

COURSE OUTLINE: GEOG 3411 –Resource Mgmt and Sustainability (W) 2020

- Prerequisite(s):** Geography 1150 or 1170 or permission from the Chair of the Department of Geography and the Environment
- Required Text:** Harris, J. M., Roach, B. 2018. Environmental and Natural Resource Economics: A Contemporary Approach, 4th Edition. Routledge, New York, NY. 645pp. ISBN 9781315620190 (ebook).
(Harris, 20170626) [VitalSource Bookshelf version]. Retrieved from: vbk://9781317216209
- Supplementary:** Mitchell. B. 2015. Resource and Environmental Management in Canada: Addressing Conflict and Uncertainty 5th edition. Oxford and New York: Oxford University Press. 608 pp. ISBN - 13:9780199009886
- Instructor:** Dr. Mitchell Taylor, Department of Geography
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Office Hours:

Office location: RC 2006E Thunder Bay Campus. Office hours are M-W from 10:30 – 12:00 or by appointment for those with access to the Thunder Bay campus. Hopefully most questions or issues can be resolved through correspondence. However, I am happy to meet with you at a time that works for both of us if that is possible.

Communication:

Please use the email address above for all digital communications. I will not monitor the D2L communication option because there is no need for two independent addresses. Please consult the reference materials before emailing me with a question. The Course Outline may be updated periodically, so please check it periodically. Questions are welcome, but please be patient. I will reply as soon as I can.

Introduction:

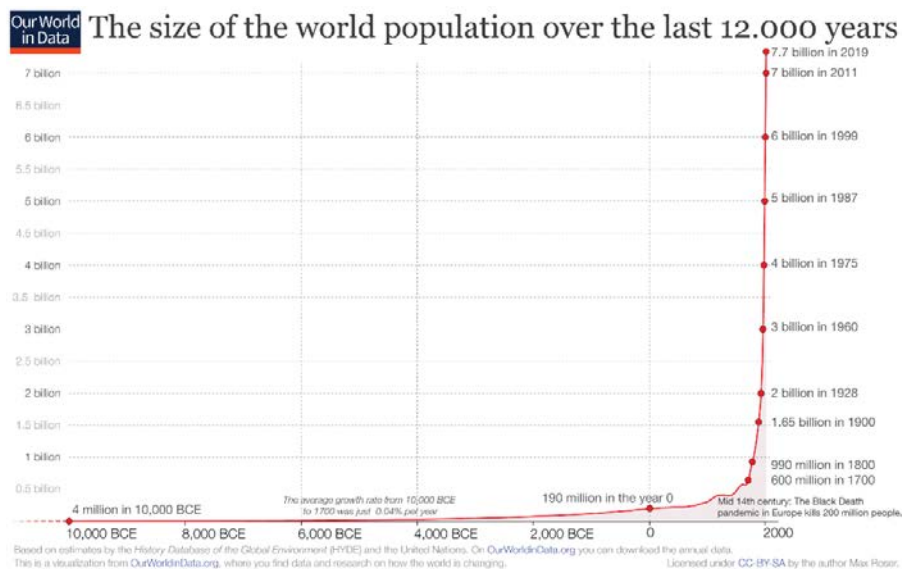
My BSc and MSc are from the Department of Biology at Kansas State University. My PhD. is from the Department of Ecology at University of Minnesota. I did post-doctoral work and lectured at the Faculty of Forestry at University of British Columbia. I then joined the faculty at the Fisheries and Wildlife Department of Michigan State, but left that job to work as polar bear biologist for the Northwest Territories Department of Renewable Resources. That position transferred to Nunavut when the NW Territories divided. I was Manager of Nunavut's Wildlife Research Section for my last few years in

the north and moved to the Thunder Bay area in 2008. I am currently an adjunct professor with Geography and the Environment, and I am teaching this course as contract lecturer.

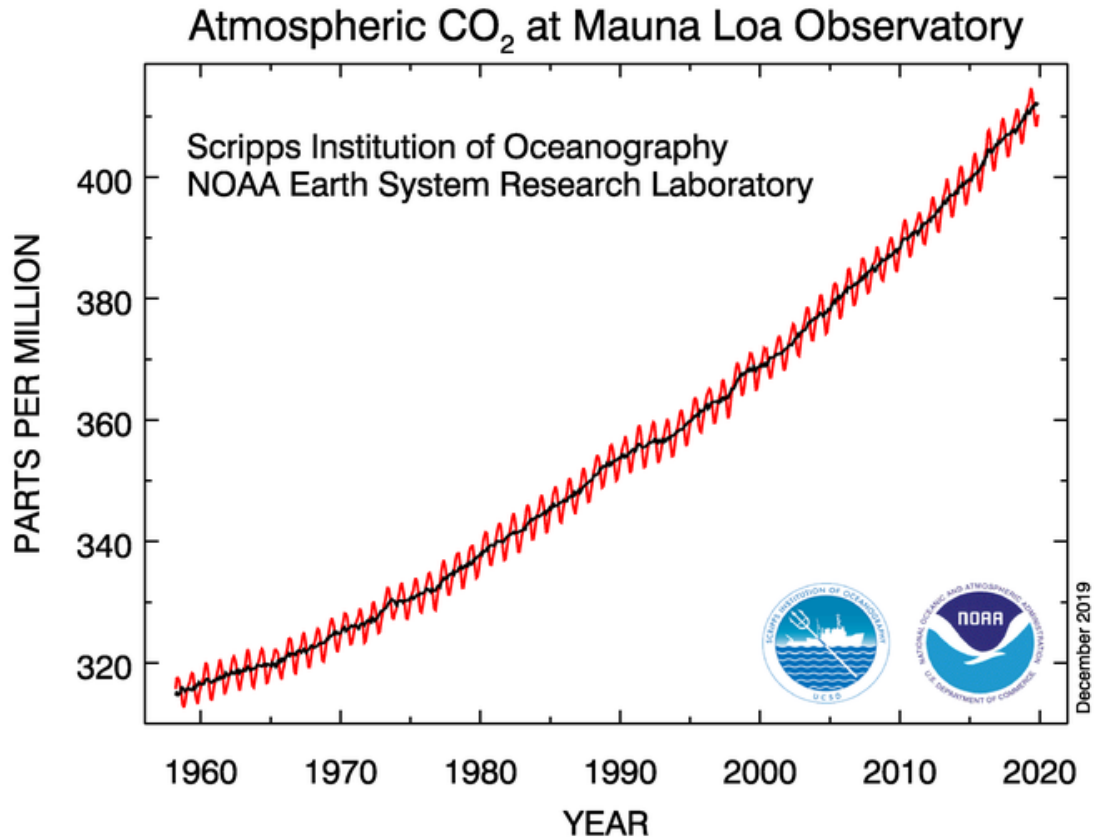
Course Context:

Perspectives on sustainable resource management have changed greatly in the last 50 years. The world population doubled from 3.7 billion in 1970 to 7.5 billion in 2020. About 7% of all people who have ever lived are alive today. By 2050 about 9% of all people who have ever lived will be alive (9.8 billion). The UN estimates world population will be at 11.2 billion by 2100, but the confidence interval for that estimate is 7.2-16.5 billion. If everyone ate a vegetarian diet, the earth could feed about 10 billion people.

About 10,000 years ago there were about 2.5 million people living mainly as paleolithic hunter-gathers. In response to climate cooling, some of these people began practicing agriculture in the Mesopotamia region of Asia. The practice spread, and civilization began. These few and scattered people caused only local and minor environmental impacts. Until 1700 world population numbers only doubled every thousand years, so by the time of Christ world population was only ~188 million. By 1700 (the Age of Discovery) the world still had only 600 million people. However, the Industrial Revolution brought on advances in medicine and agriculture that caused a dramatic increase in human population growth rate. By the early 1900's human numbers had risen to 1.7 billion; and the development of commercial fossil fuel technology accelerated human population growth rate even more. By my birthday (1949), human numbers had increased to 2.5 billion; which means I have personally seen human numbers triple (increase by 5 billion) over my lifetime. The use of fossil fuel allowed both human numbers and the **per capita** GDP to increase exponentially. It is not an exaggeration to say that currently our economy and our civilization runs on fossil fuel.



The annual use of fossil fuel has increased every year up to the present (2020). The result has been a steady increase in atmospheric CO₂.



Reducing human numbers to a level that would:

- 1) allow civilization to persist at levels that would support a good quality of life (good economy) for all,
- 2) allow a diversity of cultural and spiritual societies,
- 3) continue to advance our knowledge and technologies,
- 4) have only local and temporary environmental impacts to essential ecosystem services and on biodiversity

would seem to be the obvious way to manage resources in a sustainable manner.

Yet only a few NGOs are advocating population regulation and population reduction as practical method of containing and reducing environmental impacts. No one on the left or the right of the political spectrum thinks population regulation is a good idea. There are no UN initiatives or national programs to regulate or reduce population numbers. The 17 UN Sustainable Development Goals that are intended to remedy and reverse environmental and ecosystem declines around the world do not contain any mention of stabilizing or reducing human population numbers except through voluntary measures associated with anticipated social and economic reforms (the demographic transition).

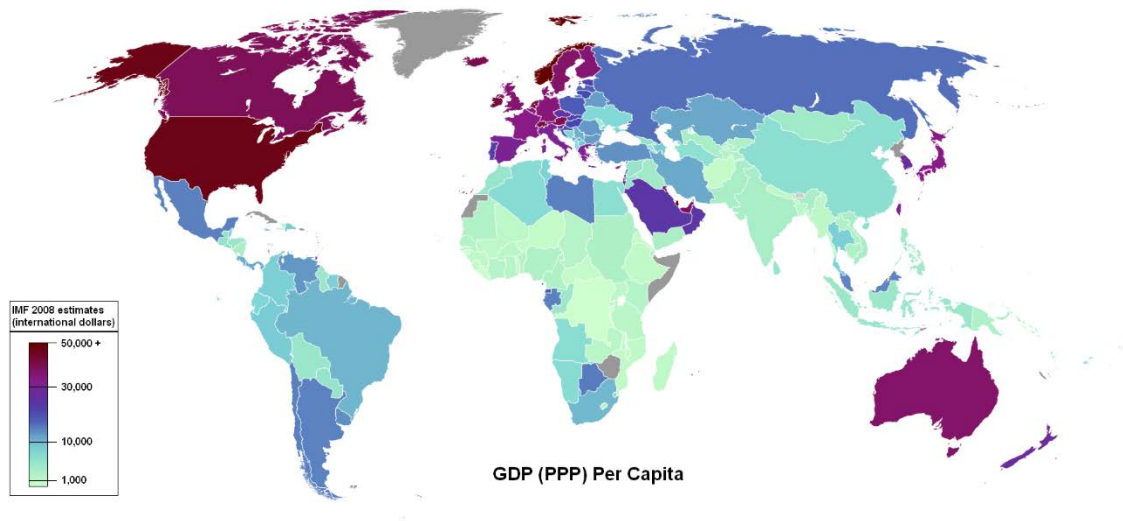
We will consider the historical development of Sustainability initiatives, and see that the term “sustainable” has evolved from a biological term describing removals from a population or ecosystem at a rate managed to be less than the rate with which the population or ecosystem renews itself; to “Sustainable Development”. Sustainable Development has been summarized as: “Economic development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. However, unlimited real economic development is required to meet the needs of an unlimited population growth, or the quality of life declines. Eventually the finite ecosystem resources of the earth will be insufficient to sustain economic growth without causing harm and insufficiency to future generations.

The 20th Century experienced two world wars mainly because economic conditions created a political environment in disadvantaged nations that prompted them to extreme forms of nationalism and war. The 20th Century also experienced the Cold War (between 1947 and 1991) that pitted Economic and Ideological Communism against Economic and Ideological Capitalism. The result of the Cold War was that free market capitalism essentially replaced the various flavors of communism throughout the world. Although the failure of global communism does not imply that capital can increase without bounds forever; the Cold War did make it apparent that democratic capitalism was better than communism ... especially to people living in communist countries.

Adam Smith’s *Wealth of Nations* (1776) was the basis of classical economics. Smith asserted that there is a natural system of laws that governs free market economies, which (if left alone by government) works to improve the quality of goods and services, reduce the price of goods and services, ensure fair wages for labor and fair costings for rents, and works (through trade) to promote peace and prosperity. Others (e.g., Karl Marx) have pointed out that such a system also tends to concentrate wealth over time into the hands of a few individuals; and that capital (in fact) cannot increase forever in the real finite world. Like a common chain letter, the end game of capitalism must be the decline of the middle class, impoverishment of lower classes, and rise of a police state to keep order and preserve the fortunes of the rich. You cannot become an investor if you must use all of what you earn to live. Also, there big benefits to capitalists who can develop a monopoly on the goods and services they produce at the expense of the consumers of those goods and services. So democratic government does have an essential role to play in the regulation of the free market economy. But too much government interference in free market economics causes economic decline and failure. Although it is often stated and entirely self-evident: Governments produce nothing by themselves, they only tax and spend a portion of the wages and profits of the private sector. Thus, economic declines reduce the ability of government to provide for national defense, social services, infrastructure, environmental protection, health care, and education. Some nations have adopted policies of chronically spending more than tax revenues provide; and borrowing the rest to avoid reducing services, programs, and regulatory capacity. Such policies eventually lead to extended periods of low or even negative interest rates, which stimulates the economy and makes large government debt government affordable. However, when interest rates on savings are lower than the inflation rate, those who save suffer an annual loss in the actual value of their savings. Riding the lightning of deficit

spending is a risky and short-term economic strategy for both private and public institutions. Eventually the debt must be paid or the borrower must declare bankruptcy and be disallowed from further borrowing.

From a global perspective there is a massive regional imbalance in the economies and quality of life between developed and developing nations.



A good explanation of how global economic inequity developed is provided by: *Diamond, Jared M. Guns, Germs, and Steel: The Fates of Human Societies. New York: Norton, 2005.* In brief, Eurasian countries had a geographic advantage in the development of agriculture, technology, and warfare over the New World and Africa. The “Voyages of Discovery” were also voyages of European conquest and colonization. New World and Australian aboriginal peoples were decimated by European diseases deriving from domestic livestock previously unknown to these areas. The colonial system imposed through conquest and unfair trade practices resulted in widespread poverty, foreign ownership of most of the various colony’s resources and assets, and even slavery. In response to the hardships brought on by these practices, local people found security in large families that could buffer disease, starvation, and the lack of any social safety net. There are currently 61 colonies or territories still maintained by western nations. Conditions have improved greatly in these remaining colonies/territories, and most derive a net benefit from their current status. Independent nations that were former colonies receive aid and development loans from other nations and NGOs through a variety of programs, but many of them are so over-populated, have so few natural resource endowments, so little industry so little capital, and so little capacity for health education and social services ... that there is little hope to ever grow an economy sufficient to meet basic standards of living needs, let alone a viable middle class.

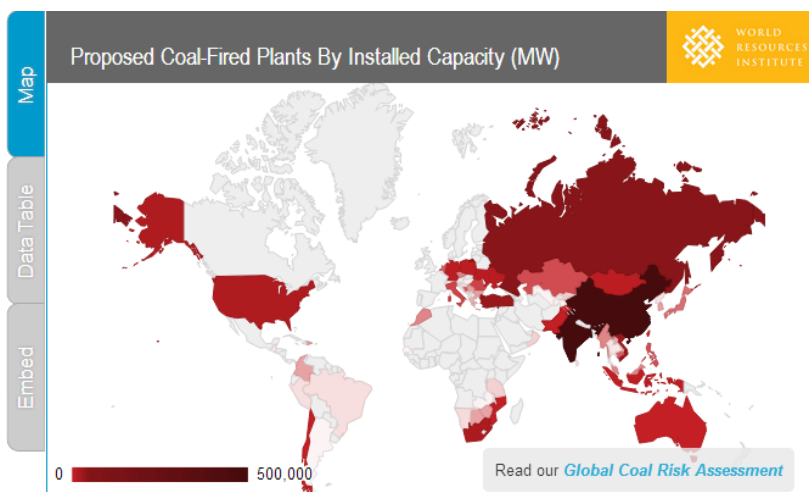
However, some former colonies and communist countries have embraced classical economics and become “Asian Tigers”. In 2014 China’s GDP and petroleum use exceed the US GDP and petroleum use. India’s economy is also very large and increasing faster than western economies. Other Asian economies (e.g., Japan, Indonesia, South Korea,

and Thailand) and Middle Eastern economies (e.g., Saudi Arabia and Iran) are also heavily industrialized) or are becoming industrialized because they have cheap labor and more favorable factor endowments compared to the west). China, India, and Japan have reduced their intrinsic population growth rates to almost 0, while developing a substantial and increasing middle class. About 60% of Chinese working age nationals are currently counted as middle class. By 2022 about 550 million people of China's 1.43 billion people will be middle class if the Chinese economy continues to grow at 7.5% or better. By 2022 there will be more middle-class citizens in China than the USA by a factor of 1.5.

In 2014 China's GDP (PPP method) exceeded the US GDP



The environmental costs of this economic “miracle” can be summarized by looking at CO2 emission for North America and the Euro block versus all other nations. Western nations currently emit only 38% of annual CO2 emissions while other countries account for about 62% of annual CO2 emissions.



In 2019, China and India increased coal emissions (0.8% and 2%, respectively). Coal emissions in other parts of Asia increased 4-5%. In 2019, overall global CO2 emissions increased by about 2%.

The economic miracle that many formerly developing countries have experienced is not a miracle at all. It is simply the result of the west exporting much of its heavy, medium, and light industry to parts of the world where labor was relatively cheap, raw materials are plentiful, and environmental standards low (if they existed at all). The west (North America and Europe) has also benefitted from the resulting globalized trade. However, offshoring has resulted in chronic unemployment in some areas and been particularly hard on blue collar workers. Canada's economy has historically been based on primary sector products (timber, minerals, energy) for export plus manufacturing. Our Canadian economy is tied to the global economy because the demand for commodities and goods is greater during periods of growth and expansion. Globalization (offshoring of labor-intensive manufacturing) has resulted in increased economic dependence on resource extraction, refining, and transportation of raw materials to foreign markets. This is gross over-simplification of Canada's economic system. But primary sector cost/benefit trade-offs between development and the environment are quite real and quite controversial in Canada. How these conflicts are resolved will have a significant impact on Canada's economy.

Sustainability has come to mean more than just continued growth with better environmental protection measures. As listed below contemporary "sustainability" has social, political, moral, economic, and conservation goals. Taken together these goals describe a transformation change the current world order and perhaps even human nature.



The clash between traditional (conservative) values and progressive (socialist) values is not new. What is new is the rate at which the earth and its resources are being saturated and sometimes depleted from human demands. Will the demographic transition be sufficient to slow and finally balance human numbers with ecosystem services? What sort of social and cultural changes will be required to accommodate that balance? How

will this transition be achieved in areas that are already over-populated (human numbers can only be sustained with massive perpetual external relief). Is CO₂ accumulation and climate warming a serious threat to the earth's biophysical systems, or just a clever way to slow down western economies while post-colonial economies catch up. Is what the 38% does with its CO₂ emissions even relevant if the 62% simply uses the fossil fuel that the West declines to better their own economies with cheap energy. Is equality for all peoples a realistic goal, or are we better off to adopt measures that will make us more competitive and secure, improve the quality of life for Canadian residents, while conserving our national environment.

The future is uncertain, and times of rapid transition require constant reassessment of national goals and personal values to stay grounded in the ever-changing underlying reality; and not become lost in the past or captured by a false narrative.

This then is the context of our text and our course. The authors of our text adopt a progressive perspective to the question of how to achieve sustainable development. Their answer is to borrow from classical (Adam Smith) economics and introduce new environmental costs to production that they term “externalities”. These externalities are viewed by the authors as augmenting or completing the classical economic formulae by requiring that production have net zero environmental impacts. This protocol increases the costs to consumers, reduces the profits of producers, reduces how much is produced, and makes what is being produced less competitive with the same products produced elsewhere without costing for externalities. So, adopting economic models that include environmental externalities is good for the environment; but bad for the economy and bad for producers and consumers. What is crucial to any implementation of these “enhanced” economics is the determination of the cost of externalities. Put a high price on the externality, and the product becomes unfeasible (unprofitable) to produce. Put a low price on the externality, and it may no longer be sufficient to protect or remediate the environment. Above all how does this proposed modification of classical economics affect our national economy and our government’s ability to meet the expectations of its citizens? Can we be precautionary without being self-destructive?

I appreciate that this is a demanding context for a broad introductory course on resource development and sustainability. However, the economic perspective advanced by the authors of our text is consistent with the prevailing progressive perspective on sustainable development. It is hard to disagree that any systematic consideration of sustainable development should explicitly include economics. For this course it is enough that you become familiar with this approach by learning the material provided in the text. I do not require that you agree or disagree with it entirely, or from time to time. I hope that you will consider both strengths and weaknesses associated with the various arguments presented in the text; and also keep in mind how adopting these protocols would affect Canada’s economy, the environment and you personally.

Pedagogy and Evaluation:

Most of the material for this course will be provided as assigned readings from the text. There will also be assigned readings of selected articles to allow you to see how sustainable development thinking has changed over the years. My comments on selected topics will be shared as messages with attachments. The assigned readings are archived on D2L under the folder “Resources”. There will be weekly timed quizzes over the material assigned to date. These exams will be proctored and scored by the “Quizzes” Tab on D2L. All quizzes are to be written **independently** and all quizzes are comprehensive because the course will build upon the concepts and terminology already covered as we progress through the term. However, the quizzes will emphasize the material that has been assigned since the last quiz. D2L will scramble the order of quiz questions and the order of the answers for individual questions. The questions for any given quiz can also be varied randomly by selection from a test bank, and not all questions from the test bank will occur on all quizzes. However, the main feature to promote adherence to the Lakehead code of ethics (independent work) is that the questions will be timed (~1 minute per question). Quizzes will be open book and open notes. You may highlight and outline your text and assigned papers. You may create and use a digital key-word search index. You may share your study archive with other students. You may use a calculator. Quizzes will be “open” for a 6 hour window beginning 4:00AM and ending at 12:00 noon on Mondays of each week except Reading Week (Oct 8-12). If more than one quiz is scheduled, you may take a break between quizzes. The length of each quiz will vary, but each quiz question is counted as the same value for the quiz portion of your final mark. By convention there is no quiz during Reading Week. Missed quizzes may not be made up without documentation or prior approval in writing (email message). Those traveling for sports or other purposes are responsible to make arrangements for internet access while they are away. I will re-schedule quizzes missed for medical reasons within the week the quiz was due unless the documentation identifies longer time frame for recovery. After that time interval, the window for make-ups will have expired.

The final exam will be an on-line exam. The final examination will be a no notes, no books, and no memory aids exam. You may bring a non-programmable calculator for any math problems on the final.

The schedule of material is provided by the course outline listed below.

The on-line format offers considerable flexibility for students to complete the course in a manner that is complimentary to their other priorities. However, successful completion of this course requires discipline, diligence and consistency. The term system puts pressure on both students and professors to defer what can be deferred to accommodate other scheduled priorities. I have tried to provide sufficient structure to make this course a successful competitor for your time this term. If you keep up with the readings and appreciate that the quizzes are identifying what I consider to be the core material for the course ... you should do well. If you procrastinate or schedule too many conflicting priorities ... your mark will reflect these choices. So, if you need a particular mark to

meet your professional goals, make sure you budget the time and do the work necessary to get the mark you need. Please do not come to me after the course is over and ask for special dispensation.

There is no mid-term. In addition to the quizzes and the final, a short (5 page) review paper is required. Course marks are determined as 12% for the review paper, 38% from the total percent correct on the quizzes and 50% from the total percent correct on the final exam.

The Course Schedule below provides a time table for assigned readings, quizzes, and assignment (Practicum).

The scheduled times for completion of quizzes, exams, and assignments are firm, and will be modified only in accordance with Lakehead policy (documented illness and family emergencies). Please contact me if you have any special circumstances or questions.

Status of the Planet/Nation: 2085 Assignment (12 points):

Most of you will live for another 60-65 years or longer. By 2085 the world is projected (by the UN) to have slightly more than 10 billion people. There will be approximately 1.5 times additional demand on global ecosystem services and both renewable and non-renewable resources compared to 2020. The assignment is to identify a system of governance and the specific changes required to achieve an equitable and sustainable global economy **or** a sustainable Canadian economy. In other words, you can **either** go with a world-government global approach, or opt for a nationalist Canadian resource management strategy.

The required format for your review is as follows:

Title Page with your name and student #

Introduction: The future is always uncertain. Use the Introduction to describe and develop the scenario you anticipate in 2085. Be specific regarding the social, political, and regulatory mechanisms you envision. Describe global and national conditions as you imagine they might be. Have the 4 Horsemen of the Apocalypse arrived to reduce population numbers, or has the world managed to identify cooperative systems that have actually improved the quality of life for most people? Are we independent nations, regional collectives, or a one-world government? Is democracy still the preferred system of government? Is the world even more economically stratified than it is now, or have rich countries declined and poor countries improved to some common standard of living? Are ecosystem services intact and well managed or damaged and declining. Are we all living in cities near transportation lines? Do we still have single family dwellings, personal automobiles, freedom to travel anywhere we like, good health

care, schools, infrastructure, and safe cities? Do we still have pandas, koala bears, polar bears, and protected wilderness areas? Is population growth rate declining as expected or back to maximal rates in areas of chronic poverty and warfare.

The introduction is where you make your predictions of what the world or Canada will be like in 2085. Obviously, the national circumstances will include the global situation, and the global situation will include Canada. But you can adopt either perspective for your paper.

Considerations: This is the main body of the paper. Use subheadings to identify the topic being discussed. I suggest the following be considered: National and Global Governance System, Quality of Life and Lifestyle Norms, status and regulation of natural resources and ecosystem services, Geopolitical Conflicts, Regional Inequalities, Global and National Economies, Social and Cultural Norms and Changes. Other categories are possible. You may include tables, figures, and maps to support the text.

Conclusions: Summarize in point form the topics discussed in Considerations. Provide a summary paragraph that explains why your Status of the Planet: 2085 scenario was realistic, and why other scenarios are less likely.

Literature Cited: Follow the usual protocol for crediting your sources. Online agency or journal references are fine. Advocacy websites are unlikely to provide balanced and neutral information, and may even exaggerate a bit (or a lot). The best sources for reliable information are academic journals and books. However, be critical of everything you read. Is the information supported by the data or by logical argument; or is it opinion or conjecture.

The length of your paper should be about 5 pages plus the title page plus any figures, tables, or maps that you include. Please use normal fonts and pitch.

EIA Review Papers are due 24 February, but they can be turned in before that date. Please submit them as email attached IBM PC MS WORD documents. If I can't download them or I can't read them, they will not be considered "received". I will confirm receipt by return message. If you don't get a return message in a few days ... ask me why not.

You should decide on your approach by the second week of class. An outline must be submitted by the end of the third week of class to confirm your approach that will be successful. The outline should be consistent with the above format. A description of what constitutes an outline is contained in the Resources directory, and that style is required. Please keep the scope of your paper to something that is manageable for our time frame (one term) and our page limit (about 5 pages). Marks will depend more on the content than the length of your paper.

Grading Protocol:

The course outline is an expression of an intention and can be modified by the instructor as required to meet course objectives, accommodate contingencies, and correct any errors.

| | |
|--------------------------------------|-------------|
| Weekly Quizzes | 38% |
| Review Paper (outline 2%, paper 10%) | 12% |
| Final Exam | 50% |
| Total | 100% |

Deferred Examinations and Assignments:

Please regard the scheduled quizzes as a series of appointments that have been arranged to facilitate teaching and evaluation for Environmental Impact Assessment. Assignments are accepted on or before the day that they are due. Late assignments will be counted as zero credit unless prior approval is provided (email message or hard copy) or appropriate documentation for University approved absence is provided. Approved absence includes illness (medical practitioner certificate), varsity sports (letter or email message from coach), or personal/family emergency (documentation of circumstance). Scheduling conflicts with other courses are not considered an approved absence. Absence due to participation in scientific meetings or field trips associated with other courses will be considered on a case by case basis.

Special Circumstances or Disabilities:

Students with special circumstances or disabilities are encouraged to contact the Learning Assistance Center right away so that appropriate accommodations can be arranged. It is not necessary to get my permission or support. The Learning Assistance Center will notify me of any accommodations that are required, and this information will be kept confidential.

Academic Honesty:

The Guidelines for Academic Conduct from Lakehead University (Code of Student Behaviour and Disciplinary Procedures) may be found at:

><http://vpacademic.lakeheadu.ca/?display=page&pageid=46><

Honesty and integrity are expected in class participation, examinations, assignments, and other academic work. Expectations include:

- Perform your own work unless specifically instructed otherwise;
- Use your own work to complete assignments and exams;
- Cite the source when quoting or paraphrasing someone else's work;
- Follow examination rules;
- Be truthful on all university forms;
- Discuss with your professor if you are using the same material for assignments in two different courses;
- Discuss with your professor if you have any questions about whether sources require citation;

- Use the same standard of honesty with fellow students, lab instructors, teaching assistants, sessional instructors and administrative staff as you do with faculty.

Hints to doing well in this course:

To reiterate: quizzes are comprehensive, but mainly cover the previous week's material and emphasize the material in the lecture slides. If you are not already familiar with the Desire to Learn (D2L) software you should go to the site and read the introductory material. Your quizzes will be automatically scored, and your marks will be available to you as soon as everyone has completed the quiz. After the quiz window has closed, the questions and correct answers will be posted under the "Submission Views" tab of each quiz. It is OK to construct a memory aid for your quizzes. Some students have constructed searchable data bases on their computers. Others have created an indexed reference system using key words and acronyms. Anything goes except having someone help you do the quizzes. No additional materials are allowed for the final exam (calculator only) ... so not learning the material during the term will only set you up for failure when you take the final. I use the quizzes to indicate what I consider to be the core material for the course. This course rewards preparation and consistency. Good luck.

Course Schedule for Resource Management and Sustainability GEOG 3411

| Dates | Monday Quizzes | Chapters | Topic Area | Assigned Readings |
|--------------|--|---|--------------------------------------|--|
| Jan 06-10 | | C 1, 2 | The Economy and the Environment | 1 Introduction to Resource Management and Sustainability |
| Jan 13-17 | Quiz 1 | C 3, 4 | Externalities, Common Property | |
| Jan 20-24 | Quiz 2 | C. 7, 8 | Cost-Benefit, Pollution Policy | Precautionary Principle 2003 |
| Jan 27-31 | Quiz 3 | C 9, 10 | Ecological Economics, Accounting | Grumbien 1994 |
| Feb 03-07 | Quiz 4 | C 12, 13 | Climate Science, Economics, Policy | |
| Feb 10-14 | Quiz 5 | C 15 | Population & Environment | Millennium Ecosystem Report Overview |
| Feb 17-21 | study break | C 16 | Agriculture, Food & Environment | Millennium Ecosystem Condition and Human Well-Being |
| Feb 24-28 | Quiz 6 | C 17 | Non-Renewable Resources | |
| Mar 02-06 | Quiz 7 | C 18 | Fisheries | |
| Mar 09-20 | Quiz 8 | C 19 | Forests & Ecosystems | Franklin 1989 |
| Mar 23-27 | Quiz 9 | C 20 | Water Economics and Policy | |
| Mar 30-Apr 3 | Quiz 10 | C 21, 22 | World Trade, Sustainable Development | Mitchell: Chapter 20 2003 |
| | Quiz 11 (C 21&22) is open all day on Friday April 03 | Please note: Status of the Planet/Nation: 2085 paper is due February 24 th or earlier. | | |
| TBA | Final Exam is online , | | | |
| | Course Marks due April 23 | | | |
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* Quizzes are online (D2L) from 0600 to 1200 Monday mornings only. Quizzes are comprehensive, but emphasize the assigned readings from the previous week. For example, quiz 1 covers Chapters 1 and 2 from the text; and quiz 2 mainly covers Chapter 3.