



Conservation issues and approaches for dynamic cultural landscapes

Keywords

New England, conservation, environmental history, land management, land planning, natural disturbance, cultural landscape, land-use history, biodiversity.

Although the details of New England's history and current landscape conditions are unique, studies of the region underscore ecological themes that are common to many landscapes and ecosystems worldwide. In similar fashion, the region's dynamic history raises challenges for conservationists and land managers that are shared by decision makers for any region that bears the legacies of environmental change, natural disturbance and human activity. These challenges include several basic questions.

- What do we conserve in dynamic landscapes and how do we accomplish this?
- To what extent should we value and conserve cultural landscapes and habitats that have been shaped by land-use activities that are no longer current practice?
- How do we protect different biotic communities and conservation values in a varied landscape while still accommodating human development and natural resource extraction?
- What are the regional and global consequences of local land management and conservation policy?

Beyond the general theme of change, New England shares many specific drivers of ecological change with broad portions of the globe. Over past millennia the list of important environmental processes shaping the region include: long-term climate change, including the Little Ice Age and twentieth century warming trends; natural disturbance by wind, fire and native pests and pathogens; numerous introductions of exotic organisms, including fungal pathogens, insects, plants and animals; and an evolving history of land-use impacts, commencing with Native American activity and becoming increasingly intensive upon European arrival (Hall *et al.*, 2002; Orwig *et al.*, 2002; Paillet, 2002; Parshall & Foster, 2002). The dominant role of agriculture, especially widespread deforestation, grazing, and modification of native vegetation is shared with immense areas world-wide, as are subsequent shifts to industrial and post-industrial economies.

Interpretation of the ecological consequences of New England's dynamic history yields fundamental lessons that have been echoed by ecologists from many lands, regardless of the species, timeframe, or ecological focus under scrutiny (Foster *et al.*, 1990; Foster & Motzkin, 1998). Over past millennia and increasingly with intensive cultural impacts, the land and its ecological systems have changed continually and have supported a varying mosaic of assemblages in which the species composition have varied considerably. The results have been likened to a kaleidoscope in which the individual elements (i.e. species) are little changed but come together in different combinations to form a series of constantly changing and novel assemblages, structures and patterns (Lawton, 1997). Through this history some species have disappeared (locally, regionally and even globally), many new organisms have arrived and become naturalized, and the relative abundance of essentially all plants and animals have been altered, in some cases dramatically. Importantly, many assemblages of organisms have been strongly shaped or even created by the history of cultural activity (Motzkin *et al.*, 2002). Consequently, some communities, biotic patterns and species are dependent on ongoing disturbance, of either human or natural origin, for their continued abundance or even presence on the landscape.

Of equal importance, studies from many regions confirm that landscape conditions will continue to be shaped well into the future by the prior history of human impact and environmental change (Foster *et al.*, 2003). The land and its ecological systems and attributes, ranging from forest biomass to soil properties to wildlife populations, are on long-term trajectories that are only partially explained by current conditions (Bellemare *et al.*, 2002; Foster *et al.*, 2002). Oftentimes, past events provide key explanations of modern dynamics. The importance of land use and disturbance legacies is apparent in all ecosystems and provides one of the fundamental reasons that historical research will continue to be a critical part of ecology, environmental science and conservation planning (Foster *et al.*, 2003).

Beyond similarities in themes and details, it is impossible to ignore the global context of regional studies and activities. The New England landscape is affected on a daily basis by processes and decisions originating from distant places; likewise, the ecological changes and management activities occurring on

a local scale in the forests and agricultural fields of New England influence broad-scale ecological processes and exert impacts on ecosystems that lie continents away. The list of global connections is diverse: re-growing forests across the north-eastern USA sequester immense amounts of carbon that serve to offset the rate of increase in atmospheric CO₂; local decisions to conserve, recycle or obtain resources in New England can have dramatic benefits for resources and the environment in current source areas for these materials around the globe; conversely, USA environmental policies that exert a positive benefit on local ecosystems can generate negative impacts elsewhere if they only serve to shift the source of resource extraction or environmental degradation to other parts of the globe.

The commonality of environmental and conservation issues among many different landscapes as well as the linkages that exist among disparate parts of the globe lend some general application to conservation thinking and planning in New England (Foster, 2000). In the following set of articles the authors seek to take the results of many historical–ecological studies and to apply these to conservation issues that embrace the fundamental questions listed above. These articles start from a position which recognizes that scientific and historical research do not identify a single correct set of goals or supply the answers to major policy questions. Ultimately management and policy objectives are based on subjective political, economic, aesthetic or emotional grounds. However, science and history do provide much of the grist for debate of these goals by establishing a set of facts and relationships and focusing discussions on relevant issues and questions. In addition, the results of ecological and historical research also provide critical information regarding such issues as the rates and directions of future change, appropriate strategies for achieving desired outcomes, and the means for evaluating success in the application of management and conservation measures.

The article by Motzkin & Foster (2002) examines a specific case study, that of the New England coastal landscape and its openland habitats that harbour important and uncommon species and assemblages. In considering a landscape that has been shaped by a lengthy history of intense human activity, the article addresses straightforwardly such issues as the connection between high priority habitats and historical processes, the questions that arise when attempting to conserve cultural landscapes and assemblages, and the varied approaches that are used to maintain or restore these disturbance-dependent communities and species.

The article by Berlik *et al.* (2002) examines the issue of local natural resource consumption and extraction in a global context, and looks specifically at some of the consequences that land-use decisions in New England may exert on distant natural environments. Based on consideration of wood utilization in Massachusetts, the authors put forward a threefold approach to local conservation based on a global environmental argument: reduction of resource consumption (by recycling and reduced use); protection of existing forest areas from development or fragmentation; and utilization of these forest areas as sources for increased local production of wood, as well as natural preserves. The paper argues that increased local resource production might decrease the impact on more pristine forests and vulnerable species in areas where environmental oversight and regulation may be weak. Moreover, local forest management provides an educational opportunity to connect an affluent and consumptive population with the sources of their resources, thereby illustrating the environmental consequences of their individual behaviours.

The introductory article (Foster, 2002) examines three prominent directions that conservation in New England is taking: conservation of cultural landscapes shaped largely by historical agriculture; intensive and environmentally sound forest management for wood production and habitat creation; and development of a network of wildland preserves. In its examination of these contrasting directions for conservation, the paper illustrates how each has emerged from and fits well into the history of regional change. It then proceeds to offer an initial attempt to fit these three directions geographically into the current landscape. Through this effort the paper argues that a historical–geographical approach enables the development of effective conservation schemes that may be placed strategically in the landscape, in contrast to the oftentimes haphazard activity that is currently taking place.

Although not comprehensive in their treatment of all aspects of biological and natural resource conservation in the region, this suite of articles addresses many issues that currently face regional conservation planners and land managers and that emerge quite naturally in any land with a history of cultural and ecological change.

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BIOSKETCH

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