

### Title of the symposium:

The role of landscape experiments to inform large-scale habitat restoration

### Detail of organizer(s):

Responsible

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Co-organizer

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### Symposium abstract

Large-scale habitat restoration has been widely adopted as a strategy to combat extreme habitat loss and fragmentation - a major driver of global biodiversity decline. Much of this restoration action is aimed at joining up fragmented habitats through the creation of habitat corridors and stepping-stones, as well as improving habitat quality through site-scale actions. However, we know relatively little about the ecological consequences of creating and restoring habitats, and about the relative value of potential actions to restore species and the functions they perform in an ecosystem. Much of the scientific evidence used to underpin landscape-scale restoration comes from studies of habitat fragmentation, and there is little evidence to suggest that the ecological consequences of habitat loss and fragmentation (and associated extinction debts) are reciprocal with the benefits of habitat restoration and creation (and associated immigration credits). As a result, there is now much debate in the scientific and conservation communities on how to prioritise alternative site and landscape-scale restoration actions.

A greater use of experimental approaches could help to resolve this situation and increase the chances of teasing apart the relative merit of various site and landscape-scale restoration actions for biodiversity. However, there are two fundamental challenges to large-scale habitat restoration experiments. The first is a trade-off between the 'spatial scale' necessary to ensure ecological realism and obtain evidence applicable to practical conservation versus the ability to exert experimental control and replication. The second challenge is related to 'temporal scale' and the potentially significant time lag in biodiversity responses to habitat restoration. This time lag, often called 'immigration credit', based on a combination of habitat development, species colonisation and establishment processes may be considerable for poorly dispersing species in slowly developing habitats in highly fragmented landscape (e.g. forests).

This symposium will bring together researchers' working on a range of restoration experiments that have used different approaches to overcome these spatial and temporal challenges. These studies range from fine-scale highly controlled 'manipulative' experiments to large-scale 'natural' experiments (where researchers overlay an experimental design on an ecosystem where change has occurred beyond their control) but all of which have the potential to provide important evidence to inform future landscape-scale restoration efforts.

### **How your symposia will improve landscape ecology science?**

Whilst the importance of experimentation in landscape ecology is widely acknowledged, it remains a relatively rare approach, especially in terms of habitat restoration, due to various spatial and temporal challenges. The proposed symposium will showcase a number of on-going initiatives aimed at tackling the spatial and temporal challenges associated with large-scale restoration experiments. These range from fairly small, short-term, highly-controlled 'manipulative' experiments through to larger, long-term 'natural' experiments. This is timely as landscape-scale conservation is now a major policy driver for many countries and a large number of projects aimed at improving habitat connectivity and implementing ecological network concept are underway (e.g. Nature Improvement Areas in England, the Yellowstone to Yukon conservation initiative in North America). The symposium will provide a synthesis of this topic, bringing together a global community of researchers working at different scales and in different biomes to examine the role of habitat restoration in combatting the loss and fragmentation of many habitats.

### **Broad thematic areas**

Broad thematic areas 1st choice: Restoration of habitats and landscapes

Broad thematic areas 2st choice: History, dynamic and transformations of landscapes

### **Free Keywords**

restoration, ecological networks, landscape-scale conservation, natural experiment, woodland creation

### **Notes**

The symposium will aim to bring together a global network on researchers working on large-scale habitat restoration projects, with the aim of sharing experience and knowledge and working towards a 'synthesis' paper or similar.