

Society of Wetland Scientists

Position Paper on the Definition of Wetland Restoration

8/6/00

The Society's objective is to increase public understanding of wetland issues and to promote sound public policy through the development and communication of position papers that are based upon the best available scientific information.

POSITION STATEMENT:

Wetland Restoration is defined as: actions taken in a converted or degraded natural wetland that result in the reestablishment of ecological processes, functions, and biotic/abiotic linkages and lead to a persistent, resilient system integrated within its landscape.

SCALE OF ISSUE: International

BACKGROUND:

In the last part of the Twentieth Century, a significant amount of money and time was dedicated to re-instating more natural conditions in a variety of ecosystems. Despite an overwhelming sense that such action is critical to the well-being and recovery of many systems, the word 'restoration' is used very loosely in most scientific and political arenas. As the science of restoration is young and we are still learning how it should be applied, the need for a clear definition is critical to identify the framework within which advances will be made.

STATEMENT OF ISSUE:

As a professional organization for many of the scientists currently involved in restoration, it is appropriate for the Society of Wetland Scientists (SWS) to provide guidance as to the meaning of the term "wetland restoration." Current ambiguity in the use of this word has led to a broad range of projects being funded and endorsed under its umbrella. In addition, it has led to difficulty in the communication of ideas within and among academia, the private sector, regulatory agencies, lawmakers, and the public. The advancement of any field depends on clarity and consistency in the use of key terms. A clear, practical definition of restoration is needed to develop a common understanding between all those working toward the restoration of ecosystems.

SCIENTIFIC CONSIDERATIONS:

Many definitions of restoration have been written over the past decade or so. Most indicate that restoration in some way repairs anthropogenic damage to a natural system (Lewis 1989, National Research Council 1992, Jackson et al. 1995, Gersib 1997, Kauffman et al. 1997). The discrepancy between these different definitions lies in the details of what is repaired and the final condition to which it is repaired. Over the past decade, both our scientific and practical understanding of ecological restoration and the number of projects implemented have grown dramatically. In this time, our concept of restoration has evolved to the point that now, in writing a definition, there are a few key elements that need to be conveyed in order to define the term adequately and usefully.

1. Restoration is the reinstatement of driving ecological processes. The fundamental forces that maintain wetland ecosystems are the hydrology, geomorphic setting, physical processes (e.g., fire, sediment movement), biological processes (e.g., competition, decomposition, predation), and biogeochemical processes (e.g., nutrient cycling). These fundamental forces interact to perform the ecological functions and produce the structure that we associate with wetlands. As actively installing the biotic structure of a system may not always be necessary (Mitsch et al. 1998) or adequate to restore the functions of the system (Zedler 1996, Malakoff 1998), restoration needs to

address these root forces first. The National Research Council (1992) eloquently summarized this need in their approach to restoration of fluvial systems, which favors establishment of the natural sediment and water regime of a river followed by engineering of the natural geometry of the system only if restoring the sediment and water regime alone does not restore this physical structure, and finally introduction of the biotic community only if the previous efforts do not lead to its establishment.

2. Restoration must be integrated with the surrounding landscape. Successful restoration demands that consideration be given to the landscape setting in which the system occurs. It is this landscape that underlies many of the large-scale factors and fundamental forces (e.g., water and sediment movement, geomorphology, fire regimes) that are essential to the formation and long-term maintenance of ecosystems (Brinson 1993, Bedford 1996). Restoration projects that address the effects of alterations that have occurred within the landscape as a result of human development can deal directly with the causes of degradation rather than just the symptoms. As understanding of landscape ecology and its importance to restoration develops, it becomes increasingly clear that the integration of restoration projects within the landscape context is essential to producing ecosystems that function in a dynamic and resilient manner.

3. The goal of wetland restoration is a persistent, resilient system. The concept of a persistent, resilient system is gaining definition through the development of the field of ecological engineering, where a primary objective of designing and building ecosystems is to produce a system that is not static but rather has enough of the physical and biological processes intact that it can respond to disturbances without human intervention (Mitsch 1998). The practical realities of conducting restoration in the modern world often necessitate human involvement to maintain an ecosystem (e.g., prescribed burning or the removal of non-native species). In addition, implementation of adaptive management in learning how to better conduct restoration requires active management and monitoring of a site. Acknowledging these caveats and limitations in the pursuit of a wholly persistent, resilient system, the ultimate goal of restoration should be a system that is dynamic and that can function without human intervention.

4. Wetland restoration should result in the historic type of wetland but may not always result in the historic biological community and structure. The importance of maintaining the historic diversity of wetlands across a landscape requires that the geomorphology and hydrologic regime of a restored wetland match that present historically (Wilcox and Whillans 1999). However, restoration of the historic wetland type will not always lead to re-instatement of a historic or specific biological structure. While the essence of wetland restoration is 'putting it back to a former or original state,' a variety of factors (e.g., successional stage, seed bank conditions, disturbance history, etc.) may prevent establishment of the communities and biological structure present prior to human disturbance even when the driving processes have been restored.

5. Restoration planning should include the development of structural and functional objectives and performance standards for measuring achievement of the objectives. The planning process in which objectives and performance standards for achieving them are established is the foundation of adaptive management. It is critical that we learn from our successes and failures, particularly in the relatively new field of wetland restoration.

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Citation: Society of Wetland Scientists, 2000. Position Paper on the Definition of Wetland Restoration.