

*McMaster University*  
*Department of Economics*  
**Economics 3W03**  
**(Economics of) Natural Resources**  
**C01, Winter 2018**

**Instructor:** *Dr. Robert Jefferson*

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**Office Hours:** Tuesdays, Noon-1:00, Thursdays, 11:00-Noon

**Lectures:** Tuesday, Thursday, Friday; 11:30-12:20; TSH B106

**Midterm:** Friday, March 2, 7:00-8:30 pm

**Course Description:**

Canada is rich in natural resources - vast forests, huge fishing grounds and enormous deposits of minerals, oil and gas. How should these best be used to further the aims of society? Should we use them up as quickly as possible, or eke them out so that they last "forever"? How should the harvesting of fish and timber be organized so as to achieve the greatest benefits? How should the benefits from resource use be distributed? Are we running out of resources, as some contend, or can we expect to have adequate supplies for the foreseeable future? The purpose of this course is to address some of these questions.

The approach used in this course differs from that of environmental economics, which is largely applied public-finance and welfare economics. The exploitation of mineral deposits, forests, or fish stocks involve the management of assets as well as the determination of optimal flow rates of production; our analyses will resemble capital theory. Resource management policies deal with rates of exploitation; hence the major analytical tool is the mathematics of dynamic optimization. The necessary tools and concepts will be covered as the need for them arises.

## **Course Objectives**

By the end of this course, you should be able to:

1. Identify and explain the roles of (a) property rights [including externalities and ‘collective consumption goods’], (b) alternatives to extractive use, and (c) dynamics (exploitation patterns over time), in the analysis of the extraction or harvest of natural resource stocks.
2. Explain, using diagrams and/or algebra, the key determinants of optimal extraction profiles for non-renewable resources.
3. Compare indicators of resource scarcity and evaluate their usefulness.
4. Identify known shortcomings in the allocation and use of water in Canada; explain the efficiency losses associated with existing water distribution mechanisms, and outline possible remedies.
5. Explain, using diagrams and/or algebra, the analytics of optimal forest rotation, from the perspectives of biologists (foresters) and economists.
6. Identify and explain optimal fishing effort and catch levels (a) when the fishery is characterized by open-access, (b) when access is controlled and the objective is to maximize sustainable yield, and (c) when access is controlled and there is a positive rate of time preference (or interest).
7. Differentiate between the various concepts of “sustainability,” specifying in each case (a) what is to be sustained, and (b) for whose benefit.

## **Turnitin.com**

*In this course we will be using a web-based service (Turnitin.com) to reveal plagiarism. Students will be expected to submit their work electronically and in hard copy so that it can be checked for academic dishonesty. Students who do not wish to submit their work to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to <http://www.mcmaster.ca/policy/Students-AcademicStudies/Turnitin.pdf>*

## **MSAF forms**

The MSAF can be used ONLY for the midterm examination.

MSAF consideration will NOT be given for online quizzes, nor for any component of the term paper.

Drafts of term papers MUST be submitted on time—papers received by deadline will be distributed to other students for editing/critiquing.

## Course Resources:

### **Text:**

Conrad, Jon M., *Resource Economics*, Cambridge (2<sup>nd</sup> ed., 2010).

### **Other sources:**

Clark, Colin W., *The Worldwide Crisis in Fisheries: Economic Models and Human Behavior*, Cambridge (2006) [despite the sensational title, excellent description of fisheries models, with applications, more accessible than Clark's classic, *Mathematical Bioeconomics*]

Conrad, Jon M, and Colin W. Clark, *Natural Resource Economics: Notes and Problems*, Cambridge (1987) [Mathematically advanced—written as a graduate text]

Field, Barry, C., *Natural Resources Economics: An Introduction*, McGraw-Hill (2001)

Harris, Jonathan M., *Environmental and Natural Resource Economics: A Contemporary Approach*, Houghton Mifflin, (2<sup>nd</sup> ed., 2006; 3<sup>rd</sup> ed., 2013)

Hartwick, John M., and Nancy D. Olewiler, *The Economics of Natural Resource Use*, Pearson (1986, 2<sup>nd</sup> ed., 1998) [out of print—for years the ONLY undergraduate text for Natural Resources Economics (not Environmental Economics)]

Kahn, James R., *The Economic Approach to Environmental & Natural Resources*, Thomson (2005)

Kolb, Robert W., *The Natural Gas Revolution: At the Pivot of the World's Energy Future*, Pearson (2014)

Neher, Philip A., *Natural Resource Economics: Conservation and Exploitation*, Cambridge (1990)

Pearce, David W., and R. Kerry Turner, *Economics of Natural Resources and the Environment*, Johns Hopkins (1990)

Tietenberg, Tom, and Lynne Lewis, *Environmental & Natural Resource Economics*, Pearson (9<sup>th</sup> ed., 2012) [a 'standard' undergraduate text, mainly environmental]

Ward, Frank A., *Environmental and Natural Resource Economics*, Pearson (2006)

Zhang, Daowei, and Peter H. Pearse, *Forest Economics*, UBC Press (2012) [a rewrite of Pearse's classic forestry economics text]

***Avenue to Learn (Avenue) site:***

We will use a site on Avenue for

- Dissemination of information (announcements, course notes, exam practice)
- Online homework

**Student Evaluation:**

Midterm (March 2)	20%
Online Quizzes (4)	10%
Peer Edits Drafts (2)	10%
Term Paper	30%
Final Exam (comprehensive)	30%

**On-Line Quizzes**

There will be four (4) on-line quizzes/assignments included on the course Avenue site. These are in the nature of homework, designed to help students keep up with the material, but to do so at their own pace. Students are encouraged to work together on these on-line quizzes, either in person or by using the discussion board—but each student must, ultimately, answer the quiz questions individually.

Students may open and exit from each quiz as many times as they like before submitting answers.

After the quiz “closes” (no more submissions accepted), the answers, with instructor feedback, will be made available to be used as study aids.

The value of on-line quizzes comes not from the marks awarded for their completion, but from the learning that takes place as students work them. Any question that has appeared, with its associated explanation, on a quiz, will be judged as suitable for use in the midterm examination or in the final examination.

**Submission Dates**

Quiz 1 due (closes)	Thursday, January 25, 8:00 pm
Quiz 2 due (closes)	Thursday, February 15, 8:00 pm
Quiz 3 due (closes)	Thursday, March 8, 8:00 pm
Quiz 4 due (closes)	Thursday, March 29, 8:00 pm

## **Examinations**

### **Use of Calculators**

Only the Casio FX-991 series calculator may be used for tests and the exam (available in the bookstore).

### **Photo ID**

You will be required to show your university photo ID at all tests and the exam.

### **Scan Sheets**

All tests and the final examination will be multiple choice questions to be answered on scan sheets.

You must use an HB pencil to fill in these sheets and you are responsible for providing your own.

## **Mid-Term Examinations**

The mid-term examination will be written on March 2<sup>nd</sup>.

In the event that a student is unable to write on the scheduled date, the MSAF form or a medical certificate should be submitted within 3 days. With documentation, the 20% of total course grade from the missed mid-term will be re-assigned to the final examination. In the absence of valid documentation (please note that the MSAF form can be used only ONCE in a term), a zero will be assigned for the missed mid-term exam.

Due to the difficulty of scheduling additional rooms and proctors, there are no deferred midterms.

## **Final Examination**

The final examination for the course is cumulative, covering everything in the course. It will be written during the Final Examinations period, scheduled by the Examinations Office.

**SHOULD YOU MISS THE FINAL EXAMINATION:** The MSAF cannot be used for a missed final examination for any McMaster course.

Take your documentation to your faculty's Associate Dean's office, for approval of a deferred exam in June.

Students who do not write the exam will receive a mark of F until a deferred exam has been written.

See:

<http://www.mcmaster.ca/policy/Students-AcademicStudies/UndergraduateExaminationsPolicy.pdf>

## **Term Paper**

You may choose to write about either (a) a critical evaluation of an article from a professional journal, or (b), a less critical review of several articles on a single topic.

### **Format and Submission:**

Each draft of the paper is to be submitted electronically, through Turnitin, for distribution to other students for review and editing.

To preserve privacy and anonymity, please do not include any identifying information (name, McMaster id., etc.) in your paper.

The Turnitin site for the course is found at **turnitin.com**

For our course, you need the following:

Class Name: **Natural Resources Economics W18 Econ 3W03**

Enrolment Password: **Boisvert**

Turnitin ID: **16736883**

First drafts of papers are to be submitted no later than 11:59 pm., Tuesday, February 6. Second drafts are to be submitted no later than 11:59 pm., Tuesday, March 13.

At 12:01 on February 7 (first draft), and March 14 (second draft), all submitted papers will be anonymized by Turnitin. All students who have submitted drafts will be assigned three papers to review / critique.

Reviews / critiques are to be completed and submitted within Turnitin before 11:59 pm. on February 13 (first draft peer review) and March 20 (second peer review).

**You cannot participate in the Peer Review exercise (and receive marks) if you have not submitted your draft before the deadlines.**

Each draft of the paper must contain a bibliography, preferably in APA format.

Students should familiarize themselves with resources available from the Student Success Centre, Writing Support Services. The Centre's web site has many detailed documents, on topics ranging from common grammatical errors through correct forms for citations (see "Handouts" under "Writing"). While personal assistance with revision of papers is available, the Writing Centre consultants work with you—they will NOT edit/fix/write your paper for you. Appointments must be made well in advance.

A link to the Student Success Centre, Writing Support Services:

<https://studentsuccess.mcmaster.ca/academicsupport/academicsupport/#academicWriting>

## Term Paper Length

The suggested minimum length for the final paper is 2500 words, excluding title page, endnotes, and bibliography. There is no specific grade penalty for shorter papers, but you are unlikely to treat your topic adequately in a paper that is too short. There is no suggested maximum length.

The first draft of the paper should be at least 1500 words, and must contain a bibliography. The second draft must be a revised version of the first, unless you have been directed to change topics by the instructor. The final draft must be a revised version of the second draft.

## Editing:

Following receipt of the first drafts of papers, each student will receive three drafts written by classmates. These are to be edited for clarity, structure, organization and completeness.

Appended pages of comments and suggestions are generally welcomed by authors, but are not required.

## Submission Dates:

First Draft due, electronically	11:59 pm, February 6
First Edits due, electronically	11:59 pm, February 13
Second Draft due, electronically	11:59 pm, March 13
Second Edits due, electronically	11:59 pm, March 20
Final Paper due, electronically and paper copy	3:00 pm, April 11

## Late Penalties:

Final Paper Five per cent (5%) of final paper mark per (calendar) day to April 14,  
Ten per cent (10%) of final mark per (calendar) day thereafter

Schedule/Calendar of Late Penalties (based on TURNITIN clock):

April 11, Before 3:00 pm	April 12, Before 3:00 pm	April 13, Before 3:00 pm	April 14, Before 3:00 pm	April 15, Before 3:00 pm	April 16, Before 3:00 pm	April 17, Before 3:00 pm
NO penalty	5%	10%	15%	20%	30%	40%
April 18 , Before 3:00 pm	April 19, Before 3:00 pm	April 20, Before 3:00 pm	April 21, Before 3:00 pm	April 22, Before 3:00 pm	After April 22, 3:00 pm	
50%	60%	70%	80%	90%	100%	

**Penalty for NO HARD COPY: 10%**

## Term Paper Grading Scheme:

The grade for the final version of the paper is broken down as follows:

Introduction	15%
Conclusion	15%
Content	30%
Organization	15%
References/Bibliography	10%
Grammar/Style	10%
Spelling	5%

The **conclusion** (written second last) and **introduction** (written last) are essential components of any academic paper.

The **introduction** should start with a general discussion of your subject and lead to a specific statement of the main point, or thesis. The thesis should tell in one (or at most two) sentence(s), the overall argument, and briefly, what the body of the paper will be about.

The **conclusion** serves to sum up the paper's points or provide a final viewpoint about the topic. The **conclusion** should consist of three or four convincing sentences that clearly review (not restate) the main points, and briefly describe the author's thesis.

**Content** refers to (a) mastery of economic concepts, (b) degree of economic sophistication (analysis rather than simple description), and (c) quality of the description of linkage between economic concepts and natural resources exploitation or policy.

The paper should be logically **organized**.

**References** should include all sources used in the preparation of the paper, whether quoted or not. Sources cited are authoritative (primary--Wikipedia does not count as an authoritative source, but is a good place to learn and to find authoritative sources). At least 3 authoritative sources cited (preferably more).

The **bibliography** should follow APA style.

**Grammar** and **style** refer to general paragraph and sentence structure.

Correct **spelling** is essential, and students are advised that spell checkers will not pick up all errors. Each spelling error found will cost one mark of a possible five. Papers with five or more errors will be given zero on this portion of the total grade.

*Grades are assigned based on my professional judgment of the quality of your work and are not subject to negotiation.*



**Academic Misconduct:**

*Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at <http://www.mcmaster.ca/academicintegrity/>*

*We have a zero – tolerance policy with respect to cheating. Any student found cheating will be given a grade of zero on the test or exam. In every case, you will be reported to the Office of Academic Integrity and to your faculty. If it is a first offence, a letter will remain in your file until you graduate. If it is a serious first offence or a second offence, the minimum penalty is zero in the course and a notation on your transcript.*

*If you are found with a cheat sheet, a cell phone, iPod, etc. on your person during a test or the exam, this constitutes cheating and you may be prosecuted as outlined above, even if you were not using such items at the time. Talking at any time during a test or exam is also cheating, regardless of what you claim you were talking about. In addition, we have software that can identify students who were copying from other students. Any and all of these cases will be prosecuted in full.*

**Course Modification Warning**

*The instructor and university reserve the right to modify elements of the course during the term.*

*The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check his/her McMaster email and course websites weekly during the term and to note any changes.*

**Faculty of Social Sciences E-Mail Communication Policy**

*Effective September 1, 2010, it is the policy of the Faculty of Social Sciences that all e-mail communication sent from students to instructors (including TAs), and from students to staff, must originate from the student's own McMaster University e-mail account. This policy protects confidentiality and confirms the identity of the student. It is the student's responsibility to ensure that communication is sent to the university from a McMaster account. If an instructor becomes aware that a communication has come from an alternate address, the instructor may not reply at his or her discretion.*

### Course Sequence

Week	Topic	Assignments
Jan. 5	Course Introduction	
Jan 8 – 12	Static vs. Dynamic Efficiency	
Jan. 15 – 19	Property Rights, Open Access Externalities	
Jan. 22 – 26	Public Goods Non-Renewable Resources Optimal Extraction	Online Homework “Quiz” 1, Jan. 25
Jan. 29 – Feb. 2	Non-Renewable Resources Optimal Extraction	
Feb. 5 – 9	Optimal Extraction	First Draft, Term Paper, February 6
Feb. 12 – 16	World Oil Supplies Pricing of Water	Edits, First Drafts February 13 Online Homework “Quiz” 2, Feb. 15
<b>Feb. 19 - 23</b>	<b>READING WEEK</b>	
Feb. 26 – Mar. 2	Pricing of Water Water Demand Management  <b>Midterm Exam—March 2</b>	
Mar. 5 – 9	Forest Management, Optimal Rotation	Online Homework “Quiz” 3, Mar. 8
Mar. 12 – 16	Forest Management, Optimal Rotation	Second Draft, Term Paper Mar. 13
Mar. 19 – 23	Economics of Fisheries	Edits, Second Drafts March 20
Mar. 26 – 30	Economics of Fisheries “Sustainability”	Online Homework “Quiz” 4, Mar. 29
April 2 – 6	“Sustainability”	
April 11		<b>Term Paper</b> (Electronic and Paper Copy)