bay of Fundy? Do they differ between individuals and species and what factors may drive these similarities or differences?
- 6) Student project ideas: Be brave and creative and come up with your own idea.

You will be required to hand in your hypothesis and datasheets by 9:00 AM on Tuesday Aug 20<sup>th</sup> via e-mail or in person. These will be marked and given back to you by the end of the day so you can make any necessary changes before leaving for the field. After the field trip, you will be required to analyze the data (only simple statistics are expected), give a brief (15 minute) oral presentation on your project for the class and finally write up your project as a scientific paper following the format required by *Canadian Journal of Zoology*. Formulating the proposal/hypothesis, data collection and analysis and oral presentation will be done in groups, however the write up must be done individually and each person will be marked individually.

### **Equipment available**

Boat, with ship-board depth sounder, fish finder, thermometer and GPS  
Limited number of GPS units  
Limited number of timers  
Tide time-tables  
SLR cameras\*  
Binoculars  
Charts of area

\* SLR cameras are not always available so if you have a digital SLR with a telephoto lens of > 200mm you are likely to be encouraged to pursue the photo-id project.

### **Field Conditions**

Field-work will be conducted off a chartered whale watching boat in the Bay of Fundy, leaving each day from Tiverton, Long Island. Right and humpback whales will be commonly observed and trips will be tailored to sight these two species, however we will watch for all marine mammals, including harbour and grey seals, minke and fin whales and harbour porpoises. Keep in mind however, there are no guarantees that marine mammals will be seen with every outing, such is the risk with any field work. You will also be expected to identify and log each seabird sighting. There will be a lecture on marine mammal and marine bird identification before you go into the field.

During the field trips we will be camping on Digby Neck at a local campground. You will be sharing tents and cooking facilities. We will be in "field conditions" however, there are showers at the campground. Please bring your own sleeping bag and sleeping pad, or borrow one if you do not own one, and warm clothing for camping. We will be getting up early every morning (630am), therefore it is imperative that everyone is able to sleep by a decent hour, so noise should be kept at a minimum.

Cooking: All meals will be provided. Snacks on the boat between meals are your own responsibility. Please let me know about ANY DIETARY REQUIREMENTS (vegetarian etc) well in advance. We will rotate through project groups to help with all meals and all

dishes throughout the trip. After you have cooked a meal, the following day you will be

responsible for washing the dishes. Meals are planned in advance, and the ingredients bought, so each group will simply have to prepare the meal with the help of instructions. NOTE: Alcoholic beverages will not be permitted during the field trip.

### **Field Trip Details**

Charter: Pirate's Cove Whale and Seabird Cruises, Tiverton, Long Island

(902) 839-2242, Toll Free: 1-888-480-0004, Fax: (902) 839-2271

Campsite: <http://www.angelfire.com/country/campers/Welcome.html>, 1-800-565-0000

### **Required Field Gear**

We will not have much room in the vehicles so PLEASE DO NOT OVER PACK.

However, you should ensure that you have sufficiently warm clothing and bedding. The weather in the Bay of Fundy can change rapidly, and can be very cool and damp even in the middle of summer. Fog is common in the evenings, so please, bring lots of warm clothing and good raingear. Even when it's not raining (and it WILL rain), the boat can get somewhat wet, so a pair of rain pants makes you a lot more comfortable when sitting out for hours at a time.

- water bottle to take on boat
  - sleeping bag, sleeping pad and pillow
  - appropriate clothing for the field: - warm clothes, ie. fleece, wool, gore-tex, toques, gloves; good rain gear; appropriate footwear (not flip-flops): well-soled sandals/hiking boots/running shoes/rubber boots
  - sunscreen/hat/sunglasses
  - bug repellent
  - pencils/pens
  - we will need a few people to bring tents that they are willing to share with others!
- Please inform us if you own a tent, and then we will organize people into tents.

### **Recommended Field Gear**

binoculars

camera

flashlight or headlamp

travel alarm or watch alarm

### **Provided Field Gear**

We will provide food, stoves, propane, cooking pots and dishes. Field books.

People are welcome to bring laptops if they wish for data entry, but we cannot be responsible for any items lost or stolen.

**Class Schedule BIOL 3626**

**Class Schedule for Field Methods in Marine Mammal Ecology, 3626**

What	Who
Intro to course Intro to marine mammals How do we study marine mammals Population dynamics Project proposals	DA DA DA DA  DA
Marine mammal anatomy Marine mammal disease monitoring Marine mammal necropsy	DA /DL GL: Heather Fenton DA/DL/TBA
Distribution and habitat use Photo ID Conservation and management Pt 1 Conservation and management Pt 2	DA TBA DA  DA
Marine mammal identification Project proposal briefing (Photo-id+Distribution+Seabirds) Project proposal briefing (Behaviour+Dive) FREE	DL DA/TBA DL
Meet in LSC parking lot  Arrive in Whale Cove campground, Digby Neck  Set up camp and lunch  On water	
On water	



## Class Schedule BIOL 3626

Half day charter	
Lecture: Humpback/Right whales	TBA
Midterm exam	
On water	
Lecture: Marine mammal strandings	TBA
Half day charter	
Drive home and unload	
----- FREE -----	
Reproduction of marine mammals	DL TBA
Bottlenose whales in the Gully	
Telemetry	GL: Susan Heaslip
Marine mammal physiology	GL: Margi Cooper
Final project expectations + Informal exam review	DL
Telemetry exercise	DL
Genetics	GL: Tim Frasier
Pilot whales	GL: Joana Augusto
Acoustics	DL
Social structure of sperm whales	DL
Final exam	
Oral presentations	DA/DL/TBA
--- Free ---	

**DA – Deborah Austin; DL – Damian Lidgard; GL: Guest Lecturer; TBA – To Be Announced**