Recovering the urban forest: The role of trees, tree culture, and place attachment before and after Hurricane Harvey

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ABSTRACT

Trees can be powerful symbols that contribute to the production and consumption of places. Disaster events, such as hurricanes, alter the physical landscape, causing tree damage and loss. In places with strong tree cultures, the reforestation of damaged landscapes becomes an implicit element of recovery plans; however, less is known about the implications of tree loss to community recovery. In 2017, Hurricane Harvey made landfall near the coastal communities of Rockport and Fulton, Texas. Rockport-Fulton, known for its beach tourism, is home to a remnant live oak (*Quercus virginiana*) forest shaped by coastal onshore winds. Many of Rockport-Fulton's windswept oaks were damaged or lost along with native and non-native palm trees. Rockport-Fulton's history is imbued with stories situated around its oak forest. Drawing from multiple sources and participant observations from repeated site visits, we analyzed references to Rockport-Fulton's trees in news media, organizational communications, and public exhibits before and after Harvey to understand the area's tree culture and its associated discourses. We also interviewed tourists, business owners, and community members nine months after Harvey to understand their perceptions of recovery efforts. Our findings show that tree narratives pre- and post-Harvey amplify social-ecological systems definitions of resilience and that tree loss was a dominant theme in the recovery process for all participants. Yet we also found that tourists discussed the damage to palm trees, whereas community members focused on the loss of live oaks. Despite these preferences, trees available through replanting efforts contained few live oak and palm species; furthermore, recovery plans did not amplify trees in recovery strategies. Overall, our findings highlight the importance of replanting trees during the disaster recovery process in a way that not only enhances local biodiversity but also reaffirms place characteristics to meet community members' and visitors' expectations.

1. Introduction

Trees provide important services to cities that are essential to achieving sustainable and resilient urban environments (Hirokawa, 2011; Ordóñez and Duinker, 2010). Trees work to make urban areas more sustainable and resilient by attenuating air pollution, mitigating flooding, reducing energy consumption, raising property values, promoting community cohesion, and enhancing quality of life (Roy et al., 2012). Urban forests contribute to the cultural representation of places where trees work to strengthen an area's sense of place and foster place attachment (Cloke and Jones, 2002; Lo and Jim, 2015). Trees also acquire symbolic meaning in cultural systems where they represent social ideas, qualities, or processes derived from their biological aspects (Rival, 1998). For instance, trees symbolize life, growth, strength, and rebirth (Dwyer et al., 1991; Tidball, 2014b). Together these services enhance the wellbeing of people and allow them to recover more quickly from environmental change (Beatley and Newman, 2013).

Despite the important services urban forests provide, trees are lost each year to urban processes and natural disasters. Estimates suggest that urban canopy cover in the United States declined 40,000 ha per year between 2012 and 2017 due to urbanization (Nowak and Greenfield, 2020). A complex set of spatial and temporal dynamics influenced in part by urban (re)development patterns (Croeser et al., 2020; Lavy and Hagelman, 2017) and individual preferences (Conway, 2016; Kirkpatrick et al., 2013) drives urban forest loss at the neighborhood scale. Tree loss across large swaths of both public and private lands also occurs from natural disasters (Burley et al., 2008). For example, Hurricane Katrina resulted in the loss of approximately 320 million trees (Chapman et al.,

2008), and an estimated 301 million trees died across Texas as the result of a 2011 drought (Texas A&M Forest Service, 2012b). Tree recovery after natural disasters is often uneven (Salisbury et al., 2022), and large, acute tree losses from disaster events have the potential to impact environmental services, such as flood mitigation and air pollutant removal, as well as social, cultural, and economic services, including community aesthetics, artistic significance, health and wellbeing, and recreational opportunities.

The abrupt change in the physical landscape after natural disasters, in many cases, renders the landscape unrecognizable to residents and changes their emotional connection to the place (Knez et al., 2018; Schumann, 2015; Zavar and Schumann, 2020). In places with strong tree cultures, community members and visitors accustomed to a forested landscape, may experience an emotional response tied to the loss of trees after a disaster event. For these locales, the reforestation of damaged landscapes becomes an implicit element of disaster recovery plans, and trees and tree-related activities become important symbols of recovery and resilience (Tidball, 2014b, 2014a). This research provides another case study to the growing body of literature on how tree loss affects community recovery efforts, alters a community's sense of place, and influences community members' and visitors' perceptions of the recovering area. Further insight into these dimensions would provide disaster management professionals and environmental stewards with information vital to creating more sustainable and resilient communities. Therefore, this research seeks to analyze the impacts and implications of tree loss through an examination of changes in a community's tree culture before and after a disaster event.

2. Sense of place, place attachment, tree cultures, and natural disasters

Sense of place is a geographic concept characterized by the multiple ways in which people connect with their surroundings and is defined as "the emotive bonds and attachments people develop or experience in particular locations and environments … [and it also includes] the distinctiveness or unique character of particular localities and regions" (Foote and Azaryahu, 2009, p. 96). Place attachment is a closely linked concept with similar definitions derived from environmental psychology that emphasizes the feelings, attitudes, and behaviors linked to a place (Gifford, 2014). Place attachment is also closely related to topophilia, another geographic concept, that refers to positive feelings representative of an individual's attachment to a place acquired from elements of the physical environment (Tuan, 1990). Yet feelings of nostalgia, or missing a place, often occur alongside place attachment. The term solastalgia may better capture the emotional distress when familiar places experience extreme change as often occurs following a disaster event (Albrecht et al., 2007). Together these concepts communicate how people emotionally connect with a place.

Sense of place and place attachment are informed by social-ecological systems operating across regions and influencing local characteristics. In other words, the interaction between human systems and natural systems creates distinct landscapes that affect how people and groups connect with areas. Visitors and residents (both permanent and nonpermanent) can attach meaning to the same places differently (Daryanto and Song, 2021). For example, in tourist areas, the physical environment plays an active role in creating a positive sense of place and fostering place attachment across a broad spectrum of visitors, including tourists, second homeowners, and seasonal visitors (Aronsson, 2004; Stedman, 2006). Tourists, in particular, become attached to a place through recreational activities, social experiences, and aesthetic qualities (Eisenhauer et al., 2000), whereas social bonds may serve as a greater driver of place attachment for permanent residents in the same location. Additionally, the amount of time nonpermanent residents spend in an area strongly influences their place attachment (Kelly and Hosking, 2008). Because of this, groups of place users, such as residents and visitors, often exhibit distinctive behaviors based on how their place

attachment manifests (Daryanto and Song, 2021).

Trees often play an important role in the cultural representation of places where trees are ascribed meaning with symbolic significance, strengthening an area's sense of place and fostering place attachment among residents and visitors, creating strong tree cultures (Cloke and Jones, 2002; Lo and Jim, 2015). In these places, trees become social-ecological symbols that "contain both social and ecological meanings, and also, more importantly, social and ecological interactions" (Tidball, 2014b, p. 265). For example, Tidball (2014b) describes the act of residents planting trees after Hurricane Katrina in New Orleans as a social-ecological symbol of community resilience, where trees exist as an ecological entity and the act of planting serves as a social activity that assists in community recovery. The interaction between the social activity (i.e., tree planting) and ecological entity (i.e., the trees) produces information relative to the values a community holds about itself and its recovery as well as the importance of trees to the wider community. In places with strong tree cultures, where trees serve as social-ecological symbols, we expect narratives to emerge about trees reflective of not only the physical spaces they occupy but also the imaginative spaces they inhabit within the memories of residents and visitors (Cloke and Jones, 2002). These discourses of trees either as environmental amenities (Stedman, 2003) or as iconic symbols signifying their cultural importance (Cosgrove and Daniels, 1988) further foster sense of place and inform place attachment. A discourse is "a specific ensemble of ideas, concepts and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1995, p. 44). Thus, discourse is a product of place, and people rely on discourse to explain and make sense of the places they occupy. Taken together, trees as social-ecological symbols and the (visual) discourse of trees reflect a specific tree culture.

A growing body of work considers the role of trees as part of the disaster recovery process from a commemoration context, including memorial groves (Heath-Kelly, 2018), survivor trees (Micieli-Voutsinas and Cavicchi, 2019), and living memorials (Ramírez and Serpente, 2012; Svendsen and Campbell, 2014). Commemoration is a vital part of the disaster recovery process (Eyre, 2007) as it offers communities the opportunity to acknowledge loss, including the loss of place-specific attributes (Zavar and Schumann, 2020). As disasters change once-familiar physical landscapes into the unrecognizable, a community's sense of place, or the emotional connections to the locale, is altered as well (Brown and Perkins, 1992). This warrants the re-envisioning, remaking, and reproducing of place during the recovery process (Chamlee-Wright and Storr, 2009). Commemorative acts, from physical monuments to performative ceremonies, can help individuals and communities recreate place in the wake of tragedy. The ritual of tree planting after disasters often symbolizes rebirth, supporting communities' recovery while also mitigating the loss of trees and re-establishing a more familiar landscape (Tidball, 2014a). Through this reproduction of place, survivors select what to remember and what to forget from the pre-disaster landscape. Commemoration, however, is also political in nature, where governments and institutions select whose narratives are preserved and which aspects of place are commemorated following tragedy (e.g., Alderman and Inwood, 2013; Simpson and Corbridge, 2006; Xu, 2018). Post-disaster landscapes are further altered by land management practices and policies that emerge during disaster reconstruction. These policies often encourage development which obscures the pre-disaster landscape enabling the forgetting of place and the event that altered it (Colten and Giancarlo, 2011).

Despite this potential for loss of place, reconstruction efforts to enhance community resilience to future events are critical (Beatley, 2014). Sustainable post-disaster reconstruction strategies during recovery efforts are increasing; however, their effectiveness varies (e.g., Fernandez and Ahmed, 2019). As part of these strategies, nature-based solutions play an increasing role in disaster recovery efforts (e.g., Mabon, 2019). Nature-based solutions use natural features to enhance

community resilience (Kabisch et al., 2016). Vegetation and trees, in particular, are restored and enhanced to protect areas from weather-related events. For example, the restoration of mangroves and other aquatic vegetation lessen storm surge and tsunamis (Osti et al., 2009). In urban areas, trees mitigate the urban heat island effect and attenuate flooding. In this way, restoration of natural features, including trees, after disaster events is critical to healthy ecosystem functioning and continued ecosystem services delivery (e.g., Pramova et al., 2012). Moreover, post-disaster tree replanting projects led by local communities can be leveraged to create desired outcomes (e.g., increased ecosystem services, human benefits, and social capital) that reinforce community resilience (Tidball et al., 2018). Thus, incorporating nature-based solutions that re-establish and enhance environmental infrastructure and that contribute to community resilience become paramount in the recovery process and are a growing element of disaster mitigation plans (Zavar and Lavy, 2021).

Given the importance of trees in the wider-disaster recovery process, we examine the role of trees and their place in a Texas coastal community recovering from 2017's Hurricane Harvey. In doing so, we add to the growing body of literature that examines trees as symbols, trees as contributors to sense of place, and trees as agents in disaster recovery efforts. Specifically, we detail the community's tree culture before and after Hurricane Harvey, consider contrasting expectations between the local community and tourists regarding the recovery of trees and the post-Harvey vegetated landscape, and discuss implications of these differing views for long-term community recovery. This case study

provides an understanding of how a strong tree culture informs recovery narratives and expectations across different groups.

3. Materials and methods

The coastal communities of Rockport and Fulton, Texas, are located on the Gulf Coast in the Texas Coastal Bend (Fig. 1). Rockport-Fulton's economy is dependent on tourism, offering year-round activities for visitors. Spring and summer tourists visit Rockport's family-friendly beach. Birders visit in the fall and winter to view migratory bird species at nearby Aransas National Wildlife Refuge, including endangered whooping cranes (*Grus americana*). Anglers visit year-round to fish off the many piers of Rockport-Fulton or in the Gulf of Mexico. Art galleries, cultural heritage sites, such as the Fulton Mansion State Historic Site and the Texas Maritime Museum, and specialty shops lining Rockport's main street draw tourists to the area. Additionally, annual festivals, ranging in theme from art to food to local wildlife, attract frequent visitors.

The towns of the Coastal Bend, including Rockport-Fulton, are situated in the Live Oak Woods physiognomic region of Texas. Live oak (*Quercus virginiana*) dominates this woodland environment with 71 to 100 % canopy cover (McMahan et al., 1984). Onshore coastal breezes shape the region's live oaks, resulting in a windswept growth pattern. Windswept live oaks are emblematic of the Texas Coastal Bend landscape (Fig. 2). Clusters of live oaks bend and twist away from the Gulf of Mexico, forming islands of matted branches and leaves suspended above the otherwise flat coastal terrain. Because of its uniqueness, the live oak
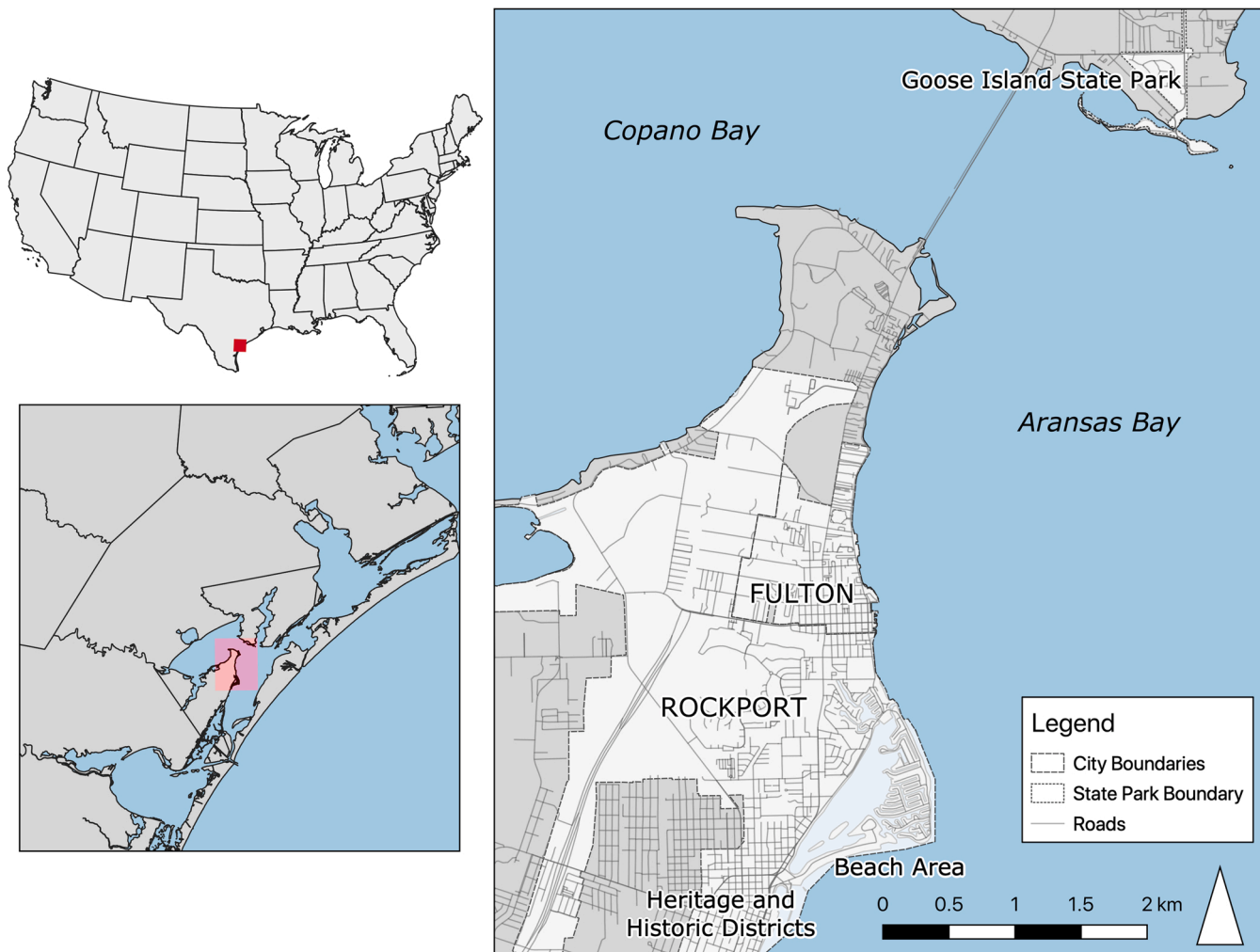

Fig. 1. Rockport-Fulton, Texas.

Fig. 2. Rockport-Fulton's Windswept live oaks (Image: B.L. Lavy).

woods in and around Rockport-Fulton are intertwined in the area's history, cultural identity, environmental systems, and sense of place.

Yet the dynamic cultural and physical landscape of the Coastal Bend is at risk to coastal hazards, including tropical cyclones forming in the Atlantic basin. Historical accounts document major storms in the area since the mid-1800s. In 1875 and 1886, powerful hurricanes made landfall near the former site of Indianola, Texas, 60 km northwest of Rockport-Fulton (Roth, 2010). In early August 1970, Category 3 Hurricane Celia made landfall south of Rockport-Fulton causing 15 deaths and widespread damage along the Coastal Bend (National Weather Service, n.d.). In late August 2017, Category 4 Hurricane Harvey made landfall near Rockport-Fulton, claiming the lives of 68 people and generating billions of dollars in losses to the region (Blake and Zelinsky, 2018). These disasters not only caused loss of life and damage to the built environment but also to the unique woodland ecosystem native to the Coastal Bend region.

Rockport-Fulton's history is imbued with stories situated around the region's live oaks. Stories include tall tale survival anecdotes of citizens clinging to live oak trees during hurricanes. These historical narratives shape present day identities and sense of place. The area's windswept live oaks feature prominently in logo designs and in business names across the region. Goose Island State Park is home to one of the largest living specimens of live oak, which features prominently on Texas Parks and Wildlife Department's materials. Additionally, the community celebrates its live oaks through art, festivals, and tourism events. For community members, winter Texans, seasonal visitors, and tourists, Rockport's windswept oaks transcend more than liking place, instead representing an emotional attachment to a place – the Rockport and Fulton communities. This affective place attachment, which Tuan (1990) calls topophilia, represents a range of positive moods, feelings, and attitudes about Rockport-Fulton, informed by experiences encountered in Rockport-Fulton against a backdrop of windswept coastal live oak trees.

Although the live oak is symbolic to the region, Rockport-Fulton's urban forest includes many commonly planted species, especially native and non-native palm species. The Coastal Bend is home to native Texas sabal palm trees (*Sabal palmetto*) as well as nonnative palm species, including Washington palm (*Washingtonia robusta*), royal palm (*Roystonea regia*), Bismarck palm (*Bismarckia nobilis*), and queen palm (*Syagrus romanzoffianum*). In Rockport-Fulton, these trees – products of past planning efforts – line thoroughfares in and near the beach and bay areas as well as its tourist-facing business district along Austin Street. The palm trees contribute to the beach atmosphere and related beach culture. Although the Sabal palm, as well as other native species including the live oak, are less prone to hurricane damage, many nonnative trees lack resistance to hurricane-force winds (Duryea et al., 2007; Duryea et al., 2007). Yet nonnative trees increase local biodiversity, contribute cultural ecosystem services similar to or better than native species, and depending on their requirements, may respond better to climate change than native species (Schlaepfer et al., 2020).

These findings have led researchers to increasingly call for the incorporation of nonnative species into urban forest management plans (Conway et al., 2019).

3.1. Data and analysis

Because of the strong tree culture in the area, this research examines the role of Rockport-Fulton's urban forest in the community's recovery from Hurricane Harvey (2017). Derived from the reported concerns and recommendations from Rockport-Fulton businesses and the local Chamber of Commerce, we conducted semi-structured interviews with tourists and businesses during the first Independence Holiday following Hurricane Harvey to examine levels of community recovery and tourists' perceptions related to recovery efforts. We conducted 61 interviews with tourists and 18 with business owners from 2018 July 3 to 5. Initial analysis of the interviews focused on the extent to which social networks and place attachment attracted visitors to the recovering community and explored ways to leverage early returners in the disaster recovery process (Zavar et al., 2020); however, many tourists and business owners reflected on the damage to Rockport-Fulton's physical environment, and in particular, they referred to tree loss. Because of this, we analyzed the interviews for discourse related to the physical environment and performed a thematic analysis to identify semantic and latent patterns related to Hurricane Harvey recovery from the vantage point of tourists and business owners (Braun and Clarke, 2006). Additionally, we implemented a quantitative content analysis to count the frequency of features (i.e., houses, restaurants, trees, etc.) tourists described as damaged or recovered (Krippendorff, 2013).

To increase the validity and reliability of our study, we incorporated a wide range of sources to understand the established tree culture in Rockport-Fulton and analyze perceptions of the landscape's recovery from Hurricane Harvey vis-à-vis its urban forest. Through multiple site visits from 2018 to 2019 and archival research over the same period, we collected and analyzed references to Rockport-Fulton's tree culture found in news media, organizational communications, and public exhibits. During site visits, we observed and photo documented the use of trees in logos, branding, and as part of community and tourism events to gain a better understanding of local tree culture (Rose, 2016). This included documenting narratives posted on placards around the area, such as at Goose Island State Park and the Rockport-Fulton Chamber of Commerce's visitor center. We also met twice with members of the Rockport-Fulton Chamber of Commerce and interviewed an additional business owner during our routine site visits. We further triangulated our findings via a subscription to the Chamber of Commerce's weekly email communications. Throughout the initial recovery phase, these bulletins highlighted community recovery initiatives sponsored by various government entities, including efforts to recover the area's urban forest. We also sourced references to Rockport-Fulton's tree culture from urban planning documents, news articles, and other public communications before and after Harvey. We employed a critical discourse analysis (Fairclough, 2010) to identify the overt and implicit themes within the text corpus. Through this bricolage (Denzin and Lincoln, 2011), we wove together multiple sources and diverse modes of analyses to capture the complex, interconnected processes that contribute to the recovering Coastal Bend landscape and Rockport-Fulton's reimagined sense of place.

4. Findings

By focusing on place and place attachment, our findings illustrate how live oak trees became social-ecological symbols of a place and the associated reimagining of that symbolic landscape during Hurricane Harvey recovery efforts. We begin with a presentation of the pre-Hurricane Harvey tree culture to identify how trees worked in the production of place before this recent disaster. In doing so, we focus our discussion on the predominant theme that emerged from our research

related to Rockport-Fulton's tree culture pre- and post-Hurricane Harvey. This theme centers on community resilience communicated through narratives that exemplify the elasticity of the Rockport-Fulton community through references to its urban forest.

The concept of resilience varies across space and time, discipline and context. From a social-ecological systems perspective, Walker et al. (2004, para. 7) defined resilience as "the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks." Similarly, resilient communities are capable of "protect[ing] and enhanc[ing] quality of life, long term ecological productivity and public and personal health" (Beatley and Newman, 2013, p. 3332). Whereas U.S. emergency management professionals, who are tasked with implementing these goals into practice, are guided by all-hazard approaches to resilience defined as "the ability to withstand and recover rapidly from deliberate attacks, accidents, natural disasters, as well as unconventional stresses, shocks and threats to our economy and democratic system" (Department of Homeland Security, 2022). Likewise, the United Nations (2020, p. 3) defined resilience as "the ability … to prevent, resist, absorb, adapt, respond and recover positively, efficiently and effectively when faced with a wide range of risks, while maintaining an acceptable level of functioning without compromising long-term prospects for sustainable development, peace and security, human rights and well-being for all." The disaster science scholarship referred to resilience as the capability of "communities to rebound from disaster and reduce long-term vulnerability, thus moving toward more sustainable footing" (Colten et al., 2008, p. 37). As exemplified by Colten et al. (2008), much of the disaster science literature emphasizes that resilient communities use disaster recovery as an opportunity to improve upon pre-disaster conditions. Despite the different goals and intended uses of each of the previous definitions, in each case, a community's resilience is linked to its disaster recovery trajectory. A resilient community is able to adapt to changes in local and regional social-ecological systems.

We draw on these different definitions, attributes, and characteristics of resilience to understand how the term is intertwined in the Harvey-related discourse. Specifically, in analyzing discourse pre- and post-Harvey, we identified instances of community resilience embedded in discourse related to Rockport-Fulton's tree culture. Through this discourse analysis, we describe how narratives of community resilience and recovery reflect different meanings depending on the context in which they were produced (i.e., pre- or post-Harvey) and by whom (i.e., government officials, community members, tourists, and authors). Finally, we consider the tension between the community recovery efforts that seek to restore lives and livelihoods, the desire to preserve the pre-Harvey social-ecological landscape, and the very real need to mitigate against future storms through effective land management practices.

4.1. Rockport-Fulton tree culture before Hurricane Harvey

Place making is affirmed via symbolic representations of the everyday (Cosgrove and Daniels, 1988). As you enter the cities of Rockport and Fulton roadway signs announce that Rockport is a Tree City USA – a distinction from the Arbor Day Foundation that it has held since 1998 (Arbor Day Foundation, 2022). Specifically, the windswept live oak forest features prominently across the cultural landscape. The live oaks are valued in backyards, where they increase property values, to heritage sites and conservation areas, where they contribute to the tourism-based economy of the region. The windswept live oak appears on Rockport's official city logo as well as the logos of local businesses (Fig. 3). We also observed the windswept oak's frequent use in advertising and marketing campaigns in the region. Additionally, numerous businesses feature the oaks in their names, including RV facilities (e.g., Hidden Oaks RV Resort, the Wilderness Oaks Campground, and the Oak Garden Apartments). Additionally, the windswept live oaks are a prominent focus of local and visiting artists, whose works appear in Rockport-Fulton's numerous art galleries. These examples illustrate how

Fig. 3. The use of windswept live oaks in government and businesses logos.

the Rockport-Fulton community embraces the windswept live oaks as an iconic symbol and at the same time commodifies them.

Thus, the ubiquitous use of windswept live oaks by Rockport-Fulton's institutions, businesses, the arts community, as well as the emphasis on trees, tree preservation, and trees' historical significance underscores their deep symbolic value to the Rockport-Fulton community. The windswept oaks are makers of place for the Coastal Bend area, and Rockport-Fulton, as a place, is a maker of the windswept oak trees. In other words, the windswept oaks work in the production of Rockport-Fulton as a place and work as social constructions of Rockport-Fulton, "which depends both on their physical location and context and on their symbolic and imaginative locations within local and wider cultures" (Cloke and Jones, 2002, p. 73). The windswept oaks are a dominant feature on the landscape, which reinforces residents and visitors' experiences and, in turn, provides Rockport-Fulton with its iconic symbol. In this way, the urban forest becomes an overarching symbol of what the place is and of the experience had while visiting or living in the Rockport-Fulton area, and through this, visitors and community members attached memories to the trees.

The role of the windswept live oak in Rockport-Fulton's place making and place attachment are further reflected and reinforced throughout local government actions. Aransas County, home of Rockport-Fulton, possesses a tree preservation ordinance, which outlines the community's values in relation to what are deemed a "special natural resource" and provides regulatory guidance for tree protection. The county government designed the ordinance – at least on paper – to prevent the clearcutting of windswept live oaks. Passed in 2010 and revised in 2011, the ordinance states:

> Windswept Oak Trees are considered a special natural resource to this area, shaped and created by forces of nature, and are irreplaceable. Windswept Trees provide character and beauty to the community, and the special preservation of such trees benefit the community. Windswept Oak Trees are deserving of extra protection by the Committee. The Committee may deny any application for removal of a Windswept Oak Tree unless the Committee finds, by clear and convincing evidence, that the reasons for removal exist in fact and the removal is eminently necessary to accomplish the applicant's stated reasons (Aransas County, 2011, p. 1).

The official government narrative defines the unique and "irreplaceable" character of the oaks and posts publicly-available committee meeting minutes on the Aransas County webpage. Through its passage and continuous committee meetings, the larger community reinforced the standing of the windswept live oaks with the ordinance, which serves to further solidify the importance of the trees to the community.

Given that the focus of placemaking and place attachment in Rockport-Fulton is situated around the live oaks, the area's history is recounted through them. The area is home to prominent oak trees with historical significance dating to the 19th century each demarcated with historical markers. The Zachary Taylor Oak sits at the center of Rockport's Zachary Taylor Arboretum Park. This oak, estimated to be over 400 years old, supposedly provided shade to then-U.S. General Zachary Taylor (12th U.S. President) in the lead up to the Mexican-American War. Further inland, across the Capano Bay, and near the town of Refugio, stands the Urrea Oaks. This group of oaks is cited for its historical significance as a staging area during the Texas Revolution and the Battle of Refugio.

In addition to these heritage sites, oak trees recount the disaster history of the region. Neighboring Goose Island State Park is home to the "Big Tree," one of the largest live oak trees in the nation at 13.4 m in height with an average trunk circumference of 10.7 m (Fig. 4; Rockport-Fulton, 2021). This estimated 1,000-year-old tree and designated State Champion Coastal Live Oak (1966 to 2003), has endured numerous threats and hazards, including those posed by hurricanes, droughts, and fires. By some popular accounts, it has withstood 40 hurricanes over its lifetime (e.g., Rowan, 2017). The plaque adjacent to the Big Tree includes the following inscription written by John E. Williams:

> Welcome to my home. I am a live oak tree and I am very old. I have seen spring return more than a thousand times. I can remember hundreds of hurricanes, most I'd rather forget, but I withstood. There was a big fire once. I hate fires. Around me are my offspring. We are an old-dune woodland community. We provide shelter and acorns for squirrels, jays, raccoons, bobwhite, deer, javelina, and most other members of our community. For most of my life I belonged only to myself. Now I belong to you, or so I'm told. Humpf! Branch breakers and root tramplers the lot of you. Some years ago someone came and patched my cracks, trimmed my dead branches, killed my pests and healed my fungus rots. Was that you? I'm feeling much better, thank you. I am tired now. You may leave me in peace when you are ready to go. Please leave my home as you found it. I have important things to do. The seasons are changing again and I must get ready.

The text, written in the Big Tree's voice, employs personification and anthropomorphism in recounting the Big Tree's experiences, which can be extended to the experiences of any long-standing tree in this region, and to other resident species, including people. Speaking from a slightly grumpy voice of experience, the Big Tree narrative evokes an emotive response akin to a wise community elder sharing lessons from the past. The narrative highlights the range of risks the Big Tree has experienced, including environmental hazards, such as hurricanes and fires, as well as anthropogenic hazards like people altering the woodland community, breaking branches, and trampling roots. Despite this hazard history, the text weaves a narrative of social-ecological resilience for the Big Tree, its offspring, and the wildlife that depend on them.

Through this resilience narrative, the theme of community is reinforced, both in terms of the Big Tree's ecological role in the old-dune woodland community, but also in the relationship the tree shares with people (Beatley and Newman, 2013). The text highlights the benefits of human-intervention for the Big Tree, as the tree was tended to and mended, presumably by park rangers. Relatedly, the narrative references ownership, "For most of my life I belonged only to myself. Now I belong to you, or so I'm told. Humpf!" This line spotlights the transition of the land into the park system and emphasizes that the Big Tree lives on publicly-owned land, further reinforcing that it is a part of a larger community, one that involves people. In this account, people bring both risk and protection. The closing passage reasserts the role of this elder in the community by stating, "I have important things to do," which include preparing for seasonal changes. The reader can infer that the changes include those same hazards and disasters that the Big Tree has previously weathered; through its ecological role, the Big Tree is readying the community for the next event and, by extension, fulfilling

its social role by encouraging community resilience. In other words, the narrative works to transition from the tree's perspective to the wider community and imbues it as a social-ecological symbol of strength and perseverance reflected across Texas's Coastal Bend. A series of articles and online comments made during an historic dry period illustrate this point.

In 2011, this region – and much of Texas – experienced a drought that rivaled the state's drought of record. The severe drought conditions claimed an estimated 5.6 million urban trees and 301 million rural trees (Texas A&M Forest Service, 2012a, 2012b). Local residents created and implemented a watering schedule to save the Big Tree. Several news outlets captured the importance of the Big Tree's value to the local community. In one article, a resident remarked, "I wouldn't miss coming and sitting by [the Big Tree] for nothing. God put it out here for a reason" (UPI, 2011, para. 5). A volunteer firefighter also recounted memories of visiting the tree for over 30 years. Because of this, the firefighter felt obligated to help save the tree and added, "It's good history. I want to be part of it. 'Here I am, Mr. Oak.'" (UPI, 2011, para. 8). These comments reflect how the Big Tree contributes to place attachment among the wider-Rockport-Fulton community, and they also highlight the Big Tree as a social-ecological symbol of local community resilience.

The Big Tree, the Zachary Taylor Oak, and Urrea Oaks are a few of the thousands of oaks that experienced the devastation wrought by tropical cyclones along the Texas central coast. Historical accounts posted on placards around the visitors' center at the Rockport-Fulton Chamber of Commerce further enumerate the entrenched role of live oaks in the local culture of Rockport-Fulton relative to tropical cyclones. On the front porch visitors may sit on one of the oversized rocking chairs and read these placards about people strapping themselves to area live oaks to survive hurricanes of the 1800s and early 1900s. During one site visits, a tourist recounted the tenacity of these early survivalists while rocking his small child to sleep in these chairs. These historic narratives composed for public consumption, celebrate the survivalist spirit of early settlers and the endurance of the windswept oaks.

Although the windswept oaks seemingly dominate the community's historical and cultural landscape, Rockport-Fulton's tree culture extends beyond its live oak forest and includes palm trees. The Texas Coastal Bend is home to the native Texas sabal palm tree (*Sabal palmetto*) as well as nonnative palm species. The palm trees are not pervasive across the landscape, yet they contribute to place making and place attachment in Rockport-Fulton. The majority of palm trees are located in areas frequented by tourists and beach goers, and they contribute to the area's beach atmosphere. The Rockport-Fulton Chamber of Commerce uses a palm tree in its logo. Yet beyond this reference, we did not find the same sort of robust discourse related to the area palms nor any references to their ability to withstand storms despite their ability to bend in high winds (Rosa-Aquino, 2022).

4.2. Tree culture post-Hurricane Harvey

Hurricane Harvey decimated the Texas Coastal Bend as it made landfall near Rockport-Fulton in late-August 2017. Harvey's economic cost was estimated at $125 billion USD – the second most costly storm in U.S. history. Harvey destroyed 15,000 homes and damaged another 25,000 (Blake and Zelinsky, 2018) and caused extensive damage to Rockport-Fulton's urban forest with varying estimates of forest loss (Fig. 5). The Texas Forest Service initial estimates suggested that "Rockport lost approximately 20 % of its public trees with 1300 more needing to be removed or requiring care" (Texas A&M Forest Service, 2018, para. 7). The city further reported that Rockport's golf course lost approximately 1200 trees (Rockport Country Club, 2019), and through personal communications during site visits, residents and business owners also reported tree losses, with one homeowner informing us during a site visit that they lost 21 trees on their property and a second-homeowner told us they lost 18 of 28 trees on their bayside

Fig. 4. The Big Tree and interpretation signage with poem by Mary Hoekstra. (Images: B.L. Lavy).

Fig. 5. Tree debris cleanup site in Refugio, Texas, after Hurricane Harvey (14 October 2017; Image: Christopher Mardorf / FEMA).

vacation property (personal communication, 2018).

Despite the damage to the area's urban forest, post-Harvey narratives used the trees as a means to spur recovery efforts. Recovery narratives drew heavily on the established tree culture but differed depending on their source. For example, directly after Hurricane Harvey made landfall, discourse across news and social media turned to the Big Tree specifically and live oaks in general. One quote, broadcast across outlets, explained, "live oaks are near and dear to the hearts of Texas. They represent a feeling of endurance. And this week, Texans were live oaks all over the storm path" (e.g., NPR, 2017). Similarly, the Texas Parks and Wildlife Department, reporting on the status of the Big Tree, stated on social media, "The 1000-year-old Big Tree … is okay! … You don't get old by being weak" (Texas Parks and Wildlife, 2017). In response, a respondent commented, "I know it's silly but if [the Big Tree] can make it, then no matter what else we as Texans can keep going. I am just so happy to see this" (Brotherwood, 2017). Within these quotes, the Big Tree's survival evokes shared feelings of strength and endurance while providing hope for the community. These discourses reflected definitions of resilience common in emergency management where the ability to withstand and adapt are spotlighted (Department of Homeland Security, 2022; United Nations, 2020).

However, in a press release issued nine months after Hurricane Harvey, Texas Governor Greg Abbott reinforced the ongoing strength narrative and in doing so, directly tied ecological recovery to social recovery by comparing new growth on the Big Tree to place recovery, resilience, and survivorship. Abbott (2018) stated:

> Though smaller trees were felled by Hurricane Harvey's fierce winds and torrential rains, the more than 1,000-year-old Big Tree at Goose Island State Park near Rockport withstood the historic storm's wrath as it did for centuries during every previous hurricane, as it did through fire, flood and damaging drought. Now, nine months after Hurricane Harvey destroyed so many other treasures, new leaves are growing back on the Big Tree. The mighty old oak stands as a symbol of strength mirroring the resilience of the people of the Coastal Bend region. Rockport and Fulton are rebuilding …. While each day brings more progress, and more families returning home, our job is not yet done, recovery is not yet complete. But we remain – like the Big Tree – #TexasStrong.

Both Governor Abbott's and TPWD's comments differ from pre-Harvey narratives, which discussed resilience as a passing trait, but these post-Harvey narratives, in particular, use stronger, more emotive language linked to the social-ecological symbolism of live oaks bending but not breaking. Moreover, the narrative of how the Big Tree withstood the storm illustrates how survival is part of community resilience – if the Big Tree can survive, then people can as well. These and other official

comments use persistence, strength, endurance, and tenacity as synonyms for resilience. These terms are frequently reflected in definitions of resilience particularly from the United Nations (2020); however, the concept of improving pre-disaster conditions (Colten et al., 2008) is missing from these post-disaster narratives.

Spotlighting resilient traits, the Rockport-Fulton community heavily drew on the symbolism of the area's iconic live oak trees to promote recovery efforts. The Rockport-Fulton Chamber of Commerce and other establishments sold shirts and other merchandise embroidered with an image of a bent live oak and the phrase, "Rockport-Fulton Strong – bend with the wind" (Fig. 6). Together, the official government narrative, reinforced through local expressions, is meant to invigorate the Coastal Bend communities by suggesting that resilience – and by extension recovery – is a quality of survivorship. These official narratives draw upon the area's established sense of place – its urban forest – to lay the framework for a robust recovery. In this way, the Big Tree, and other live oaks in the region, are emblematic of a survivor tree – a symbol of resilience across generations and timescales (Heath-Kelly, 2018; Micieli-Voutsinas and Cavicchi, 2019). Yet the survival of the Big Tree and others do not completely overcome the feelings of loss related to changes wrought by a disaster of Harvey's magnitude. Missing from these narratives is the reality surrounding the historic forest losses from Harvey's destructive path and, in particular, community perspectives on how the storm affected Rockport-Fulton's sense of place relative to tree damage.

On the ground, our conversations with local community members revealed a more nuanced, situated take on community recovery and the impact of forest loss on Rockport-Fulton's defining place characteristics. For community members and visitors alike, the loss of trees – whether live oak or palm trees – was conspicuous and altered Rockport-Fulton's long-established sense of place, defined by its urban forest. Comments, during interviews and site visits, reflected a strong emotional response

Fig. 6. T-shirt promoting local resilience (Image: B.L. Lavy).

to the observed changes in the physical landscape as commonly occurs after disasters alter the physical landscape (Albrecht et al., 2007). Residents recounted their losses by number of trees damaged or destroyed by the hurricane, and visitors described the loss of trees as "sad." Taken together, our findings suggest, based on our analysis of available discourse, that visitors more often indicated palm trees as an important place characteristic of Rockport-Fulton and that community members were more likely to discuss the area's live oak forest as an important place characteristic.

For example, in an interview with a local news station Rockport's mayor remarked on the loss of trees saying, "Oaks, that's our identity. The amount of vegetative debris that we had was heartbreaking to us because it was the trees that became that debris" (Dart, 2018, paras. 2–4). As the multi-year recovery wore on, one business owner described Rockport-Fulton's urban forest after Harvey as a "sad loss, so many oak trees … I only lost a couple trees, [but it] changed the face of Rockport." He added that after the hurricane there was a "weird, naked feeling because [there were] no leaves on any of the trees. Eerie." This business owner also suggested that "some weekenders said Rockport is ugly now" and indicated that this was an excuse for second homeowners to leave the community because they "didn't want to deal with the mess." He added, "we don't need you," referring to those that did not stay to rebuild. And as if to reassert his disapproval, he said "[it is] amazing to see how quick [the trees] came back." Another business owner, referring to the area's trees, stated, "We don't want an ugly Rockport, and we don't want to lose one of the things that rooted people to the place." Retail business owners in the heritage and cultural districts of Rockport, where palm trees were a common pre-Harvey feature, seemed particularly concerned with how the changes in the natural environment would impact the return of visitors. None of the residents, however, mentioned palm trees directly but did comment on the loss of oaks frequently.

Visitors also emphasized the importance of Rockport-Fulton's tree culture during the recovery process. When we asked visitors if they observed any visual reminders of the recovery efforts from Hurricane Harvey, tourists mentioned damage to the built environment (84 %), including tarps on houses, debris, piers gone, and closed businesses (Fig. 7). Visitors, many of them repeat visitors, also mentioned damage to natural features with direct mentions of missing trees (16 %). One visitor in the downtown area suggested the place felt different due to tree loss. A camper at Goose Island State Park corroborated this sentiment and stated the "natural aspects" are different as they gazed upward when describing the lack of tree canopy. Another visitor in the heritage and cultural district area commented, "everywhere you look … uprooted

trees." Visitors in the cultural and heritage district specifically commented on the loss of palm trees but did not comment on the live oak trees during our interviews. One of these respondents emphasized the loss of palm trees, saying the area lost "trees, big palm trees, a lot of palm trees." A repeat visitor suggested that the city was not doing enough to clean up the area and said, while pointing toward dead palm trees, "get the eyesores out of here." Yet another repeat visitor described how "happy [they were] to see" that a group of palms survived the storm and had grown since their last visit.

Other repeat visitors expressed their emotional distress when they returned to Rockport for the first time after Hurricane Harvey. One explained, "I almost had a heart attack" when driving in and seeing the town for the first time. Another said, "I grieved…the drive was good then all of a sudden just construction." These repeat visitors also noted the loss of palm trees as they described damages to their favorite spots, and one commented that while driving around town, they told their sister it "felt like something is wrong here" without the palms along the shops downtown. They went on to describe the missing storefronts and recounted purchasing furniture and art from places no longer in business. These interactions and comments all capture solastalgia (Albrecht et al., 2007) where Hurricane Harvey altered the physical landscape causing emotional distress for those with strong attachments to the area. Additionally, residents', business owners', and visitors' comments show that these groups connected to different portions of Rockport-Fulton's urban forest depending on time spent and activities undertaken in the area (e.g., Eisenhauer et al., 2000; Stedman, 2006). Finally, the sense of loss – whether tied to live oak or palm losses by business owners, residents, or visitors – could also reflect an instance of "urgent biophilia," where tree loss triggered an emotional response across individuals and groups of people as they encountered a landscape where familiar vegetation was absent (Tidball, 2012). This, in turn, could spawn actions to restore Rockport-Fulton's urban forest and, at the same time, its ecological function (Tidball and Stedman, 2013). Against this backdrop, we explore Rockport-Fulton's urban forest recovery efforts in the next section.

4.3. Recovering the urban forest

Efforts to recover the Rockport-Fulton urban forest after Harvey varied. Official plans provided little evidence of the trees' role in Rockport-Fulton's sense of place during the initial disaster recovery efforts and long-term plans. A comprehensive recovery plan for Aransas County published in 2018 mentioned the area's live oak trees once in the
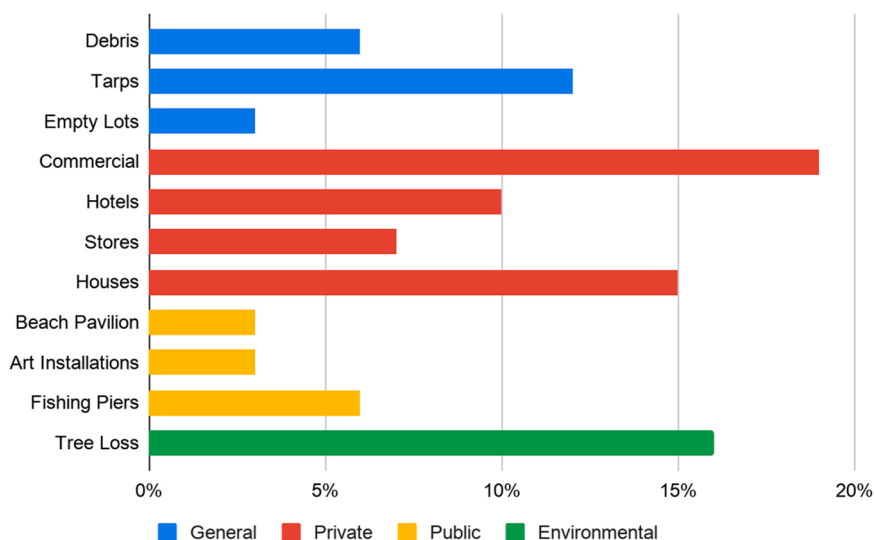
Fig. 7. Tourists' references related to observed damage 9-months post-Harvey.

document as part of non-prioritized economic recovery strategies. The document stated that the county should, beginning in 2019, "leverage assets such as oak trees and other natural elements" to enhance a community sense of place and quality of life (Whitson and Foutz, 2018, p. 88). The plan, however, did not recommend planting efforts as a way to recover lost trees to help reinforce the area's sense of place. Similarly, a 2020 plan for Rockport mentioned preserving historic trees and planting new street trees but did not make a connection between the existing urban forest, its history, and its relevance to Rockport's sense of place. Instead, it called for planting live oak trees because

> [t]he emphasis in Rockport should be on using large canopy trees (live oaks) wherever possible, as they make the most visual impact (while allowing for unobstructed sight lines underneath the canopies) compared to the sparsely planted palm trees currently along Austin Street (Community Planning Assistance Teams, 2020, p. 49).

Austin Street runs through the heart of Rockport's heritage and historic district, which is a popular spot for tourists and beach goers. Based on our findings, this recommendation does not consider the sense of place visitors expect to encounter along this thoroughfare. Indeed, our interviews with tourists revealed a preference for palm trees in this district.

Community efforts to restore the Rockport-Fulton urban forest were more prominent early in the recovery process, signifying a greater understanding of the impact of forest loss on the community. Eight weeks after the storm, a local garden store advertised that "oak trees and a variety of fruit trees [were] available" to the community for purchase. In March of 2018, the Treecovery group from Texas A&M Forest Service gifted Rockport ten 15-gallon live oak trees, which the city planted in public parks. Coordinated tree-giveaways for residents followed. The City of Rockport, the Arbor Day Foundation, and the Texas A&M Forest Service hosted a Harvey Anniversary Tree Planting Ceremony on 25 August 2018. This event was followed by a tree-giveaway in Rockport on 9 November 2018. A press release from Rockport's mayor indicated that tree "offerings include a variety of live oaks, Mexican sycamores, bald cypress, palms and other trees suitable for our zone" (City of Rockport, 2017, para. 4). Additionally, TXU Energy donated 40 trees to Aransas County Independent School District in August 2018. Tree species in this giveaway included desert willow (*Chilopsis linearis*), red mulberry (*Morus rubra*), possumhaw holly (*Ilex decidua*), and vitex (*Vitex agnus-castus*).

Almost a year later, the City of Rockport, the Arbor Day Foundation, and the Texas A&M Forest Service came together again to distribute a variety of native trees to area residents, including Mexican olive (*Cordia boissieri*; 125), red mulberry (100), anucua (*Ehretia anacua*; 75), live oak (50), Mexican white oak (*Quercus polymorpha*; 50), Texas ebony (*Ebenopsis ebano*; 50), cedar elm (*Ulmus crassifolia*; 50), and bald cypress (*Taxodium distichum*; 50). At the time, the Arbor Day Foundation president said, "By replanting, we strive to bring healing and hope to the people and the communities in which they live, as well as help return the beauty and the value trees bring back to their properties." At this event, the organizers distributed 750 trees to 400 recipients. The overwhelming community participation in tree giveaways supports research that suggests replanting efforts enhance community resilience and, at the same time, contribute to resilience in local and regional social-ecological systems (Tidball and Stedman, 2013). This is notion is further supported in information on the giveaway obtained from the regional forester that noted:

> The loss of canopy, shade, wildlife habitat, and aesthetics had a profound effect on residents and visitors. Buildings could be replaced with funding from insurance and other sources but trees were not included when it came to settlements. The Arbor Day Foundation tree give-away program helped fill a void and has provided a spark of hope for our residents and for our future.

Given that Rockport-Fulton's tree culture focuses on live oaks, which

are repeatedly used in advertising, marketing, and other branding initiatives, it is important to note that while live oak trees were included in the giveaways, they were not the dominant species in them. Other native species were available in greater quantities for planting. Moreover, visitors in the heritage and cultural district and beach area spoke more about palm tree loss than live oak loss; yet, the tree giveaways did not include palm tree species. The lack of live oak and palm species may be due to availability of trees at the time in addition to external organizations' preferences, like the Arbor Day Foundation, rather than local community members. The giveaways also targeted residential properties and schools where smaller ornamental trees may have been preferable due to lot size. Despite these motivations, the lack of emphasis on planting palm and oak trees may continue to bring changes to the physical landscape, one already altered by the destruction wrought by Harvey, which ultimately can disrupt sense of place and place attachment for residents and visitors alike. Beyond altering emotional ties to the area (e.g., Knez et al., 2018), the changed sense of place may have financial effects as well. An urban forest composed of different species than tourists and second homeowners expect to see in the Coastal Bend may influence visitorship and therefore the local economy, which is heavily dependent on tourism (e.g., Woosnam and Kim, 2013).

5. Conclusions

We examined the tree culture of Rockport-Fulton before and after 2017′s Hurricane Harvey to understand the role of trees and place attachment, the emotional bonds and symbolic meanings attributed to a locale (Cloke and Jones, 2002), in the towns' recovery efforts. Our findings suggest that Rockport-Fulton's urban forest, in particular live oak trees, are important social-ecological symbols of resilience and play a prominent role in the area's hazard-prone history. Through archival research and interviews with residents, business owners, and visitors as well as our own observations, we illustrated how tree narratives pre- and post-Harvey amplified community resilience by drawing on the Texas Coastal Bend's established sense of place situated around its unique ecological setting. In this way, our findings show that Rockport-Fulton's urban forest is a symbol of resilience and that tree loss from Harvey led to individual and community actions (e.g., tree giveaways) supporting the reestablishment of local and regional social-ecological systems (Tidball et al., 2018). However, the use of the term resilience evolved over time with pre-Harvey narratives encompassing definitions aligned with emergency management that emphasize adapting to and withstanding stresses (Department of Homeland Security, 2022) while post-Harvey definitions reflected the social-ecological systems definitions that integrate ecological health and social well-being (Beatley and Newman, 2013). Broadly, the findings of this study provide additional evidence that damage to social-ecological systems can be motivation for continued involvement in disaster recovery efforts, creating reinforcing feedbacks that contribute to community resilience (Tidball and Aktipis, 2018; Tidball and Stedman, 2013). Yet we observed how tree loss was manipulated to absolve others from participation in reconstruction and recovery. We also found that essential elements of Rockport-Fulton's tree culture were missing from recovery planning as well as from replanting activities.

Additionally, our findings suggest that visitors and residents experience the Rockport-Fulton area differently. Both groups communicated emotional responses to tree loss. However, residents focused on the loss of native live oaks during interviews while visitors commented more frequently on the non-native palm trees. Tree giveaways provided an array of native species but the trees that shaped visitors' and residents' attachments to Rockport-Fulton were limited. Although native species are vital for the local ecology and adapted to the environmental conditions of the Coastal Bend region, we expected more palm and live oak trees distributed through tree giveaways given their importance to the area's sense of place. Similarly, we found that recovery plans in general do not fully realize the extent to which palms and oak trees influence

people's connections to the Texas Coastal Bend and Rockport-Fulton. Oak trees provide a cultural and an aesthetic value to the community. Palms do as well, but they also provide economic value to Rockport-Fulton as they create a sense of place identifiable to visitors.

These observations raise questions about community resilience as well as forest recovery strategies related to tree preference that should be explored through future research. For communities with economies dependent on tourists visiting natural and heritage sites, recovering iconic places and ecological infrastructure is instrumental in returning to normal operations (Kim and Marcouiller, 2015). Moreover, recovering ecological infrastructure in tandem with homes and businesses can help attract visitors thus bringing in money to support the local economy. Because of this, we contend that replanting of these iconic social-ecological symbols early in the recovery process should be part of recovery plans to preserve an area's sense of place for community members and visitors.

This research is not without limitations. It offers a case study on a unique urban forest with an established tree culture. Because of this, generalizations from this study to other areas recovering from disasters may be limited (Yin, 2003). We designed our research to focus broadly on recovery efforts, yet residents' and visitors' continual comments about the loss of trees spurred our interest in the role trees play in the recovery process of this tree-rich community. A more targeted interview protocol situated specifically on tree loss and recovery may have produced more nuanced findings; however, we contend that the comments captured in our interviews helped avoid bias. We overcame this limitation by triangulating our findings through multiple data sources. Finally, our research captures a brief period in the recovery process – a period where tree loss was conspicuous to residents and visitors. We acknowledge that our interviews with visitors occurred over a one-week period and our time with residents and business owners was limited to three additional site visits. Capturing visitors' and residents' comments on recovery over multiple weeks throughout the years' long recovery process would provide additional insight into how well urban forest recovery efforts were meeting both visitors' and residents' expectations as well as their impacts on the area's sense of place. Longer-term research – 5, 10, 15, and 20 years post-disaster – is needed to understand how visitors and residents respond to vegetation recovery over time, whether changes occur in how they attach meaning to the place, and if tree loss impacts or, on the other hand, replanting efforts spur social-ecological resilience.

CRediT authorship contribution statement

Brendan L. Lavy: Conceptualization, Methodology, Data collection, Analysis and interpretation of findings, Writing - Original draft, Writing - Review and editing. **Elyse Zavar:** Conceptualization, Methodology, Data collection, Analysis and interpretation of findings, Writing - Original draft, Writing - Review and editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

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