

SYLLABUS  
MAR 224 MARINE FIELD WORK  
FALL BLOCK, MTWR 10:00-11:50 a.m. (GH231), TW 2:00-4:50 p.m. (GH301)  
Field trip: Prince William Sound  
Thurs 27 Aug - Wed 3 Sep 2008  
Vans reserved 26 Aug - 4 Sep

Professor Scheel  
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Office Hours: T 08:30-09:30

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W 2:00-3:00 and by appointment.

Prerequisite: College biology (SC160 Principles of Biology)

Required Text: Handouts.

Excerpts: S.N. Murray et al. 2006. Monitoring Rocky Shores. University of California Press.  
Rigby et al. Sampling Biodiversity in Coastal Communities. Sections 3, 4-5, 8, 19  
Something on databases in marine research?

Course Description: This course, a companion course to Survey of Marine Biology, focuses on the handling of marine biological records and data, from study planning and design through field work to database entry and descriptive analyses. These objectives are met through field and lab studies in which students collect, organize and report on their own data. Includes required overnight field trip or travel. Lab fee required.

Topics include properties of seawater, marine biota & taxonomy, marine field methods (for example, specimen collection, identification and preservation, transect & quadrat sampling, animal tracking, laboratory techniques, live animal handling, diversity measurements, photographic sampling), record keeping, data types, database organization and analyses, and data presentation (graphical techniques, preparing a poster, talk or report).

Purpose of the Course:

- (1) To gain familiarity with North Pacific marine organisms and their taxonomy;
- (2) To introduce the general methods used to study marine biological systems.
- (3) To Introduce study design, scientific record keeping, data types and databases;
- (4) To gain practice with organization, graphical and descriptive statistical analyses of field data, and their presentation to scientific audiences

This course should be a useful beginning if you plan to work in marine biology. It is an important part of the Marine Biology major, since the problems in marine systems require using unique techniques not required in terrestrial biology. However, to understand marine biology you must also grasp the basic techniques universally present in biological field research. And even if you are not a major and never formally use the information that you gain through this course, a knowledge of marine biology enlarges your understanding of biological sciences in general, and the methods we use to learn about them.

Special Note: There may be an opportunity to fish during the field trip. However, if you are interested in fishing during the trip, you must have a current Alaska fishing licence.

Assignments:

*To introduce general field methods used to study marine systems.*

**Small boat handling** (Captain Neal Oppen). Learn to safely operate a small boat for field work. No written assignment. You must be approved by the Captain before you can pilot the small boats.

*To introduce methods used to study marine systems; introduce study design, scientific record keeping, data types & databases.*

**Properties of seawater** - Examine temperature, salinity, and density properties of seawater. See handout.

*To gain familiarity with North Pacific marine organisms and their taxonomy.*

**Species Identification, Taxonomy & Classification** – Learn to recognize 100 local marine species in six days! Complete the assignment as detailed in the handout.

*To introduce the general questions & methods used to study marine biological systems, to gain familiarity with North Pacific marine organisms and their taxonomy; and to introduce study design, scientific record keeping, data types and databases*

**NaGISA Shore survey:** Collaborate with the class to conduct an intertidal biota survey of a shoreline, compile the data and conduct your own independent analyses of the data. To do so, complete your individually assigned sampling protocol as described in your handout. Enter your data in the indicated Excel spreadsheet; and turn in your data electronically. Obtain a compiled copy of the survey data Excel spreadsheet. Complete the analyses as described in the handout.

*To introduce field methods; and to gain familiarity with North Pacific marine organisms & taxonomy.*

**Collection** (intertidal & fouling community; kelps). There are several ways to complete the collection assignment: (1) press kelp specimens (see Rigby et al. Ch. 8 in NaGISA handout for procedure); (2) collect desirable additions to the aquarium holding (check with your professor about husbandry), including collection, care in the field, transportation, and introduction to lab aquariums. In each case, you must identify all collected organisms, and document species id, date and location of collection on the collection data sheet. Grade will be based on correct identification, completion of collection records and (for kelp) presentation or (for live organisms) contribution to the aquarium holdings.

*To introduce study design, scientific record keeping, data types and databases; and practice organization, graphical and descriptive statistical analyses of field data, and their presentation to scientific audiences*

**Animal movement & tracking:** You will assist student researchers in tracking sonic tagged octopuses throughout the field trip. Obtain a copy of the data. For each animal tracked, prepare and turn in (1) a map of recorded movements, labeled with time-series information; (2) a graphical analysis of aspects of the movement, such as step-length, net displacement, changes in habitat characteristics, etc.

*To practice organization, graphical and descriptive statistical analyses of field data, and their presentation to scientific audiences*

**Poster presentation:** Prepare a poster exploring any set of data from the field expedition (see examples in the hallway outside the lab). Include a rationale for the data collection (what is interesting about the system under study, what question will the data answer), graphical analyses of the data, and interpretation of the graphs. Minimize text by conveying ideas with graphics and illustration; use large text font for legibility. You must analyze and present some numerical data; and your poster must be unique - no two students may analyze and present the same data in the same manner.

Grading:

N.B. Student collaborative learning is allowed, and even encouraged. However, **students must each individually prepare their own original work for assignments to be turned in.**

Properties of seawater	(20%)
Species Identification	(20%)
NaGISA Shore survey, see handout	(20%)
Collection	(10%)
Animal Tracking	(10%)
Poster presentation	(20%)

Minimum grades: A- for  $\geq 90\%$ ; B- for  $\geq 80\%$  but  $< 90\%$ ; C- for  $\geq 70\%$  but  $< 80\%$ ; D for  $\geq 65\%$  but  $< 70\%$ ; F for  $< 65\%$ ; use of - and + grades at the instructors discretion.

Course Expenses:

A course fee of \$300 was collected when you registered. This fee covers:

PWS Vessel charter & lodging	\$200 per student + \$200 for instructor
Van fuel, other field supplies	

Additional costs **NOT** covered by your fees.

Food on Field trips	Price will vary.
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Field Trip plans [Dawn 0630] [Sunset 2100]

W 27	0600 Depart ANC. 1300 Arv Valdez, load boat. <b>en route</b> <u>Properties of Seawater</u> stations 1-3. Assemble & set SeaLapse (set shrimp pots?). Arv EL est 1800. <b>Eve.</b> Establish housekeeping. Search for June sonic tags.	
Th28	0700 beach walk for octopuses and collecting. <b>a.m.</b> Small boat handling, species IDs. Set & pull long-line? <b>p.m.</b> Wood gathering, <u>Properties of Seawater</u> Ellamar B. station at high tide.	-1.0 f at 0554 (best 0530-0630)  +10.3 f at 1230
F 29	0630 EL beach walk for octopuses and collecting <b>a.m.</b> Team assignments; <u>Properties of Seawater</u> Ellamar B. station at low tide <b>p.m.</b> Team assignments. Turn-over SeaLapse.	-1.6 f at 0636 (best 0545-0730)
Sa30	0630 BU beach walk (NaGISA) & octopus collection <b>a.m.</b> NaGISA survey & ID of specimens from plots. <u>Properties of Seawater</u> Busby Is. station. Catalog all collected specimens and octopus midden content. Team assignments. <b>p.m.</b> Team assignments.	-1.8 f at 0715 (best 0630-0815)
Su31	0630 BU beach walk (inner beach) for octopus collection <b>a.m.</b> Team assignments (tracking, oyster cleaning-ID & collect some specimens!) <b>p.m.</b> Team assignments. Turn-over SeaLapse	-1.5 f at 0750 (best 0700-0845)
M 01	0815 EL beach walk (hike to site). Neal to meet Jet Boys. <b>a.m.</b> Team assignments (tracking & oysters-ID & collect some specimens!). <b>p.m.</b> Team assignments (complete assignments).	-0.9 f at 0825 (best 0815-0900)
T 02	No beach walk. <b>a.m.</b> Team assignments. <b>p.m.</b> Team assignments (tracking, end-of-season storage & cleanup). Retrieve & disassemble SeaLapse. <b>Eve.</b> Pack, clean cabin.	0.0 f at 0858  12.8 f at 1513
W 03	0530 EL to Vdz; 0900 Vdz to Anc. 1630 Clean gear @ APU.	

**SCHEDULE MTWR 10:00-11:50 a.m. (GH231), TW 2:00-4:50 p.m. (GH301)**

Week 1:

**Mon, 25 Aug - 1. Introductions**

a.m.: Introductions, field trips & releases, field meals  
NOON: LUNCH, READ SYLLABUS & HANDOUTS  
p.m.: No class. Work on your field prep.

**Tues, 26 Aug - 2. Database concepts**

**Read:** Ch1. Designing Field Studies; Properties of Seawater lab handout  
a.m.: Syllabus, seawater lab samples, Major ideas & types of inquiry  
p.m.: Field planning (projects, gear)  
**16:00:** Load van

The field trip activity schedule is necessarily tentative and subject to change to fit circumstances. This year the class will be accompanied by research students, providing you opportunities to see projects in progress.

N.B. DAWN AT 0630 SUNSET AT 2100

**Wed, 27 Aug - Travel Anc to Ellamar. (Van resvd)**

a.m. (0600) Meet & depart to Valdez  
p.m.: Properties of seawater stations en route, Set shrimp pots & SeaLapse? Arv Ellamar, set up housekeeping.

**Thu, 28 Aug - Small boat day EL 0554 -1.0 f best 0530-0630.**

**Read:** ID & taxonomy lab handout  
**0700** Preliminary collection work on Ellamar reef  
a.m.: Small boat handling & IDs  
p.m.: Wood gathering dead & down; water sampling

**Fri, 29 Aug -**

**0630** EL beach walk EL 0636 -1.6 f best 0545-0730  
a.m.: Beach walk, teams, EL station at low tide  
noon: Group prep NaGISA survey lab  
p.m.: Teams, turn over SeaLapse, shrimp pots?

**Sat, 30 Aug - NaGISA EL 0715 -1.8 f best 0630-0815**

**0630** BU beach walk  
a.m.: Beach walk, teams, ID & log, BU station  
p.m.: Pick shrimp pots, Teams

**Sun, 31 Aug - EL 0750 -1.5 f best 0700-0845**

**0700** BU inner beach walk  
a.m.: Beach walk, teams including clean oysters  
p.m.: Teams, turn over SeaLapse

Week 2:

**Mon, 01 Sep (Labor Day) - NaGISA datasets**

Tempest to Valdez for Jet Boys

**Read:** NaGISA Lab handout with attachments  
**0730** EL beach walk (hike) EL 0825 -0.9 f best 0815-0900  
a.m.: Beach walk, teams including clean oysters  
p.m.: Teams, time for assignments

**Tues, 02 Sep - No Beach Walk**

a.m.: **TEK group discussion**; teams  
p.m.: Retrieve & disassemble SeaLapse, cleanup

**Wed, 03 Sep - Return to Anchorage.**

**0530** EL to Vdz; **0900** Vdz to Anc  
**1630** Meet in GH301 to help clean & store gear.

**Thur, 04 Sep - Workshop: NaGISA data sets**

a.m.: NaGISA database population & organization, gear storage.  
p.m.: No class

**Fri, 05 Sep - No Class**

**NOON: DUE** E-mail NaGISA data sets to instructor.

Week 3:

Instructor returns compiled data sets by e-mail

**Mon, 08 Sep - Workshop: Spatial Data**

a.m.: Spatial data: some quick analyses with Excel  
**DUE:** Collection report & specimens  
**DUE:** Species lists  
p.m.: No class

**Tues, 09 Sep - Workshop: Graphical analyses.**

**Read: To be announced**  
a.m.: Graphical investigation, NaGISA, octopus data  
**Wed, 10 Sep - No class**  
BREAK - No class 10-17 September. Use the time wisely to make as much progress as possible on your assignments due next week.

Week 4:

**Mon, 15 Sep - No class**

**Tues, 16 Sep - No class**

**Wed, 17 Sep - No class**

**Thur, 18 Sep - Workshop: Poster design**

**Read:** Handout on poster design; also see web page <http://www.swarthmore.edu/NatSci/cpurrrin1/posteradvice.htm>  
a.m.: Organizing & displaying scientific results  
p.m.: No class

**DUE:** Properties of Seawater report

**Fri, 19 Sep - Turn in NaGISA**

a.m.: **1000 DUE:** NaGISA analyses  
p.m.: No class

Week 5:

**Mon, 22 Sep - Presentation of results**

a.m.: Poster presentations  
**DUE:** Octopus movement report  
**DUE:** Posters, 8.5 x 11 hard copy and pdf  
p.m.: No class