

THE JEKYLL AND HYDE OF “RESILIENCE”

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The 'Dr Jekyll' take on Resilience



- ❑ Resilience is a measure of “the capacity of a system to withstand disturbance while still retaining its fundamental structure, function and internal feedbacks” (Walker and Salt 2006).
- ❑ Given that ‘disturbance’ (i.e, change’) is inevitable, people generally interpret resilience in a positive light.

Resilience thinking adopts a 'post-normal' scientific framework


- ❑ Complex systems behaviour is non-linear. For example:
- ❑ There may be significant lags between cause and effect (e.g., global warming is lagging GHG concentrations by 20-60 years).
- ❑ Important systems variables (or whole systems) may be characterized by critical thresholds or 'tipping points' whose existence is unknown until they have been breached.
- ❑ Beyond a threshold the system may gravitate into a new 'regime' or 'basin of attraction' that is not amenable to human purposes or even human existence.
- ❑ Such 'catastrophic' change may not be reversible in practical terms (e.g., collapse of North Atlantic cod stocks).

Resilience thinking accepts that:



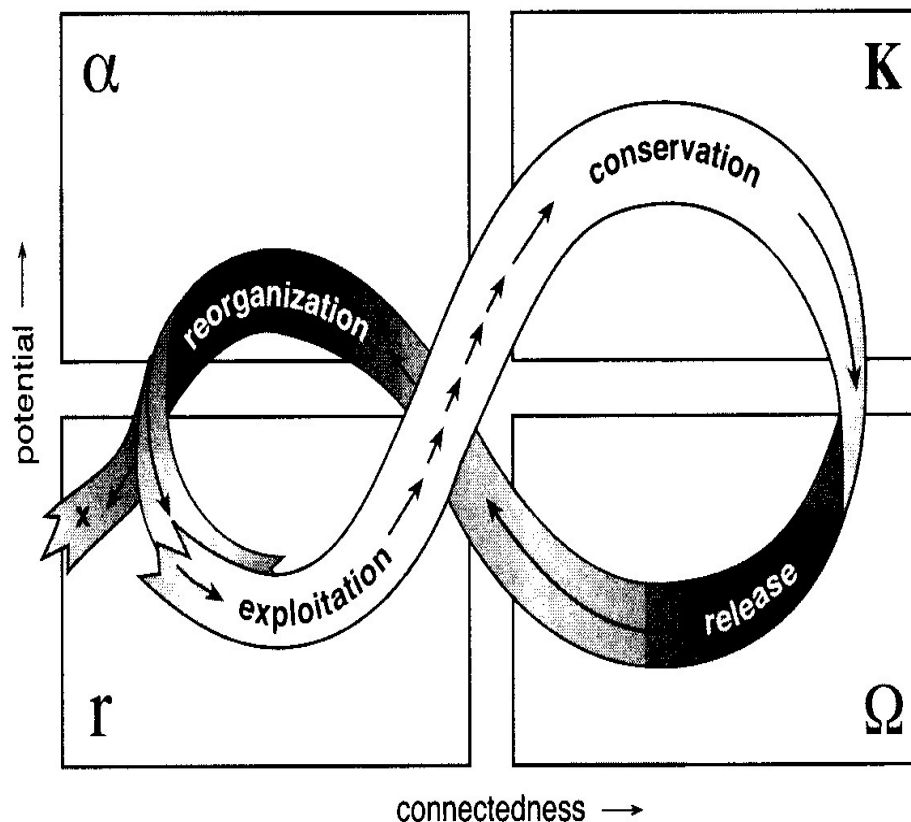
- ❑ the human enterprise is structurally and functionally inseparable from nature, i.e., the human enterprise is a fully imbedded subsystem of the ecosphere.
- ❑ linked/integrated socio-ecosystems are complex adaptive systems that are constantly changing.
- ❑ the sustainability of the human enterprise on a crowded and resource-stressed planet depends on our ability to conserve the resilience of socio-ecological systems.
- ❑ resource management efforts must shift from reshaping nature to satisfy human demands to moderating human demands.

Resilience recognizes cycles of adaptive change in complex systems (Panarchy Theory)



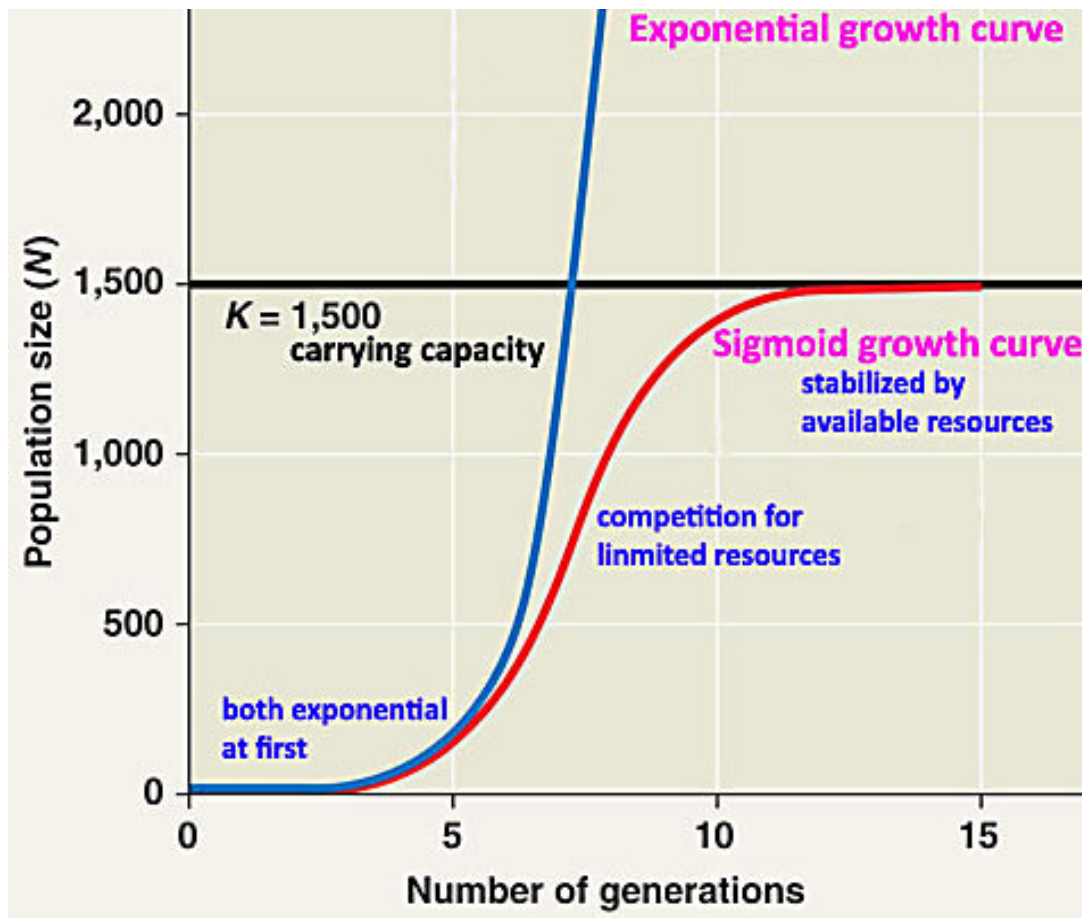
- ❑ The ecosystems, human systems, and combined systems that comprise the ecosphere exist in an overlapping hierarchical structure referred to as a “panarchy”.
- ❑ All subsystems within the hierarchy are interconnected in *repeating adaptive cycles of growth, accumulation, release [collapse] and renewal*.
- ❑ These transformational cycles take place at scales ranging from a single organism to the biosphere over periods from days to geological epochs.

Phases of the adaptive cycle in socio-ecological systems



- ❑ **Exploitation & growth:** Invasion and rapid growth of stronger opportunistic species (ecosystems) or new businesses (economy).
- ❑ **Conservation:** Consolidation and accumulation; high connectivity, low resilience; the system becomes 'brittle', prone to collapse if 'shocked.'
- ❑ **Release:** "The longer the conservation phase persists, the smaller the shock needed to end it" (Walker and Salt 2006, 77). All structure and organization may be lost in collapse.
- ❑ **Reorganization:** All options are theoretically open. Possibility of novelty and experimentation. Often however, *conditions produce a faithful repetition of the previous cycle.*

Contemplating *H. Sapiens*: Archetypal 'K'-Strategist



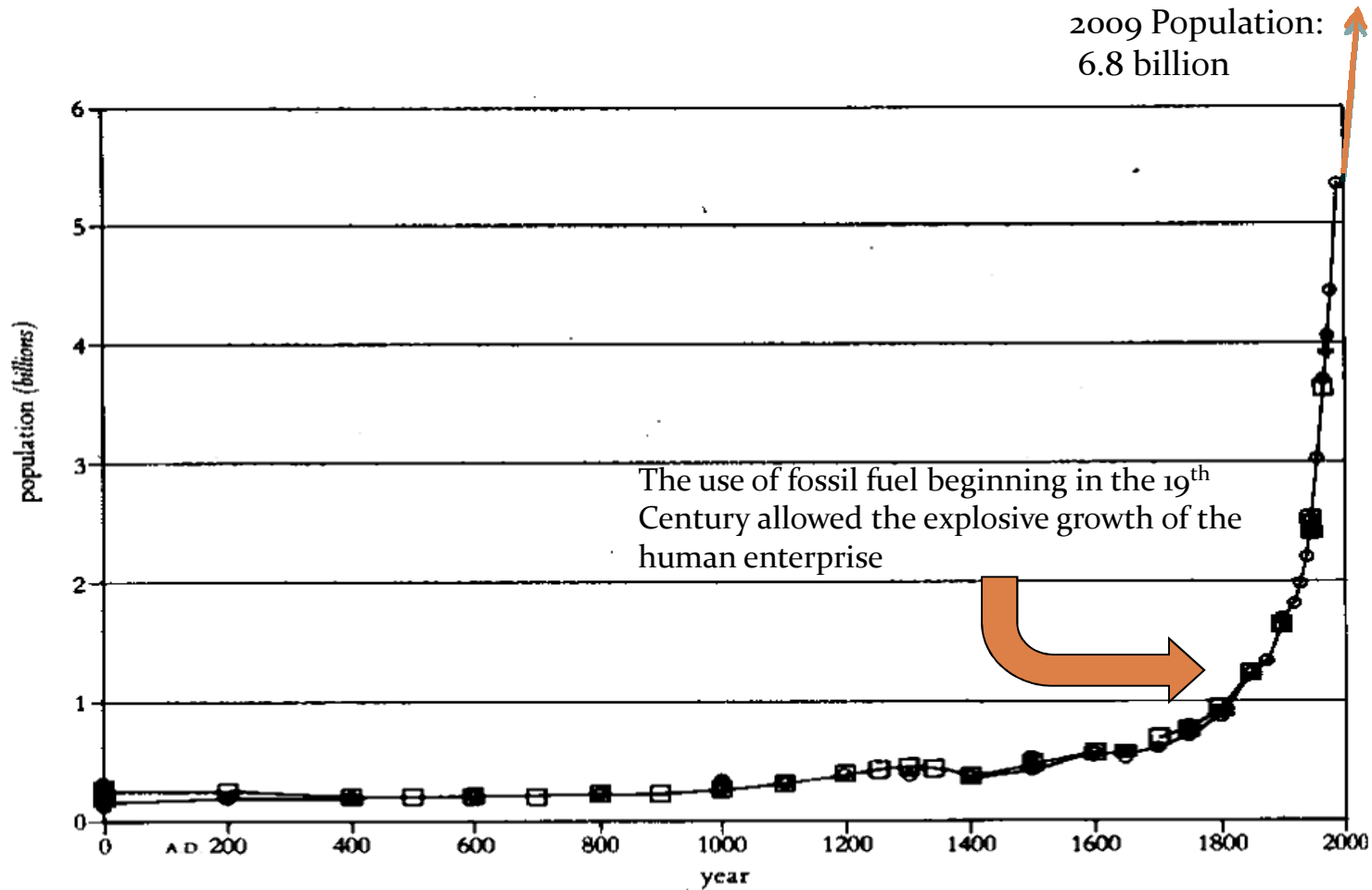
- ❑ **'K'-Strategists:** Large, long-lived, slowly reproducing, competitive organisms with high survival rates to maturity
- ❑ K-strategists therefore tend to press against carrying capacity.
- ❑ Humans are clearly 'K'-strategists, a distinction we share with other mammals ranging from tapirs through elephants to blue whales.

Biological Drivers of the Human Adaptive Cycle: Genetic 'Presets'

- ❑ Unless or until constrained by negative feedback, humans, like all other species will:
 - *expand to fill all the accessible habitat and*
 - *use all available resources (in the case of humans, 'available' is determined by contemporary technology).*

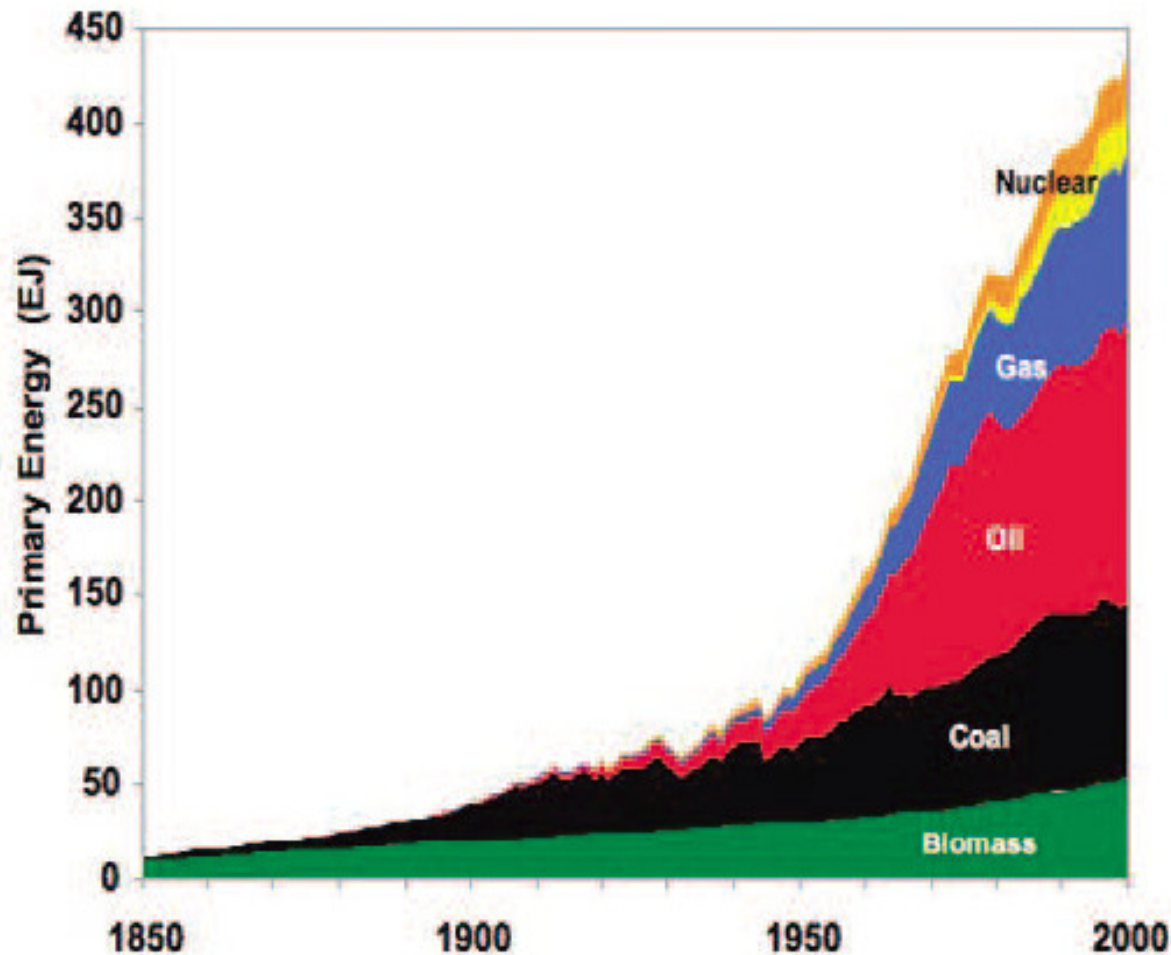
Note that these biological predispositions are currently being reinforced by our dominant cultural narrative—the progress myth and the cult of perpetual economic growth.

Result: The Anomalous, Unsustainable Oil-Based Expansion of Civilization



Continuous growth—population and economic—is an anomaly. The growth spurt that recent generations take to be normal is the single most abnormal period of human history.


Growth toward collapse? (propelled by exo-somatic non-renewable energy)



(TU-Wein & IIASA
2003)

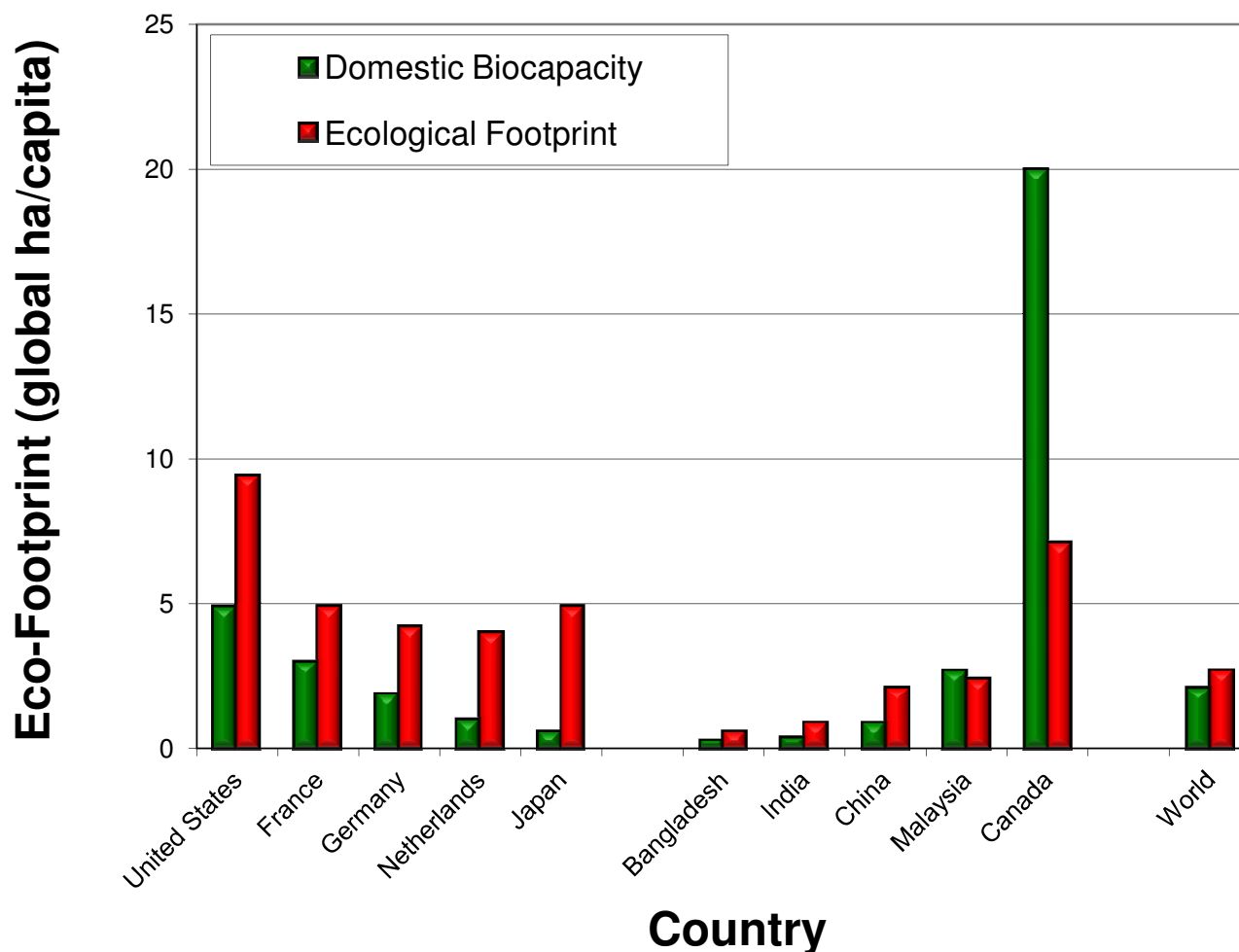
- By 2000 fossil fuel-based energy systems generated more than 80% of the total energy used to power the global economy.
- Growth in fossil energy use has been exponential. About 76% of the anthropogenic increase in atmospheric carbon (total increase = 105 ppm) has occurred since 1950, half in the past 30 years.

Problem: The human enterprise is an open, growing, fully-contained dependent sub-system of a materially closed non-growing ecosphere



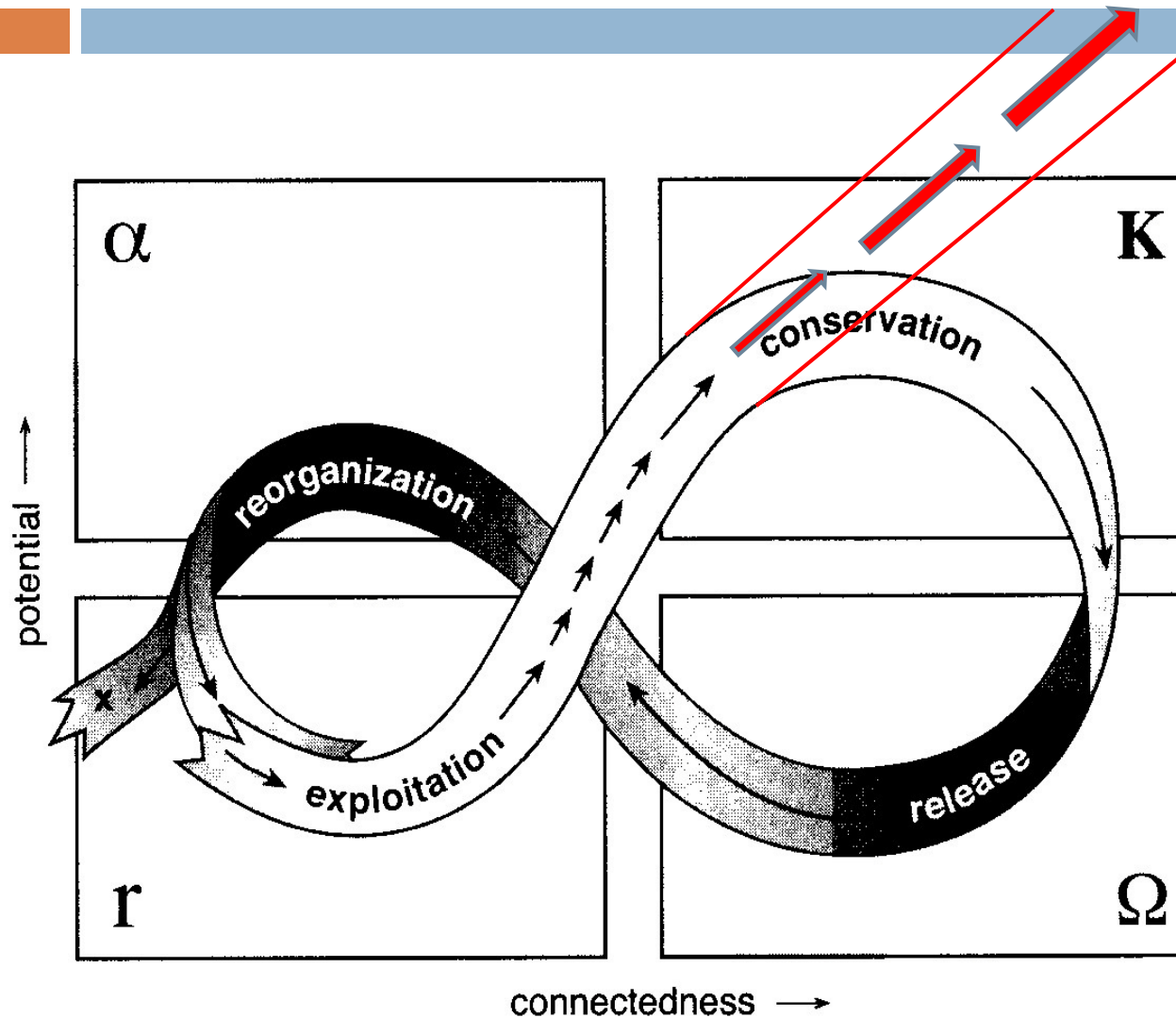
- ❑ The modern human sub-system can grow and maintain itself only by extracting energy and material from, and by discharging its wastes into, its host ecosystems.
- ❑ The result of the sustained human growth trajectory *on a global scale* is the permanent dissipation and degradation of vital resources and systems needed for self-(re)organization and renewal, should the existing human system collapse.

Evidence We are Depleting the Planet: Biocapacities and Eco-Footprints of Selected Countries



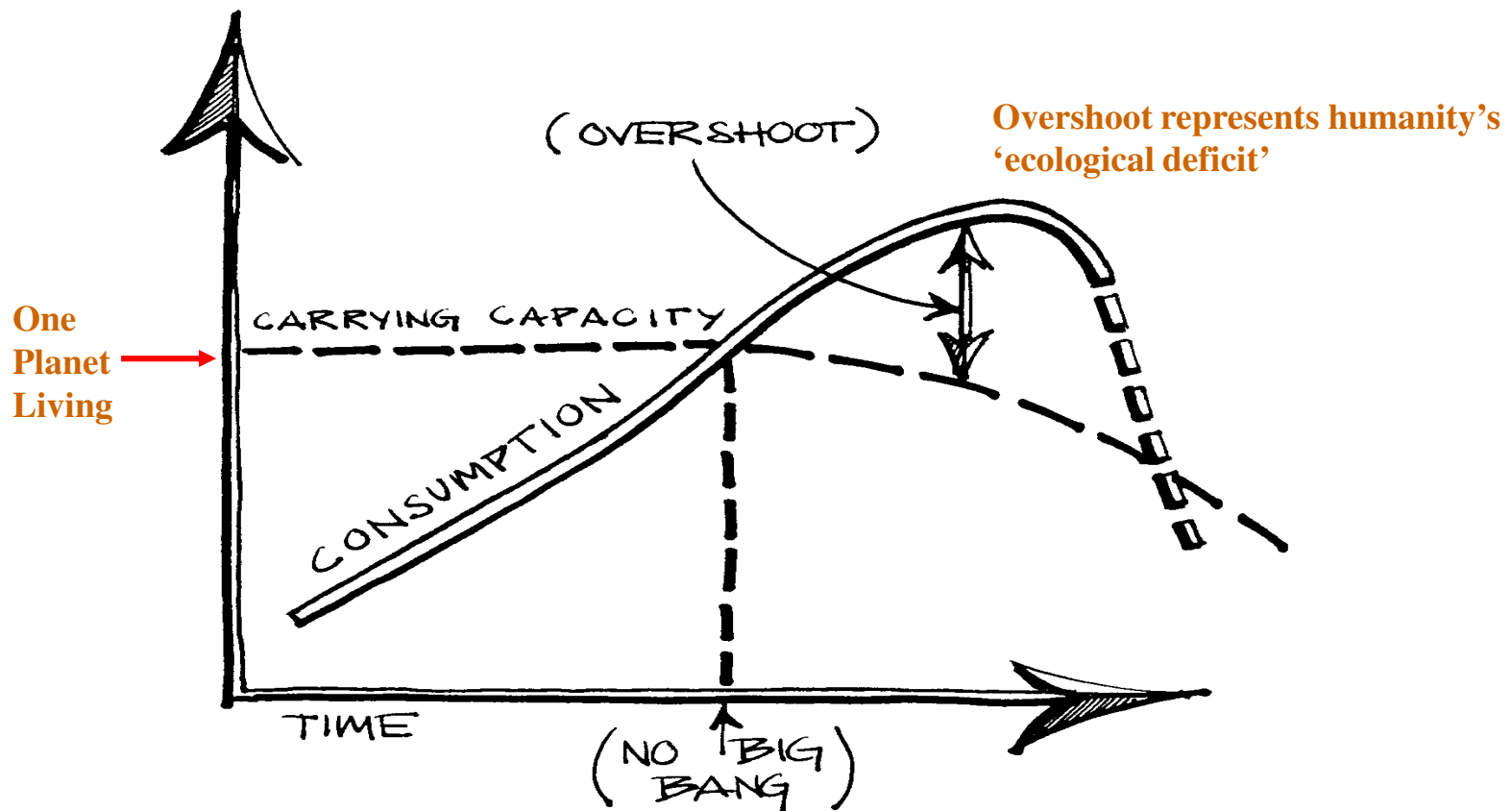
Because of globalization and trade, countries that run eco-deficits can extract 'surplus' biocapacity from low density countries (like Canada) and the global commons and use it to sustain their destructive consumption habits.

The Mr Hyde of Human Resilience: Extending Eco-Dysfunction



- Human technological prowess and globalization are ‘adaptive’ responses to resource shortages that preserve the system’s structure and function (i.e., they embody “resilience”).
- These adaptations have greatly extended the ‘growth and conservation’ phase of humanity’s ‘adaptive’ cycle in time and space *at great potential long-term cost.*

Societies in overshoot invite catastrophic collapse



Whenever a population grows beyond carrying capacity, the environment is degraded. Think: climate change, ozone depletion, sea level rise, deforestation, fisheries collapses, land degradation, etc. This is uneconomic growth that makes us poorer, not richer.

Recent findings turn the screws

“Reframing the climate change challenge in light of post-2000 emission trends”

- ❑ To stabilize GHGs at even 650 ppmv CO_{2e}, **the majority of OECD nations must begin to make draconian emission reductions soon (within a decade).**
- ❑ Unless we can reconcile economic growth with unprecedented rates of decarbonization (in excess of 6% per year), **this will require a planned economic recession.**
- ❑ 650 ppmv CO_{2e} implies a *catastrophic* 4 C degree mean global temperature increase.

(Anderson and Bows. 2008. *Phil. Trans. R. Soc. A*
doi:10.1098/rsta.2008.0138)

Evidence abounds, but we live in deep denial

- “The masses have never thirsted after truth. They turn aside from evidence that is not to their taste, preferring to deify error, if error seduce[s] them. Whoever can supply them with illusions is easily their master; whoever attempts to destroy their illusions is always their victim.”
(Gustave le Bon 1896).
- “... a new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it” (Max Planck, 1949)

An Explanatory Cognitive Mechanism



- During individual development, sensory experiences and cultural norms literally shape the human brain's synaptic circuitry in patterns that reflect and embed those experiences.
- Subsequently, people seek out *compatible* experiences and, **“when faced with information that does not agree with their [preformed] internal structures, they deny, discredit, reinterpret or forget that information”** (Wexler, 2006).
- This is a source of potentially perverse resilience (the Mr Hyde syndrome again).

SO, THE QUESTION OF THE DAY:



What would an intelligent, forward-thinking, compassionate species do in response to available data, the historical record and on-going trends, to enhance the resilience of contemporary society?

Recognize the Jekyll & Hyde nature of resilience

Some 'natural' resilience is frustrating to human purposes

- ❑ The evolved tolerance of agricultural insect pests to many kinds of chemical biocides.
- ❑ The evolved resistance of pathogenic bacteria and fungi to many kinds of antibiotics.

Some **human** resilience is frustrating to human purposes

- ❑ The resistance of the corporate sector to demands for ecological responsibility and social justice.
- ❑ Globalization and technological solutions to sustaining the status quo are destroying long-term global life support.

Restructure our socio-ecosystems for collective resilience

- ❑ Formally abandon the mythos of continuous economic growth (resilience often means giving in).
- ❑ Create socio-eco-economic planning regions on a humanly manageable spatial scale.
- ❑ Manage regional socio-ecosystems to maintain/increase species diversity, systems integrity and optimal habitat patchiness for the species concerned (i.e., inhibit development of the ‘conservation phase’ of the adaptive cycle).
- ❑ Relocalize—strive to maintain economic diversity and multiple employment opportunities within every planning region.
- ❑ Invest in multiply redundant energy systems with an emphasis on sustainable renewable forms.

Re-socialize

- ❑ Initiate a national public education campaign on the severity of the crisis and the need for decisive action.
- ❑ Emphasize that *global change is a collective problem requiring collective solutions* (individual actions have inadequate, even trivial effects). Governments must act in for the common good.
- ❑ Promote a cultural shift from private to public capital accumulation and to human development.
- ❑ Implement job-training and job-placement programs to equip people for employment in sunrise industries.
- ❑ Design and implement new forms of social safety nets to enable peoples' transition to the post-carbon economy (there will be sunset as well as sunrise industries).
- ❑ Recognize the advantages of job-sharing in the context of improved work-life balance (self-actualization).

Intervene to create more efficient markets



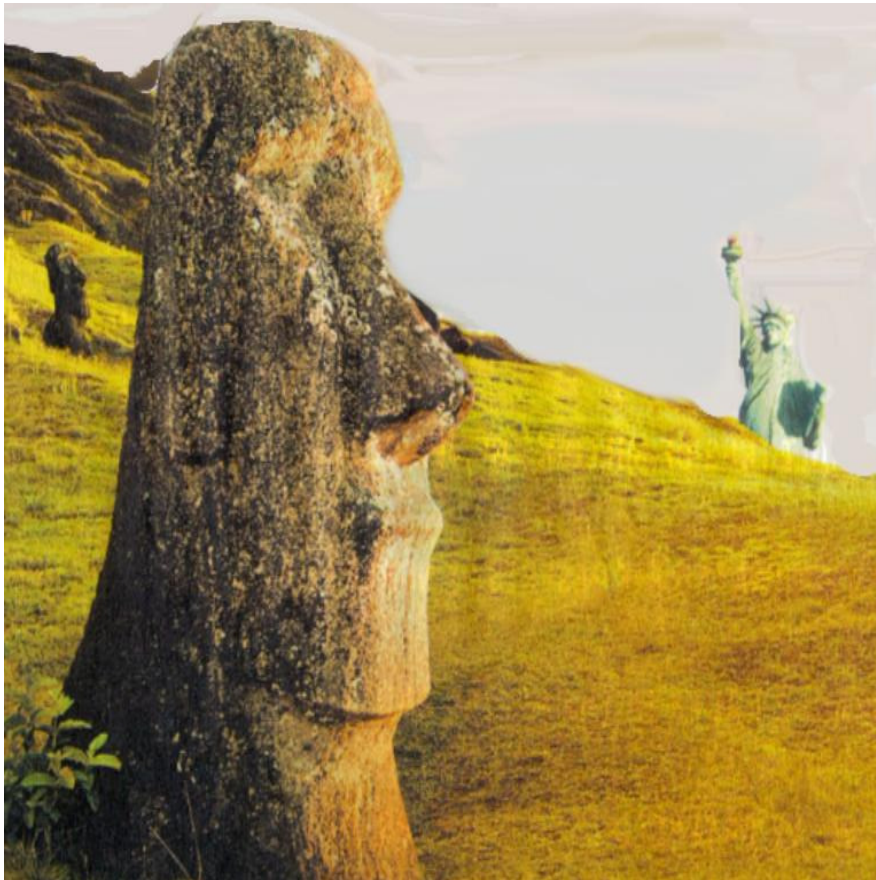
- ❑ End perverse subsidies (e.g., to the fossil fuel sector).
- ❑ Acknowledge that most goods are underpriced and therefore over-consumed.
- ❑ Recognize that government intervention to correct for gross market failure (e.g., climate change) is necessary and legitimate.
- ❑ For efficiency, internalize ecological and social externalities, i.e., insist on full-cost pricing.
- ❑ Initiate ecological fiscal reform—tax the bads, not the goods.
- ❑ Implement a combination of pollution charges/taxes (e.g., carbon tax) and import tariffs. (Support WTO reform.)
- ❑ Consider a negative income tax to assist low-income families through the transition.

The ultimate in resilience: Society must consciously script a new cultural narrative



- ❑ For sustainability, we must learn to override our innate expansionist tendencies and abandon our socially constructed perpetual growth myth.
- ❑ We need a new *global* cultural narrative that shifts the values of society from competitive individualism, greed, and narrow self-interest, toward community, cooperation, and our collective interest in repairing the earth for survival.
- ❑ Motivation: For the first time individual and national self-interests have converged with humanity's collective interests.

On Failure: Could growth-based global culture be 'selected out'? (It wouldn't be the first time!)



- “...what is perhaps most intriguing in the evolution of human societies is the regularity with which the pattern of increasing complexity is interrupted by collapse...”
(Joseph Tainter 1995).

Sir Frederic Hoyle on the Sustainability of 'Civilization'



“It has often been said that, if the human species fails to make a go of it here on the Earth, some other species will take over the running. ...this is not correct. We have or soon will have, exhausted the necessary physical prerequisites so far as this planet is concerned. With coal gone, oil gone, high-grade metallic ores gone, no species, however competent, can make the long climb from primitive conditions to high-level technology.

[Civilization] is a one-shot affair. If we fail, this planetary system fails so far as intelligence is concerned.”