



York University Faculty of Environmental and Urban Change

Fall 2022: Ecological Footprint Applications

Enroll as EU/ENVS 6599A Individual Directed Study for 3 credits

Overall purpose and intended outcomes

This small-group course introduces the concept and application of Ecological Footprint and Biocapacity accounting. An Ecological Footprint measures the area needed to supply humans with food and fiber crops, forest products, lands for settlements and infrastructure, and the sequestration of anthropogenic carbon emissions. This can be compared to Biocapacity, which measures the potential for specific lands and waters to sustain an Ecological Footprint. Ecological Footprint and Biocapacity can be compared to each other because they are expressed in the same units of global hectares.

By the end of the course, you should be able to: 1) demonstrate an understanding of Ecological Footprint and Biocapacity accounting; 2) appraise the Ecological Footprint within the context of other sustainability metrics and accounting systems; 3) communicate the potential for additional applications of Ecological Footprint and Biocapacity accounting.

This is the first in a series of sequential one-term IDS courses. Optionally, this stream of courses trains you to be able to participate in experiential work-study opportunities.

Prerequisites and co-requisites

This course is meant to be taken concurrently with EU/ENVS 6115 Ecological Economics.

Ecological Footprint Applications is a pre-requisite for the winter-term course ENVS 6599B Ecological Footprint Informatics, which focusses on computational techniques that are used to produce the accounts and to communicate their findings.

Time and location of course meetings

We will meet weekly online before the fall reading week. During reading week, we will meet intensively in person for 3 days from October 11-13. Thereafter we will meet every second week to the end of term. All meetings outside of reading week will normally take place on Wednesdays from 9-11 AM, or at an alternative time that works for all registrants.

Course Director

Eric Miller (ewmiller@yorku.ca)

Office hours

You may schedule appointments with me through the course website's automated system.

Course website h4x.ca/efi/

This restricted-access website contains the most updated schedule of course meetings and materials, including supporting slides, videos, hyperlinks to all required readings (through the library proxy), guidelines used to grade the assignments, and a class list with emails. The website allows you to post comments and to reply to other comments. You are expected to access the website throughout the term.

Organization of the course

Each meeting outside of the reading week will involve a discussion about the required readings, and a lecture to introduce the next topic to prepare you for the required readings and in-class discussions. During reading week, meetings will focus on engaging with software and data that are used in the National Ecological Footprint and Biocapacity Accounts. A detailed agenda of each meeting is provided on the course website.

Schedule of topics, learning outcomes, and required readings

Details that follow are subject to change; the course website will have the most current list of topics, learning outcomes, and readings that are hyperlinked for free access through the library.

No class on September 7 when the fall term begins; our first meeting will be on September 14.

Sep 14 (online): Introduction to the course and the topic of sustainability
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This meeting will review the course infrastructure and introduce participants and their perspectives on sustainability. A lecture will introduce the next topic of sustainability.
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(No readings are required in advance of this first session)

Sep 21 (online): Key concepts and indicators of sustainability

Compare and evaluate competing visions, definitions, and empirics of sustainability

O'Neill, D.W., Fanning, A.L., Lamb, W.F., and Steinberger, J.K. 2018. [A good life for all within planetary boundaries](#). *Nature Sustainability* 1, 88-95.

Syrovátka, M., 2020. [On sustainability interpretations of the Ecological Footprint](#). *Ecological Economics*, 169, p.106543.

Sep 28 (online): Overview of (National) Ecological Footprint and Biocapacity accounting

An introduction to the methodology used to calculate Ecological Footprint and Biocapacity

Borucke, M., Moore, D., Cranston, G., Gracey, K., Iha, K., Larson, J., Lazarus, E., Morales, J.C., Wackernagel, M. and Galli, A., 2013. [Accounting for demand and supply of the biosphere's regenerative capacity: The National Footprint Accounts' underlying methodology and framework](#). *Ecological indicators*, 24, pp.518-533.

Lin, D.; Hanscom, L.; Murthy, A.; Galli, A.; Evans, M.; Neill, E.; Mancini, M.S.; Martindill, J.; Medouar, F.-Z.; Huang, S.; Wackernagel, M. 2018. [Ecological Footprint Accounting for Countries: Updates and Results of the National Footprint Accounts, 2012–2018](#). *Resources*, 7, 58.

Oct 5 (online): Sub-national accounting and applications

How national accounts can be downscaled and integrated with local measurements

Isman, M., Archambault, M., Racette, P., Konga, C.N., Llaque, R.M., Lin, D., Iha, K. and Ouellet-Plamondon, C.M., 2018. [Ecological Footprint assessment for targeting climate change mitigation in cities: A case study of 15 Canadian cities according to census metropolitan areas](#). *Journal of Cleaner Production*, 174, pp.1032-1043.

Miller, E., Robinson, R., McMaster, M.-L., Holloway, E., and Kapoor, A. 2021. [Ontario's Ecological Footprint and Biocapacity: Measures and trends from 2005 to 2015](#). Report submitted to the Ontario Ministry of Natural Resources and Forestry.

Oct 11 + 12 + 13 (in person): Reading-week intensive introduction to footprint informatics

Introduction to techniques that are used to produce the National Ecological Footprint and Biocapacity Accounts, including data sources, computational infrastructure, and data outputs. This includes learning about MS Excel and its filtering and formula auditing capabilities, MySQL and MySQL scripts, and the use of MySQL Workbench to engage with a cloud-based database.

Meetings will generally be 9AM-4PM on campus in a classroom using personal laptops.

A detailed daily schedule is posted on the course website.

Note that the four remaining sessions will take place every second week.

Oct 26: Engaging with critiques and limitations of the NFBAs (online)

Appraise some critiques and limitations of the scope of the accounts and how the footprint and biocapacity components are weighed through equivalency factors and yield factors

Wiedmann, T. and Barrett, J., 2010. [A review of the ecological footprint indicator—perceptions and methods](#). *Sustainability*, 2(6), pp.1645-1693.

Wackernagel, M., A. Galli, L. Hanscom, D. Lin, L. Mailhes, T. Drummond (2018), **CHAPTER 33: Ecological Footprint Accounts: Criticisms and Applications**, p521-539 in Routledge Handbook of Sustainability Indicators, Simon Bell and Stephen Morse (Editors). Routledge International.

Nov 9 (online): Alignment with SEEA-EA

Introduction to the international System of Environmental Economic Accounts (SEEA) and its guidance on Ecosystem Accounting (SEEA-EA), with an appraisal of SEEA-EA as it compares with Ecological Footprint and Biocapacity accounting.

Edens, B., Maes, J., Hein, L., Obst, C., Siikamaki, J., Schenau, S., Javorsek, M., Chow, J., Chan, J.Y., Steurer, A. and Alfieri, A., 2022. [Establishing the SEEA Ecosystem Accounting as a global standard](#). *Ecosystem Services*, 54, p.101413.

Statistics Canada, 2022. [Human Activity and the Environment 2021: Accounting for ecosystem change in Canada](#). Catalogue no. 16-201-X. [Read the highlights on p 4-10, and browse the rest]

Nov 23 (online): Alignment with the SDGs

Introduction to the international Sustainable Development Goals (SDGs) and an appraisal of the use of modelling and metrics, including Ecological Footprint and Biocapacity.

Wackernagel, M., Hanscom, L. and Lin, D., 2017. [Making the sustainable Development Goals consistent with sustainability](#). *Frontiers in Energy Research*, 5, p.18.

Dasgupta, P., Dasgupta, A. and Barrett, S., 2021. [Population, ecological footprint and the sustainable development goals](#). *Environmental and Resource Economics*, pp.1-17.

Dec 7 (in person): Engaging the public and policy professionals

Learn about techniques of data storytelling and methods of reaching the public
Develop and evaluate proposals to engage policy professionals

There are no required readings for this class; everyone will present their pitches during class.

Assignments and Evaluation

Each of these four assignments are equally weighted:

1. Written reflections about each topic, assessed after each meeting

For each meeting you will add concise bullet-point-style notes to a Google Document. Your notes will reflect upon a handful of statements or questions inspired by your learnings.

2. Participation, assessed during each meeting

In each meeting, you will contribute to a thoughtful value-adding discussion.

3. Verbal pitch to a policy professional, due in the last class

You will deliver a brief (maximum 6-minute) presentation that aims to convince a hypothetical policy professional to newly incorporate insights from Ecological Footprint (and Biocapacity) accounting into a program or project or reporting system. The policy professional could be someone in governmental department or agency/tribunal, or a non-governmental organization. You may use visual aids such as one or two PowerPoint slides.

4. Written profile of an existing application, due after the last class and before the term ends

You will write a brief profile about a government / organization / person who has demonstrated leadership by applying insights from Ecological Footprint and Biocapacity accounting. The brief should be written for a learned but non-specialist audience, such as for hypothetical international readers of a footprint newsletter. With your optional permission, it may be published or circulated to others. Aim for around 1500 words at the most; you may wish to adopt more of a long-form journalism approach than a standard academic essay.

Grading system

MES courses use a Pass (P) or Unsatisfactory (U) grading system in order to encourage interdisciplinary exploration and creativity. York transcripts show grades of Pass (P), Withdrawn (W), or Unsatisfactory (U). A Pass grade is equivalent to a B- letter grade or better, which is equivalent to 70%; anything less is Unsatisfactory. Your MES dossier will contain a written evaluation of your performance in this course.

Academic honesty

All York students are subject to policies regarding academic honesty as set out by the Senate of York University and by the Faculty of Environmental Studies (FES). Students are strongly encouraged to read the Senate Policy on Academic Honesty, a copy of which can be found on the York University web-site (<http://www.yorku.ca/academicintegrity/students/policy.htm>). FES is committed to maintaining the highest standards of academic integrity. Please be advised that conduct that violates the ethical or legal standards of the University community may result in serious consequences. For more information, please contact the Director of Student and Academic Services and/or the FES Writing Program Coordinator.

Access/Disability

York provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. If this applies to you, it is your responsibility to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet

with each professor to discuss your accommodation needs. Failure to make these arrangements may jeopardize your opportunity to receive academic accommodations.

Intellectual property notice

All materials prepared for this course are the intellectual property of the Course Director or otherwise stated. Course materials should only be used by students enrolled in this course. This can include but is not limited to the following material: lecture notes, handouts and recordings; assignment handouts and instructions; spoken and written presentations; audio and video recordings; PowerPoint slides; and questions and/or solution sets for assignments, quizzes, tests and final exams. As a student in this course, you may not publish, post on an Internet site, sell, or otherwise distribute any of this work without the instructor's express permission. Unauthorized or commercial use of these materials is strictly prohibited. Third party copyrighted materials (such as book chapters, journal articles, music, videos, etc.) have either been licensed for use in this course, or fall under an exception or limitation in Canadian copyright law. Copying this material for distribution (e.g. uploading material to a commercial third-party website, or online sharing of course material with people outside of the course) may lead to a charge of misconduct under York's Code of Student Rights and Responsibilities and the Senate Policy on Academic Honesty. In addition, you may face legal consequences for any violation of copyright law.