316-663 Environmental Economics and Strategy

**Unit coordinator:** Professor Harry Clarke is contactable at this - and please only this - email address Harry.Clarke@optusnet.com.au or, at an *absolute* pinch, on mobile 0400857951, office at 94791732, home at 94993212. I prefer email inquiries so that I can collect my thoughts before responding to an inquiry. I generally won’t respond to inquiries about information that was missed through non-attendance at class.

Consultation times to be arranged at University of Melbourne by appointment preferably before or after the weekly classes. Again I prefer to arrange appointments by email.

I will seek to meet with *every* student during the unit to discuss their progress and any problems they may be encountering. These meetings will begin after week 3. Generally I will arrive early for each class - I typically have a coffee before each class in the student Union - and welcome discussion of materials and questions about unit content then.

If you have problems with course material see me immediately. I *am paid to help you.* There are no silly academic questions and my only frustration arises with students who complain at the end that they did not understand something without ever asking questions!

**Purpose of this unit.** There are three main objectives of this unit:

(i) To provide *all* participants with enough knowledge so that they can appreciate the way economists view environmental problems. In a practical sense participants will be taught enough environmental economics so that they can appreciate the broad perspective that economists take.

(ii) To provide participants with enough background knowledge so that they can apply important fundamental parts of economics to analyzing environmental problems.

(iii) To provide participants with an introduction to the analysis of environmental policies from an economics viewpoint.

**Prerequisite:** Knowledge of some basic economics is helpful but not at all essential - no prior knowledge is assumed. Those without any economics need to make an initial sustained effort. The initial class of three hours will be held revising basic ideas of microeconomics.

**Timetable for classes:** Tuesday 6-15pm – 7-15pm (tutorial), 7-15pm-9.15pm (lecture) all in Sisalkaft Theatre 1-2.

**Contact:** 2 lectures and 1 tutorial per week.

**Assessment:** Final 2 hour exam (70%), seminar/tutorial performance (15%) and a 2,500 word essay (15%). Regular attendance at lectures and especially tutorials is expected. Those with good economics backgrounds can skip the first couple of tutorials but thereafter attendance is required.

Failure to complete any component of the unit will result in grade zero being assigned to that component. I am a simple person who does exactly what he says he will do. No arguments, no negotiations, no exceptions!
Text: Comprehensive notes are provided online and any of the texts below can be utilized. The book by Tietenberg is very good and I draw on parts of the Ward text but each of these books adopts an approach different from mine.

The online material is provided at LMS which can be accessed at:

http://www.lms.unimelb.edu.au/

Students will need to then login and the subjects they are enrolled in will appear for them to choose from. Note that there are live links in many parts of this document.

You will need to copy an electronic version of this document onto your computer to access this material simply by clicking on relevant hyperlinks. Sometimes hyperlinks are disconnected and you may not be able to access material. You then need to go to the library!

References – Books

Tom Tietenberg & Lynne Lewis, Environmental and Natural Resource Economics, Addison-Wesley, 6th edition, 2010. (Very good! Used in parts of unit.)


References – Academic Journals

Many environmental and resource economic issues are published in mainstream economics journals such as the American Economic Review, Journal of Political Economy or the Australian journal the Economic Record.

Journals with a specific resource and environmental focus include:

- Journal of Environmental Economics and Management
- Natural Resource Modeling
- Resources and Energy Economics
- Land Economics
- Australian Journal of Agricultural and Resource Economics
- American Journal of Agricultural Economics

For the most part you will not need to consult these now but it is important to know where these key sources are.

Professional Associations

Much environmental economic research in Australia is carried out in the Australian Agricultural and Resource Economics Society which publishes the Australian Journal of Agricultural and Resource Economics. This society runs an excellent Annual Conference in February each year. For further information see http://www.aares.info/.
Course Outline

The main sources used in writing up class materials are listed. You are not expected to read all references though you will know where to find additional information should you need it. Required reading for examination purposes is denoted (**) while recommended reading is denoted (*).

Further references will be provided during class.

My PowerPoints and lecture note material are provided at http://www.lms.unimelb.edu.au/ (you need your username and password) as well as detailed background reading. All lecture notes have selected material deleted to encourage students to attend class. Copying the PowerPoints and then skipping classes is not the path to success in this unit.


The main ideas of microeconomics. Supply, demand and market equilibrium. Producer, consumer and social surpluses are explained and used to assess market efficiency. Elasticities of demand. Willingness-to-pay and willingness-to-accept-compensation. Production possibility frontiers. Those without an economics background need to make an real effort here

(**) H. Clarke, Powerpoints and notes.
Ward, pps 35-68.  (Discussion from a distinctively environmental perspective).
Tietenberg/Lewis Chapters 1 & 2.


What is distinctive about resource and environmental economics? The market failure rationale for government intervention to deal with environmental problems. The first and second theorems of welfare economics. Merit goods and income distribution. This starts you on a path to looking at resource and environmental issues from an economic perspective.

(**) H. Clarke, Powerpoints and notes.
A reasonable Wikipedia entry here.


(**) H. Clarke Powerpoints and notes.

(*) Tietenberg Chapter 4.


**Topic 4. Road Congestion, parking and pricing (2 classes).** 23 March 2010.

The basic economics of congestion, hypercongestion and congestion tolls. Parking economics and ‘free’ parking. Supply policies. Policies for Melbourne. This is an accessible application of externality modeling which is of intrinsic importance.

(**) H. Clarke, Powerpoints and notes.


Tietenberg/Lewis Chapter 17.


A recent paper that also addresses pollution externalities is:


For good discussion of the Braess Paradox see the wikipedia entry [here](http://ssrn.com/abstract=1149604).

On parking see:


**Topic 5: Cigarette smoke – internalities and externalities (1 class).** 30 March 2010.

Cigarette smoking is the major preventable cause of death in the world today. The externality issues are not as significant however as are issues of consumer irrationality. An exercise in thinking clearly about what motivates policy on the basis of market failure issues.

H. Clarke, Powerpoints and article by Clarke/Collis.


(**) H. Clarke, Powerpoints and notes.
(**) Tietenberg Chapter 17.

Most microeconomics texts contain a discussion of property right regimes. They may not include discussion of club goods but this is straightforward and the class materials should be sufficient to cover this.

A reasonable Wikipedia discussion of public goods is here. On common property here.
A nice game theoretic model is P. K. Dutta, Strategies and Games, The MIT Press, 2001, p 91-102. This however uses maths.
An excellent Wikipedia article on the ozone layer is here.

**Topic 7: Global Public Goods and Climate Change (4 classes) 13th April and 20th April 2010.**

Climate change is the most significant environmental issue to ever confront humanity.

We discuss various topics here but start with the basic science, then some economics, then various adaptation problems. We will discuss the CPRS or emissions trading scheme. The major references on climate change are available online. In fact there is enough reading here to keep you going for a year. Among the references cited I think the Baker et al. report is a practically useful – and not over-lengthy way of getting into the modern debate. You can then try the other reading.

(**) H. Clarke, Powerpoints.

Intergovernmental Panel on Climate Change (IPCC) (here). There are three recent reports here: The physical science basis; Impacts adaptation and vulnerability; and, Mitigation of climate change. There is a lot of material here summarized in the Synthesis Report (here).


For an assessment of the Stern Review methodologies see:


J. Quiggin, ‘Stern and the critics on discounting’ mimeographed. 2006. (hopefully here).

For a critique of Stern based on the perspective that it understates dangers see:


For an attempted synthesis by an economic theorist:


Current government policies on emissions trading (hot off press!):


On biodiversity adaptations you might want to look at:


On climate change policies under uncertainty:


On strategic issues see:

The excellent wikipedia entry on global emissions (here) and this from *Carbon Planet*.


(***) H. Clarke, *Powerpoints*.

(*) Tietenberg Chapter 3.
Ward 93-126, 127-149, 150-188, 581-590. (Lengthy but very good!)
Basic material is available in all environmental economics texts. See e.g.: Callan & Thomas op cit. Chapters 6-8.
For advanced discussion see:
We discuss in passing:

Exhaustible resources and increasing scarcity. The Hotelling rule. Resources as a limit to growth. An introduction to dynamic policy modeling of environmental and resource issues. Exhaustible energy resources. Peak oil.

(**) H. Clarke, Powerpoints and notes.
(*) Tietenberg pps. 128-180.

The economics of renewable resources (fisheries, forestry, aquifers, self-renewing environments). Modeling of renewable resource management issues. Open access and common property resources.

(**) H. Clarke, Powerpoints and notes.
(*) Tietenberg pps. 258-313.
World Resources Institute & others, pps. 292-302, 313-318.
The classic modern treatment of forestry issues is P.A. Samuelson, ‘The economics of Forestry in an Evolving Society’, Economic Inquiry, 24, 1976, pp. 466–492

Decision-making in environmental situations where there is simultaneously risk and uncertainty. Dynamic programming. Endangered species issues. Irreversibilities, uncertainty and climate change. This work is on the frontiers of contemporary work but of immense importance and fairly accessible.

(**) H. Clarke, *Powerpoints* and notes.


R.S. Pindyck, ‘Uncertainty in Environmental Economics’, Available online [here](http://www.aei-brookings.org/admin/authorpdfs/page.php?id=1349&PHPSESSID=712b1a7d3c6f4b98e73ff8c51090e13)


We will review the contents of the unit. A question I like to pose is whether course participants have come to see the value of the economics approach. What are the limitations of the economic view.

(**) H. Clarke, *Powerpoints*.

*Tutorials*

There are eleven tutorials in all. Tutorials commence in week 2 of the course.

Tutorial performance will be assessed as 15% of the total course assessment. This will involve making a short presentation.

You **must** maintain a satisfactory attendance at tutorials.

A roll will be maintained and **grade zero for the tutorial assessment will be assigned to those skipping more than a two tutorial classes**. Experience has demonstrated to me that students not attending tutorials have problems. Thus non-attendance at tutorials is **penalised** but attendance, in itself, is not rewarded. You are expected to contribute to classes either by answering questions or by explaining clearly the difficulty you experienced trying to answer them.

It is essential that you spend **at least** (a minimum that will generally be insufficient) half an hour glancing through the tutorial questions assigned each week and an hour or so thinking
about the seminar topics to be presented. Most of the final examination will be based on questions – and discussion – that occurs during the tutorials.

The first few tutorials involve set questions. Then there are seminar/discussions. In most cases these tasks involve doing Google searches and a search of the economics journal literature.

Presentations will begin in the tutorials in week 5. Group rather than individual projects are encouraged. I will award a total mark for each assignment based 50% on the verbal presentation and 50% on the written assignment. The marks will be averaged across contributors unless contributors vote among themselves and agree to an alternative weighting. You must coordinate with other members of the group – independent presentations by single members of a group are not sought.

Top grades will be awarded for clear presentations that present a cohesive viewpoint simply. Presentations crammed with a myriad of views that are unclear will receive low grades even if a lot of work has gone into them.

Verbal presentation should be for a maximum of 20 minutes and all members of a group should contribute something. **After 20 minutes you will be cut-off irrespective of whether you have finished or not – no exceptions.** Moreover you will lose marks if you do not finish!

Try to make a few issues clear rather than presenting a host of issues in a rushed way.

Time for discussion is 10 minutes and all class participants must be prepared to ask a question or make a comment.

**Non attendance at a discussion where you have agreed to present means an automatic loss of all marks (worth 15%) both for written or verbal presentations.**

All projects should be typed with an electronic version supplied to me at least 5 days before the presentation (generally on the Monday before) which I will place on the unit website. This means emailing me the presentation by the night of the Thursday before the class.

**Marks will be deducted if material is not ready for posting 5 days in advance.**

Total length (excluding references) should be less than 2000 words but can be less than this. References to all websites and all articles used must be provided.

The projects need to be presented in order from week 4 onwards.

**All presented material is examinable. The specific topics are set out below**
Tutorial 1: 9th March 2010

Review the following concepts. Ask if you are unclear about any of them. (Remember that I am paid to explain these things to you. Make certain you understand clearly).

- Microeconomics.
- Markets.
- Agents acting as buyers and agents acting as sellers.
- Demand, quantity demanded, willingness-to-pay.
- Supply, quantity supplied, willingness-to-sell.
- Choke and shut down prices.
- Market equilibrium, excess demand, excess supply.
- Exogenous and endogenous variables and comparative statics.
- Pareto improvements.
- Pareto efficiency.
- Marginal willingness-to-pay.
- Net consumer surplus.
- Gross consumer surplus.
- The water-diamonds paradox.
- Producer (or seller) surplus.
- Social surplus.
- Voluntary exchange theorem.
- Deadweight loss.
- Price supports and price controls.
- Optimality of free market exchange.

There are many un-worked problems below which is more than will usually be set. Do what you can!

1. Exposit the economic model of market equilibrium. What is the distinction between *exogenous* and *endogenous* variables in this model?

2. What is meant by the price taker assumption for buyers and sellers? When are buyers or sellers price takers? What is a *competitive market*?

3. Explain clearly to your boss who has never studied any economics what is meant by a consumer’s demand schedule in terms of that consumer’s *willingness-to-pay*. Similarly interpret a supply curve in terms of a vendor’s *willingness-to-sell*.

4. What is meant by *comparative statics*? Illustrate the comparative static effects on the competitive market equilibrium for recreational environmental resources of an increases in incomes in a developing country.

5. Illustrate, using demand and supply curves respectively, the distinction between demand/supply and quantities demanded/quantities supplied.

6. Analyze the impact of:

   (a) A technological innovation that allows more efficient production.
(b) An increase in wage costs, on market equilibrium for consumer durables such as a refrigerator.
(c) An increase in consumer incomes on the demand for second-hand clothing.
(d) An increase in consumer incomes on the demand for international travel.

7. Why is a firm’s supply curve vertical in the short-run?
8. What is meant by Pareto efficient and Pareto improvement in welfare?
9. What is the ‘invisible hand’? How do prices act as an allocative device?

**Answer:** This is a tough question that all students of economics should begin to think about. It is a basic theme in economics. At first sight one might think the capitalist system will produce chaos. Consumers selfishly maximize their satisfactions (utilities) while producers greedily maximize their profits. No one coordinates who gets what or who produces what but still there is often not chaos and generally nobody starves. The way that individual greed and selfishness can lead to an orderly efficient economy was described by Adam Smith as the 'invisible hand':

“As every individual, therefore, endeavours as much as he can both to employ his capital in the support of domestic industry, and to direct that industry that its produce may be of the greatest possible value; every individual labours to render the annual revenue of the society as great as he can. He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its production may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of society more effectually than when he really intends to promote it.” (Adam Smith, *The Wealth of Nations*, Edited with an Introduction and Notes by Edwin Cannon, Fifth edition, 1994 (originally published in 1898)).

Adam Smith, a Scotsman, is a towering figure in economics. He is regarded by many both as the founder of economics as a science and as one of the great economic minds. His *Wealth of the Nations* is a classic economic treatise that explains the division of labour; the determination of prices of goods and incomes of workers, capitalists and landowners.

Prices act as an allocative device by providing goods and services to those who will pay for them. Other allocative devices include the central government giving goods to individuals (via types of socialism), people stealing the goods they want or various rationing schemes.

10. Draw a diagram illustrating the circular flow of economic activity.

**Answer:** Households own the labour, land and natural resources that business firms require to produce the goods and services that households want. Firms pay households wages, interest, rents and so on for the services households provide. Households then use the income they receive from business firms to purchase the
goods and services produced by firms. The incomes of households are the production costs of business. This is the circular flow.

11. (a) What is an equilibrium in the market supply and demand model? Why cannot equilibrium be maintained with an excess of supply over demand? (b) Is the labour market in Australia in market equilibrium?

12. The demand for Australian brandy per year is given by $D=15-0.6P$ while supply is $S=5+0.4P$. Show that, in equilibrium, 9 units are sold at an equilibrium price of $10.

**Answer:** This is an important example showing how to determine market equilibrium in a simple linear model. All that is needed is linear algebra. Check carefully that you understand the steps below.

Equilibrium requires $D=S$ so $15-0.6P=5+0.4P$. Hence equilibrium price $P^*(0.4+0.6)=(15-5)$ so $P^*=10$. At price $10$ demand (equals supply) is $D^*=15-0.6P^* = 15-0.6*10 = 9$ so 9 units are sold.

13. Illustrate using graphs of the supply/demand model the following comparative static effects:

(a) Market equilibrium for cigarettes following increased government spending on advertising warning of the effects of smoking on lung cancer.
(b) Effect on markets of imposing a lump-sum tax on suppliers.
(c) Market equilibrium for rental accommodation when maximum rent restrictions are imposed on property owners.

18. How will the ‘invisible hand’ (the market mechanism that stems from individual self interest) help ensure that the world does not run out of energy by the year 2010? Can the world ‘run out’ of oil?
**Hint:** What happens as oil gets scarce and prices rise? Plausibly exploration will increase as will the use of substitute fuels. Suppose the world is down to its last billion barrels of oil. Will this be sold at prevailing prices if sellers believe it will be in very high demand in the near future? Will they not hold a bit more? Now think!

19. (a) What do *consumer surplus* and *producer surplus* measure?
(b) Provide graphical measures of the consumer and producer surplus derived in a market with linear supply and demand which clears at equilibrium price \( p^* \).

20. When inverse demand is \( p = 50 - 0.5x \) compute the loss in consumer surplus when a tax drives price from $1 to $5.


22. (a) What is *social surplus*?
(b) Explain the *voluntary exchange theorem*.
(c) Prove that *price supports* impose deadweight losses.
(d) An economic policy creates disadvantages for one group of citizens and advantages for another group. When do *deadweight losses* arise?

23. The demand for caviar is \( x = 300 - p \) and the supply is \( x = (p - 60)/2 \) where \( x \) is the demand in jars per month and \( p \) is price per jar. Suppose a tax of $15 is imposed on each jar of caviar.

(a) What are the equilibrium quantities sold and what prices are paid before and after the tax?
(b) How much consumer surplus is lost due to the tax?
(c) How much producer surplus is lost due to the tax?
(d) What is the value of taxes collected?
(e) What are the deadweight losses?

**Answer:** (a) The equilibrium price before tax is where \( 300 - p = (p - 60)/2 \) when \( p^* = $220 \) and \( x^* = 80 \). The tax reduces the receipts of sellers by $15 per jar. Thus supply shifts to \( x = (p - 75)/2 \). This equals demand when \( (p - 75)/2 = 300 - p \) which implies an equilibrium selling price of $225 with a net price paid to producers of \( p = $210 \). At this prices sellers sell \( x^* = (225 - 75)/2 = 75 \) jars.

(b) To answer (b) graph the supply and demand curves:
(c) The lost consumer surplus is original consumer surplus \((80*80)/2\) less the new level of consumer surplus \((75*75)/2\) which is $387.50.

(d) The lost producer surplus equals the original producer surplus \((160*80)/2\) less the new producer surplus \((150*75)/2\) which equals $775.

(e) The deadweight losses here equal the excess of the consumer plus producer surplus losses \((387.50+775=1162.50)\) over the tax collected \((1125)\) which is $37.50.
Tutorial 2.  16th March 2010.

Review the following concepts. Ask if you are unclear about any of them.

- The distinction between natural and environmental resources.
- The distinctiveness of environmental economics.
- The First and Second Theorems of Welfare Economics.
- Public goods and private goods.
- The market failure reasons for activist economic policies.
- Second-best theory.

1. (a) Calculate the equilibrium market price in the market with the linear supply curve \( q^s = 12.0 + 0.5p \) and the linear demand curve \( q^d = \alpha - 1.0p \) where \( \alpha \) is a parameter. Show that an equilibrium price exists only when \( \alpha > 12 \) but that for \( 0 < \alpha < 12 \) the good can be provided free. Is it ever appropriate to assign environmental resources a zero price?
   (b) Economists distinguish between open access use of a resource (take the case of a forest) where there are no restrictions on resource use, common property where a community shares the resource in accord with community norms and private ownership which is exclusive and involves no sharing. When are each of these regimes efficient and when are they inefficient?

2. In what sense is the price-output equilibrium produced by a monopoly wasteful? (If you know a bit of monopoly theory then you should be able to prove that monopoly creates deadweight losses). Suppose a vital energy deposit, e.g. oil, is owned by (i) a monopolist, (ii) a corresponding competitive industry. Which ownership structure will be more conservationist? Which will be more efficient?

3. A train passes by housing at 3:00am creating noise and vibrations which jolts occupants of the houses out of their sleep. Two economists are employed to deal with the issue. One says that the problem is due to the property rights do not exist for the right to create rail noise/vibration in the region and that this right should be sold by the residents to the railway at the smallest price that will just compensate the residents for their disturbed sleep. The other economist disagreed arguing the problem arose from the nonexistence of a market for the right to sleep. Thus the residents should pay the railway the minimum amount necessary to prevent it disturbing their sleep. Which economist is right or are both right? (A celebrated theorem by Ronald Coase, that we will eventually discuss, states that ignoring transactions costs and income distribution each of the economic prescriptions here define an efficient equilibrium outcome.)

4. When does the ‘invisible hand’ fail in resource markets? Provide various examples of market failures that motivate activist resource and environmental policies.

5. Willie the Wimp and Eccles the Economist are debating the case for levying a tax on car emissions that reduce air quality. Willie argues that a tax will fall inequitably on the poor who need to use their car to make long cross-town journeys to their workplaces. Hence he argues the tax should only be imposed on citizens whose total family income exceeds $40,000 annually. Eccles argues that the tax should be imposed all on with compensating income transfers from rich to poor being used to deal with the issues of income disparity. Who is right?
6. A newly-graduated student with first-class honors in economics from the University of X is employed by a local government as an advisory economist. In his first week she proposes an overall of the system of charging for urban waste disposal. The gist of her argument runs as follows.

‘Currently household waste is charged for with a fixed charge through local government rates. Thus the charge is independent of the quantity of waste disposed of. But the cost of disposing of waste increases with the quantity of waste disposed. Thus there are incentives for households to dispose of socially excessive waste. Hence we could improve efficiency in waste disposal by levying a charge for waste disposal that reflects the marginal cost of such disposal. If the sum of such charges did not add up to total costs the residual could be funded from council rates’.

Analyse this suggestion. When will it be a useful proposal and when will it not work?
Tutorial 3. 23rd March 2010.

Review the following concepts. Ask if you are unclear about any of them.

- Externality
- Production and consumption externality.
- Positive and negative externality.
- Marginal social costs and marginal private costs.
- Marginal social benefits and marginal private benefits.
- Pigovian taxes.
- Market creation.
- Bargaining and the Coase theorem.
- Optimal pollution.
- Direct controls versus economic instruments.
- Tradeable pollution permits.

1. What is the case for pricing an environmental resource at its marginal social cost? What are the practical difficulties of implanting such a policy?

2. When does Coase’s analysis resolve the externalities issue? What are the impacts of transaction costs and strategic behaviour in limiting the applicability of this approach?

3. A river runs through a city. Upstream is a factory which pollutes the river downstream with a toxic byproduct. Also downstream is a freshwater fishery whose fishery outputs are diminished because of the upstream pollution. Property rights to use of the river are as yet unassigned but they will be assigned by the Commissioner for Cleanup in a decision she is about to make.

   (a) Is the current pattern of production in the two firms inefficient? Is there a net social loss associated with the pollution if costs of internalising the externality are $R$?
   (b) Explain to the Commissioner how the Coase theorem can be used here to achieve economic efficiency. Are the different approaches to equilibrium equivalent in their distributional effects? What sensible criteria can you come up with to determine who should gain exclusive property rights to use the river.

4. Think about the various externality-internalising policies you have discussed in class with respect to (a) air pollution in a city; (b) positive wilderness benefits from a wetland; (c) the positive externalities society derives from educating university students. Which policy prescriptions work well?

5. Consider status conscious individuals who gain high utility if their own income is high but negative utility (envy) from their neighbour earning high income. Suppose also that incomes are determined by work effort.

   Analyse this issue as an externality problem and show that the resulting outcome involves a ‘rat race’ where everyone works too hard. Provide an externality-resolving solution to this externality problem.
Tutorial 4. 30\textsuperscript{th} March 2010.

Student presentations begin this week.

1. How should the city of Melbourne adapt to the prospects of enhanced climate change?
   References: You might want to begin with this:

2. How might you apply the analysis of Shoup to the issue of parking policies in the city of Melbourne?
   References: Shoup (Topic 4), Clarke (Topic 4)

Tutorial 5: 13\textsuperscript{th} April 2010.

3. What can economists and environmental managers learn from environmental history?
   References
   A starting point is the wikipedia entry here.
   T. Griffiths & L. Robin (eds), \textit{Ecology and Empire: Environmental History of Settler Societies},

Tutorial 6. 20\textsuperscript{th} April 2010

5. Assess the Nordhaus critique of the Stern Review. Are Stern’s discount rates too low?
   References: Nordhaus (Topic 7).

6. What issues are involved in changing Australia’s system of nature conservation reserves to accommodate climate change?
   References: Clarke (Topic 7), Dunlop & Brown (Topic 7).

7. Is contingent valuation nonsense? When do voting procedures outperform other decision-making approaches?

References: A vast technical literature here. This is a bare introduction with the main references:

The following provides an assessment of alternative approaches?

Alastair Munro, Optimal decision processes: on the choice between environmental valuation methods. (copies available online).

8. When will oil supplies start to exhaust in an economic sense? What are the implications for energy planning of the ‘peak oil’ debate?

References: You might want to start with one side of the debate here:
http://www.peakoil.net/.

There are many other views.


9. Describe the implications of over-fishing catastrophes for the management of pelagic fish stocks.

References: You might start here:

http://kalimna.blogspot.com/2006/05/overfishing-catastrophes.html

10. What lessons can be learned from the Brander-Scott model of Environmental Destruction on Easter Island?


11. Distinguish between the economic problems posed by onsite and offsite agricultural land degradation.

References

My notes on land degradation.
The Murray Darling Basin is discussed in Crase chapters 7 & 8. The paper by Terry Hillman in Crase is very good – it focuses on environmental, mainly biodiversity, implications of irrigation. A brief account is on my website [here](#).
You might also consult the Murray Darling Basin Commission website [here](#).

12. Is population growth the enemy of the environment or is the problem poor environmental policy?

References

My notes on population and the environment.
Tietenberg pps. 103-126.
World Resources Institute & others, pps. 141-151, 244-253.

Tutorial 10. 18th May 2010.

Biodiversity

The conservation of biodiversity is an important issue in environmental economics. This class attempts to involve you in some of the relevant literature. General references:
My notes on biodiversity conservation.


References:


14. How should Australia prioritise the conservation of biodiversity?

References:

The *Environment Australia* webpage.


Tutorial 11. 25th May 2010.

15. Is there evidence that the incidence of drought is increasing in Australia with climate change? Should drought relief be provided to farmers? How?

References:


16. Discuss the main ideas in Pindyck’s paper on uncertainty in environmental economics. Apply the analysis specifically to climate change issues.

References: Pindyck (copies available online)
Course Essay

All students should complete an essay that should be submitted at 5pm Tuesday 10\textsuperscript{th} May, 2009. The essay must be typed, correctly referenced and footnoted and should be of less than 2500 words in total. The essay contributes 15\% of the course assessment.

The essay is due at the class on 18\textsuperscript{th} May, 2010. Both a hard copy must be handed in and an electronic copy forwarded to harry.clarke@optusnet.com.au by that date.

If only an electronic copy is submitted by the due date it will not be graded.

No extensions on the essay are possible. The essay topic assigned in the first class.

If essays are not submitted by the due date a zero grade will be given and the weight assigned to the final examination increased to 80\% - so there is a 10\% aggregate grading penalty for not doing the essay.

Essay topics:

1. What respective roles do public sector planners and the private sector have in adjusting to climate change with respect to:

   Urban land-use and planning

   or

   Australian agriculture?

2. How should Australian policy-makers assess the risk of possible catastrophic climate change outcomes?

3. Is the Stern Review ‘alarmist and incompetent’ or ‘reasonable and carefully argued’?

4. Assess the ‘peak oil’ literature. What will be the course of oil prices over the next 50 years?

5. Assess the future of international fisheries. Will management policies succeed?

If you have a particular environmental interest that you would like to pursue – particularly if it relates to the local Melbourne area - please discuss with me. It may be possible to devise an essay topic related to this interest.

Prof. H. Clarke
Melbourne, February 2010.