Public health in the Anthropocene: The grandest challenge, the wickedest problem

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The grandest challenge

- **We must all live together with a decent quality of life and in good health on this one small planet.**

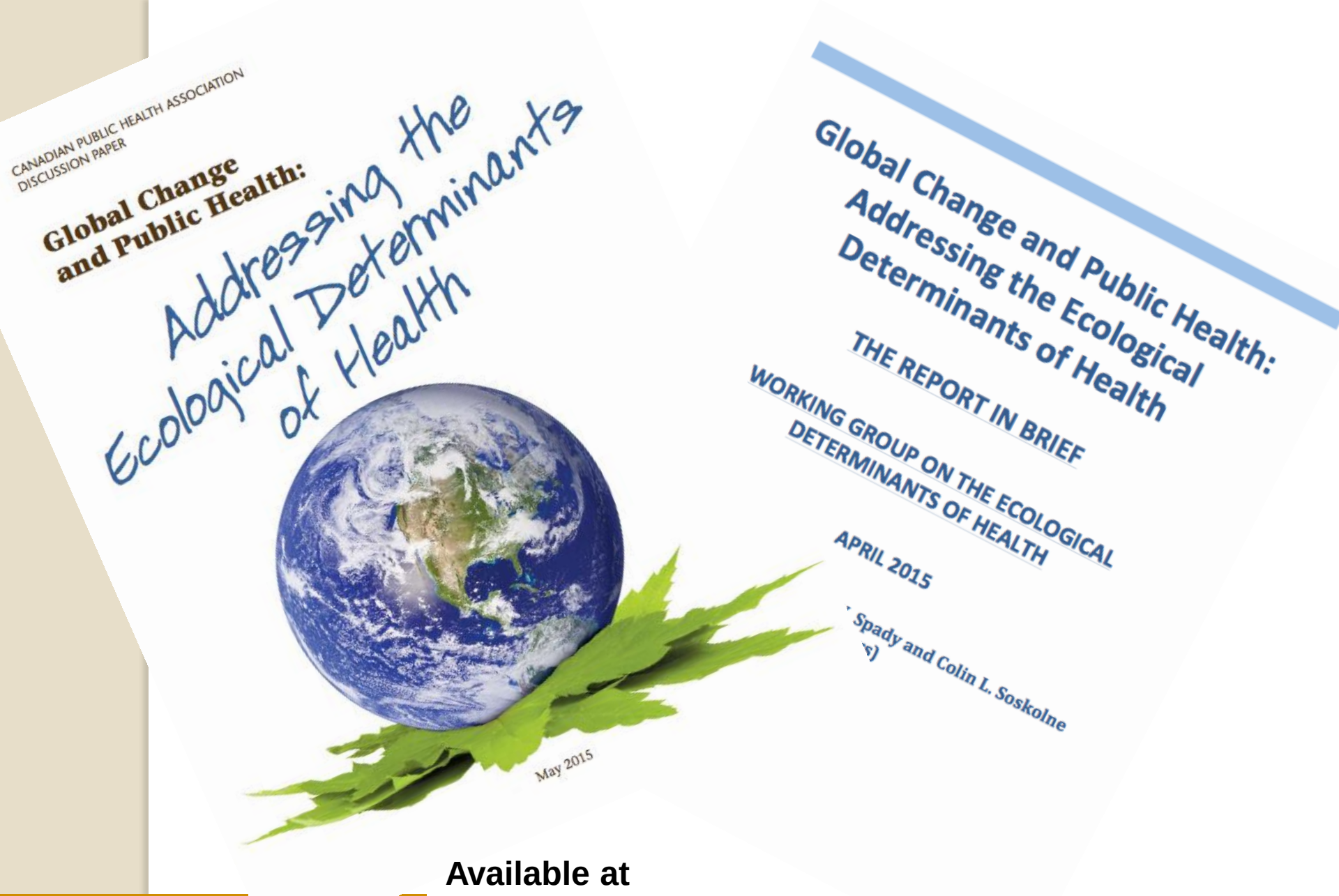
The wickedest problem

- **What will we have to change in order to do this?**

Global change and public health

CPHA Project

- Document the potential health impacts of major global ecological changes
  - Climate and atmospheric change
  - 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

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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

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Outline

1. The Anthropocene
2. The ecological determinants of health
3. Key ecological changes underway
4. Human driving forces
5. Health and human development impacts
6. Imagination and hope
7. The public health agenda
8. Managing decline

1. The Anthropocene

- Our efforts to subdue nature have been so successful that the time in which we now live has been called the Anthropocene - it will show up in the geologic record
- Welcome to the Anthropocene!

2. The ecological determinants of health

- We have become so fixated on the social determinants of health that we have neglected the ecological determinants of health
  - Population health has been ecologically blind

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.**

3. Key ecological changes underway

Its more than climate change!

Global ecological change includes

- **Climate and atmospheric change**
- **Resource depletion**
- **Pollution and ecotoxicity**
- **Loss of species and biodiversity**

The state of the Earth's ecosystems

Nine Earth System Processes:

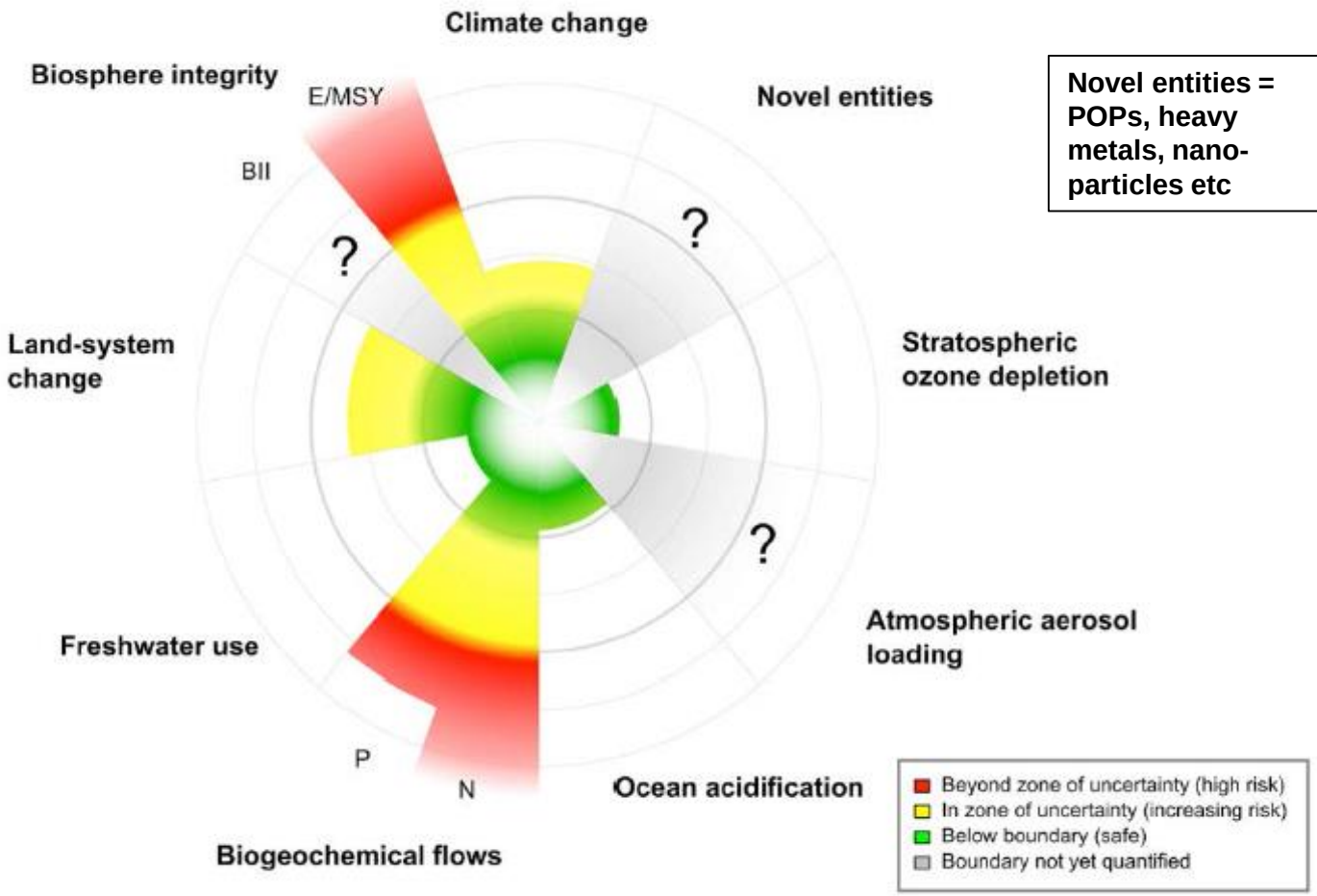
(Steffen et al, 2015)

- Climate Change
- Loss of Biodiversity
- Nitrogen & Phosphorus Cycle
- Ozone Depletion
- Ocean acidification
- Global freshwater use
- Changes in land use
- Novel entities*
- Atmospheric aerosol loading

* new substances, new forms of existing substances and modified life-forms that have the potential for unwanted geophysical and/or biological effects e.g. POPs, heavy metals, nano-particles, genetically engineered organisms

Crossing Planetary Boundaries

- Genetic diversity = extinctions per million species-years (E/MSY)
- Functional diversity = Biodiversity Intactness Index (BII)



Novel entities = POPs, heavy metals, nano-particles etc

Steffen et al, 2015

Core boundaries

Two core boundaries - climate change and biosphere integrity - have been identified

- **are highly integrated, emergent system-level phenomena**
- **connected to all of the other PBs**
- **each has the potential on its own to drive the Earth System into a new state should they be substantially and persistently transgressed**

Steffen et al, 2015

The threat of 'state shift'

- The various global ecological changes interact, so the totality of their impacts is greater than the sum of their parts. (MAHB, 2013)
- State shift - rapid non-linear change.
- an emergent property of many complex adaptive systems e.g.
  - the 'Big Five' mass extinctions in geological history,
  - the loss of Arctic sea ice
  - methane release from permafrost

Barnosky et al, 2012

Ecological footprint, 1961 - 2010

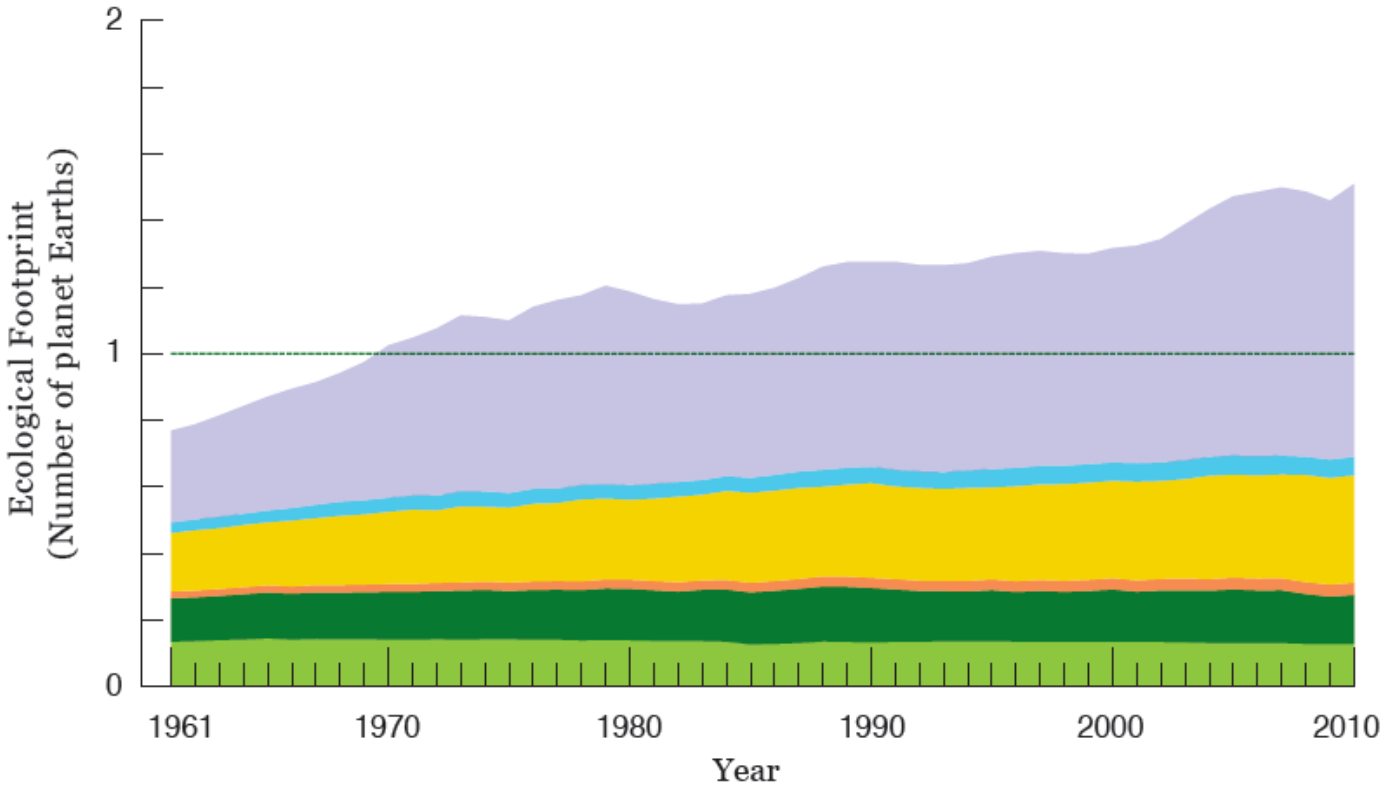


Figure 3: The Ecological Footprint components: *the carbon component makes up more than half of the total global Ecological Footprint. (Global Footprint Network, 2014).*

Key

- Carbon
- Fishing grounds
- Cropland
- Built-up land
- Forest products
- Grazing products

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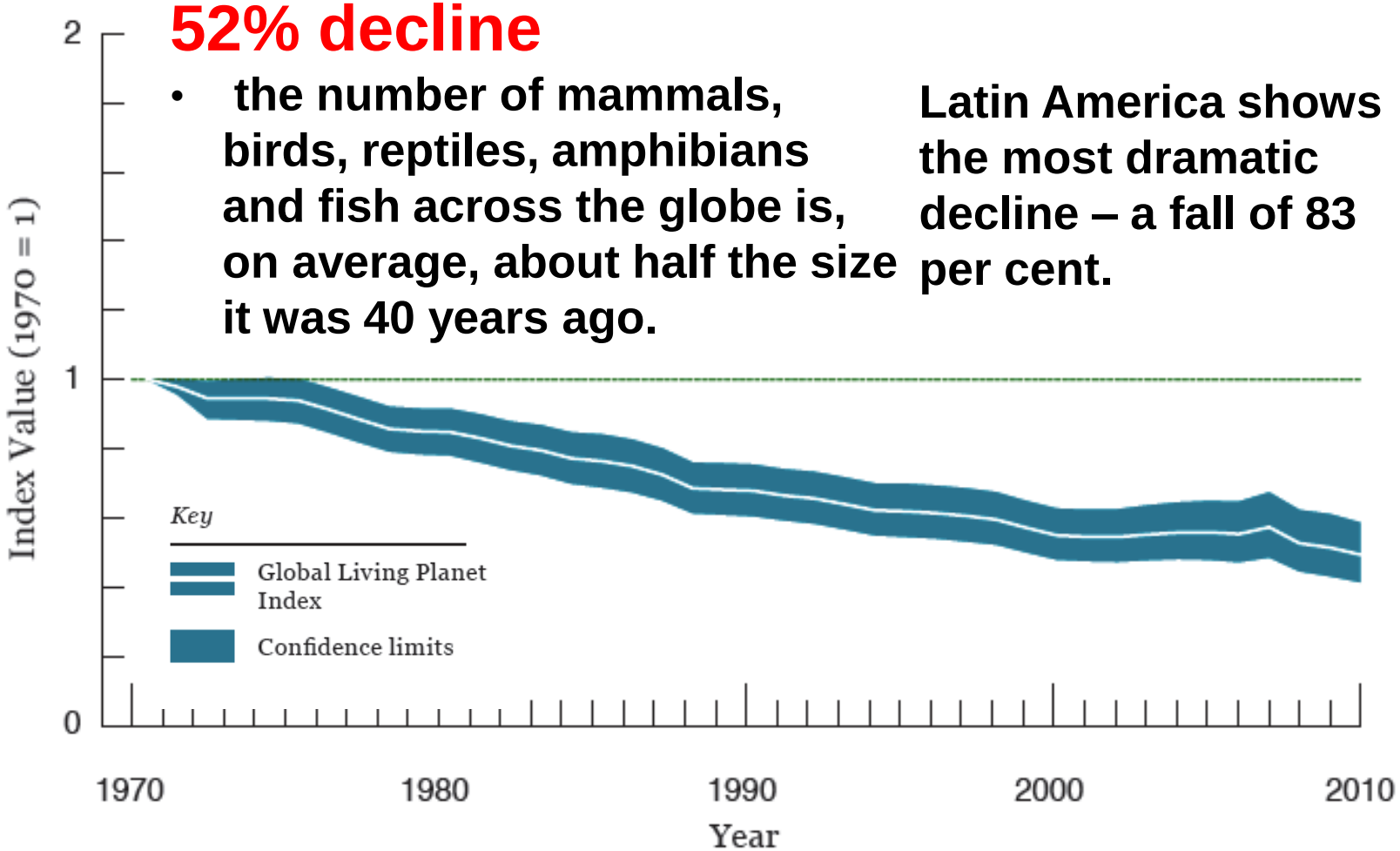
Source: ***WWF Living Planet Report 2014 Summary*** **(p 10) /**
Global Footprint Network, 2014

Living Planet Index 1970 - 2010

52% decline

- the number of mammals, birds, reptiles, amphibians and fish across the globe is, on average, about half the size it was 40 years ago.

Latin America shows the most dramatic decline – a fall of 83 per cent.

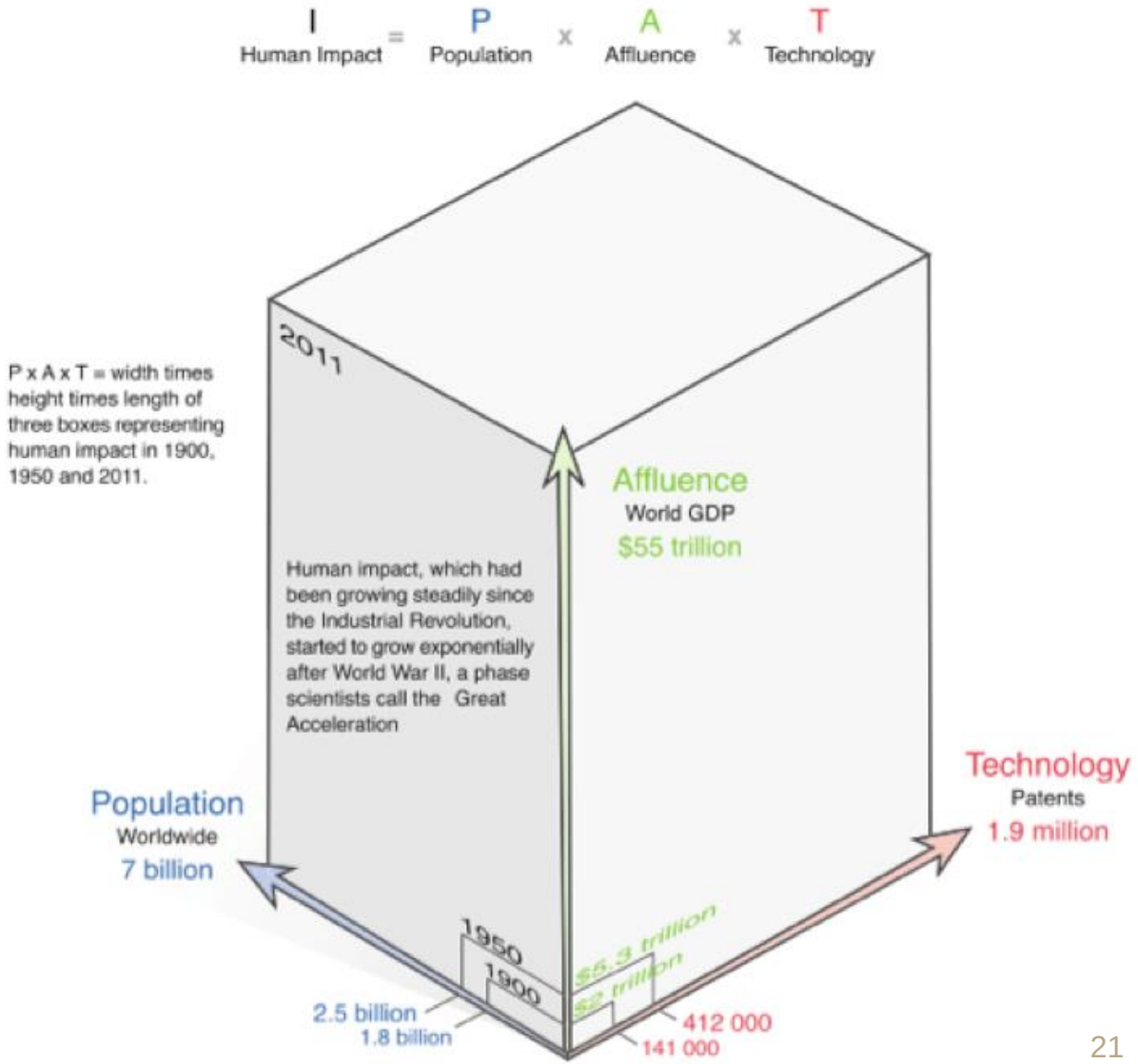


Source: *WWF Living Planet Report 2014 Summary* (p 8)

4. Human Driving Forces

The IPAT Equation: Impact = Population x Affluence x Technology

Societal & human forces driving change,1900 – 2011



Impact over an 80 year lifespan

- 1% annual growth in population = 2.2x
- 3% annual growth in real GDP = 10.6x
- TOTAL OVER 80 YEARS = >23x

Even if our technology became 5 times more efficient, it is still >4x

There <u>are</u> Limits to Growth

"Troublingly, the original forecasts produced by the MIT group, which predicted a substantial collapse of the global ecosystem and economy during the mid-21st century period, appear to be on track forty years after they were generated." (Turner, 2008)

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The BAU scenario "aligns well with historical data that has been updated in this paper" (Turner, 2014)

We won't destroy

- The planet
  - It's been here 4 billion years
- Life on Earth
  - It's been here 1 billion years
- The human species
  - We are intelligent, tough and resilient

BUT

- Some of our societies and civilisations may not survive

5. Health and Human Development Impacts

Little recognition and study

- "to date there has been little formal description and study of the relationships between global environmental changes (GEC) and human health"
- "there has been relatively little recognition that ecosystem disruptions, species extinctions, degradation of food-producing systems, the perturbation of cycling of elements and nutrients, and prevailing forms of urbanisation pose risks to the wellbeing and health of human populations."

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

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.

The Millennium Ecosystem Assessment, 2005

- **“approximately 60% (15 out of 24) of the ecosystem services examined during the Millennium Ecosystem Assessment are being degraded or used unsustainably . .”**

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

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

6. Imagination and Hope

Imagining a better future

- *"Vision is values projected into the future"*

  Clem Bezold, Founder and President

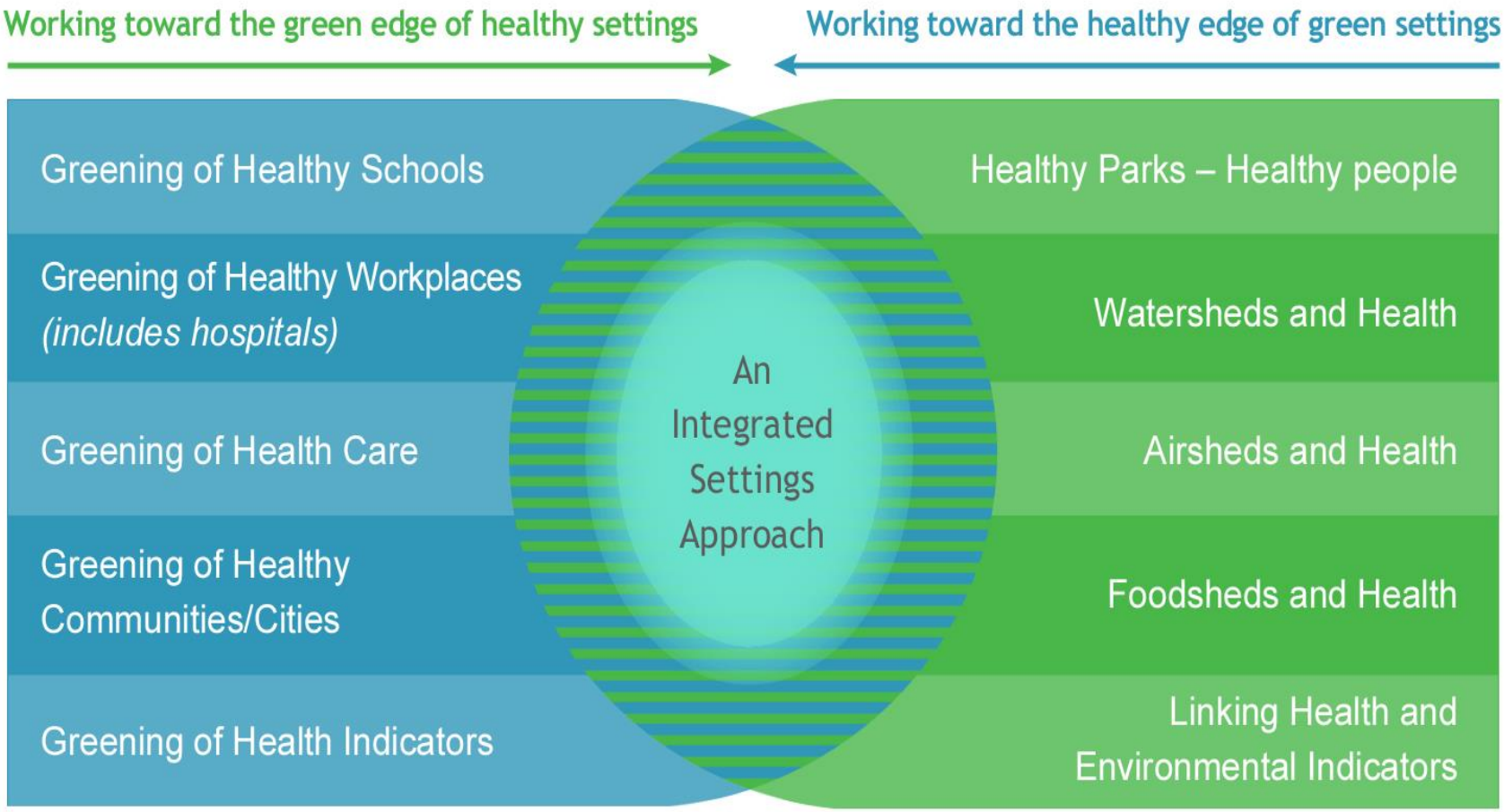
  Institute for Alternative Futures

- *"Thinking about the future is only useful and interesting if it affects what we do and how we live today"*

  James Robertson,

  British alternative futurist

Integrating healthy and green settings (Source: Northern Health, 2012)



Doing better things

Involves

- **Recognizing the limits to what we know (or think we know)**
- **Addressing non-linear and unexpected changes 'beyond the tipping point'.**
- **Working in partnership with many other disciplines**

Resilience is seen as the ability to 'bounce forward' to a new, more sustainable and healthy future.

Signs of hope: new and emerging concepts and practices

- ***"Hope is . . . the commitment to positivity in the face of adversity"***

Dutt and Brcic, 2014

Messages of hope

1. **The shift to a more ecologically sustainable society results in health gains from a healthier way of living.**
2. **We have successfully helped to create major societal shifts in favour of health before.**
3. **We are not alone; we have many potential partners.**

4. **For the most part we know what needs to be done, indeed we have known for a very long time**
5. **We have made some progress, there are in fact many examples of people, organisations, businesses, communities, cities, even entire nations, who are doing the right things and setting an example.**

Health co-benefits

All of the following have direct health co-benefits

- Energy efficiency
  - Air quality up (beware IAQ issues!)
  - Physical activity up
  - GHG emissions down
- Public transport
  - Fewer injuries, more exercise, fewer emissions, more social connections
- Low meat diet
- Local economies
  - Social connections

Foundations for (re)connecting social and ecological determinants of health

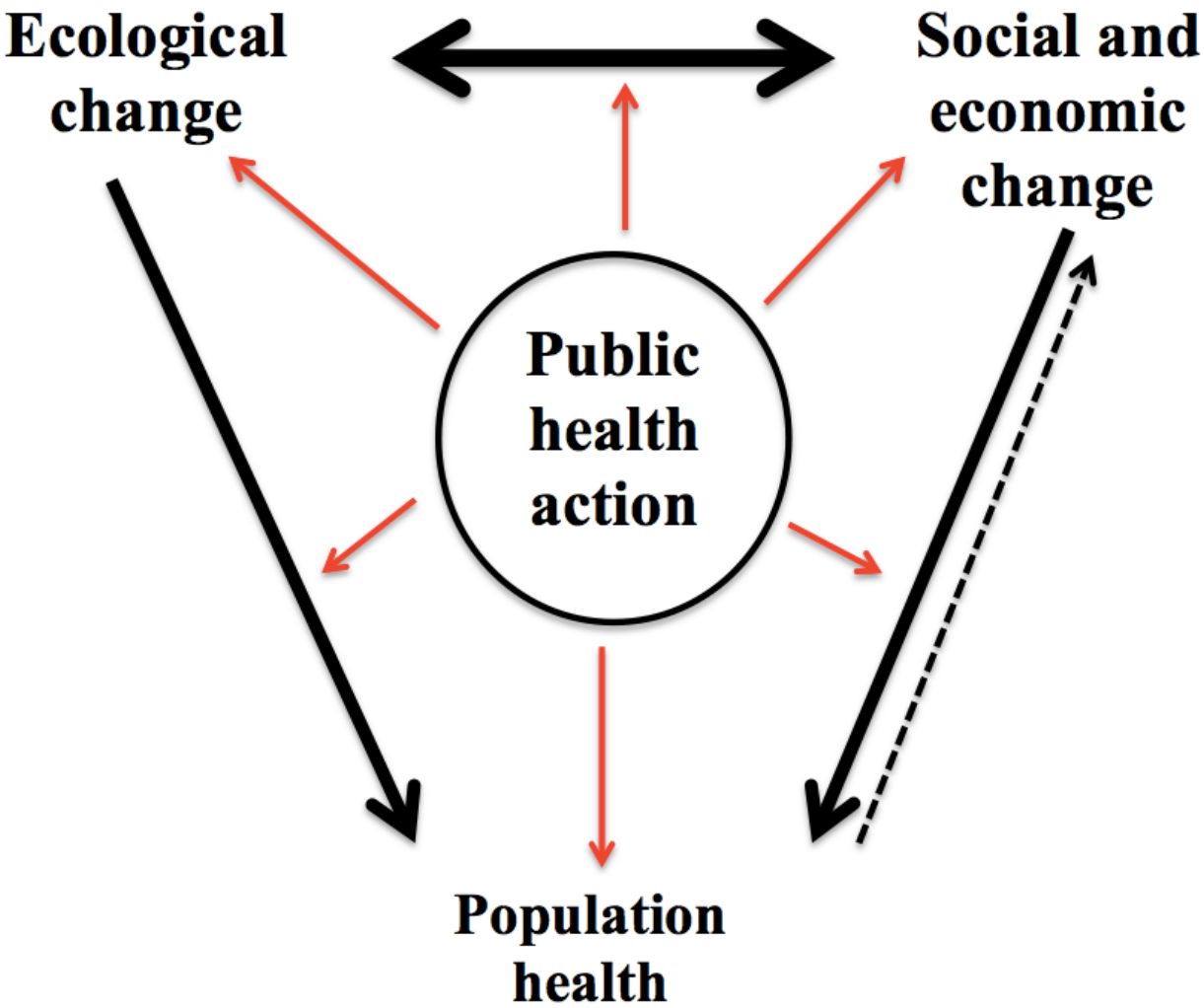
- Indigenous and historical precedents
- New principles based on understanding the socio-ecological context for health
- New ways of knowing
- New models of development and a new economics
- Toward shared governance: Crossing intersectoral boundaries

Finding hope at the local level

- Urban design, transportation, health and sustainability
- Asset-based community development
- Acting locally: Creating healthy and sustainable communities

7. The public health agenda

Ecosocial Model for Public Health Action



Action agenda

There are nine major categories of recommended actions.

1. **Expand the concept of public health ethics**
2. **Understand and address the ecological determinants of health**
3. **Walk the talk: Environmentally responsible health care**
4. **Change social norms and values**

5. Change the focus of development and the way it is measured
6. Strengthen ethical purchasing and investment policies
7. Protect people and communities from harm and health inequity
8. Protect people and communities from the adverse impacts of ecological change
9. Work with others to establish policies and practices that create more ecologically sustainable and healthy societies and communities.

1. An expanded concept of public health ethics

- Adopt a combination of anthropocentrism and ecocentrism/biocentrism
- Incorporate intergenerational equity
- Recognize the right to a healthy environment
- Adopt the principle of environmental justice
- Apply the precautionary principle

Two key mechanisms

- Apply comprehensive and integrated impact assessments
- Adopt the ‘polluter pays’ principle

2. Understand and address the ecological determinants of health

- Integrate the ecological determinants of health into population health frameworks:
- Educate public health professionals about the ecological determinants of health:
- Monitor, assess and report regularly on the ecological determinants of health with respect to immediate and longer term public health needs:
- Fund and support research into the ecological determinants of health:
- Establish a UN Commission on the Ecological Determinants of Health:

3. Walk the talk: Environmentally responsible health care

- **Public health organizations and their parent health care organizations should apply the principles and practices of environmentally responsible health care, consistent with established national and international standards and codes of practice (e.g., Leadership in Energy & Environmental Design (LEED), International Organization for Standardization (ISO), etc.).**

4. Change social norms and values

- **Public health must join others in working towards a fundamental shift in the values and social norms of Canadians in order to create change and effectively address the emerging ecological crisis. To do this, public health organizations and practitioners need to listen to and learn from those already working toward more positive futures, and foster alliances with other efforts that demonstrate socio-ecological approaches to the health of present and future generations.**

Public health action

- Change social norms and values.
  - Change the focus of development and the way it is measured in both the public and private sectors, emphasizing human and social development and environmental sustainability as the new bottom line.
  - Challenge corporate power where it harms ecosystems, societies, communities and the health of the population
  - Change economic practices by supporting ethical purchasing and investment, boycotts and divestment.

5. Change the focus of development and the way it is measured

- **Public health professionals and organizations must consistently and persistently argue for measurement of social development and progress, at all levels, that reflect the ecological determinants of health and are focused on sustainable health, wellbeing and human development. Public health should champion a pan-sectoral focus under the banner of "Health in All Policies".**

6. Strengthen ethical purchasing and investment policies

- All public health organizations should develop ethical and ecological purchasing and investment policies and criteria to exclude receiving financial benefits from those economic activities deemed to be the most harmful to local or global ecosystems.

7. Protect people and communities from harm and health inequity

- **Public health practitioners and organizations should examine how to use public health legislation to address the public health impacts of ecological change, and should request the Minister, Provincial Health Officer or other appropriate public health officials to initiate an inquiry or investigation where their Public Health Act requires or enables such an action.**

8. Protect people and communities from the adverse impacts of ecological change

- **The public health sector at all levels must address real and potential adverse impacts of ecological change using two main approaches: first, to reduce vulnerability and protect the vulnerable, and secondly to increase resilience and adaptation.**

9. Work with others to establish policies and practices that create more ecologically sustainable and healthy societies and communities.

- **Public health must find allies and forge partnerships with those individuals and organizations at all levels and in all sectors of society that share our vision to create a more just, sustainable, and healthy society. Policies and practices in the public and private sectors should be examined from a population health perspective, as part of comprehensive impact assessments. Those that are consistent with improving or not harming the ecological determinants of health should be adopted or encouraged, those that would do harm must be amended or dropped. As a general principle, public health should support the transfer of public subsidies and tax incentives from economic activities that worsen the ecological crisis to those that improve ecological functions and resource sustainability.**

Managing decline

Hancock, Trevor (2015) Managing Decline: Global Change Requires Local Action in Butler, Colin D.; Dixon, Jane and Capon, Anthony G. (Eds) *Health of People, Places and Planet: Reflections based on Tony McMichael's four decades of contribution to epidemiological understanding* Canberra: ANU Press

We are entering a long, slow disaster

- We need to prevent decline sliding off into collapse
  - Aim for a ‘soft landing’
- We can learn from our disaster preparedness and management system
- Establish ‘decline management’ research, preparation and management units