

## Syllabus and Course Information

Community Ecology (Bio 419) – Spring 2017

**Instructor:** Dr. Jonathan Myers, Assistant Professor

jamyers@wustl.edu, 314-935-3167, McDonnell 409

Help sessions: By appointment

Laboratory website: myersecolgylab.com

Biology faculty page: wubio.wustl.edu/myers

**Teaching Assistant:** Chris Catano, PhD Student

chcatano@gmail.com, 314-935-8396, McDonnell 418

Help sessions: Monday 1:00–2:00 p.m., or by appointment

Research website: <http://chcatano.wix.com/ecology>



MacArthur's Warblers  
(Artist: Deborah Kaspari)

### Course Description:

Community ecology is an interdisciplinary field that bridges concepts in biodiversity science, biogeography, evolution and conservation. This course provides an introduction to the study of pattern and process in ecological communities with an emphasis on theoretical, experimental and quantitative approaches. Topics include: ecological and evolutionary processes that create, maintain or modify patterns of biodiversity; biodiversity and ecosystem function; island biogeography; metacommunity dynamics; niche and neutral theory; species interactions (competition, predation, food webs) and species coexistence; and effects of human-mediated environmental change (climate change, habitat alteration, invasive species) on biodiversity. The class format includes lectures, discussions, and hands-on simulations using the R language for statistical computing and graphics.

### Prerequisites:

Principles of Biology II (Bio 2970) required, Introduction to Ecology (Bio 381) recommended, or permission of instructor.

### After completing this course you should be able to:

- 1) **Explain** and **evaluate** the four fundamental ("high-level") processes of community ecology, how ecologists study them empirically, and why these processes are important for conservation and environmental sustainability.
- 2) **Summarize**, **evaluate**, **explain** and **discuss** primary literature in community ecology and **reflect** on its scientific impact.
- 3) **Appreciate** uncertainty in the field of community ecology.

### Class meeting times & locations:

- Monday (Lecture): 2:30–4:00 p.m., McDonnell 361
- Wednesday (Discussion): 2:30–4:00 p.m., McDonnell 361 & 362

### Textbook (required):

Mittelbach, Gary G. 2012. *Community Ecology*. Sinauer Associates, Sunderland, MA.

### **Blackboard course website:**

The course website will be on Blackboard ([bb.wustl.edu](http://bb.wustl.edu)). The website will contain the current course schedule, assignments, class meeting slides, an online grade book, reading material, and important course announcements. Unless instructed otherwise, you will upload all assignments to Blackboard. You should check the course website on a regular basis, and to help stay up-to-date on the course, we recommend setting the option to receive an email when we post announcements. You can access help for Blackboard by clicking on “Help” at [bb.wustl.edu](http://bb.wustl.edu) or by contacting WU Student Technology Services ([sts.wustl.edu](http://sts.wustl.edu)).

### **Course schedule, reading assignments, and assignments:**

The course schedule, readings, and assignments will be posted on Blackboard.

### **Assessment:**

The grade you earn in this course will be based on the following components:

|                  |  |
|------------------|--|
| 400 points       | Take-home exams – 2 exams (40% of final grade)               |
|                  | • 200 points Take-home exam 1 (20%)                          |
|                  | • 200 points Take-home exam 2 (20%)                          |
| 250 points       | Discussion preparation & participation (25%)                 |
|                  | • 100 points Discussion Question Journal – 10 total (10%)    |
|                  | • 150 points In-class participation (15%)                    |
| 200 points       | In-class presentation (20%)                                  |
| 100 points       | Mini-quizzes on pre-lecture readings – 10 total (10%)        |
| <u>50 points</u> | <u>Attendance and in-class participation in lecture (5%)</u> |
| 1000 points      | Total  |

The following scale will be used to assign final course grades. If you are taking this course Credit/No Credit, you must receive a C+ or better to receive credit.

|    |         |    |        |    |        |    |        |   |       |
|----|---------|----|--------|----|--------|----|--------|---|-------|
| A+ | 97-100% | B+ | 87-89% | C+ | 77-79% | D+ | 67-69% | F | 0-59% |
| A  | 93-96%  | B  | 83-86% | C  | 73-76% | D  | 63-66% |   |       |
| A- | 90-92%  | B- | 80-82% | C- | 70-72% | D- | 60-62% |   |       |

### **Take-home exams:**

The goal of the take-home exams is to demonstrate your ability to *explain, evaluate* and *synthesize* fundamental concepts, observations, and approaches in community ecology. The exams will integrate reading assignments, lecture material, and primary literature from discussions. You must work independently on the exam and cannot discuss this exam with anyone. You will have 1.5 weeks to complete each exam. There is no final exam.

**Exam re-grading policy:** Every attempt will be made to grade fairly, consistently, and accurately. If you disagree with the way your answer on your individual exam was graded, you may submit a written request for a re-grade within 72 hours of receipt of your graded exam. We will examine re-grade requests at the end of the semester if your grade is borderline, at which point we reserve the right to re-grade the entire exam.

## **Discussion preparation & participation:**

The goal of the discussions is to provide you with the opportunity to: develop skills in reading primary literature; **summarize** and critically **evaluate** concepts and data; **explain, discuss** and **reflect** on how these research papers link to the broader conceptual framework of the course; and **appreciate** uncertainty in the field of community ecology.

**Guidelines & tips for preparing for discussions:** The instructors will provide guidelines and tips on how to read, evaluate, interpret, and discuss primary literature. Some useful questions to consider while reading the paper(s) and preparing for discussions include:

- 1. Reflect** on the key ideas from lecture and previous discussions:
  - a) What key idea(s) emerged from lecture and the previous discussion that you found particularly interesting?
  - b) How do the concepts in the paper(s) for this week connect to concepts from one or two relevant prior papers and/or lectures?
- 2. Summarize** the key questions and results and practice **explaining** them to yourself:
  - c) What is the main question the researchers are hoping to address with their study?
  - d) What is/are the main hypothesis(es) they provide regarding this question?
  - e) What predictions do they make regarding these hypotheses, specific to their study?
  - f) What evidence do they provide to support or refute the hypotheses?
  - g) How has the paper helped to resolve (or fuel) controversial topics?
  - h) How might remaining disagreements, empirical gaps, or theoretical gaps be resolved through additional experiments, observations, or other approaches?
  - i) What surprised, confused, or struck you most about the paper?

**Discussion preparation & participation grades:** Your grade for the discussions will be based on two assessments:

### **1. Discussion Question Journal:**

Writing about the discussion paper(s) encourages you to think about and engage with the text in deeper and more meaningful ways. To that end, the goals of the Discussion Question Journal are to: a) help you prepare for and participate in discussion; b) assess your ability to **summarize**, **explain**, and **reflect** on primary literature; c) "prime" the class for a fun and productive discussion; and d) provide current and future graduate students with a study resource to help prepare for qualifying exams in graduate school. Your journal will consist of a single document that includes entries for each discussion (10 total entries), with the journal entries ordered from newest (first page) to oldest (last page). Each entry will include short answers to 2–4 questions provided in advance by the instructors, and 3 questions that you provide for group discussion. Here are some tips for writing good discussion questions:

- a) Think about questions you would like to discuss while reading the paper(s).
- b) Strive to avoid factual types of questions that will lead to short responses (e.g., how much species diversity is there in the microbiome?) and aim to ask about deeper questions or topics that will lead to back-and-forth discussion (e.g., what factors contribute to high species diversity in the microbiome?).
- c) Try to ask a series of connected questions, as these often lead to extended discussion.

- d) Whenever possible, bring in connections to past readings, themes, or topics.
- e) Use quotes from the text.

Prior to each discussion, the instructors will choose selected questions from your journals for discussion. If one of your questions is selected, you should be prepared to elaborate on it in the group discussion. The due date for uploading entries to your discussion question journal will be Tuesday at 11:59 p.m. We will provide an example journal entry for our first discussion.

## **2. In-class participation:**

Participation will be assessed based on your level of preparation and participation, including: knowledge of the assigned reading; contributions to small-group discussions; integration of the assigned reading with lecture material and previous discussions; clarity, creativity and logic of your questions and arguments; and the productiveness of the discussion. Your grade for each discussion will be based on a total of 4 contribution points (1 point for contributing to small-group discussions and 3 points for contributing to the whole-group discussion). To receive 3 contribution points for the whole-group discussion, you will need to make at least 3 **substantive** contributions to the whole-group discussion. A substantive contribution is one that: demonstrates in-depth understanding of the assigned reading; integrates the assigned reading with lecture material or previous discussions; demonstrates clarity, creativity and logic of the questions and arguments; and/or leads to productive discussion. Examples of non-substantive contributions include: agreeing or disagreeing with a contribution from a classmate without elaborating on your contribution; discussing peripheral or unrelated topics that move the discussion away from the main concepts relevant to the papers; and posing questions that require your peers to simply re-state facts from the paper.

## **In-class presentation:**

The goal of the in-class presentation is to demonstrate your ability to *evaluate* and *synthesize* primary literature on a topic of interest to you, *reflect* on how this topic links to broader conceptual frameworks in the field of community ecology, and *explain* this topic to your peers. As an audience member, the presentations will provide an opportunity for you to develop a deeper appreciation for the diversity of questions, approaches, and applications that motivate the careers and interests of real-world community ecologists.

**Topics:** Early in the semester, you will choose a prominent case study from the literature that provides empirical evidence for one or more of the "high-level" processes in community ecology: dispersal, ecological drift, selection & speciation. The case study may include experimental or observational studies of organisms in the field or lab. The instructors will provide examples of classic and contemporary case studies during the first two weeks of class. You may choose one of these case studies or another case study that you find exciting. The case study may be based on research conducted by a single prominent ecologist or multiple ecologists that have worked with the same organisms or ecosystems. The case study should: 1) provide a compelling example of one or more of the "high-level" processes; 2) provide an example from an ecological community comprised of two or more species (i.e., the case studies cannot come from studies of single-species populations); and 3) interest you. If you are conducting graduate or undergraduate thesis research, we encourage you to choose a case study directly related to your research and to view this presentation as an opportunity to help advance your research. As an alternative to selecting a single case study, graduate students will have the option to conduct a

quantitative meta-analysis on a larger number of empirical studies focused on one or more of the "high-level" processes. Each student must have their case study or meta-analysis pre-approved by Jonathan Myers.

After choosing your case study, you will conduct a literature search for at least 5 peer-reviewed papers focused on experimental or observational studies of the organisms or ecosystems of interest. These papers will form the basis for your presentation.

**Presentation grades:** Presentations should be 10 minutes in length, followed by 2 minutes for questions and answers, and formatted for an audience at a professional scientific conference such as the [Annual Meeting of the Ecological Society of America \(ESA\)](#). The last slide should contain an annotated bibliography of the selected papers; this slide will not be presented to the class, but will be evaluated by the instructors. On the day of your scheduled presentation, you will be required to 1) upload an electronic copy of your presentation to Blackboard by 12:00 p.m., and 2) bring 2 copies of a presentation handout (4 slides per page) for the course instructors to use for grading. Presentations will be evaluated on content over showmanship. Grades will be based on the quality of your literature synthesis, the conceptual integration of the empirical papers with one or more of the "high-level" processes, and the clarity of presentation. The instructors will provide a grading rubric prior to the presentations.

### **Attendance and in-class participation in lecture:**

We expect you to attend and actively participate in all class meetings by voicing your opinions and asking questions. You are responsible for all material covered in class whether or not you attend. If you anticipate that you must be absent from a class for a legitimate reason, please e-mail the instructors in advance.

### **Mini-quizzes on pre-lecture readings:**

The goals of the mini-quizzes are to 1) evaluate your understanding of key concepts from the pre-lecture reading assignments from the textbook or primary literature, and 2) foster in-depth discussion of key concepts during lecture and paper discussions.

### **Late work:**

To be fair to all students and to the instructors who are responsible for grading, **no late work** will be accepted after the item is due. You are required to keep copies of all work. We will not consider technology excuses. Please make sure to frequently back up your work to avoid losing data.

### **Academic integrity:**

The academic integrity policy of Washington University in St. Louis states: "Effective learning, teaching and research all depend upon the ability of members of the academic community to trust one another and to trust the integrity of work that is submitted for academic credit or conducted in the wider arena of scholarly research. Such an atmosphere of mutual trust fosters the free exchange of ideas and enables all members of the community to achieve their highest potential. In all academic work, the ideas and contributions of others must be appropriately acknowledged, and work that is presented as original must be, in fact, original. Faculty, students, and administrative staff all share the responsibility of ensuring the honesty and fairness of the intellectual environment at Washington University."

The complete policy and procedures are available at: [studentconduct.wustl.edu/integrity/policy](http://studentconduct.wustl.edu/integrity/policy). As a student at Washington University, it is your responsibility to become familiar with, understand, and abide by the standards outlined in this policy before performing any academic work. Ignorance of these policies is not a defense in cases of infringement.

Any person found using unauthorized assistance (including plagiarism, submitting work for more than one class without obtaining permission from all instructors, copying answers from another student's exam, or turning in group work to which you did not contribute) will be forwarded to the Committee for Student Academic Integrity. Students found guilty by the Committee will be given a grade of F for the course and be referred to the Dean for further action.

### **Laptops and cell phones:**

To help facilitate an interactive learning environment with minimal distractions, the use of laptops will not be allowed during Monday lectures. Laptops will be allowed for Wednesday discussions, and at least one of these classes will be devoted to hands-on computer simulations using the R language for statistical computing and graphics. During discussions, you may not use your laptop for activities unrelated to the discussion, including email, Facebook, or web browsing, as these activities are very distracting to the other students and the instructors. You may bring phones to class but the sound must be muted. You may not use your phone or text message during class. Doing so will reduce your participation grade.

### **Resources to help you succeed in this course:**

**Academic resources:** The Natural Sciences Learning Center (NSLC) ([nslc.wustl.edu](http://nslc.wustl.edu)) located in the Life Sciences building (near the greenhouse) has a computer lab and rooms available for study groups. Cornerstone offers free academic peer mentoring and training in learning skills ([cornerstone.wustl.edu](http://cornerstone.wustl.edu)).

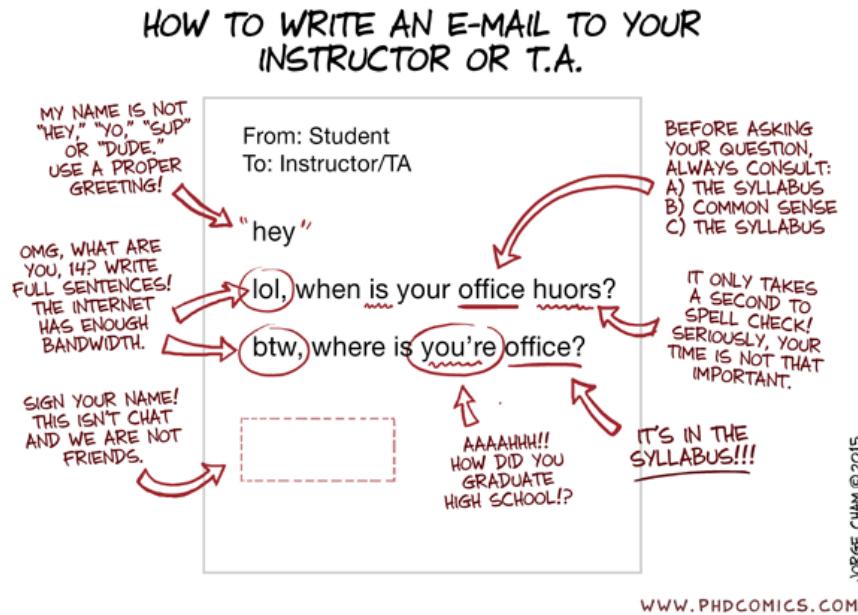
**Accommodations based upon sexual assault:** The University is committed to offering reasonable academic accommodations to students who are victims of sexual assault. Depending on the specific nature of the allegation, such measures may include but are not limited to: implementation of a no-contact order, course/classroom assignment changes, and other academic support services and accommodations. If you need to request such accommodations, please direct your request to Kim Webb ([kim\\_webb@wustl.edu](mailto:kim_webb@wustl.edu)), Director of the Relationship and Sexual Violence Prevention Center. Ms. Webb is a confidential resource; however, requests for accommodations will be shared with the appropriate University administration and faculty. The University will maintain as confidential any accommodations or protective measures provided to an individual student so long as it does not impair the ability to provide such measures.

**Bias Reporting:** The University has a process through which students, faculty, staff and community members who have experienced or witnessed incidents of bias, prejudice or discrimination against a student can report their experiences to the University's Bias Report and Support System (BRSS) team. See: [diversityinclusion.wustl.edu/brss/](http://diversityinclusion.wustl.edu/brss/)

**Mental Health:** Mental Health Services' professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect the academic

experience. These include conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety and depression. See: [shs.wustl.edu/MentalHealth](http://shs.wustl.edu/MentalHealth)

**Contacting us:** Please feel free to email, call us, or to stop by office hours. Please allow 48 hours for email responses and do not wait until the last minute (e.g., after 5:00 p.m. or a weekend) to contact us, as we may be unavailable to reply. When e-mailing us, please strive to use professional email etiquette. For example, use clear subject lines, use a salutation to open your email, sign off with your full name, and avoid using informal phrases or words such as "Hey" or textspeak.



### Want to learn more? Recommended books for further reading:

- Chase, Jonathan M. & Mathew A. Liebold. 2003. *Ecological Niches: Linking Classical and Contemporary Approaches*. University of Chicago Press, Chicago, IL.
- Gotelli, Nicholas J. 2008. *A Primer of Ecology*, 4th Ed. Sinauer Press, Sunderland, MA.
- Gotelli, Nicholas J. & Aaron M. Ellison. 2004. *A Primer of Ecological Statistics*. Sinauer Press, Sunderland, MA.
- Hubbell, Stephen. 2001. *The Unified Neutral Theory of Biodiversity and Biogeography*. Princeton University Press, Princeton, NJ.
- Levin, Simon A., Stephen R. Carpenter, H. Charles J. Godfray, Ann P. Kinzig, Michel Loreau, Jonathan B. Losos, Brian Walker & David S. Wilcove (eds). 2010. *The Princeton Guide to Ecology*. Princeton University Press, Princeton, NJ.
- Magurran, Anne E. & Brian J. McGill (eds). 2011. *Biological Diversity: Frontiers in Measurement and Assessment*. Oxford University Press, Oxford, U.K.
- Real, Leslie A. & James H. Brown (eds). 1991. *Foundations of Ecology: Classic Papers with Commentaries*. University of Chicago Press, Chicago, IL.
- Vellend, Mark. 2016. *The Theory of Ecological Communities*. Princeton University Press, Princeton, NJ.

**Course Schedule:** Community Ecology (Bio 419) – Spring 2017 (Updated Apr. 6, 2017)\*

\*Notes: The schedule, due dates, and reading assignments are subject to change

| Week | Day | Date      | Topic   |
|------|-----|-----------|---|
| 1    | Mon | 1/16      | No class – Martin Luther King Day   |
|      | Wed | 1/18      | <b>Lecture:</b> The causes and consequences of biodiversity in our changing world   |
| 2    | Mon | 1/23      | <b>Lecture:</b> The theory of ecological communities  |
|      |     |           | <b>Key concepts:</b> Dispersal; ecological drift; selection; speciation   |
|      | Wed | 1/25      | <b>Discussion:</b> Ricklefs 2008; Brooker <i>et al.</i> 2009; Ricklefs (2009)   |
| 3    | Mon | 1/30      | <b>Lecture:</b> Ecological drift & dispersal I  |
|      |     |           | <b>Key concepts:</b> The theory of island biogeography; species-area relationships (SARs)   |
|      | Wed | 2/1       | <b>Discussion:</b> Powell <i>et al.</i> 2013; Wagner <i>et al.</i> 2014   |
| 4    | Mon | 2/6       | <b>Lecture:</b> Ecological drift & dispersal II   |
|      |     |           | <b>Key concepts:</b> The unified neutral theory of biodiversity and biogeography  |
|      | Wed | 2/8       | <b>Discussion:</b> Siepielski <i>et al.</i> 2010; Tewksbury <i>et al.</i> 2002; Damschen <i>et al.</i> 2014   |
| 5    | Mon | 2/13      | <b>Lecture:</b> Selection in ecological communities I   |
|      |     |           | <b>Key concepts:</b> Niche theory; three fundamental forms of selection   |
|      | Wed | 2/15      | <b>R workshop:</b> Simulating community dynamics under ecological drift, dispersal & selection  |
| 6    | Mon | 2/20      | <b>Lecture:</b> Selection in ecological communities II  |
|      |     |           | <b>Key concepts:</b> Constant selection; negative frequency-dependent selection; Lotka-Volterra competition; R* theory  |
|      | Wed | 2/22      | <b>Discussion:</b> Byers 2000   |
| 7    | Mon | 2/27      | <b>Lecture:</b> Selection in ecological communities III   |
|      |     |           | <b>Key concepts:</b> Negative frequency-dependent selection; spatially variable selection; enemy-mediated coexistence; Janzen-Connell hypothesis                |
|      | Wed | 3/1       | <b>Discussion:</b> Connell 1980; Condon <i>et al.</i> 2014; Godfray 2014  |
| 8    | Mon | 3/6       | <b>Lecture:</b> Selection in ecological communities IV  |
|      |     |           | <b>Key concepts:</b> Temporally variable selection; stable coexistence theory; the storage effect   |
|      | Wed | 3/8       | <b>Discussion:</b> Adler <i>et al.</i> 2007, Levine & Hille Ris Lambers 2009  |
| 9    |     | 3/12–3/18 | No class – Spring Break   |
| 10   | Mon | 3/20      | <b>Lecture:</b> Dispersal, drift and selection in metacommunities   |
|      |     |           | <b>Key concepts:</b> Mass effects; neutral metacommunities; patch dynamics; species sorting   |
|      | Wed | 3/22      | <b>Discussion:</b> Clark 2009; Vellend <i>et al.</i> 2014   |
| 11   | Mon | 3/27      | <b>Lecture:</b> Biodiversity & ecosystem functioning  |
|      |     |           | <b>Key concepts:</b> Diversity-invasibility relationships; diversity-productivity relationships; niche-complementarity hypothesis; species-selection hypothesis |
|      | Wed | 3/29      | <b>Discussion:</b> Schnitzer <i>et al.</i> 2011; Zuppinger-Dingley <i>et al.</i> 2014; Tilman & Snell-Rood 2014   |
| 12   | Mon | 4/3       | <b>Lecture:</b> Speciation & species pools  |
|      |     |           | <b>Key concepts:</b> Species-pool hypothesis; latitudinal-diversity gradient  |
|      | Wed | 4/5       | <b>Discussion:</b> Price 2015; Rabosky & Hurlbert 2015; Harmon & Harrison 2015  |
| 13   | Mon | 4/10      | <b>Lecture:</b> Presentation workshop   |
|      | Wed | 4/12      | <b>Discussion:</b> Community ecology in the Anthropocene – Scheffers <i>et al.</i> 2016; Urban <i>et al.</i> 2016; Pecl <i>et al.</i> 2017                      |
| 14   | Mon | 4/17      | <b>Class presentations</b>  |
|      | Wed | 4/19      | <b>Class presentations</b>  |
| 15   | Mon | 4/24      | <b>Class presentations</b>  |
|      | Wed | 4/26      | <b>Class presentations</b>  |

**Assignments:** Community Ecology (Bio 419) – Spring 2017 (Updated Apr. 6, 2017)\***\*Notes:** All assignments must be uploaded to Blackboard by 11:59 p.m. on the due date

| <b>Week</b> | <b>Day</b> | <b>Date</b> | <b>Reading assignments</b>   | <b>Other assignments</b>           |
|-------------|------------|-------------|--|------------------------------------|
| 1           | Wed        | 1/18        |  |                                    |
| 2           | Mon        | 1/23        | Mittelbach Chapter 1; Vellend 2010   | Mini-quiz #1                       |
|             | Tue        | 1/24        |  | Journal entry #1                   |
|             | Wed        | 1/25        | Ricklefs 2008; Brooker <i>et al.</i> 2009; Ricklefs 2009                                     |                                    |
| 3           | Mon        | 1/30        | Hubbell 2001 Chapter 1; Mittelbach Chapter 2   | Mini-quiz #2                       |
|             | Tue        | 1/31        |  | Journal entry #2                   |
|             | Wed        | 2/1         | Powell <i>et al.</i> 2013; Wagner <i>et al.</i> 2014   |                                    |
| 4           | Mon        | 2/6         | Rosindell <i>et al.</i> 2011   | Mini-quiz #3;                      |
|             | Tue        | 2/7         |  | Journal entry #3                   |
|             | Wed        | 2/8         | Siepielski <i>et al.</i> 2010; Tewksbury <i>et al.</i> 2002; Damschen <i>et al.</i> 2014     |                                    |
| 5           | Mon        | 2/13        | Chase & Leibold 2001 Chapters 1 & 2  | Mini-quiz #4                       |
|             | Tue        | 2/14        |  |                                    |
|             | Wed        | 2/15        |  |                                    |
| 6           | Mon        | 2/20        | Mittelbach Chapters 7 & 8  | Mini-quiz #5                       |
|             | Tue        | 2/21        |  | Journal entry #4                   |
|             | Wed        | 2/22        | Byers 2000   | R Tutorial<br><i>Exam 1 posted</i> |
| 7           | Mon        | 2/27        | Terborgh 2015  | Mini-quiz #6                       |
|             | Tue        | 2/28        |  | Journal entry #5                   |
|             | Wed        | 3/1         | Connell 1980; Condon <i>et al.</i> 2014; Godfray 2014  |                                    |
|             | Fri        | 3/3         |  | <i>Exam 1 due</i>                  |
| 8           | Mon        | 3/6         | Mittelbach Chapter 14  | Mini-quiz #7                       |
|             | Tue        | 3/7         |  | Journal entry #6                   |
|             | Wed        | 3/8         | Adler <i>et al.</i> 2007, Levine & Hille Ris Lambers 2009                                    |                                    |
| 9           | 3/12–3/18  |             | <b>No class – Spring Break</b>   |                                    |
| 10          | Mon        | 3/20        | Mittelbach Chapter 13  | Mini-quiz #8                       |
|             | Tue        | 3/21        |  | Journal entry #7                   |
|             | Wed        | 3/22        | Clark 2009; Vellend <i>et al.</i> 2014   |                                    |
| 11          | Mon        | 3/27        | Mittelbach Chapter 3   | Mini-quiz #7                       |
|             | Tue        | 3/28        |  | Journal entry #8                   |
|             | Wed        | 3/29        | Schnitzer <i>et al.</i> 2011; Zuppinger-Dingley <i>et al.</i> 2014; Tilman & Snell-Rood 2014 |                                    |
| 12          | Mon        | 4/3         | Cornell 2013   | Mini-quiz #9                       |
|             | Tue        | 4/4         |  | Journal entry #9                   |
|             | Wed        | 4/5         | Price 2015; Rabosky & Hurlbert 2015; Harmon & Harrison 2015                                  |                                    |
| 13          | Mon        | 4/10        |  |                                    |
|             | Tue        | 4/11        |  | Journal entry #10                  |
|             | Wed        | 4/12        | Scheffers <i>et al.</i> 2016; Urban <i>et al.</i> 2016; Pecl <i>et al.</i> 2017              | <i>Exam 2 posted</i>               |
| 14          | Mon        | 4/17        |  | Class presentations                |
|             | Wed        | 4/19        |  | Class presentations                |
|             | Fri        | 4/21        |  | Exam 2 due                         |
| 15          | Mon        | 4/24        |  | Class presentations                |
|             | Wed        | 4/26        |  | Class presentations                |