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Social scientific research on the American West: current debates, novel methods, and new directions

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Abstract

Reviewing recent social science research on the western United States from multiple disciplines, we present a state-of-the-art synthesis for scholars and policymakers focused on the socioecological future of this distinctive region. We address four core topics: (1) *Migration and population change*, focusing on the movements of people across the US West, and the ways that these population shifts are both shaped by and shaping the rise of 'New West' economies. (2) *Environmental governance*, synthesizing work on non-federal government institutions' interactions with the environment, including local/regional government agencies, Indigenous nations, and non-governmental organizations—all of which shape environmental quality and resource access for communities. (3) *Place, culture, and belonging*, which concerns how people find meaning in their environment and locate their sense of place in the region given changing social and natural landscapes. (4) *Research methodologies*, with a specific focus on blending cutting-edge machine learning, and social network approaches with well-established ethnographic, demographic, and survey-based methods. We then map out a future interdisciplinary agenda for the policy-relevant study of social and environmental change in the US West. Our approach stresses the importance of mixed method social research and a robust understanding of how culture, values, and identities intersect with ecological changes on landscapes to shape the well-being of people and ecosystems.

Introduction

The advent of the Anthropocene makes clear that human impacts on natural systems have reached an inflection point (Crutzen and Stoermer 2000, Ruddiman 2013). Historians reference this moment as the collapse of natural history into human history, illustrating the need for multidisciplinary approaches that analyze human and natural systems as an interconnected set of processes that are simultaneously social and biophysical (Chakrabarty 2008, Dove and Kammen 2015). Socio-ecological approaches in the social sciences offer powerful analytical tools for how to think about the reciprocal dynamics that link human and natural systems (Partelow 2018).

There is a rich empirical literature from the social sciences examining how communities navigate common-pool resource problems (Agrawal 2003, Ostrom 2009). These approaches focus on institutions as the independent variable in a systems model where communities are small, homogeneous, and relatively stable. Implicit in this kind of model is an assumption of low population growth and limited migration. For the most part, case studies are drawn from the Global South. This led scholars to call for the development of a 'First World' political ecology to address the structural political and economic processes that shape resource use and conflict in areas of the Global North, including the US West (McCarthy 2002, Walker 2003).[4] This review focuses on social scientific studies that take a diachronic, or change-over-time, approach to social systems. In terms of method, this literature review is necessarily selective given the expansive body of work found across disciplines studying the US West. But it

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[4] A number of scholars took up this approach in subsequent years, offering important studies of society and environment (Sayre 2003, Walker and Fortmann 2003, Prudham 2005, Kosek 2006). Yet there was relatively little attention paid to the United States as a settler nation-state, a primary focus for this review. This subject is discussed further in the section on place, culture, and belonging.

Figure 1. Map of the Intermountain West within the western United States. The Intermountain West region is highlighted in topographic relief while other parts of the US West are in grey (US Geological Survey 2016).

largely centers its attention on work in the disciplines of cultural anthropology, human geography, and sociology. We do not aim to be comprehensive, but instead strategically selected the scholarship best reflective of the four key themes highlighted in this review. The authors used their detailed knowledge of these literatures to select the material contained herein. We conclude with a section on new methodological approaches that show promise in enhancing understanding of the socioecological future of the US West.

Early social and historical scholarship on the US West overemphasized its exceptionalism and largely ignored exogenous influences on its people and the environment (Guha 2000, Sutter 2013). Long an important site for the creation of a national identity, the US West, like most places, is tied into global networks of information, commodities, and labor (Tucker 2000). Political upheaval in the past few decades have brought greater scholarly attention to the importance of values and identities, especially across the boundaries of race, class and gender, as demographic change is reshaping contemporary social and political issues in the region (Fixico 2019). The US West is part of this transformation, as its long association with a Euro-American, masculine, individualist frontier ethos—one that circulates as a powerful cultural imaginary—is being challenged by scholars (Kosek 2006, Byrd 2011, Barraclough 2019). These static representations of the US West are upset by multicultural histories of the region and diverse metropolitan communities (Pulido 2000).

This review article is split into four sections: (1) migration and demographic change, which examines the movement of people in relationship to changing economies and environments; (2) environmental governance and the importance of local, regional and non-governmental institutions shaping the management of public lands in a region with a large proportion of federal land; (3) place, culture and belonging, which explores how communities are relating to place and navigating the experience of belonging as communities and environments change; and (4) emerging mixed method research approaches including computational text and social network analysis that compliment qualitative approaches. Moving beyond the familiar qualitative-quantitative divide in the sciences, this review seeks a new synthesis that highlights the importance of values, identities, and politics. We view mixed-method approaches as complementary to ethnography and other qualitative approaches, not as a substitute for fine-grained, interpretive analysis.

Defining the 'US West' as an object of study

Defining the precise boundaries of the 'US West' is fraught. While some scholars do spend significant time contemplating how best to draw boundaries around the term, we follow the lead of Robbins *et al*'s (2009) review and largely sidestep strict definitional questions. In an aim to think broadly, we consider the eleven most western continental US states, with a tendency to focus especially on the 'Intermountain West' or the 'Mountain West' region (figure 1).[5] The reason for a greater focus on the

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[5] This region is defined largely by the geographic location of the Rocky Mountains, and includes Idaho, Utah, Arizona, Nevada, Eastern Washington, Eastern Oregon, Eastern California, Western Montana, Western Wyoming, Western Colorado, and Western New Mexico.

Intermountain West is this region holds greater cohesion as a sociological and geographic space relative to the Pacific Coast where large urban areas face their own social and environmental challenges distinct from interior areas. But our review does not exclude relevant studies from outside of this region when their inclusion is warranted by the key research themes discussed here.

An important question posed by Paul Robbins and co-authors is whether to consider the US West as its own object of research. These scholars ultimately argue that the region *should not* be taken as a 'coherent geography,' and that the US West 'is largely reflective of larger scale socioecological forces playing out in similar ways around the postindustrial world' (2009, p 356). While acknowledging the importance of linking this region to larger-scale trends and placing it in a comparative context, there are nevertheless ways that the *cultural imaginary* of the US West shapes the region today. For instance, amenity migration—which, within the United States, is most prevalent in the US West—is in part driven by ideas of 'the West' as a bounded entity. Richard Etulain, in conversation with Wallace Stegner, sums it up well in describing the West as a 'fragmented unity' (Danbom 2015, p 9).

With all of that said, we do believe that these ongoing historical debates about what counts as 'the West' have uncovered a set of unique characteristics *that indeed make it a distinct object of study*, despite its fuzzy boundaries and fragmented unity. In contrast to other areas of the US, the West is distinctive because of a set of different factors. Its economies are deeply reliant on the environment, as both natural resources (e.g. timber, mining, farming, and energy extraction) and natural amenities (e.g. outdoor recreation spaces and aesthetically appealing landscapes). And perhaps most importantly, beyond the 100th meridian it is an exceedingly arid region, distinctive in its highly heterogeneous precipitation patterns and the increasing economic and political value of water. States in the US West possess the vast majority of public lands and a complicated patchwork of governmental entities that manage them, which all radically shape social, political, cultural, and economic life. It is unique in its ethnic diversity, home to the largest population of Indigenous Americans (and number of Native American Tribal Nations)[6] and significant populations of Latina/o and Asian immigrants. And finally, the landscapes of the West contain vast open spaces, extensive mountainous terrain, huge elevation changes, and rural sparsity—all of which shape day to day life and the sociopolitical in ways not seen in other regions.

Related to all of this, is a cultural distinctiveness, where the West is *the* symbol of a nation—an idea and a physical space where manifest destiny might be fulfilled, and a global bearer of romantic and ruggedly individualistic frontier life. This imaginary is something that many social researchers have critiqued for an unreflective embrace of settler colonial archetypes that erase Indigenous peoples and their extant political rights and claims to land-based practices and territory. These cultural representations of the US West are why it cannot only be viewed through a biophysical or institutional lens. It requires the tools of social and cultural analysis to understand how the region is made into something that appears coherent and what follows from these various constructs. The article begins with the dynamic nature of human communities in the US West given population change and large-scale migration, a central subject of inquiry for social scientists studying the region.
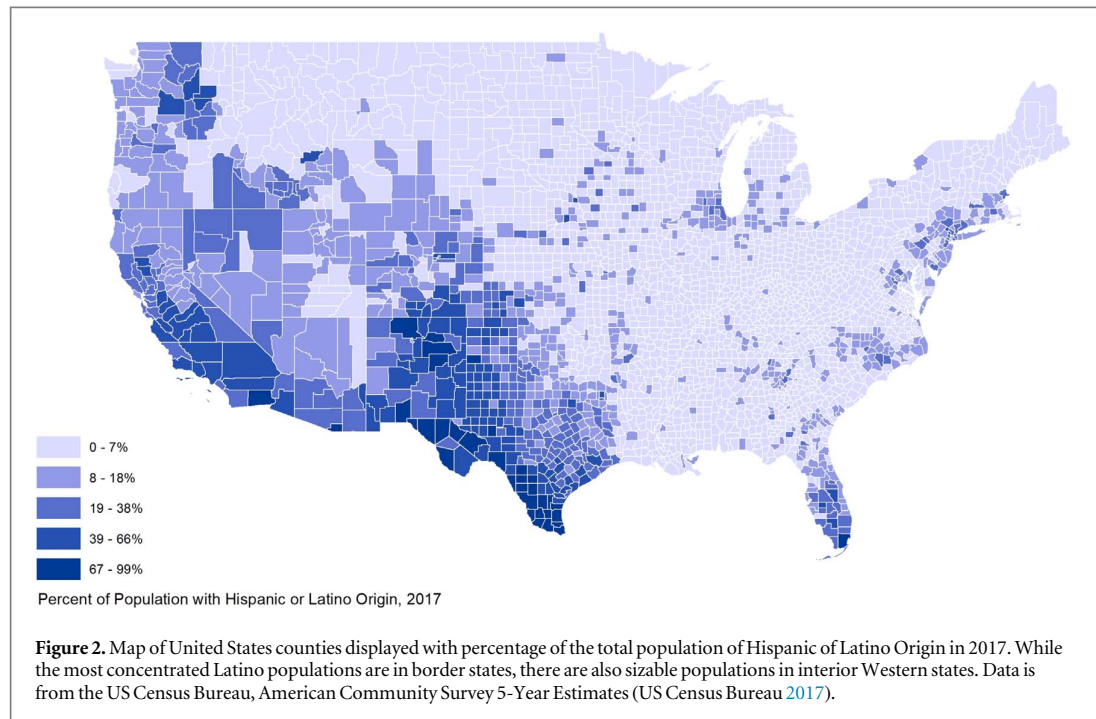
Migration and population change

The environment and migration

A growing body of international migration scholarship examines the ways that climate change impacts affect migration patterns. While hugely important, this line of research is primarily based in the Global South (Piguet *et al* 2018), and has yet to rigorously consider the Western United States. Yet, we anticipate that this region will not be spared from climate impacts, which already include droughts, wildfires, extreme heat, and flooding.[7] All of these hazards have the potential to influence both natural resource and outdoor recreation economies, in turn influencing labor migration.[8] Future research should examine how these environmental changes may alter mobility patterns in the region, and interact with existing migration systems. For instance, will the presence of chronic wildfire smoke dampen amenity migration into mountain regions? Will sea-level rise along the Pacific coast contribute to further population movement from coastal to interior West states? Social scientists should anticipate the ways that climate change is reshaping landscapes, and, in turn, the ways that these changes may influence settlement and mobility patterns.

'Environmental migration' literature tends to emphasize push factors–or, how environmental hazards influence people to *leave* a place. While not frequently categorized as such, amenity migration can be considered as a form of environmental migration, but based on pull factors that *draw* people to a place,

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[6] A note on terminology: the authors use the terms 'Native Nations' or 'Native American Tribal Nations' to reference Indigenous governments in the United States. In other settler-state contexts terms such as 'First Nations' may be more familiar. We use the aforementioned terms because of the specific historical and legal context in which Indigenous governments arose in the US that create a distinct governance relationship with the US federal government.

[7] Some of these impacts are already being realized with widespread drought and destructive wildfires in California in 2017 and 2018, not to mention the impact of ecosystems transformed by the arrival of invasive species like cheatgrass and widespread development in the wildland-urban interface. For more on this subject, see Pyne (2015).

[8] See the Fourth National Climate Assessment (USGCRP 2018).

Figure 2. Map of United States counties displayed with percentage of the total population of Hispanic of Latino Origin in 2017. While the most concentrated Latino populations are in border states, there are also sizable populations in interior Western states. Data is from the US Census Bureau, American Community Survey 5-Year Estimates (US Census Bureau 2017).

such as recreation opportunities and mountain aesthetics. A large amount of scholarship documents the rise in amenity migration around the world, with the Western United States as the most frequently analyzed region (Gosnell and Abrams 2011). This area of research tends to emphasize the cultural dimensions of migration, with special attention to the social dynamics of receiving communities. Often based in ethnographic research, surveys, and case studies, amenity migration literature tends to emphasize differences in values and perceptions of place between newcomers and longer-time community members (Kondo *et al* 2012, Ooi *et al* 2015, Ulrich-Schad 2018).

Recent work suggests ways that amenity migration scholarship on the US West is beginning to situate the phenomenon within a larger, global context. From this vantage point, destination sites are no longer described as separate from the rest of the world, but embedded in larger networks of socio-ecological change. Nelson and Hines' case studies in Jackson, Wyoming, for example, reframe amenity migration through a 'supply-side' framework, describing ways that international capital flows are implicated in rural gentrification. This approach departs from most amenity migration scholarship, which primarily adopts a 'demand-side' framing, focusing more on individual consumer preferences (Nelson and Hines 2018). Nelson and Hines' work invite scholars to consider how structural economic forces that operate at a global scale influence rural regions at the local level. Relatedly, Lekies *et al*'s (2015) review argues that scholars should begin to analyze the ways that climate change will alter the very environments that attract amenity migrants. Like international capital markets, global

climate change is already affecting rural Western communities that have been misperceived as insulated from external changes. Future amenity migration research may consider not only how places in the US West will be locally affected by these global-scale systems individually, but further, how forces such as globalization and climate change simultaneously impact communities, in what some scholars have termed 'compound exposure' (O'Brien and Leichenko 2000). But population changes are not only consequential in their magnitude—it matters *who* is moving to particular places, and thus social identities matter, something we address in the next section by emphasizing the important of work looking at Latina/o migration throughout the region in recent decades, though it is hardly a new phenomenon given the colonial history of the US West.

Latina/o migration in the US West

A major focus of migration research in the Western United States explores the movements and experiences of Latina/o people, considering both transnational movements across the Mexican-American border as well as the changing geographies of Latina/o settlement within the broader US West. [9]

Recent research has shifted beyond Southwest border regions, exploring how Latina/o communities are increasingly dispersed throughout the Intermountain West (figure 2), with a special focus on labor migration.

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[9] We use the term 'Latina/o' to refer to people who were born in or have ancestors from Latin America. We recognize that this choice of terminology is significant, and that there is much ongoing debate over the use of the terms 'Latino,' 'Latina/o,' 'Latin@,' and 'Latinx.' We adopt 'Latina/o' because it is more gender inclusive than 'Latino,' but retains Spanish syntax. For an engaging conversation over the use of these terms, see de Onís 2017.

Human geographers Lise Nelson and Peter Nelson demonstrate how growing Latina/o migration in this region is linked to flows of predominantly white and affluent amenity migrants moving West. These scholars point out that most prior research on Latina/o migration had focused on urban centers, and that the little research on rural Latina/o migration had overwhelmingly examined manufacturing-dependent regions such as the Midwest or Southeast. In contrast, economic growth in the Mountain West is increasingly tied to the influx of amenity migrants, who in turn spur demand in building construction, restaurants, and household work, among others. Nelson, Nelson, and other scholars describe a form of 'linked migration,' whereby Latina/o's move to amenity destinations following growth in these service sectors (Nelson *et al* 2009, Nelson and Nelson 2011).

Complementing quantitative descriptions of changing migration patterns, scholars have begun to qualitatively document the lived experiences of Latina/o migrants in rural Intermountain regions. Sociologist Leah Schmalzbauer and collaborators have carried out extensive ethnographic and community-based participatory research in Southwestern Montana, a region that experienced a major wealth influx and rapid gentrification over the past several decades. Schmalzbauer's work pays particular attention to the experiences of women migrants, and the ways in which migrants negotiate gender roles in this new region (Schmalzbauer 2009, Schmalzbauer 2011, Letiecq and Schmalzbauer 2012, Schmalzbauer 2014). Additionally, by comparing the experiences of Latina/o migrants in rural Montana to those in urban Southern California, Schmalzbauer and García argue that theories of assimilation should better account for the physical geographies and built environments of receiving communities (García and Schmalzbauer 2017). Like Nelson and Nelson's (2011) work, Schmalzbauer and García (2017) push us to consider how long-held migration theories based almost exclusively on urban empirical research must adapt to account for new findings from a growing body of rural migration destination research.

Lisa Sun-Hee Park and David Pellow's *The Slums of Aspen* (2011) and Justin Farrell's *Billionaire Wilderness* (2020) explore the social dynamics of linked Latina/o and white amenity migration. Based on ethnographic work in Aspen, Colorado and Jackson Hole, Wyoming respectively, these texts examine frictions that arise between primarily white amenity migrants (often termed 'New West'), less affluent existing populations (often termed 'Old West'), and growing Latina/o communities. Both scholars point to the ways that amenity migrants' advocacy efforts function to spatially segregate or outright exclude Latina/os from otherwise white enclaves. While Park, Pellow, and Farrell's work point to ecosystem conservation as an exclusionary tool, Laura Barraclough's scholarship describes how animal rights activism in Nevada has specifically targeted *charrería,* Mexican rodeo, more so

than predominantly white, mainstream rodeo practices (Barraclough 2018). These works raise larger questions regarding whether and how growing Latina/o populations will be accepted into Western communities, which are in turn often experiencing gentrification and displacement due to the simultaneous arrival of affluent amenity migrants.

As service and technology sectors play an increasing role in many Western economies, labor migration is shifting in response to these industries. The research outlined above largely traces migration related to such 'New West' economic growth. However, as Robbins *et al* (2009) note, even as the composition of Western economies change, 'Old West' commodity production (e.g. agriculture, mining, timber, and grazing) is still a significant sector for many communities (Robbins *et al* 2009), and migrant labor remains tied to these industries. While recent scholarship tends to emphasize 'New West' economic migration, a small number of scholars continue to document the experiences of Latina/o migrants working in traditional Western industries. For example, Latina/o workers in Oregon's timber industry have received some attention (Sarathy and Casanova 2008, Wilmsen *et al* 2015), as have agricultural workers in Oregon's Willamette Valley (Nelson 2007, Stephen 2007). In Central Wyoming, Quechua migrants from the Peruvian Highlands have worked as sheepherders since the 1970s and continue to do so (Krögel 2010).

Future research should consider these two strands of labor migration together, as only a handful of works have done.[10] As Western economies continue to change, do we see Latina/os changing employment sectors? Do 'New West' or 'Old West' economies drive more labor migration? Do these two categories of employment result in different settlement patterns? While these works have begun to fill in our understanding of Latina/o migration dynamics in the rural US West, research in this area remains relatively underdeveloped compared to other 'newly emerging destinations' of Latina/o migration.[11] The importance of these population changes are compounded by the institutional context in which they take place, something we examine in the subsequent section through a review of work on environmental governance and its relationship to settler colonialism.

Environmental governance

Indigenous environmental governance and settler colonialism

Scholarship on environmental management in the US West tends to stress the power of the federal government. Rather than approaching the federal government as a monolithic entity, impervious to the social

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[10] See Gonzales-Berry and Mendoza (2010).

[11] See Lichter and Johnson (2009) as an example of 'new destinations' literature.

currents around it, this review focuses on state, local, tribal, and nongovernmental actors playing an increasingly important role in public lands management. While litigation and conflict are still widespread, collaborative approaches to conservation highlight other models for developing land management policies (Charnley *et al* 2014). In particular, we describe the growing importance of Tribal Nations and non-governmental organizations in shaping Western landscapes through managing their own lands or influencing the management of public lands. Nonetheless, the attenuated sovereignty of Tribal Nations in the United States can severely restrict the exercise of governance over Indigenous domains, as evidenced in the inability of Tribal Nations to prosecute crimes committed on their lands when committed by a non-member (Wilkins 2013). Furthermore, settler legal institutions, such as those under US federal law, demonstrate how private actors, individuals and corporations have effectively undermined Indigenous sovereignty through the courts, as exemplified in the US Supreme Court case Dollar General Corp. v. Mississippi Band of Choctaw Indians. These 'entangled sovereignties' force Indigenous nations to negotiate multiple institutions in order to mitigate the territorial claims made by various actors and also operate through the instrumental effects of these policies' outcomes (Cattelino 2010, Dennison 2017, Biolsi 2018).

American Indian Tribal Nations are taking an increasingly significant part in public land management, including in areas beyond reservation boundaries. Much of the interaction between Tribal Nations and US federal agencies occurs in the context of consultation in a government-to-government relationship. These interactions form what agencies refer to as 'cultural resource management,' and are seen by many Tribal Nations as an important exercise of sovereignty (Richland 2018). Many Tribal governments are seeking to maintain and expand land management practices in areas that have largely excluded them. Since Native land dispossession began prior to the emergence of the national public lands system more than a century ago, US federal agencies assumed control of natural resource management, privileging forms of western scientific expertise at the exclusion of Indigenous and local knowledges (Kimmerer 2013, Whyte 2018a). Of particular importance is the rise of Native American tribal governments as land managers not unlike federal land agencies, but often with a distinct constituency (members of the Tribal Nation) as well as different values and identities. Novel environmental policies emerge from these institutions, such as the Salish and Kootenai Tribes' Mission Mountains Wilderness Area, the first Tribal wilderness in the US and a model for conservationists elsewhere given its management emphasis on cultural uses and the well-being of plants and animals over recreation (McDonald 1995). The institutionalization of Tribal Nations is one of the most important political developments of the post-war period, though not without its consequences (Wilkinson 2006, Coulthard 2014). Recent scholarship on the Western US has begun to explicitly identify settler colonialism as an underlying condition that shapes social and environmental formations (Bonds and Inwood 2016, Cattelino 2017).

Settler colonialism refers to a set of social and institutional structures that emerge (and endure) when a group of people arrive in a place and establish their claim to land by taking it away from the extant inhabitants (Wolfe 2006). Unlike franchise colonialism, the type common to many former European colonies in Asia and Africa, settler colonialism is when the settlers come to stay. The United States shares the status of being a settler colony along with other western nations, including Canada, Australia, and New Zealand. Scholars are paying increasing attention to the ways that settler colonialism shapes both the environment and human communities (Griffiths and Robin 1997, Cattelino 2015, Nadasdy 2017). This process was elemental to the development of the US West, and persists in its influence on ecosystems and environmental governance, from the commodification of landscapes to the increasingly amount of time land managers spend in offices instead of on the land. An important vein of research is the field of indigenous political ecology, which offers conceptual tools for examining relationship-based approaches to interactions with the nonhuman.[12] Indigenous environmental governance studies include Clint Carroll's work on Cherokee environmental governance (Carroll 2015) and Beth Rose Middleton Manning's (cited as Middleton 2011, 2015) case studies of Tribal conservation efforts across the US. As these cases show, Indigenous nations are playing an increasing role in managing protected areas, offering a distinct model of environmental governance inflected through cultural practices and values, as exemplified in Native enclosures, or Indigenous protected areas such as those described by Carroll (2014). They are also at the forefront of innovative research approaches of Indigenous environment sciences that capture the values and practices that animate applied socio-ecological research but in Indigenous contexts (Kimmerer 2013, Whyte 2018a). In sum, communities are finding ways to strategically use these structures while advancing sovereignty over Native lands, sometimes in political solidarity with rural non-Native communities that face increasing political marginalization (Grossman 2017). But governments of various kinds are not the only actors that operate in these landscapes, they are also increasingly being shaped by non-governmental organizations such as lobbying groups and environmental advocacy organizations.

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[12] The term 'nonhuman' is used to reference forms of life that are other than human. At times, the phrase 'plants and animals,' is used, but nonhuman is intended as a more inclusive and encompassing term that captures the natural world beyond the human even as they are inextricably linked. The point is to avoid forms of human exceptionalism embedded in categories from the social sciences.

Non-governmental governance

Literature on natural resource governance in the US West tends to emphasize conflicts between federal and local governments. While important, this framing has largely overlooked the role that non-governmental actors—specifically not-for-profits and interest groups—play in governing. Recent work suggests that non-governmental entities are playing an increasing role in governance by providing resources and expertise that local and state governments may lack. For example, Eric Compas describes how environmental non-profits in the Greater Yellowstone Ecosystem provide such extensive research and training to local government staff that these groups are essentially 'acting as an extension of local government' (Compas 2012, p 890). Furthermore, Farrell (2020) documents how philanthropic groups in the low-tax setting of Wyoming have become major funders of resources and services that have historically been publicly provided. Despite playing a role similar to that of a municipal or state government, these non-governmental groups are not publicly accountable, and often favor sectors that are of special interest to their donors, such as the environment and arts sectors. Other 'buzz-kill' issues that may offer less social capital to wealthy donors (e.g. poverty, economic decline, education, and racial/ethnic discrimination) are often disregarded.

Alexander Hertel-Fernandez has detailed how state legislatures are influenced by the American Legislative Exchange Council (ALEC), a conservative non-profit that connects business interests with local policymakers. ALEC channels substantial membership dues from its private sector members towards capacity-building activities such as policy research assistance, the provision of polling data, and the development of model legislation. Hertel-Fernandez argues that, in similar fashion as the environmental non-profits, ALEC is especially successful at influencing legislation in regions with low policy capacity (Hertel-Fernandez 2014). While ALEC works across a broad range of political issues, in the Intermountain West the organization has been a loud voice in favor of the devolution of federal lands to local control (Blumm and Fraser 2017).

Future work on environmental governance in the Western United States would do well to pay closer attention to how non-governmental entities across the political spectrum may be inserting themselves into state and sub-state governance. Research on environmental governance and political geography have long described a range of ways that non-state actors engage in environmental governance (for example, see Bulkeley 2005, Karkkainen 2004, Lemos and Agrawal 2006), but scholarship focused in the US West has not engaged deeply with these existing literatures. Research in this area indicates that state and local governments with fewer resources are more likely to rely on non-governmental entities to bolster governing capacity. Given this finding, it seems likely that the Intermountain West would be particularly predisposed

to lean on non-profit organizations. This region has historically low tax rates, leading to fewer available government resources, and further, compared to other states, legislators in the Mountain West have comparably lower pay and fewer staff (National Conference of State Legislatures 2017). Future research should look beyond the traditional local-federal divide, examining the ways that various non-governmental actors are supplementing—in some cases even *supplanting*—formal governance structures.

Place, culture and belonging

Belonging is more than a feeling. It is a social process that reflects and shapes how humans find meaning in relation to other people and a particular place (Yuval-Davis 2011). These social processes constitute an important element of the politics of the community. And they take place in social and material locations, thus marking the link between place, people, and belonging. Belonging necessarily involves the creation and maintenance of boundaries that define someone or something's place through the inclusion and exclusion of themselves and others, including plants and animals (Plascencia 2012, Subramaniam 2017). Culture is a site of struggle, and ethnography is well-suited as a method for examining the situated practices that normalize and sustain social orders around the belonging of humans and the nonhuman.

Ethnographic studies on social life in the US West demonstrate how the landscape is something fundamental to place-based human experience, as well as a ground of political contestation (Kosek 2006, Winkler *et al* 2007, Garcia 2010). Yet this is treated separately from forms of belonging applied to the nonhuman. Instead, the belonging of plants and animals is conventionally treated as a natural quality of being 'native' or 'nonnative.' Yet dynamic ecosystems confound these static forms of belonging and erase the social processes at work in maintaining such categories. As plants, animals, and other forms of nonhuman life move across space and reconstitute the structure of ecosystems, human communities find themselves affected in myriad ways as the material and symbolic relations between humans and nonhumans are reworked. Landscapes are more than resources for human designs. They include nonhuman actors that dynamically respond to human influence, often in unexpected ways (Wolch and Emel 1998, Tsing 2015). Social research on community and sense of place in the US West demonstrates how sociodemographic changes manifest in struggles over belonging (Larsen *et al* 2007, Shumway and Jackson 2008, Keske *et al* 2017). Yet it is much more than the *what* of sociodemographic change—it is *how* these changes occur and *why*.

Nonhuman belonging and novel ecosystems

Migrations that change the cultural landscape of western cities and the countryside represent more than the remaking of human communities. Ecologists describe these new entanglements as novel ecosystems, ones that social scientists argue require new ways of thinking about place, space, and belonging (Hobbs *et al* 2013, Robbins 2019). Many of the pressing issues articulated by communities revolve around the social impacts of nonnative and invasive species. These transformations in ecosystems emerge from the increased mobility of plants and animals. This is a central focus of ecological science, and particularly invasion biology, but these fields seldom consider the social processes that facilitate movement in the first place (Subramaniam 2001). Furthermore, there is the risk that technological and scientific responses to changing ecosystems that emerge during the Anthropcoene will further facilitate Indigenous dispossession and settler colonialism (Whyte 2017). Scholars in Indigenous studies highlight the way all-encompassing narratives of the Anthropocene obscure the experiences of Indigenous peoples whose communities and homelands have undergone profound ecological and social change due to colonialism over the past several centuries (Whyte 2018b).

A principal concept in the social construction of belonging is indigeneity, or the quality of something being native to a place. Given that migration is not a uniquely human phenomenon—plants and animals are also prolific migrants—mobility needs to be considered as something both human and nonhuman, with each shaped by political and economic processes that take place in a globalized world. The US West is not only challenged by the sociocultural dimensions of changing human communities (and who belongs), but also the proper place of the nonhuman given changing environmental conditions that unsettle ideas of nativeness and place (Robbins 2001). Plants and animals do not exist in a social and cultural vacuum. They play a role in defining the meaning, values, and lifeways of humans. Scholars show that during periods of high human migration, there is a corresponding increase in attention toward the importance of native plant and animal species, such as during the late nineteenth century in the United States when early campaigns to eradicate nonnative species emerged (Coates 2006). Jessica Cattelino's (2017) study of environmental politics in the Everglades shows how this focus on the indigeneity of plants and animals exists in an uneasy correspondence with the Indigenous political claims of Native American Nations. Recent scholarship on the politics of indigeneity centers the struggles of Indigenous nations to seek redress for ongoing and historic harms emerging from settler colonial dispossession, including how to manage for culturally important plants no longer able to establish themselves in particular places due to environmental change.

Indigeneity and environmental politics

Environmental research involving Indigenous communities is seeing renewed attention after an earlier era that largely disregarded Indigenous knowledge and did little to support community priorities. Originating out of the practice of 'salvage ethnography,' or the systematic collection of cultural objects and practices seen as disappearing forever, anthropologists and other social scientists offered little analysis of how colonialism remade landscapes and impacted Indigenous communities. In the US West, narratives largely centered on human domination of a forbidding environment, highlighting the experience of white settlers, and excluding non-white communities. As historians in the 1990s reworked assumptions about race, class, and conquest, recent social research on the contemporary US West highlights how communities are grappling with environmental and economic changes (Limerick 1987, White 1991).

Some of the deeper epistemological and ontological conflicts are evident in the fact that communities view plants and animals in different ways (Burow *et al* 2018). They reflect on how people maintain attachments to the nonhuman, from the collection of culturally important plants to forms of livelihood, like ranching, that depend on natural resources from public lands. which in turn forms core concerns of governance across political boundaries (Carroll 2015). Beth Rose Middleton Manning's work shows how disruptive public lands projects serve to undermine Indigenous sovereignty (Middleton Manning 2018). The role of place as the grounds of the contested cultural politics of nature demonstrates how belonging is central to the social and cultural futures of western communities. Anna Tsing's (2015) work on matsutake mushrooms shows how place and belonging are not exclusively shaped by political boundaries, but are often implicated in transnational commodity chains and routes of human migration. Many matsutake pickers in Oregon's rural forests are Southeast Asian refugees from US imperial wars, and the very conditions that favored matsutake growth emerged from forests substantially altered by industrial-scale timber extraction. Dana Powell's (2018) examination of political struggle around the failed Desert Rock Power Plant project in Navajo Nation shows how material landscapes are infused with meaning and produce their own politics in ways that should be seen as not just destructive to lands and people, but also generative to movements that advance Indigenous sovereignty and alternative energy futures.

Many environmental conflicts over endangered species serve as proxies for social and political conflict over land use and rights (Sayre 2003, Alagona 2013). The cultural politics of indigeneity is one of the key social processes shaping environmental politics in the US West. As settler colonialism shapes the categories that define ideas of belonging, political contestation emerges around the place of particular nonhumans on

public lands. But the risk of shifting toward the non-human in explicating the politics of belonging is that it erases contestation over social difference within human communities. Social research in the US West, while foregrounding race, ethnicity, gender and sexuality to a greater extent than in the past, still leaves much wanting in understanding how these formations are constituted in relation to one another. An important avenue for future research is to better understand how multicultural immigrant communities are reshaping the boundaries of belonging in the US West in relation to amenity migrants, Indigenous nations, and multi-generational (non-Native) communities. This will be an important site of future work, including examining these communities' connections to landscapes, to understand how human and nonhuman difference are interconnected and shape the socio-ecological future of the US West.

State of the methods

In this last section we step back to consider the ways that the themes and questions above might be studied in fresh ways using an innovative mixed-methods approach. These tools are not unique to the study of the US West, yet we believe that many of the most pressing issues in the US West that we have identified (e.g. migration, governance) lend themselves to a dynamic methodological approach that blends computational social science and traditional qualitative methods. Here we introduce this approach using examples from recent research, and then suggest ways that future work might expand upon these methods in order to begin to fill some of the research gaps introduced above.

It is no secret that inside and outside of the US West, the digital revolution has touched nearly every aspect of economic, social, and political life, and social scientific research is just beginning to keep pace with these changes. Rural or urban, we now live our lives within digital networks, and much of what we do on a daily basis leaves digital traces of 'big data' to be analyzed by social scientists. We swipe our credit cards, send text messages, stream movies, send money, purchase everyday goods, sell our homes, read and watch news, travel down 'streetview' on a western dirt road or in a city on the other side of the world, post our political views, and share photos.

In the US West, for example, farmers now rely on ultra-precise satellites to increase agricultural yields and automate labor. Government agencies that manage the US West now solicit NEPA public comments online, with the aim of widening civic engagement and increasing bureaucratic transparency. Western environmental groups use satellite imagery to create large-scale maps that visualize ecological disturbance. Computer vision and artificial intelligence can help cities automatically assess the condition of their infrastructure. And more broadly, we now have small sensors that make any ordinary products 'smart,' with the aim of increasing efficiency, such as large-scale streamlining of supply chain management, efforts to digitize health records, water sensors for land managers to better predict water inflow and outflow, or more commonly, the 'smart' revolution in consumer products like phones, automobiles, wrist watches, and home appliances.

Researchers studying issues affecting the US West must make better use of the ubiquity of data in order to improve our understanding of economic, social, and political life in this region. While we do believe that the massive amount of precise data is a positive development, we also caution against data hubris, or the notion that data science should replace rather than complement traditional approaches to study. Certainly, data from this digital monsoon allow us to ask novel research questions, yet perhaps more interestingly, they allow us to ask old questions in new ways. In what follows we provide concrete pathways for integrating new data and methods into the state of research on the US West, including ways that such approaches might blend with traditional qualitative research.

Innovative pathways to study governance, migration, and belonging in the US West: automated text analysis and network science

While the careful analysis of the written and spoken word has long been a cornerstone of research on the US West, the recent digitization of government documents, news media, speeches, meeting notes, and myriad historical records present new opportunities (Grimmer and Stewart 2013). While we cannot—and should not—replace careful qualitative readings of individual texts, methods from the computer sciences have evolved to allow for automated content analysis of massive collections of texts, with a surprising level of detail and validity.

We are especially optimistic about applying text analysis to questions of environmental governance raised in the first section above. For example, this method can be used to catalogue and synthesize large amounts of discourse from government agencies and the public to trace interactions between institutions, political actors, and political outcomes. Farrell (2015b) geocoded and extracted themes in hundreds of thousands of NEPA public comment letters written amidst environmental management conflicts in the Greater Yellowstone region, providing unique insight into why some environmental issues are more intractable than others. And, drawing on recent uses of semantic similarity analysis that revealed 'copy and paste lawmaking' (Jansa *et al* 2019), future research on the US West might examine whether and why western lawmakers reinvent—or 'copy'—neighboring social and environmental policies.

Texts may be readily available through Application Programming Interfaces that allow researchers to bulk download large collections of pre-cleaned written and spoken words. Yet in other cases, which can sometimes be the most interesting and valuable, scholars can build new, custom collections via web-scraping, optical character recognition, and other means for digitizing data that may not yet be readily available. For example, Spirling (2011) digitized all tribal treaties from 1784 to 1911, and coded them using sophisticated word-use methods, providing new insight into political dynamics between the tribes and the United States government. With regard to historical texts, the written record in the US West is likely less comprehensive and less formalized than in other regions, and thus building such custom text collections for western research may be all the more necessary and important.

Automated text analysis can take increasingly complex forms, but the development of user-friendly software and packages continue to lower the barrier to entry. In some cases, a researcher may simply be interested in how many times certain words appear in their documents. In other cases, their research question may necessitate more complex techniques to automatically identify names of persons or locations in texts, or to dissect of sentence structure of a speech, or to assess emotional sentiment of texts, or to code themes within and across a large amount of documents that cannot be coded by hand, or to isolate latent themes that might be missed by the human eye, or to compare the semantic similarity of one set of texts with another. Though exciting and new, these automated methods should not preempt the careful development of a research question, or replace the prudent interpretation of findings. But these approaches do increase the scale, scope, granularity—and most importantly, the creative possibilities—for examining how the written and spoken word influence, and are influenced by, socio-political life in the US West.

Another useful tool, especially for the study of migration, is social network analysis. This methodological approach focuses on the *relationships* between individual or institutional actors, and the overall *structure* these relationships take. Individuals are embedded in all sorts of different networks that social scientists can analyze, ranging from families to school cliques to large political movements. While basic forms of this method are commonplace in social science research, we do highlight novel ways that they might be applied in work on the US West as well as novel methodological developments that blend social network analysis with large-scale text and semantic network analysis.

For example, in the US West we might be interested in the social structure of rural community to improve our understanding and discover solutions to problems of social isolation and the region's high rates of suicide. Or, we might be interested in how information flows through networks of individuals, such as how people get their news or how they rely on acquaintances to find a job. Returning to our synthesis of population change and migration above, researchers might apply network science to shift their focus away from individual migrants toward the pathways that link them to various institutions and communities. This would provide a better birds-eye-view of the rapidly changing demographic shape of the US West.

Beyond the individual level, we also might look at relationships between organizations, examining how larger institutional networks are structured, or how various financial or social resources flow between them (figure 3). Similar to text analysis, scholars have long been interested in studying the structure of these sorts of social relationships, but recent advances in computation, visualization, and data availability have supercharged this area of research and created new possibilities.

Because society itself is defined by connections between things, nearly any social research project on the West *could* integrate social network analysis. One especially fruitful avenue in which we believe future research should focus on is using social network analysis to uncover and illustrate the power dynamics operating within Western politics. For example, in his historical study of the transcontinental railroads, Richard White (2011) examined the networks of relationships between companies, individuals, and board memberships that structured this industry between 1872 and 1894. More recently, network methods have, for example, been used to study the relationship between wildfire transmissions and rural communities (Ager *et al* 2017), to better understand the structure and function of environmental philanthropy in the region via networks of wealthy amenity migrants (Farrell 2020), and to map the structure of relationships between stakeholders competing over water in Arizona (Muñoz-Erickson *et al* 2010). Figure 4 illustrates how a text analysis approach and a social network approach can be fruitfully integrated, especially when paired with ethnographic study.

Beyond the scope of the US West, scholars have combined text analysis with network analysis to examine how democracy is being thwarted, by uncovering the financial connections between industry and lobbying (Farrell 2016a, 2016b, 2019), as well as via online social networks (i.e. Twitter, Facebook) that have created echo-chambers and can foster greater polarization within the public (Farrell 2015a, Bail *et al* 2018, Jasny *et al* 2018). While these issues are certainly national in scope, there exists an opportunity for scholars to use network analysis to consider how these issues are playing out in similar (or different) ways within Western communities and political processes.
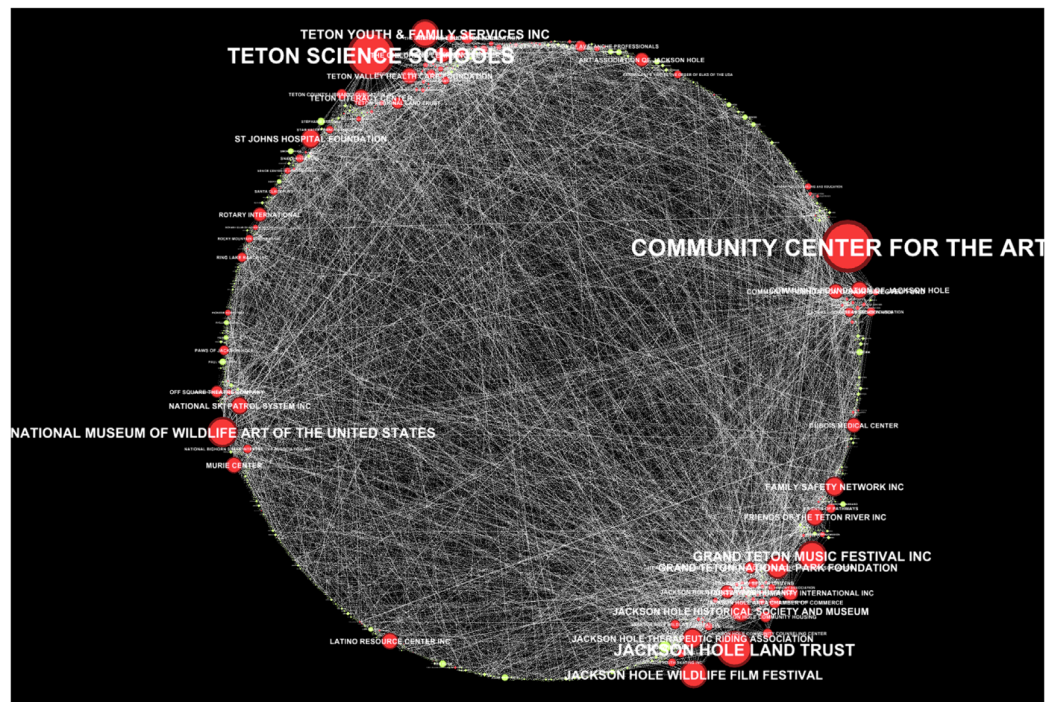
Figure 3. From Farrell (2020), plotting the structure of all relationships between individuals and organizations in Teton County, Wyoming between 1997 and 2014. Size of the circles equals the influence of an organization within the network. The lines between the circles represent a documented relationship (person —> organization). 280 organizations, 4060 people, with a total of 17 848 connections between a person and an organization.
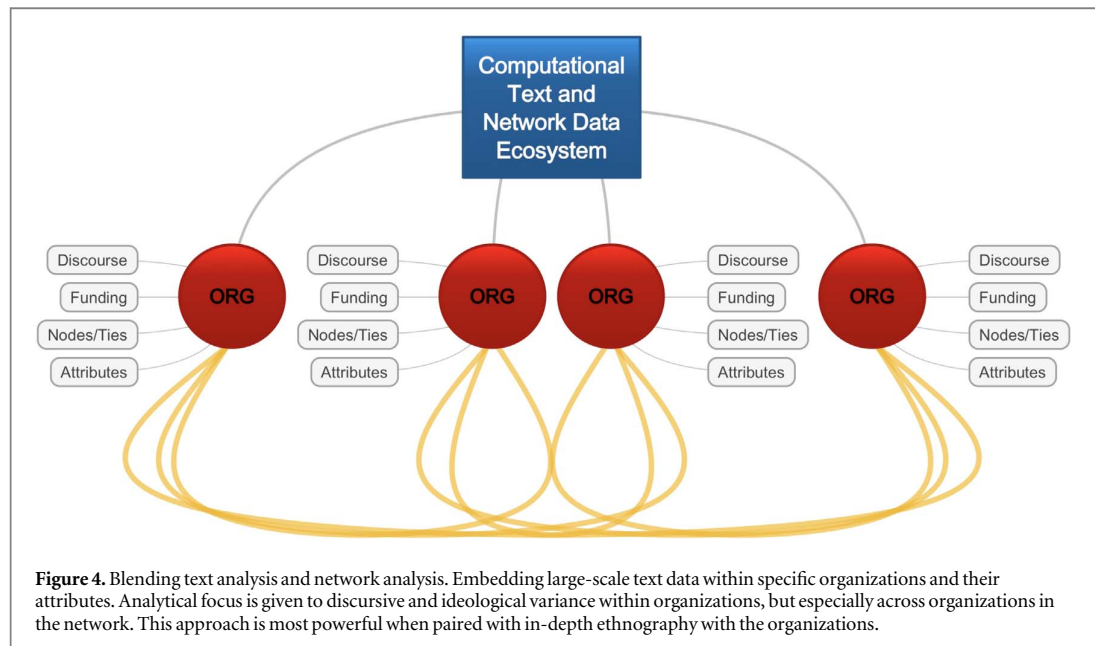

Figure 4. Blending text analysis and network analysis. Embedding large-scale text data within specific organizations and their attributes. Analytical focus is given to discursive and ideological variance within organizations, but especially across organizations in the network. This approach is most powerful when paired with in-depth ethnography with the organizations.

There are also opportunities to integrate automated text analysis or large-scale social network analysis with longstanding approaches to social research, such as ethnography, surveys, and historical analysis. Examples of this are cited above, such as Richard White's (2011) network analysis of railroad actors, or Justin Farrell's (2015b, 2020) combination of ethnography and interviews with large-scale text and network analysis—both of which provide better leverage on environmental governance in the US West.

The field of Digital Humanities continues to grow, and provides yet another institutional example of what

we believe should be a mixed-methods future, where qualitative and quantitative social science work in tandem. Furthermore, the aim of automated text analysis is often very similar to qualitative research in its epistemological approach, with its focus on inductive reasoning and rich thematic content analysis. And, social network analysis—which has its roots in early anthropology and sociology—can be even more powerful when paired with qualitative interviews, to better understand how actors within the network think and behave.

As issues of environmental governance and human migration continue to unfold in complex ways across the US West, it is incumbent upon researchers to creatively draw on new data and methods to consider new puzzles and to revisit old ones. Indeed, while twenty years ago the problems many researchers faced concerned the scarcity of data and limits to computational power, today it is quite the opposite. If applied in creative and responsible ways, western research is poised to build on past contributions, and tackle some of the most pressing problems with greater clarity, scope, and depth. As we shown in the examples above, we have seen great progress, yet we believe the complexity of the issues in the US West demand a more complex and mixed-methods approach.

Conclusion

This review synthesizes social science scholarship examining the US west through four key themes. It reviews work on migration and population change to illustrate how Latina/o migration is remaking the sociocultural landscape of many communities along with the arrival of amenity migrants that are often, but not always, white and wealthy. Many of these changes are linked to economic changes, such as the need for service sector workers in the tourism and recreation economy. These changes are also linked to social and economic tensions related to housing costs and the belonging of new arrivals that bring with them their own cultural values and practices.

Climate change is already affecting the region, and there is a need for more research on how communities can mitigate its impacts and adapt to changes that will impact communities in highly uneven ways in line with social and economic inequality. Examining environmental governance, it becomes important to understand the increasing role of environmental non-profit organizations and non-federal government actors, such as Indigenous nations and local/state governments. Greater attention to settler colonialism is highlighting the important role of Indigenous peoples and nations in managing lands on and off reservations, and the ways that unequal power relations manifest in conflict over environmental management. Furthermore, many of the structural characteristics of settler

colonialism as it relates to belonging and control over natural resources are shared with other Anglophone settler nation-states such as Canada, Australia, and New Zealand. Many of the empirical conclusions discussed in this article can be productively applied to other contexts to pose research questions and compare results.

The changing sociodemographic composition of human communities, and renewed concerns about the boundaries delineating communities and what defines them, demonstrate how experiences of inclusion and exclusion are animating political conflict over access to lands and livelihoods in a time of profound ecological change. Finally, new methodological approaches in computational text analysis provide insight into social processes that can be productively analyzed alongside qualitative methods like ethnography. Future research should continue to expand the potential of these combined approaches to answer questions about social and environmental change in the US West and its impacts on human communities and ecosystems.

Data availability statement

Any data that support the findings of this study are included within the article.

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