PLACING STREAM RESTORATION IN GEORGIA IN A NATIONAL PERSPECTIVE

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Abstract. We are assessing the nature of the science underlying ecological restoration activities using stream ecosystems as model restoration systems and considering river restoration in Georgia, the Southeast, and the United States. We are assembling a data set that spans multiple ecoregions and many different types of restoration activities performed by diverse groups with various stakeholder interests. Data gathering is focused on several nodes, one of which is in Georgia. Specifically, the data set addresses: what kinds of restoration activities, at what scale, and by what means have taken place; how goals were set and success measured in these restoration efforts; the extent to which scientific criteria were used; the extent to which adaptive management was an explicit component of the restoration activity; and the extent to which scientists formed partnerships with restoration practitioners in order to use restoration projects as opportunities for scientific experimentation. The goal of the project is to facilitate the linkage between the practice of ecological restoration and the science of restoration ecology; we will attempt to establish standards for data gathering to scientifically assess restoration methods and success. We seek information on restoration projects in Georgia.

INTRODUCTION

Ecological restoration has enormous potential to enhance ecosystem goods and services and to protect biodiversity (Dobson et al. 1997). Ecological restoration also provides enormous opportunities for ecologists to conduct large-scale experiments and test basic ecological theory (Allen et al. 2001, Young et al. 2001). Indeed, the development of restoration ecology as a science is dependent upon tests of relevant ecological theory being linked to actual restoration projects. Likewise, to maximize the success of restoration projects, ecological restoration (the practice) should be informed and guided by restoration ecology (the science) (van Diggelen et al. 2001). Michener (1997) has suggested that of the thousand, perhaps more, restoration activities that take place annually, only a small fraction benefit from the combined insights of practitioners and scientists.

Streams and rivers have arguably experienced some of the most dramatic forms of habitat simplification of any type of ecosystem (Allan and Flecker 1993, Stanford et al. 1996, Sala et al. 2000). Because rivers are so important economically and ecologically, restoration of these ecosystems is receiving a lot of attention and enormous financial support (Cairns 1995, Gore and Shields 1995, Karr and Chu 1999). Restoration activities are diverse, ranging from channel engineering, to hydrologic experimentation, renewal of riparian vegetation, bank stabilization, and habitat improvement (Gore and Shields 1995, Gore et al. 1995, Kondolf 1995, Riley 1998, Rosgen 1996, Smith et al. 1995, Stanford et al. 1996). All levels of government, as well as volunteer groups, businesses, and non-governmental organization are involved in restoration efforts. Projects vary in scope from some of the largest imaginable (e.g., the Everglades), to small reaches of headwater streams.

While some of these efforts are being catalogued, few are evaluated for ecological success. While there has been some predictive work--what might happen if certain restoration activities are implemented--there has been little after-the-fact

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monitoring and analysis of the results of those activities. When these projects are monitored and analyzed, it is typically at only a local or single-site scale, and is limited to a visual survey of the integrity or stability of in-stream structures; the ecological functioning of the stream is rarely considered. Successful stream restoration requires identification of the relevant biological and physical processes and requires an understanding of the interacting nature of these processes (Hobbs and Harris 2001).

The post-restoration analysis that has been done has not been disseminated to practitioners and grassroots watershed groups who are trying to restore streams. In addition, there has been no synthesis of these evaluations to draw broader conclusions and develop practical and policy recommendations. For example, in Georgia, local governments have sponsored river and riparian restoration projects or agreed to those projects as mitigation for damage done elsewhere on the river. Yet we do not know if these projects are providing the ecological services lost elsewhere.

Both the development of restoration ecology as a science and the success of restoration projects depend on linking the practice with the science, yet many thousands of stream restoration activities take place annually, only a fraction of which benefit from the combined insights of practitioners and scientists. For example, miles of Georgia stream banks have been stabilized and planted with trees, but little monitoring data were collected before or after the projects to evaluate their success. Decisions are being made about the types and location of restoration projects with limited information on their effectiveness. Stream restoration projects are authorized to serve as mitigation for damages done to Georgia's streams and wetlands without knowing if these mitigation projects are truly effective.

THE NATIONAL RIVERINE RESTORATION SCIENCE SYNTHESIS

The National Riverine Restoration Science Synthesis is the project of a working group through the National Center for Ecological Analysis and Synthesis and American Rivers (Table 1). We are organized into eight regional nodes in which our efforts are concentrated, including the Southeast Node, centered in Georgia. Our goal is to analyze the extent, nature, scientific basis, and success of river restoration projects, and to present this information in a way that is useful to scientists, restoration practitioners, and those making policy decisions on what kinds of projects ought to receive priority for funding and implementation. This approach will place Georgia's river restoration projects into both a regional and national perspective.

Specifically, we are synthesizing the state and regional data to (1) evaluate the status of the practice of river restoration nationally and identify successful demonstration of different types of stream restoration, highlighting the reasons for their success; (2) produce a scientific document that examines the links between ecological theory and river restoration, such as the roles of refugia, connectivity, and natural processes, as well as the unanswered questions meriting further research (3) develop a series of specific recommendation to improve how river restoration is carried out and its success evaluated; and (4) disseminate this information broadly on an on-going basis.

We are in the process of identifying successful restoration projects throughout Georgia and are actively seeking input from stream restoration practitioners. Individuals with knowledge of restoration projects in Georgia are encouraged to contact one of the Georgia authors of this paper. We intend to produce recommendations for improving the practice of stream restoration in Georgia, and disseminate this information to practitioners and interested citizens throughout the state of Georgia.

STREAM RESTORATION IN GEORGIA

Investments have been made in river restoration in the state; for example the Upper Chattahoochee Riverkeeper's work on the Soque River, Dekalb County's Stream Buffer Revegetation Project, and the projects of Southeast Waters AmeriCorps. Research on the effectiveness of these projects could inform future stream restoration in Georgia. Many other states have organized ongoing efforts mixing stream restoration science and policy, including North Carolina's Stream Restoration Institute and a collaborative project of the University of Louisville and Kentucky's Division of Water. These offer possible models for future management of stream restoration in Georgia.

Many restoration projects are currently being planned in Georgia, including the restoration of Tanyard Branch on the University of Georgia campus. Their design, implementation, and post-restoration monitoring could be improved by our findings and analysis. There is also considerable interest in the acquisition of greenspace in Georgia and elsewhere in the region, and funding for riparian restoration is often incorporated into those projects. Although investments have already been made in river restoration in the state, we expect there to be much more restoration activity in the future that could benefit from our project's findings.

We are currently in the process of locating stream restoration projects in Georgia and the southeast and identifying questions and concerns of practitioners in the region. We would greatly appreciate information and contributions from those who work in stream restoration in Georgia.

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