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Overview of Vol.1, No.5 - Environments with Low Resiliency

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As a relatively young science, developed only within the past few decades, restoration and reclamation ecology is still in its formative stages. While successes have been noted and replicated for a few types of systems, little precedent exists for restoring or reclaiming those ecosystems in which recovery from perturbation is slow by human temporal scale. Determining the feasibility of proposed interventions and designating an expected time frame for recovery is particularly difficult for environments with low resiliency because often the only reference by which to measure the progress of recovery is a historic or palaeologic one. Historical records are often unreliable or nonexistent; even more rare are palaeoecologic records for individual sites. Extrapolation of expectations from previously successful interventions on systems which recover more easily is risky, since the same temporal parameters cannot be used to assess recovery. Nonetheless, given the uniqueness of these environments and the exponential rate at which they seem to be disappearing, motivation is strong to study and preserve those that remain and to restore or mitigate the loss of others.

The case studies in this section describe very diverse environments which are, yet, bound by their common complexity and fragility. Each site has suffered a combination of human and natural degradation and each continues to be threatened by pressure from conflicting resource use by encroaching human activity and invasive species. The success of reclamation for each site in terms of sustained ecosystem structure and function rests precariously on our ability to sustain, restore, or engineer the broader ecosystem complex in which it resides.

The cases exhibit a broad range of motivations, from purely scientific or ecological, to structural, to artistic or cultural. Yet each involves some aspect of all of these. While the balance of ecological to cultural intentions varies from case to case, the common challenges for all of the projects have been: to clearly state the goals, both cultural and scientific, to determine how success will be monitored, and to initiate policy that will assure follow-up sustenance over the long term required for recovery. The duality of roles each project plays as an experiment and as a precedent for future restorations makes addressing these issues

critical, not only for the project itself, but for the state of the science as a whole. Interestingly, many of the attempts at restoration have stemmed from an initial desire to protect or eliminate a single species or group of ecotypes. Hovever, it has become clear, as these cases show, that specific problems can only hope to be solved when considered in context with the greater ecosystem of which they are a part, and that the self-sustainability of the solutions cannot be judged simply on the merit of initial changes in vegetation which are readily observed.

Because communities with low resiliency are often innately so as a result of the non-botanical factors which shaped their evolution in the first place, such as climate, unique hydrology, or other geophysical features of their sites, the question of whether they are truly restorable or reclaimable becomes an issue once they have been degraded. The cases studies presented here demonstrate a variety of approaches in the quest for an affirmative answer. In the optimal scenario, intervention for sensitive areas would best be in the form of conservation and preservation prior to degradation. And time may prove that these are actually the only viable methods for protecting the diversity of ecosystems that currently exist. However, these projects take aim at the most difficult of targets, and have been able to, at the very least, make some progress toward answering the question of possibility, if not feasibility, for their long term success.

The sites considered in these studies are small in relation to the large-scale interventions which often are needed for their reclamation. For those whose goals tend to be more cultural, such as the Tree of Life at Papago Park and Green Heron Pond, the scope of the project is more easily limited to the site itself. The cultural value of the site merits the efforts that will likely be required over time to maintain it during its recovery and after the target community has been reached. The Green Heron Pond proposal goes beyond the purely cultural aspects however, to include scientific methods for monitoring and for quantitative assessment during its progress toward that target. The Eagle Creek project also leans toward more cultural issues. However the size of the area which impacts and is impacted by the reclamation puts it in a class of sites which require more far-reaching interventions spatially, as well as more concentrated coordination of interested and affected groups. The Green Heron Pond and Eagle Creek cases demonstrate the extensive pre-planning which has become an integral part of more recent projects,

based in part on the information gathered by past restoration and reclamation efforts.

The Beartooth Plateau studies of Alpine rehabilitation in Montana, the northeastern Massachusetts wetland studies and the Stonington, Connecticut salt marsh project give good perspective for an appreciation of the state of restoration ten to twenty years ago. Review of the methods employed in these projects emphasizes once again the need to define goals, to document results from interventions observed over time, and, perhaps most important, to utilize the insight gained from observation to change the course of the interventions if necessary. Commitment to long term monitoring must be well-stated and well-defined in proposals for restoration or reclamation of environments with slow recovery rates, since the short term data may have little meaning.

The documentation of experimental results gathered from these cases is invaluable for application to current and future proposed restorations. In addition, the relative successes and failures of well documented projects, if used effectively, have the potential to become an integral part of policy decisions that involve disturbance of fragile sites. Should it become evident that certain systems cannot be effectively restored or mitigated, as seems to be the case with many sensitive ecosystems, only a cultural appreciation of their value and the infrastructure provided by policy will be able to protect them.