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To cite this article: Dawn L. Sanders, Amy E. Ryken & Katherine Stewart (2018): Navigating nature, culture and education in contemporary botanic gardens, Environmental Education Research, DOI: [10.1080/13504622.2018.1477122](https://doi.org/10.1080/13504622.2018.1477122)

To link to this article: <https://doi.org/10.1080/13504622.2018.1477122>



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Published online: 29 May 2018.



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# Navigating nature, culture and education in contemporary botanic gardens

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## ABSTRACT

Increasingly, humans are an urban species prone to 'plant blindness'. This demographic shift and situation has implications for both individual and collective perceptions of nature, as well as for addressing 'ecophobia' and encouraging 'biophilia' through education. Contemporary humanity occupies a world in which extensive physical change, both in the landscape and its related organisms, is occurring. Education-related debates on these issues links to the noted phenomenon of a 'bubble wrap generation' growing up within 'nature-deficit' childhoods in 'megalopolitan cities'. Indeed, some commentators consider that 'nature has already disappeared' and exists only in protected spaces. Such perceptions have consequences for education in 'presented world' settings such as zoos, botanic gardens and natural history museums. This editorial, and its associated collection of papers, considers the critical relationships between nature, culture and education in contemporary botanic gardens and the ways in which visitors navigate their journeys, as demonstrated by research.

## ARTICLE HISTORY

Received 10 March 2018  
Accepted 3 May 2018

## KEYWORDS

Nature; culture; education;  
botanic gardens

Increasingly, humans are an urban species prone to 'plant blindness' (Wandersee and Schussler 1999). This demographic shift and situation has implications for both individual and collective perceptions of nature, as well as for addressing 'ecophobia' (Sobel 1996) and encouraging 'biophilia' (Cajete 1999) through education. Contemporary humanity occupies a world in which extensive physical change, both in the landscape and its related organisms, is occurring (Millennium Ecosystem Assessment 2005). Education-related debates on these issues links to the noted phenomenon of a 'bubble wrap generation' (Malone 2007) growing up within 'nature-deficit' childhoods (Louv 2008) in 'megalopolitan cities' (Chipeniuk 1995). Indeed, some commentators consider that 'nature has already disappeared' and 'exists only in preservations and reservations - botanical gardens, national parks, protected waters, sanctuaries and zoos' (Benjamin 1996, 28). Such perceptions have consequences for education in 'presented world' settings (Braund and Reiss 2006) such as zoos, botanic gardens and natural history museums, suggesting that, 'when there is no more wild, the meaning of the zoo changes' (Wilson 1992, 246).

According to Jan Zwicky (2008), 'Nature is the tendency in things to be what they are, and in that tendency to present themselves as both distinct and connected' (90). 'Presented world' settings, like

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botanic gardens, provide complex representations of biodiversity that may also counter issues such as plant blindness, namely, 'the inability to see or notice the plants in one's own environment,' which leads 'to the inability to recognize the importance of plants in the biosphere and in human affairs' (Wandersee and Schussler 1999, 82).

In some zoos, the role of animals has changed 'from objects of curiosity, to ambassadors for their wild relatives, to representatives of an eco-system' (Kawata 2000, 5). Equally, natural history museums, with their taxidermic specimens, may offer visitors 'glimpses of extinction' (Cordero 2009). Nevertheless, 'presented world' settings can be perceived as reinforcing the narrative of nature in peril due to human consumption of resources [see also, *Environmental Education Research* (2011), 17(6), a special issue on 'The media, animal conservation and environmental education'].

Botanic gardens, like zoos and natural history museums, typically offer repositories of living organisms that can also evoke a sense of relationships within ecosystems. Educational initiatives in such settings can open up opportunities to revisit complex questions about human relationships to, and impacts on, other species, and how these are taught, learned, unlearned and retaught (see, for example, Bonnett 2007). Yet, in terms of priority given to these spaces for learning and teaching, botanic gardens are often overlooked as sites for environmental education. As Wandersee and Schussler (1999, 82) warn: 'Paradoxically, plants form the basis of most animal habitats and all life on earth (Abbott 1998). While animals frequently steal the spotlight where extinction is concerned, one in eight plant species worldwide is currently threatened with extinction. Intellectually, we know that you don't get pandas without bamboo plants, but culturally, this is often forgotten (Abbott 1998)'.

Botanic gardens are often understood as: 'institutions holding documented collections of living plants for the purposes of scientific research, conservation, display and education' (Wyse-Jackson 1999, 27). However, such a succinct definition means the cultural complexity of botanic gardens remains an elusive phenomenon. Furthermore, such definitions raise key concerns pertaining to:

- the identities that institutions themselves accentuate
- contested territories within, and between, those identities
- perceptions from 'outside' the botanic garden community.

Heyd (2007), for example, frames two inquiries that have implications for the rationale and aesthetic of botanic garden collections and associated visitor perceptions. Firstly, 'how may we avoid perceiving botanic gardens either as merely entertaining displays of plant collecting or as mere living archives of plant species?' and, 'how should we conceive of the space in botanic gardens so we do come to reflect on the possibility that we may be partners of plant life and not just its owners or protectors?' (178). Moreover, contemporary questions being asked of botanic gardens focus on an emerging philosophical and pedagogical discussion concerning 'plants as other-than human persons' (Hall 2011). So how do such perspectives challenge the enactment of the scientific and educational role of botanic gardens?

On the one hand, collecting can be viewed as a form of inquiry; researchers and collectors use objects, their collections, and curated spaces to develop scientific processes of observation and experimentation (Sanders and Hohenstein 2015). On the other, the scientific expertise of the botanic garden has broadened to include the formation of critical partnerships with local human and more-than human communities. On a continuum, as suggested by Ballantyne and Packer (2006), a botanic garden could be viewed in three main ways, which in order of importance, are: firstly, as a scientific institution to visit; secondly as providing botanical, horticultural and/or ecological expertise; and thirdly, as collaborators in multidisciplinary projects. If the ways and balance between them are to shift, where can commentators, educators and researchers go to (re)draw the boundaries of difference and areas of commonality in these critical spaces for botanic gardens as socio-educational institutions? Does recent and ongoing research on societal perceptions of the more/other than human world matter in these contexts (cf. Spanring 2017)?

Prior to the 1960s, most botanic gardens were historical remnants of either early physic gardens (in places such as Italy, where physic = nature), or an imperialistic past. Other botanic gardens were based on taxonomic collections utilised by university botany departments for teaching. Many institutions

still maintain this history but more diverse practices are developing. Surprisingly, rather than being a relic of the Renaissance or a dusty Victorian vestige, most botanic gardens world-wide originated from the period post-1960 to the present day, particularly in countries such as China. As relatively modern institutions, they have been instigated with very different perspectives on their relationships with society and science (Davies, Sanders, and Amos 2015). For example, viewing plants as an intrinsic part of culture has been a major step forward for some botanic gardens. Many are now much more 'people' oriented, as they realise that people's perceptions of, and relationships with, plants are crucial to not just visit numbers and financial support but also to the survival of biodiversity.

Article 13, of the Convention on Biodiversity (1993), places a specific responsibility on botanic gardens in conserving plants and educating the public about their value. Importantly, the Article stresses the need for both formal and informal education. Under 'informal education' the article states that, 'Zoos, botanic gardens and aquaria have unique facilities which are compatible with educational goals and are well suited to educating diverse groups of people' (Glowka et al. 1994, 69). Thus, in emphasising the links between curation, visitation, conservation and education, Blackmore, Gibby, and Rae (2011) note that:

Botanic gardens have a valuable and distinctive mix of staff skills, including people who can research plants, grow plants and communicate about plants, all working together within institutions that are dedicated to plant systematics, conservation, education and public communication. Furthermore, they rarely, if ever, work in isolation (269).

## Seeding attention

Isolation from each other? From theory? From research? From wider developments in contemporary understandings and priorities for education? It was questions like these that sparked the impetus for developing this special collection within *Environmental Education Research*. In what follows, we bring together a series of contributions that focus on the ordered, but sensory 'presented world' (Braund and Reiss 2006) of botanic gardens to raise critical questions of how we might navigate nature, culture and education in contemporary botanic gardens.

Our call for papers that would contribute to such a collection encouraged studies that utilised theoretically reflective (Dillon 2003) and narrative forms of inquiry (Gough 2002) alongside critical commentaries to reimagine botanic gardens 'as models for collaborative relations between human beings and the natural world' (Heyd 2006 200) and perhaps go deeper in examining the notion of 'plantness' (Darley 1990) in such relationships. As guest editors, we acknowledge our own research interests lie in the visually rich aesthetic of individual and grouped botanic garden specimens, as a stimulus for meaning-making, in relation to understanding the multi-layered message of 'plants = life' (Galbraith 2003). Given the vital role of plants in ecosystem resilience, neither science nor society can afford citizens to see 'nothing' (Schneekloth 1989) when they look at plants. Furthermore, botanic gardens 'invite discussion on the roles(s) of "culture" in relation to "nature" and can act as a metaphor for the complex relationships that humanity has with the environment and its associate flora and fauna' (Sanders 2007, 1213). Botanic gardens then, can also provide a context for critical inquiry into 'interactive landscapes' and can make visible 'the unique interwoven pattern of nature and culture which makes up the story of place' (Plumwood 2006, 141).

The framing questions for this collection were:

- How can a culture of critical reflective inquiry be nurtured in botanic gardens?
- What is the relationship between the educational and landscape design intentions of botanic gardens and other cultivated spaces, and visitor perceptions and experiences?
- How might learning theories and philosophical approaches inform how botanic gardens and other cultivated spaces frame the interaction between nature and culture?
- What role do scientific narratives play as visitors navigate the interface of nature and culture through the dominant scientific purpose of a botanic garden; and what are compelling educational alternatives (narratives, roles, purposes)?

In what follows, we briefly note that the manuscripts accepted for publication critically examine the 'nature'/'culture' relationship in distinct ways:

Haywood's (forthcoming) contribution explores the question, what are families' views of Kew Gardens as a setting for family science learning? Her work describes how intentionally developed interpretative materials that encouraged families to engage with taxonomic plaques connect the family members' focus on the aesthetic beauty of plants to learning about science.

Suárez-López and Eugenio's (2018) contribution critiques the capitalist and ethnocentric frameworks of environmental education. They consider how wild botanic gardens in Latin America can promote knowledge decolonisation by engaging a variety of epistemologies, from science to the voices of social activism to popular education initiatives, as well as traditional and indigenous knowledge of nature.

Rahm's (2018) contribution explores how urban youth of colour in the Botanic Garden of Montreal create space to engage with nature. She advocates for desettling underlying botanic garden epistemologies, to acknowledge how youth engage with plants and nature, and to disrupt the cultural production of a narrative that frames youth as disconnected from nature.

But before we get to the contributions, we turn to the broader question of why botanic gardens are studied in *Environmental Education Research*, the many possible foci for research related to environmental education, and where scholarship might go next in light of the points we raise in this editorial essay, and by way of the contributions to the collection.

## Why study botanic gardens?

From their inception, botanic gardens have typically served as sites for scientific study of living plant collections even as they have also represented multiple purposes including: spiritual refreshment, displaying power and social status, and cultivating an appreciation of art and design (Cunningham 1996; Ballantyne, Packer, and Hughes 2007; Ryken 2009). Worldwide, there are over 3,000 botanic gardens. Like zoos and natural history museums, they are well-visited sites of school field trips, family outings, and community events, with Botanic Gardens Conservation International estimating 250 million visits internationally per year to botanic gardens (Romano 2008).

When botanic gardens are understood as museums, we should recognise that their visitors generate their own highly personalised meanings from the same exhibition experience (Diamond 1999; Stamp 1999; Falk and Dierking 2000; Marstine 2006; Sandell 2007). In addition, learning in many museums is highly social: visitors interact with each other in family groups, with volunteers, with museum staff, and with displays (Diamond 1999; Falk and Dierking 2000; Sandell 2007). In this, a tension can be recognised between seeing a museum as an authoritative knowledge provider and respecting visitor agency in constructing meaning (Sandell 2007). Arnold (2006), for example, suggests there are three approaches to knowledge creation in museums: (1) *Narrative*, where objects are used to tell stories, (2) *Functional*, where objects are considered for their uses to humans, and (3) *Taxonomic*, where objects are arranged and classified. Thus, it is important to consider questions such as: Do visitors bring life experiences and socially construct meanings to the 'objects' found in botanic gardens? And, how do curators and educators acknowledge and work with these experiences and meanings in such sites? Such questions suggest that planning for another's learning, by focusing educational initiatives on enduring understandings (Wiggins and McTighe 1997), may be in tension with visitor-directed learning or meanings that, for example, resist treating plants as 'objects' but rather position them as fellow (albeit different) 'subjects' (Cajete 2009; Hall 2011).

We might also consider how the possibilities for a culture of critical reflective inquiry (Kim 1999) could be nurtured in botanic garden learning environments. Zhai (2011), for example, finds discernible differences in botanic garden educator identities oriented around 'the scientist educator' as opposed to the 'teacher in the garden'. Such differences influence the stories that educators in botanic gardens appear to tell and the questions they seemingly ask, rather than the ones they really provoke (Wagner 1993). In addition, Chang, Bisgrove, and Liao (2008) put forward a case for designing 'narrative landscapes' for educational means, noting the importance of aesthetic impressions for visitors to botanic

gardens. Moreover, other-than-human voices within a botanic garden setting may not be consistent with those of the human interpreters of various facets to the garden and its signage or artefacts; they may even offer or stimulate counter stories to those intended by the educators (or sponsors) of the garden and its exhibits as well.

The last point reinforces as it complicates the key assumption that botanic gardens will be ascribed broad, socially constructed, and thus socially oriented, goals. These usually include building empathy or instilling connections with nature (Ades 2005; Peddretti and Soren 2006); changing people's values and attitudes about environmental issues (Reading 2005); focusing on ecosystem-centred rather than human-centred understandings of natural resource use (Sutter 2005); and engaging learners with concepts such as sustainability (Romano 2008), place consciousness, decolonisation and reinhabitation (Gruenewald 2003), and global climate change (Forrest 2008). Meanwhile, studies of the attitudes of botanic garden visitors indicate that they rate the restorative features of the garden setting as more important than learning about plants or conservation issues (Connell 2004; Ballantyne, Packer, and Hughes 2007). More specifically, visitors value features such as being away from everyday scenery and being immersed in a different world (Herzog, Maguire, and Nebel 2003; Scopelliti and Giuliani 2004), e.g. through an 'indigenous garden curriculum' (Cajete 1994, 200) or the 'faraway nearby' (Solnit 2013) feeling of escape that being in the garden can bring (Wassenberg, Goldenberg, and Soule 2015).

## Conclusion and an invitation

In James Hamilton-Patterson's novel *'Griefwork'*, the reader is invited to follow a palm house curator's life in an urban botanic garden during socially austere times. At one point, the main character cries out in despair:

People ought to be flocking to the gardens and the palm house at times like these, reminding themselves of what beauty and richness and fecundity still are. But they're put off. It's all too surrounded by an aura of dry learning and crankiness (Hamilton-Patterson 1994, 201).

As we show throughout this special collection, modern botanic gardens can ill afford the possibility these fictitious perceptions might be true. In fact, we need more critical commentaries than those we are able to provide here, to interrogate modern experiences of botanic gardens and the teaching and learning that may take place there, within and outwith the lens of environmental education.

Botanic garden educators are having to engage ever more deeply with plant extinction rates in an increasingly populated world where the gap between rich and poor is growing. In conclusion, we ask, will botanic gardens sustain 'their right to continued existence through their scientific and pedagogic value' (Kohlmaier and Sartory 1990, 42)? Or will more culturally complex functions and interactions come to the fore?

By editing this collection, we have come to the view that we are witnessing an emergence of a 'new generation' of botanic garden research work which attempts to 'desettle' (Rahm 2018) taken for granted ways of educating about plants. We look forward to your engagement with the articles and themes of this special collection, and testing our own and our contributors' questions and observations further. We welcome future manuscripts on these, and related topics, that can be published by this and other research or educational outlets.

## Acknowledgements

The authors wish to thank Alan Reid and anonymous commentators for reviewing this editorial essay. Your feedback strengthened our work. Thank you.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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**Amy Ryken** is a dean and professor in the School of Education at the University of Puget Sound in Tacoma, Washington, USA. She is the chair of the Education Committee of the W. W. Seymour Botanical Conservatory. She studies teacher learning and partnerships that foster connections between schools and community resources such as outdoor environments and museums.

**Katherine Stewart** is an academic lecturing in science and environmental education in the School of Education at Macquarie University in Sydney, Australia. Her doctoral study documented the processes of teaching and learning with school groups in a botanic garden, providing a theoretical underpinning for education in a botanic garden (University of Sydney, 2003). Her recent research is focused on using mobile technologies to support outdoor learning.

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## References

- Abbott, C. 1998. Extinction Threatens 1 in 8 Plants Globally. *Yahoo News*, 9 April, 1–2.
- Ades, G. 2005. "Awakening Empathy: Connecting Visitors with Nature." *Living Forests* 1: 12–14.
- Arnold, K. 2006. *Cabinets for the Curious: Looking Back at Early English Museums*. Aldershot: Ashgate.
- Ballantyne, R., and J. Packer. 2006. "Promoting Learning for Sustainability: Principals' Perceptions of the Role of Outdoor and Environmental Education Centres." *Australian Journal of Environmental Education* 22 (1): 15–29.
- Ballantyne, R., J. Packer, and K. Hughes. 2007. "Environmental Awareness, Interests and Motives of Botanic Gardens Visitors: Implications for Interpretive Practice." *Tourism Management* 29 (3): 439–444.
- Benjamin, M. 1996. "To Have and to Hold." In *Collectors' Items*, edited by K. Salway. London: The Pale Green Press.
- Blackmore, S., M. Gibby, and D. Rae. 2011. "Strengthening the Scientific Contribution of Botanic Gardens to the Second Phase of the Global Strategy for Plant Conservation." *Botanical Journal of the Linnean Society* 166 (3): 267–281.
- Bonnett, M. 2007. "Environmental Education and the Issue of Nature." *Journal of Curriculum Studies* 39 (6): 707–721.
- Braund, M., and M. Reiss. 2006. "Towards a More Authentic Science Curriculum: The Contribution of out-of-School Learning." *International Journal of Science Education* 28 (12): 1373–1388.
- Cajete, G. 1994. *Look to the Mountain: An Ecology of Indigenous Pedagogy*. Skyland, NC: Kivaki Press.
- Cajete, G. 1999. "Reclaiming Biophilia: Lessons from Indigenous Peoples." In *Ecological Education in Action: On Weaving Education, Culture, and the Environment*, edited by G. A. Smith and D. R. Williams, 179–188. Albany, NY: State University of New York Press.
- Cajete, G. 2009. "Indigenous Knowledge: The Pueblo Metaphor of Indigenous Education." In *Reclaiming Indigenous Voice and Vision*, edited by M. Battiste, 181–191. Vancouver: UBC Press.
- Chang, L. S., R. J. Bisgrove, and M. Y. Liao. 2008. "Improving Educational Functions in Botanic Gardens by Employing Landscape Narratives." *Landscape and Urban Planning* 86 (3–4): 233–247.
- Chipeniuk, R. 1995. "Childhood Foraging as a Means of Acquiring Competent Human Cognition about Biodiversity." *Environment and Behaviour* 27 (4): 490–512.
- Connell, J. 2004. "The Purest of Human Pleasures: The Characteristics and Motivations of Garden Visitors in Great Britain." *Tourism Management* 25 (2): 229–247.
- Cordero, G. A. 2009. "Encouraging Students to Utilize Museum Resources in Ecology, Evolutionary and Conservation Biology." *Bulletin of the British Ecological Society* 40 (4): 59–60.
- Cunningham, A. 1996. "The Culture of Gardens." In *Cultures of Natural History*, edited by N. Jardines, J. A. Secord and E. C. Spary, 38–56. Cambridge: Cambridge University Press.
- Darley, W. M. 1990. "The Essence of 'Plantness.'" *The American Biology Teacher* 52 (6): 354–357.
- Davies, P., D. L. Sanders, and R. Amos. 2015. "Learning in Cultivated Gardens and Other Outdoor Landscapes." In *Darwin-Inspired Learning*, edited by C. J. Boulter, M. J. Reiss and D. L. Sanders, 47–58. Rotterdam: SensePublishers.
- Diamond, J. 1999. *Practical Evaluation Guide: Tools for Museums and Other Informal Educational Settings*. Walnut Creek, CA: AltaMira Press.
- Dillon, J. 2003. "On Learners and Learning in Environmental Education: Missing Theories, Ignored Communities." *Environmental Education Research* 9 (2): 215–226.

- Environmental Education Research. 2011. Special Issue. *The Media, Animal Conservation and Environmental Education*. edited by J. Blewitt. 17(6), 711–849.
- Falk, J. H., and L. D. Dierking. 2000. *Learning from Museums: Visitor Experiences and the Making of Meaning*. Walnut Creek, CA: AltaMira Press.
- Forrest, T. A. 2008. "How One Botanical Garden is Engaging the Public on Climate Change." *Public Garden* 23 (1): 13–15.
- Galbraith, J. 2003. "Connecting with Plants: Lessons for Life." *Curriculum Journal* 14 (2): 279–286.
- Glowka, L., F. Burhenne-Guilmin, H. Synge, J. Mcneely, and L. Gundling. 1994. *A Guide to the Convention on Biodiversity. Environmental Policy and Law* (Paper No. 30). Switzerland: International Union for the Conservation of Nature.
- Gough, N. 2002. "Ignorance in Environmental Education Research." *Australian Journal of Environmental Education* 18: 19–26.
- Gruenewald, D. 2003. "Foundations of Place: A Multidisciplinary Framework for Place-Conscious Education." *American Educational Research Journal* 40 (3): 619–654.
- Hall, M. 2011. *Plants as Persons: A Philosophical Botany*. Albany: SUNY.
- Hamilton-Patterson, J. 1994. *Griefwork*. London: Vintage.
- Haywood, N. forthcoming. "Beauty in the Foreground, Science behind the Scenes: Families' Views of Science Learning in a Botanic Garden." *Environmental Education Research*.
- Herzog, T. R., C. P. Maguire, and M. B. Nebel. 2003. "Assessing the Restorative Components of Environments." *Journal of Environmental Psychology* 23: 159–170.
- Heyd, T. 2006. "Thinking through Botanic Gardens." *Environmental Values* 15: 197–212.
- Heyd, T. 2007. *Encountering Nature: Towards an Environmental Culture*. Aldershot: Ashgate.
- Kawata, K. 2000. "From Regents Park to the Bronx: A History of Zoos." *Interpretation Journal* 5 (3): 3–5.
- Kim, H. S. 1999. "Critical Reflective Inquiry for Knowledge Development in Nursing Practice." *Journal of Advanced Nursing* 29: 1205–1212.
- Kohlmaier, G., and B. V. Sartory. 1990. *Houses of Glass: A Nineteenth-Century Building Type*. Cambridge, Mass: MIT Press.
- Louv, R. 2008. *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill: Algonquin Books.
- Malone, K. 2007. "The Bubble-Wrap Generation: Children Growing up in Walled Gardens." *Environmental Education Research* 13 (4): 513–527.
- Marstine, J. 2006. *New Museum Theory and Practice: An Introduction*. Malden, MA: Blackwell.
- Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-Being: Biodiversity Synthesis*. Washington, DC: World Resources Institute.
- Peddretti, E., and B. J. Soren. 2006. "Reconnecting to the Natural World through an Immersive Environment." *Canadian Journal of Science, Mathematics, and Technology Education* 6 (1): 83–96.
- Plumwood, V. 2006. "The Concept of a Cultural Landscape: Nature, Culture and Agency in the Land." *Ethics & the Environment* 11 (2): 115–150.
- Rahm, J. 2018. "Youths' Navigations of Botanical Gardens: Bids for Recognition Ways to Desettle Practice." *Environmental Education Research*. doi:10.1080/13504622.2018.1469731.
- Reading, R. P. 2005. "Is Knowledge-Provision Enough?" *The Relationship between Values, Attitudes and Knowledge with Respect to Wildlife Conservation, Living Forests* 1: 19–22.
- Romano, J. 2008. "Leading the Way to Sustainability." *Public Garden* 23 (1): 6–9.
- Ryken, A. E. 2009. "Interpreting Nature: Connecting to Visitor Understandings." *Roots: Botanic Gardens Conservation International Education Review* 6 (1): 9–13.
- Sandell, R. 2007. *Museums, Prejudice, and the Framing of Difference*. New York, NY: Routledge.
- Sanders, D. L. 2007. "Making Public the Private Life of Plants: The Contribution of Informal Learning Environments." *International Journal of Science Education* 29 (10): 1209–1228.
- Sanders, D., and J. Hohenstein. 2015. "Death on Display: Reflections on Taxidermy and Children's Understanding of Life and Death." *Curator* 58 (3): 251–262.
- Schneekloth, L. H. 1989. "Where Did You Go? The Forest? What Did You See? Nothing." *Children's Environments Quarterly* 6 (1): 14–17.
- Scopelliti, M., and M. V. Giuliani. 2004. "Choosing Restorative Environments across the Lifespan: A Matter of Place Experience." *Journal of Environmental Psychology* 24 (4): 423–437.
- Sobel, D. 1996. *Beyond Ecophobia: Reclaiming the Heart in Nature Education*. Great Barrington, MA: The Orion Society and The Myrin Institute.
- Solnit, R. 2013. *The Faraway Nearby*. London: Granta.
- Spannring, R. 2017. "Animals in Environmental Education Research." *Environmental Education Research* 23 (1): 63–74.
- Stamp, K. M. 1999. "Planning and Implementing Evaluation." In *Museum and Gallery Education: A Manual of Good Practice*, edited by H. Moffat and V. Woollard, 121–131. Walnut Creek, CA: AltaMira Press.
- Suárez-López, R., and M. Eugenio. 2018. "Wild Botanic Gardens as Valuable Resources for Innovative Environmental Education Programmes in Latin America." *Environmental Education Research*. doi:10.1080/13504622.2018.1469117.
- Sutter, G. C. 2005. "Ecocentrism in a Museum Setting: A Canadian Case Study." *Living Forests* 1: 23–26.
- Wagner, J. 1993. "Ignorance in Educational Research or, How Can You Not Know That?" *Educational Researcher* 22 (15): 15–23.
- Wandersee, J., and E. Schussler. 1999. "Preventing Plant Blindness." *The American Biology Teacher* 61 (2): 82–86.

- Wassenberg, C. L., M. A. Goldenberg, and K. E. Soule. 2015. "Benefits of Botanical Garden Visitation: A Means-End Study." *Urban Forestry and Urban Greening* 14: 148–155.
- Wiggins, G., and J. McTighe. 1997. *Understanding by Design*. Alexandria, VA: Association of Supervision and Curriculum Development.
- Wilson, A. 1992. *The Culture of Nature: The North American Landscape from Disney to the Exxon Valley*. Ontario: Between the Lines.
- Wyse-Jackson, P. 1999. "Experimentation on a Large Scale – An Analysis of the Holdings and Resources of Botanic Gardens." *BGC News* 3 (3): 3.
- Zhai, J. 2011. *Engaging Children in Learning Ecological Science: The Pedagogical Practices of Botanic Garden Educators*. Unpublished PhD Thesis, King's College London.
- Zwicky, J. 2008. "Lyric Realism: Nature Poetry, Silence, and Ontology." *Malahat Review* 165(Winter): 85–91.