Unit Outline

Unit: Natural Resource Economics
ECON 3311

Semester: 1

Campus: Crawley

Unit Coordinator: Steven Schilizzi

Updated: February 2007
Introduction

This unit offers core knowledge in the area of natural resource management from an economic perspective. Even when you have all the science, you need to know how to use your knowledge in a world of limited financial resources and conflicting interests. Science alone is not enough: economics complements science in how best to use the limited resources of our natural world.

This unit is taught by a team of three staff: Dr. Steven Schilizzi (unit coordinator), Dr. Ben White, and Dr. Atakele Hailu (see contact details below). This is to provide you with people who are best qualified in each specific topic this unit offers. It will also provide you with a bit of diversity! Accordingly, the unit is divided into three modules, each four weeks in length. The last week is dedicated to revisions and (possibly) to real world experiences from government and industry presenters – who may also intervene during semester.

This is a core unit for some of you in the Faculty of Natural and Agricultural Sciences, but it is open to all other interested students from this or other faculties, provided they have some minimal background in economics.

Goal

The unit provides the fundamental concepts and tools needed for managing natural resources and the environment in an economically sustainable way.

Broad Learning outcomes

On completion of this unit you should be able to:

- Understand how the value of natural resources and the environment can be measured, whether for use or for conservation, and know which valuation technique to apply in which case.
- Understand how to determine the socially optimal management of a natural asset, whether for use or for conservation, and how private and social optima may conflict.
- Apply the above concepts to the management of both renewable and non-renewable resources, such as land, water, fish, forestry and minerals.
- Understand the principles and limitations of government policies affecting the management of natural resources and the environment, and be able to critically assess a given environmental policy, whether local, national or international.

Unit-specific prerequisites

Natural Resource Economics ECON 2211 or equivalent.

Technical Requirements

N/A

Software Requirements

N/A
Contact details

Unit web site (may include Web CT URL): webct.uwa.edu.au

Name of Unit coordinator: Dr. Steven Schilizzi

e-mail: Steven.Schilizzi@uwa.edu.au

Phone: +61 8 6488 2105

Fax: +61 8 6488 1098

Consultation hours: TBA and by appointment

Other Teaching Staff:

Name: Dr. Ben White  -  Ph: 6488 3409

e-mail: bwhite@are.uwa.edu.au

Name: Dr. Atakelty Hailu – Ph: 6488 2538

e-mail: Atakelty.Hailu@uwa.edu.au

Name: *

e-mail: *

Lecture times: Refer to UWA timetable on the UWA Web page: http://www.timetable.uwa.edu.au/

Lab/prac/tute times: Refer to UWA timetable and advice from the unit coordinator

Unit structure summary

Lectures

Three one-hour lectures per week.

Practical and/or laboratory sessions

As announced by the lecturer, a practical in the Agriculture Computer Lab., may take place in lieu of the tutorial.

Tutorials

A one hour tutorial per week. Attendance is compulsory.
### Workshops

N/A

### Other

N/A

### Unit schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Readings/Activities (eg text references, tutorial topics, web search, etc)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module 1</strong></td>
<td><em>Measurement: Non-market valuation and decision-making analysis</em></td>
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<tr>
<td></td>
<td><em>Part 1: Non-Market Valuation (NMV)</em></td>
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<tr>
<td>1</td>
<td>Introduction to NMV</td>
<td>Lecture 1 and readings</td>
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<td>1</td>
<td>Foundations of NMV: WTP and TEV</td>
<td>Lecture 2 and readings</td>
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<td>1</td>
<td>Technique 1: Hedonic Pricing Method</td>
<td>Lecture 3 and readings</td>
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<td>2</td>
<td>Technique 2: Travel Cost Method</td>
<td>Lecture 4 and readings</td>
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<td>2</td>
<td>Technique 3: Contingent Valuation Method</td>
<td>Lecture 5 and readings</td>
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<td>2</td>
<td>Technique 4: Choice Modelling Method</td>
<td>Lecture 6 and readings</td>
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<td></td>
<td><em>Part 2: Decision-making analysis for NRM</em></td>
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<tr>
<td>3</td>
<td>Decision making frameworks for NRM: CBA, MCA, PDM</td>
<td>Lecture 7 and readings</td>
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<tr>
<td>3</td>
<td>Foundations of Cost-Benefit Analysis</td>
<td>Lecture 8 and readings</td>
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<td>3</td>
<td>Comparing values over time: discounting</td>
<td>Lecture 9 and readings</td>
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<td>4</td>
<td>Decision criteria for CBA</td>
<td>Lecture 10 and readings</td>
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<td>4</td>
<td>Multi-Criteria Analysis</td>
<td>Lecture 11 and readings</td>
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<tr>
<td>4</td>
<td>Multi-Criteria Analysis</td>
<td>Lecture 12 and readings</td>
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<tr>
<td><strong>Module 2</strong></td>
<td><em>Policy: Externalities and environmental policy</em></td>
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<td></td>
<td><em>Part 1: Policy intervention and the role of economics</em></td>
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<td>5</td>
<td>Optimal level of pollution or conservation</td>
<td>Lecture 13 and readings</td>
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<td>5</td>
<td>Cost-effectiveness equimarginal principle</td>
<td>Lecture 14 and readings</td>
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<td></td>
<td><em>Part 2: Point source pollution</em></td>
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<td>5</td>
<td>Command and control approaches</td>
<td>Lecture 15 and readings</td>
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<td>6</td>
<td>Emission charges (Pigovian taxes)</td>
<td>Lecture 16 and readings</td>
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<td>6</td>
<td>Tradable emission permits (Coasian approach)</td>
<td>Lecture 17 and readings</td>
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<td>6</td>
<td>Other economic instruments</td>
<td>Lecture 18 and readings</td>
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<td></td>
<td><em>Part 3: Non-point source pollution</em></td>
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<tr>
<td>7</td>
<td>Compliance measures and policy challenges</td>
<td>Lecture 19 and readings</td>
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<td>7</td>
<td>Policy instruments for managing NPS pollution</td>
<td>Lecture 20 and readings</td>
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<td><em>Part 4: Conservation and biodiversity</em></td>
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<td>7</td>
<td>Regulatory and voluntary approaches</td>
<td>Lecture 21 and readings</td>
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<td>8</td>
<td>Incentive-based instruments</td>
<td>Lecture 22 and readings</td>
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<td></td>
<td><em>Part 5: Choosing policy instruments</em></td>
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<tr>
<td>8</td>
<td>Policy instruments for pollution control currently in use in Australia and elsewhere</td>
<td>Lecture 23 and readings</td>
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<tr>
<td>8</td>
<td>Policy instruments for resource conservation</td>
<td>Lecture 24 and readings</td>
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</tbody>
</table>
Module 3  *Management: Efficiency in natural resource management*

**Part 1: Non-renewable resources**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Lecture(s)</th>
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</thead>
<tbody>
<tr>
<td>9</td>
<td>Two-period competitive industry</td>
<td>Lecture 25 and readings</td>
</tr>
<tr>
<td>9</td>
<td>Two-period monopoly industry</td>
<td>Lecture 26 and readings</td>
</tr>
<tr>
<td>10</td>
<td>Resource extraction over time: introduction</td>
<td>Lecture 27 and readings</td>
</tr>
<tr>
<td>10</td>
<td>Resource extraction over time: extensions</td>
<td>Lecture 28 and readings</td>
</tr>
<tr>
<td>10</td>
<td>Hotelling’s rule in practice</td>
<td>Lecture 29 and readings</td>
</tr>
</tbody>
</table>

**Part 2: Renewable resources**

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<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Lecture(s)</th>
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</thead>
<tbody>
<tr>
<td>10</td>
<td>Fish harvesting and conservation</td>
<td>Lecture 30 and readings</td>
</tr>
<tr>
<td>11</td>
<td>Gordon-Schaefr model</td>
<td>Lecture 31 and readings</td>
</tr>
<tr>
<td>11</td>
<td>Dynamics of fisheries management</td>
<td>Lecture 32 and readings</td>
</tr>
<tr>
<td>11</td>
<td>Common property resources</td>
<td>Lecture 33 and readings</td>
</tr>
<tr>
<td>12</td>
<td>Fishery policies in WA</td>
<td>Lecture 34 and readings</td>
</tr>
</tbody>
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**Part 3: Forestry resources**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Lecture(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Optimal forest management</td>
<td>Lecture 35 and readings</td>
</tr>
<tr>
<td>12</td>
<td>Multiple use forests and natural forests</td>
<td>Lecture 36 and readings</td>
</tr>
</tbody>
</table>

**REVISIONS FOR NRE 310**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Revisions</td>
<td>Questions and discussion</td>
</tr>
<tr>
<td>13</td>
<td>Revisions</td>
<td>Questions and discussion</td>
</tr>
<tr>
<td>13</td>
<td>Revisions</td>
<td>Questions and discussion</td>
</tr>
</tbody>
</table>

**Important Notice:** Because Dr. Ben White will be away part of this semester, we have switched Modules 2 and 3 around (M2 being M3 and M3 being M2). This does not affect the content of the unit.

**References, resources and reading materials**

**Recommended/required text(s)**

**Module 1**

Non-market valuation
(Two copies on closed reserve).

Cost-benefit analysis

Multi-criteria analysis

**Module 2**


**Module 3**
Additional/suggested/alternative text(s)

Module 1

Non-market valuation:

Pearce, D.W., 1993. *Economic values and the natural world.* Parts 1, 2 and 4 + Appendix II.

Cost-benefit analysis:


Multi-criteria analysis:


Module 2


Module 3

Optimal resource management:


Non-renewable Resources:


Renewable Resources:


Forestry:


Hartman, R. (1976). The harvesting decision when the standing forest has value, Economic Inquiry, 14, 52-89.

Journals

Some of the major journals in the Natural Resource Economics area include:

Australian Journal of Agricultural and Resource Economics (AJARE)
Land Economics
Journal of Environmental Economics and Management (JEEM)
Ecological Economics
Marine Resource Economics
Environmental and Resource Economics

Closed reserve (may have a bit of delay at BIOL Library)


Others may be announced by the lecturers in due time.

Databases

N/A

Web sites

Some useful web sites for this unit include (as in 2004):

Module 1

Overview of ecosystem valuation methods, and associated Internet links:
http://www.ecosystemvaluation.org/default.htm
http://www.ecosystemvaluation.org/links.htm
http://economics.iucn.org/

A reference list for NMV studies (Look at the section on “Values”)  

Valuing biodiversity
http://biodiversityeconomics.org/valuation/valuation-topics.htm
http://biodiversityeconomics.org/

Using environmental valuation within the framework of cost-benefit analysis:
http://www.ncedr.org/tools/othertools/costbenefit/module7.htm
http://www.ncedr.org/tools/othertools/sdtools/intro.htm
http://www.ncedr.org/tools/

Module 2 : Will be given in lectures

Module 3

Department of Fisheries WA:  http://www.wa.gov.au/westfish/

Unit web site

There is a WebCT site available for this module at http://webct.uwa.edu.au/webct/homearea/homearea. Enter this address and you will be asked for WebCT ID and password. Your WebCT ID will be your student number. Any letters must be
in upper case (capitals) and do not include the slash. Your password will be the barcode as displayed on your campus card.

This site includes PowerPoint lecture notes, a bulletin board and more.

**Assessment**

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Important dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment and quizzes – Module 1</td>
<td>20%</td>
<td>Assignment Mod 1 to be handed in at 4 pm on Thu 22 March, in class.</td>
</tr>
<tr>
<td>Assignment and quizzes – Module 2</td>
<td>20%</td>
<td>TBA</td>
</tr>
<tr>
<td>Assignment and quizzes – Module 3</td>
<td>20%</td>
<td>TBA</td>
</tr>
<tr>
<td>Final exam</td>
<td>40%</td>
<td>TBA</td>
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<tr>
<td>TOTAL MARK</td>
<td>100%</td>
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</tbody>
</table>

Note that all three modules are weighted approximately equally, and add up to 100%:
- Module 1: 34%
- Module 2: 33%
- Module 3: 33%

The specific split between assignment and quiz marks will be specified in each module.

**Details of Assessment**

**Practical/tutorial exercises/activities**

Tutorials will be essential for students to grasp “hands on” the material presented during lectures. They will involve individual and group work, class discussions over specific examples, application exercises, and further explanations of lecture material when needed. Attendance will be recorded. Material presented during tutorials will be examinable.

**Assignments (3)**

Each of the three modules will propose a topic for the assignment. To the extent possible, assignments will focus on real applications of the concepts and methods reviewed in class. Use of Internet resources and contacts with external institutions and experts for information gathering will be encouraged. The focus of the assessment will be on how correctly the student can apply the general concepts and methods reviewed in class to a specific real world problem. Real and critical understanding, not learning by rote, will be assessed. Assignment length will be approximately of 1500 words. More detailed information will be given by the lecturer in each module.

**Final Exam**

There will be a two-hour exam. It will consist of three sections, one for each of modules 1, 2 and 3 of the unit. Students will have the choice between several questions. Questions will include both short answer and long answer type. They will aim at checking how well students have really understood key concepts and methods, mainly by asking them how they can be used in various specific cases. No rote learning will be needed, nor is it recommended.

**Plagiarism**
All forms of cheating, plagiarism and copying are condemned by the University as unacceptable behaviour. The Faculty's policy is to ensure that no student profits from such behaviour. Generally a failure will be recorded for the subject in which the cheating has occurred. Serious cases shall be referred to the University’s Board of Discipline. All students should note that cases of copying are automatically reported to the Dean and documentary evidence along with associated correspondence is placed on the student’s permanent record.

**Academic misconduct**

The University has a new system for sanctioning academic misconduct. Please read online at [http://www.teachingandlearning.uwa.edu.au/page/59146](http://www.teachingandlearning.uwa.edu.au/page/59146)

**Appeals against academic assessment**


**Charter of student rights**


**Guild student centre contact details**


**Supplementary Information**

I would wish to hand out this information sheet to the students at the beginning of the unit.