UVic in the Anthropocene

A learning forum and planning workshop on the role UVic can and should play in the wider global community

Image credit: Matt Jiggins via Flickr

Thursday March 17th, 5:00-7:30pm

Engineering/Computer Science Building, Room 108

Who: For UVic faculty, grad students and community leaders.

Details: A growing number of earth scientists suggest that we are entering a new geological epoch –the Anthropocene. The impact of humanity on the Earth has grown so large that our footprint will be evident in the geologic record far into the future.

This has implications for the wellbeing of humans and other species, for communities and societies, and indeed for our entire modern civilization. So the Anthropocene is a challenge for us all, spanning every field of study at UVic, and every endeavour in our communities. This forum and workshop will provide an overview of these issues and look to participants to explore the role the Uvic community should play as part of a global community.

On **April 6th**, we will follow up on these issues with an interactive workshop to decide on next steps at UVic.

Program: March 17th

WHAT IS THE ANTHROPOCENE?

Mapping the Anthropocene
Professor Peter Keller, Dept. of Geography and Professor Eileen van der Flier–Keller, School of Earth & Ocean Sciences

A Local Indigenous Perspective
Dr. Nick Claxton, Faculty of Education and Tsawout Band & WSÁNEĆ Nation Indigenous Academic Advisor/Coordinator

Driving Forces & Political Implications
Professor Jamie Lawson, Dept. of Political Science

Discussion
Facilitated by Professor Budd Hall, UNESCO Chair

WHAT ARE THE IMPLICATIONS OF THE ANTHROPOCENE?

Impacts on Health and Human Development
Professor Trevor Hancock, School of Public Health and Social Policy

An Ecological Economics Perspective
Professor Lynda Gagné,
School of Public Administration

Responding Actively and with Hope
Professor James Rowe, Environmental Studies

Discussion
Facilitated by Professor Budd Hall, UNESCO Chair

Light refreshments will be provided

RSVP to dirintd@uvic.ca

Please register early as space is limited.

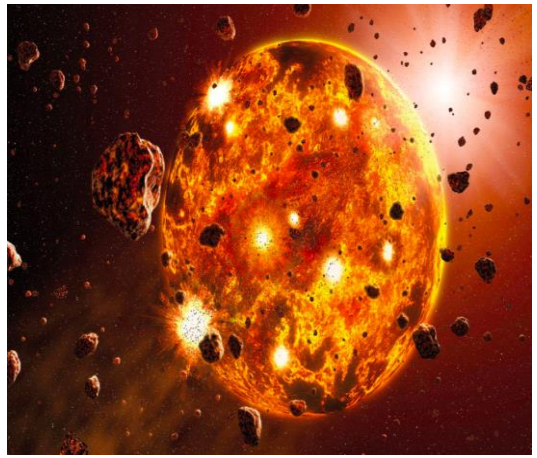
University of Victoria
Office of Interdisciplinary Academic Programs

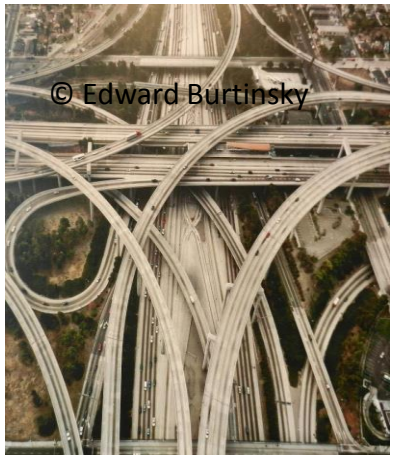
University of Victoria
Vice-President Academic & Provost

Centre for Global Studies

University of Victoria
Public Health & Social Policy

Mapping the Anthropocene

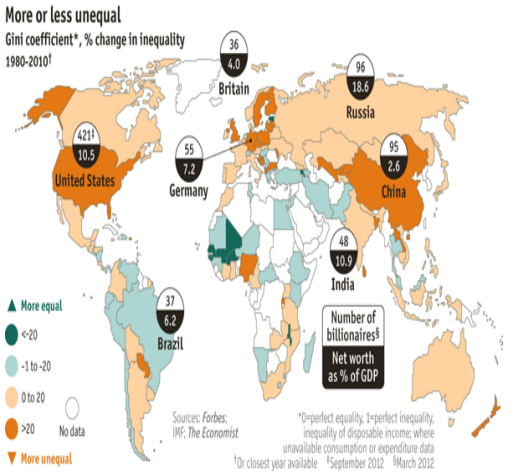




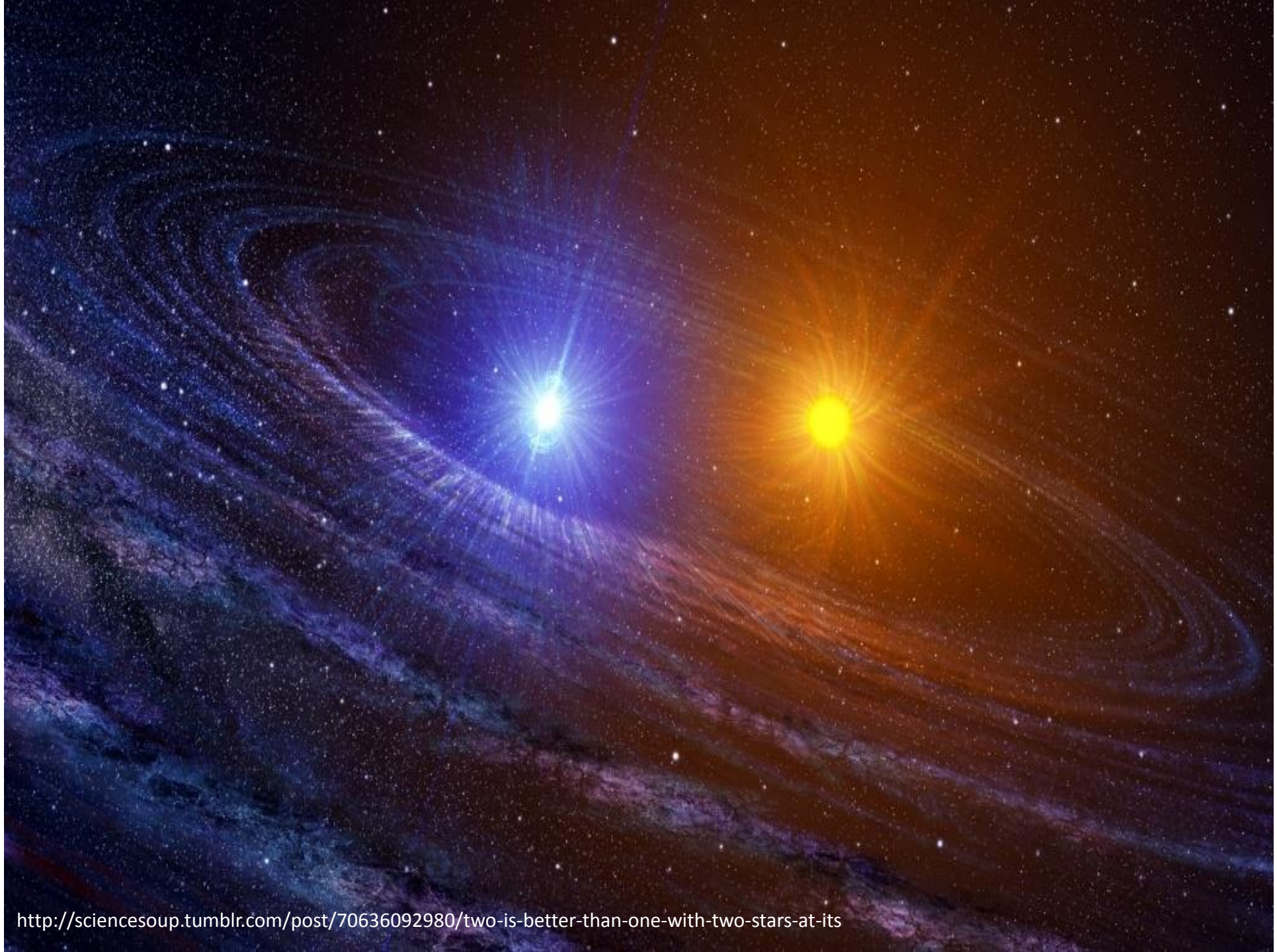
Eileen van der Flier-Keller

Peter Keller

University of Victoria



http://www.economist.com/node/21564414

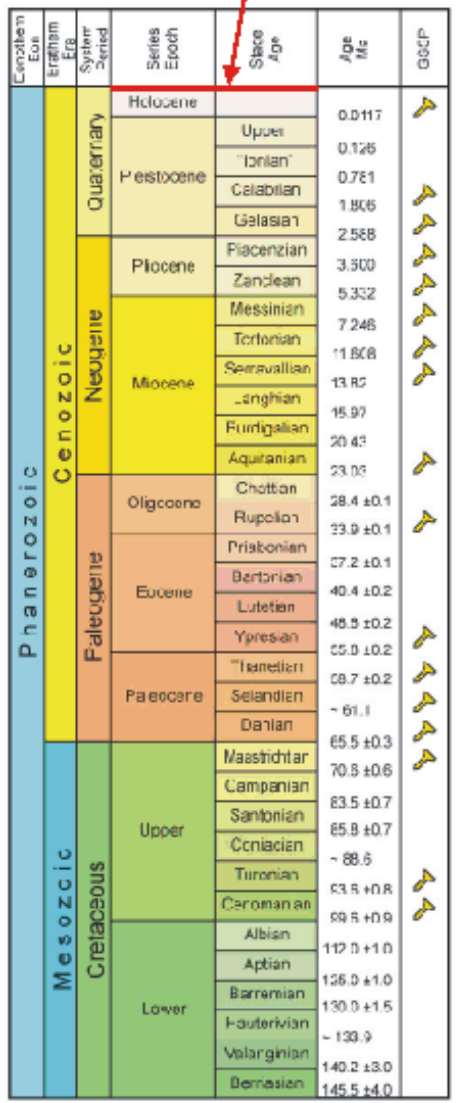


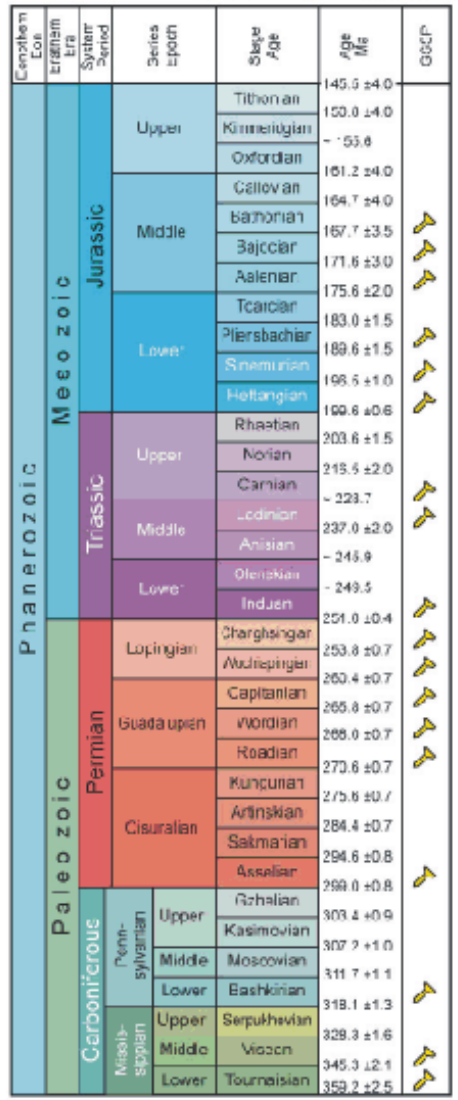
http://sciencesoup.tumblr.com/post/70636092980/two-is-better-than-one-with-two-stars-at-its

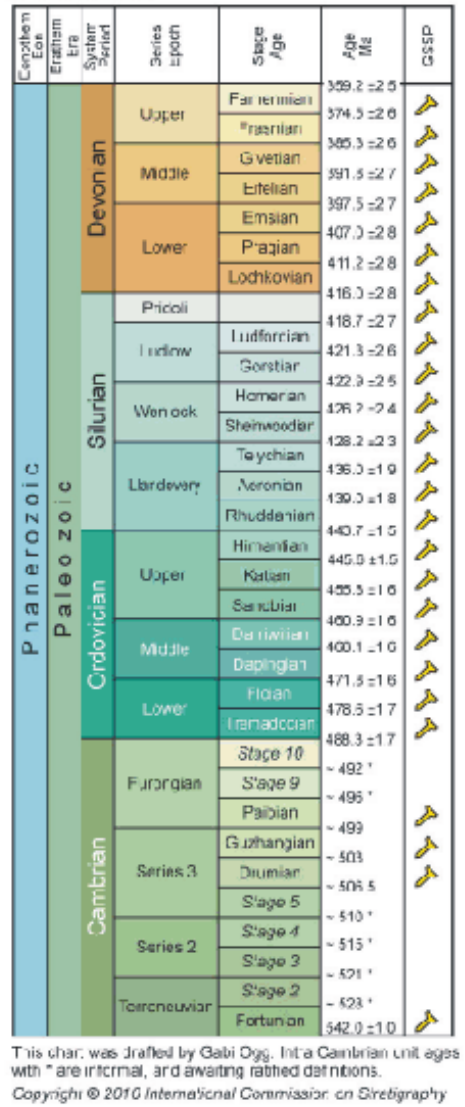
Modern time

INTERNATIONAL STRATIGRAPHIC CHART

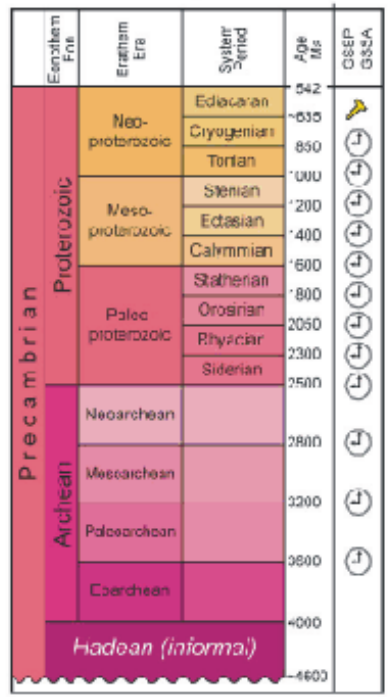
International Commission on Stratigraphy







This chart was drafted by Gabi Ogg. Into Cambrian unit ages with * are informal, and awaiting ratified definitions.



Subdivisions of the global geologic record are formally defined by their lower boundary. Each unit of the Phanerozoic (~542 Ma to Present) and the base of Ediacaran are defined by a basal Global Boundary Stratotype Section and Point (GSSP), whereas Precambrian units are formally subdivided by absolute age (Global Standard Stratigraphic Age, GSSA). Details of each GSSP are posted on the ICS website (www.stratigraphy.org).

Numerical ages of the unit boundaries in the Phanerozoic are subject to revision. Some stages within the Cambrian will be formally named upon international agreement on their GSSP limits. Most sub-Series boundaries (e.g., Middle and Upper Aptian) are not formally defined.

Colors are according to the Commission for the Geological Map of the World (www.ccgmw.org).

The listed numerical ages are from "A Geologic Time Scale 2004" by F.M. Gradstein, J.G. Ogg, A.G. Smith, et al. (2004; Cambridge University Press) and "The Concise Geologic Time Scale" by J.G. Ogg, G. Ogg and F.M. Gradstein (2008).

Sept. 2010

Joggins Nova Scotia

Stratigraphic Boundaries:
Major changes in life forms
Type section to represent the time period
Internationally agreed upon lower boundary
Globally synchronous and recognisable
GSSP or golden spike

Tiktaalik 375my
The missing link between
fish and amphibians
Ellesmere Island, Canada

TED DAESCHLER / ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

Four Billion Years and Counting
Quatre milliards d'années d'histoire

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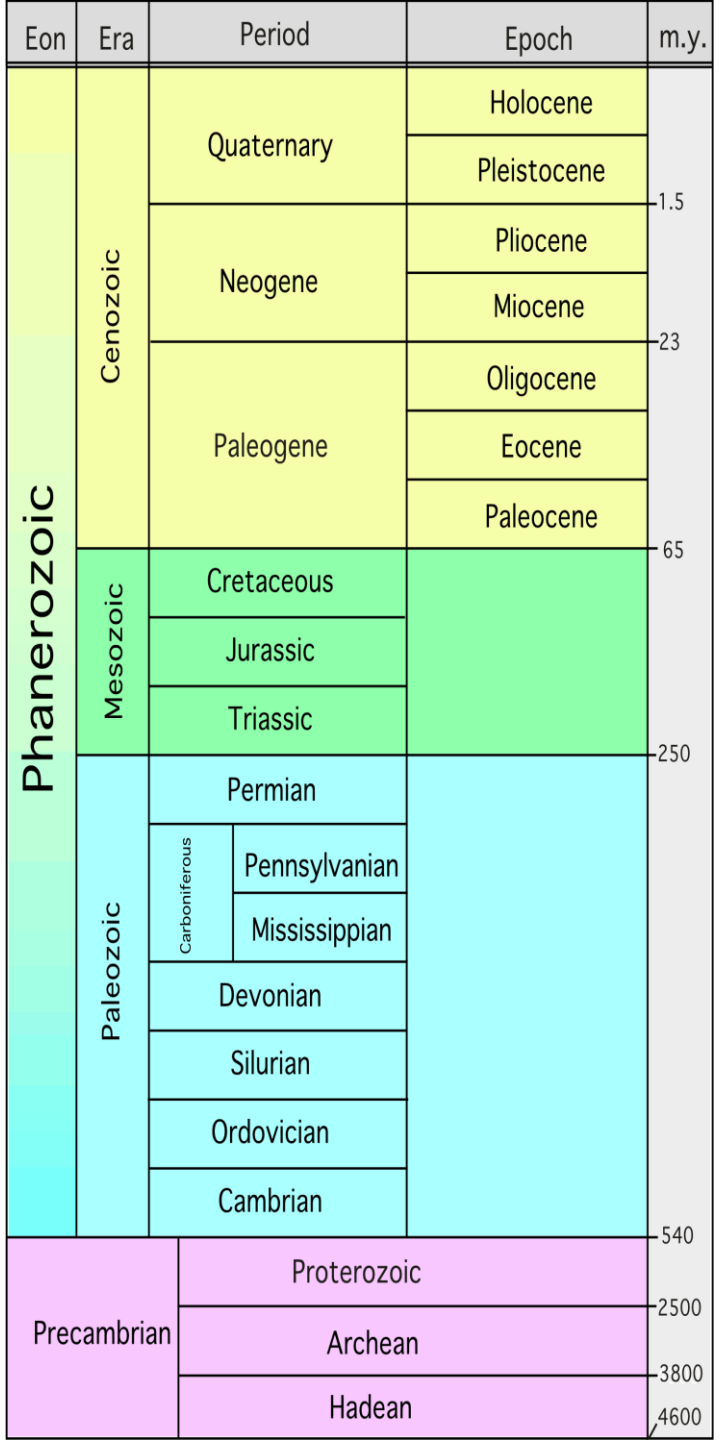
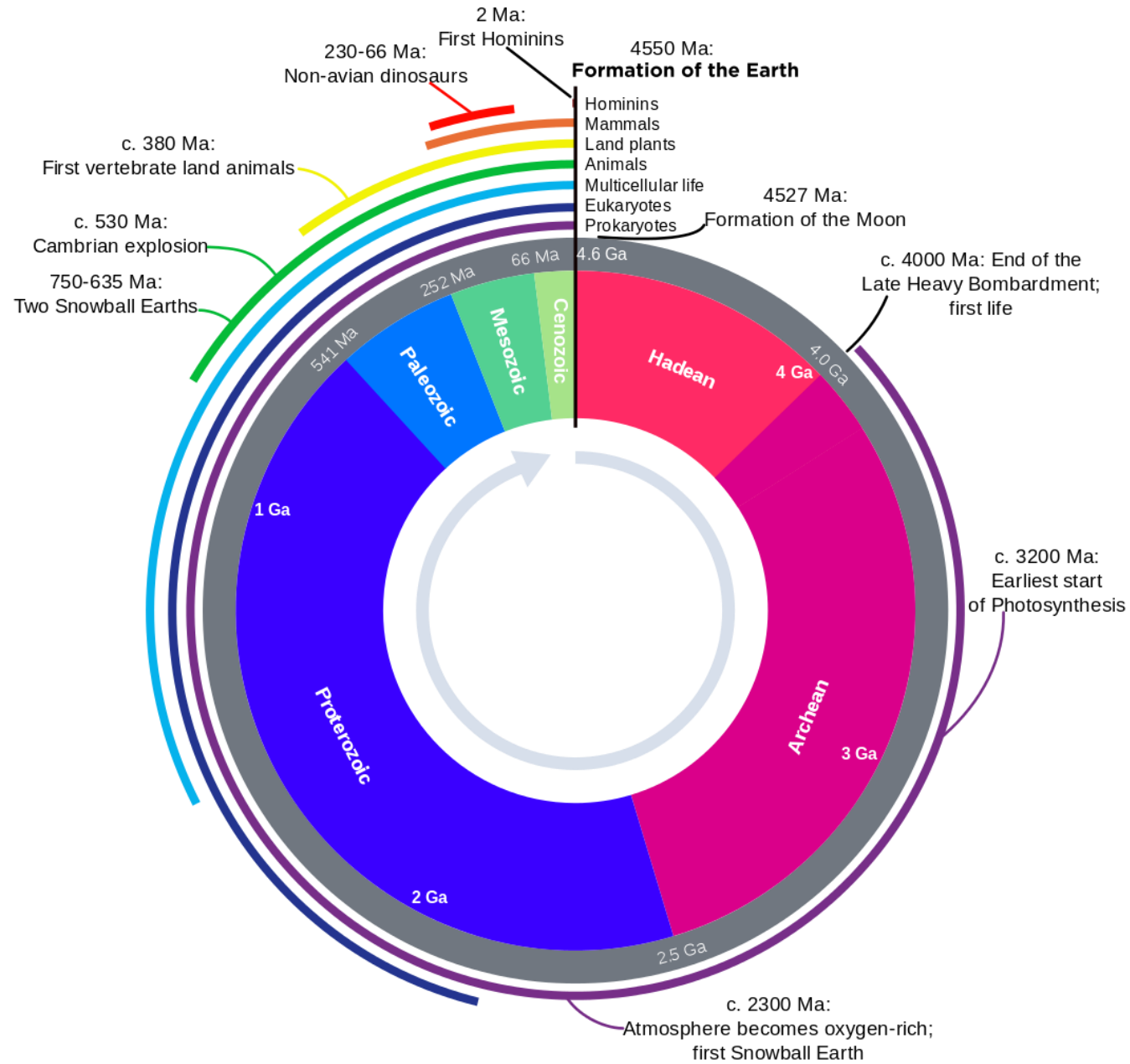
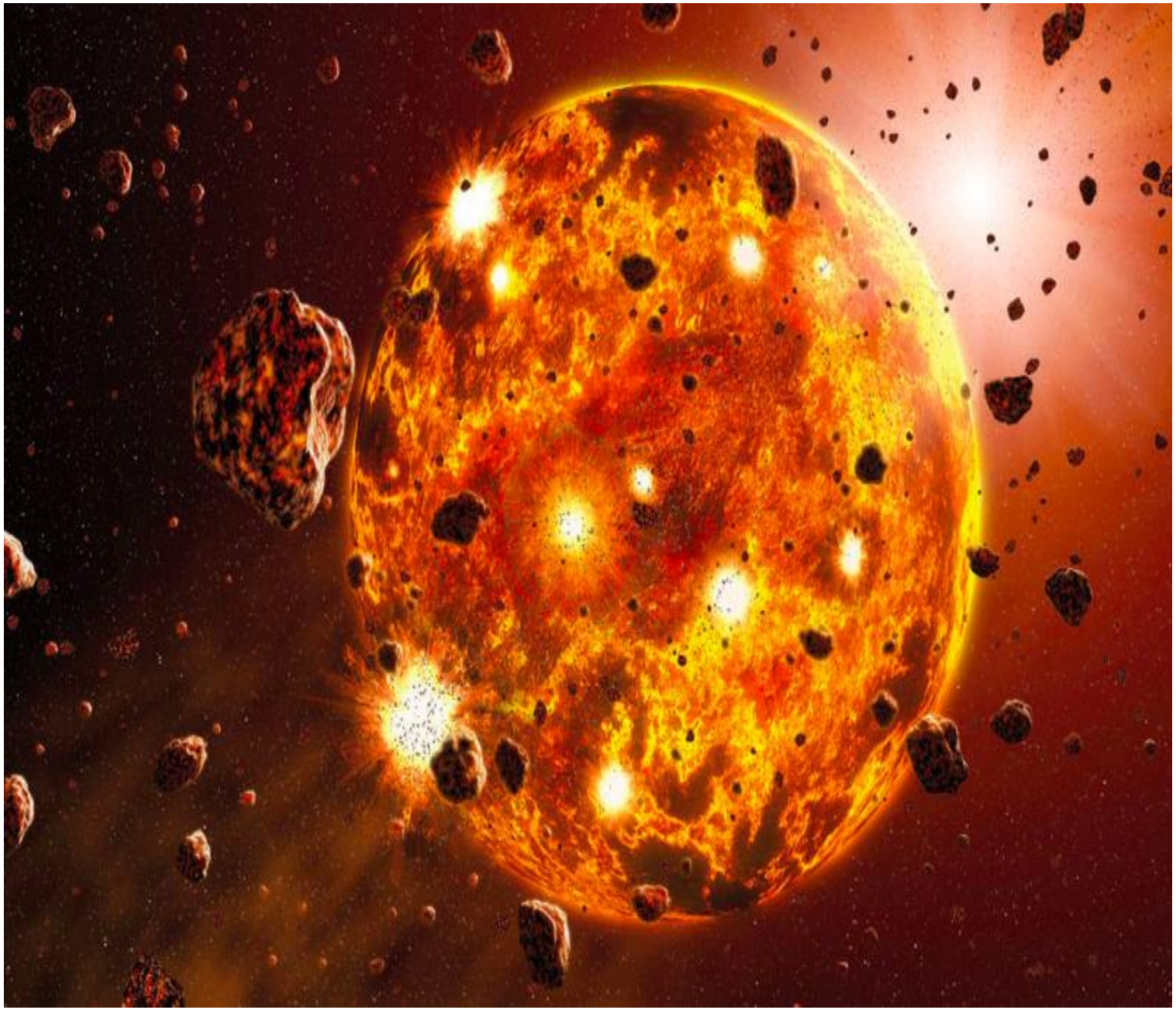


http://paleo.cortland.edu/tutorial/Timescale/timescale.htm

Modified from McRoberts, 1998

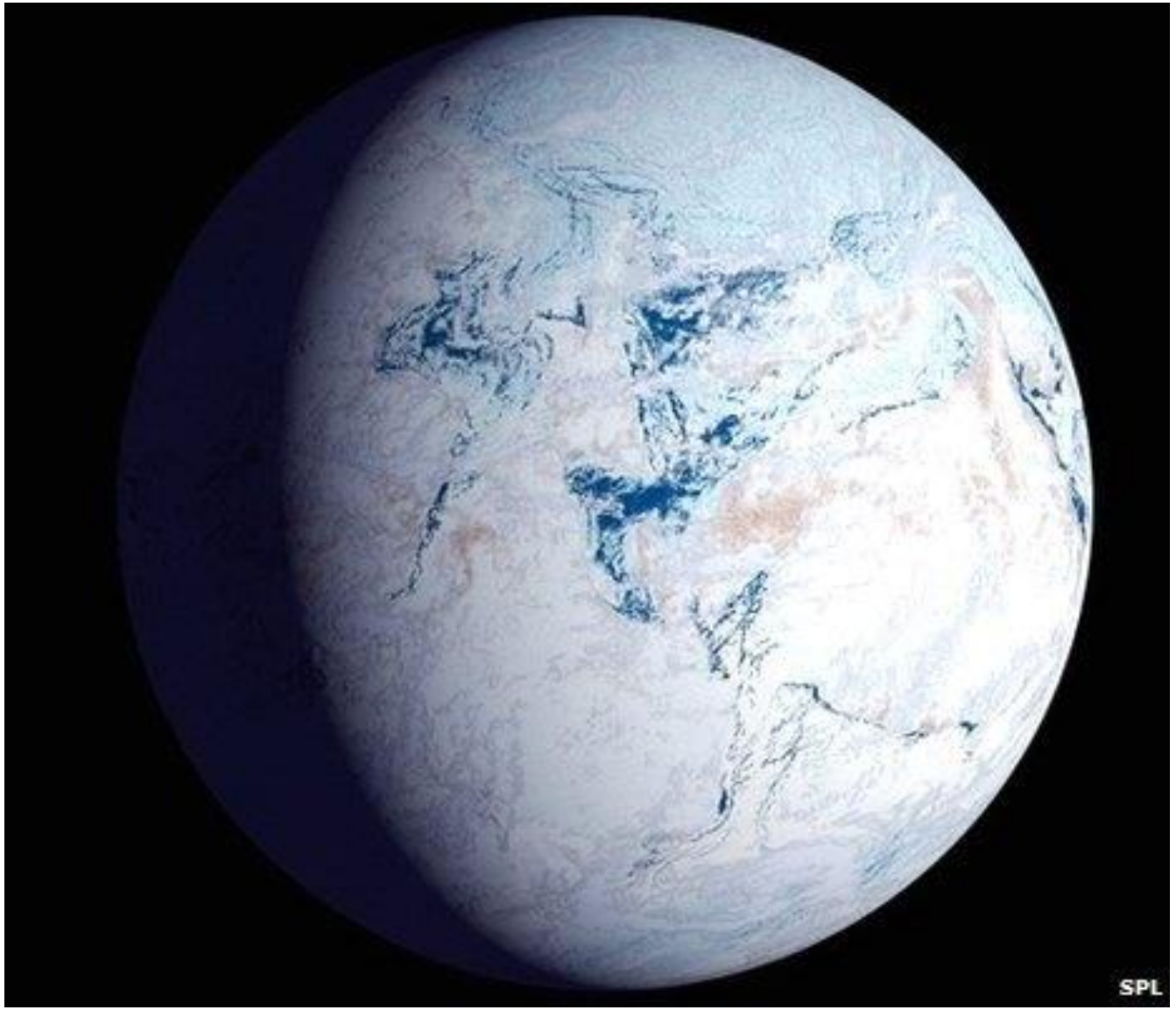

2 Ma:
First Hominins
230-66 Ma:
Non-avian dinosaurs
4550 Ma:
Formation of the Earth
Hominins
Mammals
Land plants
Animals
Multicellular life
Eukaryotes
Prokaryotes
c. 380 Ma:
First vertebrate land animals
4527 Ma:
Formation of the Moon
c. 530 Ma:
Cambrian explosion
750-635 Ma:
Two Snowball Earths
c. 4000 Ma: End of the
Late Heavy Bombardment;
first life
66 Ma
4.6 Ga
252 Ma
541 Ma
Cenozoic
Mesozoic
Paleozoic
Hadean
4 Ga
4.0 Ga
1 Ga
Proterozoic
Archean
3 Ga
2 Ga
2.5 Ga
c. 3200 Ma:
Earliest start
of Photosynthesis
c. 2300 Ma:
Atmosphere becomes oxygen-rich;
first Snowball Earth



http://sploid.gizmodo.com/scientists-show-of-earth-4-000-million-years-ago-1613591779

Artist rendering of the Siberian Traps Volcanic eruptions which precipitated the Permian mass extinction 250 million years ago

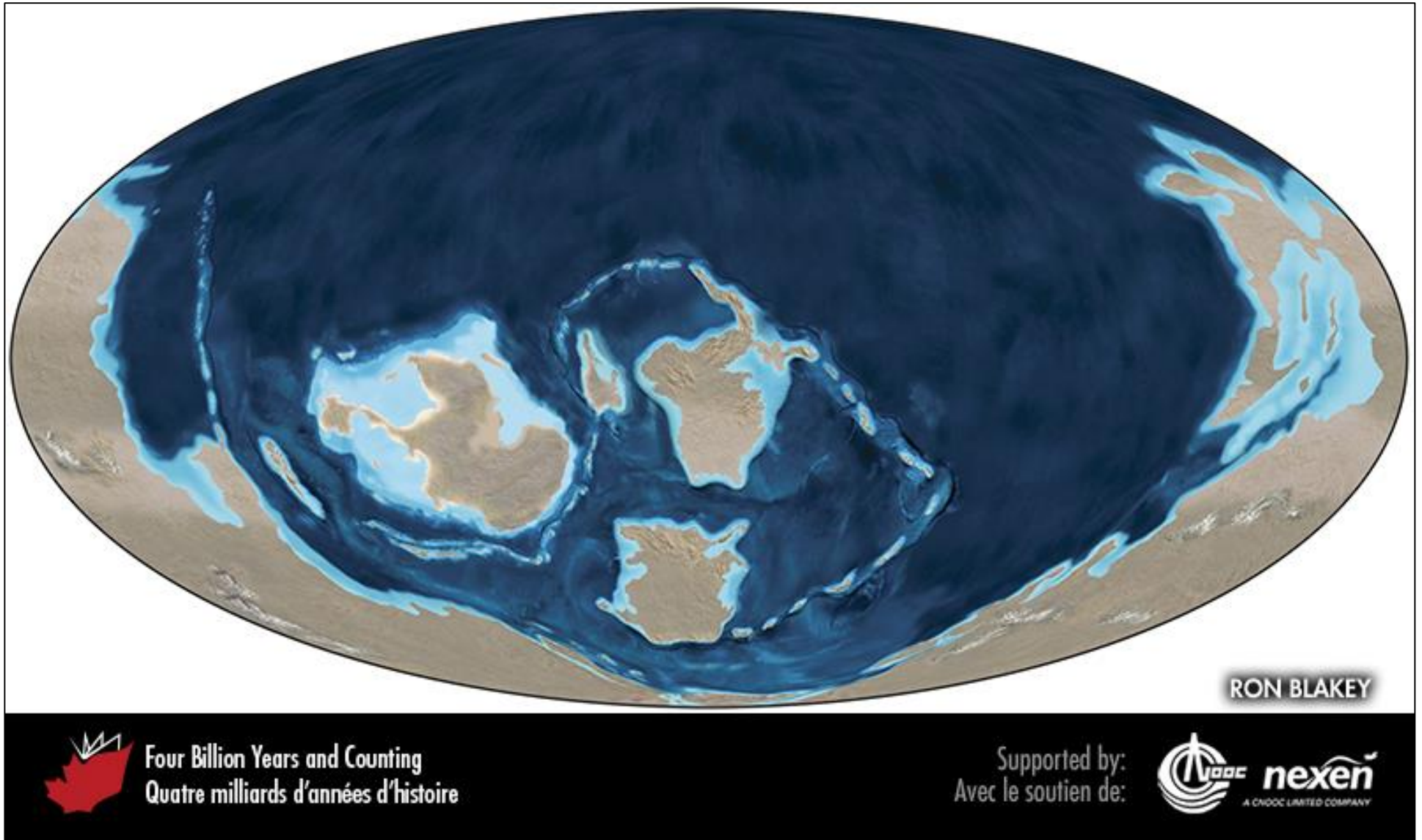
Snowball Earth – series of global glaciations 800- 650 my

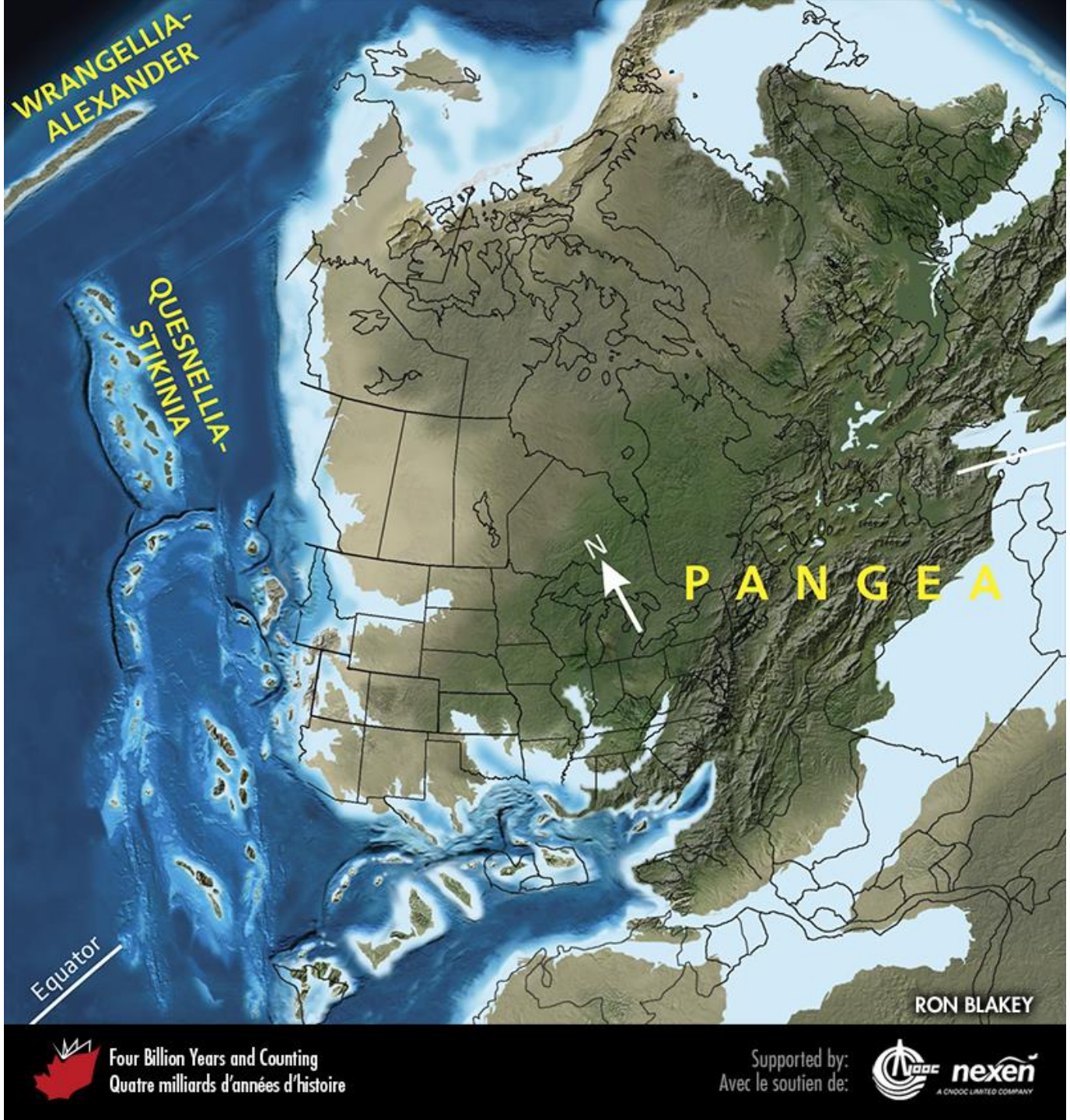


BBC.co.uk

Earth is a dynamic planet – a system where the solid earth, atmosphere, hydrosphere and biosphere are interconnected

Paleogeography 500 million years ago in the Cambrian





Late Carboniferous
315 my ago

Four Billion Years and Counting
Quatre milliards d'années d'histoire

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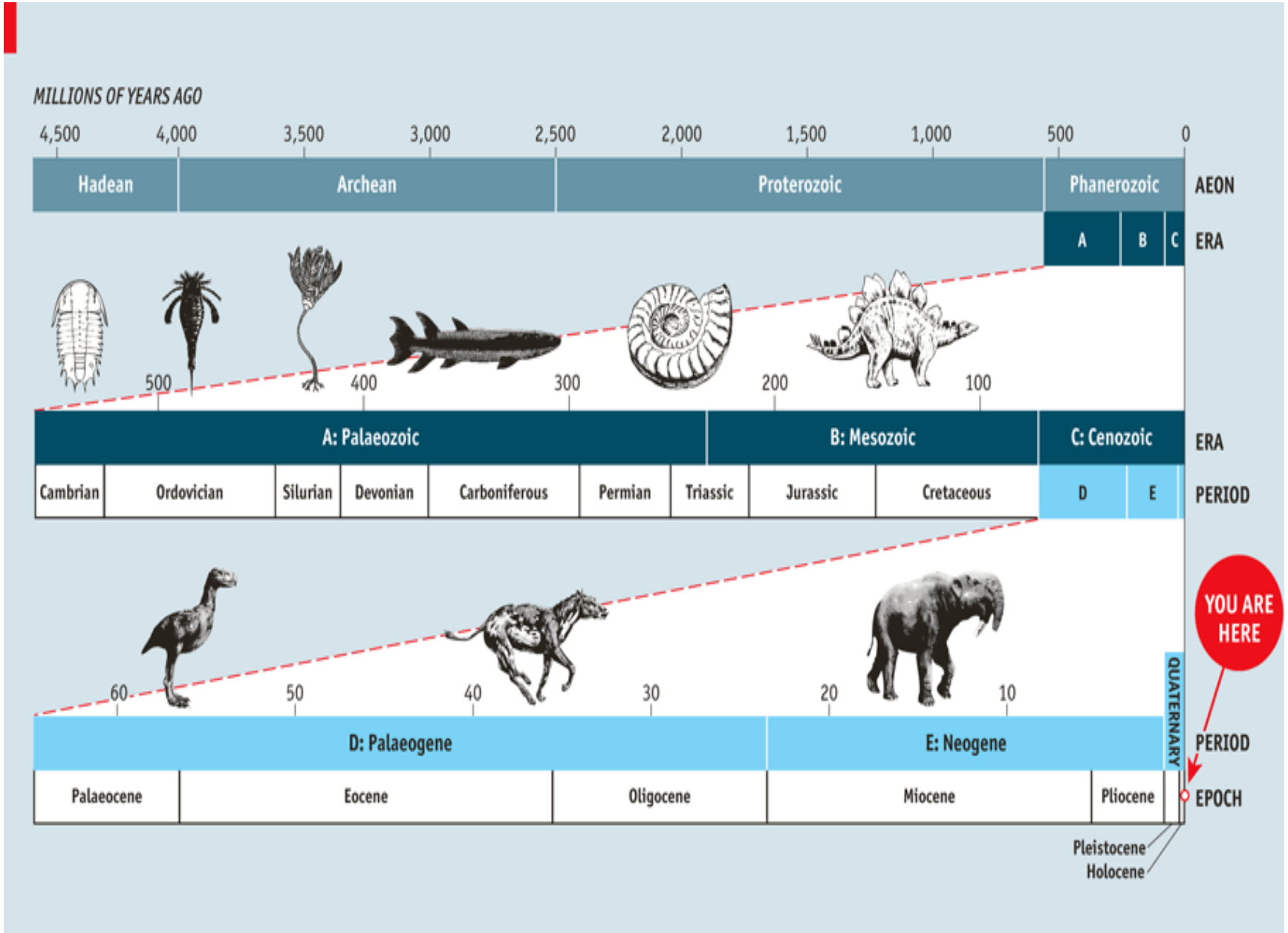


http://pocketbookuk.com/category/science-technology/geology/

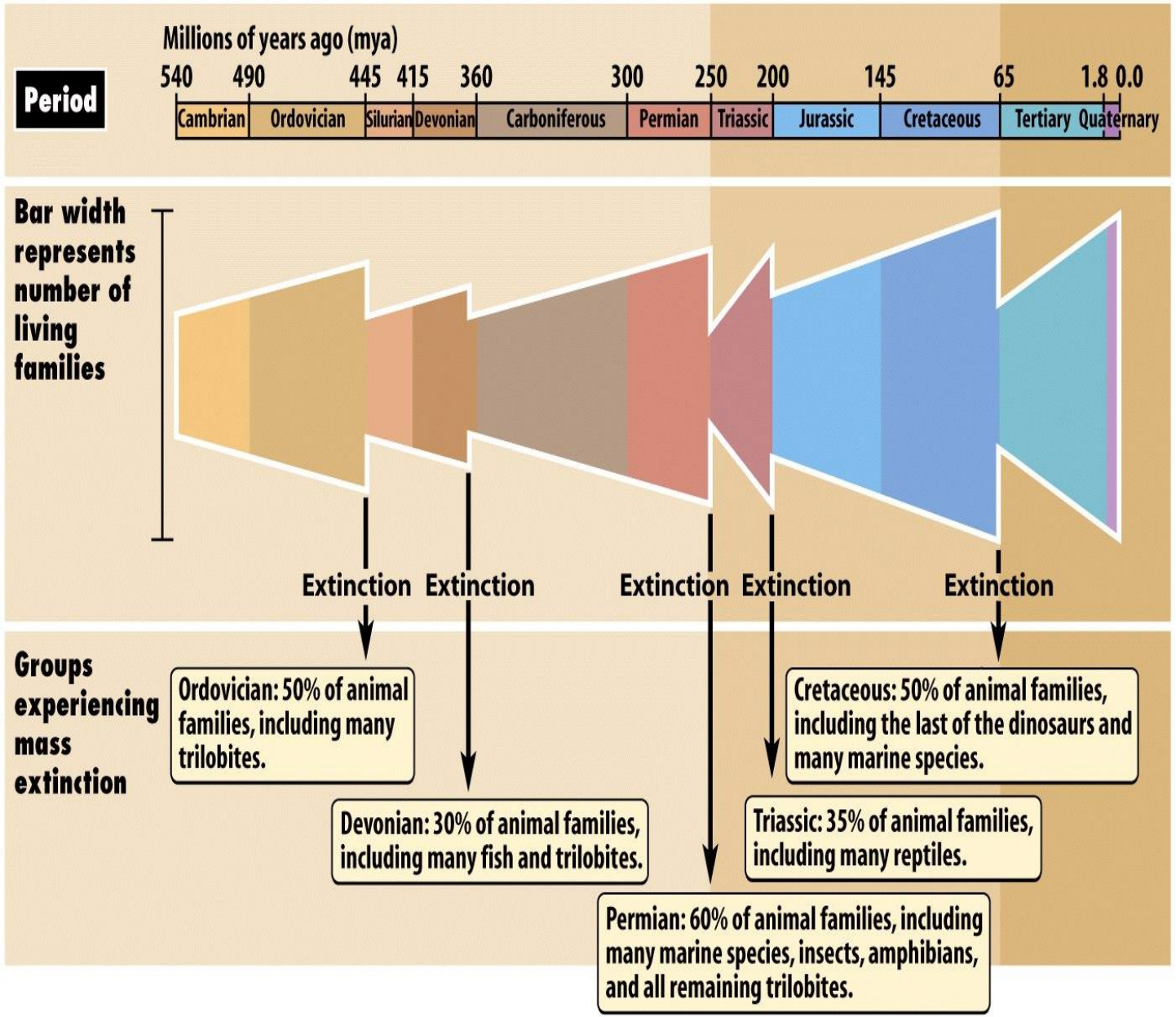
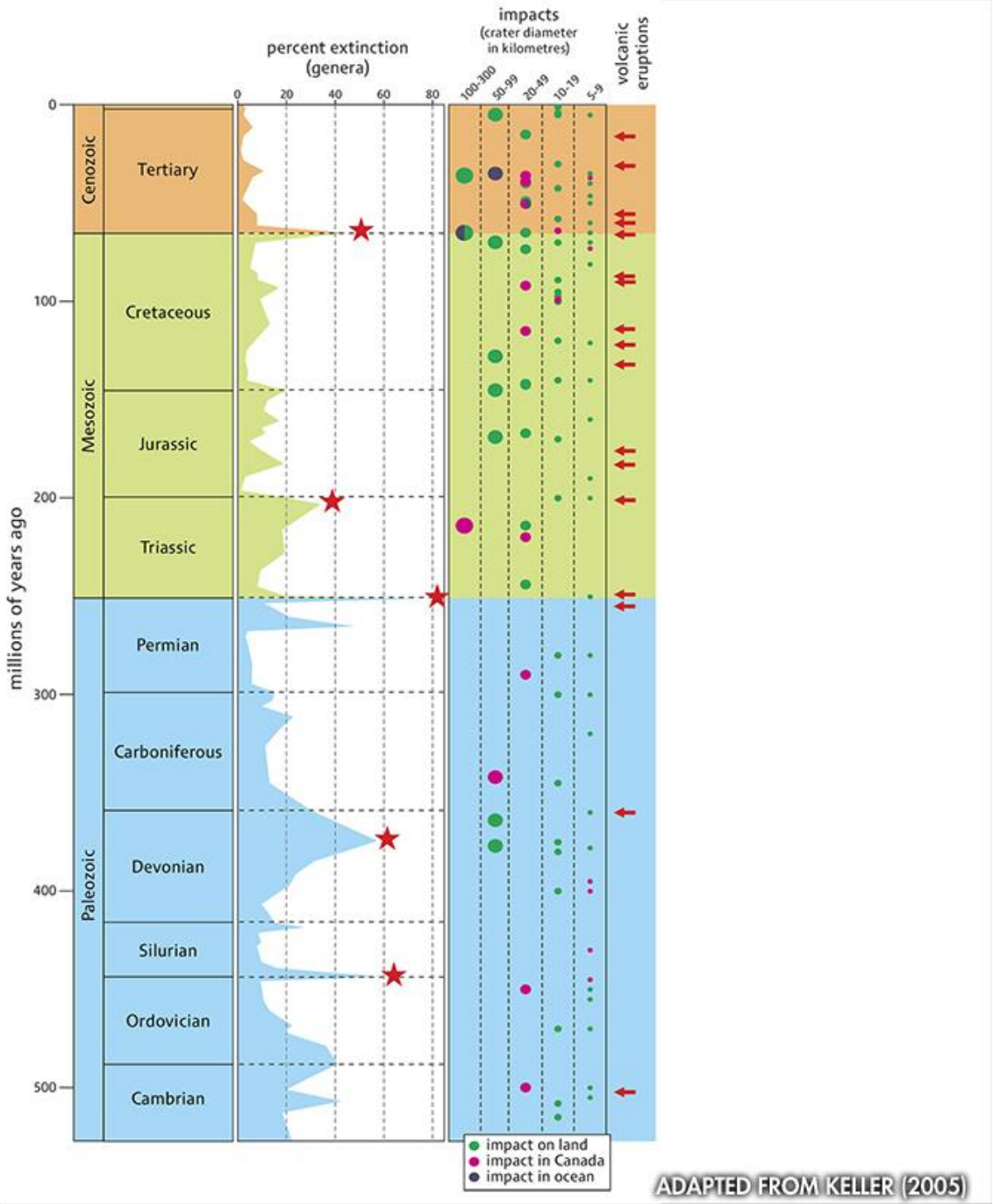


Figure 19-8 Discover Biology 3/e



ADAPTED FROM KELLER (2005)

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nexen

Potential Start Dates for a formal Anthropocene (Epoch, Stage)

- Megafauna Extinction 50,000-10,000 BP diachronous, but near-global
- Origin of Farming 11,000 BP – fossil pollen, diachronous, SW Asia becoming global
- Industrial Revolution – 1760 to present, fly ash, diachronous, NW Europe becoming global
- Nuclear weapon detonation – 1945 to present, 1964 C^{14} peak, local events, global impact
- Persistent industrial chemicals – 1950 onwards, peaks so recent they are difficult to date, local events, global impacts

Sediments in the deep ocean that represent the last 70 years would be thinner than 1mm (Finney 2013 Geol Soc)

Are there going to be significant records in global stratigraphy?

Modified from Lewis et al 2015 Nature

“To Improve the World you must First Understand It”

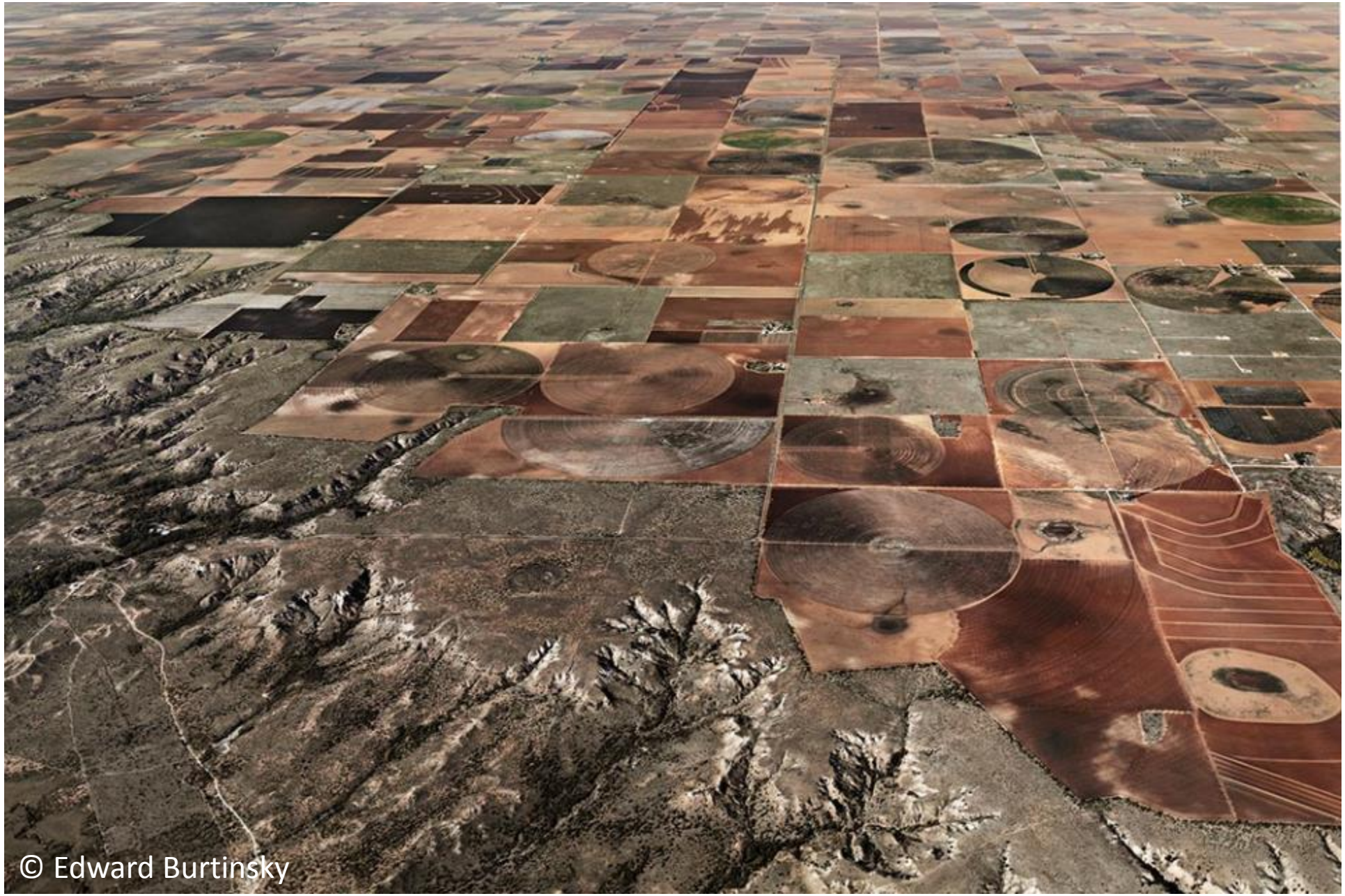
marketing slogan used by the Independent Institute when promoting its flagship political economy journal, “The Independent Review”.

But “to improve” is a value laden verb. As is “to understand”.

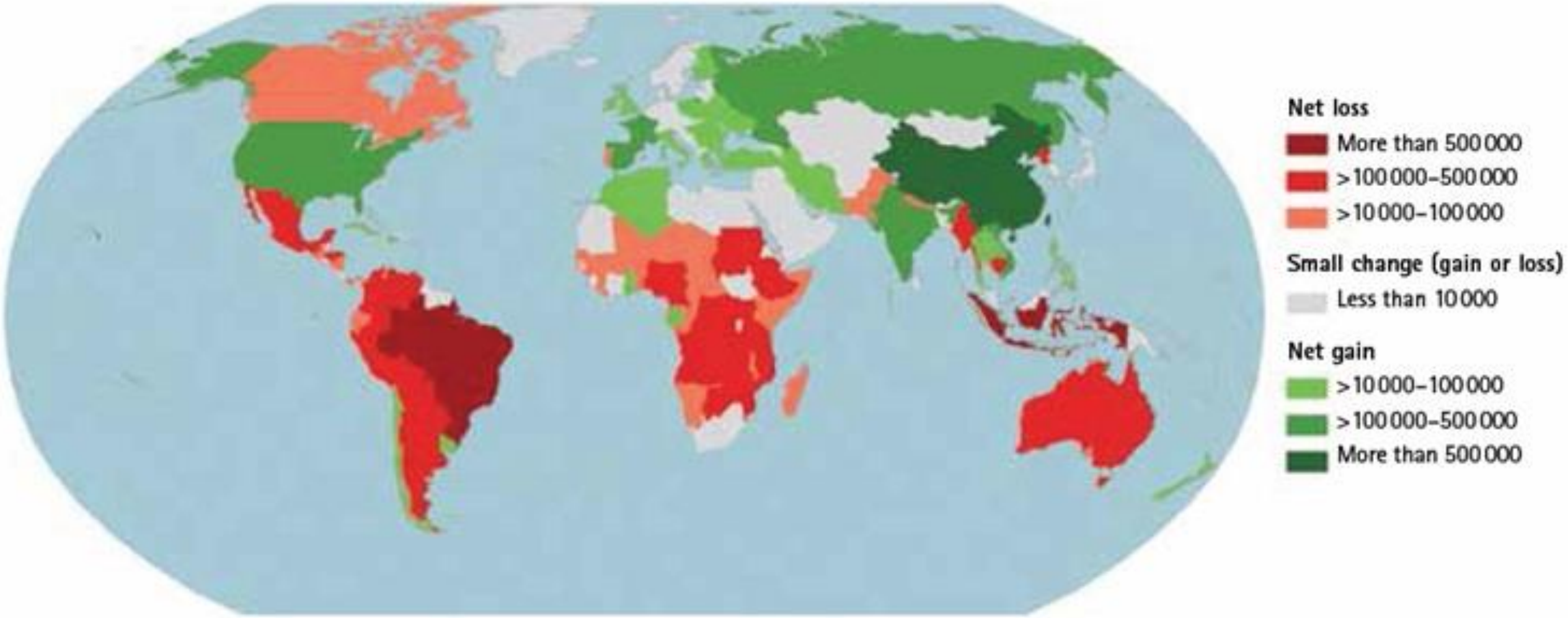
They say that hard facts and pictures speak a thousand words. So, to set the stage, we thought we should show some images and raise some key messages to help frame the conversation.

We understand the need for ecological diversity and natural chaos to maintain nature's resilience and well-being, but …

we continue massively to modify land form and land cover

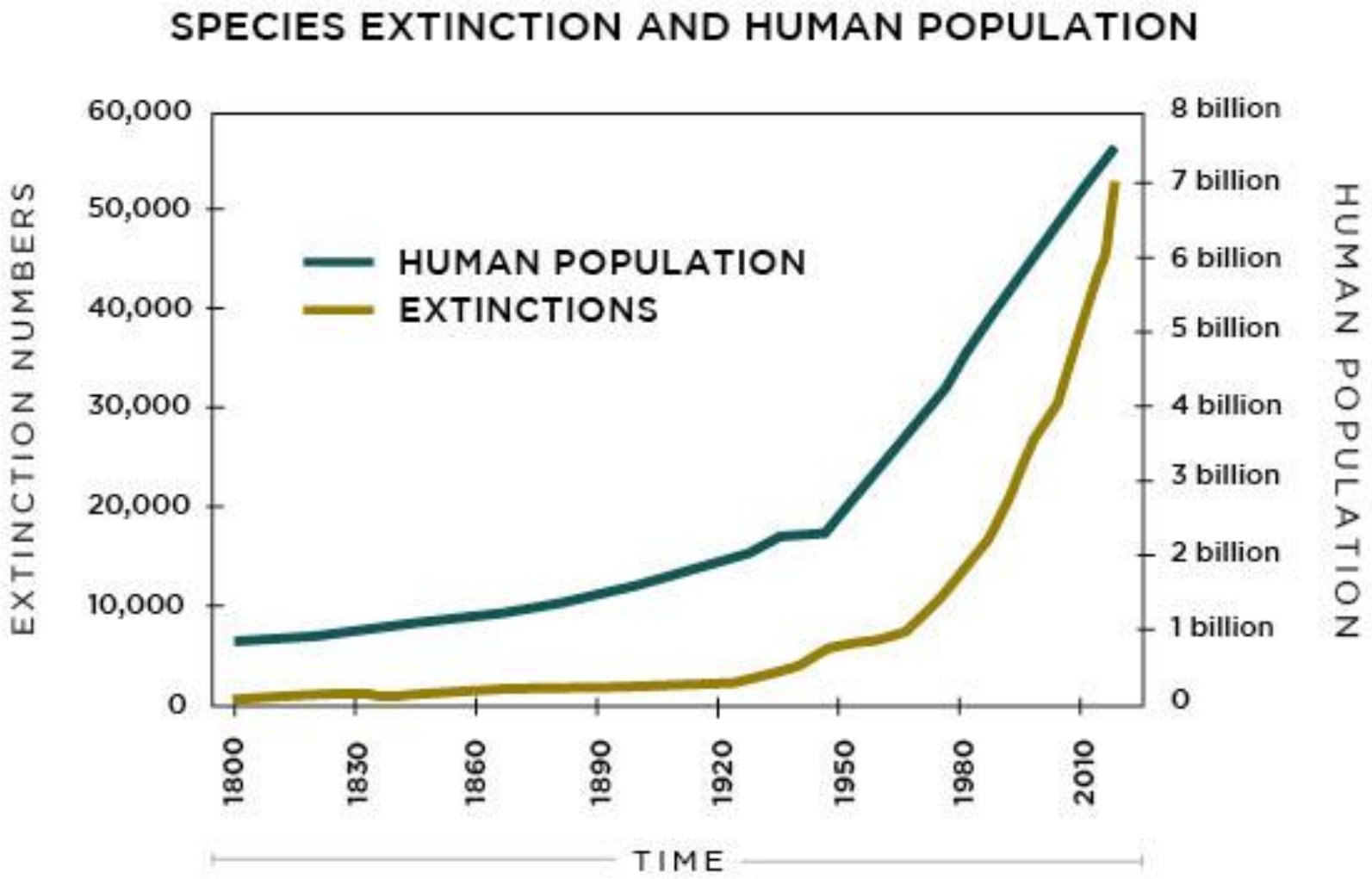

© Edward Burtinsky

Annual net forest gain/loss (ha) by country (1990-2015)

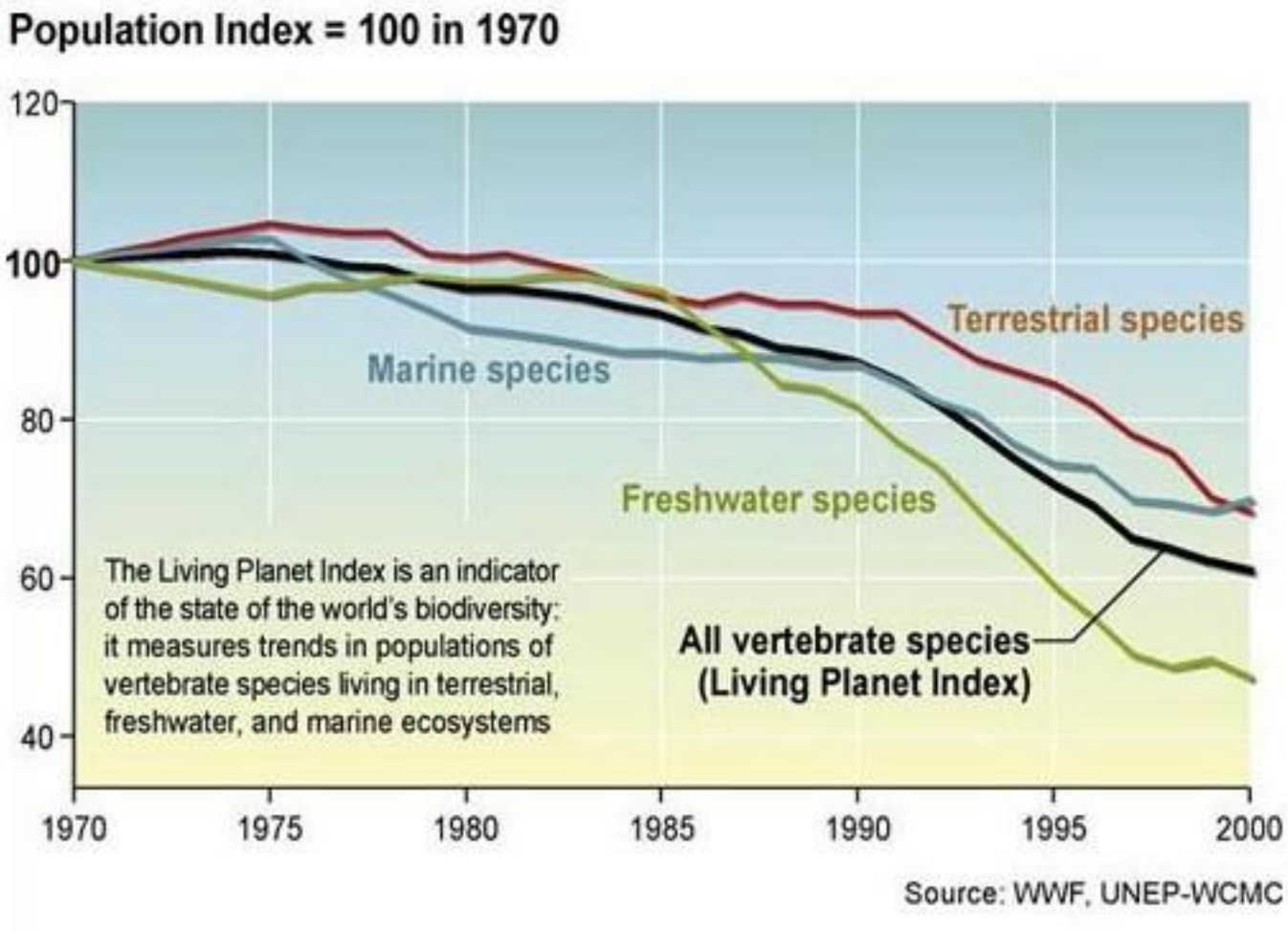


Source: FAO FRA 2015

and we continue the trend of species extinction

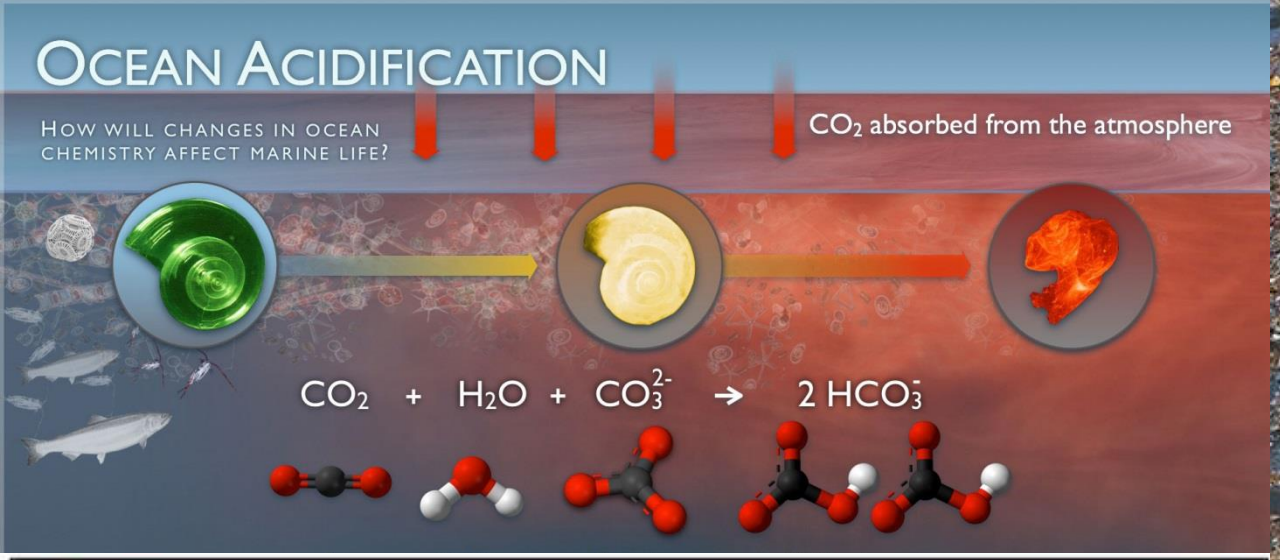


Scott, J.M. 2008. Threats to biological diversity: Global, continental, local. U.S. Geological Survey, Idaho, Cooperative Fish and Wildlife, Research Unit, Unviversity of Idaho.



WWF, UNEP-WCMC

http://webecoist.momtastic.com/2009/01/02/planet-earth/

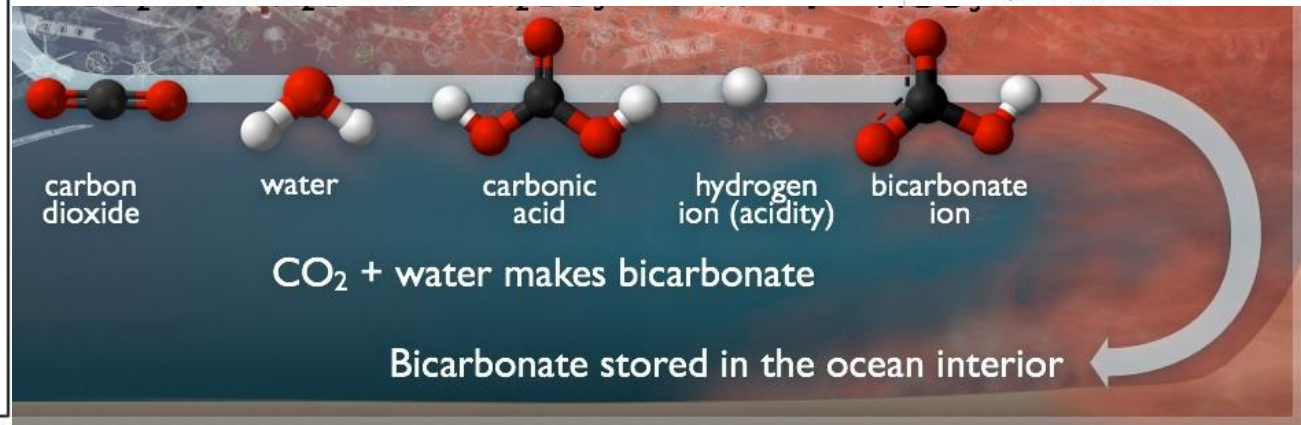


Great Pacific Garbage Patch

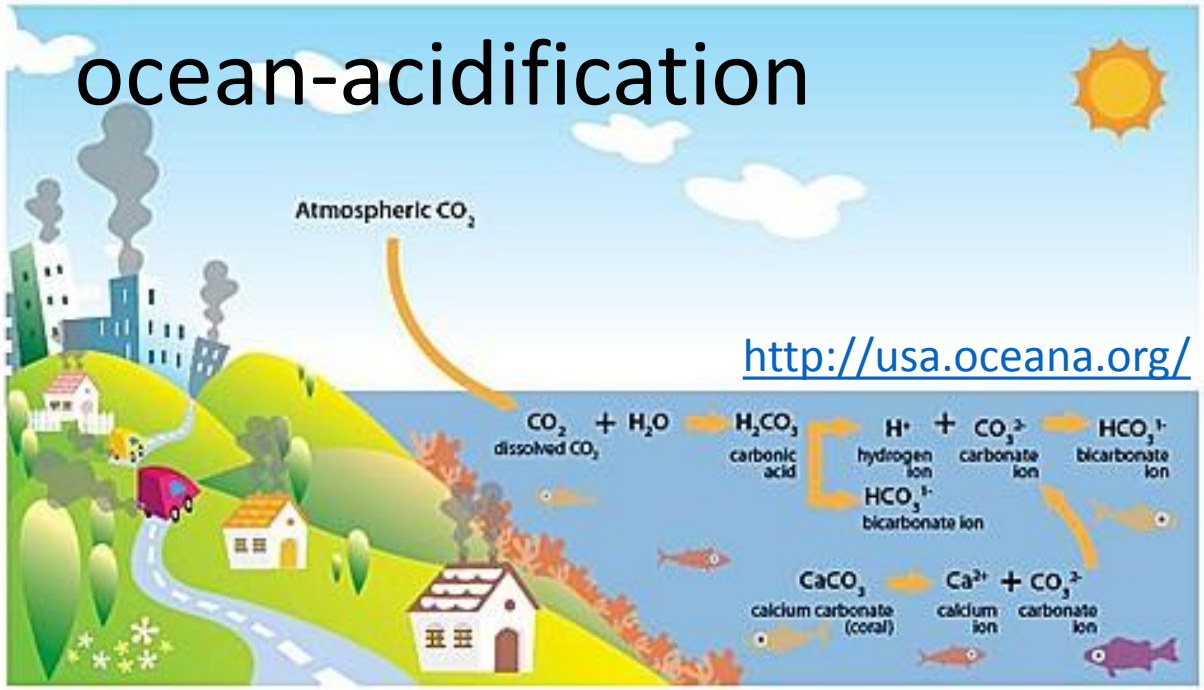
Ripley's Believe It or Not!
The "Great Pacific Garbage Patch" covers 8.1% of the Pacific Ocean—TWICE the size of continental U.S. — with Ruslana Kovalynskaya.

Like · Comment · Share · July 26

Album: Timeline Photos
Shared with: Public
Open Photo Viewer

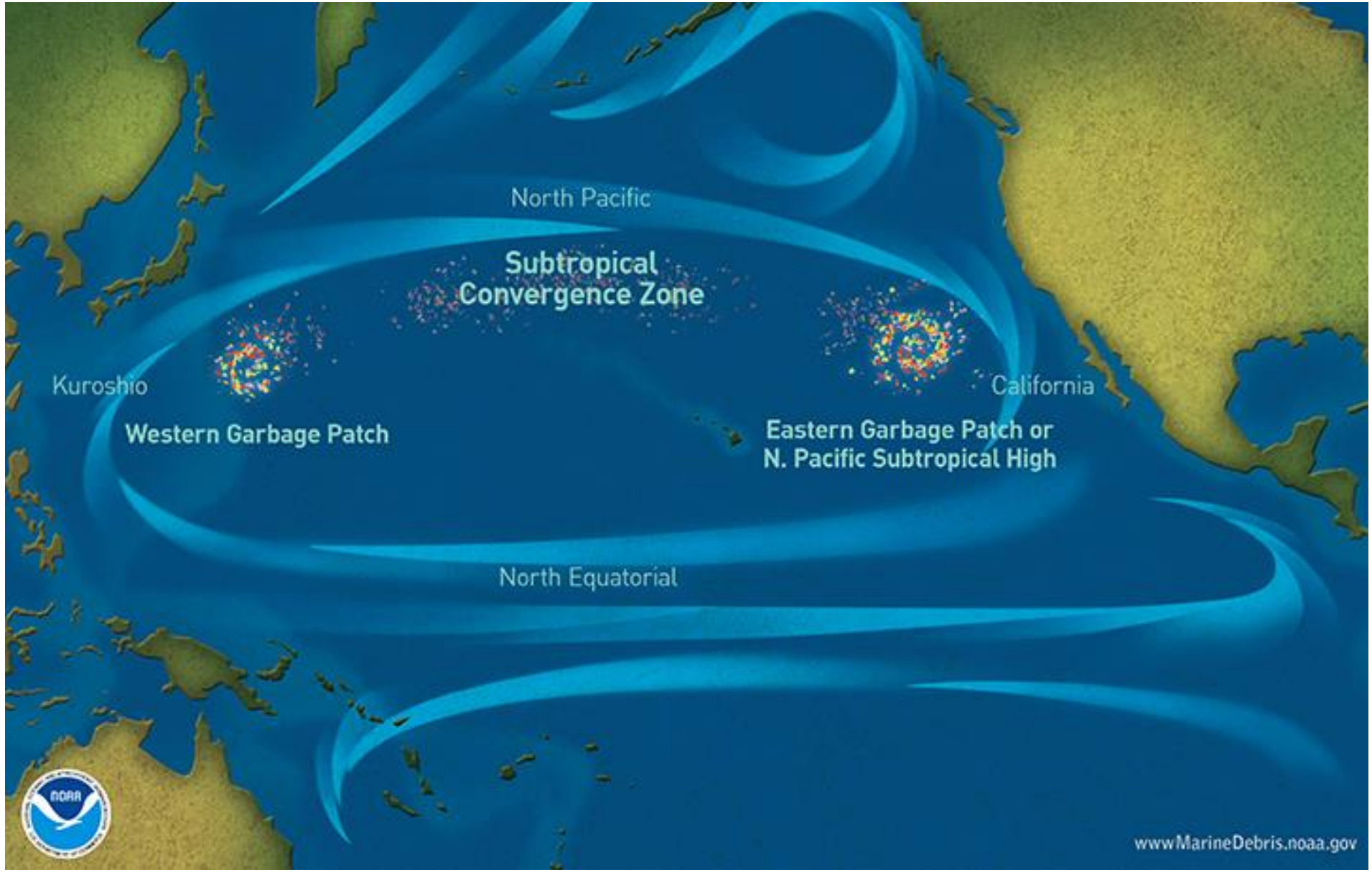


ocean-acidification

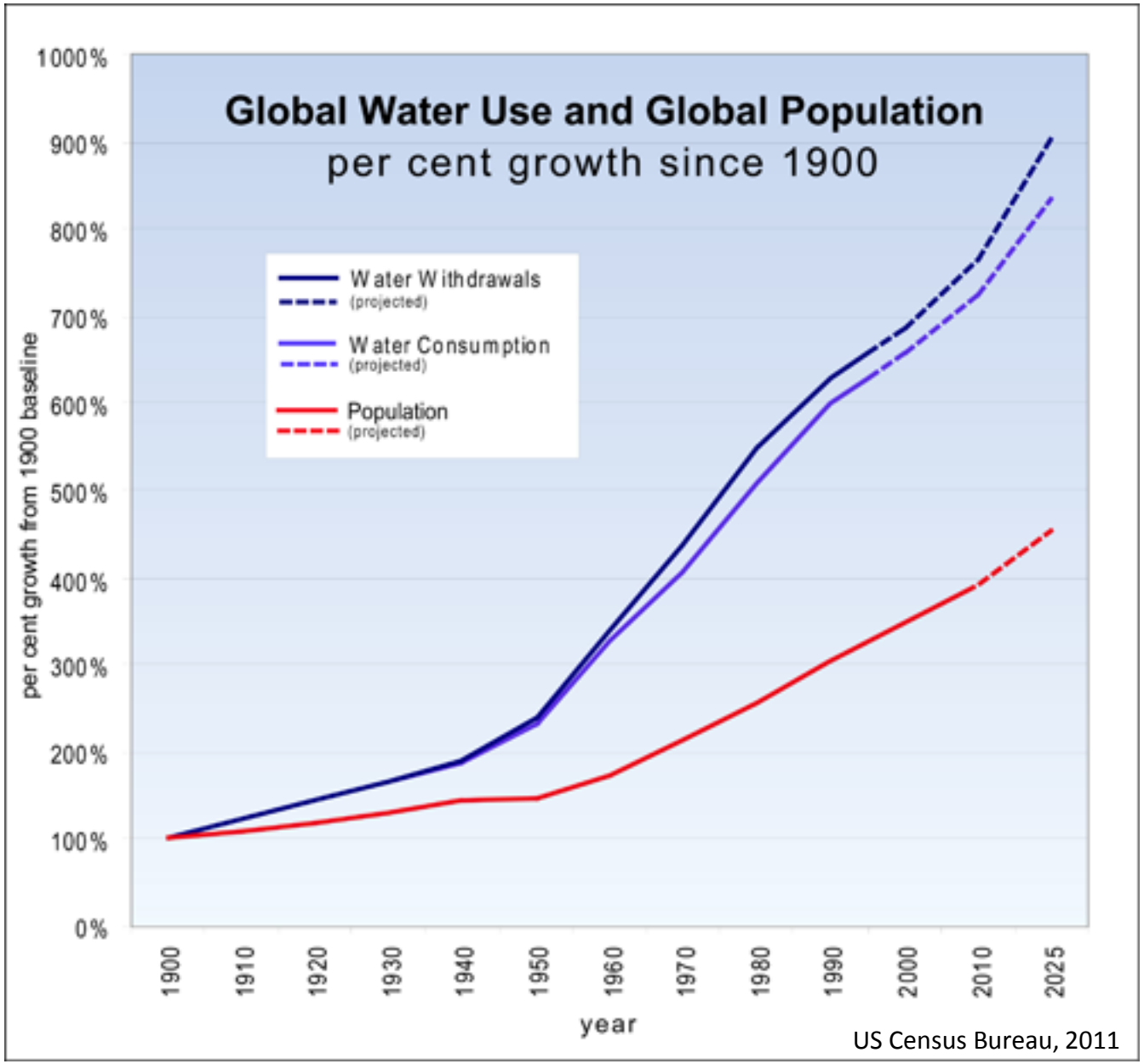


http://usa.oceana.org/

As CO_2 is absorbed by the atmosphere it bonds with sea water forming carbonic acid. This acid then releases a bicarbonate ion and a hydrogen ion. The hydrogen ion bonds with free carbonate ions in the water forming another bicarbonate ion. This free carbonate would otherwise be available to marine animals for making calcium carbonate shells and skeletons.

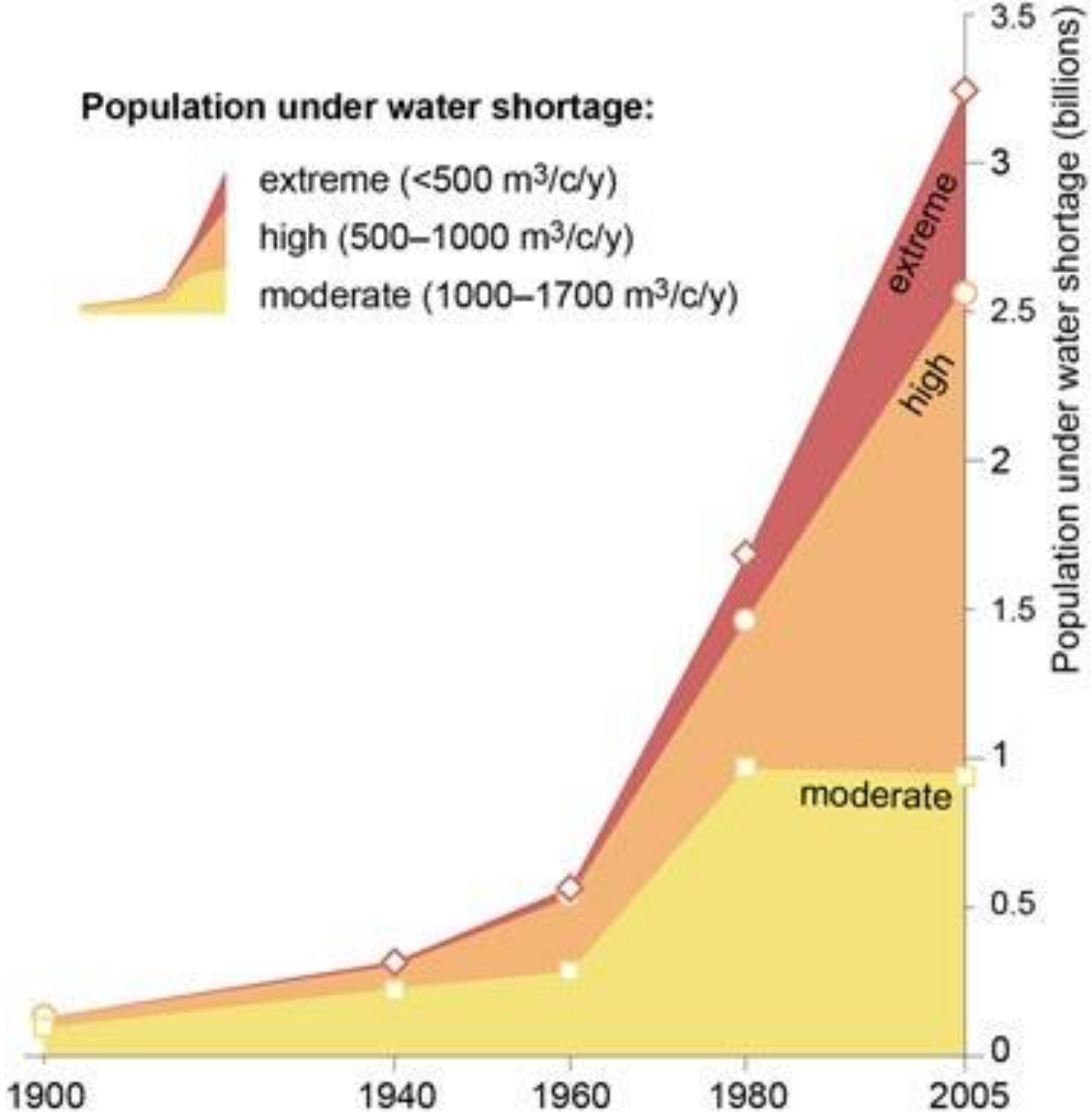

North Pacific
Subtropical
Convergence Zone
Kuroshio
California
Western Garbage Patch
Eastern Garbage Patch or
N. Pacific Subtropical High
North Equatorial
NOAA
www.MarineDebris.noaa.gov

Do we really comprehend the importance of water and it's meaning to subsistence?

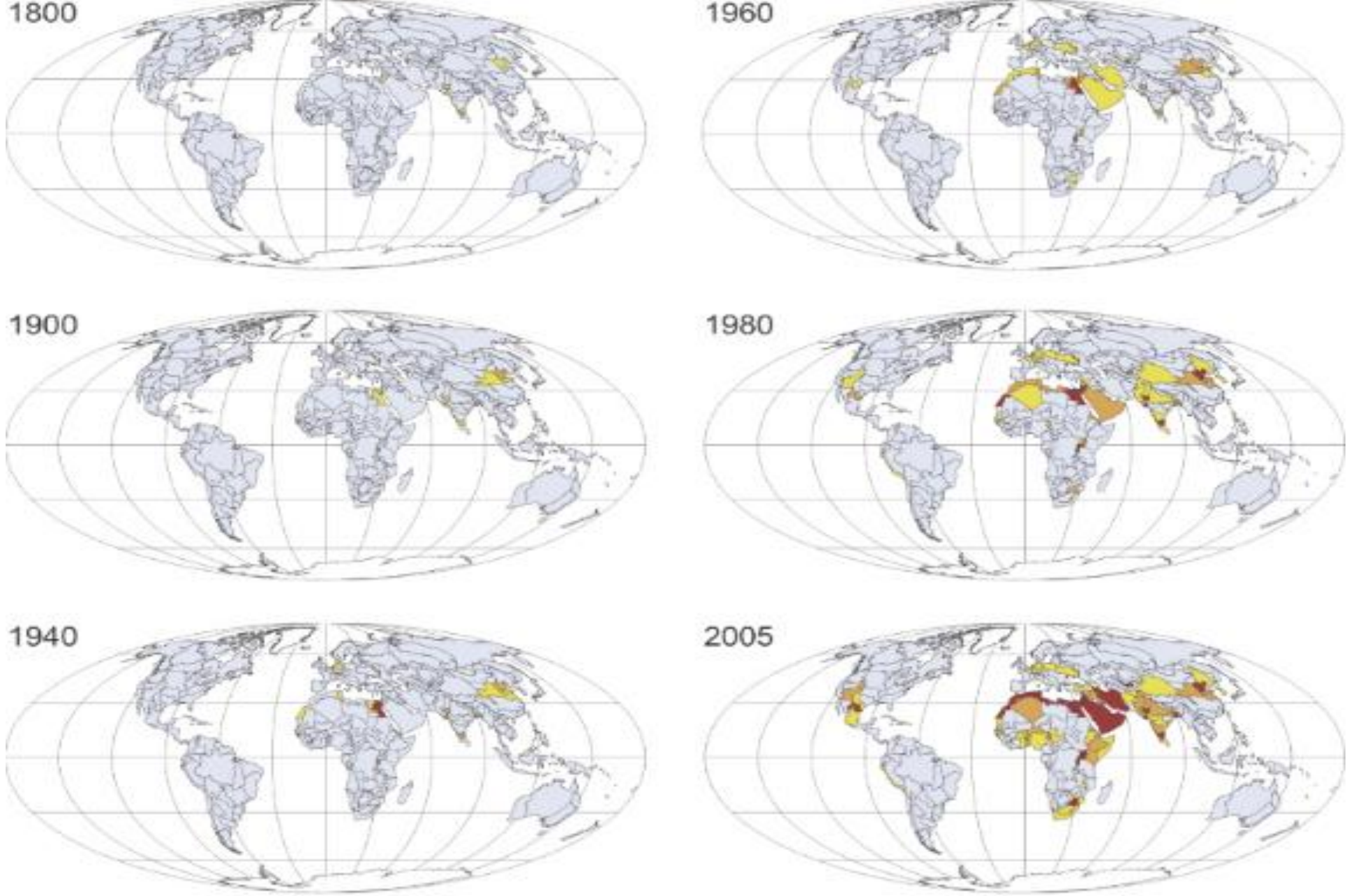


US Census Bureau, 2011

http://mic.com/articles/111644/why-water-shortages-are-the-greatest-threat-to-global-security#.VpsvBWPpK

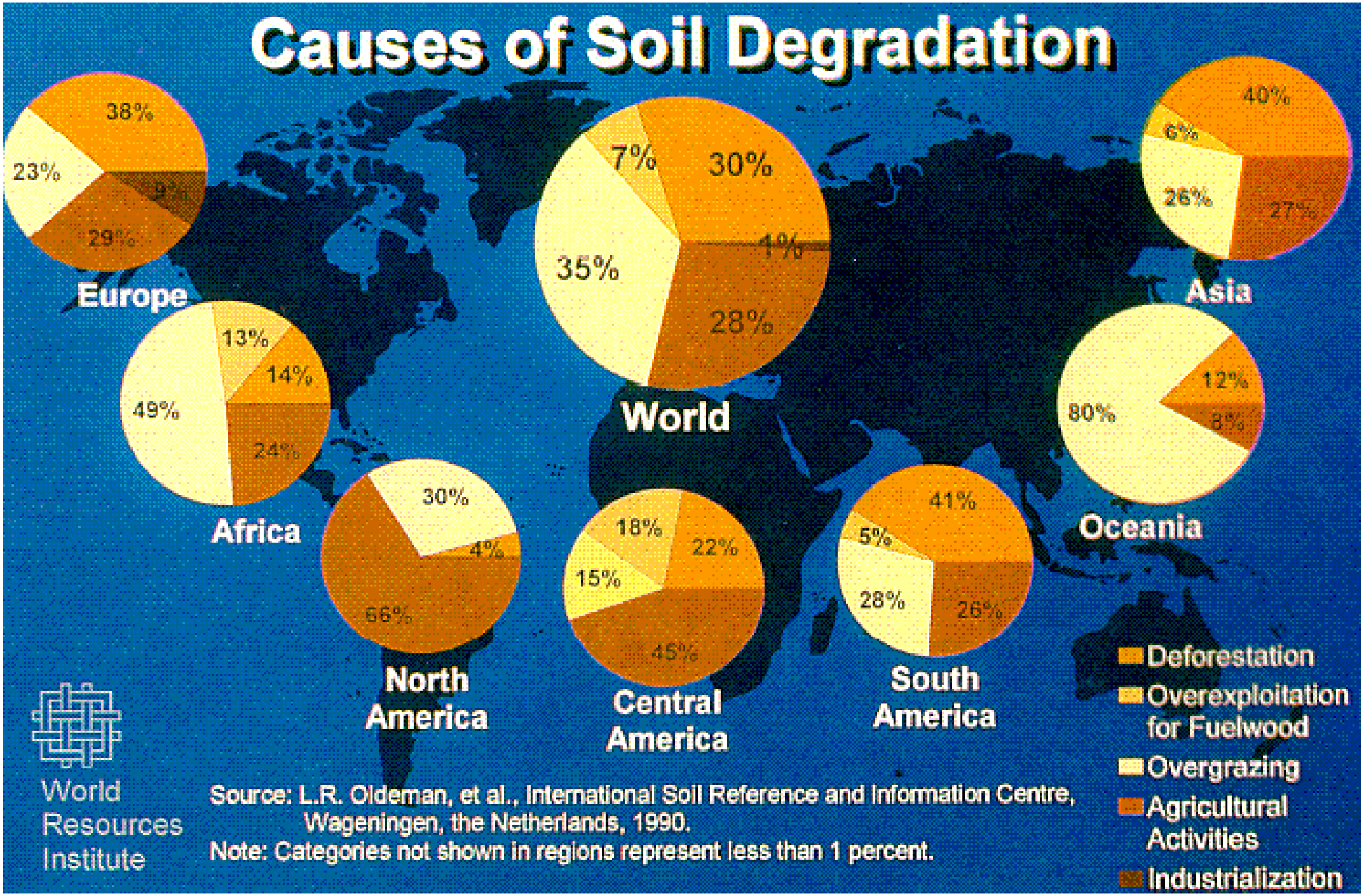


Kummu et al. 2010

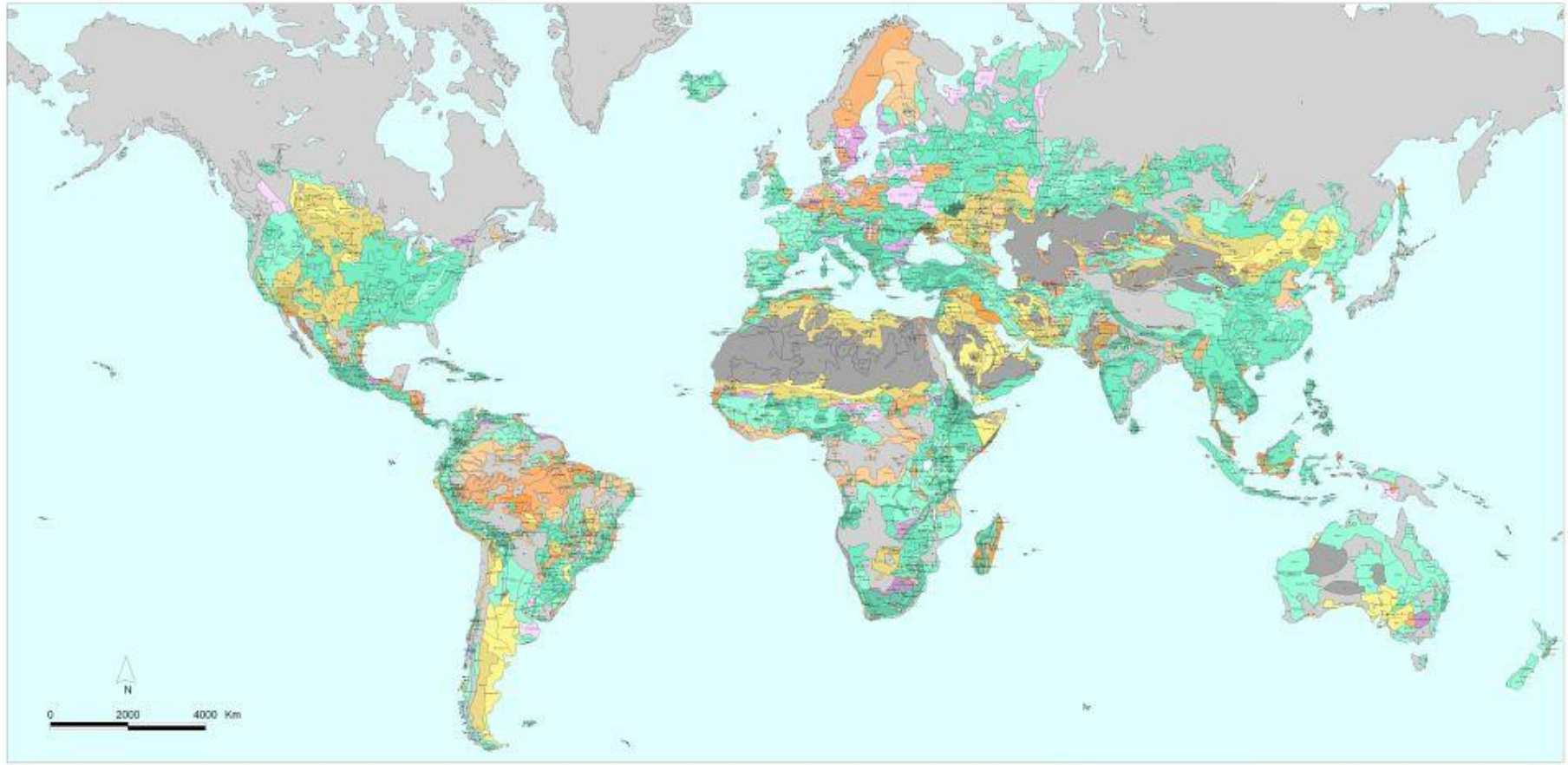

1800
1960
1900
1980
1940
2005
Population under water shortage [m³/capita/yr]
<500
500–1000
1000–1700
>1700

http://colley-law.com/fracking-gag-order-on-kids-how-the-shale-industry-earns-its-bad-rep/

Credit: Binh Thuan, UNEP


Causes of Soil Degradation
38%
23%
9%
29%
Europe
7%
30%
4%
35%
28%
World
40%
6%
26%
27%
Asia
13%
14%
49%
24%
Africa
12%
80%
8%
Oceania
30%
4%
66%
North America
18%
22%
15%
45%
Central America
41%
5%
28%
26%
South America
Deforestation
Overexploitation for Fuelwood
Overgrazing
Agricultural Activities
Industrialization
World Resources Institute
Source: L.R. Oldeman, et al., International Soil Reference and Information Centre, Wageningen, the Netherlands, 1990.
Note: Categories not shown in regions represent less than 1 percent.

GLOBAL ASSESSMENT OF THE STATUS OF HUMAN-INDUCED SOIL DEGRADATION (1990)



DEGRADATION SEVERITY (Extent + Degree)

Water erosion
- Loss of topsoil
- Terrain deformation/ mass movement

Low
Medium
High
Very high

Wind erosion
- Loss of topsoil
- Terrain deformation
- Overblowing

Low
Medium
High
Very high

Chemical deterioration
- Loss of nutrients/ organic matter
- Salinization/alkalinization
- Acidification
- Pollution

Low
Medium
High
Very high

Physical deterioration
- Compaction/crusting
- Waterlogging
- Subsidence of organic soils

Low
Medium
High
Very high

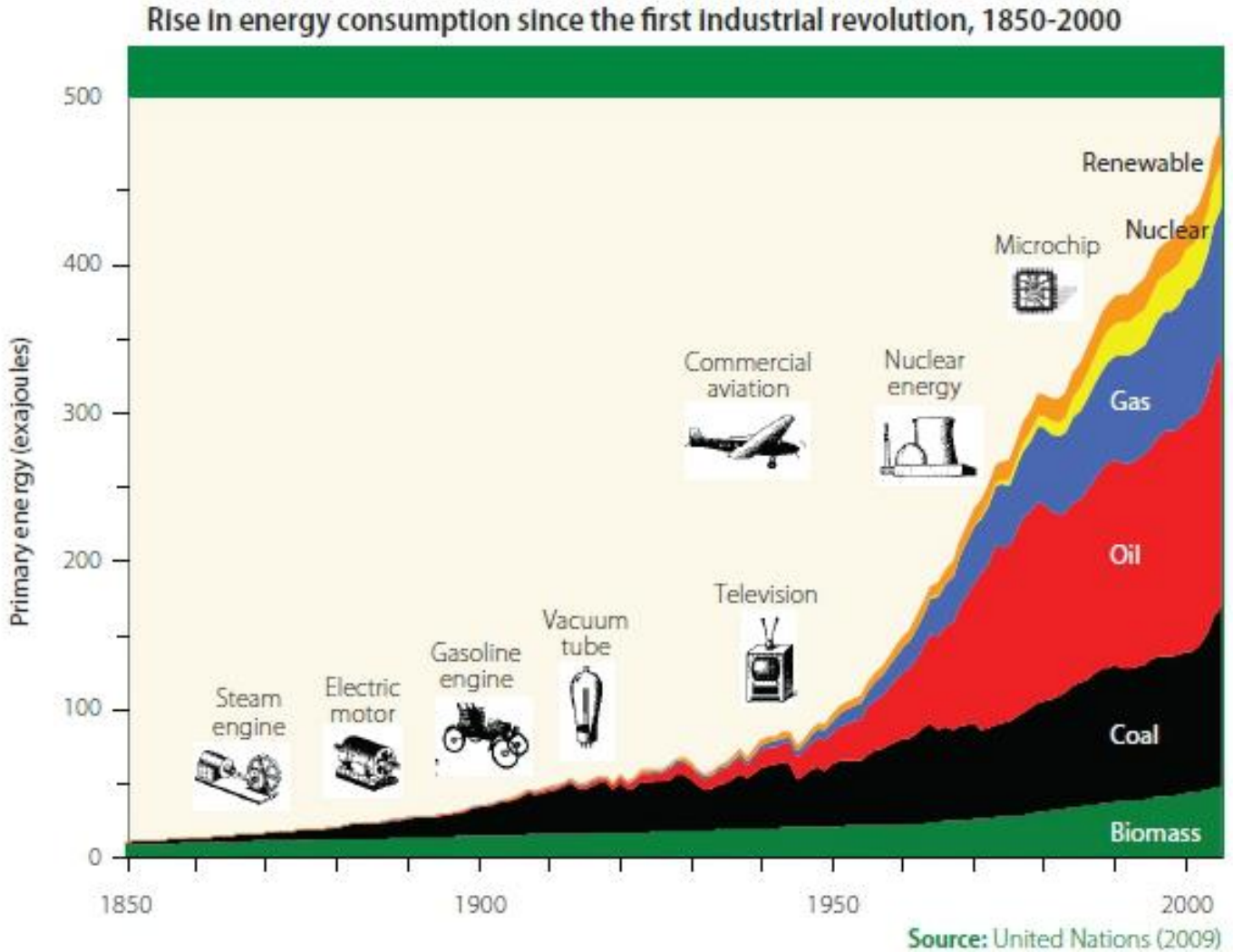
Stable terrain
- Stable under natural conditions
- Stable without vegetation
- Stabilized by human intervention

Stable

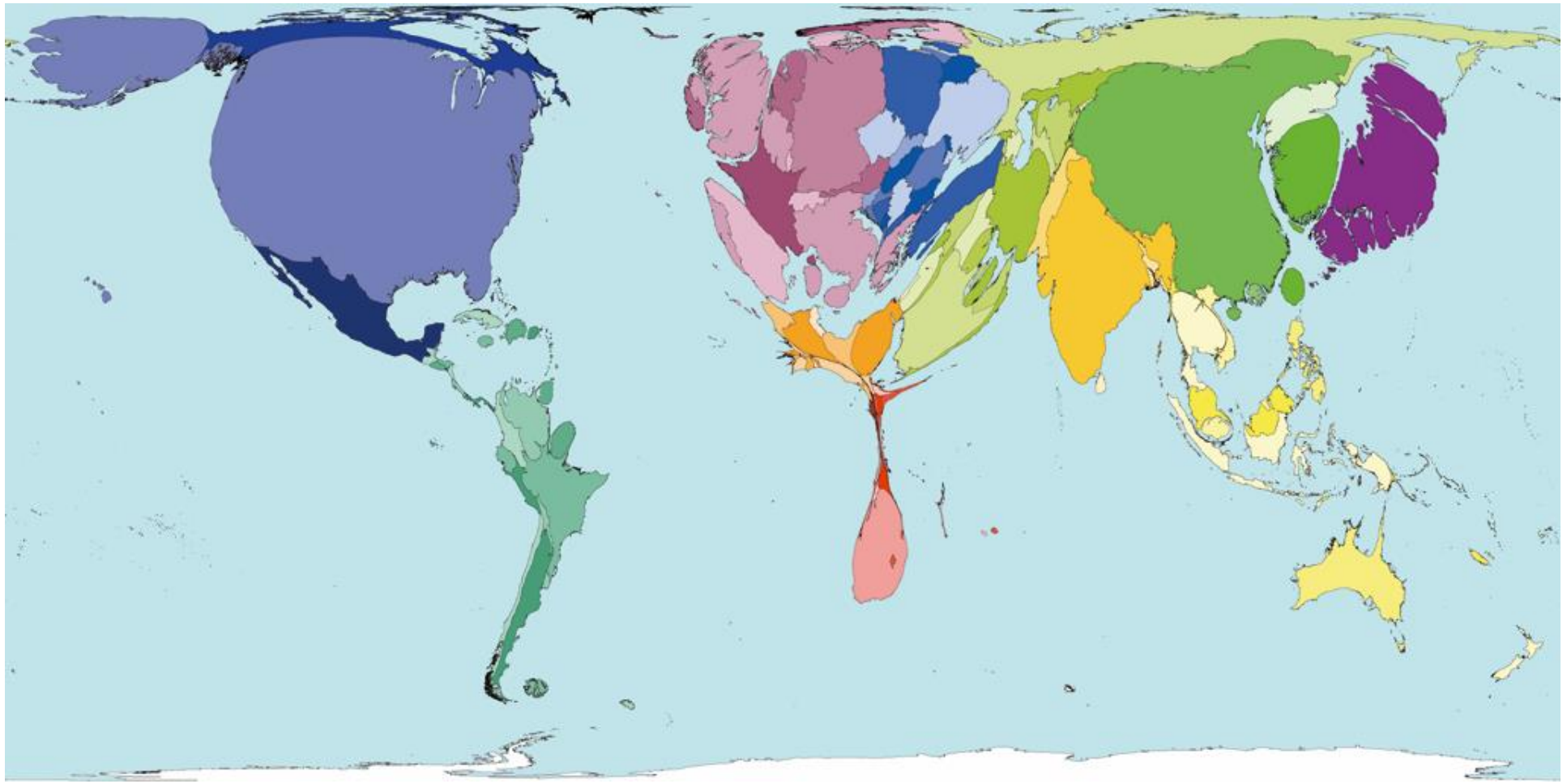
Other
Non used wasteland
Ocean, inland water

What about “growth” as a core assumption driving societal and economic well-being? In a closed and balanced system, does growth in one place by necessity not imply decline somewhere else?

A good example is growth energy consumption in relation to an associated decline in human and natural well-being!



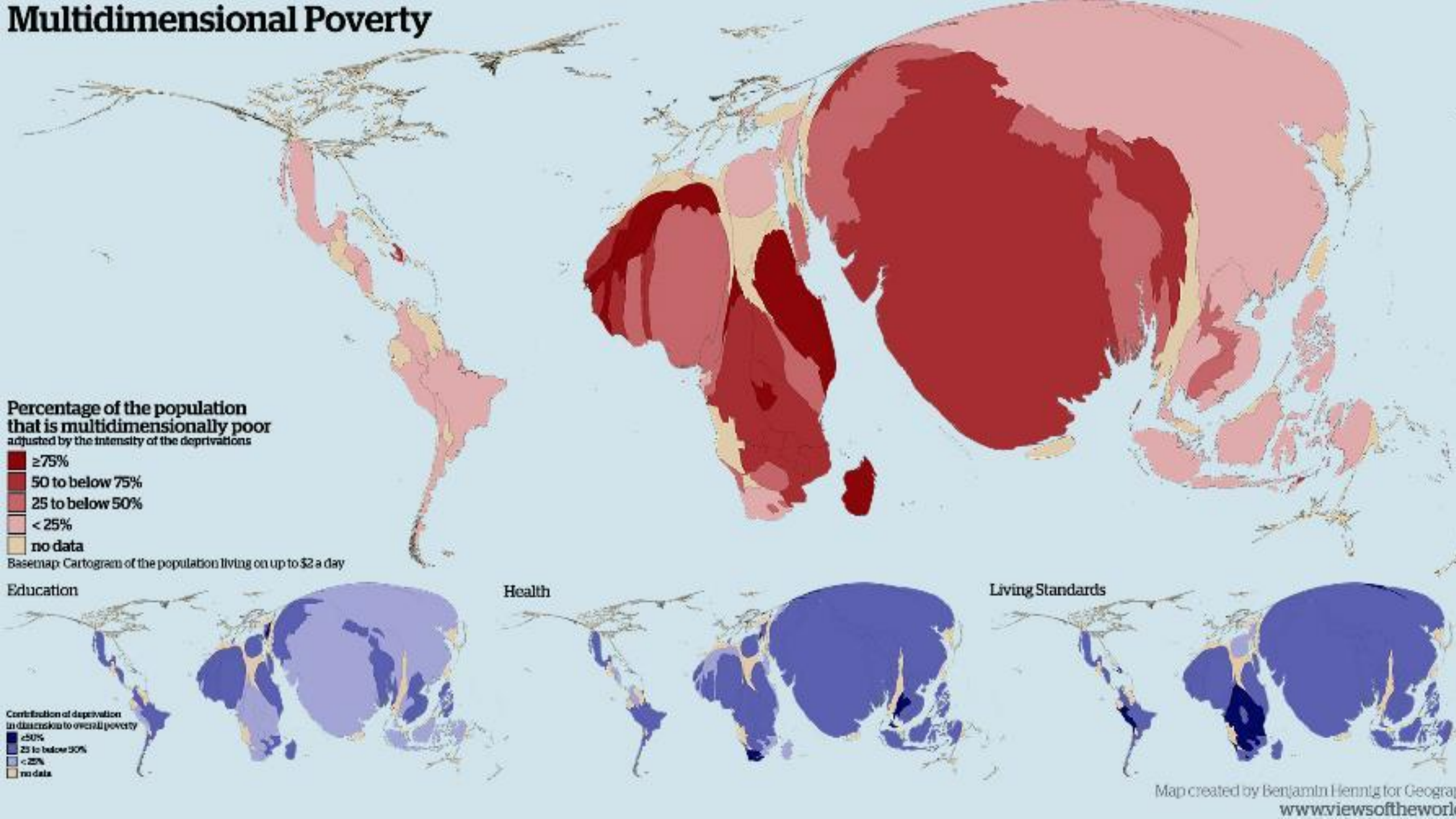

Credit: Michael Evans



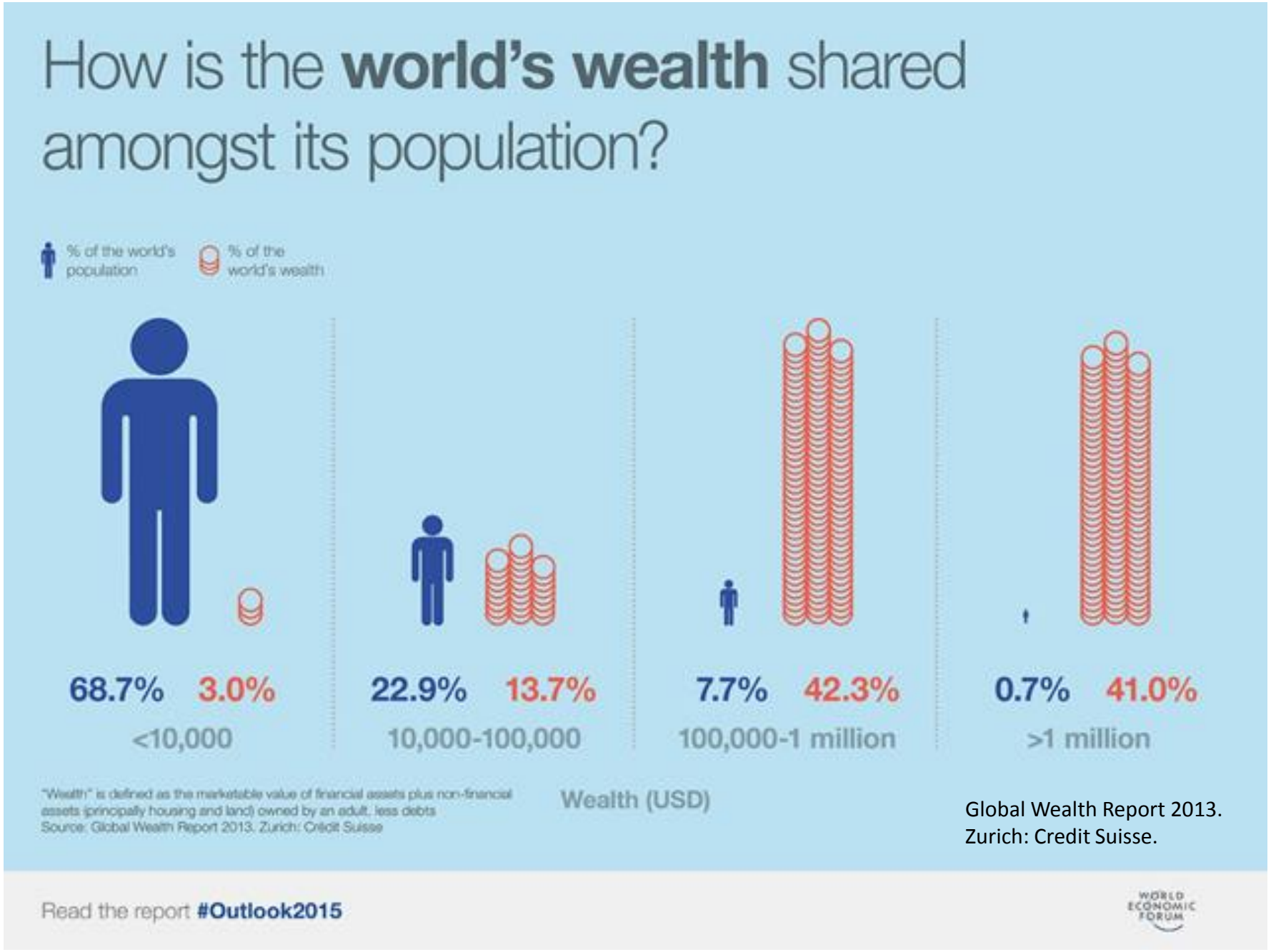
Carbon Emissions in 2010

http://jaltcoh.blogspot.ca/2008/10/see-world-maps-distorted-to-show.html

Multidimensional Poverty



Map created by Benjamin Hennig for Geograp
www.viewsoftheworl



Global Wealth Report 2013. Zurich: Credit Suisse.

http://www.pewresearch.org/fact-tank/2014/11/08/with-41-of-global-wealth-in-the-hands-of-less-than-1-elites-and-citizens-agree-inequality-is-a-top-priority/

The gap between the rich and poor is named the 8th wonder of the world

Melzinha1234.tumblr.com

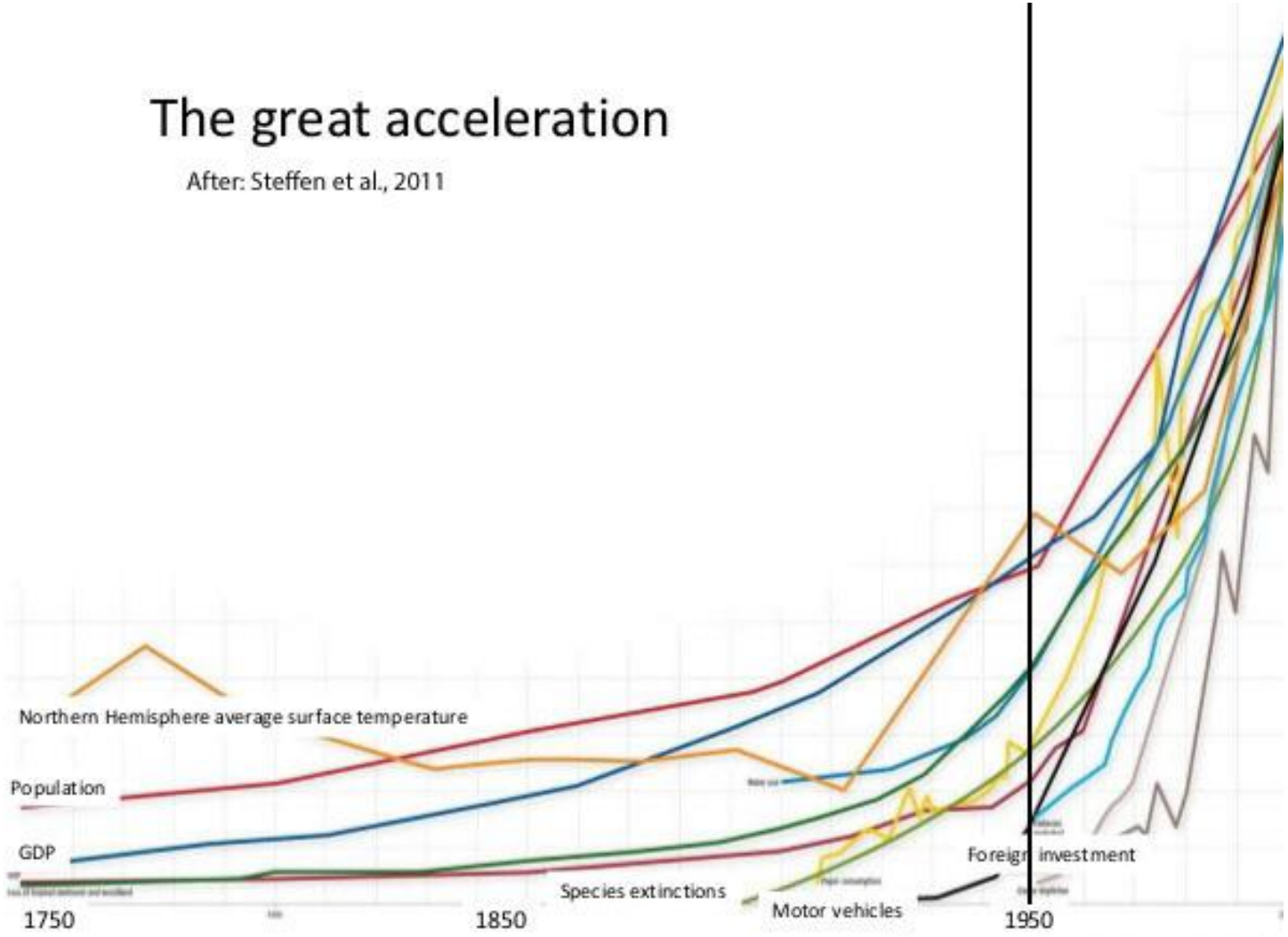

Improntaunika.it

http://capitalismisover.com/gap-between-rich-and-poor-named-8th-wonder-of-the-world/

When all signs point in the same direction,

and the message gets very consistent,

is it time to pay attention?



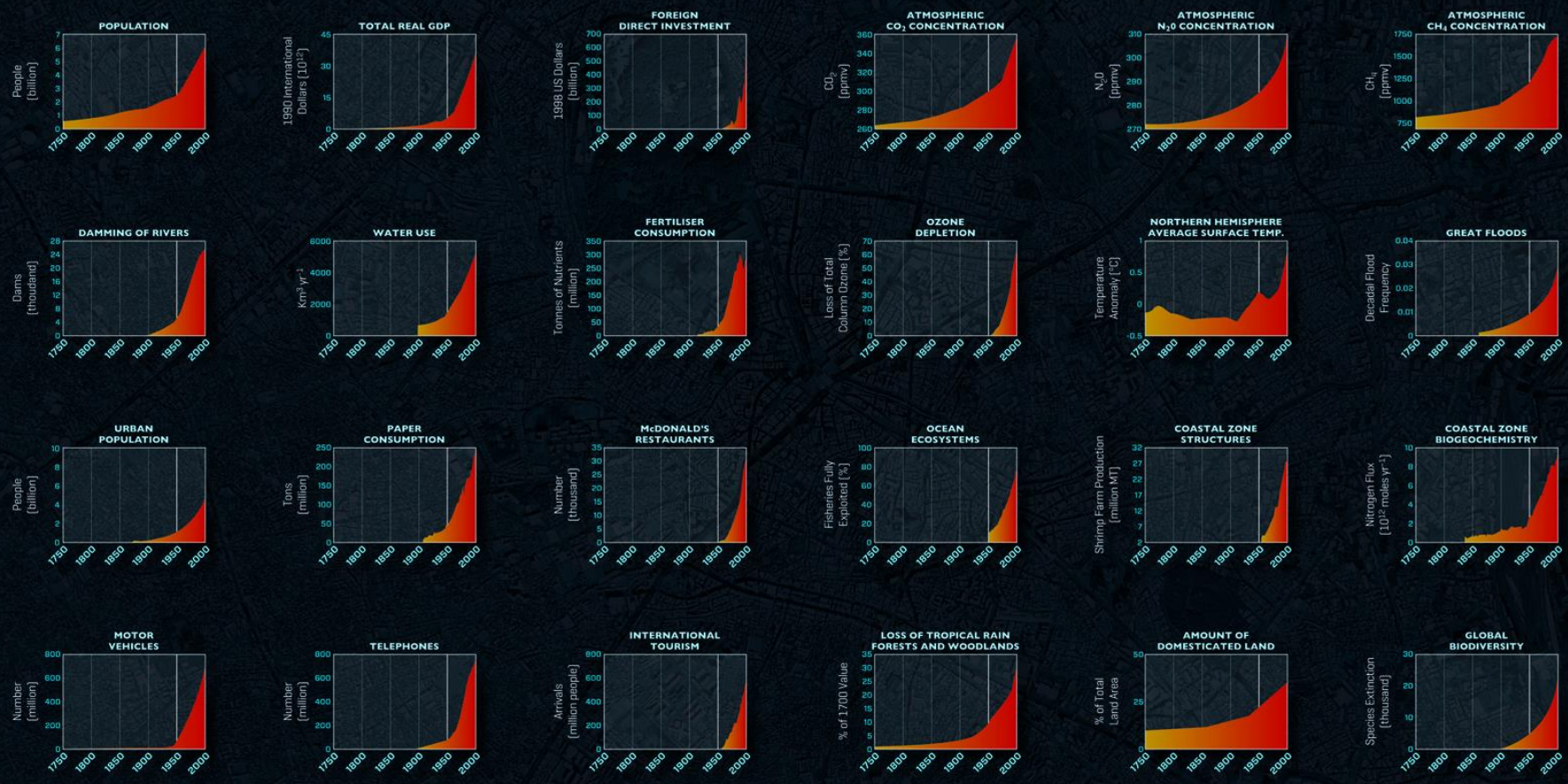
Steffen et al., 2011

THE **ANTHROPOCENE**

The Anthropocene defines Earth's most recent geologic time period as being human-influenced, or anthropogenic, based on overwhelming global evidence that atmospheric, geologic, hydrologic, biospheric and other earth system processes are now altered by humans.

The line corresponding to 1950 highlights the **Great Acceleration**, the post-World War II worldwide industrialization, techno-scientific development, nuclear arms race, population explosion and rapid economic growth.

These graphs were compiled in a publication of the **International Geosphere-Biosphere Programme** (IGBP).



SOURCE: igbp.net | Steffen et al., 2005, Global Change and the Earth System, Springer, pp. 132-133
DESIGN: Globaia.org

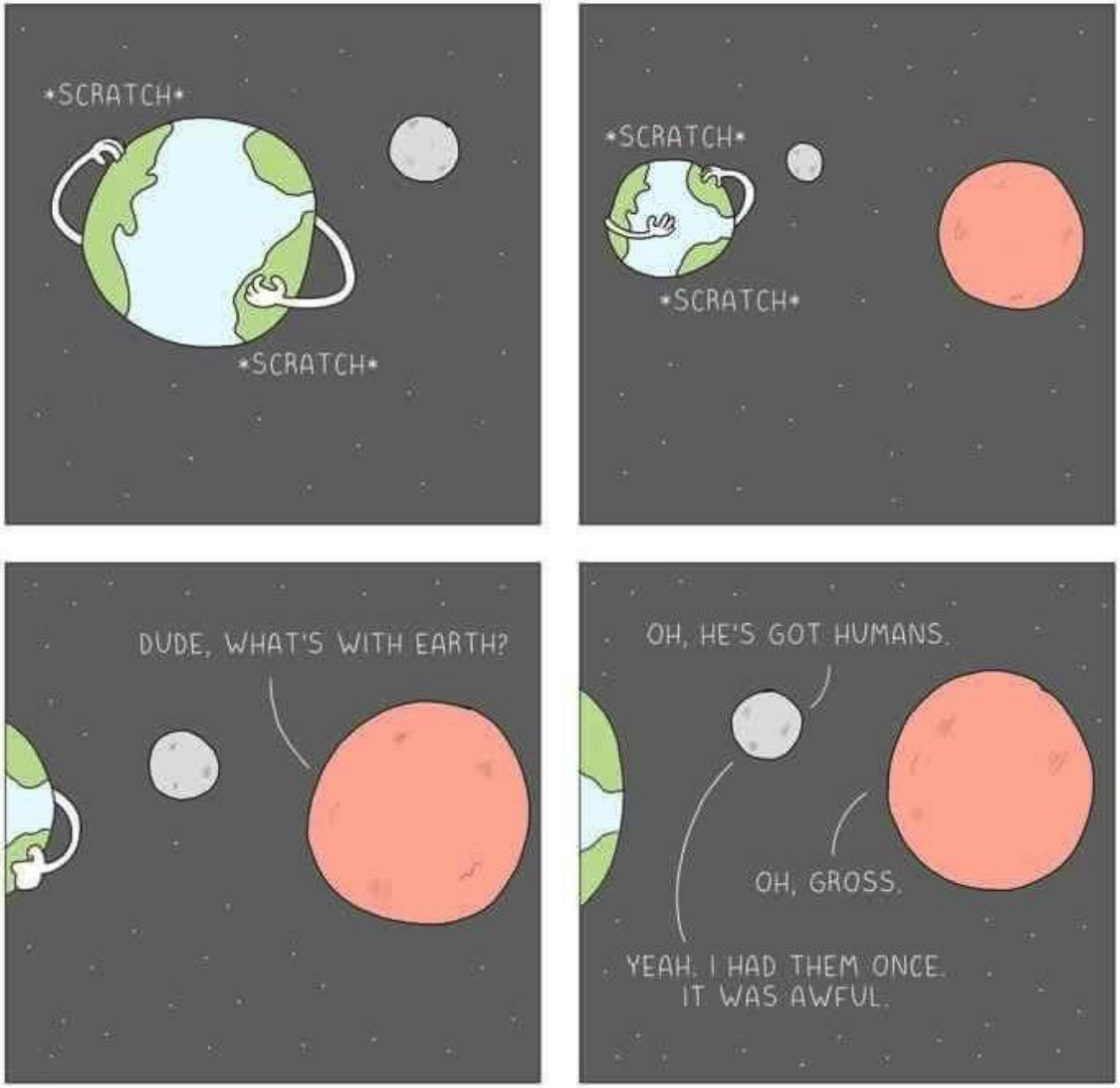
Steffan et al. 2005

Thank you

Local Land-Based Indigenous Knowledge and the Anthropocene: Looking Backward to Look Forward

XEMƬOLTW̱

Nick Claxton



Ancient Knowledge

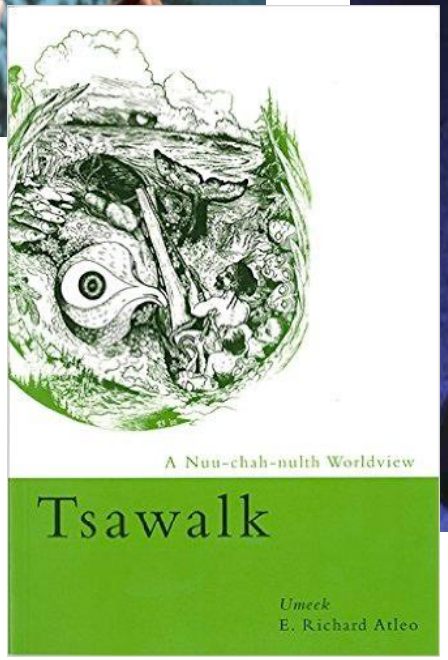
“Western science, following Roger Bacon, believed man could force nature to reveal its secrets; the Sioux simply petitioned nature for friendship”

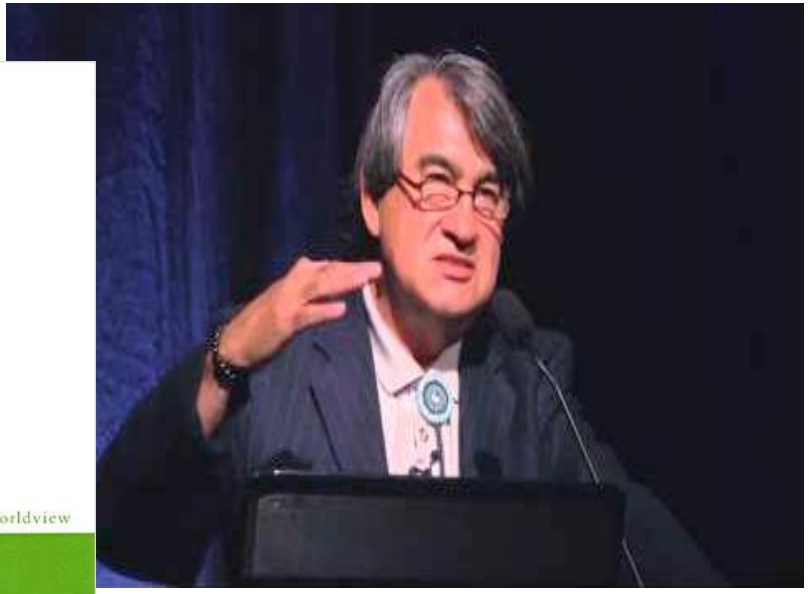
-Vine Deloria Jr.

We have been here a long time. During that time we lived with the sea songs, the elements, the lands. Our ancestors continue to teach us through our ancient language through our presence here.

-STOLQEŁ (Dr. John Elliot Sr.)

Indigenous Knowledge according to Indigenous Scholars



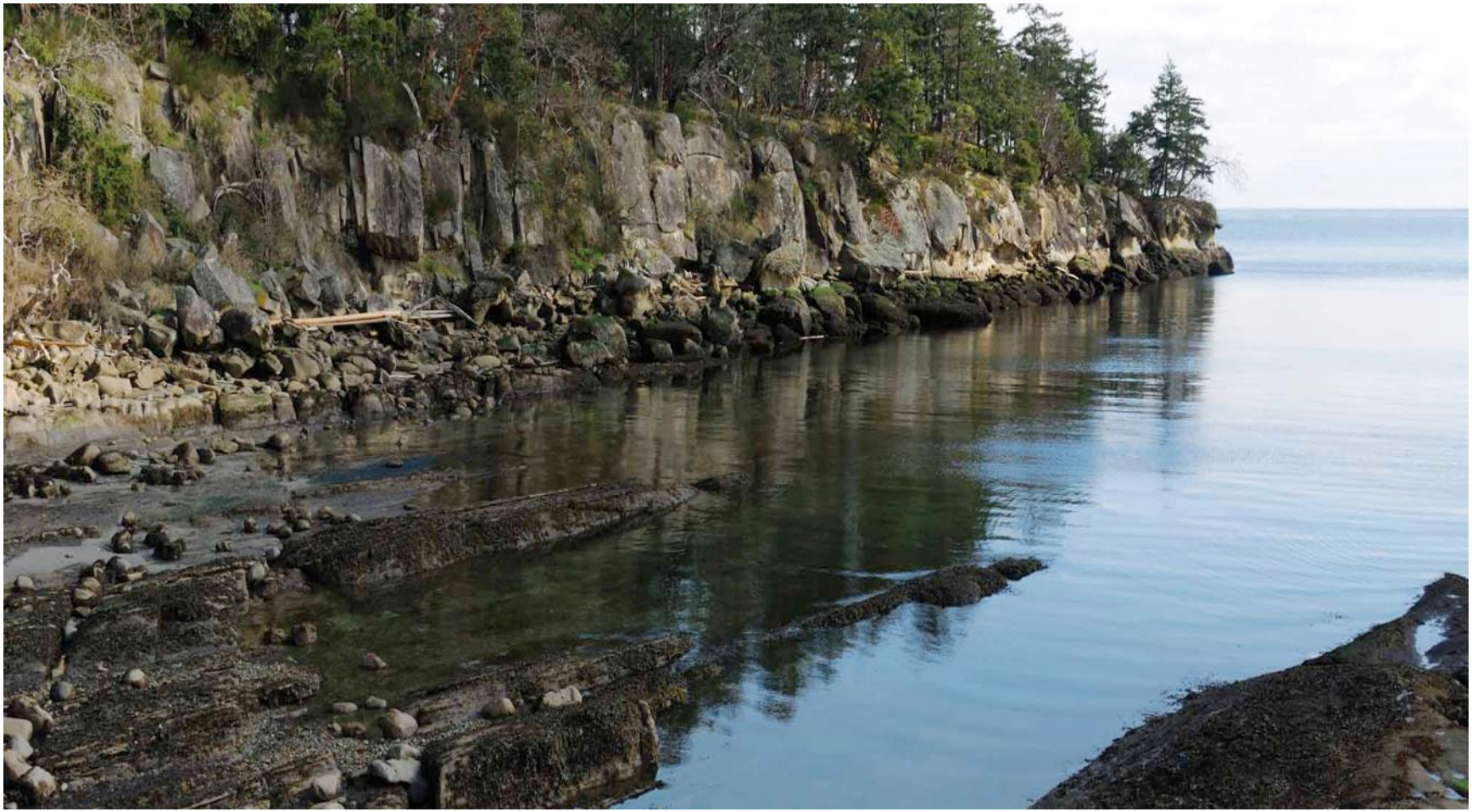


Indigenous Worldview/Paradigm (responsibility)

Name/Land/Beliefs/Teachings/Laws

The role UVIC: Education of “being” rather than “knowing”

Relationship to the land



What is the "*anthropos*" in the Anthropocene?

Who or what is in the "driver's" seat?

James (Jamie) Lawson, PhD
Department of Political Science, UVic
lawsonj@uvic.ca

Why ask the question?

- "Anthropocene" signals responsibility
  - Responsibility as causation
    - virtually ALL the effects are considered worrisome
  - Responsibility as obligation to do something
    - assuming a managerial role
    - slowing or reversing our impact

What is the “anthropos” in “Anthropocene”? Version 1.0

Humanity as “man” (old sense):

the characteristics of virtually all individual people

What follows from this “anthropos”?

- Our features as individuals determine what our species does to earth
  - Example: we seek clothes, shelter; we work: we make things, consciously change surroundings.
- If this is the Anthropocene, “man” did it: it’s the sort of thing *anthropoi* do

What is the “anthropos” in “Anthropocene”? Version 2.0

“man” as the plural of “a man”

“*zoon politikon*” – a social or political animal

What follows from this “anthropos”?

- Collective efforts make new scales possible
- Some things can only be done together
- Our essence: still traceable in every individual
- If this is the Anthropocene, our “we-ness” did it: collective size as arrogance, lack of self-restraint
- Tower of Babylon 2.0

What is the “anthropos” in “Anthropocene”? Version 3.0

Humanity as social relations

- “...there is no abstract “human nature”, fixed and immutable [but] human nature is the totality of **historically determined social relations**, hence an historical fact which can, within certain limits, be ascertained.” (Antonio Gramsci, *Selections from Prison Notebooks*)

Social Relations: internal differentiation and opposition

- Retains genetic unity of humanity
- Subgroups socially structured: gender, “race”, class
  - Simple differences, diversity
  - Divisions, antagonisms (A = A; A not B)
  - Opposites (A = not A)

What follows from this “anthropos”?

- Individual traits do not mirror general traits
- Traits of one part are often mistaken for whole (“man” vs woman; over-consumers vs poor)
- If this is the Anthropocene, our **causal** responsibilities are
  - differentiated AND/OR opposed
- BUT further: **responsibility to act** may mean altering the structures generating difference, opposition

IMPLICATIONS OF THE ANTHROPOCENE: Impacts on Health and Human Development

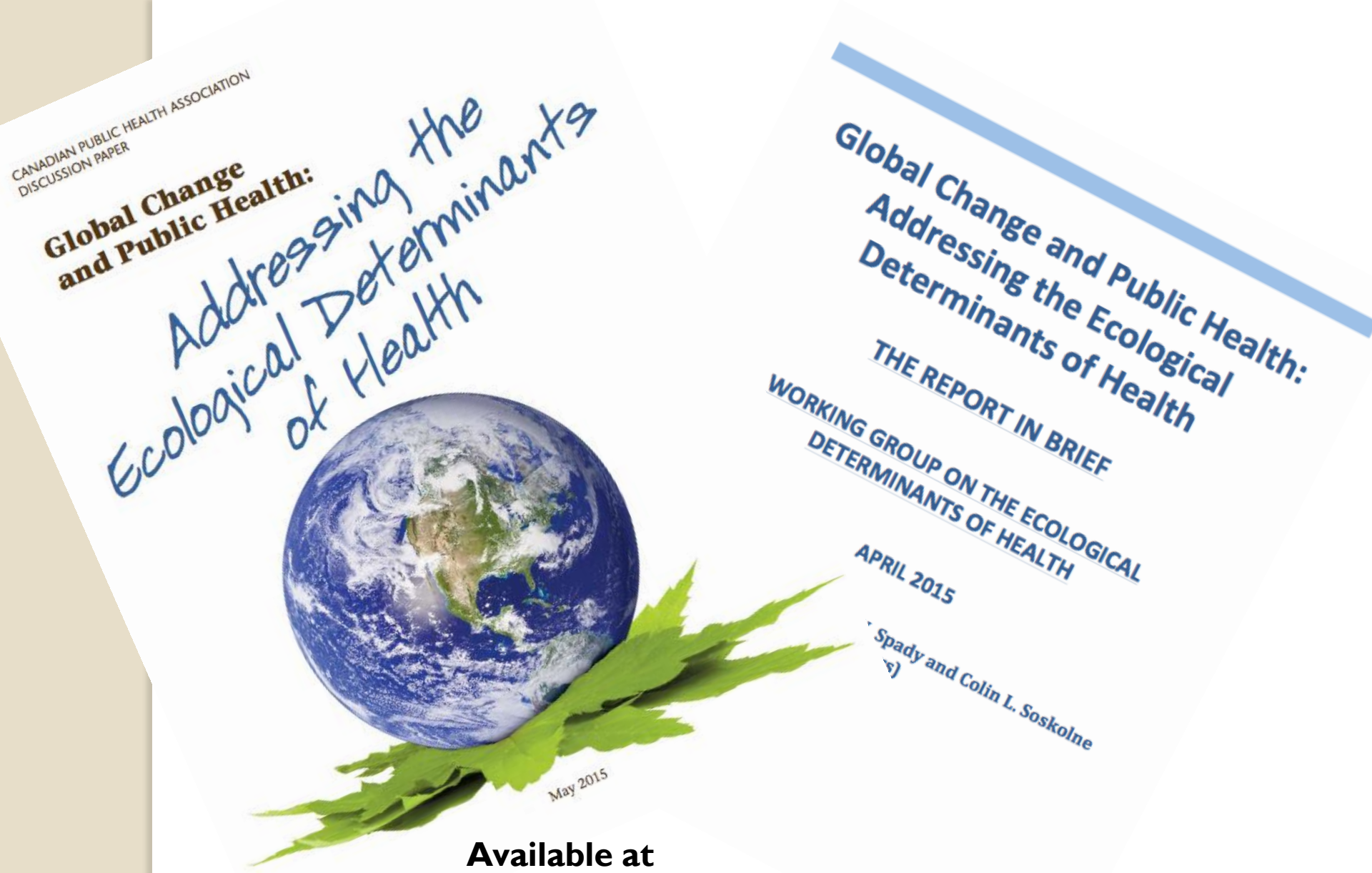
UVic in the Anthropocene
17 March 2016

Dr. Trevor Hancock
Professor and Senior Scholar
School of Public Health and Social Policy
University of Victoria
and
Lead author and editor, CPHA reports on the Ecological Determinants of Health

Global change and public health

CPHA Project

- Document the potential health impacts of major global ecological changes
  - Climate and atmospheric change
  - Ocean acidification
  - Pollution and ecotoxicity
  - Resource depletion
  - Loss of species and biodiversity
- Identify the drivers of these changes
- Propose an action agenda for public health



Available at

http://www.cpha.ca/uploads/policy/edh-brief.pdf
http://www.cpha.ca/uploads/policy/edh-discussion_e.pdf
http://www.cpha.ca/uploads/policy/edh-discussion_f.pdf

The ROCKEFELLER FOUNDATION THE LANCET

The Rockefeller Foundation–*Lancet* Commission on planetary health

Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–*Lancet* Commission on planetary health

Sarah Whitmee, Andy Haines, Chris Beyrer, Frederick Boltz, Anthony G Capon, Braulio Ferreira de Souza Dias, Alex Ezeh, Howard Frumkin, Peng Gong, Peter Head, Richard Horton, Georgina M Mace, Robert Marten, Samuel S Myers, Sania Nishtar, Steven A Osofsky, Subhrendu K Pattanayak, Montira J Pongsiri, Cristina Romanelli, Agnes Soucat, Jeanette Vega, Derek Yach

University of Victoria | Human and Social Development
School of Public Health & Social Policy

The ecological determinants of health

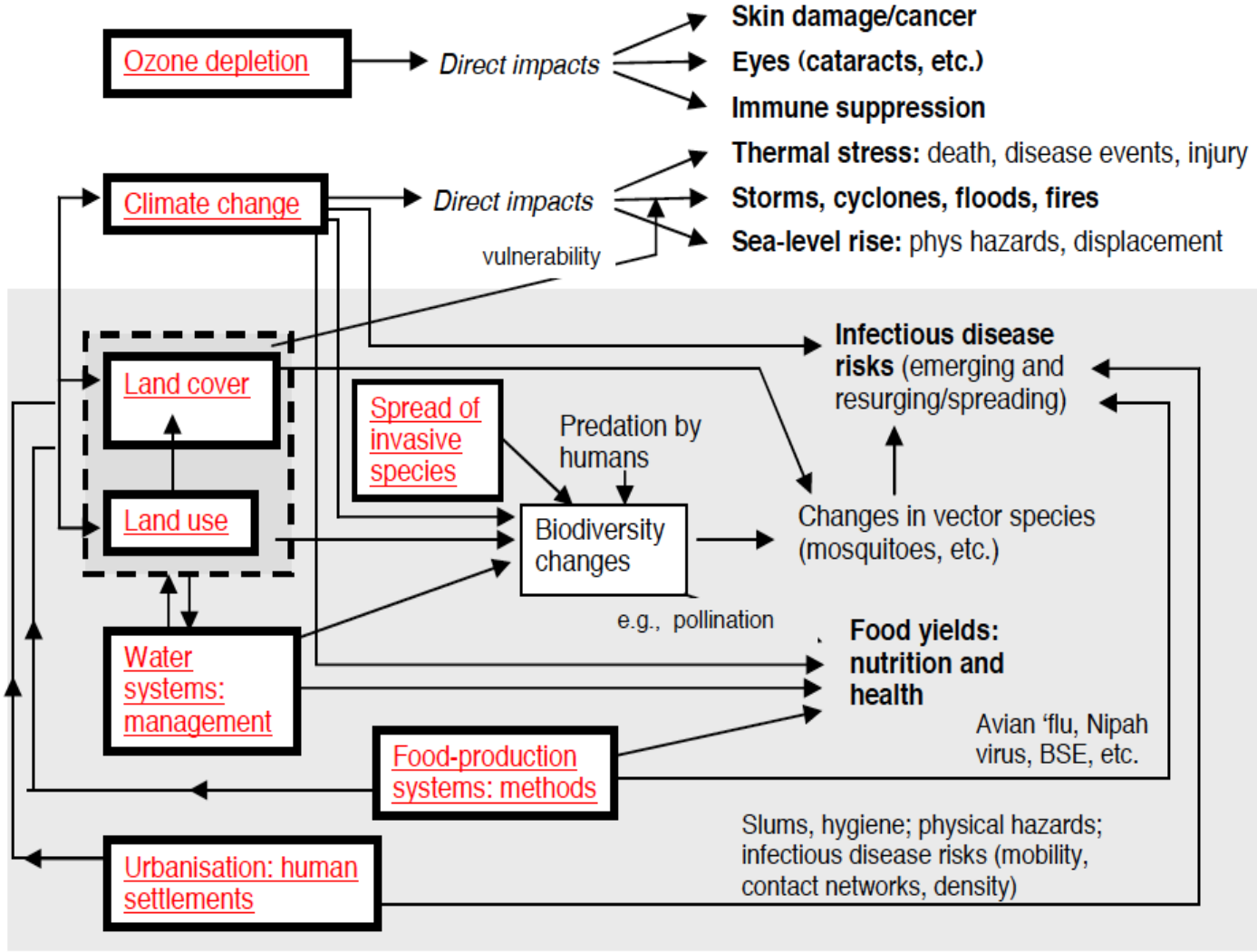
We depend on ecosystems for the very stuff of life:

- **Air**
- **Water**
- **Food**
- **Fuel and materials**
- **Protection from UV radiation**
- **Waste recycling and detoxification and**
- **A relatively stable and livable climate.**

A limited understanding

- **What we know about the health impacts of global ecological change is sketchy, preliminary, and often speculative**
- **But these changes often interact, multiplying adverse effects and affecting the whole system. Thus knowledge of the health impacts has to reflect comprehension of overall system change and its health impacts.**

Implications for population health



Source: Global Environmental Change and Human Health, 2007

The global estimated numbers of people at risk from selected major examples of the adverse health impacts of global environmental changes

Category of health risk	Size/proportion of populations at risk	Types of GECs involved
Malaria	40% of world population	Climate change and land use change
Dengue fever	3 billion	Climate change, urbanisation, world trade
Diarrhoeal diseases (associated with water quality/quantity)	1 billion people	Climate change, land cover change, pollution, irrigation and freshwater shortage, urbanisation
Malnutrition (especially food shortages)	840 million	Climate change, land use, freshwater shortage, biodiversity change
Health consequences of desertification: malnutrition; respiratory diseases; impacts of population displacement	250 million people	Climate change, land use, land cover change
Skin cancer, eye disorders, immune system depression	Mid-high latitude populations (1-2 billion)	Stratospheric ozone depletion

***Global Environmental Change and Human Health* (2007), p 1**
Earth System Science Partnership

Probability of major increases in ill-health by mid-21st century due to climate change

- **Very high confidence**
  - **Greater risk of injury, disease, and death due to more intense heat waves and fires**
  - **Increased risks of food- and water-borne diseases**
- **High confidence**
  - **Increased risk of under-nutrition resulting from diminished food production in poor regions**
  - **Consequences for health of lost work capacity and reduced labor productivity in vulnerable populations**
- **Medium confidence**
  - **Increased risks of vector-borne diseases**

IPCC, 2014

Threats to food supply

- Land degradation
- Water supply
- Ocean acidification
- Overfishing
- Ecotoxicity

The problem of a high meat diet

- 75% of the world's agricultural land is used for raising animals
- World average meat consumption per person doubled between 1961 and 2011
- Beef production requires
  - 28 times more land
  - 11 times more irrigation water
  - 5 times more greenhouse gases
  - 6 times more Nr [reactive nitrogen],

  than the average of the other livestock categories

Health impacts of ecotoxicity

- **Of 10 chemicals of major concern for public health identified by WHO, knowledge of their health impacts is limited**
- **Almost 800 chemicals are known or suspected endocrine-disrupting chemicals (EDCs)**
  - **Only a small fraction have been properly tested**
  - **There is evidence of widespread and simultaneous exposure of both humans and wildlife to multiple EDCs (WHO/UNEP, 2012)**

In utero and childhood exposure . . .

- to persistent organic pollutants (POPs) and EDCs, as well as heavy metals
- 2 recent Canadian reviews found
  - some evidence for health impacts of prenatal and childhood exposure,
  - many associations where there is limited or inadequate evidence,
  - mainly because of an inadequate number of studies or methodological problems such as small sample size, a limited range of exposure or poor exposure indices

Health impacts of loss of biodiversity

- **Many of the ecosystem goods and services on which we depend are created through the actions of other species**
  - **Birds and bees pollinate many of our plants**
  - **Many species are natural pest control agents**
  - **Microbial species fix nitrogen, decompose waste, etc**

The Millennium Ecosystem Assessment, 2005

- **"At the heart of this assessment is a stark warning. Human activity is putting such strain on the natural functions of Earth that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted."**

Mortgaging the health of future generations

"we have been mortgaging the health of future generations to realise economic and development gains in the present. By unsustainably exploiting nature's resources, human civilisation has flourished but now risks substantial health effects from the degradation of nature's life support systems in the future."

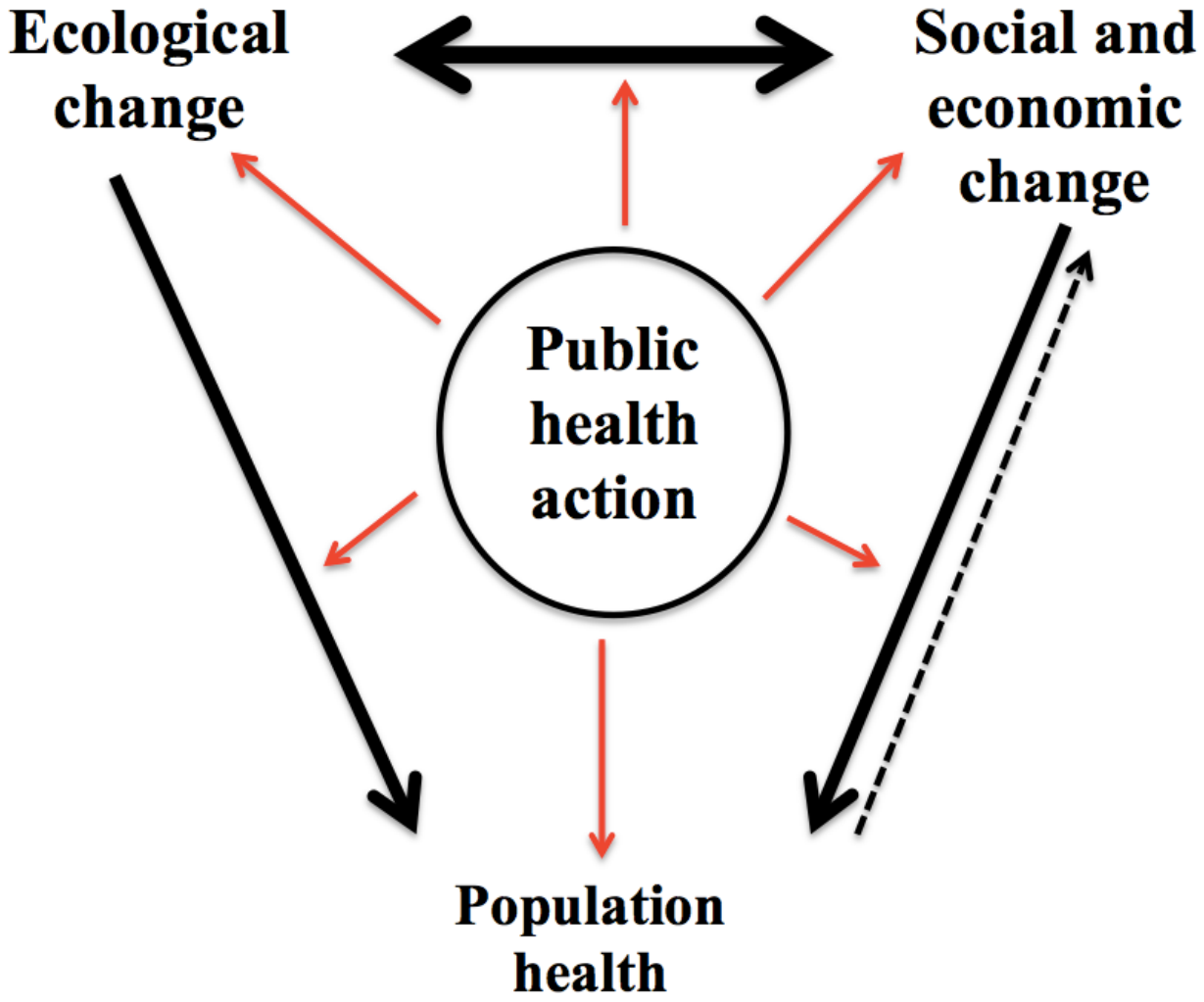
Rockefeller Foundation–Lancet Commission on Planetary Health

University of Victoria | Human and Social Development
School of Public Health & Social Policy

Our ultimate message

- **The population health impacts of the ecological determinants of health are large, and comparable to the impact of the social determinants of health**
- **The two interact and must be considered as a whole – we cannot continue to be ecologically blind**

Ecosocial Model for Public Health Action



UVic in the Anthropocene

March 17, 2016

Implications of the Anthropocene: An Ecological Economics Perspective

Lynda Gagné, PhD, CPA (CGA)

School of Public Administration

Introduction

- Economics, economists, and environmental/ecological issues
  - "…my unscientific impression is that economists are on average more pro-environment than other people of similar incomes and backgrounds. Why? Because standard economic theory automatically predisposes those who believe in it to favor strong environmental protection." (Paul Krugman, 1997)
  - "Anyone who believes in indefinite growth in anything physical, on a physically finite planet, is either mad or an economist." (Kenneth Boulding, ?)

Economics, Ecological Economics, and the Anthropocene

- Does (mainstream) economics recognize environmental issues?
  - Krugman is right: economists recognize externalities, public goods, and the tragedy of the commons as market failures that reduce social welfare and propose various types of government intervention to address these issues and improve social welfare
- How does mainstream economics differ from ecological economics?
  - Boulding is right: his statement is a reflection of the difference in how mainstream and ecological economics view growth, sustainability, and ecological value
    - Weak versus strong sustainability assumptions
    - The value placed on the welfare of future generations in policy decisions that affect them
    - Non-anthropocentric ecological values

Economics, Ecological Economics, and the Anthropocene

- Weak vs strong sustainability
  - Can human-made capital be substituted for natural capital? If yes, per capita growth in welfare can perhaps be expected to continue indefinitely; otherwise, we're nearing a cliff and need to steer the Titanic away from the iceberg. Ecological economics does not support the assumption that technology can replace natural capital. Technology and natural capital are complements, not substitutes.
- The value of the welfare of future generations in policy analysis
  - If future generations are expected to be better off than current ones, then a principle that supports equality across generations leads us to discount the value of their welfare leading to lower investment in ecological preservation (consequence of weak sustainability assumption)
- The anthropocentric approach
  - More likely to be rejected by ecological economists: the environment has intrinsic value

Economics, Ecological Economics, and the Anthropocene

- Does the average person think more like a mainstream or an ecological economist?
- Is humanity willing to make the personal sacrifices needed to steer the Titanic away from that iceberg and give more than lip service to the welfare of future generations or are most of us going to continue with BAU?

Notes from the 17th March Forum

This first meeting was attended by approx 20 - 25 people, including several community members. Following a greeting and blessing from May Sam, an Elder from the Tsartlip Nation, and a brief introduction from Trevor Hancock – including the short video 'Welcome to the Anthropocene' – Budd Hall facilitated the session, which began with three presentations reflecting on the Anthropocene. After a break for pizza, a further three presentations explored some of the implications of the Anthropocene.

The lively discussion that ensued included several powerful comments about issues in the community that need to be addressed. Overall, the sense was that we need to move from thinking to action; we need to focus on local issues and challenges; we need to be advocates and stand up for what we value and believe in; and we need to collaborate.

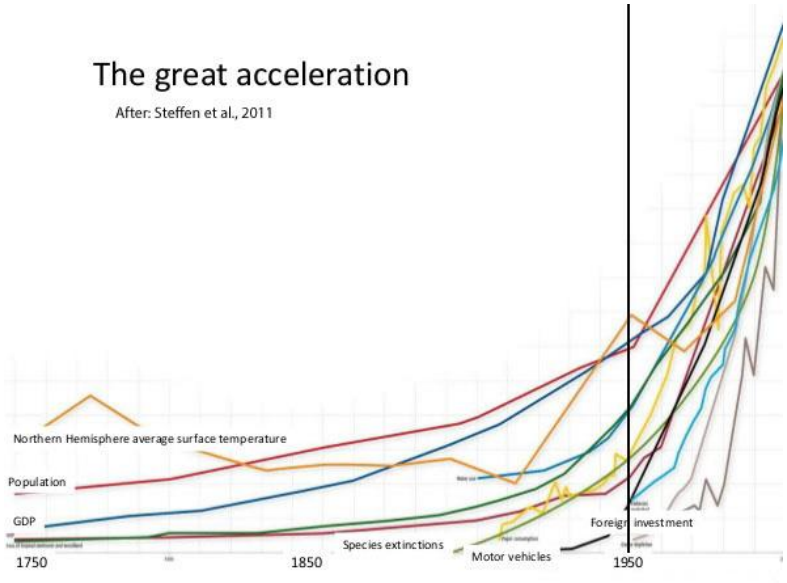
The next session, on April 6th, will explore ways that UVic and the community can work together on this issue.

- Mapping the Anthropocene - Peter Keller, Geography & Eileen van der Flier–Keller, School of Earth & Ocean Sciences

  The purpose of this presentation was to discuss the Anthropocene in terms of geologic time and explore some of the dimensions of the Anthropocene.

  - The Earth is about 4.5 billion years old and life has been around about ~3.8 billion years, while Homo Sapiens Sapiens evolved about 200,000 years. We are currently in the Holocene Epoch which is a mere 11,000 years old – about 2 seconds and 0.22 seconds respectively if the age of the Earth were represented by a 24-hour clock.
  - The Earth is a dynamic and interconnected planet, and has experienced volcanic eruptions, massive plate tectonic shifts, several Ice ages and meteor strikes, as well as 5 major previous mass extinction events.
  - Earth scientists and the International Commission on Stratigraphy (who oversee the formalisation of the geological time scale) have not yet accepted or formally designated an "Anthropocene" time unit. So this is presently still an informal term similar to terms like the Bronze Age etc. There is an Anthropocene Working Group who are debating the possible timing of the start of the Anthropocene, with suggestions ranging from 50,000 – 10,000 years ago (megafaunal extinctions) to the origins of farming (11,000 years ago), or more recently from the Industrial Revolution (about 1760) to nuclear weapons and persistent industrial chemicals since about 1945.
  - No matter when it is deemed to have started, or if scientists in fact designate it as an official unit of Earth history, the changes we call the Anthropocene have occurred in the blink of an eye, geologically speaking.
  - A series of graphic charts and images then laid out the many dimensions of the Anthropocene: Massive modifications to land form and land cover; deforestation; species extinction; climate change; ocean acidification; plastic waste in the ocean; water shortage; soil degradation; economic growth v human wellbeing; rising inequality and poverty.

- Contemplating the 'Great Acceleration', with mutliple ecological and socio-economic indicators all sky-rocketing since the early to mid-20th century (see Figure), they left us with this question:
    - When all signs point in the same direction, and the message gets very consistent, is it time to pay attention?



- <u>Local Land-Based Indigenous Knowledge and the Anthropocene: Looking Backward to Look Forward</u> - Nick Claxton, Faculty of Education and Tsawout Band
    - "Western science, following Roger Bacon, believed man could force nature to reveal its secrets; the Sioux simply petitioned nature for friendship" - Vine Deloria Jr.
    - "We have been here a long time. During that time we lived with the sea songs, the elements, the lands. Our ancestors continue to teach us through our ancient language through our presence here." - STOLQEŁ (Dr. John Elliot Sr.)
    - Indigenous worldviews are holistic, based on relationship with and responsibility towards the land, focused on 'being' as well as 'knowing'
- <u>What is the "*anthropos*" in the Anthropocene? Who or what is in the "driver's" seat?</u> - James Lawson, Political Science
    - Why ask the question? "Anthropocene" signals responsibility
        - as causation
        - as obligation to do something
    - What is the "anthropos" in "Anthropocene"?
        - Version 1.0: Humanity as "man" (old sense), as individual – so we did it as individuals (and are responsible as individuals)
        - Version 2.0: "man" as the plural of "a man", the collective - a social or political animal - collective size as arrogance, lack of self-restraint

        - NB: Traits of one part are often mistaken for whole ("man" vs woman; over-consumers vs poor)
    - Version 3.0: Humanity as (historically determined) social relations - Subgroups socially structured: gender, "race", class etc.
    - If this is the Anthropocene, our **causal** responsibilities are differentiated AND/OR opposed
        - BUT further: **responsibility to act** may mean altering the structures generating difference, opposition

- Impacts on Health and Human Development – Trevor Hancock, Public Health and Social Policy
    - The ecological determinants of health - We depend on ecosystems for the very stuff of life: Air, water, food, fuel and materials etc.
    - What we know about the health impacts of global ecological change is sketchy, preliminary, and often speculative – but likely to be large and serious
    - Threats to health arise from climate change, ocean acidification, pollution and ecotoxicity, resource depletion and loss of species and biodiversity
    - "Human activity is putting such strain on the natural functions of Earth that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted." he Millennium Ecosystem Assessment, 2005 - T
    - These ecosystem changes "are set to become the most challenging risks populations will face in the coming decades." - WHO, 2016
- Implications of the Anthropocene: An Ecological Economics Perspective – Lynda Gagne, Public Administration
    - "…my unscientific impression is that economists are on average more pro-environment than other people of similar incomes and backgrounds. Why? Because standard economic theory automatically predisposes those who believe in it to favor strong environmental protection." (Paul Krugman, 1997)
    - "Anyone who believes in indefinite growth in anything physical, on a physically finite planet, is either mad or an economist." (Kenneth Boulding, ?)
    - But ecological economics differs from mainstream economics:
        - Makes strong rather than weak sustainability assumptions
        - Places value on the welfare of future generations in policy decisions that affect them – so does not discount
        - Adopts non-anthropocentric ecological values - the environment has intrinsic value
    - Does the average person think more like a mainstream or an ecological economist?
    - Is humanity willing to make the personal sacrifices needed to steer the Titanic away from that iceberg and give more than lip service to the welfare of future generations or are most of us going to continue with 'business as usual'?

- Responding Actively and with Hope - James Rowe, Environmental Studies

(Did not use any Powerpoint slides)