

Fall 2022

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**FOR200**

## **CONSERVATION OF CANADA'S FORESTS**

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**CLASSROOM LOCATION:** HS 160  
**TUTORIAL LOCATIONS:** PB 255, MS3278, MS4279, WB219, HS106, HS108  
**CLASS HOURS** Mondays, 6-8pm  
**PROFESSORS:** Dr. Patrick James; Dr. Danijela Puric-Mladenovic  
**EMAIL:** [patrick.james@utoronto.ca](mailto:patrick.james@utoronto.ca)  
[d.puric@daniels.utoronto.ca](mailto:d.puric@daniels.utoronto.ca)  
**OFFICE HOURS:** Dr. James: Thursday 10-12; ES 4017  
Dr. Puric-Mladenovic: TBA; ES 2012

### **COURSE OVERVIEW**

The goal of this course is to introduce students to the fundamentals of forest ecology, conservation, and management with an emphasis on Canadian forests and forestry practices. The course is divided into two sections. In the first section (weeks 1-6; Dr. James), we will explore forest biology and ecology and explore content related to what constitutes a forest and the processes that create and maintain them. This section will include topics on tree physiology, ecosystem dynamics, the different forest regions of Canada and the trees that comprise them, biodiversity, disturbance, and landscape ecology.

The course's second part (weeks 7-12; Dr. Puric-Mladenovic) will focus on tools and approaches for forest conservation in Canada. This section will introduce forest conservation across different land ownership and land uses and provide an understanding of essential economic, ecological, and social aspects of forest conservation. We will also discuss policy, sustainable forest management, voluntary and stewardship approaches and tools used to conserve Canada's forests. We will also examine area-based forest conservation (e.g., parks and protected areas) and forest conservation from the perspective of species, forest patches, and larger management units. Students will also learn about the importance of species and genetic diversity to effective restoration and conservation.

### **COURSE OBJECTIVES**

By the end of this course, students will:

- Be familiar with basic concepts and theories of forest ecology
- Understand current issues in forest conservation
- Understand the different tools and approaches that exist to improve the conservation of Canada's forests
- Understand the challenges for effective forest conservation in the face of global change

## EVALUATION

Evaluation	Date	Weight
Weekly quizzes (10 @ 3.5% ea.)	Every Monday	35 %
Tree planting report	October 28	25 %
Final paper	December 9	35 %
Tutorial Participation	Weekly	5%

## COURSE CONTENT AND SCHEDULE

Topic	Week	Details	Readings
1	Sept. 12	Course introduction. Current issues (global) in forest conservation. Canada's forests	SoCF 2021 <a href="#">Drushka 2003, Ch. 2</a>
2	Sept. 19	Forest regions of Canada. Forest health. The boreal forest	<a href="#">Drushka 2003, Ch. 1</a> CCFM-1 document Gauthier <i>et al.</i> 2015
3	Sept. 26	Forest ecophysiology	Y&G: Ch. 4, pp.75-97 Koch <i>et al.</i> 2004
4	Oct. 3	Forest disturbance: fire, insects, and wind	Volney and Hirsch 2005 Thiffault 2019; pp 59-65; 77
5	Oct. 17	Succession and stand development	Franklin <i>et al.</i> 2007
6	Oct. 24	Forest landscape ecology and biodiversity	Y&G: Ch. 7, pp.132-146 Y&G: Ch. 14, pp.313-326
7	Oct. 31	Sustainable forest management; Silviculture	<a href="#">Drushka 2003, Ch. 4 &amp; 5</a> NRC 2015 Elliot <i>et al.</i> 2000. Section 3.1 and 3.2
8	Nov. 14	Urban and peri-urban forest conservation; forest and land use policy and management tools; Certification	Konijnendijk <i>et al.</i> 2006 CCFM-2 document
<b>Note that November 16 is the last day to cancel F courses</b>			
9	Nov. 21	The role of protected areas and parks in forest conservation	Gray <i>et al.</i> 2015. Ch. 2, pp. 9-28 Dearden 2004
10	Nov. 28	Conservation of endangered species; Invasive species in forest systems	Burke <i>et al.</i> 2011 Herms 2014
11	Dec. 5	Indigenous and traditional forestry knowledge Guest lecture by Gary Pritchard ~Giniw (Golden Eagle), Conservation Ecologist & Indigenous Engagement /Placemaking Specialist from Curve Lake First Nation, Ontario	Berkes & Davidson-Hunt, 2006
12	Dec. 8	Forest restoration on crown, private, and public lands; Conservation genetics	Drever <i>et al.</i> 2021 Šijačić-Nikolić <i>et al.</i> 2014

## TEACHING ASSISTANTS

TAs are available to answer questions pertaining to tutorials and grading.

Name	Email	Section	Location
Kennedy Korkola	kennedy.korkola@mail.utoronto.ca	TUT 5101	<a href="#">PB 255</a>
Callum Guppy	callum.guppy@mail.utoronto.ca	TUT 5102	<a href="#">MS 3278</a>
Kevin Myers	kevin.myers@mail.utoronto.ca	TUT 5103	<a href="#">MS 4279</a>
Zoe Turner-Debs	zoe.turnerdebs@mail.utoronto.ca	TUT 5104	<a href="#">WB 219</a>
Amber James	amberlynn.james@mail.utoronto.ca	TUT 5105	<a href="#">HS 106</a>
Shraddha Vadgama	shraddha.vadgama@mail.utoronto.ca	TUT 5106	<a href="#">HS 108</a>

## TUTORIALS

Weekly tutorials will be held from **5-6pm**, just prior to the scheduled lecture time. During these tutorials, the course TAs will take up the previous week's quiz and be available to answer specific questions. Presentations and group activities will be facilitated to develop course objectives.

## TUTORIAL SCHEDULE

	Date	Topics
1	Sept. 19	Group discussion: SoCF 2021 report - something that you knew, something you didn't know and find interesting, and something that you remain uncertain or curious about. Present one uncertainty from your group to the rest of the class
2	Sept. 26	Week 1 quiz Group discussion: what is forest health? Is it a useful concept? Why or why not? (Gauthier <i>et al.</i> 2015)
3	Oct. 3	Week 2 quiz How to plan, organize, and write an effective essay. Proper referencing and plagiarism Group discussion: what determines tree height (Koch <i>et al.</i> 2004)?
4	Oct.17	Week 3 quiz Group discussion: <u>Tree planting potential</u> - in your group, present and discuss the argument you plan to use for your report. Is everyone in agreement in terms of their perspective? Why or why not? Were there any novel, or unexpected perspectives in your group?
5	Oct.24	Week 4 quiz Group discussion: Climate change, disturbance, and succession - select one or more forest disturbances and design a simple "model" / flow chart to describe how you expect climate change to affect that disturbance and/or forest succession; present your "model" to the class
6	Oct.31	Week 5 quiz Group discussion: Forest Landscape Ecology and biodiversity. What is landscape ecology and why is it important to forest conservation? How can forestry be used to better conserve biodiversity?

7	Nov.14	Week 6 quiz Group discussion: Conservation of managed forest /crown lands. What are strength and weakness of the existing approaches, policy, and tools? What are other ways that could be used for effective conservation of managed forests or crown lands?
8	Nov.21	Week 7 quiz Group discussion: Urban and peri-urban forest conservation for people, biodiversity, or ecological services? How to conserve private forests for collective benefits?
9	Nov.28	Week 8 quiz Group discussion: What are the strengths and weaknesses of area-based forest conservation? Are protected areas enough to support conservation, and how much? Why is important or not to conserve forests outside of protected areas? Forest Group discussion: final paper topics and questions
10	Dec. 5	Week 9 quiz Group discussion: final paper topics and questions. Open discussion

## READINGS

We will use a combination of textbook chapters, government documents, and peer-reviewed research articles to provide a well-rounded set of foundational information on forest conservation. Note that reading material may not necessarily be discussed directly in class, but **elements of the readings will likely appear in weekly quizzes**. Students are responsible for all assigned materials. Students are also strongly encouraged to use the assigned readings to provide context and depth to their written reports.

### Texts

Young, R.A. & Giese, R.L. 2003. Introduction to Forest Ecosystem Science and Management. 3<sup>rd</sup> Edition, Wiley & Sons. [*referred to above as Y&G*]

Drushka, K. 2003. Canada's Forests: A History. Forest History Society. McGill-Queen's University Press.

### Other readings

The State of Canada's Forests: Annual Report 2021. Canadian Forest Service, Ottawa, Ontario. [*referred to above as SoCF*]

Berkes, F. and Davidson-Hunt, I.J. 2006, Biodiversity, traditional management systems, and cultural landscapes: examples from the boreal forest of Canada. *International Social Science Journal*, 58: 35-47

Burke D, Elliott K, Falk K, Piraino T. 2011. A land manager's guide to conserving habitat for forest birds in southern Ontario. Ontario Ministry of Natural Resources, Science and Information Resources Division; Trent University, Manotick, ON, [Peterborough, Ont.].

Canadian Council of Forest Ministers (CCFM). Fact Sheet. Always changing: Canada's Boreal Forest [*referred to above as CCFM-1*]

Canadian Council of Forest Ministers (CCFM). Fact Sheet. Forest Certification [*referred to above as CCFM-2*]

- Dearden, P. 2004. Parks and protected areas. In B. Mitchell (Ed.), *Resource and environmental management in Canada: Addressing conflict and uncertainty*. pp. 314-341. Oxford University Press.
- Drever, C.R., Cook-Patton, S.C., Akhter, F., Badiou, P.H., Chmura, G.L., Davidson, S.J., Desjardins, R.L., Dyk, A., Fargione, J.E., Fellows, M. and Filewod, B., 2021. Natural climate solutions for Canada. *Science Advances*, 7(23), p.eabd6034.
- NRC (Natural Resources Canada). 2015. *Canada's Regulatory Framework for Forest Management*.
- Elliot, K., S. Strobl, D. Bland. 2000. Section 3: Silvicultural Systems, in *A Silvicultural Guide to Managing Southern Ontario Forests*. Strobl & Bland (Eds.).
- Franklin, J.F., R.J. Mitchell, B.J. Palik. 2007. *Natural Disturbance and Stand Development Principles for Ecological Forestry*. USDA Forest Service, Newtown Square, PA.
- Gauthier, S., Bernier, P., Kuuluvainen, T., Shvidenko, A.Z., & Schepaschenko, D.G. 2015. Boreal Forest health and global change. *Science*, 349(6250), 819-822.
- Herms, D.A., & McCullough, D.G. 2014. Emerald ash borer invasion of North America: history, biology, ecology, impacts, and management. *Annual review of entomology*, 59, 13-30.
- Koch, G.W., Sillett, S.C., Jennings, G.M., & Davis, S.D. 2004. The limits to tree height. *Nature*, 428(6985), 851-854.
- Konijnendijk, C.C., R.M. Ricard, A. Kenney, and T.B. Randrup. 2006. Defining urban forestry – A comparative perspective of North America and Europe. *Urban Forestry & Urban Greening* 4:93-103.
- Gray PA, Paleczny D, Beechey TJ, King B, Wester M, Davidson RJ, et al. 2009. *Ontario's Natural Heritage Areas: Their Description and Relationship to the IUCN Protected Areas Classification System*: Queen's Printer for Ontario.
- Šijačić-Nikolić M, Milovanović J, Nonić M. Conservation of Forest Genetic Resources. In: M. R. Ahuja and K. G. Ramawat, editor. *Biotechnology and Biodiversity*. 1st ed. ed: Springer International Publishing; 2014. p. 103-28.
- Thiffault, E. (2019). Boreal forests and soils. Ch. 5 In *Developments in Soil Science* (Vol. 36, pp. 59-82). Elsevier.
- Volney, W. J. A., & Hirsch, K. G. (2005). Disturbing forest disturbances. *The Forestry Chronicle*, 81(5), 662-668.

## **COURSE MODULES ON QUERCUS**

Course materials will be posted on *Quercus* as a series of weekly course modules. Readings will be posted at least a week in advance. Copies of the lecture slides will most often be made available prior to each lecture.

## COURSE EVALUATION

### Weekly quizzes (35%)

Each week, students will complete a short online quiz pertaining to the previous week's material, including both lecture materials and assigned readings. Quizzes will be made available on Monday mornings at 10 am and will be time limited (15 minutes). Quizzes will no longer be available as of 11:59 that same night. Answers to the quizzes will be posted immediately after the quiz window has closed.

We recommend that you review your notes and the readings prior to logging in to *Quercus* and starting the quiz. Although you will have your study materials available to you during the quiz, without adequate preparation you may not have sufficient time to complete all questions; it takes time to look things up.

Please also note that each student's quiz will be a different subset of a larger question bank such that it is unlikely any two students' quizzes will be alike.

Each quiz is worth **3.5%** of your final grade and will include a mixture of multiple choice, true or false, and short answer questions.

**NB → There will be no opportunity to re-take missed quizzes.**

### Tree-planting Report (20%)

*Be sure to carefully read all the instructions associated with this assignment*

#### *The context*

Globally, forest restoration is seen as an urgent need. Reduction in global concentrations of CO<sub>2</sub>, production of clean water, and the provisioning of other essential ecosystem services all depend on healthy forest cover. Forest losses are contributing to rapid decline in global biodiversity and to the ongoing climate crisis. Solutions are required to increase tree cover to reduce these negative effects on earth's systems and biota, as well as human well being.

#### *The issue*

Recently, a team of authors published a paper in the scientific journal *Science* on the global tree-planting potential (Bastin *et al.* 2019). The authors argue that enormous gains can be made in carbon sequestration and mitigating global change simply through planting trees. Using a complex spatial model, they identified opportunities to increase global forest canopy cover by **0.9 billion** hectares. At the same time, the Government of Canada has committed to planting 2 billion trees. Despite these optimistic predictions regarding the global tree-planting potential, many researchers do not think that the report produced by Bastin *et al.* (2019) is accurate and overestimates the space available for planting trees. Others have suggested that their calculations are not sufficiently nuanced regarding where trees can be planted to produce the purported benefits.

#### *The report*

In this report, students will clearly summarize this issue and provide analysis of the perspectives presented in Bastin *et al.* (2019) and a critique of that article. Students will select a single critique and evaluate the relative merits of the initial article and the critique. You will provide an informed synthesis and opinion based on the readings below and additional supplemental information (a minimum of two additional academic articles or opinion pieces). Students are encouraged to connect their report to

other ideas, readings, and content presented in the course. In summarizing the issue and in making your assessments, be sure to base your ideas on evidence, rather than sentiment.

### *Format*

Your report should be a concise **1200 - 1500** words in length, not including your references / bibliography. Please prepare your report using Times New Roman, 12 pt. font, with standard margins and 1.5 line spacing. Include your name and student number in bold in the top left of the header section of your document, along with the report word count. Submit your report as a **PDF** to *Quercus*.

In terms of organization, a reasonable approach would be to first summarize the Bastin *et al.* (2019) article. This summary should include the broad issue it addresses as well as the specific contributions of the article. Next, you would similarly summarize the critique that you selected. Finally, you will provide a synthesis of these two previous sections where you weigh the relative merits of the original article and the critique and provide an informed opinion on the issue.

Use in-text APA-style citations throughout. E.g.,

*Tree planting holds great promise to improve carbon sequestration (Bastin et al. 2019).*

Also, list your references in APA format at the end of your report. E.g.:

*Bastin, J. F., Finegold, Y., Garcia, C., Mollicone, D., Rezende, M., Routh, D., & Crowther, T. W. (2019). The global tree restoration potential. Science, 365(6448), 76-79.*

### *Relevant readings*

#### Original article

Bastin, J. F., Finegold, Y., Garcia, C., Mollicone, D., Rezende, M., Routh, D., & Crowther, T. W. (2019). The global tree restoration potential. *Science*, 365(6448), 76-79.

#### Critiques of the original article

E. Luedeling et al., "Forest restoration: overlooked constraints," *Science*, doi:10.1126/science.aay7988, 2019.

P. Friedlingstein et al., "Comment on 'the global tree restoration potential,'" *Science*, doi:10.1126/science.aay8060, 2019.

J.W. Veldman et al., "Comment on 'the global tree restoration potential,'" *Science*, doi:10.1126/science.aay7976, 2019.

#### Authors' response to critiques

J. Bastin et al., "Response to Comments (Friedlingstein, Veldman, Lewis) on 'The global tree restoration potential,'" *Science*, doi:10.1126/science.aay8108, 2019.

#### Media commentary

<https://www.theguardian.com/environment/2019/jul/04/planting-billions-trees-best-tackle-climate-crisis-scientists-canopy-emissions>

<https://www.the-scientist.com/news-opinion/researchers-find-flaws-in-high-profile-study-on-trees-and-climate--66587>

### Canada's 2 billion tree program

<https://www.canada.ca/en/campaign/2-billion-trees/2-billion-trees-program.html>

### **Final Paper (40%)**

Your term paper can be on any subject related to Forestry and Forest Conservation as covered in this course. This essay must be well connected to material and readings assigned in class and include several additional references. You can get ideas and references for your topic from the additional references highlighted during lectures. Essays are expected to be succinct and concise, and to clearly explore an issue pertinent to forest conservation *in Canada*.

Possible topics include, but are not limited to, invasive species, sustainable forest management, afforestation, urban forestry, tree physiology, sustainable forest management, climate change and forest conservation, wildfire, insect outbreaks, forest policy, etc. As you have limited time and space for this essay, I recommend that you identify a specific aspect of your selected forest conservation topic and explore it in detail. For example, instead of exploring "invasive species" in general, it would be preferred to select a single species and explore one aspect (e.g., biodiversity, tree loss, economics) associated with that species.

As with all good essays, yours will require a thesis (that is, a **central argument**). Identify something perhaps contentious, unresolved, or particularly fascinating related to your chosen topic, and take a stance, or ask a question, on the issue. Through your research and synthesis, you will then arrive at a point where the evidence either agrees or disagrees with your thesis. The essay should be well written, well argued, supported by references, and **1500 - 2000** words in length, excluding your references / bibliography.

Again, please prepare your report using Times New Roman, 12 pt. font, with standard margins and 1.5 line spacing. Include your name and student number in bold in the top left of the header section of your document, along with the report word count. Please use the APA format for references and use in-text citations as described above.

### **LATE POLICY**

Late assignments will be penalized **5%** of the maximum grade each day to a maximum of **seven days**. After seven days, the grade for the assignment will be set to 0.

In the case of illness or other special circumstance, notification should be given to the Instructors and the Registrar as soon as possible and before the deadline in question. A **Verification of Illness (Also known as a "doctor's note") is temporarily not required**. Students who are absent from academic participation for **any reason** (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work should report their absence through the online absence declaration tool on ACORN. Additional information is available online:

<http://www.illnessverification.utoronto.ca/index.php>

### **QUERCUS WEBSITE AND INSTRUCTOR COMMUNICATION**

*Quercus*: FOR200 will use *Quercus* for its course website. To access the FOR200 website, go to the U of T *Quercus* login page (<https://q.utoronto.ca/>) and login using your UTORid and password. Once you have logged in, look for the My Courses tab, where you will find the link to the FOR200 course site (along with the link to all your other *Quercus*-based courses).

*Communication*: All important course information including links to the recorded course lectures, will be disseminated via *Quercus*. Other communication will be by email as appropriate. U of T students are



required to have a valid U of T email address, and to check *Quercus* regularly for course updates. Students are responsible for ensuring that their U of T email address is valid.

### PREPAREDNESS AT UOFT

Students are advised to register for UTAAlert, the University's alert system, at <http://alert.utoronto.ca/>. UTAAlert sends important messages to registrants via text, email, and phone.

### ACCESSIBILITY NEEDS

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs.

If you are a student who identifies with one or more of the broad categories below, we encourage you to register with Accessibility Services: <https://studentlife.utoronto.ca/department/accessibility-services/>.

- Attention Deficit Hyperactivity Disorder (ADHD)
- Autism Spectrum Disorder
- Brain Injury and Concussion
- Chronic Health
- Deaf and Hard of Hearing
- Learning Disability
- Mental Health
- Mobility and Functional
- Low Vision / Legally Blind
- Temporary Injuries

For any questions or assistance, please see the staff in the Office of the Registrar and Student Services.

### ENGLISH LANGUAGE AND WRITING SUPPORT

The University of Toronto expects its students to write well, and it provides resources to help. Please consult the University of Toronto writing site: <https://writing.utoronto.ca/> for advice and answers to your questions about writing. Please pay special attention to "Advice on Writing: Academic Writing."

The Writing Centre at the John H. Daniels Faculty of Architecture, Landscape, and Design (<https://www.daniels.utoronto.ca/students/student-services>) is a resource for Daniels students seeking assistance with academic writing through tutorials and individual consultations.

Academic writing carries with it certain expectations about properly citing, quoting, and referencing source material. Your research must be conveyed in a language commonly shared by others in the discipline. The style guidelines preferred by the Daniels Faculty are put forth in the Chicago Manual of Style and can be found here:

<http://www.chicagomanualofstyle.org/16/contents.html>

[https://owl.purdue.edu/owl/research\\_and\\_citation/chicago\\_manual\\_17th\\_edition/chicago\\_style\\_introduction.html](https://owl.purdue.edu/owl/research_and_citation/chicago_manual_17th_edition/chicago_style_introduction.html)

### ACADEMIC INTEGRITY

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters ([www.governingcouncil.utoronto.ca/policies/behaveac.htm](http://www.governingcouncil.utoronto.ca/policies/behaveac.htm)) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. The Code of Behavior on

Academic Matters states: “*It shall be an offence for a student knowingly [...] to represent as one’s own any idea or expression of an idea or work of another in any academic examination or term test or in connection with any other form of academic work, i.e., to commit plagiarism.*”

The Code also states: “*Wherever in the Code an offence is described as depending on ‘knowing,’ the offence shall likewise be deemed to have been committed if the person ought reasonably to have known.*”

Potential offences include, but are not limited to:

In papers and assignments:

1. Using someone else’s ideas or words without appropriate acknowledgement.
2. Submitting your own work in more than one course without the permission of the instructor.
3. Making up sources or facts.
4. Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:

1. Using or possessing unauthorized aids.
2. Looking at someone else’s answers during an exam or test.
3. Misrepresenting your identity.

In academic work:

1. Falsifying institutional documents or grades.
2. Falsifying or altering any documentation required by the University, including (but not limited to) doctor’s notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources. For information about academic integrity at the University of Toronto, please see <https://www.academicintegrity.utoronto.ca/>.

Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University’s use of the Turnitin.com service are described on the Turnitin.com website.

For accepted methods of standard documentation formats, including electronic citation of internet sources please see the U of T writing website at: <http://www.writing.utoronto.ca/advice/using-sources/documentation>.

Please also refer to “Reading and Using Sources: How Not to Plagiarize” on the University of Toronto writing site (<http://www.writing.utoronto.ca/>).

### **Student Work – Daniels Publishing Policy**

On occasion, the John H. Daniels Faculty of Architecture, Landscape, and Design (the Faculty) will share, use, exhibit, display, broadcast, and distribute images of student work completed in this course in connection with the activities of the Faculty for promoting, publicizing, or explaining the activities of the school. Should you wish to ‘opt out’, please contact [communications@daniels.utoronto.ca](mailto:communications@daniels.utoronto.ca), otherwise, your participation in this course grants the Faculty permission to publish such images in PR/promotional materials such as marketing, advertising, fundraising, and any other Faculty-related publication. These images may appear in a wide variety of formats including but not limited to social media, website and print.