Session: C2 Poster: T123B

Creating a climate-smart Great Lakes region: Guiding the application of climate science to ecological restoration practices

Melinda Koslow[†]; Patty Glick; Doug Inkley; Jennie Hoffman; Austin Kane
[†] National Wildlife Federation, USA
Leading author: koslowm@nwf.org

Scientists and resource managers are examining how to balance near-term restoration goals for species or habitats with achieving ecologically functional, self-sustaining systems that can persist under likely future conditions resulting from climate change. Managers can no longer assume that historical averages or trends will remain unchanged when setting their restoration goals, and must instead anticipate an increasingly different and uncertain climate. Given this new reality, state and federal agencies, non-governmental organizations, and others concerned with conservation are challenged with designing and implementing projects that will maximize the effectiveness of restoration investments under both current and expected future climate conditions. These projects are referred to as "climate-smart." In the Great Lakes region the Great Lakes Restoration Initiative (GLRI) is the largest program to support on-the-ground ecological restoration and toxic clean-up. In 2010 $475 million was allocated through the GLRI to the Environmental Protection Agency (EPA) for on-the-ground ecological restoration projects. Many of the most prevalent habitat restoration efforts funded under GLRI programs in the Great Lakes region could be vulnerable to a wide variety of climate change impacts. For example: - Changes in water temperatures and flow regimes may result in reduced target species utilization or degradation of restored in-stream habitats. - Increased air temperature and decreased soil moisture content could result in reduced growth or even overgrowth of restored riparian vegetation. - Warming may facilitate the establishment of southern fish species into the Great Lakes or the contraction northward of cold-water dependent species. - Climate change impacts such as changing temperatures, reduced ice cover, runoff patterns, and lake chemistry will interact with a range of issues related to contaminants, including changing the pattern of input of toxic materials into freshwater systems. - Toxicants can also increase species' sensitivity to various climate change impacts, for instance by decreasing thermal tolerance. Guiding restoration projects to be "climate-smart," includes: providing an initial suite of information to assist in the planning and implementation, addressing vulnerability of project goals to climate change and to modify actions as necessary over time. This guidance follows a 'bottom-up approach,' utilized to adjust restoration activities to address the realities of climate change. The approach starts with specific restoration goals (e.g., restoring critical habitat for a particular endangered species or setting maximum allowable pollutant levels); identifying how climatic variables influence those conservation goals (e.g., the influence of temperature on species' health and reproduction or the toxicity of pollutants); determining plausible physical and ecological changes under a range of climate scenarios; and finally, identifying and evaluating options for reducing the vulnerability of one's restoration goals to those projected changes.