

Ecological Renovation

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**WHAT IS WORST
SITE IN YOUR
COMMUNITY ?**

**CAN IT BE
MANAGED TO
RECOVER
VALUES /
BENEFITS ?**

RENOVATE !

RESTORATION
(bring back to previous)

vs.

RENOVATION
(bring up to usable)

UNDERSTANDINGS

**6 LIFE
LESSONS**

**STEPS
FOR
CHANGE**

FREE PUB.

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**Ecological
Renovation In
Communities**

(revised).

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Understandings

Connections

Concentration

Collapse

EMUs & Ecoplex

Assessment

Renovation

LESSON 1:

CONNECTIONS

- **fasteners
for parts**

- **velocity /
acceleration**

- **rate of change**

**IT'S
ALL
ABOUT**

CONNECTIONS

(ECO-CONNECTIONS)

**Places We
Live, Play,
Work**

**Connected
To Natural
Life Support
Processes**

But We

Cleanse

&

Sterilize

Environment

Connections

with other

life &

sustaining

processes

Diminish

Ecological Processes

Become
Strained
&
Damaged

ADDICTED

**To Hardscape
Systems**

SEPARATE

**Us From
Ecological
Support**

**Urban /
Suburban
Population's
Perceptions**

**individual
parts of
ecosystem**

**nature walks,
environmental
education,
ecological
trainings,
ordinances**

**natural systems
many parts
in bag called
“environment”**

Community Natural Resource Management

**important
ecological
functions NOT
parts nor bag**

Connections **Between** **Parts**

must be
inventoried,
measured &
affected by
management

Connections

Between

Parts

determine

future values,

changes &

management

needs

NOT

**state of
something**

BUT

**rate of
change**

WHEN a State is Measured

**Measures
Represent
The Past**

**always managing
resources a few steps
behind reality**

(Always playing catch-up)

Communities

**must deal
with dynamic
& chaotic**

change

**change is only
certain thing in
ecological system**

change

powers

system,

NOT static

parts or

things

LESSON 2:

CONCENTRATION

- **consolidation of energy / resource web**

- **shortening connections**

- **main-lining community inputs**

**Our Lives
Bound
Tightly To
Accessible
Essential
Resources**

Interconnections

With

Ecological

Framework

supplanted by

artificial

resource

concentration &

delivery systems

Resources
Concentrated
& Delivered
Into
Community
Infrastructures

**ecological connection
lines woven, wrapped,
& bundled together**

(supporting cloth or cables)

Loss Equation

$$R = 1 / I^2$$

**Resource
Concentration
(R)**

**Inter-Connections
(I)**

Loss Equation

Resource

Concentration

2X in our support

Interconnections

with ecosystems

diminish by 4X

$$R = 1/l^2$$

Communities
Isolated From
Ecosystem
Functions

by

fewer but more

important

resource

concentration

lines

**Fewer,
Concentrated,
Connections**

**prone to
chaotic
failures
& system
disruptions**

(catastrophic results!)

**Few
Biological
Units Survive
& Thrive
Under These
Conditions**

**(except humans,
pets & pests)**

**geometry &
engineering
of resource
concentration
structures in
communities**

**limit extent,
access, & potential
of ecological islands**

ecological islands

miored & isolated
within a dead,
dry, hot,
hardscape
matrix

few life inputs

ecological corridors

**height, width, length,
diversity, & soil surface**

**limited resources
&**

**large resistance
to transmission**

easily blocked

**Livability In
Communities
Come At
GREAT
Ecological
Costs
& Potential
Liability
Problems**

Community Development

- shorten ecological connections
- hide resource concentration infrastructures
- attain short-term reduction in human psychological stress & physical needs

Use

Technology

To Keep

Ecological

Systems

Away From

Equilibrium

(some will have quality of life)

LESSON 3:

COLLAPSE

- **ecosystem
volume loss**

- **strained /
dysfunctional**

- **exhausted /
declining**

- **system extinction**

Ecosystems

**Broken Into,
Used, Exhausted,
& Cast-off
(abuse / neglect)**

**like old worn-out
clothes where
simple cleaning or
time in closet
will not change
remaining values**

Ecosystem Productivity & Sustainability

**depend upon
maintenance
of proper
structure
& function**

**Systems
Declining &
Exhausted
From Long Or
Overburdened
Use**

**can NOT be
made new again**

Renovation

-- a restarting process --

**Concentrate
On Causes Of
Problems**

NOT

**Reacting to
Symptoms**

Many Current Reaction-Based Management Systems

**prone to
adversarial
approaches to
environment**

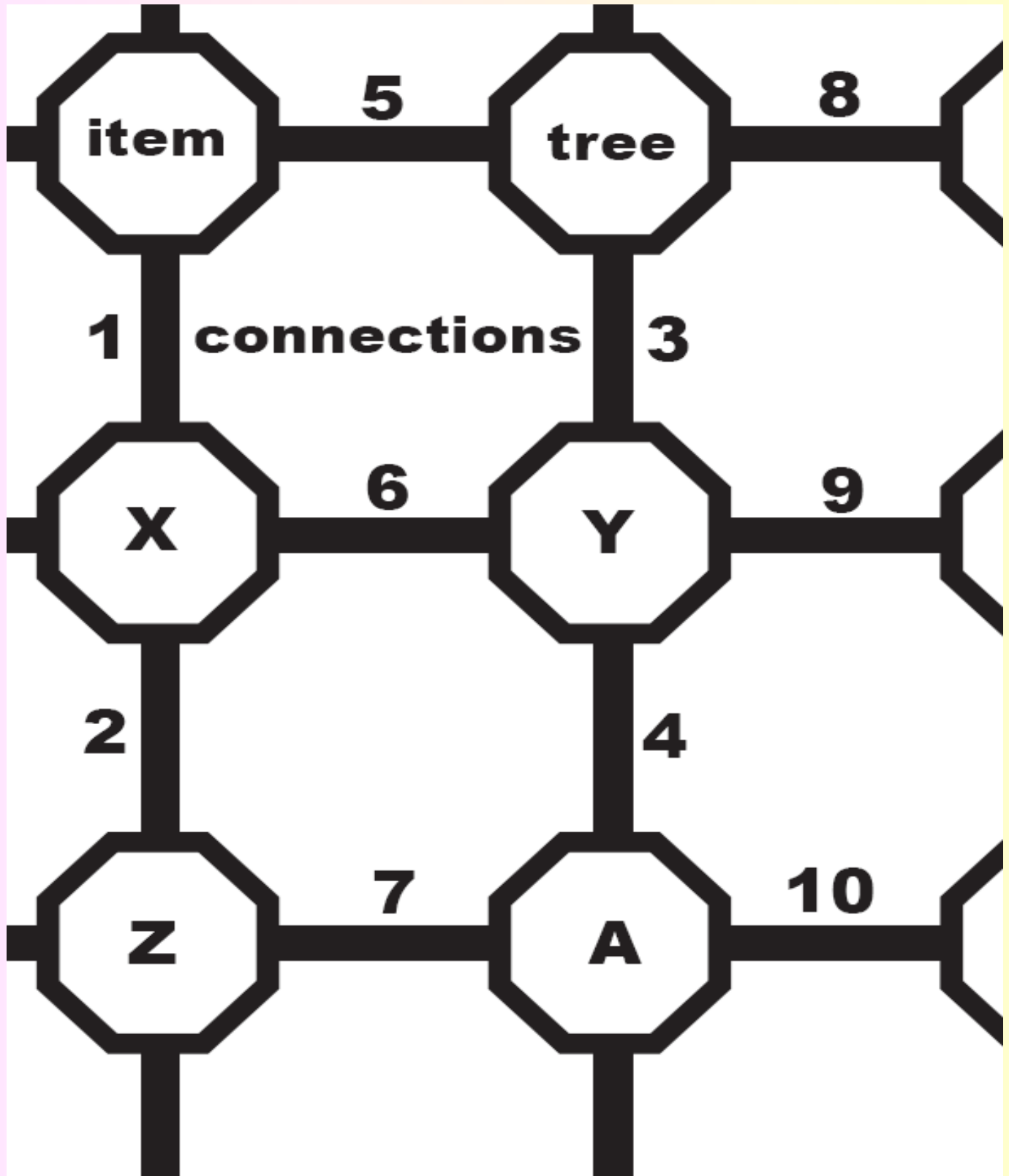
**informed consensus &
proactive ecological
investments is alternative**

TEXTILE MODEL

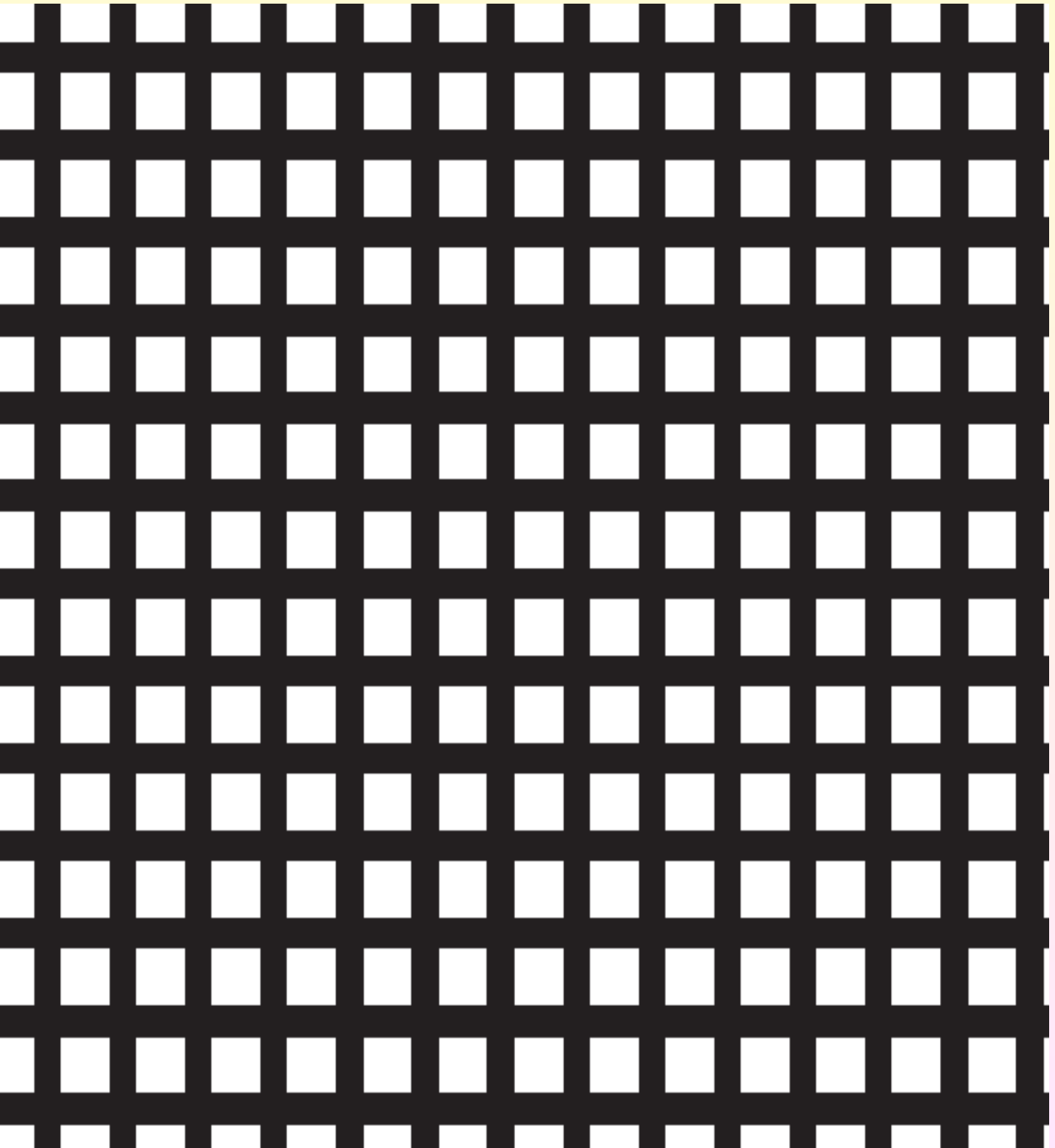
2D vision of 4D structure

**visualize
ecological
system
declining,
exhaustion,
& becoming
extinct**

TEXTILE MODEL



THREADS = CONNECTIONS
THREADS CROSS = THINGS



TEXTILE MODEL

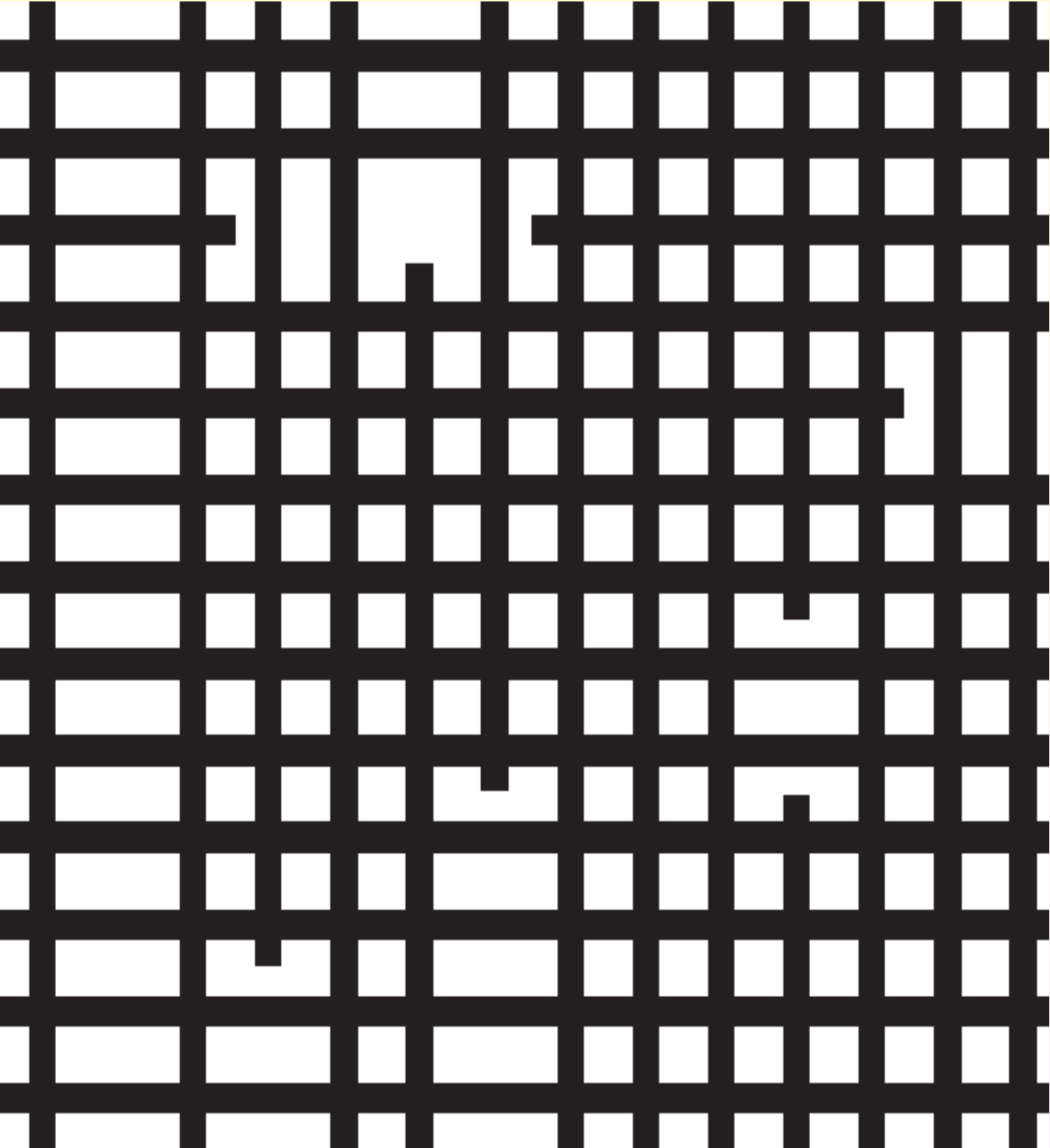
**Most Threads
Held Tight By
Interconnections**

**Under Stress
Cloth**

**(both connections & things)
Stretched & Pulled**

**All Threads
Provide Strength**

ECOSYSTEM SLIGHTLY DEGRADED



TEXTILE MODEL

**Functions &
Values
Generated By
Entire Cloth**

**remain nearly
the same for
some time**

TEXTILE MODEL

**Change Becomes
More Than
Realignment &
Reorganization**

**Change Brings
Loss of
Connections
& Connection
Points**

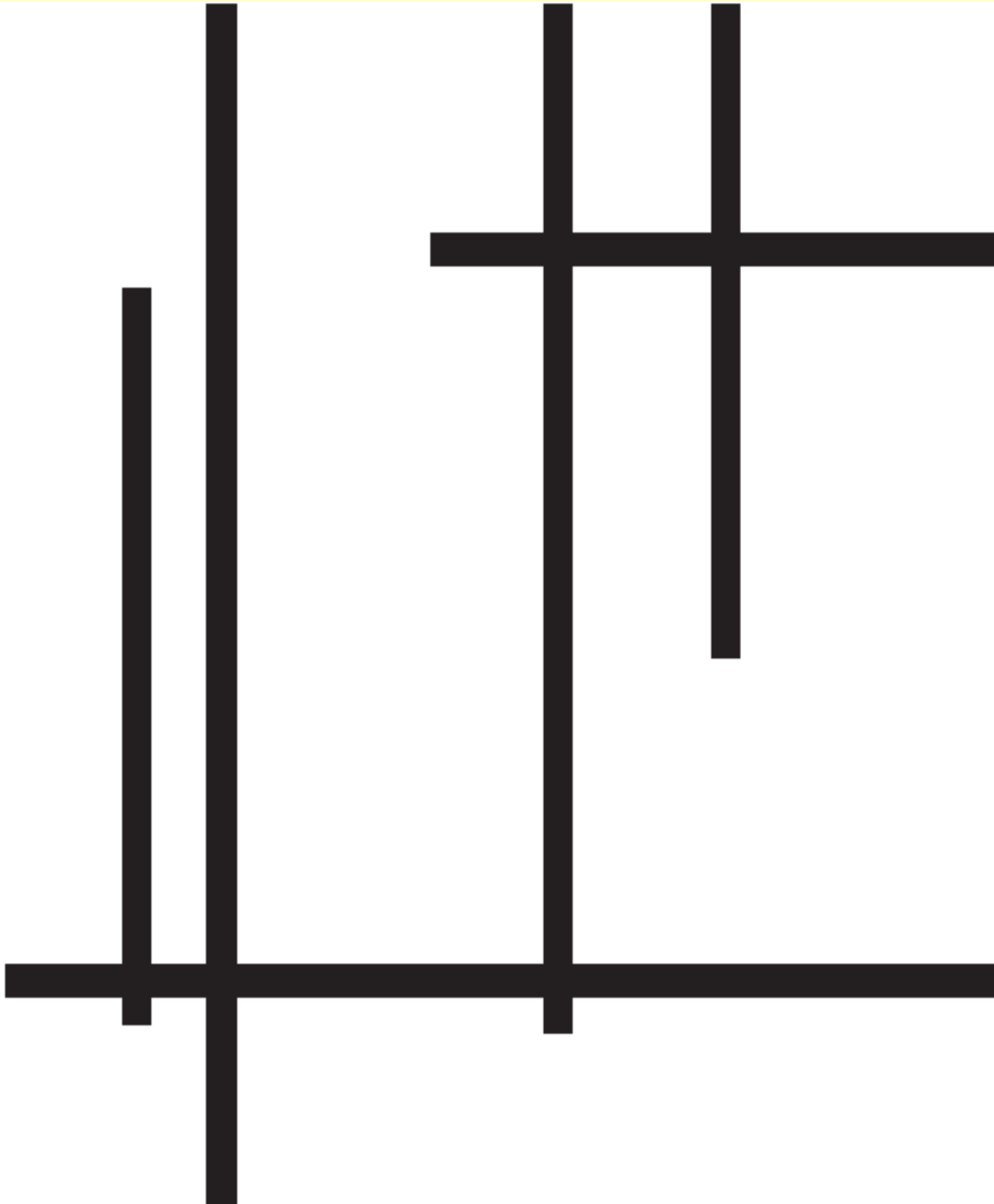
TEXTILE MODEL

**Threads
Broken &
Pulled Out**

**lines of
connections
disrupted**

**whole cloth
diminished**

ECOSYSTEM EXHAUSTED & DESTROYED

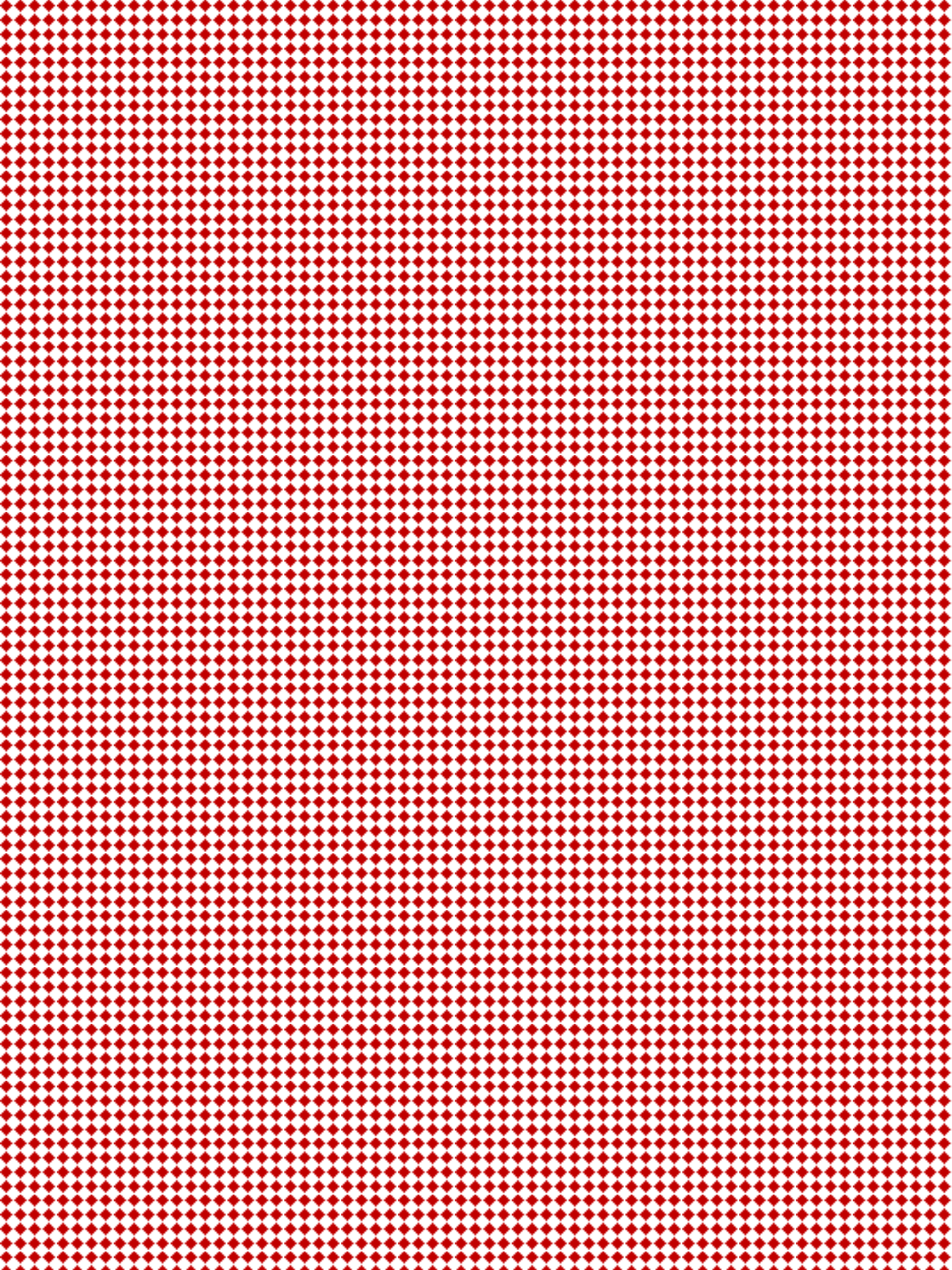


**ecological systems
devolve with
development
pressure**

**pathway to decline
& exhaustion**

**different than reverse
path to recovery**

**not adding
interchangeable parts,
but adjusting
connectivity**



LESSON 4:

ECOLOGICAL MANAGEMENT UNITS (EMUs)

**- edges,
boundaries
& size**

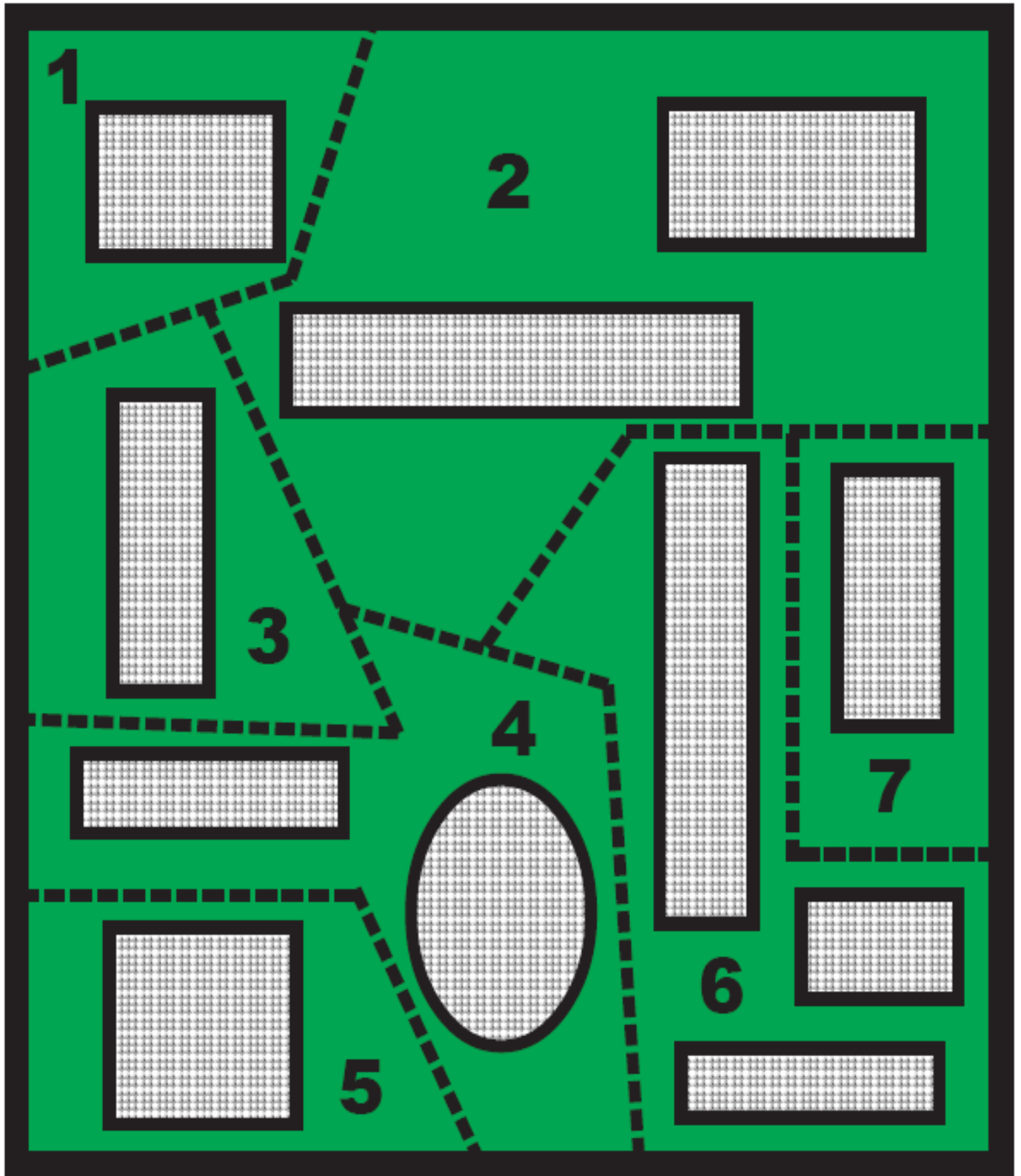
- managed places

**Ecological
Management
Units
(EMUs)**

comprise

ECOPLEX

ECOPLEX WITH 7 EMUs



URBAN

ECOPLEX

- multiple EMUs

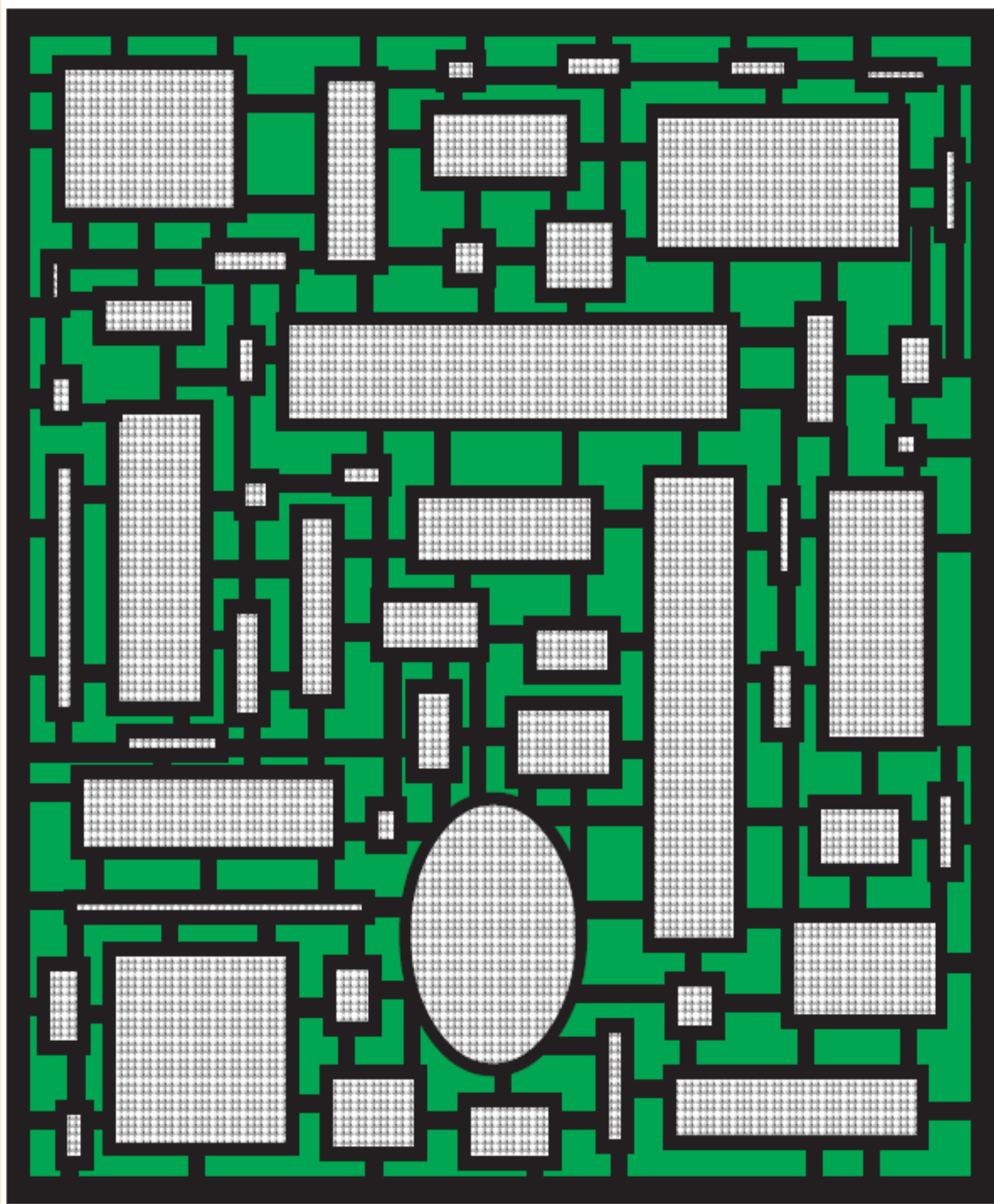
- defined features

ECOPLEX

= interwoven houses

**human defined,
area-limited,
relatively structured,
homogenous area
of dynamic matter &
energy interchanges
between / among
biological &
non-biological
components**

ECOPLEX -- LIGHT INFRASTRUCTURE MATRIX



renovation

every site

(EMU)

different

social context

ecological context

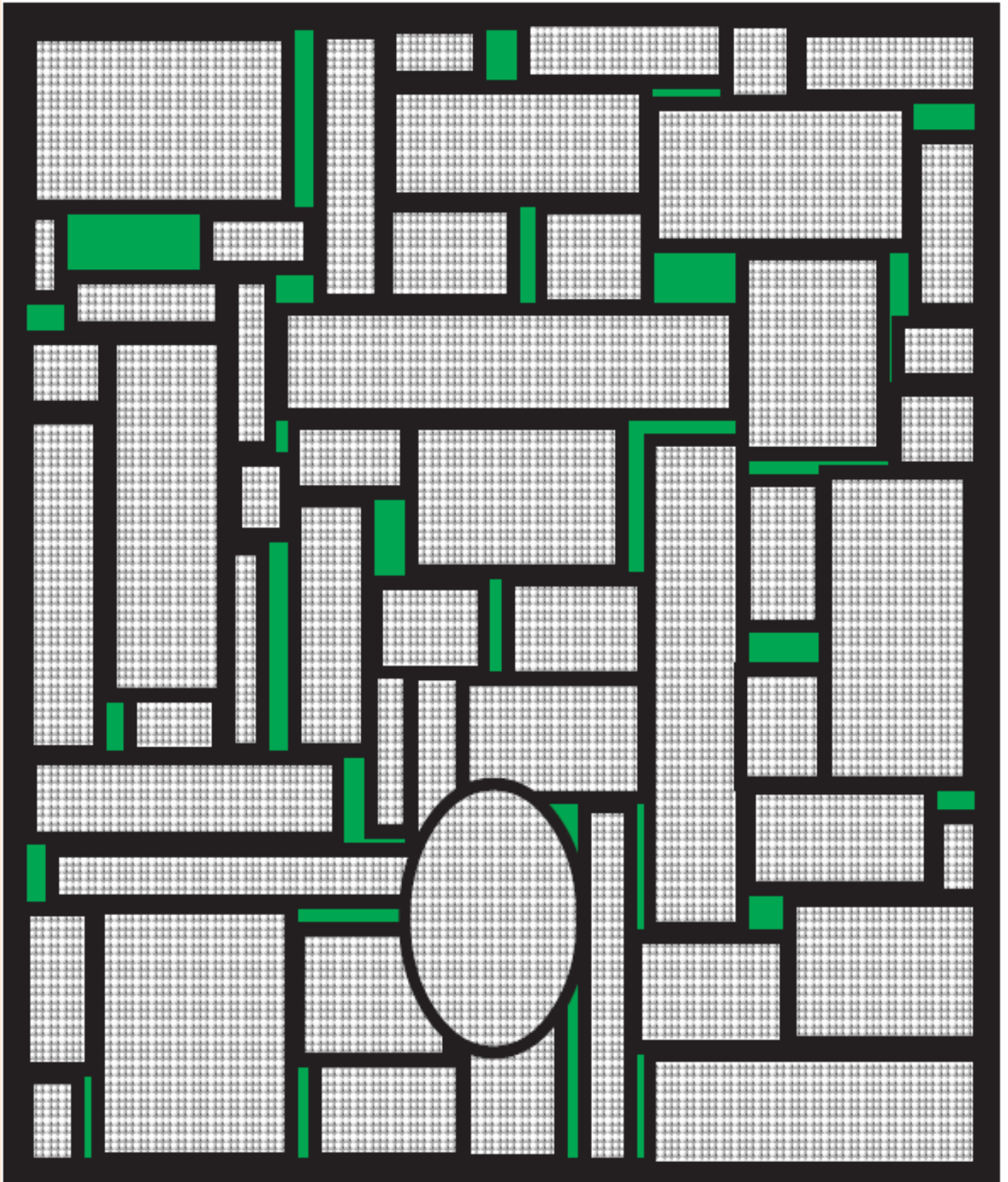
damage level

ECOPLEX

--

INFRASTRUCTURE

MATRIX



CHANGE

**myriad of
interconnected
& interacting
processes**

**appreciate each
individual process
& its limits or
boundaries**

LESSON 5:

ASSESSMENT

- **counting,
measuring,
observing**

- **what is present /
what is missing**

- **change NOT state**

**Damaged /
Exhausted
EMU /
Ecoplex
Assessment
Outline**

Ecoplex Assessment Checklist

1) Definition, delineation & representation.

2) Size appreciation — is it big enough?

3) Spatial (Space) appreciation — interconnectivity / fragmentation / integrity.

Ecoplex Assessment Checklist

**4) Diversity —
genetic, species,
habitats.**

5) Time.

**6) Disturbance —
type, intensity,
& timing.**

Ecoplex Assessment Checklist

7) Cycles & Processes — recovery of historic & low maintenance cycling systems.

8) Ecological fuel — biological legacies.

9) Management dedication — resolve to accept change.

Ecoplex Assessment Checklist

10) Principle means of renovating ecoplex:

**A. Succession
processes
reinstitution**

**B. Disturbance
regimes
reinstitution**

Ecoplex Assessment Checklist

10C. Genetic

Resources

Enrichment

1. retrieve “key” organisms (native!) = trees, ground covers, fungi, arthropods, worms

2. move toward “modified” native systems

Ecoplex Assessment Checklist

10D. Site Resources Improvements

- 1. organic matter
(soil & litter)**
- 2. soil exchange capacity**
- 3. continued soil genesis
& health (pore space
conservation)**
- 4. water availability**
- 5. nitrogen availability
(cycling)**
- 6. light tuning (shade
management & light
extinction factors)**

Ecoplex Assessment Checklist

10E. Minimizing Stress

- 1. contain / eliminate heavy metals & other damaging legacies**
- 2. control pollution**
- 3. control heat**
- 4. control exotics**
- 5. physically protect site from mechanical & chemical damage**
- 6. control oxygen availability & water drainage trade-offs**

ASSESSMENT

HOW WILL

YOU

CHANGE /

MODIFY

WHAT IS

PRESENT !

MANAGEMENT

**natural systems
messy, unkempt,
& chaotic --
multiple endpoints,
same inputs**

**accept dynamic change
&
incomplete resource
data in
decision-making
process**

LESSON 6:
RENOVATION
ACTIVITIES

PROBLEMS & APPROPRIATE RESPONSE

**-continuous change /
modify response**

**-no “treat & wait”
for response**

-not one size fits all

Major Urban Ecological Problems

#1) Hard surface increases

#2) Decline in total ecologically active volume

#3) Changes in past & current ecosystem functions / processes

Major Urban Ecological Problems

#1) Hard surface increases

**more non-evaporative / non-infiltrating surfaces,
more concentrated water flows
higher water velocity flows / larger volumes
shorter water pulse rates
more erosion
less biologically available water
greater heat generation
wider fluctuations in heat / humidity**

#2) Decline in total ecologically active volume

**more surface area per volume (more edge effect)
more isolated islands / narrower corridors
greater distances across hardscapes
less open soil surfaces
smaller number of biologic energy capture systems
less eco-diversity / less connectivity**

#3) Changes in past & current ecosystem functions / processes

**disruption & destruction of ecological processes
large scale intense disturbances
inadequate mitigation & renovation
inadequate resources provided
essential resources removed or destroyed**

Appropriate Response

#1 Hard Surface Increase

develop more active evaporating surfaces
more canopy volume
more crown coverage
more low density organic mulching
more soil infiltration areas
more shade structures
more shading or blanketing of hard surfaces.

#2 Loss of Ecological Volume

develop more canopy coverage
correct soil limitations
more biologically active volume
larger areas of soil & organisms conserved
more readily usable organic materials on soils
help reconnect system components

#3 Loss of Ecosystem Functions

improve soil health
(aeration, organic matter, no erosion, etc.)
careful water conservation & use
develop more biological volume
(open soil surface areas, plant canopies,
more composted organic material covered
with low density organic mulch, etc.)
conserve & enrich ecological diversity
keep essential resources on-site

RENOVATION PROGRAM

**-restart, accelerate
or broaden
ecological
processes**

**-enrich / maintain
biological units**

**-conserve
life-essential
resources**

Checklist of
Ecoplex /

EMU

Renovation
Activities
&
Treatments

habitats

- minimize fragmenting
- assure strong connectivity
- generate wider, full height corridors & larger natural islands
- generate less edge effect & more ecological volume

Ecoplex Renovation Activities

trees

- **produce variable living tree densities (patches)**
- **develop multi-age classes**
- **cultivate multi-species (natives)**
- **advocate proper plantings & seedings**
- **facilitate general revegetation at all levels**
- **install maintenance program**

Ecoplex Renovation Activities

organics

- **leave organics, stumps, large woody debris, roots, slash, & leaves on-site**
- **leave snags & deadwood**
- **bring in composted organic matter under mulch blankets**

Ecoplex Renovation Activities

soil / water

- **protect / renovate wetlands & buffers**
- **protect / renovate streams (beds, banks, & cover) & buffers**
- **manage surface & ground water quality (control nutrient loads, heat, pollution)**
- **protect soil fertility & health**
- **prescribe soil biological enrichment**

Ecoplex Renovation Activities

stress

management

- develop “appropriate response use” of pesticides (minimize)
- use Plant Health Care principles
- maintain ecological health & structure
- maintain individual health & structure

Ecoplex Renovation Activities

survival

- **manipulate disturbance (including pocket fires, patch clearing, & flooding)**
- **manage genetic diversity & genetic integrity (natives)**

Ecoplex Renovation Activities

site control

- **erosion control**
- **water runoff control**
- **fencing & access**
- **fire control & prescribed burning**
- **weed control / exotics control**

Ecoplex Renovation Activities

ecologically

literate

management

- **pick appropriate size, scale & time frames**
- **assure continued assessment & monitoring of resources and site**
- **develop & follow flexible management**

Ecosystem Sustainability Test

- A. Viable native populations**
- B. Biotic/abiotic interactions with normally distributed variation**
- C. Facilitation of ecological processes**
- D. Long periods of time
(at least 3 human generations)**
- E. Accommodate human use & occupancy**

-- REMEMBER --

**renovation is for
individual quality
of life &
community
sustainability /
livability**

NOT

**museum-like
preservation
of resources**

CON-

CLU-

SIONS

Active

Management

essential

for

community

sustainability

& livability

for any site –

a number of

simple,

low cost

treatments

can begin a

renovation

process

SO...

BEGIN !

WAITING

KILLS

SYSTEMS

**treatments must be
cost-effective for
a given
management plan**

BUT

**they must
halt / reverse
EMU & ecoplex
decline &
exhaustion**

RENOVATION

NOT

destination

BUT

journey

**(utilizing ecological
fundamentals)**

KEEP

CALM

&

RENOVATE

ON !

plant, care, change

