Adirondack Intensive Seminar – Ecological History of the Adirondacks

Dr. Bill Pfitsch
Office Hours TBD and by appointment
Email: wpfitsch@hamilton.edu

• Class meets promptly in the dining room of The Main House, unless otherwise specified

• All assigned electronic course material will be available via Blackboard, provided as a link below on the Course Calendar, or else its location will be discussed in class.

✓ All assigned material that can be purchased can be found on Amazon or the like. You may also purchase/order books through Lake Placid’s local bookstore, The Bookstore Plus (518-523-2950). In addition, a hard copy of these readings will be available for your shared use in the reference library on site in The Main House of The Mountain House.

✓ Required Books to purchase:

Course Description— Mountains are places where natural and human influences on the composition of ecological communities are particularly strong. This place-based course will focus on the natural and human history of the Adirondack forest landscape. We will study ecological concepts and historical literature and explore local ecological systems to relate what we find today to changes since the last glaciation, since European colonization, and to potential changes in the future. Students will apply mapping skills and forest and stream sampling techniques to investigate the consequences of historical resource and land use practices for existing ecological communities. Insights gained will inform in-depth consideration of critical conservation issues that will shape the Adirondack landscape in the future.

Course Objectives— My objective is to provide a learning environment that will enable students to:

• Become skilled observers of forest and stream ecological communities
• Apply skills and work with peers to investigate the influence of natural and human history on an Adirondack landscape.
• Become conversant in key conservation issues that will shape the Adirondacks in the future
• Become an expert in one such area
• Develop skill in written and oral communication of scientific understanding
Overview of the Semester

**Weeks 1 to 3 (8/25 to 9/15)**— Develop understanding of Adirondack forest and stream ecology and the skills to qualitatively interpret landscape history and quantitatively sample forest and stream ecological communities.

**Week 4 (8/25 to 9/15)**— Overview the history and diversity of human interactions with Adirondack forest systems and generate group proposals for independent investigation.

**Weeks 5 to 7 (9/25 to 10/11)**— Put ecological sampling skills into practice to conduct independent group investigation of human historical interactions with Adirondack forests culminating in oral presentations.

**Weeks 8 to 15 (10/16 to 12/15)**— Consider critical Adirondack conservation issues with student lead discussions of scientific literature and presentations by invited researchers.

Detailed Course Schedule by week—

**Week 1.** Mountain ecology. Learning to “read” the landscape to infer the historical events that contribute to it being the way it is.  
Field: Local tree identification; Forest “forensics” and community sampling.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/24/17</td>
<td>R</td>
<td>Course Introduction / Tree ID @ Mountain House</td>
</tr>
<tr>
<td>8/28/17</td>
<td>M</td>
<td>Mountain Ecology</td>
</tr>
<tr>
<td>8/30/17</td>
<td>W</td>
<td>Forest “Forensics” and Sampling Hurricane Mountain</td>
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</tbody>
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Readings:
- Ketchledge pp 45-153 (Key to Adirondack Trees)
- Wessels – Forest Forensics
- Ketchledge pp 11-43 (overview ADK forests); Jackson 1988 pp 1-4;
- Atlas 1,2, 2.1-2.3, McLelland & Selleck (geology); Storey Ch 1 & 2 (background ecology)

**Week 2.** Primary ecological succession following glaciation; Paleoecology – ADK vegetation changes over post-glacial timeframe; develop mapping skills  
Field: practice vegetation sampling in a diversity of Adirondack forest communities – experience bog coring.

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<tr>
<th>Date</th>
<th>Day</th>
<th>Topic</th>
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<tbody>
<tr>
<td>9/1/17</td>
<td>F</td>
<td>Day long Field Trip to Paul Smiths - wetlands and uplands walk – upland forest sampling in a.m.; bog core p.m.</td>
</tr>
<tr>
<td>9/4/17</td>
<td>M</td>
<td>Post Pleistocene Adirondacks - primary succession, colonization, and climate change.</td>
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<tr>
<td>9/6/17</td>
<td>W</td>
<td>Mapping procedures</td>
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</tbody>
</table>
Readings:
- Primary Succession:
  - Gurevitch et al. Ch 13;
  - Schowalter Ch 10, pp 286-302
- Paleo record:
  - McMartin pp 6-14 (overview ADK forests - Holocene changes);
  - Jackson 1988 (chronology of tree colonization pp 20-21); (chronology of vegetation patterns and elevation pp 22-26).
  - Stager 2017: Hidden Heritage
- Canham – Upland Forests

Assignments:
- Pre-class assignment for Wednesday – Become familiar with ArcGIS program - handout
- Summarize Paul Smiths forest sampling data. Brief informative essay reflecting on the field trip – due Wednesday 9/6.
- Mapping practice – Create a map on which you locate the trails taken and places where you made observations on a map to accompany your essay. Due Wednesday 9/13.
- CONSERVATION ASSIGNMENT starting with Canham reading – Due Monday 10/16 - independently identify and create an annotated list of 10 literature sources on one of three Adirondack conservation topics: Invasive species; Acid and mercury affected systems; Climate change. Establish Expert Groups.

Week 3. Overview of aquatic system ecology -Lab: Learn some stream invertebrates and how to characterize freshwater stream communities and food webs. Field – stream sampling

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<tr>
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<th>Activity</th>
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<tbody>
<tr>
<td>9/11/17</td>
<td>M</td>
<td>Aquatic ecology - food webs</td>
</tr>
<tr>
<td>9/13/17</td>
<td>W</td>
<td>Stream Ecology environmental impacts - Adirondacks</td>
</tr>
<tr>
<td>9/15/17</td>
<td>F</td>
<td>Stream benthic sampling - Mtn House</td>
</tr>
</tbody>
</table>

Readings:
- Textbook stream ecology readings:
  - Insect Ecology Ch 9: pp 261-282
  - McCafferty 1981. Ch 2 “Identifying Aquatic Insects” and Ch 3 “Living in Water”
  - Cummins, K.W., and Merritt, R.W. 1984
- Mulholland et al. 1992 Adirondack stream ecology

Assignment:
- Lab: Summarize the class data from the stream sampling exercise. Figure or table and written description. Due Friday 9/22.

Week 4. Class: Time course and diversity of human use of Adirondack landscapes, and the processes involved in community change after disturbance. Form groups to investigate historical effects of land use practices.
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<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Topic</th>
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<tbody>
<tr>
<td>9/18/17</td>
<td>M</td>
<td>Post European Contact - ADK forest history</td>
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<tr>
<td>9/20/17</td>
<td>W</td>
<td>History of Tanning, Mining, Logging, Fire, Agriculture</td>
</tr>
<tr>
<td>9/22/17</td>
<td>F</td>
<td>Forest Forensics of selected independent group field site</td>
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</tbody>
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Readings:
- Forest History Overview:
  - Atlas Chs 5 & 6
  - McMartin Chs IV - VII
- Beaver:
  - McMartin pages 43 & 53
  - Atlas 4.5

Assignment:
- Form groups to select areas for Forest History field projects;
- Group report on Forest Forensics and a proposal that describes sampling objectives and procedures and has a map of planned sample locations – Group proposals due on Monday 9/25 – approved by Wednesday 9/27.

**Week 5. Field:** Group independent sampling. **Class:** Consideration of secondary succession – community and ecosystem. Focus on how ecologists describe and analyze community data.

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<tr>
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<tbody>
<tr>
<td>9/25/17</td>
<td>M</td>
<td>Upland secondary succession</td>
</tr>
<tr>
<td>9/27/17</td>
<td>W</td>
<td>Groups will meet with Pfitsch to discuss proposal</td>
</tr>
<tr>
<td>9/29/17</td>
<td>F</td>
<td>Group independent sampling</td>
</tr>
</tbody>
</table>

Readings:
- Secondary Succession: Gurevitch *et al.* Ch 13
- Schowalter Ch 10, pp 286-302
- Examples of forest community studies TBD.

**Week 6. Field:** Group independent sampling. **Class:** Dealing with ecological community data – summary statistics, diversity indexes, composition – ordination. Schedule flexible depending on weather.

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<th>Date</th>
<th>Day</th>
<th>Topic</th>
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<tbody>
<tr>
<td>10/2/17</td>
<td>M</td>
<td>Community ecology data analysis</td>
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<tr>
<td>10/4/17</td>
<td>W</td>
<td>Group independent sampling</td>
</tr>
<tr>
<td>10/6/17</td>
<td>F</td>
<td>Group independent sampling</td>
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</tbody>
</table>

Readings:
- Community data analysis: Schowalter Ch 9 pp 251-261
**Week 7.** Prepare and present results of group projects!

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<th>Date</th>
<th>Day</th>
<th>Task</th>
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<tr>
<td>10/9/17</td>
<td>M</td>
<td>Data analysis &amp; PowerPoint poster preparation</td>
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<tr>
<td>10/11/17</td>
<td>W</td>
<td>Group poster presentations (PowerPoint not print)</td>
</tr>
<tr>
<td>10/13/17</td>
<td>F</td>
<td>FALL BREAK</td>
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**Assignments:**
- Group oral presentation of results summarized in a PowerPoint Poster of investigation of forest / creek history.
- Individual reports on results of forest / creek history investigation due date 10/27. Can be written as a formal scientific report or an informative essay (e.g. Adirondack Life article)

**Weeks 8 & 9.** Expert Groups determine reading assignments on Conservation topics. First Topic: Effects of invasive organisms on Adirondack Ecology

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<tr>
<th>Date</th>
<th>Day</th>
<th>Task</th>
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<tbody>
<tr>
<td>10/16/17</td>
<td>M</td>
<td>Expert group discussions of literature exploration &amp; readings</td>
</tr>
<tr>
<td>10/18/17</td>
<td>W</td>
<td>ADK Invasive organisms background: Brendan Quirion TNC</td>
</tr>
<tr>
<td>10/23/17</td>
<td>M</td>
<td>Expert group led discussion of readings</td>
</tr>
<tr>
<td>10/25/17</td>
<td>W</td>
<td>Guest Investigator – Dr. Jeffrey Corbin, Union College</td>
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**Reading:**
- Wk. 8. Background reading: Brown Trout Ch.1.3.1 in Townsend *et al.*
- Wk 9. Corbin & D’Antonio & Discussion articles TBD assigned by Expert Group

**Assignments:**
- Monday 10/16: Due date for individual annotated reference lists on conservation issues.
- Friday 10/20: Group compiled annotated reference list for conservation discussion + suggestions for assigned readings.
- Friday 10/27: Due date for Forest History reports

**Week 10.** Future of the Adirondacks – Jerry Jenkins; plus the Ecology of Disease

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<tr>
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<th>Task</th>
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<tbody>
<tr>
<td>10/30/17</td>
<td>M</td>
<td>Discussion with Plenary Speaker – Jerry Jenkins</td>
</tr>
<tr>
<td>11/1/17</td>
<td>W</td>
<td>Ecology of disease: Beech Bark Disease case study – Danielle Garneau</td>
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</table>

**Readings:**
- Jenkins TBD
- Disease: Garneau *et al.* 2012
Assignments:
- **Sunday 10/29:** PRR on Jenkins reading;
- **PRR on Garneau et al.**

**Weeks 11 & 12. Effects of atmospheric pollution on Adirondack ecology**

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<tr>
<th>Date</th>
<th>Day</th>
<th>Activity</th>
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<tbody>
<tr>
<td>11/6/17</td>
<td>M</td>
<td>Atmospheric pollution in the Adirondacks – background ecology</td>
</tr>
<tr>
<td>11/10/17</td>
<td>F</td>
<td>More</td>
</tr>
<tr>
<td>11/13/17</td>
<td>M</td>
<td>Expert group led discussion of readings</td>
</tr>
<tr>
<td>11/15/17</td>
<td>W</td>
<td>Guest investigator – TBD</td>
</tr>
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Readings:
- Background reading: Driscoll *et al.* 2009
- Discussion articles reading assigned by Atmospherics Expert Group

Assignment:
- **Monday 11/13:** PRR on Expert Group assigned articles

11/18 to 26/17 | THANKSGIVING

**Weeks 13 & 14. Climate change and Adirondack ecology**

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<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>11/27/17</td>
<td>M</td>
<td>Climate change background ecology</td>
</tr>
<tr>
<td>11/29/17</td>
<td>W</td>
<td>More</td>
</tr>
<tr>
<td>12/4/17</td>
<td>M</td>
<td>Expert group led discussion of readings</td>
</tr>
<tr>
<td>12/6 or 8</td>
<td>W/F</td>
<td>Guest investigator – Dr. Curt Stager, Paul Smith’s College</td>
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Reading:
- Discussion articles reading assigned by Expert Group

Assignment:
- **Monday 12/4:** PRR on Expert Group assigned articles.

**Week 15.** A culminating capstone discussion on the past and future of the Adirondack landscape

Assignment:
- Collaboratively written Executive Summaries due at the end of the course
Course objectives and College goals:

Hamilton College challenges students to foster the development of eight educational goals throughout their time on the Hill (see: https://www.hamilton.edu/educational-goals-and-curriculum). Below is a description of how this course promotes many of these goals.

**Intellectual Curiosity and Flexibility** — You will have opportunities to delve into topics that especially interest you in this course by exploring Adirondack landscapes and the scientific literature, and by developing expertise about a particular land-use and conservation issue.

**Analytic Discernment** — Much of this course (lecture & lab) will focus on collecting and analyzing data, information, patterns, connections, ideas.

**Aesthetic Discernment** — The physical beauty of organisms is what attracts many people to the study of biology and what motivates many people’s desire to conserve or preserve nature. This course will provide countless opportunities to encounter that beauty. Aesthetics go beyond appreciation of physical beauty to include appreciation of the aesthetics of how natural systems function in relationship to the physical environment, or how scientists function as they design studies to explore those relationships.

**Disciplinary Practice** — In this course you will engage, practice, and become proficient in methods commonly used in biology ecology, and environmental studies.

**Creativity** — Science is a creative process! Major breakthroughs have occurred in science because scientists have linked ideas across disciplinary boundaries or developed original approaches and interpretations.

**Communication and Expression** — Science can be complicated - writing and speaking with clarity is paramount to communicating your ideas. In a small class, there is an expectation that everyone will regularly contribute to discussion. There will be a variety of opportunities for informal and formal oral presentations.

**Understanding of Cultural Diversity** — In this course we will focus on (at least) one aspect of the relationships among human cultural diversity and the diversity of natural systems: Humans have interacted with natural systems in the Adirondacks since the glaciers retreated from these landscapes more than 10,000 years ago. That relationship was profoundly altered about 500 years ago when Europeans engaged with the Native Americans. We will explore at least one aspect of that cultural interaction – the implications of changes in large mammal harvests imposed by the Europeans.

Disabilities Support Statement

Hamilton College will make reasonable accommodations for students with properly documented disabilities. If you are eligible to receive an accommodation(s) and would like to make a formal request for this course, please discuss it with me within the first two weeks of the semester. You will need to provide Allen Harrison, Associate Dean of Students (Elihu Root House; Ext. 4021) with appropriate documentation of your disability.
Grading—

I assign grades to assignments on an A to F scale using percentage equivalents: A = 95%, B = 85%, etc. I use a continuous scale, so it is possible to get an A-/B+ = 90%. At the end of the semester I total the scores and assign course grades based on the final percentages. Under some circumstances, totals may be adjusted upwards, but not downwards.

A – level: Outstanding, essentially flawless presentation; thoughtful consideration of all aspects of the assignment.

B – level: Good work that considers all aspects of the assignment; some combination of the following distinguishes it from A-level: errors in presentation, superficial treatment or understanding, flaws in reasoning.

C – level: Adequate completion of the assignment; consistent errors in reasoning and presentation; superficial consideration of the problem, writing problems, lack of consideration of outside references.

Grade Distribution—

• Participation in class and field: 30%
• Lab exercises: 30%
  o Mapping of Paul Smith’s sample areas
  o Summary of stream sampling
  o Group research project
    ▪ Group proposal
    ▪ Group map project
    ▪ Group class presentation
    ▪ Individual reports
• Expert group: 30%
  o Literature assignment
  o Leading discussion of papers from literature
  o Executive summary – written report (individual or group written?)
  o Executive summary – capstone discussion
• PRRs n = 5; 10%
## A list of assignments by week—

<table>
<thead>
<tr>
<th>Week</th>
<th>Assignments</th>
</tr>
</thead>
</table>
| 2    | • Pre-class assignment for Wednesday – Become familiar with ArcGIS program - handout  
     • Summarize Paul Smiths forest sampling data. Brief informative essay reflecting on the field trip – due Wednesday 9/6.  
     • Mapping practice – Create a map on which you locate the trails taken and places where you made observations on a map to accompany your essay. Due Wednesday 9/13.  
     • CONSERVATION ASSIGNMENT starting with Canham reading – Due Monday 10/16 - independently identify and create an annotated list of 10 literature sources on one of three Adirondack conservation topics: Invasive species; Acid and mercury affected systems; Climate change. Establish Expert Groups. |
| 3    | • Lab: Summarize the class data from the stream sampling exercise. Figure or table and written description. Due Friday 9/22. |
| 4    | • Form groups to select areas for Forest History field projects;  
     • Group report on Forest Forensics and a proposal that describes sampling objectives and procedures and has a map of planned sample locations – Group proposals due on Monday 9/25 – approved by Wednesday 9/27. |
| 7    | • Group oral presentation of results summarized in a PowerPoint Poster of investigation of forest / creek history.  
     • Individual reports on results of forest / creek history investigation due date 10/27. Can be written as a formal scientific report or an informative essay (e.g. Adirondack Life article) |
| 8    | • Monday 10/16: Due date for individual annotated reference lists on conservation issues.  
     • Wednesday 10/18 – Invasive Expert Group Reading Assignment for Monday 23 Oct. discussion.  
     • Friday 10/20: Group compiled annotated reference list for conservation discussion + suggestions for assigned readings. |
| 9    | • Monday 10/23: Personal Reflection and Response (PRR) on Expert Group assigned articles.  
     • Friday 10/27: Due date for Forest History reports |
| 10   | • Sunday 10/29: PRR on Jenkins reading;  
     • PRR on Garneau et al. |
| 12   | ⇒ Monday 11/13: PRR on Atmospheric pollution articles |
| 14   | ⇒ Monday 12/4: PRR on Climate change articles |
| 15   | • Collaboratively written Executive Summaries due at the end of the course |

⇒ Expert Groups lead class discussion of their assigned articles
Formal references of source readings listed in detailed schedule, as well as some other relevant articles.

**Week 1 – Adirondack Mountain Ecology**


**Week 2 – Primary succession; paleo record**


**Week 3 – Stream Ecology**


**Week 4 - Beaver References**


**Week 5, 6, & 7– Forest Community Case Studies**


**Weeks 8 & 9 – Non-native organisms in Adirondack Systems**


**Week 10 – Ecology of Disease**


**Weeks 11 & 12 Effects of atmospheric pollution in Adirondack Systems**


**Weeks 13 & 14 Effects of global change on Adirondack Systems**

