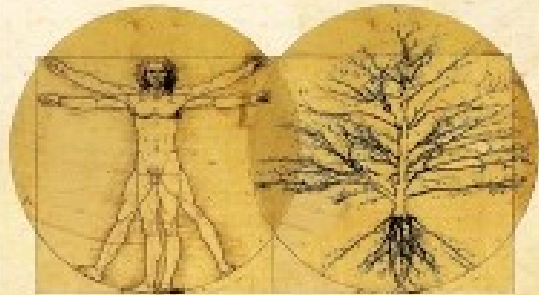


Foundations *for* Sustainability

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A Coherent Framework of Life–Environment Relations



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Chapter 1: To solve a difficult problem, enlarge it

Your reaction:

- 1) What is, in your opinion, the main message of Chapter 1?
- 2) What part was most confusing or most difficult to understand?

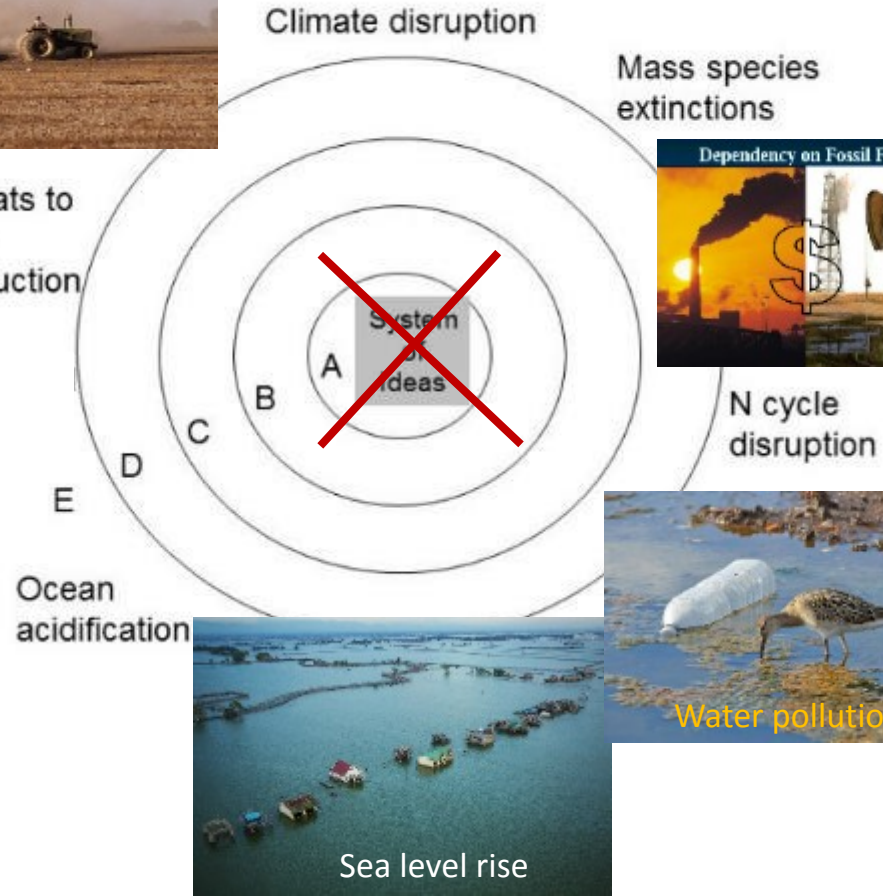
Evidence of crisis

- 1) Unprecedented land use change and conversion of natural habitat to human dominated landscapes
- 2) Rates of species extinctions on par with the five mass extinctions of all time
- 3) Soil loss and degradation
- 4) Plateau of food production and increasing vulnerability of the food supply
- 5) Disruption of the global nitrogen cycle
- 6) Pressure related to fossil-fuel dependency (including conflicts over pipelines, fracking, and more)
- 7) Global climate disruption
- 8) Sea level rise and impacts on coastal areas with dense human population
- 9) Ocean acidification and related disruption to coral reefs and ecosystems
- 10) Water pollution and shortages in many areas
- 11) Persistent and bioaccumulating toxins and solid waste such as plastic and microplastics

Environmental Challenges

emerge from
our core way
of knowing

a new paradigm



Reality of win-win

- Switch from a paradigm that see a fragmented and antagonistic relation between life and environment, and humans and environment
- To one that recognizes that ecosystem interdependencies promote mutualism and synergism
- The fundamental, net human-environment relationship is mutualism or win-win

Applied-theory science

- 1) Balances and synergizes holism with reductionism;
- 2) Equally emphasizes internalist and self-referential as well as objectivist perspectives;
- 3) Is anticipatory and accelerates the pace and process of paradigm shifts; and
- 4) Is consciously, intentionally, and transparently value-based centered on the value of life.

All education is environmental education

- By what is included or excluded students are taught that they are part of or apart from ecological systems – disciplines separate people from nature



Getting the metaphor right

- Switching from a machine view
- To ecosystem/web/network view
- More on this later



Reverence for life

- Schweitzer
- Leopold
- Ulanowicz
- Chapter 2

If you need something to worship,
then worship life — all life,
every last crawling bit of it!
We're all in this beauty together!



What is life?



A single cell possesses all the necessary aspects to be alive

What is life?



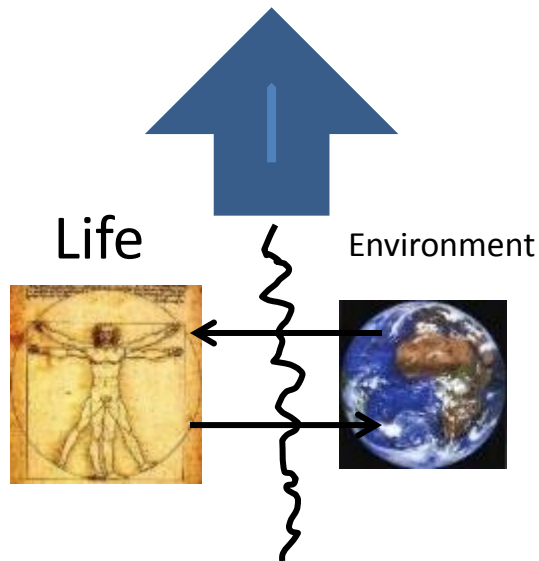
A single organism possesses all the necessary aspects to be alive

Mental models and outcomes

Real impacts of choice of system boundaries

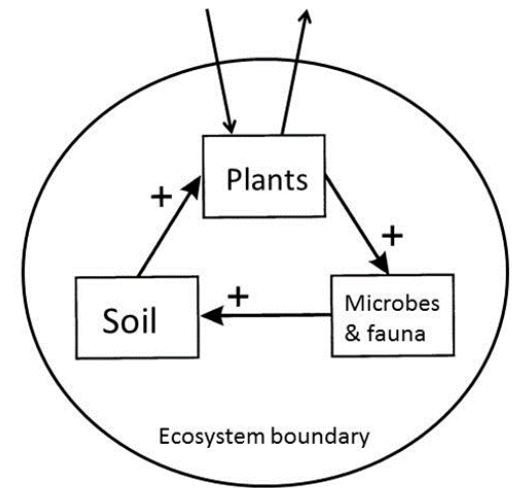
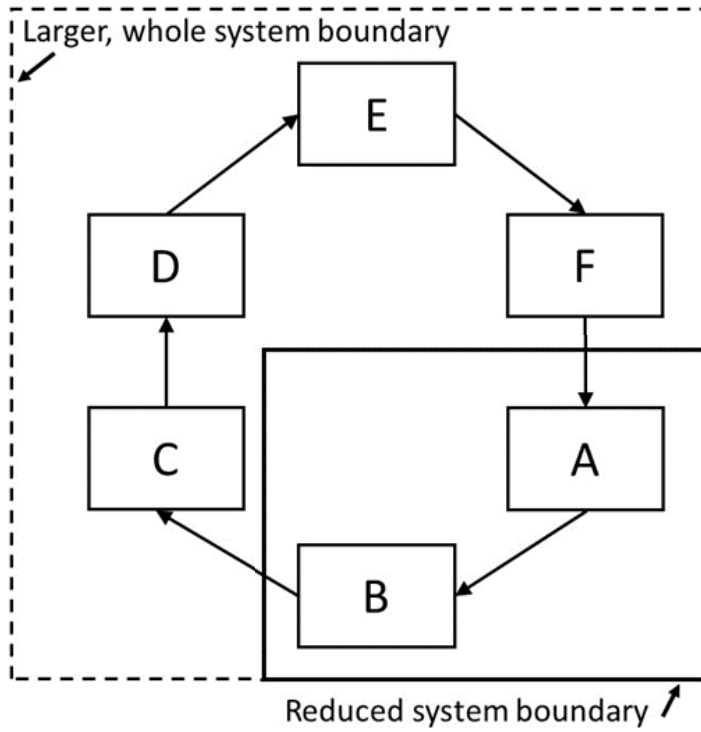
Tragedy of the Commons

Humans win, environment degrades



Figures by Dan Fiscus

- Inherent in this paradigm, life is separate from environment in mind and action
- Once fragmented, it is possible and likely that the value of environment is seen and treated as less than the value of life
- Environment is consumed and degraded as manifest in many symptoms of ecological crisis



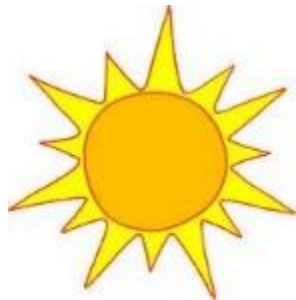


Ecosystem is full of
Interconnections
and
Interdependencies

Art work of Jan Heath, entitled "food chain"

A bottom up re-visioning is vital: A new holistic paradigm for life

- Contrary to the dominant mainstream view, the basis of all current biology and life science education, it now is becoming clear that ***life is not only (or even primarily) an organismal property.***
- In the view actively emerging, life is not centered on or emanating from organisms, nor is it primarily a localized, objectified or material phenomenon.
- ***Life is inherently relational, distributed, and non-localized***



Environmental and ecological interactions



A single organism possesses all the necessary aspects to be alive

Interacting ecological community and its environment is an ecosystem



An ecosystem possesses all the necessary aspects to sustain life

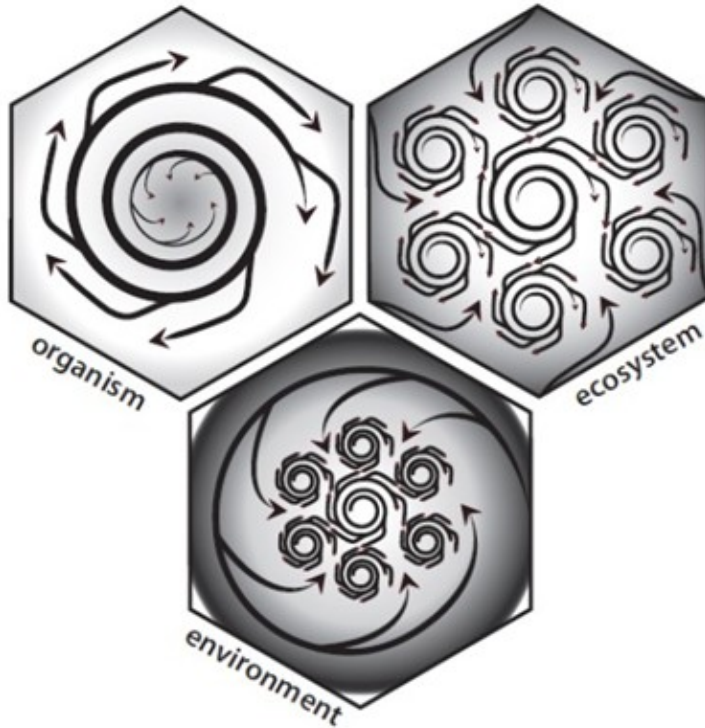
Recursive nature of nature

Bounty of the Commons
Humans win, environment
improves

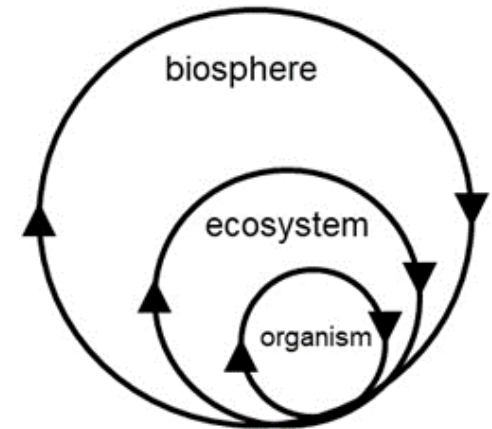


- 1) Life and environment are best understood and modeled as unified as a single “Life–Environment” system.

Three unit models of Life:
Organism
Ecosystem
Environment

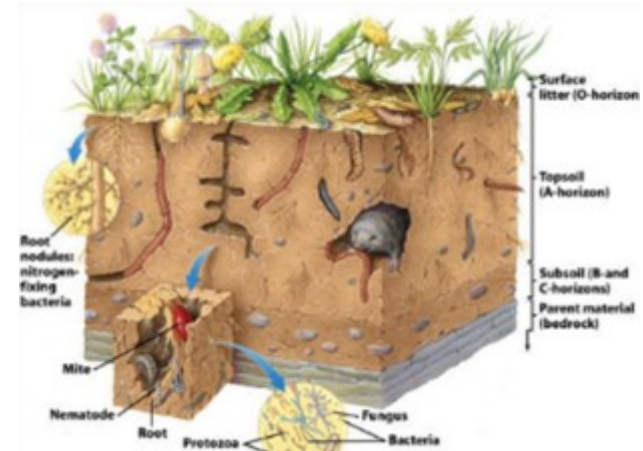


Artwork by McManus



Sustained life depends on death

- In an energy economy appropriate to the use of biological energy, all bodies, plant and animal and human, are joined in a kind of energy community. . . .
- They are indissolubly linked in complex patterns of energy exchange. They die into each other's life, live into each other's death. (Berry 1977, p. 90)



Sustainers and Transcenders

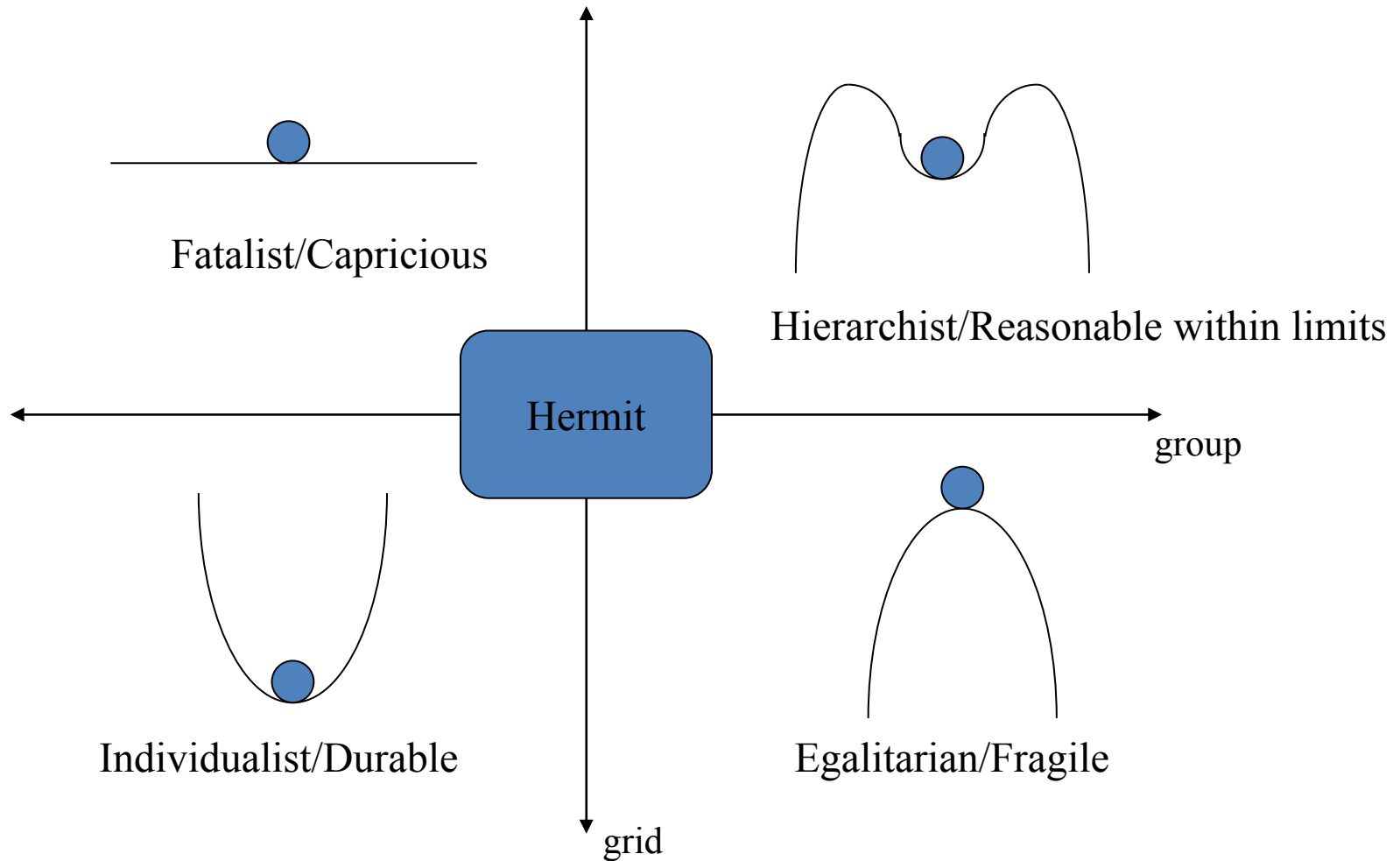
Change themselves/lifestyle
Work with nature



Break barriers
Innovate

Are there environmental limits?
Are both sides aware of them?

Cultural Theory Solidarities (Thompson 1997)



transcenders

sustainers

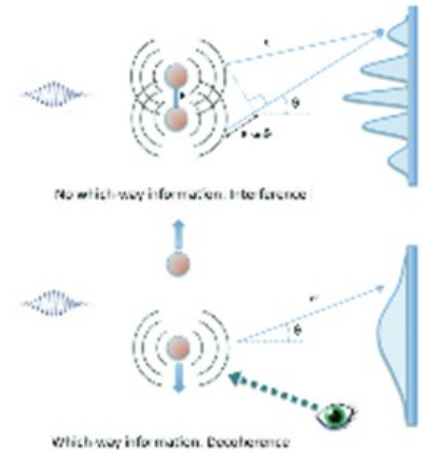
Why sustainers and transcenders need to work together

- We need to know how to take the life support with us
- NASA has programs to recycle biological and other wastes of astronauts
- But not yet to recycle astronauts themselves...

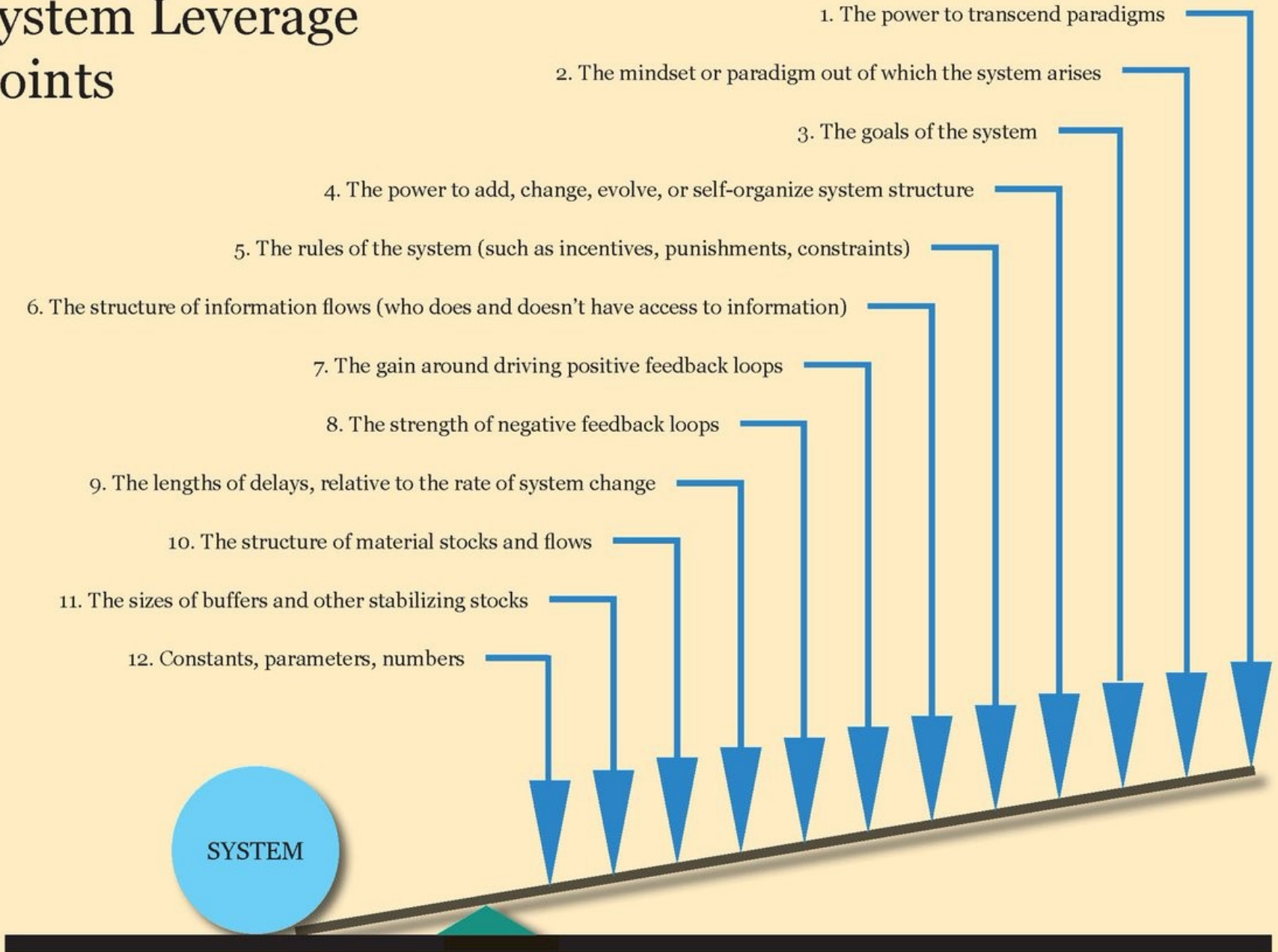


Deep truths

- Are statements in which the opposite also contains a deep truth
- Complementarity of *discrete life* and *sustained life*
- Meadow's leverage points
 - Power to transcend paradigms

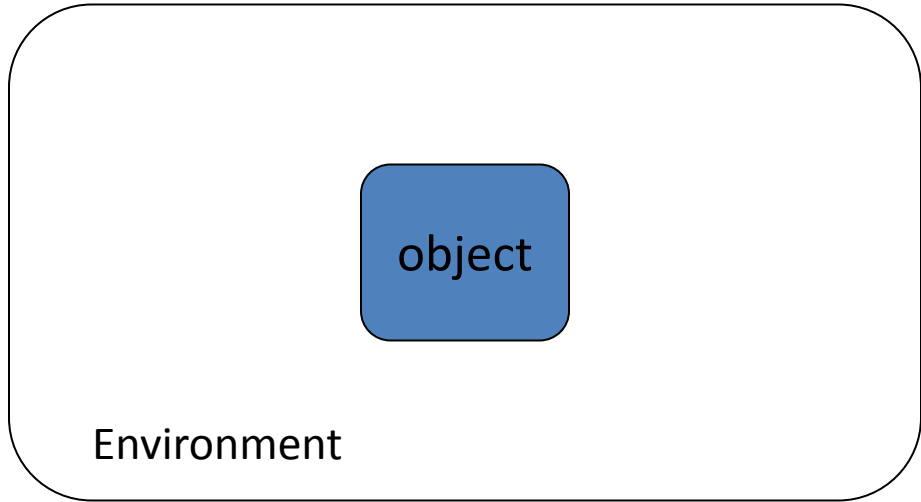


System Leverage Points



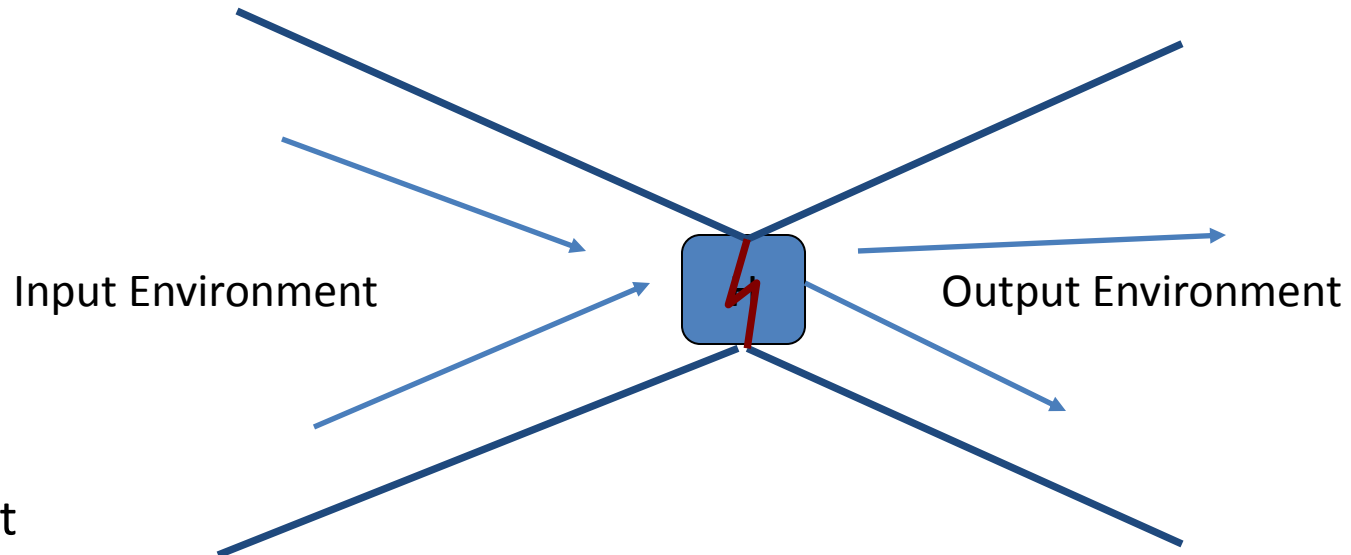
What if we are wrong? What if this is all wrong?

Key message: Avoid fragmentation

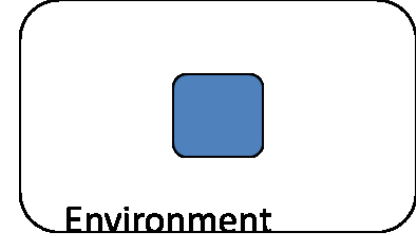


This is wrong!

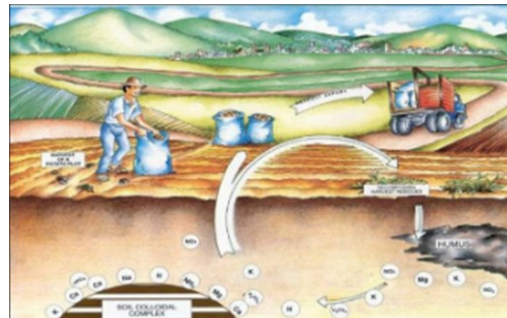
Object is inseparably part of its environment



Avoid fragmentation



- The concept of country, homeland, dwelling place becomes simplified as ‘the environment’—that is, what surrounds us. Once we see our place, our part of the world, as surrounding us, we have already made a profound division between it and ourselves.
 - We have given up the understanding—dropped it out of our language and so out of our thought—that we and our country *create one another, depend on one another, are literally part of one another*;
 - that our land passes in and out of our bodies just as our bodies pass in and out of our land; that as we and our land are part of one another, so all who are living as neighbors here, human and plant and animal, are part of one another, and so cannot possibly flourish alone;
 - our culture must be our response to our place, our culture and our place are images of each other and inseparably from each other, and so neither can be better than the other.
- Berry (1977, p. 24).



Avoiding the word “solutions”, we look for New patterns and processes that..

- 1) Build and aggrade soils and increase fertility;
- 2) A compromise similar to E.O. Wilson’s “Saving Half the Earth” is reached;
- 3) Rates of species extinctions in line with historical rates between mass extinctions;
- 4) Improved food production and resilience, sustainability, affordability, and health of the food supply and its beneficiaries;
- 5) Stable global nitrogen cycle including an end to dead zones in estuaries and gulfs;
- 6) Broken addiction with fossil fuels with most energy from renewable sources;
- 7) Stable global climate similar to the Holocene; no net increase in GHG concentrations or temperature;
- 8) Sea levels follow natural patterns and more secure coastal areas with human populations;
- 9) An end to increased ocean acidification and regeneration of coral reefs and ecosystems;
- 10) Abundant, affordable clean water sufficient for human needs and for wild nature; and
- 11) Great reduction in environmental toxins/waste; emissions within rates of recycling or decontamination.

Naïve or possible?

Discussion questions

- <https://vimeo.com/212281432>
- What does the title of the chapter have to do with the content?
- Why don't biology textbooks teach about two kinds of life (discrete and sustained)?
 - Can this be changed? How?
- How to tap into the existing forces of the system to create change? i.e., work alongside transmitters not against them.

Discussion questions

- A lot of the discussion comes back to scale – short term versus long term or global versus local. How to instill more long term, holistic approaches in a “present-oriented” society?
- We propose that when you avoid fragmentation that: **The fundamental, net human-environment relationship is mutualism or win-win**
 - Is there evidence for this?
- Other questions?