Natural Heritage Conservation and Eco-Digital Poiesis:
A Western Australian Example

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Abstract:

A city of biodiversity, Perth, Western Australia, faces significant environmental challenges. As species and habitats vanish, so too can their biocultural heritage. To address biological and cultural decline, FloraCultures is a digital conservation initiative that uses archival, ethnographic and design approaches to conserve and promote Perth's 'botanical heritage'. This article examines the project's conceptual foundations in terms of nature/culture, tangible/intangible and thinking/making dualisms, as well as some of the practical strategies used to address these dualisms. To articulate biocultural heritage, I have had to rethink categorical oppositions through ecopoiesis—the making of interactive digital objects as informed by ecological discourses. The repository being developed will incorporate cultural materials (texts, visual art, interview recordings, music and video) not conventionally associated with environmental conservation. Key community-building approaches, such as focus groups and crowdsourcing, discussed later in the article, provide digitally-based interventions into biocultural heritage loss that reflect the ecopoietic basis of FloraCultures.

The Southwest of Western Australia, including the Perth metropolitan area, is an internationally recognised biodiversity 'hotspot' (Breeden and Breeden, 2010). The region supports an endemic range of floral, faunal and fungal species—many of which are seriously threatened or face extinction through climate change and rapid

urbanisation (Ryan, 2014). Situated in Perth, the FloraCultures project confronts such urgent realities of regional conservation, but through the ethos of critical heritage studies (Smith, 2006) and the methods of digital artefact-making. The project will result in an online archive for conserving the cultural heritage of Perth's flora (www.FloraCultures.org.au). Outlining a theory and practice of botanical heritage conservation has necessitated the rethinking of conceptual distinctions. 'Botanical heritage' is intrinsically biocultural and involves the dynamic interplay between people and plants in a place over time as expressed in works of art, cultural artefacts, historical perceptions, and popular values, beliefs and attitudes (Ryan, 2014: 49). However, defined as a biological form of heritage—as a 'genetic storehouse' or 'natural resource'—botanical heritage can be constructed through quantitative practices of conservation and positivist modes of knowledge-making.

In Western Australia, the relationship between indigenous plants, classificatory data and digital technology is exemplified by the online tool FloraBase—the scientific analogue of FloraCultures (The Western Australian Herbarium, 2014). To develop a repository of botanical heritage, I have needed to consider three persistent binaries critically and propose ways to address them practically. These binaries are nature/culture, tangible/intangible and thinking/doing. This article outlines the manner in which I have navigated the interdisciplinary theoretical terrain of FloraCultures and concludes, on a hopeful note, that 'ecological poiesis' (or 'ecopoiesis') offers a mediating space of dialogue and creativity. The digital manifestation of ecopoiesis is the artefact itself—an open-access online repository of multimedia material. In the long-term, digital interventions into botanical heritage conservation through FloraCultures require

sustained interactions with user-contributors through focus groups and the crowdsourcing of archival content. The ideal end result will be the promotion of the heritage of Perth's flora, above and beyond its scientific value or biological composition (i.e. as genes, tissues, species or ecological communities).

Botanical Heritage: From Natural and Cultural to Biocultural

FloraCultures is a pilot project (2013–14) I have developed in collaboration with Kings Park and Botanic Garden in Perth with funding through a seed grant from Edith Cowan University. As Chief Investigator, I have been responsible for the project's conceptualisation, design and implementation. FloraCultures is a digitally-mediated biocultural conservation initiative. The project centralises the interrelationships between categories of heritage through a focus on a cross-section of indigenous plants identified, in consultation with Kings Park staff, as having high heritage value (Ryan, 2014: Chapter 4). The aim is to generate an integrative framework for documenting and conserving the botanical heritage of about forty species of the Kings Park bushland.

The FloraCultures methodology uses traditional archival, oral history and digital design approaches. The initiative is based on the idea that natural heritage is cultural and biological. An activist ethos underlies the project; an appreciation of heritage and its different forms goes hand-in-hand with the protection of living plants in their habitats. To this effect, the online repository will showcase a broadly conceptualised suite of heritage content—including interviews with conservationists alongside works of cultural interest that derive from (or offer a perspective on) the flora of the city circa 1827 when the Swan River Colony was founded by British settlers. The participatory web resource will be of interest to seasonal tourists,

amateur naturalists, botanical artists, natural history writers, heritage consultants and environmental conservationists. FloraCultures reflects the belief that an appreciation of biodiversity for its cultural, social, historical, artistic and literary value helps to sustain environmental conservation on the ground (Ryan, 2014: Chapter 5).

The integrative model broadens the practices of conventional heritage conservation work, particularly in relation to the nature/culture binary. As one of the most tenacious aspects of thinking, being and doing, the nature/culture formation remains a theoretical difficulty recognised by early cultural studies scholars (Williams, 1982) and negotiated by environmental humanities and ecocultural researchers (Giblett, 2011). In the discourse of natural science, culture tends to be regarded as a heritage of nature, whereas nature is constructed socio-culturally in the humanities and social sciences (Olwig, 2006). In response to these contexts, the heritage theory and practice of FloraCultures attempts to deconstruct and navigate the limiting doctrine of separation between nature, culture, conservation and heritage. However, nature/culture dualism is embedded in practices of heritage conservation. Natural heritage tends to be bifurcated from cultural heritage, the former overly narrowed through an emphasis on biological materialism (saving plants, soils, ecologies) and cultural artefacts (saving objects of museological importance made from plants).

An inclusive view of heritage has precedents in the field of heritage studies where the nature/culture distinction has been increasingly scrutinised and recast. Although not necessarily in terms of plants, this bifurcation has been critiqued by scholars of biocultural heritage (Vidal, 2011, Harmon, 2013, Papayannis and Howard, 2013), digital heritage (Cameron and Kenderine, 2007), heritage, globalisation and

the environmental crisis (Long and Smith, 2010) and natural heritage (Olwig, 2006, Dorfman, 2011, Convery and Davis, forthcoming). As informed by these studies, my approach to heritage—as situated between nature and culture—requires a practice of working across ingrained typologies, both in theory and application. Conceptual reflexivity ('nature-culture' rather than 'nature/culture') decompartmentalises the binaries and brings the sciences, arts and humanities into transdisciplinary dialogue (Ryan, 2012: Chapter 1). The simple yet potent assertion that 'nature is a cultural category' (Giblett, 2011: 15) underpins a biocultural conceptualisation of heritage, leading to a more inclusive practice of conservation, both in the field and in the digital domain.

Researchers on 'cultural landscapes' assert that 'nature is an inextricable part of culture' (Papayannis and Howard, 2013: ix). Inextricability is evident, for example, in the designations of cultural landscapes within the UNESCO World Heritage Convention and the European Landscape Convention (or the Florence Convention). Papayannis and Howard describe the 'double impact' of regarding nature as cultural heritage. The first involves the close coupling of the natural world and human culture, broadening the premises of heritage conservation and expanding the range of what content ought to be included in archives. The second leads to a biocultural ethics that calls attention to the natural 'dividends' passed through generations and forming the basis of cultural inheritance (Papayannis and Howard, 2013: xi). Heritage practice is ecological in character; the preservation of nature as cultural inheritance involves the safeguarding of the processes that have given rise to diversity in all forms (Harmon, 2001: 64-66).

Echoing notions of cultural landscapes and inheritance, other scholars point to 'biocultural diversity' conservation as an integration of heritage methods (Harmon, 2013: 77). For example, the project 'Endangerment and its Consequences' of the Max Planck Institute for the History of Science examines 'the blurring of boundaries between 'nature' and 'culture' and the emergence of *biocultural diversity* both as an intrinsically endangered phenomenon and as the goal of scientific and conservation projects' (Vidal, 2011). In the 1990s, the idea of biocultural diversity gained traction as anthropologists and linguists identified the overlays between biological and linguistic loss, particularly between the extinction of plant and animals and the decline of endemic languages (Maffi, 2008). The biocultural concept centres on correspondences between biological (e.g. genes, populations, species, ecosystems) and cultural diversity (e.g. linguistics and ethnobotanical knowledge) (Maffi, 2001). Jonathan Loh and David Harmon theorise biocultural diversity as 'the total variety exhibited by the world's natural and cultural systems' (Loh and Harmon, 2005: 231). They further explain the concept as:

Y>The sum total of the world's differences, no matter what their origin. It includes biological diversity at all its levels, from genes to populations to species to ecosystems; cultural diversity in all its manifestations (including linguistic diversity), ranging from individual ideas to entire cultures; and, importantly, the interactions among all these […] Conceptually, biocultural diversity bridges the divide between disciplines in the social sciences [and the humanities I will add] that focus on human creativity and behavior, and those in the natural sciences that focus on the evolutionary fecundity of the non-human world. (Loh and Harmon, 2005: 231-232).

For these authors, the outcome of a biocultural approach to heritage conservation is a 'more integrated view of the patterns that characterize life on Earth' (Loh and Harmon, 2005: 232). Moreover, the study of biocultural diversity spans theory, practice, politics and ethics (Maffi, 2005). Its ethical ramifications inflect the moral dimensions of cultural inheritance previously discussed.

Drawing from environmental ethicists, Harmon asserts that the maintenance of the world's biocultural heritage should become a moral obligation. A regionally-based biocultural ethics would be shared among diverse parties, including nature conservationists, social scientists and cultural archivists, as a basis of an integrated heritage framework. As a regional approach to biocultural ethics, Harmon (2013: 78) proposes the recognition of 'biocultural hotspots' to augment the scientifically-based designation, 'biodiversity hotspots' (Harmon, 2013: 78). Biodiversity hotspots are 'areas that hold exceptionally high levels of the planet's endemic plant and terrestrial vertebrate species and which also are losing large percentages of their natural habitat' (Harmon, 2013: 78-79). The approach to heritage conservation in FloraCultures begins from this premise. The Southwest region is not only an epicentre of biodiversity but also of biocultural diversity—cultural heritage is part and parcel of the biological heritage equation. Additionally, the plurality of botanical heritage (i.e. 'cultures' rather than 'culture') is vital, and spans traditional Aboriginal Australian knowledge of plants, colonial-era European writings and artworks, and contemporary immigrant perceptions of local Perth-area flora. For FloraCultures, cultural plurality also signifies the bringing together of the 'two cultures' of the humanities and sciences in the conceptualisation and production of a repository. However, while much has been invested in conserving the biodiversity of the

Southwest in which metropolitan Perth is situated (i.e. plants and their

environments), work remains to be done to ensure that the region's biocultural

diversity stays intact, alive and accessible to current and future audiences.

The Digital Repository: From Tangible and Intangible to Integrative Heritage

Biocultural heritage integrates the natural and cultural; a digital repository becomes

a site for reconfiguring these distinctions. As such, it is necessary to consider the

relationship between the artefact itself and the conceptual work it facilitates. Digital

media techniques have been applied to the conservation of cultural heritage (for

example, MacDonald, 2006). Moreover, the rise of digital technologies and new

media in heritage conservation has been described extensively for its participatory

potential (for example, Parry, 2010). However, less has been published on the

application of digital creativity to natural heritage protection and promotion (Brown,

2007, Maffi and Woodley, 2010). I argue that this discrepancy, in part, is a result of

the nature/culture dualism, in which the onus of natural heritage protection falls to

conservation science and allied scientific disciplines. Articulating a biocultural form

of heritage for Perth—and attempting to conserve it through a conceptual

framework (theory) and an online repository (practice)—has required consideration

of the role of archival instruments in the digital era. Rather than static tools of

preservation—the virtual equivalents of dusty archives, contained in a physical

location and visited by specialist researchers—digital repositories can become

community-engaged spaces of creative production, building relationships between

users, participants and conservators. The dynamic, interactive and participatory

possibilities of digital repositories are compatible with the genre-blending of

heritage content in FloraCultures, in terms of nature and culture, as well as 'tangible' and 'intangible' forms (Dorfman, 2011).

Indeed, botanical heritage (as biocultural) can be tangible, intangible or both. Yet, like the nature/culture binary, these categorical distinctions risk slighting the interconnections between forms of heritage. The field of critical heritage studies interrogates these dualisms through actual practices of heritage conservation. For example, Laurajane Smith (2006) critiques the assumptions of authorised heritage discourses (AHD) in terms of what constitutes heritage (typically material artefacts and places, in her view) and the exclusion of the public from direct involvement in conservation processes. Smith's argument can be applied to botanical heritage. On the one hand, tangible botanical heritage (TBH) includes 'materialized forms of cultural expression' (Lixinski, 2013: 7) involving plants, for example, as architectural works constructed from local timber, items of clothing woven from plant fibres, or artisanal creations using plant dyes, flowers or seeds. On the other, intangible botanical heritage (IBH) can be theorised as either dependent *on* or independent *of* tangible heritage. As dependent, IBH encompasses 'the processes, skills, and beliefs leading to the creation of tangible works' (Lixinski, 2013: 8). As independent, IBH refers to the memories, stories, songs, dances, ceremonies and other knowledge forms involving plants that do not necessarily have fixed material reference points (Ryan, 2012: Chapter 8 on 'botanical memory'). However, as FloraCultures indicates, all IBH is dependent on, referential to, or triggered by material artefacts to some extent. Human memories of nature are catalysed or deepened by direct reference to living things, meaningful objects or important places. For instance, songs might necessitate real instruments made from tree bark or ceremonies might centre on the

use of an aromatic resin from a local species. In other words, TBH and IBH are inextricably related in theory and practice; the division between tangible and intangible is a false binary, especially considering the role of living flora and plant-based objects in prompting intangible heritage (memories, stories, ceremonial knowledge, etc.).

In the Perth context, tangible botanical heritage (TBH) is scattered across a number of physical locations, such as the archives of the WA Museum and small private collections. Similarly dispersed, the intangible botanical heritage (IBH) of the area is evident in recorded oral histories with Aboriginal Australian and Anglo-European interviewees, as well as extant textual, audio and video material. The FloraCultures repository is designed to conserve both forms of heritage, that is, to make visible the complementarity between the tangible and intangible in terms of plants. Indeed, the multifaceted potential of a digital repository offers a space which can manifest past, present and future dynamics between heritage forms. One of the roles of an online repository such as FloraCultures is as a collection of digitised cultural artefacts—including texts and visual artworks—designed to give the user an impression of the region's botanical heritage. However, the repository also serves as a signifier of tangible botanical heritage, involving photographic and written documentation of plant-based artefacts existing in a physical space somewhere else, such as the private collections of a botanical artist. Yet another identity of a repository is as a research tool or a taxonomy of the biocultural world—a database— that allows users to search for and locate content systematically. In the digital era, a repository is additionally an interactive, educational or promotional platform, making possible the crowdsourcing of heritage material, including family-based

memories and community-shared stories. In the latter two senses, the repository is a creative space for artists, writers, activists, researchers and concerned citizens or, in Boris Groys' terms, a 'living machine' capable of change, adaptation and decline.

For Groys, the boundaries of a biocultural repository are fluid and changing. The determination of what is significant and, therefore, to be included in a repository (what he terms the 'New') and what is irrelevant and, therefore, to be excluded (the 'Old' or 'noncollected reality') reflects the dynamic contexts in which heritage is always produced and situated (Groys, 2012: 1-2). More than a representational system or posterior instrument, the repository provides the basis for historical, cultural and artistic creation, as 'a machine for the production of memories, a machine that fabricates history out of the material of noncollected reality' (Groys, 2012: 3). A biocultural repository is not designed as a static artefact available to a privileged few. Digital preservation and access are dynamic processes, engaging networks of users, creators and conservators and involving citizen archivists and community members (Prelinger, 2009). As a long-term resource, an online repository facilitates 'cultural production' (rather than cultural preservation only) from preserved content, reflecting the Creative Commons notion of 'free culture' which limits the reach of restrictions on creative (re)use of material (Lessig, 2004)

The theory and practice of the FloraCultures repository are designed to move seamlessly across forms, in recognition of the intrinsic links between these typologies. As a digital artefact—rather than a physical space where heritage objects can be preserved and displayed—FloraCultures is poised to foreground tangible-intangible connections. For this reason, I have been conducting oral histories with

individuals with cultural knowledge of the plants of Kings Park. Recollections of certain species lead to memories of botanically rich places outside of the park that have been drastically impacted by the recent clearing of the bush. For example, Kim Fletcher, a Kings Park Volunteer Guide for over ten years, reflects on his life-long interest in orchids, fostered by childhood excursions throughout the Armadale area in the southern suburbs: 'Underneath the marri (*Corymbia calophylla*) I remember these pink enamel orchids, not the purple ones, much bigger and popping up through all the leaf litter. So glossy looking. They were beautiful' (Fletcher, pers. comm., 2013, 13 April). Kim's memories meander between Perth and Armadale—his recollections not circumscribed by the physical limits of Kings Park. Moreover, in an interview, the memories and stories of botanical artist Nalda Searles are continually elicited by touching, smelling and pointing to the plant-based creations surrounding us in her home, demonstrating the correlation between tangible heritage (e.g. botanical works of art made from balga (*Xanthorrhoea preissii*) leaves) and intangible heritage (e.g. memories of collecting the leaves and knowledge of their tactile properties) (Searles, pers. comm., 2014, 8 April).

Ecopoiesis: From Thinking and Making to Environmental Praxis

As a digital object with a conceptual underpinning, the repository underscores the dynamics between thinking (theorising, critiquing, analysing) and making (doing, producing, materialising). However, a theme in the literature of the digital humanities posits critique as either separate from making or a relic of traditional humanistic inquiry and, in particular, the practice of textual analysis. For example, although he is willing to admit critical theorists into the field, Stephen Ramsay (2011b) asserts that 'personally I think Digital Humanities is about building things [...]

if you are not making anything, you are not […] a digital humanist'. Moreover, for Ramsay, the digital humanities involve 'moving from reading and critiquing to building and making', even at the risk of being 'undertheorised' (Ramsay, 2011a). Just as natural/cultural and tangible/intangible typologies limit eco-digital humanities research, so too does the thinking/making binary reinforced by some theorists. In contrast, FloraCultures involves thinking-making reflexivity in which each iteratively moulds the other.

Practice-led research offers a basis for rethinking theory/practice in the digital humanities. In his 'A Manifesto for Performative Research', Brad Haseman describes practice-led as experiential research resulting in new forms of performance or exhibition, or interactive digital objects, such as games. What he calls 'performative research' (as a third research paradigm after quantitative and qualitative paradigms) is suited to user-led projects and end-user research (Haseman, 2006: 9). In particular, the approach engages 'the processes of trialing and prototyping […] in the development of research applications in online education, virtual heritage, creative retail, cultural tourism and business-to-consumer applications' (Haseman, 2006: 9). Practice-led research is 'initiated' and 'carried out through' practice (Gray, 1996). Exegetical commentary in practice-led projects explicates the central role of thinking-making reflexivity, in which the object (e.g. a text, performance, composition or repository) is more than situated *in* but is shaped *by* critical discourse.

In conjunction with the practice-led model, a concept which helps to resolve the theory/practice opposition is ecopoiesis—borrowed from ecocriticism and applied to eco-digital productions (for example, Mules, 2014; Rigby, 2004). I define

digital ecopoiesis as the making of interactive digital objects, shaped by ecological

discourses, such as ecofeminism, bioregionalism and sustainability. *Poiesis* is

'making' or 'producing', whereas *praxis* is 'doing' or 'acting' (Mules, 2014: 21). In a

phenomenological sense, poiesis means 'bringing forth'—the dynamic capacity of

things (animate and inanimate) to change, adapt or decline. Moreover, *physis*, as the

material becoming of nature (e.g. seeds bursting, flowers opening), is poietic

bringing forth. Mules (2014: 22) argues that an object (biological or digital) *is* the

poiesis it manifests and that the concept 'identifies the being of things in their

becoming other: in their creative, shaped and connected possibilities'. The poiesis

exhibited by a botanical artwork is related to the plant's material becoming, leading

to a condition of 'co-becoming other' between the creative work and the living

species, and between species within an ecosystem (Mules 2014: 22). For Kate Rigby

(2004: 440), ecopoiesis involves an 'enhanced understanding of the natural world'

and 'technologies that are more compatible with its continued flourishing'. Her

interpretation of ecopoiesis encompasses praxis in relation to digitality: 'Poiesis

extends ultimately to a whole way of life. As such it is itself a form of praxis' (Rigby

2004: 430).

Ecopoiesis heralds the possibilities between environmental thinking and

making in digital contexts. Here it should be noted that not all digital theorists

subscribe to the thinking-making dichotomy. For these scholars, the making of

objects enables ecological concepts to concretise and, conversely, the making of

concepts allows eco-digital objects to come into being. Johanna Drucker (2009: 31)

argues that 'making things, as a thinking practice, is not only formative but

transformative'. 'Iterative conceptualisation' refers to 'the means by which

intellectual work takes shape (literally and metaphorically)' (Drucker, 2009: 31).

Moreover, 'tinkering' is an iterative form of experimentation with digital objects—a process of shifting between thinking and making, rather than from the former to the latter, as Ramsay would have it (Jones, 2013: 179). At the centre of FloraCultures is ecopoiesis—mediating nature/culture, tangible/intangible and thinking/making dualism and, therefore, creating pathways for digital interventions into Southwest WA biocultural diversity. The outcome is a praxis (in Rigby's joined sense of poiesis and praxis, thinking and making) of botanical heritage protection.

FloraCultures: From Collecting and Archiving to Crowdsourcing

FloraCultures uses community-building processes to safeguard and procure botanical works of heritage value. In addition to conserving digitised versions of 'objects' (e.g. floral illustrations or botanical poetry), the repository aims to crowdsource extant material while fostering the creation of new works by local artists and researchers. The repository operates across temporal levels—encompassing the more widely known historical records (e.g. the nineteenth-century writings of George Fletcher Moore), non-collected heritage content existing in smaller collections, and future works by botanical thinkers and makers. This multi-temporality is an ecopoiesis of heritage conservation; the digital repository is an object 'in-the-making', in which archival material initiates the ongoing creation of biocultural heritage.

One of the project's community-building approaches is 'design thinking', or 'the methods and processes for investigating challenges, acquiring information, analyzing knowledge, and positioning solutions in the design and planning fields' (Plattner, 2012: v). This 'style of thinking' involves empathy, creativity and reason in collaboration with potential users during different phases of a project (Plattner,

2012: v). Informed by design thinking, in 2013 I conducted focus groups with end-users, including Kings Park, the WA Wildflower Society, Cockburn Wetlands Centre and an informal botanical artists collective (including writers). These parties represent botanical education, propagation, field conservation and creative production. In response to a questionnaire, all Kings Park respondents agreed that the project offers a means for educating the public about biocultural heritage. More than 75 per cent of respondents already use cultural content in educational tours or writings. However, 90 per cent indicated an interest in accessing more Aboriginal knowledge of plants, as well as nineteenth and twentieth-century art and literature. In design terms, 85 per cent agreed on the value of a repository search function using Aboriginal, common and scientific names.

In conjunction with design thinking, crowdsourcing is a common dimension of community-based archival work. It is a problem-solving approach that enables an initiative to acquire content, services or concepts through a 'crowd' (i.e. a group or community) (Brabham, 2013: 120-121). Eco-digital creativity emerges at the interface between the crowd and the institution. This approach enables expressions of botanical heritage to be captured through a small-scale 'community archive' (Cook, 2013) to which members of the crowd are integral. Although it lacks a physical location, FloraCultures has attracted donations of bioculturally significant artefacts, such as sculptures and diaries, some of which can be digitised or, at least, digitally documented. Moreover, users will be invited to upload personal recollections or community knowledge of plants, thereby crowdsourcing intangible heritage and enhancing the 'participatory' (Huvila, 2008) potential of the resource. The result will be a web of stories about people, place and plants, juxtaposed to

images and written commentaries, prompting the input of other users. The ecopoietic web will foster contributions from Perth botanical community members, many of whom are accomplished scientists or artists.

Like the Kings Park discussions, focus groups with botanical artists centred on design possibilities, but with an interest in social media and online community development. In these sessions, I gathered input on the layout of the proposed repository but also encouraged 'the crowd' to consider the content they already had (e.g. personal letters of colonial-era artists) or could create (e.g. visual artworks to be based on plants). Rather than a static device, the repository—well before its completion—has already become a 'living machine' for past, present and future biocultural heritage work.

Conclusion: The Cultural Significance of Flora

In developing FloraCultures, I have needed to reconsider the binaries of nature/culture, tangible/intangible and theory/practice. The iterative process of decoupling and reformulating these linkages has happened alongside the work of biocultural conservation and the making of a digital repository from the ground up. The documentation of botanical heritage in all its expressions necessitates the intermingling of these conceptual formulations. This article has argued that ecopoiesis provides a middle path—a way of thinking about the eco-digital object as an agentic work-in-becoming that is always natural and cultural. It is via this middle path that the heritage value of Perth's flora can be articulated and appreciated.

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