

COURSE INFORMATION

- Lectures: Monday and Wednesday 9:05-9:55 am
Fernow G24
- Lab Sections: Tuesday or Wednesday 1:25-4:25 pm
Stimson 318
- Instructors: Cliff Kraft
Natural Resources
203 Fernow Hall
255-2775; cek7@cornell.edu
<http://www.dnr.cornell.edu/cek7/kraft.htm>
- Alex Flecker
Ecology & Evolutionary Biology
E211 Corson Hall
254-4263; asf3@cornell.edu
<http://www.eeb.cornell.edu/flecker/flecker.html>
- Teaching Assistants: Erin Larson eil23@cornell.edu E137 Corson
Tom Daniel ntd4@cornell.edu 310 Fernow
- Readings: Text: *Stream Ecology: Structure and Function of Running Waters*, 2nd edition,
by J. David Allan and María M. Castillo (required)
- Methods in Stream Ecology*, 2nd edition, edited by F.R. Hauer and G.A.
Lamberti (on reserve in Mann Library). This is a valuable reference but is not
required for the course.
- Additional readings will be posted on the course web site (via
<http://blackboard.cornell.edu/>)
- Grading: Midterm Exam I (25% of grade)
Midterm Exam II (25% of grade)
Lab Reports (20% of grade)
Field Project (20% of grade)
Participation (10% of grade)
- Office Hours: Erin Larson: Thursday 12:45-1:45 pm, or available by appointment
Tom Daniel: Monday, 10-11, or available by appointment
Alex Flecker: Friday 10-11 am, or available by appointment
Cliff Kraft: Wednesday 10:15-11:15 am, or available by appointment

OVERVIEW AND EXPECTATIONS

This course will introduce students to major conceptual themes and a toolbox of common methods used for studying the ecology of running waters. People have long had a fascination with streams and rivers, which are critical for human well being as sources of water and food, recreation, power, navigational routes, conduits for effluents, and aesthetic enjoyment. Moreover, running waters represent ideal ecosystems for understanding many ecological phenomena, hence some classic ecological studies have been conducted in stream and river systems. Our goals for this course are to gain an understanding of: 1) major physical and biological features of streams and rivers, 2) the range of diversity of running waters around the world, 3) fundamental processes producing patterns of riverine structure and function, and 4) critical issues associated with the conservation and management of streams and their biota.

We aim to engage different learning styles with a combination of readings, lectures, field trips, lab exercises, and a field project. Lectures will highlight the major points about each topic, often taking a different approach than the text and providing additional examples. The laboratory is a vital part of the course and students are required to participate in each weekly lab. The laboratory will be organized around a set of exercises designed to acquaint students with essential techniques used by stream ecologists. We will conduct these exercises at two sites along a local stream, Cascadilla Creek, with the explicit objective of gathering a set of data that can be used to compare these study sites. These data will be incorporated into a field project report submitted at the end of the semester (due **December 9**).

Exams: Two prelim exams will be given during the class period. We have tried to avoid religious holidays. Make-up exams will be arranged at the discretion of the instructors for documented illnesses. There will be no final exam.

Laboratory Exercises: We have scheduled field lab dates (see lab schedule), though our ability to conduct meaningful field activities is weather dependent, so the lab schedule may be adjusted in response to weather conditions. We will try to provide advance notice about likely schedule changes based on weather forecasts. Each field lab activity will occur at one of two contrasting field sites along Cascadilla Creek. Each lab section (i.e. Tuesday or Wednesday labs) will alternate working at these sites, thereby developing a data set throughout the semester that will be used to evaluate contrasting ecological conditions within Cascadilla Creek. These data will be incorporated into the field project report due at the end of the semester (see “Field Project” below).

Lab write-ups will be due at the start of lab one week following completion of scheduled lab activities related to each topic. The following topics will have associated lab write-ups:

1. Stream Habitat Analysis (**due 9/22 & 9/23**)
2. Fish Population Data Analysis (**due 10/06 & 10/07**)
3. Algae and Chlorophyll Data Analysis (**due 10/27 & 10/28**)
4. Stream Invertebrates Data Analysis (**due 11/10 & 11/11**)

Late lab reports will not be accepted. Exceptions will be made only for illness and other circumstances beyond your control. You must contact your lead TA regarding extenuating circumstances as soon as possible.

Field Project Report: Each student will be responsible for working on a group project that will require substantial work outside of regularly scheduled lab periods. Field work for these projects will be conducted by groups of 3-4 members, though each student will be responsible for preparing their own field project report. Reports will require collaboration and discussion among all students in a group. Project reports will also provide an opportunity for each student to take some initiative in using available data from Cascadilla Creek – collected throughout the semester – to evaluate contrasting stream conditions at our two primary study sites. We will provide details regarding the field project during class lab class sections scheduled for **September 22 and 23.**

Saturday Field Trip (optional): We will offer an all-day Saturday field trip on **October 3.** The main objective of the Saturday field trip will be to contrast and compare physical and biological features of streams along a river continuum in the Susquehanna drainage basin. The trip will provide in-the-field exposure to other local streams beyond our focal sites on Cascadilla Creek.

Academic Integrity: All students are expected to be familiar with and to adhere to the University's Code of Academic Integrity (<http://cuinfo.cornell.edu/Academic/AIC.html>), which states that any submission of work by a Cornell student for academic credit indicates that the work is the student's own. All outside assistance should be acknowledged and truthfully reported in all circumstances. Students in this class who violate the code will be given a grade of zero for the assignment and/or a failing grade for the course.

Sharing of Course Notes: We follow university policy which stipulates that students are not authorized to replicate, reproduce, copy or transmit lectures and course materials presented, or derivative materials including class notes, for sale or distribution to others without the written consent of the instructors who are the original source of the materials.

Disabilities: We will make appropriate accommodations for students with disabilities. Please make such requests during the first three weeks of the semester, except for unusual circumstances, so that arrangements can be made. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.

Poll Everywhere: We will use the *Poll Everywhere* classroom response system for in-class polling using your own mobile device. During lectures you will be asked to answer multiple-choice or short answer questions based on the assigned readings and your understanding of the lecture. Instructions and a link to register to the course *Poll Everywhere* account are available below and on the NTRES/BioEE 4560 Blackboard site. You will need to bring to class a cell phone, tablet, iPad, or laptop computer, which will allow you to either text message or respond via the web. **You must log in every time.** If you are not logged in, your answers will not be

recorded and will not count towards your participation grade. We will regularly use *Poll Everywhere* so please register as soon as possible.

Subscribing to Poll Everywhere:

- 1) Go to: <http://tinyurl.com/StreamCornell>
- 2) You will be asked to provide your name and Cornell email address (other email addresses will not be accepted in the course). Create a unique password.
- 3) If you plan on using your cell phone to text the responses, you must enter and certify your cell phone number in your profile (www.polleverywhere.com/profile/edit) to ensure that you receive credit for responding.
- 4) When you use a computer, you will need to sign in before the first poll of the day - in the upper-right corner of the Poll Everywhere page. This will ensure that you receive credit for responding. Signing in is your responsibility. *Without signing in, you will not receive credit for your answers.*
- 5) Questions will appear on www.pollev.com/Stream.
- 6) If you have any questions, please visit the Poll Everywhere User Guide (www.polleverywhere.com/guide).

DON'T FORGET: If you use the web to respond (with a laptop, tablet, iPad or a smart phone), be sure to first login at www.pollev.com/login, then go to www.pollev.com/Stream and type your response.

Lecture Schedule
Fernow G24

I. Stream templates

26 August	Overview of the course and stream ecosystems (CK / ASF)
31 August	Watersheds, stream networks and hydrology (CK)
2 September	Channel formation and physical habitat (CK)
7 September	LABOR DAY
9 September	Chemical environment of streams (pH, O ₂ , conductivity) (CK)
14 September	Physical environment of streams (flow, temperature, substrate) (CK)
16 September	Organic matter: autotrophs (AF)
21 September	Organic matter: heterotrophs (AF)
23 September	Vertical and lateral linkages: Hyporheic exchange, groundwater, and riparian zones (CK)

II. Ecological Processes

28 September	Trophic relationships (AF)
30 September	Species interactions (AF)
5 October	Top-down controls and trophic cascades (AF)
7 October	Exam 1
12 October	FALL BREAK
14 October	Bottom-up controls and subsidized food webs (AF)
19 October	Disturbance (Erin Larson)

21 October	Dispersal in running waters (AF)
26 October	Nutrient dynamics (AF)
28 October	Guest lecture: High-altitude aquatic biodiversity in the face of global glacier retreat (Dr. Olivier Dangles)
2 November	Organic matter dynamics (AF)
4 November	Synthetic frameworks of stream structure and function (AF)

III. Stream Conservation and Management

9 November	Stream assessment (CK)
11 November	Managing river fisheries (CK)
16 November	Ecology of flow-regulated rivers (CK)
18 November	River restoration (CK)
23 November	Exam 2
25 November	Thanksgiving Break
30 November	Physical data workshop
2 December	Stream Ecology Jeopardy

**Lab Schedule
(Stimson 318)**

Week 1	9/1 & 9/2	Stream Habitat Rating Lab (Field Lab)
Week 2	9/8 & 9/9	Quantifying Physical Habitat (Field Lab)
Week 3	9/15 & 9/16	Habitat Analysis Lab
Week 4	9/22 & 9/23	*Project: Leaf Breakdown (Field Lab)
Week 5	9/29 & 9/30	Estimating Fish Abundance in Streams (Field Lab)
Saturday	10/3	Saturday Field Trip (Optional)
Week 6	10/6 & 10/7	*Quantifying Autotrophs in Streams (Field Lab)
Week 7	10/13 & 10/14	Fall Break
Week 8	10/20 & 10/21	Algae Identification / Chlorophyll Analysis Lab
Week 9	10/27 & 10/28	*Stream Invertebrate Collection Lab (Field Lab)
Week 10	11/3 & 11/4	Stream Invertebrate Identification Lab
Week 11	11/10 & 11/11	*Fish Bioenergetics and Excretion
Week 12	11/17 & 11/18	Leaf Breakdown Analysis
Week 13	11/23 & 11/25	Thanksgiving Break
Week 14	12/1 & 12/2	**Class Project Workshop

* Lab write up due in section

**Field project report due Wednesday, December 9