Landscape and Urban Planning 178 (2018) 130–143

Contents lists available at ScienceDirect

Landscape and Urban Planning

journal homepage: www.elsevier.com/locate/landurbplan

Research Paper

Natural burial as a land conservation tool in the US

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ARTICLE INFO

Keywords:
Cemetery
Land conservation
Land restoration
Open space
Natural burial

ABSTRACT

Natural burial (NB) is an ecologically-sensitive alternative to traditional burial in a lawn-park cemetery. NB can reduce or eliminate the use of resources and toxic byproducts, but NB may also be more environmentally sustainable due to its potential as a land conservation tool. We address the research question 'How is natural burial being used as a tool for land conservation?' by assessing secondary data of NB trends in the US, creating a verified inventory of NB grounds, evaluating three NB models being used to conserve land, and assessing the regulatory barriers to NB. Our study reveals there are currently 162 geographically dispersed NB providers in the US and few legal restrictions to NB. The three prototype cases—representing restored agricultural land, land on the urban fringe in threat of development, and forested land adjacent to existing conserved public land—provide planners with promising models from which context-specific solutions can be adopted.

1. Introduction

Choosing how and where the dead are interred is a land use decision of communal significance and permanence that cuts across cultures and geographies (Bennett & Davies, 2015; Teather, 1998; Wright, 2005). Burial practices and burial locations reflect a combination of market, social, and emotional values, that can be at odds with each another (Bennett & Davies, 2015; Davies & Bennett, 2016; Harvey, 2006; Longoria, 2014; Niță, Iojă, Rozylowicz, Onose, & Tudor, 2013; Pattison, 1955). The conflicts created by disposition practices (including burial, cremation, and other forms of internment) reflect community perceptions about what constitutes proper practice, and which of these values should take precedence (Woodthorpe, 2011) including the sustainability of burial practices.

The US practice of burying embalmed human remains in a lawn-park cemetery is not environmentally sustainable. It may commit land and potential natural habitat to a single-use, consumes significant resources for caskets and vaults, and introduces a host of toxic byproducts into the environment—from the embalming fluids used to preserve bodies to the petrochemicals needed to maintain manicured landscapes. These practices undoubtedly have local environmental impacts, but the gross consumption of resources also has more far reaching regional and global impacts. Alternatives to embalmed full-body burial in a lawn-park cemetery—densification, cremation, and natural burial—are not new, but their rising popularity in the US presents an opportunity for planners to rethink the future of interment space. Among these choices, natural burial (NB) offers perhaps the most extensive set of environmental and social benefits. NB is a potential tool to reduce the environmental footprint of final disposition, and it has the potential to create the multifunctional greenspaces that community planners often struggle to realize.

Understanding NB in the US requires situating the practice in a broader global context. Natural burial, approached as a new phenomenon in Western Europe and the US, in fact represents standard practice in many places either driven by religious obligation, necessity, or tradition (Clayden & Dixon, 2007). Muslim communities around the world practice a form of NB as a basic religious obligation (Uslu, Baris, & Erdogan, 2009). Bodies are embalmed in some African communities, especially among wealthier Christian families, but the majority of bodies are not, forming in effect a continent-wide practice of NB (Lee & Vaughan, 2008). Burial officially replaced cremation during the Maoist revolution in China, yet cremation is still the norm among a majority of Chinese families (BBC., 2016; Wei, 2016). The full body burials that do occur in China are green in the sense that bodies are not typically embalmed and are buried in simple wooden caskets (Whyte, 1988). In some European countries, as well as in Australia and New Zealand, gravesites are open to reuse after a designated period of time (Barron, 2017). We find other contemporary burial practices in different parts of the world that are effectively green by virtue of their adherence to tradition. These include the practice of being buried among tree roots in

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https://doi.org/10.1016/j.landurbplan.2018.05.022
Received 29 August 2017; Received in revised form 4 May 2018; Accepted 28 May 2018

the Peruvian Amazon (Shepard, 2018), the disinterment of bones after a prescribed period of decomposition in Greece (O'Rourke, 2018), burial in the bush in Tanzania (Kopytoff, 2018), and sky burials in Tibet (Martin, 1996). These many examples of greener burial practices from around the world contrast with the century-long tradition in the US of maintaining single-use gravesites in perpetuity, a practice that results in ever expanding cemeteries and involves highly resource consumptive burial practices.

In this paper we review current US disposition practices as well as several less consumptive alternatives. We highlight how NB is more environmentally sustainable than other disposition alternatives, and then focus our study on addressing the research question: How is natural burial being used as a tool for land conservation? To answer this question, we survey the prevalence of NB grounds in the US, present three cases of NB land conservation (Glendale Memorial Nature Preserve in Florida, Honey Creek Woodlands in Georgia, and Larkspur Conservation Burial Ground in Tennessee), and summarize the potential land use, legal, and financial barriers to NB. We conclude that, if incorporated into the community planning process, NB holds promise as a land conservation tool due to its market potential, the relative absence of legal barriers, its cost savings, and its substantial environmental and social benefits over other disposition practices.

2. The Problem: current disposition practices in the US

The practice of burying an embalmed body in a lawn-park cemetery on the urban fringe has been the norm in the United States for over a century, but this practice is changing. The ideal of the American lawn-park cemetery has a distinct history, beginning with the rural cemetery movement in the 19th century. As urban elites grew wealthy, their relationship to the memorialization of death shifted (Linden-Ward, 1989; Mitford, 1963; Sloane, 1991). Picturesque rural cemeteries like Mount Auburn in Boston, Laurel Hill in Philadelphia, and Green-wood in Brooklyn created an environment that could serve multiple functions—as monuments to the earthly stature of the urban bourgeoisie and pleasurable retreats from increasingly crowded cities (Harris, 2007; Schuyler, 1986; Sloane, 1991).

Lush new burial grounds began to appear around cities, and an entire death care industry (DCI)[1] developed alongside, peddling an array of funerary services from embalming to elaborate caskets to underground vaults as necessary infrastructure to secure a serene eternity (Mitford, 1963; Sloane, 1991). By the early 20th century the modern lawn-park had become a standard, with an open grass field and gravestones as design centerpieces (Bender, 1974; Rugg 2006; Sloane, 1991). Over time this design, the disposition practices it supports, and expectations of an eternally manicured appearance have made lawn-park cemeteries increasingly unsustainable, economically and ecologically.

2.1. Use of resources

There are a total of 145,546 "places" in the US that the United States Geological Survey has designated as cemeteries (USGS., 2016). The vast majority of these cemeteries are either full or abandoned and are therefore not considered "active" (Zelinsky, 1994). Woodsen (2014) has estimated that there are 22,500 active cemeteries in the US. The rising popularity of cremation has reduced the volume of materials consumed by full-body burial, but what still ends up in the ground remains substantial. Woodsen (2014) has estimated that every year in the United States we bury approximately:

- An amount of hardwood equivalent to a board 73,000 km long (2.5 cm × 2.5 cm)
- 58,500 metric tons of steel
- 1.5 million metric tons of concrete
- 16.3 million liters of embalming fluid (3.1 million liters of formaldehyde)

A typical 4 ha swath of cemetery contains enough wood to construct 40 homes, approximately 900 metric tons of steel, 18,000 metric tons of concrete, and enough toxic embalming fluid to fill a typical backyard swimming pool (Harris, 2007). Projecting this out to the approximately 207 square kilometers of land it could take to bury the population bubble of the US Baby Boom generation born between 1946 and 1964 and approaching average life expectancy (Basmajian & Coutts, 2010; Coutts, Basmajian, & Chapin, 2011), and the above estimates of resources buried in a 4 ha cemetery land can be multiplied by 5175.

3. Potential solutions

Increasing awareness of the excessive costs and footprint of embalmed burial in a lawn-park cemetery has heightened interest in less consumptive alternatives (Coutts, Basmajian, Salkin, & Merriam, 2013). These alternatives range from intensifying the use of existing cemeteries with high density vaults, mausolea, and columbaria, to cremation and developing NB grounds.

There are several ways to densify existing cemeteries to allow more burials on less land while maintaining the practice of embalming and casketing. One method is grave intensification where the caskets of family members are grouped and arranged vertically in a single vault. Another is the addition of mausolea or above ground vaults. Mausolea are free-standing structures that can be added to existing cemeteries to increase capacity. While both grave intensification and mausolea are less land consumptive alternatives to the single occupancy grave, they still present relatively high monetary and environmental costs.

By far the most popular alternative to embalmed burial is cremation, which has been on the rise in the US for decades. From 2000 to 2015, the proportion of Americans choosing cremation nearly doubled to 48.6% (CANA., 2016), and 2016 marked the first year that the proportion choosing cremation surpassed burial (Singhal, 2017). Several factors have contributed to the steady rise in cremation including environmental concerns, fewer religious prohibitions, and preferences for simpler, less ornate ceremonies, but the primary driver has been cost (NFDA., 2015b). From 2004 to 2014, the median cost of an adult casketed funeral with viewing and ceremony followed by burial rose nearly 30% to $8500 (NFDA., 2015a). There is an approximate $1000 savings in choosing cremation, not burial, after an adult casketed funeral with viewing and ceremony, but costs are dramatically reduced by choosing a simple direct cremation without viewing and ceremony, which averages only $2200 (NFDA, 2015b). Though consuming less land and fewer material inputs, cremation still requires significant energy inputs, and burning any carbon-based material contributes to air pollution. Another issue with cremation is the dedicated, single-use space needed to house or scatter cremated remains, or "cremains."

We postulate that natural burial stands as the most conscientious alternative on the spectrum of ecological sensitivity. The standard definition of natural (or green) burial is widely accepted as burial of an unembalmed body in a biodegradable casket or shroud with no vault (Davies & Rumble, 2012). Table 1 summarizes the environmental costs and benefits of the array of disposition practices in the US. As compared to a full-body burial in a lawn park cemetery, cremation has far fewer environmental costs and provides the environmental benefit of consuming less land through densification, but the environmental costs are elevated when cremation is preceded by a full-body viewing ceremony. Mausolea and columbaria also provide the benefit of densification, but the preparation of the body for housing in these structures involves the same environmental costs as below ground internment. Natural burial greatly reduces environmental costs and provides a number of environmental and social benefits. The social co-benefits not only include

[1] Today, the DCI directly employs 141,000 people and generates upwards of $16 billion in annual revenue (US Census Bureau, 2012a; US Census Bureau, 2012b).