



# Mixing ecological science into landscape architecture



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Sixteen years ago, I was working in an environmental company run by a botanist and an architect. The major focus was designing constructed wetlands, and the company staff included a mix of ecologists, architects, and landscape architects. One project involved treating acid sludge leachate from a decommissioned mine, and one of my roles was to restore an eroded slope. I found five enormous rocks on the site during excavation and placed them across the steep bank. Later, at the community day when the wetlands were opened for public viewing, a running race was held in which five men – designated as the land’s future caretakers, and each with chisel and hammer in hand – raced the mile of the constructed wetland to claim their favorite rock and mark it with their name. Such small events as these are one delight of working with both ecology and landscape architecture. – MG

Landscape architecture (henceforth LA) is a design profession that engages with the intersections of the natural world and the built environment to create a huge variety of places and to engage with environmental problems caused by human actions (Figure 1). Clients and the general public are no longer just interested in the aesthetics of landscaped areas – they are also increasingly concerned about ecological performance. For this reason, the skills of scientists (including those of ecologists) are growing in value within the LA profession.

Ecologists typically collaborate and consult with landscape architects in one of two ways. The ecologist can work in-house and be engaged in the design process on a daily basis – in this case, they won’t prepare reports in the same way as an ecologist in a government agency or as an academic researcher. This arrangement is most common in large LA firms. Alternatively, the ecologist may be employed by an environmental firm and provides expertise for LA firms (referred to in the business as “practices”) like Mark Frisby’s (MF’s).

This article focuses on LA and thus diverges from general ecological consulting, which has been discussed by other authors (Beyers 2018; Nuttle and Klemow 2018) in this series. In the past few years, big multidisciplinary consultancies and LA firms have gotten bigger, providing clients with a “one-stop shop” where ecologists, landscape architects, engineers, and others act as a team. More and more small- to medium-sized consultancies focus on a specific service or area of expertise, as do many LA firms. All LA firms collaborate across disciplines, and what that looks like depends very much on the specific

nature of each project. For example, MF is currently working on a project with a firm that specializes in archaeology, human heritage, and flora and fauna, and is collaborating with a recreation planner. On another project, he is joining forces with a consulting firm of ecologists, archaeologists, urban planners, and engineers who provide expertise in drainage, infrastructure, and traffic.

Neither of the two types of roles described above would constitute a design career, though ecologists can no doubt pick up some design thinking. To work as a fully-fledged landscape architect, you would first need to return to school and complete a Master’s degree in Landscape Architecture (MLA), which provides the design coursework that best complements ecology and enables ecologists to use their knowledge and skills. We mention this not just because this was MG’s career path but because we have students who have completed an undergraduate degree in ecological science and then pursued an MLA. At our university, there is a Master’s program for “non-cognate students” who come from a wide range of undergraduate backgrounds to study design.

Science students with an interest in or aptitude for design might consider post-graduate study in LA rather than a research degree in ecology. For students who are not thrilled by research and for whom a more practical focus is appealing, adding an LA design degree is an option. Ecology students considering a design-based Master’s degree instead of a research-based PhD can bring valuable skills and knowledge to the table: site analysis, research, and reporting, as well as an understanding of ecological principles and plant function/development. If you are knowledgeable about soils, or have worked with root systems, you will bring from soil science (perhaps without realizing it) a sense of three-dimensional thinking that is of tremendous value for design work.

Some ecologists misunderstand how landscape architects conduct site evaluations, publish their methods, and apply belief systems, and may even be confused by their specialist language (Grose 2014). However, ecologists who have previously collaborated with landscape architects know how we work and what ecological information and advice we require. They would be the best people to mentor science students toward a career in LA.

But what if you have already completed a PhD or are currently pursuing a post-doc? How might you engage with

landscape architects? What suite of skills do LA practices require from ecologists who want to work either in-house (like MG) or through consultancy (as MF usually does)?

An ecologist might gain an edge toward employment with knowledge and skills that align with LA projects in key areas, which we outline here. (1) Landscape firms need knowledge of specific ecological communities, status of organisms (native or exotic), habitat preferences, growth stature of vegetation at maturity, weeds, and grasses. (2) Many LA firms work with land–water intersections and coastal change (extreme events, water-level changes); valuable skills therefore include knowledge not only about watershed hydrology and soils, but also of plant species appropriate for rehabilitation. (3) Understanding site-specific climate-change impacts and new management practices to reduce risk or facilitate persistence through extreme events will be valued. (4) The measurement of LA project outcomes (eg evaluating urban tree canopy cover) requires skills in field monitoring, data interpretation and explanation, and reporting. (5) Urban food production and the protection of existing productive landscapes, including buffers, require skills in community consultation, and knowledge of soils, landscape connectivity, and plant nutrition. (6) Cities across the world are revising their street-tree policies and plantings for urban greening, which will necessitate an understanding of climate futures, alterations in growth and establishment success, alternative management strategies, and trees' capacity for carbon sequestration. (7) Work with Indigenous communities on protecting landscapes and enhancing cultural landscape values (without cultural appropriation or disadvantage) requires knowledge of species and environmental history, and strong social, interpersonal, and community liaising skills. Many projects require experience in community consultation; many require mapping or GIS skills; and some might benefit from a diploma in ecological project management.

So, what types of projects do landscape architects work on? The American Society of Landscape Architecture's *Landscape Architecture Magazine* (<https://landscapearchitecturemagazine.org>) showcases the variety of projects tackled by LA practices. Many countries have their own LA associations and affiliated magazines. If a firm is involved in rehabilitation or projects that require ecological know-how, look up the firm on the web and see their other projects – you will notice that some are more specialized. All firms are different. You will find that some firms are rich in ecological-based projects while others are not. Browsing project portfolios will give you an idea of where you might find a niche for yourself. We also recommend reading the blog discussion between ecologists and landscape architects in *The Nature of Cities* (2017).



A. Lloyd

**Figure 1.** Once a cow field, the Toomuc Creek constructed wetland was designed for stormwater treatment and frog habitat by a collaboration of landscape architects, ecologists, and hydrologists. This area also functions as a public park, containing trails, artworks, grassy areas, and a playground that are used by nearby suburban residents in eastern Melbourne, Australia. Toomuc Creek won the 2014 Australian National Landscape Award for Land Management.

Within LA there is an increasing demand for the skills and knowledge of ecologists (Grose 2014). Students who unite these disciplines are in a unique position to advocate for positive human–environment interactions (Klemow *et al.* 2019). Ecologists deciding on a career path, especially those interested in seeing human-made spaces that were created using scientific knowledge and community engagement, should consider the opportunities in LA as part of their future.

## ■ Supporting Information

References may be found in the online version of this article at <http://onlinelibrary.wiley.com/doi/10.1002/fee.2052/supinfo>

## ■ Author biographies

**Margaret Grose** is an academic ecologist and landscape architect with a PhD in ecophysiology. She teaches ecology for landscape architects at the University of Melbourne's School of Design. Margaret is also the author of *Constructed Ecologies: Critical Reflections on Ecology with Design* (2017).

**Mark Frisby** is the director of a medium-sized landscape architecture firm in Melbourne, Australia. He has interest and expertise in strategic planning, urban renewal, coastal environments, and constructed ecology. Mark is a past National and State President of the Australian Institute of Landscape Architects.