**WFS 433/533**  
**Amphibian Ecology and Conservation**  
**Spring 2009**

**Instructors:**  
Dr. Matthew Gray (*mgray11@utk.edu*)  
Dr. Jason Hoverman (*jhoverma@utk.edu*)

**Graduate Assistant:**  
Nathan Haislip (*nhaislip@utk.edu*)

**Phone:**  
974-2740 (MG), 974-0831 (JT), 974-3897 (NH)

**Office:**  
247 Ellington PSB (MG), 230 Ellington PSB (JT), 201 Ellington PSB (NH)

**Website:**  
[http://fwf.ag.utk.edu/mgray/wfs493/493home.htm](http://fwf.ag.utk.edu/mgray/wfs493/493home.htm)

**Meeting Time & Place:**  
T, Th 5:05–7:05 p.m., 113 PBB (2 field trips required: see page 3)

**Course Credits:**  
3 credits

**Required Text:**  
The Ecology and Behavior of Amphibians, 2007 (ISBN 9780226893341)

**Author:**  
Kentwood D. Wells

**Journal Papers:**  
Occasionally journal papers will be assigned instead of or to supplement the required text. Papers will be provided in class or on the course website.

**Course Goal:**  
To expose students to the life history, diversity, ecology, conservation, and management of amphibians through a combination of lectures, readings, class discussions, labs, and field experiences.

**Expected Outcomes:**  
Students that successfully complete WFS 433/533 will have a basic understanding of amphibian identification (larvae and adults), anatomy, life history, and ecology. They will be aware of potential mechanisms of amphibian declines, and understand how to identify, collect and ship diseased amphibians to a diagnostic lab. Students will understand how to sample amphibian populations and be aware of conservation strategies.

**Weights of Academic Assessments:**

<table>
<thead>
<tr>
<th></th>
<th>WFS 433</th>
<th>WFS 533</th>
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<tbody>
<tr>
<td>● Test #1</td>
<td>30%</td>
<td>25%</td>
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<tr>
<td>● Test #2</td>
<td>30%</td>
<td>25%</td>
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<tr>
<td>● Amphibian ID Exam</td>
<td>20%</td>
<td>20%</td>
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<tr>
<td>● Mini-Presentation(^1)</td>
<td>10%</td>
<td>20%</td>
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<tr>
<td>● Participation(^3,4)</td>
<td>10%</td>
<td>10%</td>
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\(^1\)Mini-presentations will be 12-17 minute persuasive presentations attempting to convince the audience of a specific cause for amphibian declines. The class will vote on the top 3 presentations, and the winners will receive a gift certificate to Gander Mountain. Additional details are on page 4.

\(^2\)Graduate student lectures will be 50-60 minute presentations on an amphibian topic approved by Drs. Gray and Hoverman. Topics must be approved by 3 February.

\(^3\)Participation includes attendance on the 2 field trips. You will earn 5% for attending each field trip.

\(^4\)If you miss a field trip, you can either: (1) attend the SEPARC meeting, (2) write a 10-page scientific paper on an amphibian topic of your choice, or (3) accept a 5% deduction in your final grade.
Your course grade will be determined using the following scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Final Weighted Percent</th>
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<tbody>
<tr>
<td>A</td>
<td>90–100%</td>
<td>C</td>
<td>70–76%</td>
</tr>
<tr>
<td>B+</td>
<td>87–89%</td>
<td>D</td>
<td>60–69%</td>
</tr>
<tr>
<td>B</td>
<td>80–86%</td>
<td>F</td>
<td>&lt;60%</td>
</tr>
<tr>
<td>C+</td>
<td>77–79%</td>
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**Extra Credit:**

You can positively influence your final grade as much as **4.5%** by volunteering for extra credit. Volunteer work must be related to herpetofauna, and can include work on university projects or with government agencies or NGOs. For every **8 hours** of volunteer work, your final grade will be increased by **1.5%** up to **4.5%** (24 hours total). All volunteering must be completed by **28 April 2009**. A volunteer form (see website) must be filled out by the supervising individual. Scott Dykes and Pete Wyatt (TWRA non-game biologists) often are looking for volunteer assistance (Region 4 Office: 1-800-332-0900; scott.dykes@state.tn.us, pete.wyatt@state.tn.us). Also, Wayne Schacher (consulting biologist for Seven Islands Wildlife Refuge) frequently needs help with herptofaunal surveys (457-4355 home, whschacher@natreserv.com). Nathan Haislip (TA for WFS 433/533) will need assistance collecting tadpoles from farm ponds in January and April.

Extra credit also can be earned by attending the Annual Meeting of the Southeast Partners in Amphibian and Reptile Conservation: [http://www.separc.org/](http://www.separc.org/). The meeting is 19 – 22 February in Montreat, North Carolina. Your final grade will be increased by **3.5%** for attending the entire meeting. Transportation will be provided. If interested, you need to sign up by **22 January** and register by **3 February** if you are planning to travel with Drs. Gray and Hoverman.

**NOTE:** A maximum of **4.5%** can be earned in extra credit in WFS 433/533.

**Scientific Paper:** (Make-up for Missed Field Trip) **DUE: 4/28/09 or before**

Choose an amphibian topic of interest (related or unrelated to a lecture topic) and write a >10-page paper. The title page and literature cited are not included in the length requirement, and over ½ of the 10th page must have text. The paper must be written scientifically and include ≥5 non-Internet references (e.g., journal article, book chapter). The style of headings, in-text referencing, and the literature cited format must follow the *Journal of Wildlife Management* (Volume 70[1]:304-320). Your paper must be double-spaced using 10- or 12-pt Times New Roman font with 1” margins.

**ADA Accommodation:**

Any student who, because of a disability, may require special arrangements in order to meet course requirements should contact the instructor as soon as possible to make such accommodations as may be necessary.

**Religious Holy Day Observance:**

A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence IF, not later than the FIFTEENTH day after the first day of the semester (i.e., 01/23/09), the student has notified the instructor of each scheduled class that the student would be absent for a religious holy day.
## Tentative Schedule: WFS 433/533

<table>
<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Topics 1,2</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>8</td>
<td>Introduction</td>
<td>Gray</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Tennessee Anuran ID</td>
<td>Gray</td>
</tr>
</tbody>
</table>
|           | 15  | Tennessee Anuran ID  
Tadpole ID | Gray  
Haislip |
|           | 20  | Tennessee Salamander ID | Niemiller (UT)     |
|           | 22  | Diversity and Evolution of Amphibia | Hoverman |
|           | 27  | Diversity and Evolution of Amphibia  
Practice ID Exam | Hoverman  
Gray |
|           | 29  | ID Exam | Gray |
| February  | 3   | Amphibian Declines | Gray |
|           | 5   | Reproductive Strategies | Echternacht (UT)  |
|           | 6   | TAMP Workshop (12-4:30 pm):  
*Not Required (156/157 PBB)* | Bob and Pandy  
English (TWRA) |
|           | 10  | Courtship and Mating | Gray |
|           | 12  | Courtship and Mating | Gray |
|           | 17  | Tadpole Ecology and Metamorphosis | Gray |
|           | 19  | SEPARC Meeting: Montreat, NC  
(leave at 2:00 pm) | No class (attend meeting if possible) 3 |
|           | 24  | Test #1 |                                    |
|           | 26  | Review Test #1  
Amphibian Dissection Lab (meet until 7:30 pm) | Gray  
Hoverman, Haislip |
| March     | 3   | Phenotypic Plasticity | Hoverman |
|           | 5   | Community Ecology | Hoverman, Haislip |
|           | 10  | Amphibian Sampling Techniques  
Disease Sampling Techniques | Gray  
Haislip |
|           | 12  | Field Trip  
(Seven Islands Wildlife Refuge: leave at 4:45 pm) | Gray, Hoverman, Haislip |
|           | 17,19 | Spring Break |                                    |
|           | 24  | JARTU Lab (meet at lab, 5:05 pm) | Hoverman, Haislip |
|           | 26  | WFS 533 Lecture | Grad Student #1  
Grad Student #2 |
|           | 31  | Mini-Presentations #1 | 6 Undergraduates |
| April     | 2   | Mini-Presentations #2 | 6 Undergraduates |
|           | 7   | Mini-Presentations #3 | 5 Undergraduates |
|           | 9   | Amphibian Declines Debate & Vote  
WFS 533 Lecture | Class  
Grad Student #3 |
|           | 14  | Bd and *Ranavirus* | Gray |
|           | 16  | Amphibian Diseases and Pathology Lab  
(meet until 7:30 pm) | Miller (UGA) |
|           | 18  | Great Smoky Mountains Field Trip  
(leave at 8:00 am) | Gray, Miller, Others |
|           | 21  | Conservation Strategies | Gray |
|           | 23  | Test #2 2 |                                    |

1 No class on 19 February (SEPARC Meeting). Interested students can attend (19-22 Feb) and earn 3.5% extra credit.
2 Alternatively, students can take Test #2 during the scheduled final exam time (28 April, 7:15 – 9:15 pm). There will be no comprehensive final exam.
Mini-Presentation Topics  
Amphibian Ecology and Conservation  
Spring 2009

(1) Global warming  
(2) Ozone depletion and UV-B radiation  
(3) Acid rain  
(4) Silviculture  
(5) Fragmentation  
(6) Roads  
(7) Exploitation  
(8) Introduced predators  
(9) Introduced competitors  
(10) Cattle  
(11) Agricultural fertilizers  
(12) Pesticides  
(13) Endocrine disruption  
(14) *Batrachochytrium dendrobatidis* (chytrid fungus)  
(15) *Saprolegnia*  
(16) *Ranavirus*  
(17) *Ribeiroia*  
(18) No Effect – Natural Population Cycles

**Randomization:** Students will be randomly assigned to one of the above possible factors. The order of presentation will occur as listed above.

**Debate and Awards:** An open forum debate will occur on 9 April where students can voice their opinion once more for why their factor is the primary cause of amphibian declines or alternatively that declines are merely a consequence of natural fluctuations (#18). The discussion will be facilitated by Drs. Gray and Hoverman. After 45 minutes, a confidential vote will be taken for the most convincing arguments. Students cannot vote for their own presentation. Votes will be tallied and gift certificates to Gander Mountain for $100, $50 and $25 will be awarded to 1st, 2nd, and 3rd places. If there is a tie, a revote will occur between the tied factors only. In the event of a second tie, Dr. Gray, Dr. Hoverman, and Nathan will vote.

**Other Activities**

(1) Egg masses will be collected from the field or from captive amphibians and brought to class each week to observe development.

(2) Live and preserved specimens will be brought into class to illustrate differences in species or certain adaptations.

(3) Students will learn basic anatomy of larval and adult amphibians during a dissection lab.

(4) During the field trip to SIWR, students will collect tadpoles and in a follow-up lab at the JARTU facility expose tadpoles to a pathogen. Thereafter, students will necropsy diseased and healthy tadpoles for comparison.

(5) During the field trip to the GSMNP, students will have an opportunity to assist in capturing salamanders and collecting tissues for *Ranavirus* surveillance.