Ecological Renovation: Assessment Steps For Development Sites

by Dr. Kim D. Coder, University of Georgia Aug.1997

Once a management unit has been defined, and we understand how it functions at the most basic level, we can then begin a site assessment process. To ecologically renovate an ecoplex, an assessment process must be used that can identify resource inputs and outputs, internal and external cycling of resources, and the individual organisms present.

One type of assessment guide is presented below. The items defined here can help put a site and its ecological resources into context for planning and application of renovation activities. This ten step assessment process for damaged or exhausted ecoplexes can help guide future renovation steps.

The first assessment step is defining, delineating, and describing the site. It is important that you know what resources (living, dead, never-living) are present. Maps are a great way to visualize resources, changes, and results. Quantify all the states and rates of change possible. Some are, or will become, your baseline data for demonstrating management impacts.

Size and Diversity

The second and third assessment areas concern size. Size of the area should be examined to determine if it is big enough to sustain outputs and values expected. One small planting pit will not generate the values of a botanical garden. Size considerations include examining the scale of any renovation on the site, the genetic variability already present for the limited space, and the regeneration spheres of any organisms on the site (or from outside). Knowing the actual available physical space, and where everything is physically located, can help in effectively designing a renovation process. Determine the amount and extent of interconnectivity between organisms, resource cycles, and the outside world.

One of the most commonly used renovation activities is the maintenance or managed increase in diversity at the individual, species, and higher levels. Physical and biological diversity of habitat areas can be cultivated. Introduction of native genes and elimination of competitive exotics can help broaden site diversity.

Time and Disturbance

Time must be a component of any assessment. Living things age and die, taking a while to reach energy equilibrium with the environment. Assessments must map individual and species life spans, age classes, and any periodicity involved with disturbance and colonization. Successional patterns are essential to understand and use to move sites into new managerially stable positions.

Disturbance and Fuel

One of the processes most quickly destroyed in land development is natural disturbance events. The type, intensity, and timing of disturbance can have many different effects upon individuals, species,

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and site resources. Disturbance is one of the processes important to renovate for recovery of historic and low maintenance cycling systems. Energy, hydrology, and nutrients are three cycling processes to manage with disturbance regimes.

Fuel and Management

An often overlooked feature of an ecological system is the ecological fuel available for use in the detritus energy cycle. Old fallen trees can be significant biological legacies. Organic material on the soil surface, large woody debris, and soil flora and fauna are important components to ecoplex functions.

Any assessment is not complete without determining and prioritizing anticipated management responses. Management dedication in the light of natural systems being messy, unkept, and chaotic in nature is critical. Managers must have resolve to make the system work. Allowing the failure of interrelated parts will allow the whole system to collapse. A manager must be willing to accept dynamic change and incomplete resource data in a decision-making process.

Projecting Processes

Assessments for the ecological renovation of sites should include a check list of processes and resource levels to examine. The principle means of renovating an area includes five general change expectations: successional process reinstitution, disturbance regime reinstitution, genetic resources (living things) enrichment, site resource improvements, and minimizing stress.

The enrichment of genetic resources (living things) is one useful way of improving system function, if the correct fuel and feedstock resources are available on-site. Concentrate beginning steps of renovation on "key" species. For resource control and values generated, key organisms for an urban site would be trees, ground covers, fungi, arthropods, and worms. You should renovate toward a target of a "modified" native system by continuing to add major resource controller, and more selected resources to a site.

Resources Come and Go

The site resources improvement portion of a renovation checklist should include: soil and litter layer organic matter; soil exchange capacity which aids in element cycling and holding; continued soil genesis and health including pore space conservation, structural improvements, and horizonation; water availability for cycling, use, flow, and accumulation; nitrogen availability and cycling; and, light management where the various photosynthetic arrays are tuned for effective and efficient use of incoming energy and outgoing water.

The stress minimization portion of a renovation checklist should include: presence of heavy metals, organic toxins, and/or other damaging legacies; pollution control; heat control (including advected heat); control of exotics; physically protect the site from mechanical and chemical damage; and, control oxygen availability and water drainage trade-offs.

Further Information

Coder, Kim D. 1997. Basic Ecological Renovation Problems and Activities. University of Georgia Cooperative Extension Service Forest Resources publication FOR97-23. Pp.3

Coder, Kim D. 1997. Ecological Renovation In Communities: Conceptual Underpinnings. University of Georgia Cooperative Extension Service Forest Resources publication FOR97-20. Pp.3

Coder, Kim D. 1997. Ecoplex Form, Structure and Function: Ecological Renovation Targets. University of Georgia Cooperative Extension Service Forest Resources publication FOR97-21. Pp.2

Coder, Kim D. 1997. Selected Bibliography: Ecological Restoration. University of Georgia Cooperative Extension Service Forest Resources publication FOR97-10. Pp.8

Assessment outline for damaged or exhausted ecoplexes used to gauge viability for renovation and for management activity selection.

1) Definition, delineation, and representation.

2) Size appreciation — is it big enough?

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

4) Diversity — genetic, species, habitats.

5) Time.

6) Disturbance — type, intensity, and timing.

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

8) Ecological fuel — biological legacies.

9) Management dedication — acceptance and resolve to accept change.

10) Principle means of renovating ecoplex functions include:
   A. Succession processes reinstitution
   B. Disturbance regimes reinstitution
   C. Genetic resources (living things) enrichment
      1. retrieve “key” organisms = trees, ground covers, fungi, arthropods, worms
      2. move toward “modified” native systems

   D. Site resources improvements
      1. organic matter (soil and litter)
      2. soil exchange capacity
      3. continued soil genesis and health (pore space conservation)
      4. water availability
      5. nitrogen availability (cycling)
      6. light tuning (shade management and light extinction factors)

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