

Developing Recovery Plans for Riparian Ecosystems

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Riparian ecosystems are declining or have disappeared throughout the arid southwestern United States and northern Mexico. To address the ecological decline of these important areas, numerous natural resource agencies and organizations have implemented a variety of riparian recovery strategies with varying degrees of success. Experiences from implementing and evaluating riparian recovery in Arizona and Mexico indicate that several key factors are crucial in determining the effectiveness of improving habitat and stemming ecological decline.

To be effective, recovery efforts need to:

- Be based on a clear understanding of current and past ecological conditions and the reasons for site ecological decline.
- Incorporate an implementation approach that both addresses the reasons for site decline and promotes natural regeneration.
- Approach both evaluation and implementation from a watershed perspective.
- Have strong public involvement and coordination.

Identifying Reasons for Ecological Deterioration

A key lesson learned from past experience with riparian recovery is the importance of understanding current habitat conditions, the extent of their decline, and the reasons for ecological deterioration (Van Haveren and Jackson 1986; Briggs et al. 1994) prior to formulating a recovery plan. Often we too quickly jump to conclusions about the causes of ecological decline, how to fix

them, and what the end result should be. Through a thorough evaluation of site conditions, it becomes feasible to understand the causes of ecological decline and to assess approaches that may be effective in addressing them.

Watershed Perspective

A watershed perspective that considers ecological conditions is critical for developing effective recovery strategies for bottomland ecosystems. To understand past and current ecological conditions adequately, it is necessary to evaluate conditions of the uplands, channel reaches above and below the degraded riparian area, and tributaries that enter the degraded area. Project managers should avoid myopic scorecard or classification approaches that focus on particular reaches of the drainage system. The key to a rational recovery design is a thorough knowledge of flow rates in the drainage basin and the fluvial processes that determine landforms.

Recovery efforts should begin with upland considerations. A watershed approach is typically inclusive, a foundation for combining conservation and restoration efforts that are taking place throughout the watershed – both uplands and bottomlands. This approach may yield benefits that ultimately allow project managers to expand efforts beyond original objectives.

Understanding Current and Past Ecological Conditions

An evaluation program that identifies ecological conditions and why changes have occurred forms the technical foundation of a riparian-recovery effort. In particular, the evaluation process needs to document past and current conditions

of stream flow, groundwater, channel morphology, soil properties, and riparian vegetation.

Stream flow and alluvial groundwater data describe water availability, flow dynamics, and patterns (statistics) of flow. Channel morphology and its change over time portray channel stability. Physical and chemical soil data are essential for understanding which plant associations can be reestablished in an area. An inventory of vegetation allows project managers to gauge the challenges that invasive plants present to recovery efforts.

Almost always, perturbations imposed on channels in the southwestern United States and northern Mexico have prompted unanticipated and often undesirable fluvial adjustments. Therefore, evaluation efforts should be weighted toward understanding fluvial processes and developing measures consistent with stable channels and adjacent bottomlands. Especially important is the characterization of fluxes and flux changes of water, sediment, and organic matter for the entire drainage basin.

Promote Processes of Natural Regeneration

Natural regeneration can be one of the ecosystem manager's strongest allies. All riparian recovery efforts should promote natural regeneration by addressing the causes of degradation (no matter how far removed they are from the degraded bottomland environment) and allowing periodic flood disturbances to occur. Where a flood plain exists, a flood is any flow, natural or altered, that inundates the flood plain. If the re-establishment of natural lowland conditions and the protection of physical and biological

systems are objectives of a rehabilitation effort, the restoration of flood flows as a normal component of the hydrologic system must be an objective, and riverine engineering should not be designed to eliminate or reduce them.

Strong Community Involvement

Gaining strong community involvement in riparian recovery efforts is one of the most critical aspects toward realizing the project's long-term objectives and is probably the most challenging to achieve. A lack of local community involvement has kept many past riparian recovery efforts from realizing their potential (Briggs and Cornelius 1999; Briggs 1996). In some cases, projects that are implemented successfully from a technical standpoint do not succeed when follow-up monitoring and maintenance do not take place because the local community was not invested in the project.

When placed on a watershed scale, strong community participation and political backing can also allow project managers not only to expand restoration efforts to other parts of the watershed, but also to directly address root causes of ecological decline. This is even true for public land managers, who may be jurisdictionally limited to working only on public lands, but who could expand restoration efforts to include non-public lands by working with neighbors, local community groups, private conservation organizations, and friends groups.

In summary, a variety of factors must be considered when developing recovery

plans for riparian ecosystems. Current and past ecologic, hydrologic, and geomorphic conditions in the reach of interest and in the surrounding watershed must be understood. Promoting natural regeneration by allowing flood flows to occur is also a critical component to restoration efforts. Finally, in addition to scientific studies, community participation plays an important role in riparian recovery efforts, particularly in ensuring their long-term success.

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Volunteers planting rooted cottonwood cuttings on the South Fork of California's Kern River. (Photo: Ron Tiller)

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Background Photo: Newly-planted coyote willow whips along the bank at Cochiti Pueblo, New Mexico. (Photo: David Dreesen)