LANDSCAPE ECOLOGY AND CONSERVATION OF AMPHIBIANS
Highlands Biological Field Station, Summer 2021

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Prerequisites: Zoology, Herpetology or Vertebrate Biology; Ecology or Population Biology; or permission from instructor

Grading: Based on participation in discussions, presentation of literature topics, field and lab exercises, and completion of a group project.

Description: Amphibians are among the most imperiled taxa globally, with habitat loss and degradation posing the greatest threats. Landscape ecology and conservation biology provide an appropriate lens to address these threats. This course will provide an overview of landscape ecology and conservation biology principles as they pertain to amphibian ecology and life history. Students will gain an understanding of course topics through lecture, discussion of primary literature, as well as hands-on exercises and field excursions. Students will also obtain a foundational understanding of GIS technologies through lab exercises. There will be an emphasis on the salamander diversity of the Southern Appalachians and their habitats throughout the course.

Discussion Topics
Overview of amphibian ecology
Conservation and management of amphibians
Migration and dispersal patterns of amphibians
Spatially structured populations: metatpopulation and source-sink dynamics
Technology and landscape ecology
Habitat fragmentation
Habitat connectivity
Habitat configuration
Overview of landscape ecology
Spatial heterogeneity and scale
Applied environmental and conservation issues in landscape ecology

Instructional Material: PDFs of all discussion literature will be provided. Students should bring a laptop and be able to install new software/programs on it. Other gear and materials are listed below.

- High quality rain gear
- Hiking boots (Gore-Tex/waterproof preferred: it often rains in Highlands and we may be spending time in headwater streams)
- Field clothes
- Headlamp (weatherproof since we may be out in the rain)
- [SUGGESTED] Field notebook (Rite in the Rain: http://goo.gl/pCqmna)

A major focus of this course will be on the amphibian species (especially salamanders) around Highlands. A relatively inexpensive and relevant text is:

Dodd, C. K. 2004. The Amphibians of the Great Smoky Mountains National Park. The University of Tennessee Press, Knoxville, Tennessee, USA.

What to expect: The first days of class will be spent having discussions on the covered topics and literature, as well as a crash course in using geographic information systems. Students will be expected to have read all papers prior to class and to contribute to discussions. Field trips will occur most afternoons (unless a nighttime excursion is planned). When needed, students will be expected to do readings/lab exercises, in the afternoons/evenings. The instructor and/or TA will be available during these times. There is a lot to learn, see, and explore in a short period of time. We're going to make the most of our time and have fun doing it!

Course Schedule (subject to change depending upon weather and class interests):

27 June–Monday

0800–0830 Course registration, introduction and course organization
0830–0930 Student introductions
0930–1200 Lectures: Diversity and declines
Lunch
1330–1400 Organization of literature presentations, Install software
1400–1500 Intro to GPS
1500–1730 Field trip: Meet the mountains and salamanders
2000 – ??? DISCUSS: Grant et al. 2016, Scientific Reports; ***NIGHT WALK FOR SALAMANDERS***

28 June–Tuesday

0830–1000 Lecture: Life cycles
1030–1200 Lecture: Population dynamics and regulation
DISCUSS: Marsh & Trenham 2001, Conservation Biology
Lunch
1300–1430 Field: Practice with GPS
1430–1730 Lab I

29 June–Wednesday

0830–1000 Lecture: Altered climate and disturbance
1030–1200 Lecture: Introduction to Landscape Ecology
DISCUSS: Forman 1995, Landscape Ecology
Lunch
1330–1430 Land use history
DISCUSS: Yarnell 1998: A History of the Landscape
1430–1630 Lab II

30 June–Thursday

0830–1000 Lecture: Scale in Ecology
1030–1200 Lecture: Landscape connectivity
DISCUSS: Wiens 1989, Functional Ecology

Lunch
DISCUSS: Marsh & Beckman 2004, Ecological Applications
1330–1530 Lab III
1530 – 1830 Set up survey plots

1 July–Friday
DISCUSS: Zeller et al. 2012, Landscape Ecology
0830–1200 Set up survey plots, Daytime surveys
Lunch
1330–??? Lab IV; catch-up on labs
2000–??? Nighttime plot surveys

2 July –Saturday
Morning TRIP: *Urspelerpes* site
Student presentations and discussion
Afternoon Data entry & Lab catch-up

3 July –Sunday FREE (Potential for trip to see Hellbenders)

4 July –Monday
0830–1200 Guest Lecture: TBD
1330–1730 TRIP: Wayah Bald;
Student presentations and discussion

5 July –Tuesday
All Day TRIP: Great Smoky Mtns
Student presentations and discussion

6 July –Wednesday
1000–1200 Student presentations and discussion
1330–1730 Daytime plot surveys
2000–??? Nighttime plot surveys

7 July –Thursday
1000–1200 Data entry and analysis;
Exercise: HerpMapper
1730–??? Field trip to Coweeta Hydrologic Lab

8 July –Friday
0830–1200 Work on labs and final
1330–1600 Final Project Presentations
1800–??? Cook-out

Leading discussion of literature (25 points)
Everyone will be required to lead class discussion on a primary literature article. When doing so, you should clearly identify the objectives that the author(s) had in conducting their study, the main hypotheses that were addressed, the methods used to answer their questions, the focal study system / organism(s), and the major findings. Since everyone will have read the paper with the same questions in mind, we should be able to have a lively and fun discussion about each paper!

Labs (20 points each)
There will be four GIS-based labs. To facilitate access and future use of GIS, we will be using QGIS

Final Project (75 points total: 50 for written summary; 25 for presentation)
There will be a final GIS-based project that will require you to synthesize and apply the skills learned during lab exercises.

Participation (20 points)
We are a small group, and we want to hear everyone's thoughts, opinions, and perspectives. Active participation and contribution to all discussions is expected. All questions are good; ask frequently and openly!

Grading (200 points possible)

A	93–100	B–	80–82.9	D+	67–69.9
A-	90–92.9	C+	77–79.9	D	60–66.9
B+	87–89.9	C	73–76.9	E	<60
B	83–86.9	C–	70–72.9		