Environment: Human Health on an Unhealthy Planet

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University of Alberta

PHS 640 – Introduction to Global Health
October 3, 2011
Questions to ponder prior to the class

- Are we as humans utterly dependent on the ecosystems in which we live (and, indeed, on the biosphere) for our survival?

- What do we mean by structural integrity? By moral integrity? Personal integrity? And, by ecological integrity?

- What do we mean by narratives and ideologies as constraints on objectivity?
The study of the distribution and determinants of disease in populations and its application to the control of health problems

- Primordial **prevention** *(policy intervention)*
- Primary **prevention** *(avoid exposure)*
- Secondary **prevention** *(early detection)*
- Tertiary **prevention** *(rehabilitation)*

*Basic Epidemiology: Beaglehole, Bonita & Kjellström, WHO, Geneva 1993, 2006*
Our job is to **inform policy** with a view to reducing harms by preventing disease and premature mortality at the community level.

How can we more effectively deliver on this obligation under global ecological change?
Recommended readings


**Additional readings**


The Study of health effects on populations from exposures to physical, chemical, and biological agents external to the human body, and of immediate and remote social, economic, and cultural factors (e.g., urbanization, agricultural development, energy production/combustion) related to these physical, chemical, and biological agents. We try to clarify the relationships between exogenous factors and health. Recognition of health hazards posed by large-scale environmental changes and by ecological disruption, often via indirect pathways, has added an extra dimension to this field of enquiry.

Adapted from Last, JM. A Dictionary of Epidemiology, 4th Edition, 2001
Contemporary global-scale issues with major human health implications

- Global geo-climatic system changes (e.g., global warming, sea level rise, ocean acidification); CO2 levels continue to rise
- Population growth with rapid urbanization and the development of mega-cities; Mass forced and voluntary migrations
- Expansion of consumption-intensive lifestyles (e.g., into China and India, each with 1B + populations)
- Increasing global and within-country disparities
- Fresh water declines everywhere
- Resurgence of old diseases and emergence of new (e.g., malaria and tuberculosis, HIV/AIDS, SARS)
- Species extinctions
- The growth-bound paradigm is entrenched
Levels at which we operate

**Micro lens** – *e.g.*, physician-patient
- On the ground ... (advocate for patients)

**Meso lens** – *e.g.*, community
- From an elevation of about 100 meters (advocate for communities)

**Macro lens** – *e.g.*, country/world
- From an elevation of about 10,000 meters (advocate for global health and well-being)
Why should epidemiologists and public health researchers and practitioners be concerned with matters of a global nature?
Traditional Public Health Domain

- Sanitation
- Water Quality
- Food Safety
- Air Quality

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- Vaccination programs
New Concerns of Public Health

As we tamper with the very fabric of life through expansion of the human enterprise, Nature’s Services are changed; these services we take for granted and assume free-of-charge in their support of life.

The effect is a net negative, with global impacts such as climate change, declines in air, water and soil quality, as well as food security issues.
Recent Newspaper Reports …
… anecdotal evidence?
Changing Landscapes

- Expanding reach ...
- Accelerating rates ...
- Changing habitats ...
- With this, shall we anticipate changes to public health practice?
- What, if any, is the role of Eco- and Environmental Epidemiology, and other specialists?
- And, Environmental/Bio-Ethics?
- And Law?
The past 25 years have seen an ~50% reduction in biodiversity as measured by INDEPENDENTLY-DERIVED indicators.

**INDEX OF BIOTIC INTEGRITY**: James Karr, University of Washington, from his study of streams

**MEASURE OF MEAN FUNCTIONAL INTEGRITY**: Orie Loucks, University of Miami, from his study of soils and forests

**WWF**: 16 markers

**ECOLOGICAL FOOTPRINT**: William Rees

Mayan Calendar
Five Stages of Grief

- **Denial**: It can't be happening!
- **Anger**: Why me? It's not fair!
- **Bargaining**: Just let me live to see my children graduate!
- **Depression**: I'm so sad, why bother with anything?
- **Acceptance**: It's going to be OK!

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- **Laying blame**: it’s someone else’s fault
The area beneath the heel of the foot represents the concentration of population (as in any city) that depends for its sustenance on the much greater land mass represented by the remainder of the foot.

The city imports resources (air, water, food, building materials, etc) and exports its wastes.
Comparing average consumption

Ecological Footprint (EF) (ha/person)

<table>
<thead>
<tr>
<th>Country</th>
<th>1991</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>5.1</td>
<td>9.5</td>
</tr>
<tr>
<td>Canada</td>
<td>4.3</td>
<td>6.5</td>
</tr>
<tr>
<td>India</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>World</td>
<td>1.8</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Footprints are rising with rising energy and material consumption, even in the richest and most efficient countries, and fastest in the fastest growing countries, like China and India. The 2006 Living Planet Report shows the rising global EF since 1960, recognizing that the earlier years have wider margins of error.

Sources: Wackernagel & Rees. *Our Ecological Footprint* 1996; and the 2006 Living Planet Report
Environmentally speaking, the world is a seamless web: what goes around comes around …
Ethical dimensions of global climate change
November 6, 2007 (Courtesy J. Patz) -- Cartograms
Why should epidemiologists and public health researchers and practitioners be concerned with matters of a global nature?

→ The Right to Life for both present and future generations
✓ “The significant problems we face today, from our current patterns of thinking, cannot be solved by the same pattern of thinking which created them.” – A. Einstein

✓ “Inside the Box” vs. “Outside the Box”

✓ “Linear Reductionism” vs. “Complexity”


✓ “Band-Aid Solutions” vs. “Systemic Solutions”

✓ THE EARTH CHARTER: It is a vision, not an instruction manual – take it as such."
INTEGRITY EQUALS: “POPULATION” TIMES “AFFLUENCE” TIMES “TECHNOLOGY”

GEI = f[Population, Consumption, Technology]
The “$I = P \times A \times T$” identity

Impact (or “Integrity”) = $f(\text{Population} \times \text{Affluence} \times \text{Technology})$

_Ehrlich & Holdren, 1971_

Stresses the interdependence of forces which often are treated independently as needs for “population control,” “reduced consumption,” or “green technologies”. Helps in making our values and assumptions transparent.

The interplay of all determinants is critical for their recognition, investigation, and in formulating policy.
The “\( I = P \times A \times T \)” Identity

“INTEGRITY” EQUALS “POPULATION” TIMES “AFFLUENCE” TIMES “TECHNOLOGY”

Ehrlich's & Holdren, 1971

- Exposes bias and self-interest when “North” blames “South”, and vice versa
- We must recognize our collective interest on this fragile planet and, whether we are “North” or “South”, we all have to change our ways in rather profound ways if our goal is “sustainability”
- Else, it is like rearranging the deck chairs on the Titanic as we approach the iceberg that causes us to sink
Climate Change only?

Or, Global Change more generally?
Minimal uncertainty about global change, and pretty much certainty, for population growth, the rate of species’ extinctions, technological impacts, etc.
Neoliberal Globalization

A major force in the world that works against longevity and for widening disparities:

1. Neoliberal Globalization: Is There an Alternative to Plundering the Earth? - by Prof. Claudia von Werlhof
   [Link](http://www.globalresearch.ca/index.php?context=va&aid=24403)

2. Encirclement: A 2 hr and 40 minute-long docu-drama about neo-liberalism, 2008. Learn about accessing the DVD at [Link](http://encirclement.info/index2.html) The production arm is at: [Link](http://www.filmsdupasseur.com) In French with some English (interviews with Noam Chomsky), but with excellent English sub-titles throughout.
Definitions and concepts to “open our minds”

**BRAIN-WASHED:** Indoctrination by propaganda

**DOGMA:** Something held as authoritative without substantiation

**ENTITLEMENT:** A right to benefits

**HUMILITY vs. ARROGANCE**

**HYPOCRITE:** Putting on a false appearance of virtue or religion, or *Not* WALKING THE TALK: *Not* Doing what you preach

**LIVE, SPEND, AND CONSUME AS IF THERE IS NO TOMORROW:** A self-fulfilling prophesy?

**MANIPULATION:** To control for one’s own advantage
✓ The MILITARY-INDUSTRIAL-ACADEMIC COMPLEX: An alliance to influence government policy

✓ MYTH: An unfounded or false notion

✓ PARADIGM: A framework used to describe reality

✓ SELF-INTEREST: Concern for one’s own advantage

✓ SOCIOPATHS: Con artists who sway the exploitable with no regard to their rights in pursuit of power (psychopaths)

✓ SOLIDARITY: Unity based on community of interests
Traditional Health Indicators

- Life Expectancy
- Percent Low Birth Weight Babies
- Infant Mortality

- Intuitively linkable to measures of ecological degradation, but no association was found (Sieswerda et al., 2001)

- Wealth is the buffer

So, what happens to those who live in poverty without the buffer of wealth?
The Alberta GPI Indicators for Economic, Personal-Societal and Environmental Well-being - *Redefining Progress*, San Francisco; Mark Anielski, Edmonton

<table>
<thead>
<tr>
<th>Economic</th>
<th>Personal-Societal</th>
<th>Environmental</th>
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</thead>
<tbody>
<tr>
<td>Economic growth</td>
<td>Poverty</td>
<td>Oil and gas reserve life</td>
</tr>
<tr>
<td>Economic diversity</td>
<td>Income distribution</td>
<td>Oilsands reserve life</td>
</tr>
<tr>
<td>Trade</td>
<td>Unemployment</td>
<td>Energy use intensity</td>
</tr>
<tr>
<td>Disposable income</td>
<td>Underemployment</td>
<td>Agricultural sustainability</td>
</tr>
<tr>
<td>Weekly wage rate</td>
<td>Paid work time</td>
<td>Timber sustainability</td>
</tr>
<tr>
<td>Personal expenditures</td>
<td>Household work</td>
<td>Forest fragmentation</td>
</tr>
<tr>
<td>Transportation expenditures</td>
<td>Parenting and eldercare</td>
<td>Parks and wilderness</td>
</tr>
<tr>
<td>Taxes</td>
<td>Free time</td>
<td>Fish and wildlife</td>
</tr>
<tr>
<td>Savings rate</td>
<td>Volunteerism</td>
<td>Wetlands</td>
</tr>
<tr>
<td>Household debt</td>
<td>Commuting time</td>
<td>Peatlands</td>
</tr>
<tr>
<td>Public infrastructure</td>
<td>Life expectancy</td>
<td>Water quality</td>
</tr>
<tr>
<td>Household infrastructure</td>
<td>Premature mortality</td>
<td>Air quality-related emissions</td>
</tr>
<tr>
<td></td>
<td>Infant mortality</td>
<td>Greenhouse gas emissions</td>
</tr>
<tr>
<td></td>
<td>Obesity</td>
<td>Carbon budget deficit</td>
</tr>
<tr>
<td></td>
<td>Suicide</td>
<td>Hazardous waste</td>
</tr>
<tr>
<td></td>
<td>Drug use (youth)</td>
<td>Landfill waste</td>
</tr>
<tr>
<td></td>
<td>Auto crashes</td>
<td>Ecological footprint</td>
</tr>
<tr>
<td></td>
<td>Divorce (family breakdown)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crime</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Problem gambling</td>
<td></td>
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<tr>
<td></td>
<td>Voter participation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Educational attainment</td>
<td></td>
</tr>
</tbody>
</table>
The Alberta GPI Well-being Index versus Alberta GDP Index, 1961 to 1999

Source: Alberta GPI Accounts 1961-1999
Epidemiology is the science that is basic to rational public health policy formulation

- Infectious Diseases – *proximate*
- Chronic Diseases – *distal determinants: complex interactions, industrial activities, pollution, synergies*

Uncertainty is inherent to science and interplays with

The policy-maker’s conundrum
Science is but one such pressure

--- HUMILITY AND EMPATHY FOR THE POLICY-MAKER
Threshold health effect in a hypothetical time-trend study of a communicable disease

- Brief incubation period (sub-clinical disease)
- Population exposed to an emergent pathogen
- Intervention
Non-threshold health effect in a hypothetical time-trend study of a chronic disease

- disease rate

- increasing disease rate over time

- time (years)
Threshold health effect in a hypothetical time-trend study, superimposed on an idealized relationship between ecological disintegration and a sensitive health indicator.

Ecological Integrity

disease/death rate \textit{without} threshold effect (for a sensitive health indicator)

disease/death rate \textit{with} threshold effect

time (years)

effects (health/ ecological)
So, what can the public health sciences contribute to this discussion?

*Prevent* major harms to human health, well-being, and function; and the possible extinctions of sizeable communities.
For how long can human health be sustained

- while continuing to draw down ecological capital?
- while declines in ecological integrity accelerate?

Only One World >> Planet Earth
Eco-epidemiology is a sub-specialty of epidemiology, focusing on the relationships between human health and the dynamics of global ecological change.
Millennium Development Goals

HEALTH, POVERTY & CONSERVATION
1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria, and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development
Principles (from bioethics)

- Respect personal autonomy
  - Fidelity and veracity
- Do good (Beneficence)
- Do no harm (Non-Maleficence)
- Social and distributive justice
  - Equity in the distribution of benefits and risks of research and policy
- Integrity in research
Primary Principles in Public Health

- Protect the most vulnerable in society (e.g., unborn, children, Inuit, frail elderly)

- Involve communities in our research (ensure community relevance of our work)

- Integrity in Public Health
  - Serve the public health interest above any other interest
The principle of SOLIDARITY

- What goes around, comes around in our world that, environmentally, is a seamless web

- "Made in Canada", "Made in Alberta" and "Voluntary compliance" are counter to this principle

- Too much self-interest ...
  - The fox guarding the hen house ...
The FUNDAMENTAL PRINCIPLES of BIOETHICS include (under Non-maleficence and Respect for Autonomy)

**PRECAUTIONARY PRINCIPLE**

- *where there is a risk from a certain agent, the presence of uncertainty shall not be used as a reason for postponing cost-effective measures to prevent such exposure*

**POST-CAUTIONARY PRINCIPLE**

- *When we have missed the opportunity for precautionary action - as with climate change, we must plan for adaptation to prevent inevitable harms consequent to climate change*  
  
  (Lisa Heinzerling, Georgetown University, 2007)
The FUNDAMENTAL PRINCIPLES of BIOETHICS include (under Justice):

💡 ENVIRONMENTAL JUSTICE
- Who is taking the risks?
- Who is deriving the benefits?

💡 THE POLLUTER PAYS
- Incentive to internalize costs
The FUNDAMENTAL PRINCIPLES of BIOETHICS include (under Justice and Non-maleficence):

THE SEVENTH GENERATION PRINCIPLE

Consider consequences seven generations hence
In whose interests?

- Only Canada as a nation?
- Only the USA as a nation?
- Only North America as a region?
- Only the present wealthy?
- Only the present generation?
- Future generations – locally/globally?
Data from thermometers (red) and from tree rings, corals, ice cores and historical records (blue).

**Diminishing returns**

Maximum energy return on energy investment

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Maximum Energy Return on Energy Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic oil 1930</td>
<td>100:1</td>
</tr>
<tr>
<td>Coal 2005</td>
<td>80:1</td>
</tr>
<tr>
<td>Hydroelectric</td>
<td>60:1</td>
</tr>
<tr>
<td>Imported oil 1970</td>
<td>40:1</td>
</tr>
<tr>
<td>Domestic oil 1970</td>
<td>20:1</td>
</tr>
<tr>
<td>Firewood</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Imported oil 2005</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Windmill</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Natural gas</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Nuclear</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Domestic oil 2000</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Photovoltaic</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Tar sands</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Biodiesel and gasohol</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>
Be aware of forces at play that influence both science and policy.

… Great vigilance and personal integrity are required to change course
In whose best interests?

David Michaels’ work

OUP 2008: “Doubt is their product: How industry’s assault on science threatens your health”

The policy-maker’s conundrum

- The greater the uncertainty, the more unlikely it is that policy will be set
The Four D’s applied to scientists studying that which does not support the status quo

- Deny
- Delay
- Divide
- Discredit

[ Dismiss ] [ Death – Meryl Streep in the movie Silkwood, 1983? ]
Climate change questioned in schools mailout

U.S. think-tank says it’s trying to inject ‘balance’ by sending out 11,000 brochures and DVDs

MIKE DE SOUZA
Canwest News Service
OTTAWA

An American think-tank has sent out more than 11,000 brochures and DVDs to Canadian schools urging them to teach their students that scientists are exaggerating how human activity is the driving force behind global warming.

The Chicago-based Heartland Institute said its goal is to ensure that students are provided with a “balanced” education about “an important and controversial issue,” but critics, including a leading climate scientist, described it as a campaign of misinformation.

The mailout, sent in February, included results from international surveys of climate scientists conducted in 1996 and 2003, along with a 10-minute DVD called Unstoppable Solar Cycles, The Real Story of Greenland.

“It took me a while to figure out what they were up to,” said Eric Betteridge, who teaches at Hillcrest High School in Ottawa.

The Heartland Institute says that it purchased a database list of addresses of 11,250 schools from across the country, including all 10,000 private or faith-based schools, for a massive mail campaign aimed at Canadian children in all provinces.

“All the kids in our schools are being taught that climate change is a serious crisis and that we’ve got to reduce our CO2, and they’re being taught (that) quite falsely,” said Jay Lehr, the science director at the Heartland Institute who sent the package.

“We would like to educate people and basically give them the other side of the issue, so we send out materials only in hope of a little balance.”

The Sierra Club of Canada said that the Heartland Institute’s information was far from being balanced.

“It’s alarming that an American think-tank is distributing misinformation on the most important issue of our time in Canadian schools, to actually create an illusion that there is a scientific debate,” said Emilie Moorhouse, a spokeswoman for the environmental group.

The Heartland Institute describes itself as a national non-profit research and education organization whose mission is “to discover, develop, and promote free-market solutions to social and economic problems.”

The brochure and DVD said that scientists were “deeply divided” about the notion that climate change is mostly the result of human activities. It also suggested that the sun was the main factor behind recent warming on the planet.

The package does not make reference to the conclusions reached by governments and scientists from around the world in their 2007 assessment of the latest peer-reviewed research on climate change.

The Intergovernmental Panel on Climate Change wrote that global warming is unequivocal and that there is a 90-per-cent chance it is being caused by humans.

After reviewing the Heartland Institute package, Betteridge said he was left feeling both amused and distressed that someone would try to promote this material to children in the classroom.

“I think I would be concerned because it was well written,” he said.

The Heartland Institute has received $791,000 in funding from Exxon-Mobil since 1998, according to a recent analysis by Greenpeace USA.
TEFLON?... LINKED TO BIRTH DEFECTS?

DON'T WORRY, THE ACCUSATION WON'T STICK.
Hone your “bullshit” detection skills

Or, said differently:

Hone your “crap” detection skills

From any vested interest, conspiracy theorist, and even scientist whose findings you should be poised to refute
What are the most promising solutions to these problems?
Reconnecting humans to their complete dependence on the ecosystems in which they live ...

New approaches are needed to move us from our silo-based and compartmentalized approaches
Reductionist vs. Systems Approaches

- **Reductionism:** Pursuit of single causes along linear paths to explain a phenomenon

- or -

- **Systems Approaches/Wholism:** Integrative, multi-, inter- and transdisciplinary approaches to explaining a phenomenon; embraces complexity
Transdisciplinary approaches to Human Health are approaches that integrate the natural, social and health sciences in a humanities context, and in so doing transcend each of their traditional boundaries. Emergent concepts and methods are the hallmark of the transdisciplinary effort.
SUSTAINING LIFE ON EARTH

ENVIRONMENTAL AND HUMAN HEALTH THROUGH GLOBAL GOVERNANCE
EDITED BY COLIN L. SOSKOLNE

2008: Lexington Books
How have we reached this critical stage?

From the book’s PREFACE …
What jurisdictions are at the forefront in addressing large-scale environmental health problems?
Grave Challenges

Individually & Collectively

OPPORTUNITY and HOPE:

1. The Earth Charter
2. Constitution and Bill of Rights
3. Teaching about Sustainability
4. Local Land Ethic (Indiana Dunes)
5. Websites that are global
6. Conventions and Treaties
The Earth Charter

A soft law instrument … to save us from ourselves

Preamble

- Respect and care for the community of life
- Ecological integrity
- Social and economic justice
- Democracy, non-violence, and peace

The Way Forward

http://www.earthcharter.org/
Accessible in 35 different languages
I. Respect and care for the community of life

1. Respect Earth and life in all its diversity.

2. Care for the community of life with understanding, compassion, and love.

3. Build democratic societies that are just, participatory, sustainable, and peaceful.

II. Ecological Integrity

5. Protect and restore the integrity of Earth's ecological systems, with special concern for biological diversity and the natural processes that sustain life.

6. Prevent harm as the best method of environmental protection and, when knowledge is limited, apply a precautionary approach.

7. Adopt patterns of production, consumption, and reproduction that safeguard Earth's regenerative capacities, human rights, and community well-being.

8. Advance the study of ecological sustainability and promote the open exchange and wide application of the knowledge acquired.
III. Social and Economic Justice

9. Eradicate poverty as an ethical, social, and environmental imperative.

10. Ensure that economic activities and institutions at all levels promote human development in an equitable and sustainable manner.

11. Affirm gender equality and equity as prerequisites to sustainable development and ensure universal access to education, health care, and economic opportunity.

12. Uphold the right of all, without discrimination, to a natural and social environment supportive of human dignity, bodily health, and spiritual well-being, with special attention to the rights of indigenous peoples and minorities.
IV. Democracy, Non-Violence and Peace

13. Strengthen democratic institutions at all levels, and provide transparency and accountability in governance, inclusive participation in decision making, and access to justice.

14. Integrate into formal education and life-long learning the knowledge, values, and skills needed for a sustainable way of life.

15. Treat all living beings with respect and consideration.

16. Promote a culture of tolerance, nonviolence, and peace.
Enabling of MDG attainment

Linkages among health, poverty, and conservation

Inter-dependencies are recognized
Rights-Based Arguments in Support of The Earth Charter

The Earth Charter is the only document that:

- Supports Ecological Integrity rights
- Has Biocentrism at its core
- Integrates the dependence of human health on Ecological Integrity, and hence “the right to life” for present and future generations
- Extends a right to precaution in policy-making (benefits to whom? risks to whom?)
- Explicitly defends future generations

**Fully addresses Buddhist and other religions’ concerns too**
Encourages interdisciplinary and transdisciplinary approaches to addressing complex social policy questions that also integrate health

Prevention in focus –

for the support of *all* life and its inter-dependence
24. Environment
Everyone has the right
(a) To an environment that is not harmful to their health and well-being; and
(b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that
(i) prevent pollution and ecological degradation;
(ii) promote conservation; and
(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable social and economic development.
And more countries since mid-1990s

- Brazil, Colombia, Ecuador, Cuba, Andorra, Ukraine, France, India, China, Philippines, Papua New Guinea, Montenegro, Iraq, Kenya, Bhutan

- and others …
VALUES, ETHICS, AND SUSTAINABILITY

This course was first taught in the Fall term, 2008, and was rated highly. In this revamped course for 2010, students will, once more, gain an appreciation for how values and ethics impinge on decisions that are needed to reconnect humans to the ecosystems upon which we depend for a sustainable future. The topic is considered in relation to social, economic, and biophysical vibrancy the world over. Because the integrity of life-supporting ecosystems is essential to human health and well-being, the concept of sustainability is examined in various contexts: individually, collectively, regionally and internationally. While mechanisms are explored for integrating sustainability into the individual disciplines, students will emerge better able to engage in the broader social discourse on what changes are needed and how to achieve them for a sustainable world.

Class Times: Thursdays, 18:00-21:00 (January 7-April 8, 2010) Location: UT 1-38
Instructor: Colin L. Soskolne, School of Public Health

Pre-requisites: At least one relevant course in any of the sciences, humanities, or engineering disciplines AND written permission of the course coordinator (at colin.soskolne@ualberta.ca) which will be based on a brief explanation of why you are motivated enough to take this course. The course coordinator MAY waive the course requirement component for those students who can justify a waiver based on work or life experience.

Structure: This highly interdisciplinary course will reveal the extent to which “the system” is broken, how we have come to the point of systems collapse, and how a major overhaul of “the system” might be managed. It will frame the issues and equip new generations of graduates with the means for changing course, from a world destined to collapse under current business-as-usual approaches, to a sustainable world for both present and future generations.

For more information, please visit www.see.ualberta.ca
Indiana Dunes

http://www.humansandnature.org/
http://indianadunesethic.wikispaces.com/

Camrose, Alberta
(Augustana) next?
Websites

 Edmonton and Area Land Trust
  http://www.ealt.ca/culture-connection/

 V1 Newsletter: Promoting Spatial Design for a Sustainable Tomorrow
  http://www.vector1media.com/

 Global Footprint Network (1.2 to 1.5 earths – overshoot)
A two-week meeting of over 190 countries’ governments in Nagoya, Japan, October 2010. At the opening session, the very last sentence of Achim Steiner (the head of the United Nations Environment Program) was that

“we must approach biodiversity conservation from an ethical point of view”...
An historic deal to halt the mass extinction of species was finally agreed last night in what conservationists see as the most important international treaty aimed at preventing the collapse of the world's wildlife. *London Independent, United Kingdom*

http://www.independent.co.uk/environment/nature/countries-join-forces-to-save-life-on-earth-2120487.html

*October, 2010*
Home (1 hour and 33 minutes)

http://www.youtube.com/watch?v=jqxENMKaeCU
Can we prevent severe effects?

- Primordial prevention
- Primary prevention
- Secondary prevention
- Tertiary prevention
Primordial Prevention: Eco-epidemiology’s domain ...

Policy shifts for:
- Health Benefits; co-benefits
- Present and Future Generations

HOW BEST TO INFORM SUCH POLICIES?
The Challenges are to

- Influence values for sustainability
- Instill new ethical norms for sustainable behavior in:
  - Individuals
  - Organizations (NGOs, professional societies, etc)
  - Institutions (financial, schools, universities, etc)
  - Corporations
  - Governments (local, national, supranational)
- Influence law and its enforcement
- Reduce scientific uncertainties
Questions?
McMichael AJ and Lindgren E (2011) *Climate Change: present and future risks to health, and necessary responses*

Ridley M (2010) *The Rational Optimist*