

A review of ecology in landscape architecture publications

Leslie Haines

Unitec Institute of Technology, Auckland, New Zealand

ABSTRACT: In landscape architecture publications, landscape designs that incorporate ecology vary in the degree of ecological functioning that is included. Sustainability is often not specifically differentiated from ecology and the term ecology is used very loosely to support, not just rich and complex ecological design, but designs that include any environmentally-friendly aspects. This can lead to some confusion in clearly representing the degree to which ecological functioning is occurring or intended to occur in the designed or managed environment. This paper is based on a review of article content relating to ecology in *Landscape Architecture*, which identified topics relating to ecology over the period from 1996 to 2010. Results show that while there is an acknowledgement that landscape architectural designs published in *Landscape Architecture* contribute toward a 'greener' environment, there is room for more ecological complexity to be acknowledged in the profession and for a distinction between complex and singular ecological functioning.

Keywords: ecology, complex ecological functioning, sustainability, landscape design, content review

INTRODUCTION

In landscape architecture publications, landscape designs that incorporate ecology vary in the degree of ecological functioning that is planned. These range from the accommodation of existing resilient functioning ecosystems within the design, to the incorporation of low ecological function or efficient energy utilization.

Ecology generally refers to the interrelationships between organisms and their environment. The basic unit of ecology is the 'ecosystem' or 'ecological system' which infers that it is a complexity of components, processes and flows of material at different scales, typical of any system. Ecology most commonly refers to natural systems, and most often to indigenous systems. Humans are sometimes considered a part of the ecosystem but often it is inferred that humans are outside the ecosystem. Despite the inherent complexity involved in functioning ecological systems, the use of the term ecology is commonly extended to refer to an aspect of ecology such as a single natural process (e.g. toxic chemical uptake in phytoremediation), or to the use of native species in planting designs.

Ecology is associated with sustainability which involves humans and the natural world. Sustainability is usually described by its three integrated components: environment, society, economics (UNCED 1992). While the social and economic are human systems, the environment usually refers to the physical and generally non-human living and non-living components. The role ecology plays in human systems and the ecological processes that are utilised by humans are ecological services or ecoservices. Ecological processes are fundamental to the functioning of the environment and are continually present and occurring whether part of the designed intention or not.

In discussions, sustainability is often not specifically differentiated from ecology and this can lead to some confusion in clearly representing the degree to which ecological functioning is occurring or intended to occur in the designed or managed environment. Often ecology is incorporated into designs and management plans as single functions, without stated consideration of the broader ecological context. In contrast, ecology is the multi-functional complexity of the web of life.

This study attempts to clarify the degree to which complex ecology is part of landscape architecture practice as distinguished from sustainability.

1. LANDSCAPE ARCHITECTURE PUBLICATIONS

This study looks at the incorporation of ecology in landscape architecture by reviewing the articles published in the American Society of Landscape Architects (ASLA) professional magazine, *Landscape Architecture*. This magazine

currently, in 2010, is in its 100th annual volume, and produces 12 issues per year. In general, the articles published in *Landscape Architecture* profile landscape designs and associated topics such as technology and practice. In the February 1996 issue there was a change to the format, content and size of the magazine. These changes were made in order "to provide more inclusive coverage of a broader range of topics and to encourage a more thorough inspection of these topics" (Powell, 1996 p65) and resulted in the incorporation of eight named sections, or 'Departments'. One of these named sections was 'Ecology' and some of the others were 'Planning', 'Technology', 'Design', 'Practice'. The magazine maintained these same named sections for the following 10 years until November 2005. Following this, the format of sections remained, but section headings in each issue varied throughout the year which resulted in a number of new sections such as 'Urban Design' and 'Sustainable Design' being included. Since 2005, the 'Ecology' section has not been included in every issue.

Another study of article content in a landscape architecture publication is in the American academic publication of Council of Educators in Landscape Architecture (CELA), *Landscape Journal*. Powers & Walker (2009) reviewed the article content and authorship over the journal's 25 years and give an indication of the main focus of the articles. They clumped ecology and planning into one subject category called 'Landscape Planning and Ecology' of "articles addressing land use, design, and management of different landscape features, forms, functions and systems." The range of topics included "Landscape assessment; Resource management; Open space; Byways; Shorelines; Land use planning and policy; Wildlife; Mining" (Powers & Walker 2009:100). The subject categories of 'Landscape Planning and Ecology' and 'Human and Environmental Relationships' do not appear to have overlapping topic areas while the distinction from 'Sustainability' is less clear. 'Sustainability' is defined in their study as "articles addressing the relationship between humans and the environment in terms of longevity and productivity of various systems." and the range of topics include "Ecological Design; Bioregionalism; Waste; Garbage; Health." (Powers & Walker 2009:100). There is some overlapping of ecology between these two categories although the specific topic areas may be distinct.

'Landscape Planning and Ecology' was the second most common category (19% of articles), and was the dominant subject category (35%) during the 1982-1988 editorial period with more than twice the occurrence of the next most common subject category but occurring less than half as often in the following two editorial periods with a slight increase to 16% in the most recent period 2003-2007+. In comparison 'Sustainability' occurred in 5% of articles overall peaking at 10% during 1998-2002 editorial period.

In order to compare with Powers and Walker's study of *Landscape Journal* from American Society of Landscape Architecture, Gaffin & Lamba (2010) reviewed the title and abstract of each article from 2006-2009 of *Journal of Landscape Architecture (JoLA)* the academic publication of the European Council of Landscape Architecture Schools. They use the same subject categories as the Powers and Walker study and 5% of articles covered 'Landscape Planning and Ecology' which was the same level as the 'Sustainability' subject category.

The categorization of topics and subject categories in the Powers and Walker study differs from this study. Neither of these studies specifically differentiates complex ecology from the incorporation of singular ecological functioning, or identifies ecology as distinct from sustainability.

2. METHOD

To review the inclusion of ecology in landscape architecture as represented in *Landscape Architecture*, each article was read in its entirety from a selection of issues over the past 15 years in order to identify content relating to ecology, and topics that include some ecological processes.

Five volumes were selected to represent the change over the time since the reformatting of the publication in 1996: Volume 86 (1996); Volume 90 (2000); Volume 95 (2005); Volume 99-100 (2009+). Two issues from each period were selected: #2 & #12 from 1996; #1 & #12 from 2000, 2005, and 2009. The final period has three issues selected to include the most recently published issue #5 in 2010. In total, the articles from nine issues were read in their entirety, as well as the editorials. Letters, short articles and advertisements were not included in the analysis, but may be in a future study.

2.1 Ecological topics in articles

Topic areas relating to ecology were identified and grouped into subject categories as described in Table 1. It is intended that this selection will give an indication of the range being included in articles, and the subject headings they occur under.

Table 1.
The subject categories identified as incorporating ecology and related topic areas

Subject Categories	Descriptions	Range of topics attributed to subject area
1. Existing ecosystem	Preserving predominantly natural functioning ecosystem	Forest, dune, wetland, prairie,
2. Restored native ecosystem	Restoration of local native ecosystem	Multifunctional ecological processes incorporated
3. Wildlife habitat	Single or several species habitat created	Threatened species, biodiversity, local species
4. Ecosystem management	Management strategies for existing ecosystems with human presence	Ecotourism, invasive species management, natural/social hybrids
5. Native planting	Planting local native plant species	Tree canopy, local plant species, street trees, riparian planting, greenway, corridor
6. Stormwater ecotechnology	Creation of stormwater management devices	Ponds, wetlands, bioswales, rain gardens, green roofs
7. Environment	Mitigating effects of development	Energy efficient devices [solar, wind], recycling, ecoservices other than stormwater mitigation, composting

In order to more clearly distinguish between subject categories that encompass complex ecological systems from subject categories with less complex ecological functioning and/or the use of eco-technologies, two clusters have been created: complex ecology, and sustainability. The complex ecology cluster incorporates the following subject categories: existing ecosystem; restored native ecosystem; wildlife habitat; ecosystem management. The sustainability cluster incorporates the subject categories: native planting; stormwater ecotechnology; environment.

2.2 'Ecology' section

The occurrence of the section called 'Ecology' in *Landscape Architecture* was recorded for all volumes and issues published between the initial use of this section heading in February 1996 until December 2009 in order to identify a trend in the use of the heading.

A total of eight articles under the section called 'Ecology' were analysed for content for the years 1996, 2000, 2005, and 2009. Two issues for each of these years were included in this analysis. Some articles covered more than one subject category which has resulted in a number greater than eight.

2.3 Use of the term ecology

All articles from six issues (1996 #2& #12; 2000 #1 & #12; 2009 #12 & 2010 #5) of *Landscape Architecture* were read and the occurrence of the term 'ecology' and its derivatives (ecological, ecologically, ecologist, ecosystem) was noted.

3. RESULTS

3.1 Ecological topics in articles

The dominant subject category (Figure 1) was native planting (30%) followed by stormwater ecotechnology (17%) and environment (15%). The least common subject categories were existing native ecosystem and ecosystem management (each 8%).

When subject categories are compared over the four time periods (Figure 2) native planting is the dominant subject category in 1996 (40%) and 2005 (24%), and was equally the most common with stormwater ecotechnology in 2009+ (25%) and in 2000 with environment (20%). The following subject categories were not represented: existing native ecosystems in 1996; wildlife habitat in 2000; ecosystem management in 2009+.

Fig.1

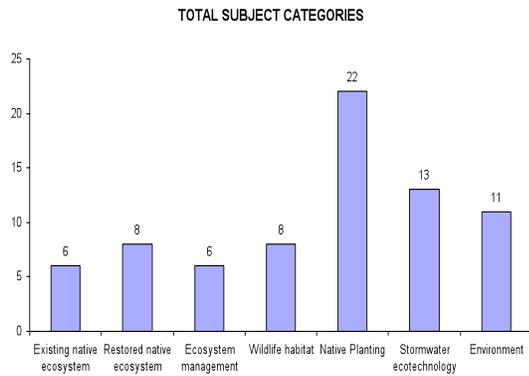
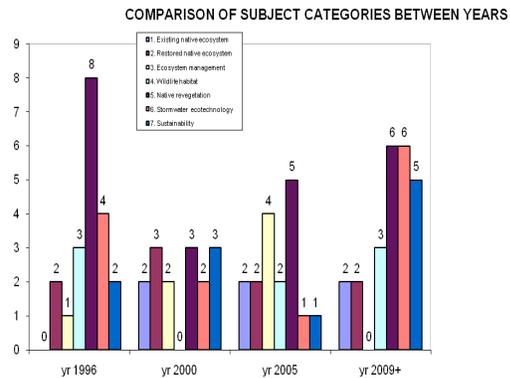


Fig. 2



When subject categories are grouped together (Figure 3) into two clusters, complex ecology and sustainability, overall the sustainability cluster is dominant (60%) compared with complex ecology cluster (40%). In 1996 and 2009+ the sustainability cluster is twice as common as the complex ecology cluster. Only in 2005 does the complex ecology cluster dominate (60%).

Fig. 3

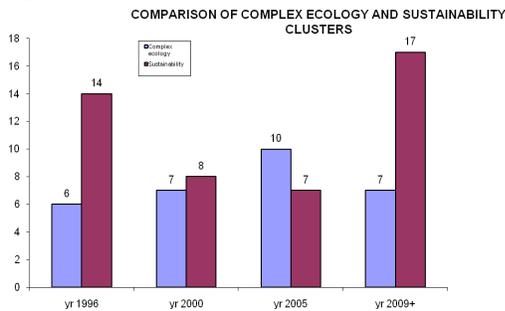
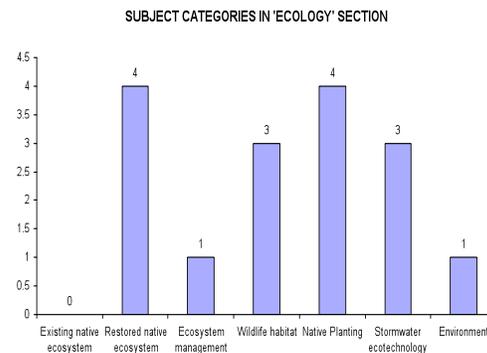


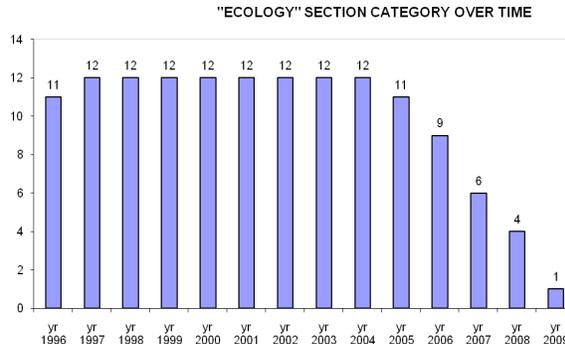
Fig. 4



3.2 'Ecology' section

The subject heading 'Ecology' was included in *Landscape Architecture* from February 1996 and for the following ten years until November 2005. The inclusion of 'Ecology' has declined in each following year, and occurs in only one issue in 2009 (Figure 4).

Fig. 5

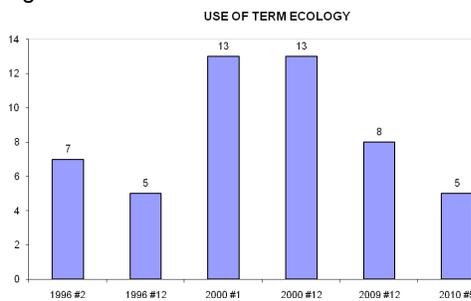


The subject categories that are dominant in the 'Ecology' articles (Figure 5) are restored native ecosystem and native planting (each 25%). The least commonly occurring subject categories are ecosystem management and environment (each 6%). One subject category, existing native ecosystem, was not represented in any 'Ecology' article within this selection. When these subject categories are grouped into complex ecology and sustainability clusters, there are an equal number in each cluster.

3.2 Use of the term ecology

The use of the term ecology (or its derivatives) occurred most frequently during 2000 (51%), approximately twice that of 1996 and 2009+, as shown in Figure 6.

Fig. 6



4. DISCUSSION

4.1 Subject categories

Conservation of biodiversity is of international importance (UNCED 1992) and the practice of planting of local native species either in gardens, urban parks/university campuses, or as street trees is achieving one aspect of this by increasing local species diversity. The other aspects of biodiversity, conserving genetic and ecosystem diversity, are more difficult through landscape design but are necessary to achieve complex ecology and consequent resilience (Peterson 2008). It is encouraging that there were a number of articles discussing management of ecosystems and also a number proposing the restoration of indigenous ecosystems, both have some ecological complexity for biodiversity conservation. Within the dominant urban context these are more difficult to achieve especially where very few extant indigenous ecosystems exist to be preserved as part of the landscape. However, the four categories that have the most ecologically complex integrated processes were the least common subject categories. One of the difficulties is that there is inherent uncertainty (Keith 2009) in natural systems and the effectiveness of ecological designs are not easy to measure (Gibbons *et al.* 2006).

The incorporation of stormwater ecotechnology was the second most common subject category followed closely by environment. Despite these categories lacking complex ecological systems approaches, they inherently incorporate some singular ecological functions or environmentally-friendly intervention. This aligns with the focus of *Landscape Architecture* which is predominantly on 'greening' the landscape, which means increased energy efficiencies, cleaner water, increased

use of local native species in plantings. The editorial of the 2007 #7 asks of ASLA membership, "How Green is Your Magazine?" and suggests that despite the divisions within the profession, the magazine has gone "out of its way to publish environmentally progressive projects" (Thompson 2007:11). The topics that Thompson includes as 'green' (e.g. stormwater gardens, porous paving, native plants) fit under the sustainability subject cluster rather than the complex ecology cluster e.g. "stormwater ponds are essentially a technical solution" (MacElroy and Winterbottom 2000:50). Lamba (2010:60) states "it appears the practitioners are leading the charge in sustainability design. The application of sustainability concepts – green roofs, stormwater management, and so on – are regular features in ...professional magazines", but Danks (2000:45) is critical that "Many schools across the US are building landscapes that tend to address a single ecological system at a time."

It is not possible to compare the outcomes of this study directly to Powers and Walker's 2009 analysis of content in the *Landscape Journal* because their criteria for categorising topics is different to this study, and articles that had content incorporating complex ecological systems, which is a focal interest of this study, was not specifically identified in their study or differentiated from less complex processes.

There is room for more ecological complexity to be acknowledged in the profession. As MacElroy and Winterbottom (2000:50) suggest "Landscape architects have a vitally important role to play in preventing and mitigating impacts [of development]. The first law in the conservation of ecosystem functions is to preserve and protect that which is healthy and working now. Our work can identify preserve, protect, and connect the pieces of our landscape mosaic that are functioning well." It is the existing ecosystems that display the most complexity.

4.2 Emerging trends

Most subject categories in the complex ecology cluster have been a consistent part of *Landscape Architecture* magazine over the past 15 years. All subject categories in the sustainability cluster are currently more strongly represented than in the early and middle of last decade, reflecting a similar emphasis to that described by Thompson (2007). It is unclear whether these are regular fluctuations between a focus on complex ecology and a focus on sustainability, or whether the dominance of complex ecology in the middle of the last decade was an aberration.

The rapid decline of the 'Ecology' section in *Landscape Architecture* in the past 5 years is not reflected in a decline to the same extent in the number of articles incorporating complex or singular ecological functioning. It may be that ecology is becoming less specifically identified and more integrated into landscape design practice under other headings. Meyer (2008) suggests that landscape architects can be categorized by the approach they have toward presenting sustainability in relation to their designs. Her categories are Distainers, Embracers, Yawners and Dismissers. If Meyer's categorization is extended to the approach to ecology then it may be that the proselytizers (Embracers) were dominant during the first ten years of this study, and since 2006 they have diminished and the Deniers (Distainers) and Yawners are becoming dominant. This would affect the number of times the term ecology is specifically used within the discussion and the declining trend to use the heading 'Ecology'. The deniers may under-use the term while the proselytizers over-use it. Personal experience with landscape architect students in Auckland New Zealand shows that currently almost all students incorporate singular ecological functioning into their major design projects and some design for complex ecology without these being the primary design driver. This trend from ecology used only as the major design premise (proselytizing) by a few to the integration of ecology in almost all projects at varying levels of complexity (Yawn and Distain), has been observed over the past four or five years. Meyer suggests this may be leading to a new 'sensibility' which is the hybrid landscape where ecology is integrated with human use without a resulting natural-looking landscape.

4.3 Limitations of this study

One of the difficulties in analysis of the articles in *Landscape Architecture* is the lack of specific details of the extent to which ecology and environmental interventions are being incorporated into landscape designs. This may have led to some under-estimation and some over-estimation of the ecological effectiveness of interventions of some subject categories. One of the contributing factors to the possible under-estimation of the role of ecology in landscape architecture may be the reluctance to emphasise these aspects of the design in the article.

There are a range of ways in which ecology is presented and this will affect the ability to measure the components of the design, which have an ecological function and the degree to which ecology is preferred or suppressed.

CONCLUSION

The importance of complex ecology as part of landscape design practice is that it results in more resilient ecosystems that require less ongoing management and provide more ecological services for society and therefore are more sustainable environmentally as well as ecologically. How much is complex ecology a part of landscape design practice?

Landscape Architecture magazine has not distinguished complex from singular ecological functioning and articles included under the section 'Ecology' have as broad a range of subject categories as those in articles under other headings. The term ecology is used very loosely to support not just rich and complex ecological design but designs that include any environmentally-friendly aspects. Considering my definition of ecology as complex functioning, the term has often been inappropriately applied in this magazine. There is an acknowledgement that landscape architectural designs published in *Landscape Architecture* contribute toward a 'greener' environment but there is room for more ecological complexity to be acknowledged in the profession. Because complex landscapes are more resilient (Peterson 2008), it is important that this distinction is clarified for, and by, practitioners and educators.

The profession of landscape architecture in New Zealand (NZILA) and Australia (AILA) are probably going through similar trends to ASLA. Further similar studies of the professional magazines of these countries would provide a useful comparison for the practice and education.

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