



Sustainability: Moving Environmental Protection Beyond Scarcity

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“Life’s challenges are not supposed to paralyze you. They are supposed to help you discover who you are.”

Bernice Johnson Reagon

SUSTAINABILITY....

- ...IS NOT ABOUT A DESTINATION
- ...IT IS SIMPLY A DIRECTION

SUSTAINABILITY IS A TRANSITION



From

- short-term thinking
- an economy outside of nature
- a linear flow of resources
- fossil fuels

To

- long-term thinking
- an economy integrated with nature
- a systems flow of resources
- solar-derived

SUSTAINABILITY IS A TRANSITION

From

- keeping score with a gross cash flow
- seeing environmental, social and economic challenges as separate and competing

To

- keeping score with a whole systems balance sheet
- seeing environmental, social, and economic challenges as an interconnected whole ed energy

Getting Sustainability Right

- Understanding the Science
- Modeling Nature
- Creating the Ethical Framework
- Applying the Human Intention
- Designing a Systems Response



A photograph of a flowering bougainvillea bush. The plant has numerous bright pink, papery bracts and small white flowers. The leaves are a vibrant green. The background is a soft-focus green lawn. The text is overlaid on the upper left portion of the image.

Getting it Right: Understanding the Science

- Identifying non-sustainability
- Defining the ecological system we are working in
- Valuing natural resource assets

Getting it Right: Creating an Ethical Framework

- Meet the moral obligation to current and future generations
- Build community inclusiveness and diversity
- Ensure social equity
- Value all of nature



Getting it Right: Applying the Human Intention

- **Avoid problem-shifting**
 - **Add economic value**
 - **Enhance meaningful work**
 - **Engage competencies for sustainability**
(systems thinkers, bio-scientists, ethicists)
 - **Seek valuation of local wealth**
 - **Adopt breakthrough technologies**
- 

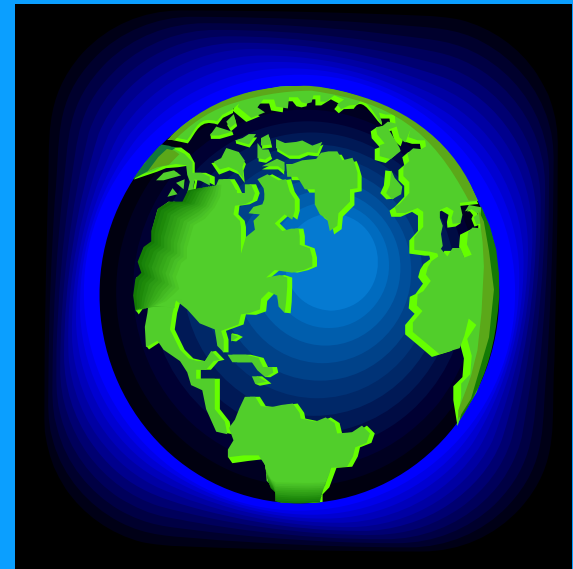


Getting it Right: Designing a Systems Response

- Optimize for the system
- Manage zeros
- Have a big here and a long now
- Build ecological integrity and social justice into every response

Taking the Planetary Pulse: Identifying Non-sustainability

- The great unraveling
- The great warming
- The great inequalities



The Great Unraveling

- Ecosystem decline
- Habitat loss
- Species extinction
- Human body burden and chemical stressors





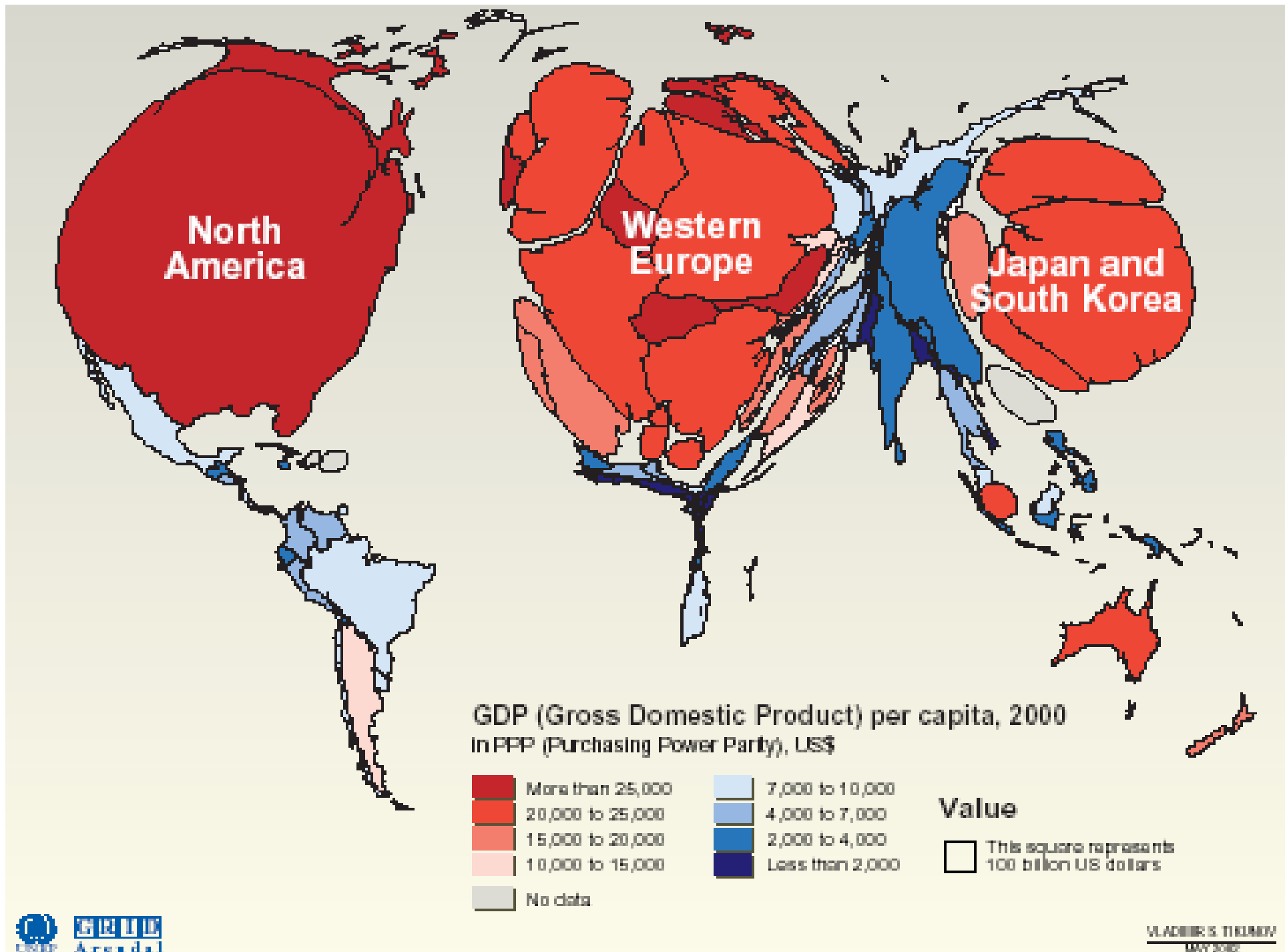
The Great Warming

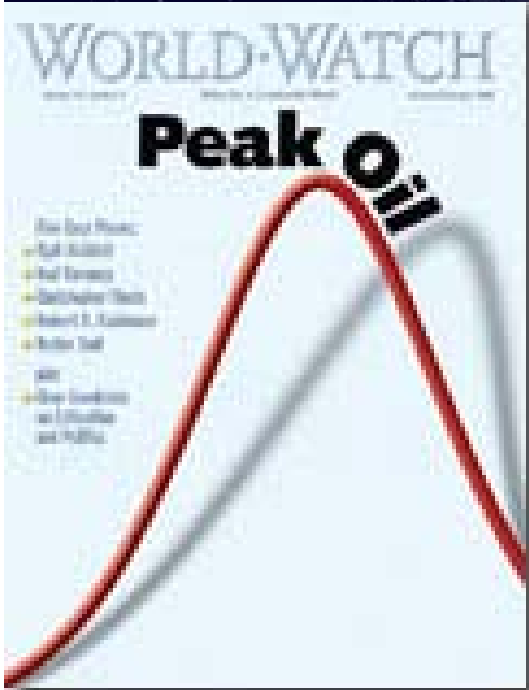
- Disruption of the global heat engine
- The planet's response
- Economic dislocation
- Climate refugees and security

The Great Inequalities

- Concentrations of wealth
- Access to resources and information
- Conflict and national security







Systems Thinking

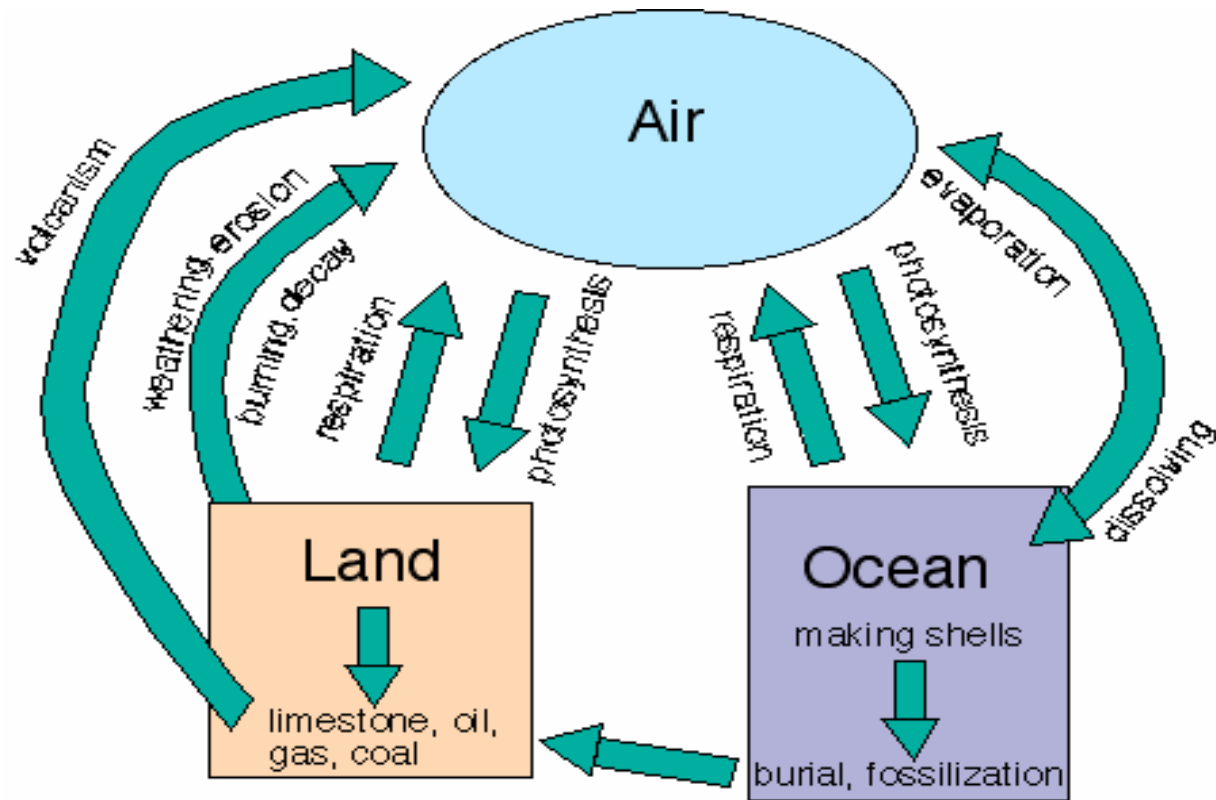
What do we mean by “system?”

What does a system need to have?

What are the values of seeing and thinking in systems?

A system is any set of interdependent or temporarily interacting parts.

A Natural System - The Carbon Cycle



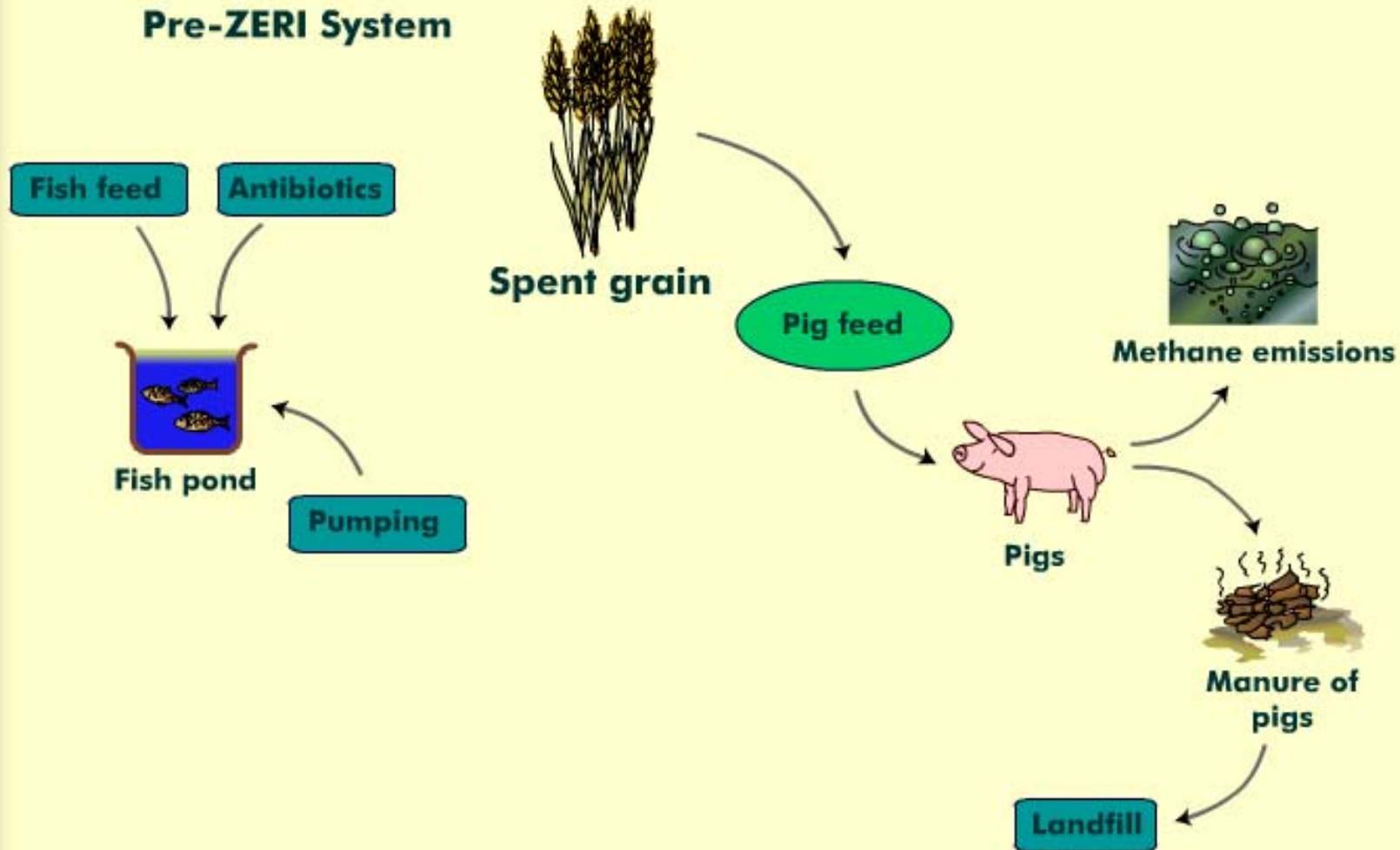
The carbon cycle on Earth

Elements of a Systems Framework - Using Nature as a Model

- Seeing the whole and its parts
- Networks of mutuality between the parts (relationships)
- Self-organizing and self-sustaining
- Recognizing system boundaries (limits)
- “Constant” creation and destruction
- Time scales often long and feedback loops hard to observe

Learning to work in systems

Pre-ZERI System

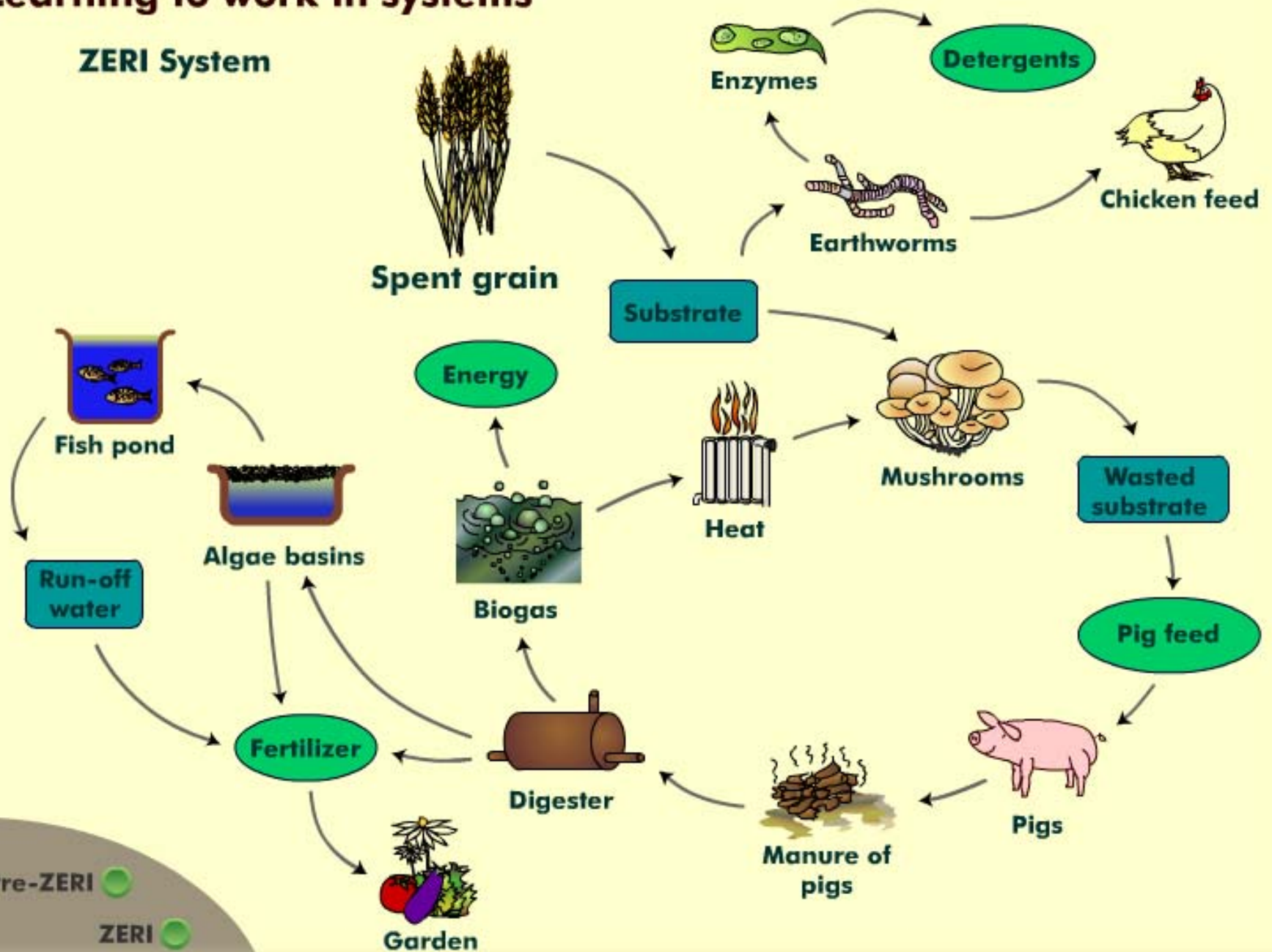


Pre-ZERI

ZERI

Learning to work in systems

ZERI System

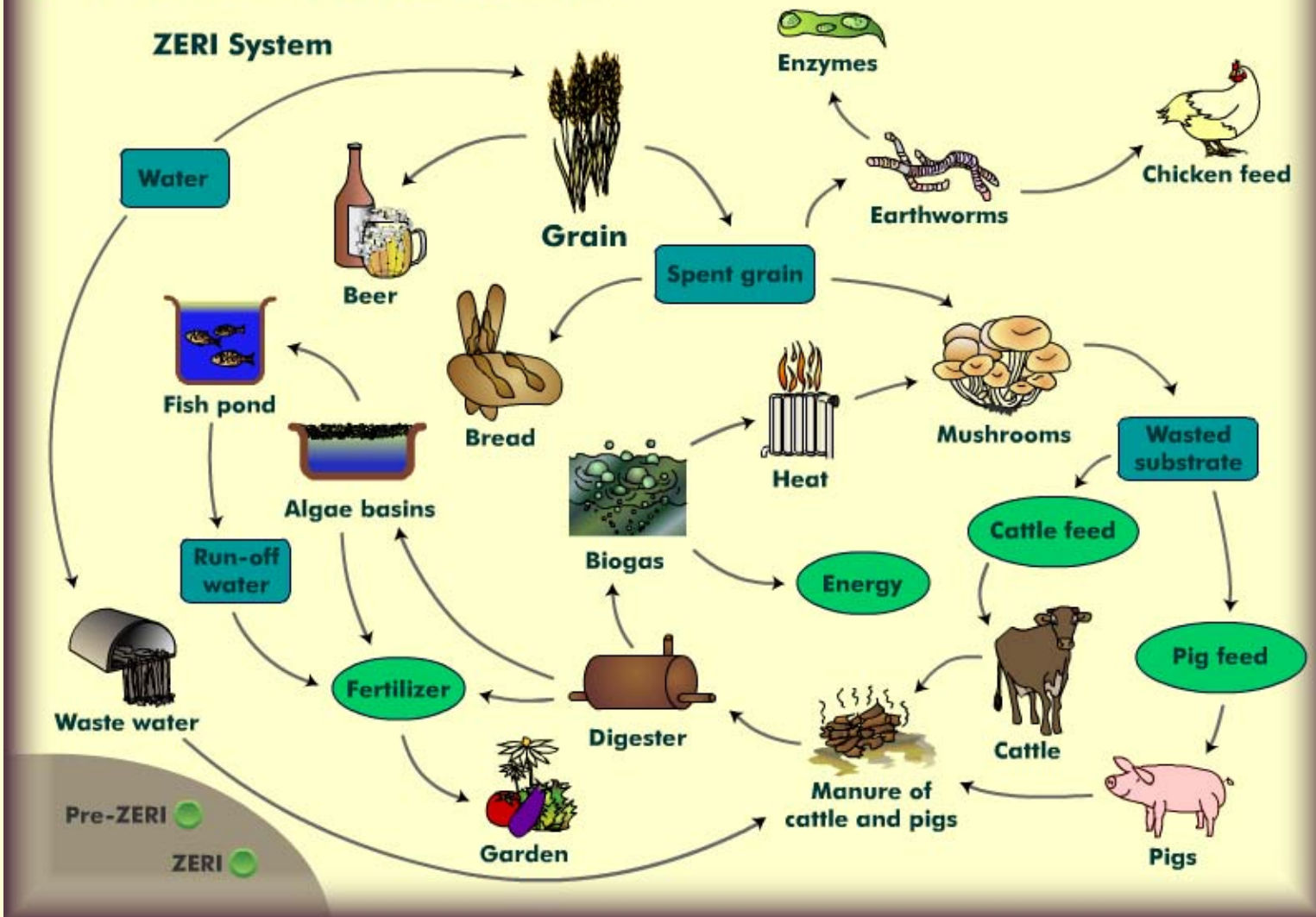


Pre-ZERI ●

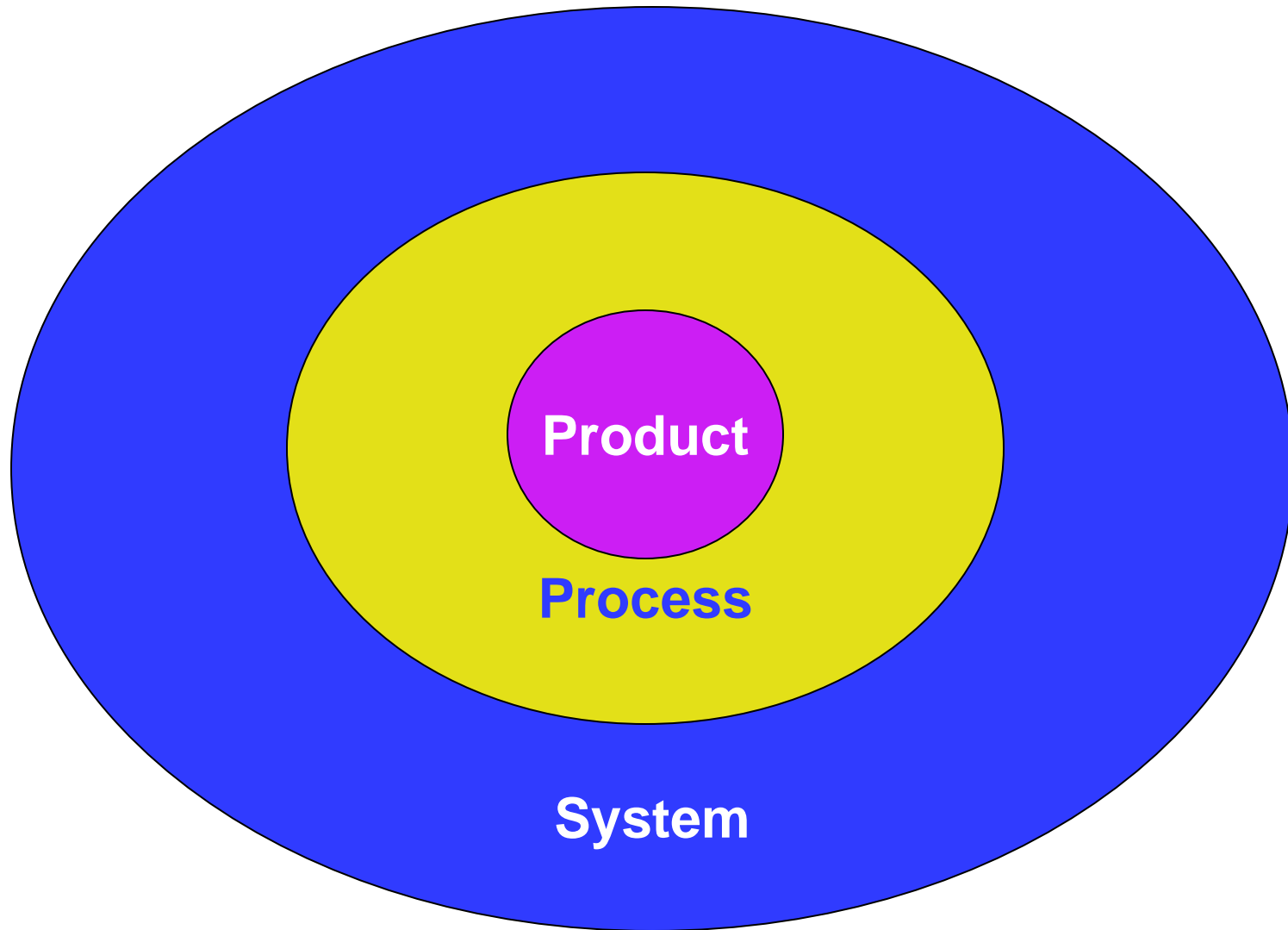
ZERI ●

Beer bakes bread and feeds fish

ZERI System



Approaching Systems on Three Levels



We Manufacture “Waste” All Day, Every Day

- 3% of the Btu value of coal becomes usable light
- 5% of a palm oil plant gets used to make detergent
- 8% of the sugars in barley are fermented to make beer
- 0.2% of the coffee plant becomes the coffee we drink
- ~60% of the materials used in our industrial economy become waste before they enter the economy

The Lessons of Working in Systems

- Everything is connected to everything else
- You can never do just one thing
- There is no “away”
- Nothing grows forever
- There are no simple solutions
- When there are serious imbalances, don't fight positive feedback; support negative feedback instead
- Competition is often cooperation in disguise

Our Responsibility as a Systems Thinker

- See the systems (product, process, system)
- See the parts
- See the relationships
- See and understand feedback loops
- Look for interdependencies (information flows)
- Expect unanticipated consequences
- Keep options open; value flexibility and resilience
- Can't get economies of scale out of a system
- Understand the temporality of relationships
- Pay attention and give voice to the long term

The Immune System as the Archetypal Metaphor

- Management System
- Social System
- Ecological System

Attributes of the Immune System

- It reflects distributed intelligence
- It multi-processes
- It is regenerative
- It must have its basic needs met
- It is efficient under stress
- It multicasts
- It self-organizes
- It communicates with pattern
- It responds locally
- It responds when needed
- It is distributed
- It is complex
- It acts instantly
- It learns
- It remembers
- It adapts

The “Movement” as Representation of the Social Immune System at Work

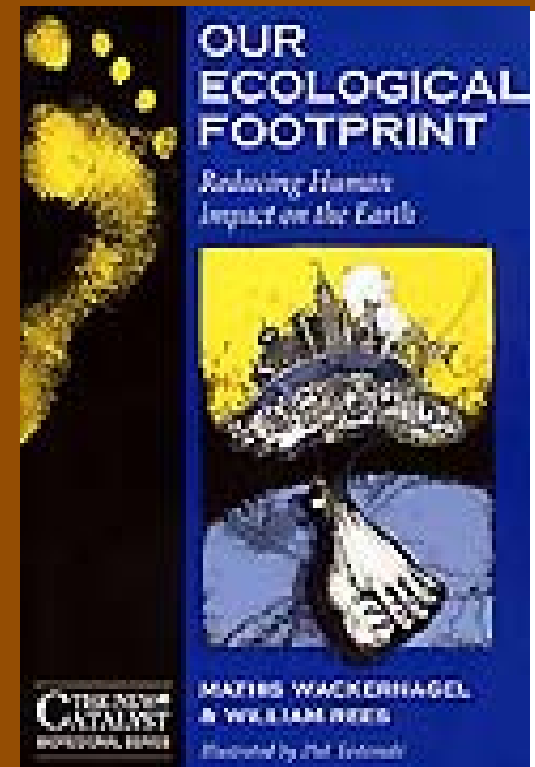
- A million or more citizen-based organizations
- Networked
- With shared principles
- Diverse intents but all supportive of the larger cause
- Defense Against Injustice
- Defense Against Loss of Indigenous Diversity
- Defense Against Ecological Destruction
- Defense Against Threats that are New, Immense and Game-ending

Major Sustainability Frameworks

- Ecological Footprint
- The Natural Step
- Natural Capitalism
- Industrial Ecology
- Cradle-to-Cradle
- Biomimicry
- ZERI

Ecological Footprint

- A measure of how much land and water area a human population requires to produce the resources it consumes and to absorb its wastes
- An ecological asset-management tool
- Comparisons across populations (individuals, cities, nations)

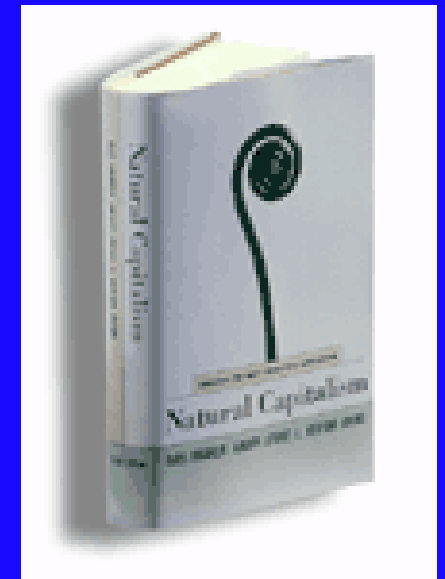


The Natural Step

- Nature cannot withstand the systematic increase of substances extracted from the earth's crust
- Nature cannot withstand the systematic increase of substances produced by society
- Nature cannot withstand systematic degradation by physical means
- Human needs must be met worldwide

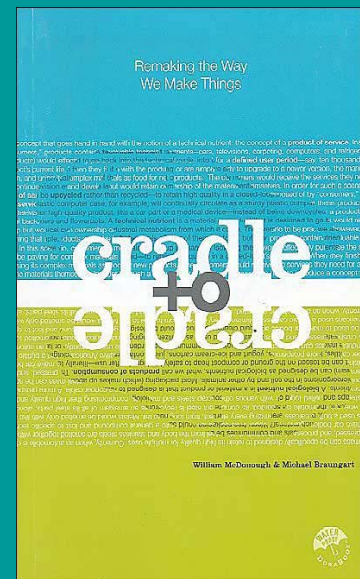
Natural Capitalism

- Radical Resource Productivity
- Biologically Inspired Production Models
- Service and Flow Business Model
- Reinvestment in Natural Capital



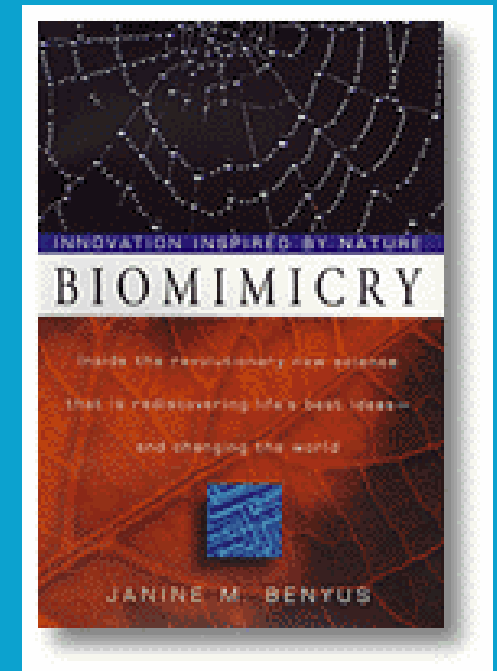
Cradle-to-Cradle

- Two planetary metabolisms - biological and industrial
- Two nutrients - biological and technical
- Sequester nutrients within their own metabolisms



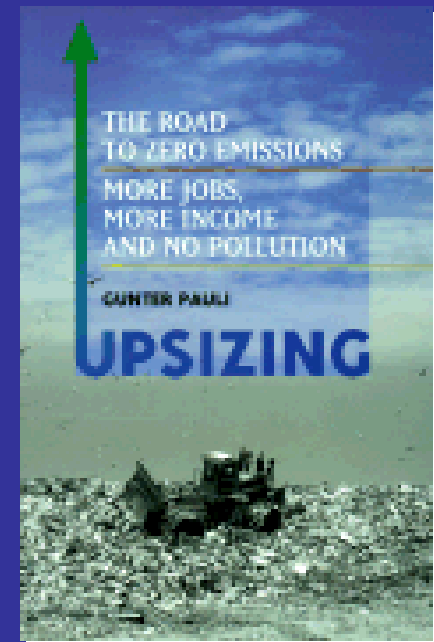
Biomimicry

- Does it run on sunlight?
- Does it use only the energy it needs?
- Does it fit form to function?
- Does it recycle everything?
- Does it reward cooperation?
- Does it bank on diversity?
- Does it demand local expertise?
- Does it curb excess from within?
- Does it tap the power of limits?
- Is it beautiful?



Zero Emissions Research and Initiatives (ZERI)

- Nature-based systems framework
- Uses all 5 kingdoms of nature
- Diversity and locality are critical
- Output-input models
- Industrial clustering
- Total productivity of materials
- Managing zeros
- Breakthrough technologies



Industrial Ecology

- An industrial model of resource usage based on natural systems
- Minimize energy and materials usage
- Using wastes from industrial processes as feedstocks for other industrial processes
- Waste equals food



Questions to Ask and Answer

- **What have we achieved?**
- **How has the “problem statement” changed (new science and global challenges)?**
- **What does it now mean “to protect human health and the environment?”**
- **Organizations and skill sets - are they sufficient?**
- **Do we need a new mental model?**

“You’ve Come a Long Way Baby...” or Have You?

- **Enshrined the idea of environmental protection**
- **Huge and very expensive sector-focused responses**
- **Major improvements in gross pollution loading**
- **Off-shored the worst industries**
- **Bumping up against limits of technology**
- **Knowing now what we didn’t know then**

So What's Wrong with Environmental Protection-as-Usual?

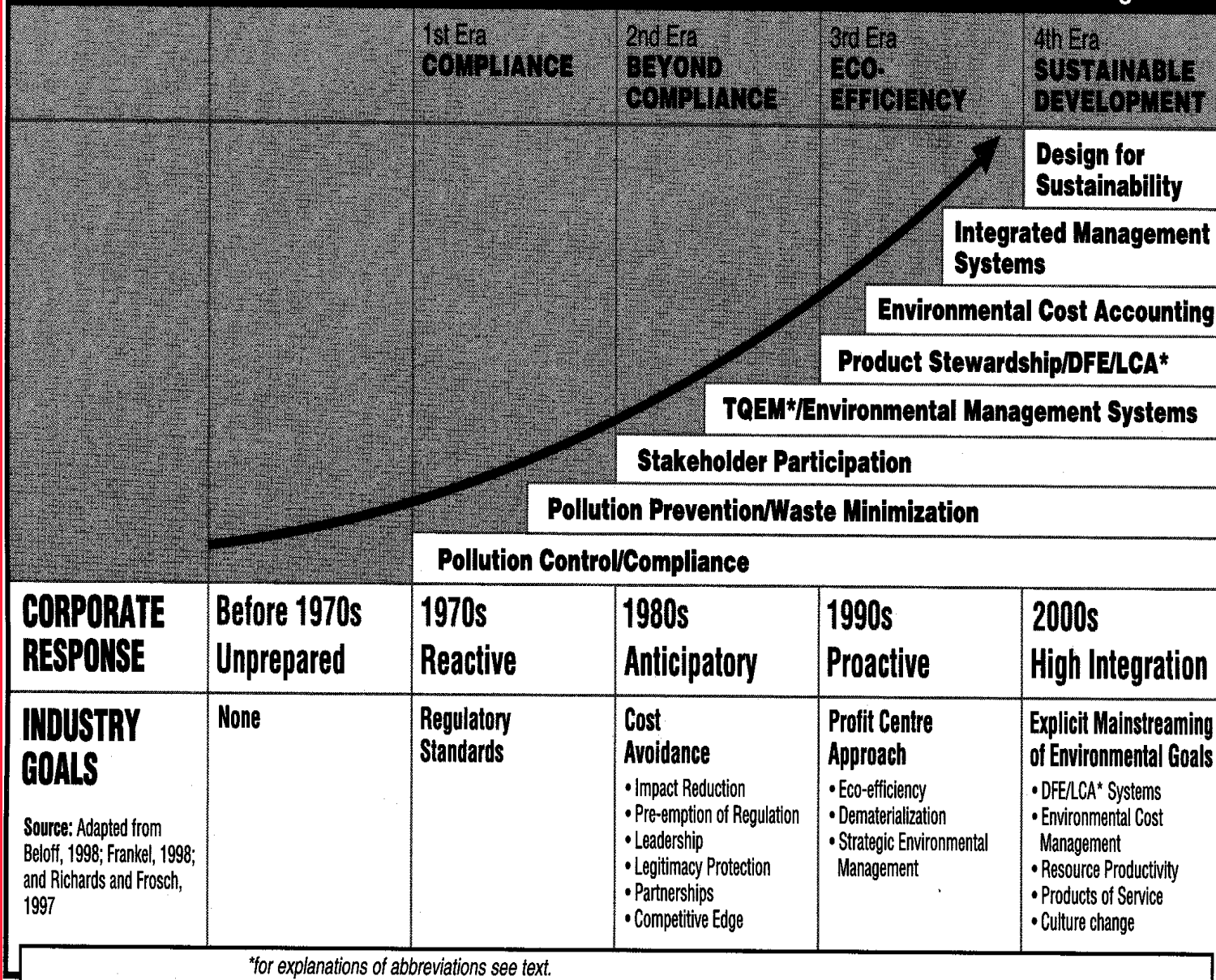
- “Reduced emissions”
- “Reduce, reuse, recycle”
- “Cost-benefit analysis”
- “Eco-efficiency”
- “Infrastructure investment (and decay)”
- “Pollution prevention”
- “Optimize on small scales”
- “Consume ourselves with process”
- “Allocate scarce resources”

The Human Health and Ecological Equivalent of: *“What Did You Do During the War?”*

- Chemical Body Burden
- Diseases New to Medicine
- Decline of Ecosystems
- Species Extinction
- Synergy Effects of 80,000 Chemicals
- Rethinking Risk - How Low Can You Go --
- And Should You?
- The Climate Experiment Has Failed

Industry's Sustainability Learning Curve

Figure 2.1



Source: Adapted from Beloff, 1998; Frankel, 1998; and Richards and Frosch, 1997

*for explanations of abbreviations see text.

Is Scarcity an Inevitable Condition of Life?



Through the Lens of Scarcity

“Far from scarcity disappearing, **it will be the most dominant aspect of the society.**” Kenneth Boulding, *Public Interest*. 1966

“The **habitual condition of civilized man** is one of scarcity.” William Ophuls. *Ecology and the Politics of Scarcity*. 1977

“I believe in coming decades the world will probably see a **steady increase in the incidence of violent conflict** that is caused at least in part, by environmental scarcity.” Thomas Homer-Dixon, “*Environment, Scarcity, and Violence*” 1999

Through the Lens of Abundance

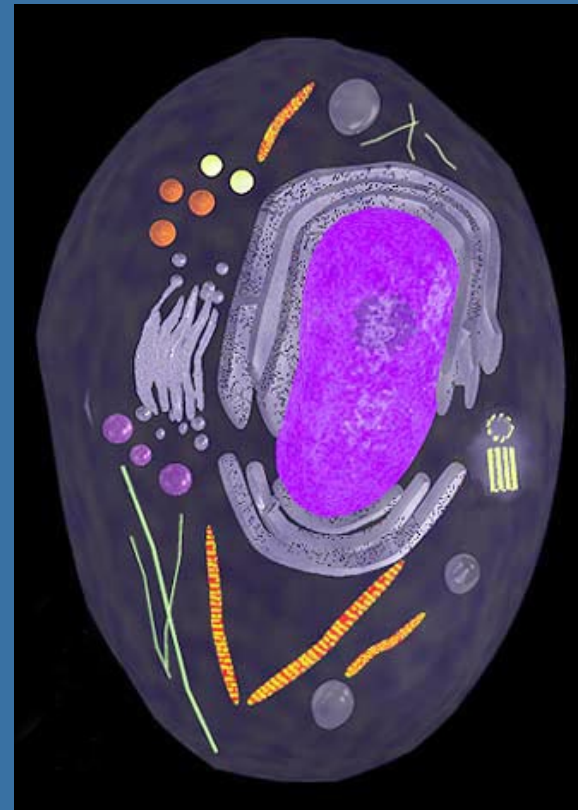
- Ecological systems of incredible diversity
- Uncountable and unnamed complexity of life and interrelationships of species
- Immeasurable value of natural services
- No limiting artificial models (i.e. a core business) to constrain possibilities

Nature Through the Lens of Abundance

- "We are symbionts on a symbiotic planet, and if we care to, we can find symbiosis everywhere".
Lynn Margulis.

■ Endosymbiosis reframes evolution and asks "is competition the best game in town?"

■ A Model of Collaboration

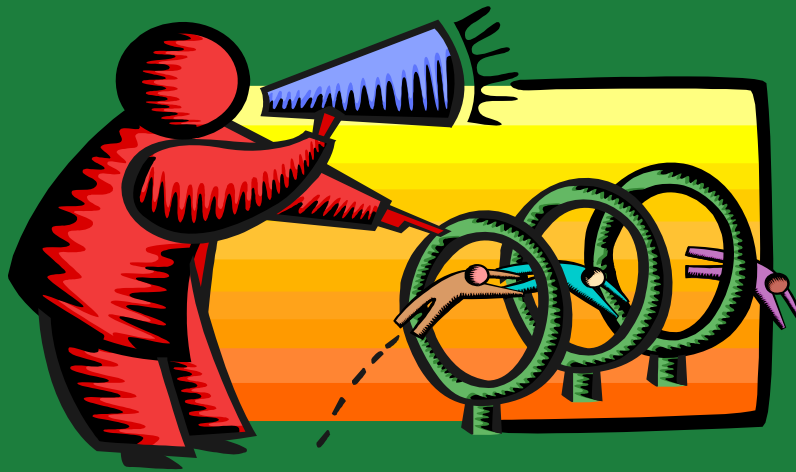


What Happens When We Don't See Abundance



- We create economic frameworks to regulate scarcity
- We create social and political institutions to prop up the economic framework
- We allocate scarcity

When We Allocate Scarcity...



- We treat nature as a closed system
- We invite the 2nd law to dominate
- We make our relationship with nature a zero sum game

When We Allocate Scarcity...

- We create winners and losers
- We institutionalize poverty
- We insure conflict
- We squander abundance
- We ensure non-sustainability



We Manufacture Scarcity...

All Day, Every Day

- 3% of the Btu value of coal becomes usable light
- 5% of a palm oil plant gets used to make detergent
- 8% of the sugars in barley are fermented to make beer
- 0.02% of the coffee plant becomes the coffee we drink
- ~60% of the materials used in our industrial economy become waste before they enter the economy

On what target do we fix?

- Scarcity: scarcity of resources, scarcity of techniques and methods; scarcity of imagination
- Abundance: abundance of resources; abundance of ideas and opportunity; abundance of possibility

- The target we select becomes the lens through which we see our world - the lens of scarcity or the lens of abundance

- it drives our world view, our mental models, our approach to problem solving, our research agenda, and our policy responses

The Way Out of the Scarcity Trap

- See and Expect Abundance
- Seek Solutions that are Local
- Work in Systems (acknowledge limits - NOT scarcity)
- Use Nature as a Model - Find Value in Everything (Follow Biomimicry Principles)
- Put Nature's Capital on the Balance Sheet
- Design All Outputs to be Someone's or Something's Inputs

What Next for the New Environmental Professional?

- Develop systems thinking competency
- Always ask “How would nature do it?”
- Look for asset-building opportunities
- Zero out waste
- Help others “plug the leaks”
- Seek out and trust “knowledge of place”
- “Trade” locally

Highlights of Federal Sustainability Activities

- Federal Network for Sustainability (FNS)
www.federalsustainability.org
- Navy Region NW Sustainability Planning
- USDA - Sustainable Agriculture Research and Education
- US Army - Ft. Lewis, Ft. Carson, Ft. Bragg, USACE
- Coast Guard, USFS, NPS, DOE, GSA, USAF
- OFEE www.ofee.gov
- Proposed National Sustainability Council
- FedCenter.gov

**Fort Lewis
Sustainability Annual Report**
April 2003



Fort Lewis Joins Stakeholders to Adopt Sustainability Goals



In February of 2003, Fort Lewis hosted the first ever Installation Sustainability Workshop. Bringing together regional stakeholders to understand the installation's sustainability challenges and to set a consensus of long-term goals to address those challenges. From the meeting, Fort Lewis' 10-year sustainability goals were developed.

Planning Their Work

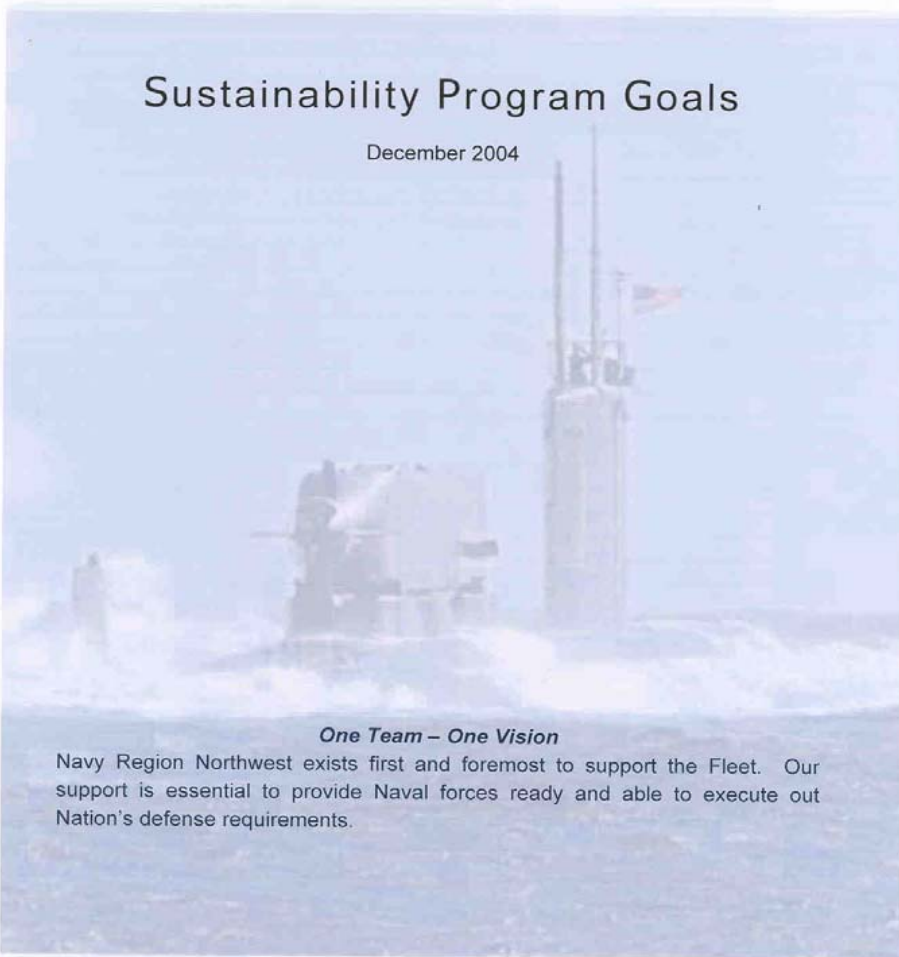
In the year since the workshop, sustainability teams that throughout the Fort Lewis professional community developed five year objectives with implementation plans for their respective goals. In this report you'll find summaries of this work and plans for future work.

The Commitment: Fort Lewis' Twenty-five Year Sustainability Goals

1. Reduce traffic congestion and air emissions by 20% by 2020
2. Reduce air pollutants from heating without a reduction in heating ability
3. Reduce electricity source air emissions by 20% by 2020
4. Reduce air emissions on and using renewable energy sources and generate all electricity on-site by 2020
5. All facilities adhere to the Comprehensive Planning standards for sustainable facilities by 2020
6. Cycle of material use to achieve (20%) net waste by 2020
7. Meet healthy, vibrant Fort Lewis and regional needs that support training, employment, cultural and economic vitality by 2020
8. Reduce air travel and avoidable federal expenses in South Puget Sound Region
9. Zero discharge of substances to Puget Sound by 2020
10. Reduce Fort Lewis potable water consumption by 20% by 2020
11. Fort Lewis contributes to publicly to groundwater and/or reconstituted all contaminated groundwater by 2020
12. Establish an efficient regional aquatic and terrestrial management program by 2020

Fort Lewis Sustainability Vision Statement

Fort Lewis is committed to supporting a strong national defense, ensuring the integrity of our natural and cultural heritage, and conserving our natural resources. We recognize the responsibility of meeting challenges that enhance and strengthen communities' ability to meet its production future.



Sustainability Program Goals

December 2004



One Team – One Vision

Navy Region Northwest exists first and foremost to support the Fleet. Our support is essential to provide Naval forces ready and able to execute out Nation's defense requirements.

VISION

“Where all parts of society actively take responsibility to improve environmental quality and achieve sustainable results”

Steve Johnson,
U.S. EPA

So What is Stewardship?

- **ETHIC: Shared responsibility for quality of the environment**
- **PRACTICE: Set of behaviors**
 - Continuous improvement
 - Efficient use of natural resources
 - Protection of ecosystems
 - Ensure a baseline of compliance

State and Local Government Responses

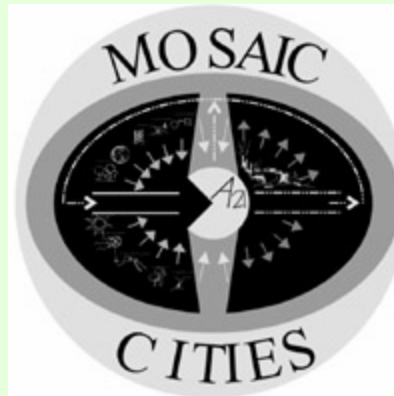
- Sustainable City Initiatives
- ICLEI - Local Governments for Sustainability
- State Sustainability Programs
- ECOS/DOD
- Mayors and Climate Protection
- Localization and Peak Oil Strategies
- Ending Non-Sustainable Behaviors

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

SUSTAINABLE CITY

WORKING TOWARD A SUSTAINABLE FUTURE FOR SAN FRANCISCO

SD Gateway

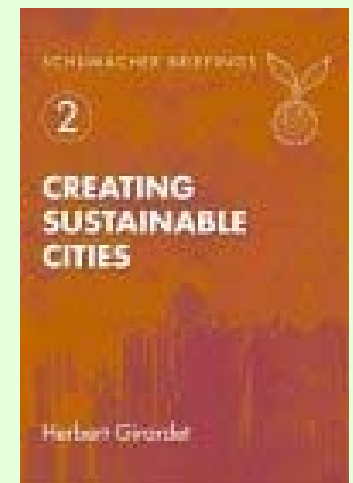


WiserEarth.org

Continuing Education
& Public Programs
A Learning Partnership

Indigo Development

Creating systems solutions for sustainable development through industrial ecology



“If you are working on something you can finish in your lifetime,
you’re not thinking big enough.”

Wes Jackson

