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CO-CREATORS OF MEMORY, METAPHORS FOR RESILIENCE, AND MECHANISMS FOR RECOVERY: FLORA IN LIVING MEMORIALS TO 9/11

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*Planting trees to mark the passing of events and people is a longstanding tradition around the world. To better understand the contemporary practices of memorialization through planting, we examine living memorials created in response to the events of September 11, 2001. As an extension of the U.S. Forest Service Living Memorials Project, we reviewed existing data (n = 787 sites) and identified 223 sites where stewards mentioned planting 102 kinds of flora. Oaks (*Quercus *spp.) were most commonly mentioned (17% of sites), while 75% of plants/trees were named at only 1% or fewer sites, underscoring their diversity. We also visited 21 sites to document their flora and conduct interviews with stewards (n = 34 stewards from 33 sites; 13 interviews were conducted by phone). We find that the symbolism of flora plays a role in continuing to keep memories alive at living memorial sites through flora traditionally used in death and memorial contexts; through more localized symbols particular to the sites as conveyed through the meanings of color, habit, and number; and through a newer symbol we identify, the callery pear* (Pyrus calleryana) *survivor tree. We also find that the community-based planting practices in public space are meaningful themselves, as they can serve as a mechanism to promote healing and recovery for communities and sometimes also promote the co-recovery of social-ecological systems.*

Keywords: *living memorial, ethnobotany, 9/11, New York City, survivor tree*

Introduction

Since ancient times, flora around the world have been imbued with potent symbolism of life and death (Russell 1981). Across cultural, geographic, and temporal boundaries, their planting, harvest, and use marks life-stage events and connects people to a world beyond their own. Flora also serve as important markers of memory, such that they have "become a landscape requirement in contemporary popular cultures of commemoration" (Sather-Wagstaff 2015:236) and are recognized as "active co-constituents in memorialization" (Cloke and Pawson 2008:107). As with other plantings, memorial plantings have a complex relationship with time. They encourage us to look toward the future since they are expected to grow, but at the same time they reflect the past, evoking memories. Here, we focus on flora in living memorials, landscaped spaces created to honor and remember individuals, places, and events (Svendsen and Campbell 2010).

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There are some common flora in memorials worldwide; however, their meanings can vary cross-culturally and over time. For example, *Plumeria rubra* (plumeria) is traditionally associated with death in Central America, its native region where it is commonly planted in cemeteries and its fragrant blossoms are used in funerary rituals. In Hawai'i, where the tree is introduced, *Plumeria* was also planted in cemeteries until the 1940s, when the growth of the tourism industry expanded its use into celebratory and performance contexts (Staples and Herbst 2005). Its blossoms are fashioned into *lei* (garlands) which are worn by hula dancers and they are also given as symbols of appreciation, *aloha* (love), and honor. The act of planting itself can be symbolic without reference to a particular species. In the post-disturbance context (e.g., floods, earthquakes, terrorist attacks), tree planting can be an expression of recovery (Fisher et al. 2015; Tidball 2014) and "an important part of 'memory work'" (Svendsen and Campbell 2014:342; see also Young 1994).

Although some research describes the symbolism of plants in ritual funeral settings and cemeteries today (Dafni et al. 2006) and in the past (Dreslerová and Mikuláš 2010), very little research identifies the plants used in contemporary memorial contexts and even less is written about the reasons for selecting particular flora (cf. Sather-Wagstaff 2015). This is surprising considering the widespread practice of creating living memorials across space and time (Young 1994), especially given the hundreds of memorials created in response to the September 11, 2001 terrorist attacks in the U.S. (9/11) (Svendsen and Campbell 2010). The work presented here is an extension of the Living Memorials Project (LMP) created by the U.S. Forest Service following 9/11. Our purpose here is to understand the role of flora in contemporary memorialization through examples from LMP.

Flora Traditionally Associated with Death, Afterlife, and Memorializing

Long-lived, Coppicing, and Evergreen Flora

Trees that are long-lived, large, and/or that coppice have traditionally symbolized the continuation of life after death and a means to maintain connections to the deceased in multiple cultural contexts. In Southern Madagascar, plantings of the long-lived tandory (*Alluaudia procera*) mark the final path followed by the dead body and the tomb; these spiny succulent shrubs are said to "grow with the spirit of the dead" (Tengö and von Heland 2014:336). In South India, middle-caste Nayars bury urns containing their relatives at the foot of jack-fruit trees (*Artocarpus heterophyllus*) which represent the life-span of the family (Uchiyamada 1998). Across the Han empire, ancient memorial ancestral shrines were engraved with a tree, likely birchleaf pear or sweet pear tree (*Pyrus betualaefolia*), which represented long life (Brashier 2005). In the Celtic region, ancient (Hooke 2010) and recent associations of the European yew (*Taxus baccata*) regard it as "one of the most powerful symbols of resurrection and eternal life" because of its "seeming ability to come back to life after dying" (Drury 1994:102). The yew is also widely featured in twentieth century Christian

cemeteries (Gough 1996). In England, the evergreen bay tree (*Laurus nobilis*) is another tree "long regarded as a symbol of resurrection, probably because an apparently withered tree has the capability of reviving from its roots" (Drury 1994:102). Pine trees (*Pinus* spp.), which are evergreen and also have long life, large stature, and coppice, have similarly long been associated with vitality and life after death. In Scotland, burials of ancient chiefs and warriors are often found under pine trees (Cockerell 2008). Given the association of coppicing with eternal life, it follows then that the cypress (*Cupressus* spp.), which does not coppice, is a symbol of death (Whittick 1960). Mediterranean cyprus (*Cupressus sempervirens*) are planted in Muslim cemeteries of Northern Israel as a symbol of mourning (Dafni et al. 2006), a symbol that may date to pre-Christian times, as suggested by their presence in the tomb gardens of Pompeii (Jashemski 1979).

Mighty Oaks

Oak trees are also large in stature, long-lived, and coppice; however, they stand out in their widespread symbolism and use across Asia, Europe, and North America. The broad distribution and elaborate species differentiation (approximately 600) of the *Quercus* genus likely influence their importance across the northern hemisphere. Logan (2005:21) unequivocally states that "no tree has been more useful to human beings than the oak." In addition to being important for lumber, shade, and food, Western cultures strongly associate these iconic trees with virtue and majesty (Hageneder 2005), "sacred[ness]…strength, longevity, and endurance" (Sather-Wagstaff 2015:246). Lore from Ancient Britain and Germany associates the oak with "kindness and nurturing but also the ability to fight when needed" (Hageneder 2005). In ancient Indo-European cultures, oak was most commonly associated with temples (Cusack 2011).

Over the ages, oaks have been used in funerary and cemetery settings. People were buried in oak coffins in the Bronze Age and they were buried in oak ships in the time of Vikings (Logan 2005). In the 1800s, gravestones in rural U.S. cemeteries began featuring oak trees to represent immortality and acorns to represent life and renewal. At the same time, heroes' groves (rather than burials) in Germany featured one oak tree for every fallen soldier (Sather-Wagstaff 2015). Today, war memorial oak groves in the U.S. are found in Texas (Angelo State University 2015), Louisiana (Louisiana State University 2015), Kentucky (Kentucky Department of Travel and Tourism 2015), and Illinois (Oak Ridge Cemetery 2009). Oaks also continue to be featured in civilian memorials (Williams 2010), including the National September 11 Memorial in New York City (NYC), dedicated in 2011 (Figure 1).

Although the National September 11 Memorial & Museum's website explains that the oaks were selected for their shade, durability, and leaf color (National September 11 Memorial & Museum 2015a), the oaks are also powerful symbols. The oak tree has been recognized as an icon of American heritage since it was designated as the national tree in 2004 (Arbor Day Foundation 2004), and its symbolism continues to be reinforced and expanded. The museum's online store features molded leaves from the memorial's swamp white oaks (*Quercus bicolor*) fashioned as souvenir key chains and ornaments that "serve as graceful and

Figure 1. Memorial Grove of 400 swamp white oaks (*Quercus bicolor*) at the September 11 National Memorial in Manhattan, NYC. (McMillen)

hopeful symbols of life and longevity" (National September 11 Memorial & Museum 2015b).

Tree Architecture and Growth Habits

The architecture and growth habits of trees can suggest death and mourning. In ancient Hindu mythology, strangler figs (*Ficus* spp.) are portrayed as death trees (Russell 1981), likely due to their aerial roots that eventually envelop and often kill their host trees. The weeping willow tree (*Salix babylonica*) has multiple associations, but most commonly represents mourning. Willows (*Salix* spp.) are featured in multiple legends, Shakespearean tragedies, and biblical references—including Psalm 137 about the captive Jews who remembered Zion, wept sitting by the rivers of Babylon, and hung their "harps upon the willows." Willows were also popular in English grave monuments and funerary plaques in the mid-nineteenth century due to their "gracefully wilting branches and mournful demeanor" (Gough 1996:73). Willows continue to be popular representations of mourning today (Halamish and Hermoni 2007).

Contemporary Living Memorials: Their Roots and Branches

The roots of contemporary living memorials can be traced in part to memorial groves. Some feature specific trees to help narrate the events being memorialized, often on or near the grounds where people perished. New Zealand's World War II memorial, opened in 1953, is an elaborate assemblage that symbolizes the diverse battle sites where members of the 19th Battalion died:

Figure 2. Commemorabilia placed at 9/11 memorial wall bearing names of deceased at the Shrine of St. Joseph in Edison, NJ. (McMillen)

> Atlantic Cedars from the Atlas Mountains of North Africa, Spanish Pines from the coastal Mediterranean, Olives portraying Greece, Crete, and Italy, and the Black Pines of Central and Southern Europe. Clumps of local native species represent the 19th men now on New Zealand soil. (Cloke and Pawson 2008:115)

The Oklahoma City Memorial, established in 1997 to memorialize the lives lost in the 1995 bombing of the Alfred P. Murrah Federal Building, includes a "rescue orchard." Its trees represent the diversity of first responders to the bombing, from the native redbud or Oklahoma state tree (*Cercis Canadensis*), to introduced varieties including the Amur Maple (*Acer ginnala*) and Chinese Pistache (*Pistacia chinensis*) (Veil et al. 2011:176).

Contemporary vernacular memorials are relatively small landmarks, often identifying the site where a loved one died due to a vehicle crash or drowning. These can be seen as branches that differentiate contemporary memorialization practices. Family members and friends typically create and steward these roadside and waterfront sites, which have a home-made aesthetic often featuring flowers (live or plastic) and/or a cross that may be embellished with the name of the deceased and artifacts (e.g., stuffed animals, statuettes, candles). Like shrines, the sites are respected as sacred and they venerate loved ones, in some cases with a hero or martyr-like status. Research on roadside vernacular memorials in the United States (Doss 2010) and Australia (Collins and Opie 2010) primarily highlights sociopolitical aspects of geography and identity, not botanical aspects.

As seen in formalized settings such as the Vietnam Veterans Memorial in Washington D.C. and in spontaneous, informal settings such as the roadside site in Paris where Princess Diana died in a vehicle crash in 1997 (Doss 2010), and the Place de la Republique in Paris—which was adorned to commemorate the victims of a terrorist bombing in 2016—shrine-like, vernacular memorials and offerings for the victims of 9/11 flourished in Union Square and other locations throughout Lower Manhattan immediately following the plane crashes at the

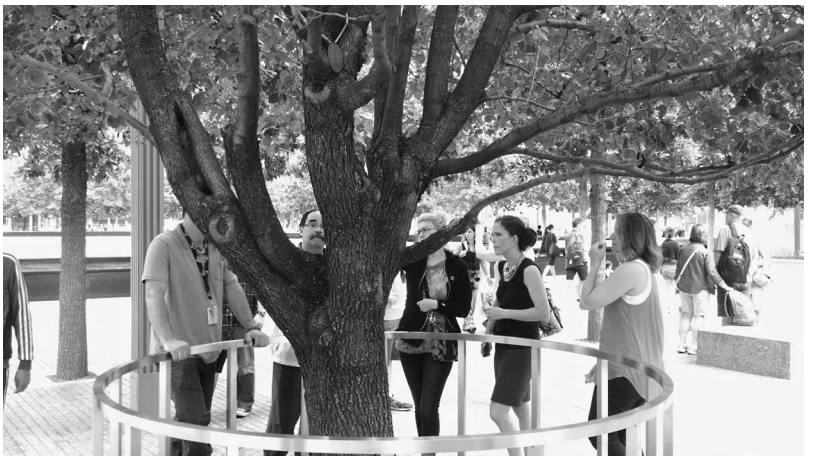

Figure 3. Visitors to 9/11 National Memorial listen to staff recount the story of the survivor tree. (McMillen)

World Trade Center. Many visitors to 9/11 living memorials today continue to leave commemorabilia—personalized offerings to their loved ones (Figure 2).

Another potent symbol that emerges in 9/11 memorials includes the "survivor tree." Because of the extreme disturbances they have endured, these trees become compelling symbols of recovery for communities seeking to respond and reconnect following a tragedy. They are found on battlefields (Gough 1996), atomic bomb sites (Conti and Petersen 2008), areas affected by natural disasters (Matsuda 2011), and terrorist attacks (Veil et al. 2011). The Oklahoma City Memorial features an American elm (*Ulmus americana*) survivor tree as the site's "most profound symbol of spirituality and hope" (Veil et al. 2011:178). The online gift shop offers seedlings from the tree that can be "planted as personal symbols of survival" (Veil et al. 2011:175) and commemorative ornaments molded from its leaves serve "as a reminder that the spirit of the city and this nation will not be defeated; our deeply rooted faith sustains us" (Oklahoma City National Memorial Foundation 2014). This survivor tree inspired the 9/11 Memorial Director of Design and Construction to "repatriate" the 9/11 survivor tree to the 9/11 Memorial plaza (Vega 2015) (Figure 3). Although this callery pear (*Pyrus calleryana*) is not marked, visitors seek it out amidst the uniformity of the 400 oaks. In both Oklahoma City and NYC, the survivor trees are seen as symbols of surviving and thriving despite the terrorist attacks.

Beyond the symbolism the trees have for their respective memorials, the propagation and exchange of survivor trees across sites of tragedy represents mutual support and unity. Both memorials propagate their survivor trees, have exchanged them with each other, and distribute them to other survivors of tragedy. The propagation and exchange of survivor trees emerges as a compelling metaphor for new life and tenacity, a topic worthy of further discussion but beyond the scope of this article. We now turn toward community-based living memorials to 9/11 to better understand the roles of flora in contemporary commemoration. In what ways are flora co-creators of memory? How do the

memorials call upon traditional symbols and/or inspire the creation of new symbols? What other factors influence the creation and stewardship of living memorials?

Methods

To honor those affected by 9/11, LMP was initiated by the U.S. Forest Service at the request of Congress. Initially, the project included funding to support communities in creating their living memorials, but has since become a longitudinal research project to document the creation and evolution of living memorials and to deepen a social-ecological understanding of community-managed green space. The work we describe here draws from our LMP database of 787 living memorials and in-depth data gathered from 2002–2004 (n = 117 sites) through semi-structured interviews, site observations, and photographs. These document the social and biophysical characteristics of memorials including: purpose, the events held on site, if the site is considered sacred and why, the approximate number of trees on site, the approximate number of new trees planted or planned, and names of trees. (For full results from the 117 interviews, see Svendsen and Campbell 2010.)

Here we report on follow-up ethnobotanical research conducted in two phases during 2015. To strengthen the rigor and reliability of the research, we triangulate existing data (described above) with follow-up interview transcripts, field notes, and photographs. First, we created a list by reviewing the LMP database for all mentions of flora planted and the reasons for selecting them. Existing interview transcripts and photographs provided additional detail and context for the resulting summary lists of trees and plants. Second, following procedures of prior informed consent, we conducted site visits and interviews (July–October 2015) on site at 21 living memorials and via 13 telephone interviews with stewards from an additional 12 sites (September–October 2015) located primarily in the NYC metropolitan area (New York, New Jersey, Connecticut) and one in Maryland. Researchers invited participants based on in-depth and long-term relationships among stewards and researchers (14 years in most cases) and stewards (n = 34) participated based on their availability. These relationships and the existing data provide a strong foundation for understanding the significance, meaning, and importance of the memorials which were explored in follow up semi-structured interviews (Lofland and Lofland 1984). We asked stewards about changes to the site and its stewardship, the flora present and why they were chosen, achievements, and challenges. Additionally, we noted and photographed the flora to triangulate with other data sets and to better understand the botanical character of the sites. For logistical reasons and out of respect for the sacred and sensitive nature of the sites, voucher specimens were not collected. The identification of flora was based on information provided by stewards, authoritative texts (Barnard 2002; Petrides 2008), and consultation with specialists.

Findings: Patterns and Purposes of Flora in 9/11 Memorials

While living memorials to 9/11 are found throughout the country, the greatest density is in the NYC metropolitan area. In response to the urgent desire to respond to the loss, these community-based living memorials were constructed shortly after 9/11, long before a national memorial at the World Trade Center site was dedicated in 2011. Most living memorials were initiated by individuals, informal groups, and civic organizations rather than by government agencies. They vary greatly in form, from single trees to forests, and involved the rededication of existing green space and the creation of new green space. They are located in forests, ocean front, parks, community gardens, town centers, found space (e.g., traffic islands, vacant lots), and on school and hospital grounds. They honor victims from among the nearly 3,000 who perished as well as responders and survivors. Because the severity of the destruction meant that only a small fraction of victims' family members received any physical remains, in many cases, these sites are revered as gravesites. In the following section, we report our findings on the patterns in flora composition seen across sites and the stewards' explanations for planting them.

Flora as Symbols of Life and Healing as the Basis for Living Memorials

As has been documented around the world, flora at these living memorials are seen as symbols of life that connect to a larger reality beyond the space and time we occupy as individuals. A woman who lost her husband, a NYC firefighter performing a rescue at the World Trade Center, explained how the act of planting pine seedlings at the memorial in Sterling Forest (Tuxedo, NY) was "very healing in and of itself because it was a living thing." Family members marked the specific trees they planted for their loved ones by adorning them with ornaments, drawings, notes, and rock designs. Similarly, a steward at the Garden of Healing memorial site in the Staten Island Botanical Garden (New York City, NY) explained:

> . . .nature is one of the things greater than all of us. It's always here, as long as the world is here, nature is here. Plants grow. Maybe the idea of returning to the soil and then things visibly growing from the soil gives us the sense of continuity of the Earth and people. . .Putting us in touch with our own finiteness and our continuity.

A fireman who helped plant trees at the same site commented:

> I think people in general, the whole world, associates greening, trees, shrubs, and flowers with something very peaceful. . .It's only natural that you come to a place like this to have a reflection on something that affected you. That's just the way we are as people. Just the forest, the green, the beautiful flowers have an effect on us. It's the natural way of doing things.

The primary steward from the Healing Garden of the Federated Garden Clubs of New York State in Staten Island reflected on the trees they planted and said, "I've

spent many beautiful times under those trees with people who all for some reason feel, you know. They expressed to me sadness. I didn't ask them to…it just…that's the power of living things." As has been documented with roadside shrines to vehicle accident victims (Einwalter 2007), designing, maintaining, and visiting these memorials is part of the mourning process that allows survivors the opportunity to "work through the loss" (Collins and Opie 2010).

Most Common Flora across Sites

A subset of sites (n = 223) from the database had records of stewards mentioning 102 different kinds (or generic categories) of plants and trees. These are primarily flora that were planted for the living memorials, but also includes those previously existing on site. The names stewards used ranged from broad categories (e.g., evergreen, perennials) to specific species such as "*Cornus kousa*" and varietals such as "Mount Vernon Red Maple," demonstrating a continuum from general to specialized knowledge. Guided by the respondents, most of whom used terms at the common folk level versus the specific species level, we followed principles of folk taxonomy (Berlin et al. 1974) of generic, specific, and varietal. When specific taxa were mentioned, we collapsed them into their generic categories for the purpose of analysis. (A list of all plants and trees mentioned and the number of mentions for each is found in Supplemental Table 1.) This decision also follows our interest in understanding if any specific flora are represented across a majority of sites.

Patterns emerged indicating the most salient categories of flora mentioned but none were in the majority of sites. Oaks were the most common, with 17% (41) of sites. This includes the specific oaks: sawtooth, willow, red, shumar, live, burr, Daimyo, white, English, and American (all *Quercus* spp.), which we collapsed into their generic "oak" category. Maples (*Acer* spp.) were also commonly mentioned at 14% (33) of sites. Specific maples mentioned included: red, Norway, silver, sugar, Manitoba, Amur, and sunset, as well as varietals—Mount Vernon Red, Japanese Red, Green Mountain Sugar, and Crimson King. All were counted as their generic "maple." Cherries (*Prunus* spp.), mentioned at 8% (18) of sites, included the specifics black, snow fountain, and weeping and the varietal Weeping Higan Cherry. The only specific evergreen mentioned was Douglas fir (*Pseudotsuga menziesii*). Otherwise, sixteen other site representatives simply mentioned they had, or had planted, evergreens. Dogwoods (*Cornus* spp.), mentioned at 7% (15) of sites, included the specific identifiers Appalachian spring, flowering, and *Cornus kousa*. Pines (*Pinus* spp.), also mentioned at 15 sites, included white, red, scrub, Austrian, Loblolly, barrens, pitch, and the varietal Fastigiate White Pine.

Across sites, composition is highly heterogeneous. Most flora (75% or n = 77) were only named at 1% or less (three or fewer) of sites. The top mentioned flora are listed in Table 1.

Number of Trees Symbolizing Lives Lost

At some sites, the number of trees planted was more symbolic than the type of tree. At the New Jersey Living Memorial, A Grove of Remembrance, the original goal was to plant 691 trees to memorialize the 691 New Jersey (NJ) lives

Table 1. Most mentioned flora types across 223 Living Memorials to 9/11.

Categories	No. mentions	Percent sites
Oak (*Quercus* spp.)	41	17%
Maple (*Acer* spp.)	33	14%
Cherry (*Prunus* spp.)	18	8%
Evergreens (multiple genus)	17	7%
Dogwood (*Cornus* spp.)	15	6%
Pine (*Pinus* spp.)	15	6%
Magnolia (*Magnolia* spp.)	13	6%
Birch (*Betula* spp.)	12	5%
Pear (callery and possibly *Pyrus* spp.)	9	4%
Rose (*Rosa* spp.)	9	4%
Spruce (*Picea* spp.)	9	4%
Crepe myrtle (*Lagerstroemia* spp.)	8	3%
Elm (*Ulmus* spp.)	8	3%
Sweet gum (*Liquidambar* spp.)	7	3%

lost on 9/11, but the project surpassed its goal and hundreds more trees and perennials were planted at Liberty State Park. The design of the Marlboro Township Living Memorial (NJ) included 15 dogwood trees, the state's official memorial tree, to honor the 14 who died from their community, plus one more to represent all the other victims and heroes. In An American Remembrance in the Manalapan Arboretum (NJ), 12 trees were planted to represent the 11 Manalapan residents that died and the twelfth tree represents all of the remaining victims and heroes. They are regionally common trees, including tulip poplar (*Liriodendron tulipifera*), London plane (*Platanus* × *acerifolia*), Hornbeam (*Carpinus betulus*), Ginko (*Ginko biloba*), and little-leaf linden (*Tilia cordata*), among others. At the Garden of Healing, the Federated Garden Clubs of Staten Island planted 78 smoke trees (*Cotinus* sp.) for the 78 fallen fire fighters from the borough. At the Richard Cudina Memorial (Lebanon, NJ), the chief steward (Cudina's widow) planted 16 Yoshino cherry trees (*Prunus* × *yedoensis*) to represent the 16 deaths from their county. In Glen Rock (NJ), 11 flowering plums (*Prunus* sp.) were planted for the 11 community members lost.

Color Symbolizing Patriotism, Remembrance, and Peace

Color can evoke emotions and the color of leaves and blossoms also played a role in the selection of flora for living memorials. Patriotic themes featuring annuals that are red, white, and blue were documented at multiple sites, including the West 104th St. Garden (NYC), the Memorial Courtyard in Binghamton, NY, the 9/11 Hometown Memorial in Babylon, NY, and Eisenhower Park American Patriot Garden in Nassau County, NY. Since annuals are ephemeral, they likely appear and disappear at other memorial sites, too. Through flower color and through other symbols, such as American flags and remnant steel from the World Trade Centers, sites that are not physically connected share common themes of patriotism and unity.

The yellow ribbon for remembrance was invoked as a reason for choosing yellow flowers. A steward at GRACE Memorial at Veteran's Park in Glen Rock (NJ)

explained they display and distribute yellow roses (*Rosa* spp.) annually at their 9/11 ceremony "because [of the custom to] tie a yellow ribbon 'til you come back." An organizer of the Daffodil Project that distributes thousands of bulbs annually around NYC explained that she thought daffodils (*Narcissus* spp.) were chosen, in part, because "yellow is technically the color of remembrance." Drawing on another traditional association with color, one steward explained that the purple fringe plants (possibly *Chionanthus virginicus*) at the Healing Garden of the Federated Garden Clubs of New York represent the bravery of the fallen firemen, a nod to the purple heart, a military award given to the next of kin of an armed forces member who is killed in action or dies as a result of war wounds.

Other sites featured flora with white flowers that bloom in the spring, which represented peace and the renewal of life for multiple stewards. White crape myrtle (*Lagerstroemia* spp.) were planted "to represent doves and symbolize peace" at one site. At the Memorial of Remembrance at the Shrine of St Joseph (NJ), "white pines [*Pinus strobus*] were selected because they symbolize peace in Native American culture and plants with white flowers were selected because they are seen as healing to the touch." The viewshed Memorial groves are located at distinct vantage points in each of NYC's five boroughs where people observed the World Trade Center's destruction. Each site features white flowering redbuds (*Cercis canadensis f. alba*), chosen both because they are hardy native trees and for their white blossoms that are "uplifting and pure." The 9/11 Memorial Grove in Brooklyn's Prospect Park (NYC) features trees that flower white in the spring, including dogwood (*Cornus* × *Celestial*) and magnolia (*Magnolia* × *soulangiana*), along a curving pathway at the end of a long, open meadow so that the "grove feels like it is hugging you" in a subtle way. The temporality of color and memory also came into play with maples. Multiple stewards talked about how the flush of red leaves in the fall marks the time of 9/11 and inspires reflection.

Stature and Habit Symbolizing Tall Structures, Smoke, Weeping, and Reflection

Across sites, stewards described how trees and plants were chosen because of the symbolism attributed to their stature. The plaque at the U.S. EPA Region II memorial (Edison, NJ) explains that the selection of trees was based on their stature and number.

> Each of the trees [is] symbolic. Columnar Pin Oaks to represent the Twin Towers, Weeping Cherries are memorials to the suffering and sadness experienced as a result of the attacks, and three Hollies to symbolize the lost, living who suffered loss, and generations to come.

Other sites also planted two tall columnar trees to represent the fallen Twin Towers. Pin oaks (*Quercus palustris*), red oaks (*Quercus rubra*), junipers (*Juniperus* spp.), dawn redwoods (*Metasequoia glyptostroboides*), towering cypress (*Cupressus* spp.), white pines (*Pinus strobus*), and spruce (*Picea* spp.) were among those chosen for that purpose.

Seven of the 18 sites that listed cherry trees specified weeping cherries (*Prunus* spp.), which multiple stewards attributed to their mournful posture. Like weeping cherries, willows (*Salix* spp.) also set a lugubrious tone and stewards

Figure 4. A site steward (left) at the Healing Garden explains the symbolism of the flowering smoke trees (background) and knock-out roses (foreground) to a Forest Service researcher (right). (McMillen)

referred to their drooping stature as reflective and sullen. One steward said "a Persian weeping willow was planted in memory of the tears, sorrow, and beauty of the lives that were lost." In the Staten Island Healing Garden, smoke trees were chosen because of the smoky appearance of their flowers (Figure 4), which symbolized the smoke encountered by the firefighters at the crash site in Manhattan.

Two ephemeral living memorial projects created by artists focused on planting sunflowers (*Helianthus* spp.) around Manhattan because of their resilient, upright, sculpture-like, and cheerful nature. The organizer of the Sunflower Project NYC said:

> Like New Yorkers, sunflowers are tenacious, surviving and thriving in adverse conditions. Sunflowers improve the ground and air where they grow, attracting birds and butterflies. They make sense as one tall way to remember life and make it a bit better—it's hard not to look up in their presence.

The Suntowers project creator aimed to demonstrate how small things, like seeds, could turn into something even bigger than the sunflowers themselves, such as towers. His concept was to plant sunflower seeds along Manhattan's streets in an outline ten times larger than the actual World Trade Center towers.

Survivor Trees

We documented survivor trees at four sites. The Living Memorial Grove, initiated by NYC Department of Parks and Recreation staff, features five

callery pear and linden (*Tilia* sp.) trees that were rescued from the Ground Zero and replanted together at the base of the Brooklyn Bridge in Lower Manhattan. A steward described them as "siblings that...had borne this tragedy together and we didn't feel we had the right to separate them." He continues to bring visitors to see the trees because they help tell an important part of the story of recovery.

The other three sites planted callery pear saplings that were grown from seeds produced by the same tree that survived and was rescued from Ground Zero and later re-planted on the same site after the 9/11 Memorial was created. As progeny of the tree that witnessed and endured the devastation, the seedlings are laden with symbolism of resiliency and renewal. The one planted at the Garden of Healing in the Staten Island Botanical Garden was among the first survivor tree offspring to be planted; however, in a twist of cruel irony, it did not survive its first winter. (The survivor tree is one of multiple features that have not endured at that memorial, likely due to a combination of its large size, elaborate design, and reductions in the Botanical Garden staff.) The two other survivor trees we observed at the memorial in the Manalapan Arboretum (NJ) and at the September 11 Family Group Memorial (Brooklyn, NYC) (Figure 5) are thriving. Stewards from both sites expressed how proud they are to have survivor trees, which they feel connect them both to the site of the tragedy as well as to the broader community of survivors. The tree helps tell their story of resilience and tenacity as survivors.

Co-recovery of Social-Ecological Systems

While the symbolism of flora at some memorial sites was described in literal terms, other stewards spoke about the symbolism of the process of restoring a site's ecological functions while promoting emotional recovery within the community as well. One of the reasons the particular site in Prospect Park (Brooklyn) was chosen for the 9/11 Memorial Grove is because it "needed restoration anyway." The memorial in Jersey City (NJ) consists of 10 acres where hundreds of trees and perennials were planted to restore a former brownfield site at Liberty State Park. The designer of the Richard Cudina Memorial focuses most of her effort on the woodlands surrounding the built aspects of the memorial. She "wants everything to be native" and so she routinely removes non-native invasive plants, protects native trees from deer browsing, and propagates and plants native trees. On Long Island (NY), at the beachfront Babylon Hometown Memorial, the site coordinator from the Department of Environmental Control chose hardy, native, and naturalized perennials to stabilize the dunes and salt-tolerant, hardy trees to serve as a windbreak. His goal is to create a place that honors the victims and their families while also restoring the native dune system. This restoration was done with extreme weather and coastal protection in mind; indeed, the memorial survived the winds and tides of Hurricane Sandy. A final example is about an hour's drive from NYC: the Sterling Forest Arrow Lake Memorial (Tuxedo, NY), 80 acres of conservation land that are managed for psycho-social and ecological recovery. Before 9/11, health professionals had already begun "prescribing" experiences there to support patients' recovery from trauma. Immediately following 9/11, staff implemented a program for Fire

Figure 5. Survivor tree signage in English and Russian at the September 11 Family Group Memorial, Brooklyn, NYC. (McMillen)

Department of New York families who lost loved ones at the World Trade Center. In a subsequent commemorative event, they planted white pine and spruce seedlings beneath dying hemlocks in dedication to those lost. A steward explained how planting was part of their bereavement process and it helped them feel connected to their loved ones.

> People just want to sit with and visit their tree quietly before they engage in socializing and comradery with other surviving family member support groups…acknowledging your loved one's loss, to do it with a living memorial, to do it with a tree—it's a living thing, it connects you back to the life and gives you a sense of how they continue on…and it's still a part of the world, it's almost like some little part of them gets imbued to the tree and so it's like they stay where we are.

The seedling survival rates and hemlock regeneration exceeded expectations. As a result, both ecological and emotional recovery are being realized at the site.

Perhaps it is at these sites of co-recovery that the flora play the most active roles in the co-creation of memories and as mechanisms for recovery.

Discussion: Memory, Metaphor, and Mechanism: The Roles of Flora in Living Memorials

How Do the Memorials Call Upon Traditional Symbols and/or Inspire the Creation of New Symbols?

The practice of planting one tree per deceased in the form of honor groves has been well documented with war memorials abroad (Sather-Wagstaff 2015) and is also evident among living memorials to 9/11 in our research. While the symbolism of each tree representing a life lost can be compelling, it can also make a site vulnerable. When a tree that has been dedicated to a deceased individual dies itself, the symbolism can take on a negative tone. At one site, two columnar oaks were planted to represent the Twin Towers. One thrived but the other did not, and the desired effect was compromised. A designer of the 9/11 viewshed memorials in NYC parks talked about avoiding the "one place, one object, one tree design" and chose to plant multiple individuals of the same hardy species (white flowering redbuds) as a way to build resilience into the memorial. She noted that avoiding singularity also avoids making the memorial territorial, which is important in public spaces meant to be appropriate for everyone, such as NYC parks. Indeed, a number of stewards avoided dedicating a tree to a specific person because of that risk. Some parks even have policies against such dedications.

Although oaks and evergreens were relatively common across LMP sites, and both are traditionally associated with memorializing, there is likely more at play. The oak's strong representation in the U.S. social-ecological landscape is likely the reason it is so widely featured in living memorials. Given its symbolism as our national tree and given the large stature, long life, and wide distribution of the *Quercus* genus, it is not surprising that it emerged as the most popularly documented tree across memorial sites. It is somewhat surprising that its traditional associations were invoked only once by an interviewee. An organizer of the "Patriot Gardens" in the Hudson Valley explained that an oak tree was chosen specifically because its strength represented the personality of the person being memorialized. Similarly, the traditional associations of evergreens with rebirth were not mentioned by stewards. Perhaps some traditions are expressed through habit and familiarity rather than conscious choice, a potential subject for further research.

Another theme conveyed through the flora and other design features of the memorials is a sense of national unity and shared identity. This includes oaks as a symbol of American heritage, survivor trees being exchanged across sites of tragedy, and the planting of red, white, and blue annuals. Although native species were not invoked as symbols of national, regional, or local identity, some stewards did talk about the ecological value of their sites as they promote natives and/or work to remove invasive species. The symbolic (not just ecological) value

of native species for fostering a shared identity could be explored in future research on memorials.

New botanical symbols have arisen in 9/11 memorialization practices. As the official memorial tree for the state of NJ since 1951 (State of New Jersey 1951), the dogwood may have been given some preference; however, most stewards commented on the beauty of its flowers as a reason for planting it and only one referred to its special designation. Another more recent tradition that is becoming a well-known, potent symbol is the callery pear 9/11 survivor tree. It emerges from the tragic event and acquires an iconic status due to circumstance, not its identity as a particular species, color, or stature. While this symbol is striking, the tree was only documented alive at three sites; however, this may be due to the recentness in which these survivor saplings have become available. An agricultural high school in Queens (NYC) has been caring for hundreds of survivor tree seedlings that may be distributed to groups who want to commemorate 9/11 in that way. We may see more plantings of survivor trees in the future.

How Do Behavior, Form, and Other Attributes of Trees Play Symbolic Roles in Living Memorials?

The color and form of trees can represent emotions, personality traits, and a specific time of year in the context of living memorials. Stewards who planted maples explained they were chosen because of their availability in and suitability to the region and because of their brilliantly colored leaves, the timing of which coincides with the anniversary of 9/11. For some, yellow daffodils became a symbol of recovery from 9/11, but they have since become a symbol of recovery more broadly as the scope of Daffodil Project itself has expanded, for example to areas most affected by Hurricane Sandy. This speaks to the malleable nature of living memorials and the "work" their plantings do. It also speaks to the diversity of the sites and their memories that are co-created by people through the stories they tell about their plants. The species are less important than how many, how tall, or how white their flowers may be. They have been chosen because they attract butterflies, help tell the story of the smoke that billowed from the towers, or because each spring they bring new life and inspiration.

What Other Factors Influence the Selection of Species and Spaces for Memorializing?

While symbolic associations of specific trees' type, habit, and color are woven into stewards' explanations of their memorial plantings, the botanical composition of sites also reflects the preferences and expertise of the community, surviving family members, volunteer landscape architects, and the availability of suitable planting materials. Logistical reasons such as funding, climate, site conditions, and the accessibility of plants and open space also influence the selection of flora and sites for memorials. Indeed, some stewards explained that plants were chosen on the basis of their environmental suitability as tolerant to drought, salt, or pests. Site designers and stewards work to balance practicality with ideals about how the sites should look. For example, a steward at the Healing Garden in Staten Island initially described their smoke trees as symbolic

representations of fallen firefighters and later she explained they were also chosen because they are heat tolerant, affordable, and available in the event one needs to be replaced.

Stewards understand the importance of having a sustainable design, especially as funding for 9/11 programs has declined considerably over the last fifteen years. A degraded memorial is seen as an embarrassment that is disrespectful to the victims and their families. One steward described his challenges managing dandelions, the reason for complaints from a vocal community member. Conversely, a well maintained memorial is seen as a sign of ongoing respect and care—an indicator of human investment in the site (Nassauer 1995). Stewards work diligently to maintain their sites and, in some cases, this has meant transforming the design to a more sustainable one that is more resilient on its own with less ongoing care and maintenance. Instead of featuring annuals, multiple sites have converted to perennials. These shifts in plant composition seem not to have compromised the meanings and the memories stewards attach to the sites. Across cases, some more clearly articulated than in others, the act of planting and the plants themselves are seen as active agents in the recovery of people from the emotional trauma. Future research could explore how stewards weigh the composition of sites with the process of maintaining them in their efforts to commemorate and recover.

Conclusion: The Work of Flora in Living Memorials

At the most fundamental level, the symbol of trees and plants as living forces is at the heart of all living memorials. Yet, their symbolism can also play specific roles in the co-creation of memory. Stewards described the flora in their memorials as metaphors for what was lost: the number of community members and their characteristics (e.g., occupations such as fire fighters; characteristics such as brave, strong, inspiring). Flora are also prompts used to punctuate narratives with the sentiments surrounding the events of 9/11, whether they be mournful (willows, weeping cherries), hopeful (springtime blossoming), or tenacious and resilient (survivor tree, sunflower). While in some instances these community-based living memorial sites may share some traits of "negative heritage" (Meskell 2002) that function as "repositor[ies] of negative memory in the collective" (Meskell 2002:558), in other cases they are more personalized and positive than more official hallmarks of post-September 11 culture that emphasize the creation and consumption of patriotic and heritage artifacts. In this study, memorial stewards explained that people under 18 years of age have no personal memories of 9/11 and that engaging them with the memorials—through educational tours and stewardship—helps them to recount the events as they unfolded in real time and became a day they would "never forget," whether it was due to the death of a loved one, the reconfiguration of their urban landscape, or perception of a new era of vulnerability.

Yet, the most common theme we documented among stewards is that the acts of planting and tending memorials are mechanisms for recovery and healing.

Many stewards described an overwhelming feeling of helplessness upon learning about 9/11, while also experiencing an intense desire to "do something." Engaging nature and tending plants has been shown to ameliorate stress (Adevi and Mårtensson 2013) and stewards described how they experience reduced anxiety and increased well-being through creating living memorials. One woman described it as "cathartic." Through the collaborative work of planting and caring for flora in memorials, grief became embodied and processed. One steward described digging holes to plant trees as "driven by the need to do something and get our hands in the soil." The ongoing stewardship of sites is part of the memory-work and the ongoing process of healing, described by stewards as their "therapeutic outlet." Some stewards recounted the achievement they felt in overcoming great odds (financial, logistical, horticultural) to create their memorials, which they saw as a parallel to overcoming the great emotional challenges their families and communities faced following 9/11. We also find that the ongoing work of planting and stewarding LMP sites has been "community building work," a theme in other research that documents how the well-being and social cohesion of the group is supported in gardens (Milligan et al. 2004) and parks (Kaźmierczak 2013).

We find that there is a basic need for people to enact rituals such as creating and tending living memorials not just to mark past events, but also for the sense of community they promote, for the expressions of resilience they represent, and for the healing they can embody. Overall, we find a prevailing engrained desire to memorialize loss that becomes differentiated by a combination of location and intent as well as time. This is an area to explore both in future research and in praxis as decisions are made regarding the use of community-managed open green space in our cities and towns. In many ways, symbolic acts of planting occur at one moment in time and the vegetation may last for one to two generations without consistent stewardship over both the site and its meaning. In revisiting many of the 9/11 memorials to better understand the ethnobotanical aspects, we've found that their flora are co-creators of memory, metaphors for resilience, and mechanisms for recovery. Through the life of the plants, living memorials symbolize the ability to live on and they reaffirm a community's strength and the ability to continue in the face of hardship and disturbance. At the same time, as living beings, these trees and plants dedicated as memorials "in perpetuity" *will* eventually die. Given this inevitable truth, how can we best understand the role of these landscaped sites as part of our collective memory, particularly through symbolic and ritual acts of dedication and memorialization, as well as more subtle, ongoing acts of stewardship and care?

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