

# Measuring Habitat Restoration using the Darwin and "Event" Cores: Australian examples powered by BioCollect

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## Abstract

Habitat decline and fragmentation are major factors in biodiversity loss across the globe and can be difficult to measure, particularly at landscape scale (Brooks et al. 2002, Fahrig 2003, Ritchie and Roser 2019). In Australia, rural, coastal and urban communities have been undertaking habitat restoration activities since the mid-1980s to protect and restore ecological balance on private land and in local shared and natural spaces. Much of the restoration effort has centered around hands-on activities as a mechanism for building community with environmental benefits. Over such a time span, thousands of locations throughout the country have been transformed from degraded and highly disturbed landscapes into resemblances of more-or-less natural areas.

However, collecting and analysing data for these activities was given little attention until quite recently, as governments, philanthropists and other investors have become increasingly interested in measuring the value and outcomes from investment. To measure the effectiveness of the restoration effort, it is essential to benchmark the environmental state and species composition before the restoration begins, but surprisingly or unsurprisingly, this is rarely done (Hale et al. 2019).

Responding to this call for better documentation of restoration outcomes, over 30 groups have been using the Atlas of Living Australia's [BioCollect platform](#) to capture complex information about current and past restoration work. The BioCollect platform enables each type of monitoring, establishment, and follow-up activity to have its own data collection schema and associated metadata structured around using a hierarchy of sampling events based on the Event class in the [Darwin Core](#) standard, which allows relationships between types of event records to be specified. When event records are created through use of an activity-based template, each occurrence of a species is also

parsed and configured as a Darwin Core occurrence record. Standard templates have been created for a range of activities, such as benchmarking assessments, site establishment, follow-up interventions and monitoring over time, which are being used by many different groups over large areas of the landscape. This allows each group to operate independently, yet collect standardised data that can be easily aggregated at larger temporal and spatial scales, quantifying change over time. The relationships between occurrences and the event context in which they were collected is also preserved and navigable.

Here we present how Darwin Core and Event Core have been implemented in the BioCollect platform to enable this important data to be collected and stored in its full richness and resolution.

## Keywords

biodiversity, landscape restoration, species composition

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## Conflicts of interest

The authors have declared that no competing interests exist.

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