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Table of Contents

Articles

Reflections

Geographic Chronicles

Power and Perception: Homelessness and Soft Policies of Enforcement in the Arcata Community Forest

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Abstract

This article examines Arcata residents' attitudes toward homeless people in the Arcata Community Forest and what their perception of homelessness implies about the nature of public space. This article indicates that, although Arcata residents express concern for people considered to be "genuinely homeless," many homeless living in Arcata are thought to have chosen their lifestyle, and therefore are looked down upon as an unwanted "other." This sense of "other" in the community leads to a heightened sense of ownership and the sanitization of public spaces through the use of soft policies of enforcement. The conceptualization of the Arcata Community Forest as a prime space indicates that natural beauty can be consumed as a commodity and that public space is to be consumed by the right people, at the right time, in the right way, as determined by a community in power.

With its lush green ferns, colossal redwoods, and muddy brown banks, the Arcata Community Forest (ACF) proper totals 793 acres of rolling hills and deep ravines. Its creation in 1955 marked a combination of six privately owned tracts of land, and its use as a municipal water source lasted until 1964 (Van Kirk 1985, 1). In 1974, legislation passed the Forest Management and Parkland Initiative, intending to develop a long-term forest management program to generate income for the city. Today, members of the community use the forest mostly for recreation—more than a dozen well-maintained hiking, biking, and horse trails, along with an extensive disc golf course, make the forest a wonderful location for a day of leisure. The forest is also used for education—its proximity to Humboldt State University allows it to become an ideal lab space for many classes—and timber harvesting, which generates $500,000–$700,000 annually (Communities Committee 2008, 5). The ACF also serves as shelter for a large homeless population, where the City of Arcata "cleans up 20–25 abandoned camps a year" (personal interview, 2015).

The ACF serves as shelter to many small encampments for the city's homeless population, but there is one site in particular that has proven to be quite

Figure 1.—Cabin found in the Arcata Community Forest (photo by author).

a rarity. Deep in the forest, off an unmarked trail and hidden in the wild brush, stands a solitary cabin (Figure 1). Solidly built, cleanly designed, and well kept, it is an obvious labor of love for some forest dweller. This cabin stands in stark contrast to the makeshift encampments of scattered detritus typically found in the forest, usually comprised of little more than a tarp, sleeping bag, scattered clothes, and tidbits of food scraps and trash. Upon entering the cabin, one notices the extreme care and attention to detail that went into its construction and maintenance. Floor swept, furniture dusted, food shelved and labeled, books neatly organized, bedding cleaned and kept out of the way, no marks of abuse, no signs of mistreatment, clean, thoughtful, and controlled. This place is more than a mere campsite—it's a home.

A forester scouting the area for timber discovered the cabin in late July, 2015. The following week, the *Mad River Union,* a local newspaper, published an article about the cabin, with the article ultimately becoming its "most popular article of all time" (personal interview, 2015). Soon thereafter, pinned on the front door of the cabin, a notice of nuisance notified the owner that the cabin is to be torn down and the contents removed. By late August, the cabin was completely removed from the forest and in its place was left the universal squatters' symbol, emblazoned in charcoal.

Since the article ran in the *Mad River Union*, the cabin has sparked debate in the community about public rights in the ACF. Many argue that the cabin should have been allowed to stay, since it was out of the way and cleanly managed, while others maintain that the cabin was potentially dangerous and built illegally, and therefore ought to have been removed.

What does the community's perception of homelessness in the Arcata Community Forest say about the nature of public space? In order to answer this question, three interconnected questions must be explored and analyzed: (1) How and why is the ACF used as shelter by the city's homeless population? (2) What is the community's response to homelessness in the ACF? (3) How has this changed over time? This article argues that public space is space to be consumed by the right people, at the right time, in the right way, as determined by the community in power.

The Arcata Community Forest

Arcata, a city of just over 17,000 inhabitants, sits on the northern edge of Humboldt Bay in Humboldt County, California, about 280 miles north of San Francisco (Census 2010). This college town is home to Humboldt State University. Opposite Arcata on the southern edge of Humboldt Bay is Arcata's sister city, the much larger and better known City of Eureka.

In the 1850s, settlers harvesting the Arcata/Eureka area for timber decimated the forest currently known as the Arcata Community Forest, as described in Wallace Elliot's History *of Humboldt County California* (1882):

> No one can contemplate the wholesale destruction of these glorious forests without the saddest feelings. Nothing can be more majestic and impressive than the land clothed with them, nor more naked, desolate, ragged and uncouth than the land after it is stripped of them. It is in the one case peace, beauty, plenty, virginity, and bounty; in the other rags, fire, destruction, rapine, ghastliness, and most unsightly death. There are not, I think, more impressive forests in the world.

Congress, whose goal was to "settle and civilize the land—not to exploit the nation's timber resources," set aside several tracts of redwood forest, bringing them under municipal control (Van Kirk 1985, 2). These tracts—the Gannon Tract, Burns Tract, Preston Tract I, Preston Tract II, Reclamation Water Co. Tract, and Brizard Tract—were operated privately until 1955, when the City of Arcata bought and combined them to create what is now known as the Arcata Community Forest, the first municipally owned forest in California (Van Kirk 1985, 1). The City of Arcata used the forest as a municipal water source, obtaining its water from Gannon Creek, Preston Creek—formerly known as Jolly Giant Creek—and Janes Creek, shifting resources in the forest toward ecological conservation and watershed management (Van Kirk 1985, 2).

Today, the forest provides educational opportunities for the community—especially students at Humboldt State University—and sustainable timber harvest, generating income for the City of Arcata. It is also a popular destination for recreational activities such as hiking, mountain biking, horseback riding, birding, and disc golf. One City of Arcata employee says, "The forest is an essential fabric of the town…It's a unique place. It's the first of its kind and no other city has anything like it" (personal interview, 2015).

Homelessness in Arcata

This ease-of-access and public nature makes it a popular destination for homeless people to create temporary encampments. In 2007, the City of Arcata published the *Homeless Services Plan: 2007–2016*, which outlines the current reasons for homelessness in Arcata, offers solutions to prevent homelessness, and provides estimates of total homeless populations in Arcata as well as estimates of income and education levels of the homeless. This document makes frequent mention of the Arcata Community Forest. According to the Homeless Services Plan, the Arcata Police Department (APD) and the Environmental Services Department clean up approximately fifteen illegal, two- to five-person camps annually in the Community Forest. These encampments are cited as a "public health and safety hazard." The Homeless Services Plan goes further by stating that:

> Police also receive complaints from Arcata City residents who report being harassed or intimidated by homeless that have "staked a claim" to a portion of public or private property. Residents also complain that the aesthetics and overall intrinsic value of the community's Marsh and Wildlife Sanctuary and Community Forest are degraded by illegal camping (City of Arcata 2007, 6).

Humboldt Housing and Homeless Coalition—a local organization committed to ending homelessness—published a 2005 "point-in-time count" of homeless people in Humboldt County which is used as a prime data source in the Homeless Services Plan. The goal of this count is to get a rough estimate of the number of homeless people living in Humboldt County, and provide basic demographic information including income, age, education level, and where they are currently staying. Humboldt Housing and Homeless Coalition (HHHC) surveyed 755 people out of an estimated 1,000 homeless people in Humboldt County in their 2005 point-in-time count. Of these 755 people, 16 percent live in Arcata. Of the people who live in Arcata, 8.6 percent said they were born in Humboldt County, 26 percent claimed they have lived in Humboldt County for six or more years, 23 percent reported having lived in Humboldt County for one to five years, and the remaining 42.4 percent have been living in Humboldt County for less than one year (Table 1). Of the total 755 homeless people surveyed, an incredible 74 percent reported currently living in illegal campsites like the ones found in the Community Forest.

Table 1: Number of Years Living in Humboldt County	Homeless in Arcata
Born in Humboldt County	8.6%
Lived in Humboldt ≥ 6 years	26%
Lived in Humboldt 1–5 years	23%
Lived in Humboldt < 1 year	42.4%

HHHC's survey brings to light three facts: (1) A relatively large percentage (16 percent) of homeless people living in Humboldt County are concentrated in the City of Arcata. (2) A great majority of the homeless people living in Humboldt County are not originally from Humboldt, meaning they have been living in Humboldt County for fewer than five years. (3) Illegal camping is by far the most popular form of shelter among the homeless population. With these three facts in mind, it becomes apparent why the Arcata Community Forest is a popular location for the homeless population to seek shelter, raising questions about who has rights to the forest—a public space open to the community—and what those rights are.

Conceptual Framework

Five concepts are essential in understanding the analytical framework necessary for this research. First and foremost, the sanitization of public spaces is an instrumental concept in understanding the processes that shape the way members of a community perceive homelessness in public space. As outlined in *Soft Policies of Exclusion: Entrepreneurial Strategies of Ambience and Control of Public Space in Gothenburg, Sweden,* this idea asserts that as city spaces become increasingly privatized, public spaces become places for consumption: places to sell goods and services to paying citizens—i.e., a shopping mall, a series of privately owned spaces designed to sell consumer goods under the guise of a public area (Thörn 2011, 6). These spaces need to be "sanitized" of unwanted individuals who make the city look "dirty" and scare away would-be patrons.

In order to sanitize these spaces of an unwanted "other," soft policies of enforcement—another essential concept—are introduced. These policies are used as a way to keep specific individuals away from places without imposing outright discriminatory laws (Thörn 2011, 7). This is done by

restricting access through conditional means—limiting where people can be by a certain time of day, for example—instead of restricting it by limiting the use to specific demographics.

Soft policies of enforcement, along with the notion of a revanchist city—the idea that homeless people are beggars who "leech" off the hard-working citizens of the city, and thus city laws should be designed to "take revenge" on people for living a homeless lifestyle—leads to the criminalization of homelessness (Thörn 2011, 7). This is vital in understanding the way homelessness is expressed in public spaces, because it puts into perspective the idea that public city spaces are spaces for individual consumption, and what happens to the individuals who do not have the means to consume. All of this points to larger economic trends that drive people to being homeless.

In terms of understanding economic trends that drive homelessness, understanding the debate between Housing First (HF) and Continuum of Care (CC) are at the forefront of the current discourse. CC asserts that individuals with severe mental health and addiction problems are incapable of living in traditional housing until these problems are addressed, whereas HF emphasizes that chronically homeless people need and have the right to housing, even if they require social services to remain housed (Klodawsky 2009, 5). The logic behind CC is that homeless people cannot care for themselves, and thus should not be put into permanent housing until their respective issues are dealt with, but HF shifts to the notion that regardless of a person's issues, they need to be put into permanent housing. Klodawsky argues that HF is an outcome of two trends: (1) growing pressure for municipal governments to attract economically productive activities, and (2) disciplinary practices that attempt to reduce the visibility of unattractive populations (2009, 5). HF implies that level of care necessary for a person is determined by visibility—i.e., "If I can't see them, they're not my problem."

Finally, an understanding of prime and marginal space is necessary for conceptualizing the spatial relationship between the marginalization of homeless people and the legitimation of community members in public spaces. Prime spaces are public spaces that community members actively participate in and can receive goods and services from; by contrast, marginal spaces lie in between or around prime spaces, but themselves are not prime (Hodgets et al. 2008, 7). An example of this dichotomy, as described in *A Trip to the Library: Homelessness and Social Inclusion,* can be seen by examining a library: the library itself would be considered a prime space because it is a place where members of a community can go and receive the benefits of the services it offers; however, the alley behind the library, the street in front of the library, and the hedges to the side of the library would be considered marginal since they do not offer goods or services themselves, but only act as spaces that occupy the area between other prime spaces (Hodgets et al. 2008, 9).

These five concepts, when combined, provide the necessary framework for analyzing homelessness in public spaces as well as reflect the larger economic trends that influence community members' perceptions of homelessness. With this framework in mind, a data collection system is constructed in order to find how these concepts apply to the Arcata Community Forest.

Methodology

This research utilizes a mixed methodology made up of intensive and extensive methods collecting both qualitative and quantitative data. These methods include interviews with City of Arcata employees, interviews with homeless people living in Arcata, surveys of 100 Arcata residents, and spatial analysis of homeless encampments in the Arcata Community Forest.

Four semi-structured interviews with city workers illuminate current policies on homelessness within Arcata. Along with these four individuals, six homeless people—whose names shall remain anonymous—were interviewed in a semi-structured setting. These six individuals were chosen at random from the Arcata Plaza. These interviews help explore what it means to be homeless in Arcata, and examine from a humanistic perspective the five concepts outlined in the "conceptual framework" section of this research. A small sample size was collected due to time restraints involving the publication of this article, however, conducting further research in order to gather from a larger sample size could potentially yield previously overlooked data.

In contrast to the intensive nature of these interviews, surveys of 100 Arcata residents are administered door-to-door in order to measure the community's perception of homelessness—especially homelessness within the ACF. In order to collect these 100 surveys, Arcata is divided into 14 sample districts (Figure 2), with seven houses surveyed from each district—district 3 and district 10 have eight houses surveyed in order to bring the total number of houses surveyed to an even 100. Discussions arise while surveying residents, and often turn into unstructured interviews.

In addition to these methods, spatial analysis of homeless encampments in the ACF is conducted in order to put into perspective the spatial distribution of homeless people within the forest. Data is collected by hiking through

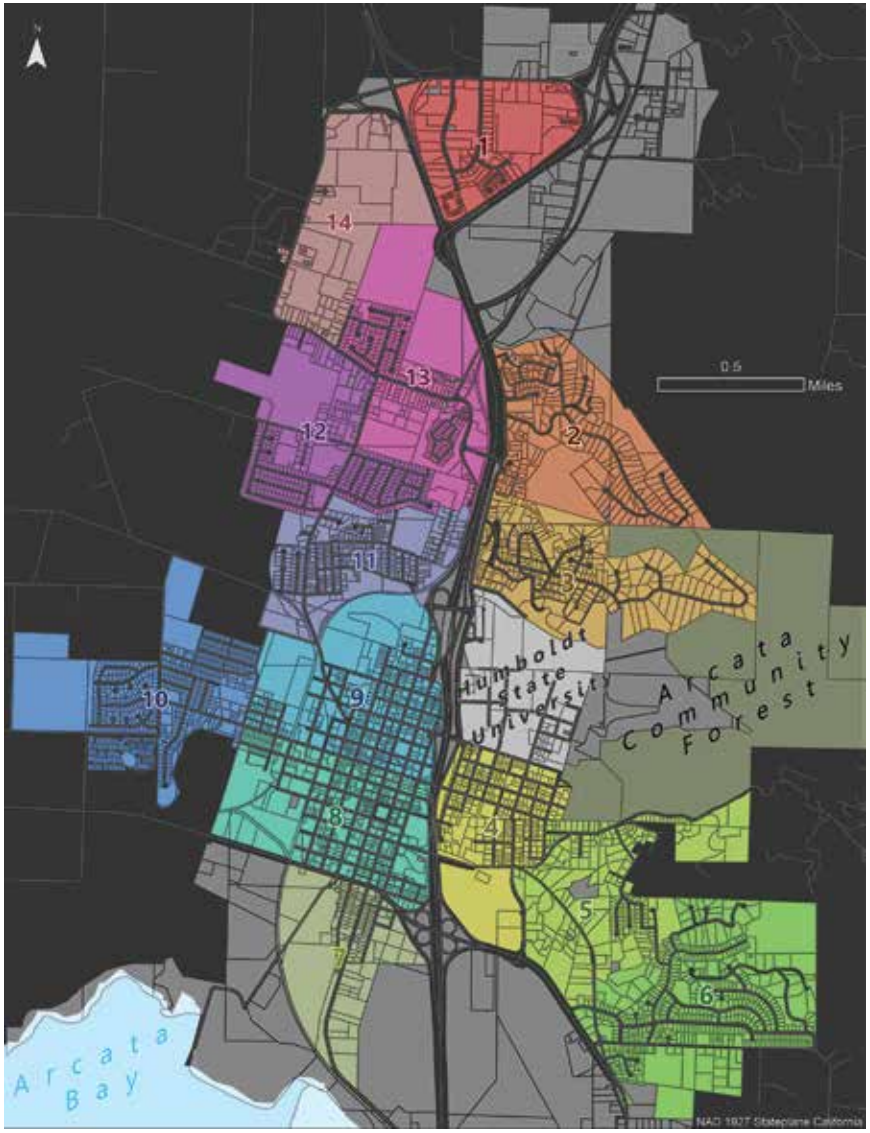

Figure 2.—Arcata divided into 14 districts (map by author).

the forest and marking encampments as waypoints on Garmin mobile GPS units. For the purpose of this research, an encampment is defined as any site that clearly shows recent human use such as compacted ground, lack of vegetation, trash, graffiti, sleeping bags, clothing, etc.

Analysis

Figure 3 shows the spatial distribution of homeless encampments in the ACF. Encampments tend to be close to entrances to the forest, tend to be very close to a trail—practically on the trail in many cases—and clustered near Redwood Park. Why are the majority of encampments built this way? Initial speculation suggests that a homeless population living illegally in the forest would prefer to build encampments inconspicuously, deep in the forest, far away from any trail, so as to remain hidden from hikers, park rangers, and police officers.

The spatial distribution of encampments in the forest points to a homeless population that desires ease of access, maneuverability, and convenience—not stability or permanent settlement. When asked where homeless people are most commonly found in Arcata, one City of Arcata employee states that they tend to congregate around the Arcata Plaza and near Highway 101 on and off ramps, then become fewer and farther apart from those places. "Why do we see squatters in the (ACF), but not the Bayside or Janes Creek forests? There hasn't been a single encampment in either of those forests for thirty years" (personal interview, 2015). The ACF is located very close to the

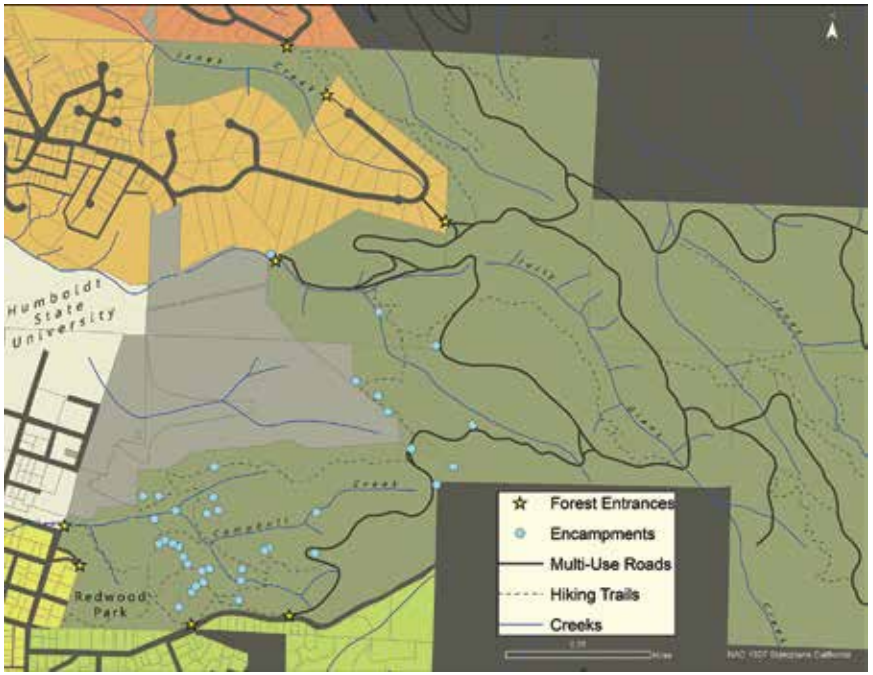

Figure 3.—Homeless encampments in the Arcata Community Forest (map by author).

Arcata Plaza—a mere fifteen-minute walk—suggesting that the homeless camp in the ACF due to its close proximity to and ease of access from a centrally located hub. The need for easily accessible and convenient spaces to build encampments near a central hub and along a major travel corridor suggests the existence of a highly mobile, transient, homeless population.

The idea of a transient homeless population being distinct from the city's chronically homeless population is prevalent in just about every single person interviewed and surveyed. This transient homeless population is generally looked down upon by members of the community. Many community members surveyed express concern for the "genuinely homeless" but frustration toward "lazy transients," or feel "taken advantage of" when asked for handouts, because they are not sure whether the person is "really homeless" or "just a transient." This sentiment is captured perfectly when one Arcata resident states: "I want to help someone who is needy, but not someone who chooses to be needy" (Arcata resident, 2015).

A transient population existing among the city's chronically homeless population is often considered part of a recent trend. In particular, the past five years are associated with a large increase in homelessness across all of Humboldt County, most likely connected to Humboldt County's illegal marijuana production. Many of these transient homeless people moved to Humboldt County in search of "trim" jobs on marijuana farms. HHHC's point-in-time count estimates that 67.4 percent of homeless people living in Humboldt County have lived in the county for five years or less (City of Arcata 2007, 6). Also, five of the six homeless people interviewed admitted to not originally being from Humboldt County and having lived in the county for less than five years. Each of these five people reported having lived in many cities throughout the past ten years, the most common cities being in California, Washington, and Oregon—cities along the Highway 101 corridor—and all six homeless people interviewed admitted to being connected to Humboldt County's marijuana production (personal interview, 2015). Reflecting on the recent influx of homeless people, a City of Arcata employee claims that encampments in the forest have gotten much worse in the past five years, citing that encampments are often filthy and bereft of any effort to remain hidden or out of the way: "It's like they just don't care anymore" (personal interview, 2015).

The survey of 100 Arcata residents reflects a change in perception of homelessness in the past five years as well. When prompted with the statement, "Homeless people have a right to live in the Arcata Community Forest," 69 percent of Arcata residents who have lived in Arcata for five or more years report they either slightly disagree or strongly disagree; however, only 37 percent of Arcata residents who have lived in Arcata for less than five years say they either slightly or strongly disagree (Table 2).

Table 2: "Homeless people have a right to live in the Arcata Community Forest."	Lived in Arcata ≥ 5 years	Lived in Arcata < 5 years
Strongly Disagree	47%	21%
Slightly Disagree	22%	16%
Indifferent	18%	26%
Slightly Agree	8%	26%
Strongly Agree	5%	11%

When asked the question, "Have you noticed a change in homelessness since you've lived in Arcata?" 87 percent of Arcata residents who have lived in Arcata for five or more years report they have noticed either a slight increase or large increase in homelessness since they've lived in Arcata; by contrast, only 42 percent of Arcata residents who have lived in Arcata for less than five years report they have noticed either a slight increase or large increase since they've lived in Arcata. In fact, 55 percent report they have noticed no change at all (Table 3).

Table 3: "Have you noticed a change in homelessness since you've lived in Arcata?"	Lived in Arcata ≥ 5 years	Lived in Arcata < 5 years
Large Increase	50%	8%
Slight Increase	37%	34%
No Change	11%	55%
Slight Decrease	0%	3%
Large Decrease	2%	0%

When asked the question, "What feeling most often comes to mind when you see a homeless person?" 27 percent of Arcata residents who have lived in Arcata for five or more years report feeling either frustration or disgust most often, whereas only 16 percent of Arcata residents who have lived in Arcata for less than five years report feeling either frustration or disgust most often (Table 4).

Table 4: "What feeling most often comes to mind when you see a homeless person?"	Lived in Arcata ≥ 5 years	Lived in Arcata < 5 years
Disgust	3%	3%
Frustration	24%	13%
Concern	32%	37%
Sadness	23%	16%
Pity	8%	13%
Indifference	10%	18%
Joy	0%	0%

Arcata residents who have lived in Arcata for five or more years have seen a greater increase in homelessness, are far more likely to respond negatively to homeless people living in the ACF, and are more likely to have feelings of either frustration or disgust when seeing a homeless person. Arcata residents who have lived in Arcata for five or more years have become skeptical and mistrusting of the homeless population, as they associate them with a growing transient population creating a deeper sense of "other" in the community, as the transient population, for the most part, are seen as a dirty, lazy, unwanted people who aren't a part of the community.

The growing homeless population is seen more and more as a nuisance that needs to be sanitized from public space. As one City of Arcata employee put it, "The City's cost to clean up the abandoned camps is astronomical; therefore, prevention of illegal camping is essential" (personal interview, 2015). Another City of Arcata employee claims, "We're spending time and resources cleaning up after people instead of something more permanent like trail or stream management and maintenance," and that the forest is paid for by the people and that money should be used to make the park more enjoyable for these people (personal interview, 2015). This implies that if someone doesn't live in the community and pay taxes in the city, then the park is not for them. They are not a part of the "community" in the "Arcata Community Forest."

This idea of ownership is reflected in the survey of 100 Arcata residents. Ninety-nine percent of Arcata residents consider homelessness an issue in Arcata, and 69 percent considering it a "large issue" (Table 5). And when prompted with the statement, "Homeless people have a right to live in the Arcata Community Forest," 57 percent of Arcata residents report they either slightly disagree or strongly disagree (Table 6).

Table 5: "Is homelessness an issue in Arcata?"	All Residents
Large Issue	69%
Slight Issue	30%
Not an Issue	1%

Table 6: "Homeless people have a right to live in the Arcata Community Forest."	All Residents
Strongly Disagree	37%
Slightly Disagree	20%
Indifferent	21%
Slightly Agree	15%
Strongly Agree	7%

Almost all Arcata residents consider homelessness an issue in Arcata, and a majority of Arcata residents believe that homeless people do not have a right to live in the Arcata Community Forest. Many community members cite the same reasons for not wanting homeless people to build encampments in the forest: the encampments contribute to environmental degradation, the people who build the encampments are potentially dangerous, trespassing in the forest is illegal, and the encampments are unsightly. All of this, again, points to the idea of an "other" that is unsightly, hazardous to health, and potentially dangerous.

In the face of this "other," many Arcata residents feel a heightened sense of ownership over public spaces such as the Arcata Community Forest. One Arcata resident brilliantly outlines this. When prompted with the statement, "Homeless people have a right to live in the Arcata Community Forest," this individual exclaims, "Not in my backyard!" (Arcata resident, 2015). This heightened sense of ownership is also seen in marginal spaces that are perceived to be connected to a prime location, as explained by one homeless person describing his or her encounter with a local business owner after trying to sleep on the sidewalk in front of the business owner's store: "This guy (the business owner) came out and starts yelling at me 'Hey! You can't sleep there! You have to move!' And I was like, 'Hey man, I'm on the sidewalk, this is public property!" (personal interview, 2015).

This sense of fear and frustration toward a dirty and unwanted "other" manifests itself in soft policies of enforcement. These policies include anti-smoking laws on the Arcata Plaza and anti-camping laws in the ACF. For

example, anti-smoking laws could be used to bar homeless people from being on the Arcata Plaza without creating laws that are outright discriminatory, because, seeing as how most of a homeless person's life is loitering, homeless people end up being uniquely excluded by anti-loitering policies such as anti-smoking laws. These policies are enacted to keep the wrong types of people out of prime spaces, and to keep these spaces clean for consumption by a community.

Soft policies of enforcement can be seen in effect as one homeless person explains the three rules for being on the Arcata Plaza: "No dogs, no smokes, and no booze." This person states further, "Cops will hang out in the café and watch people. The moment you light up a cigarette, they'll come out and bust you, or they'll hang out for a while and bust you for a cigarette you smoked an hour ago" (personal interview, 2015).

Community members use soft policies of enforcement as a primary tool in an effort to sanitize an unwanted "other" from public spaces of consumption—which, according to Thörn, has all the markings of a revanchist city—but there is something that makes the Arcata Community Forest a unique place: the conceptualization of prime and marginal space. Thörn asserts that sanitization of public space occurs as a result of the increasing privatization of public space, that these are spaces that need to be cleaned of unattractive populations in order to maximize economic productivity (Thörn 2011, 7). These spaces would have to be prime spaces because they are places where community members can go to receive the benefits of goods and services—a space of consumption (Hodgets et al 2008, 8). If this is true, then why is there an effort to sanitize an unwanted "other" from the Arcata Community Forest? Why are soft policies of enforcement enacted in the forest, when there are no goods to consume and no services from which to benefit?

There is something else that distinguishes the forest as a prime space: natural beauty. This implies that natural beauty is a commodity that functions as a consumable good for members of a community. Homeless people are sanitized from the Arcata Community Forest because they interrupt community members' ability to consume the natural beauty of the forest. Partly because of the recent influx of transient homeless, the homeless population is considered a separate entity from the community, and their tendency to create unsightly encampments interferes with community members'—tax-paying residents of the city—ability to consume a specific good; thus the homeless population is cleansed from the forest.

Conclusion

The ACF is a popular location for homeless people to build encampments, due to its ease of access and convenience. These encampments tend to be filthy, close to entrances, and easily spotted from a trail, pointing to the idea that encampments in the forest are most likely built for maneuverability and temporary residence in the forest, not privacy, stability, and permanent settlement, as originally speculated. This practice implies the existence of a large transient homeless population in Arcata.

The perception of a large, transient homeless population being distinct from the city's chronically homeless population is prevalent in most Arcata residents, who tend to view the transient homeless population as lazy and dirty. The past five years are associated with a large increase in homelessness in all of Humboldt County, a large portion of this population most likely being transient homeless connected to Humboldt County's illegal marijuana production. This influx of transient homeless has made Arcata residents suspicious and mistrusting of the city's homeless population.

Due to an increasing unwanted "other," Arcata residents feel a heightened sense of ownership over public spaces. This heightened sense of ownership manifests itself in soft policies of enforcement, which in turn begin to sanitize the homeless population from public spaces.

The sanitization of public space through the use of soft policies of enforcement defines Arcata as a classic example of a revanchist city, but the distinction of the Arcata Community Forest as a prime space makes Arcata a unique example. The existence of soft policies of enforcement in the ACF implies that natural beauty is a commodity that can be consumed by a community, as if it were food from a restaurant, groceries from a supermarket, or clothes from a retail store. The homeless population, being seen as an entity separate from the community, and being seen as something that interferes with the community's ability to consume the forest's natural beauty, is cleansed from the forest. This is because public space is space to be consumed by the right people, at the right time, in the right way, as determined by the community in power.

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Downtown Land-Use Change: A Historical Geography of Fresno, California's Central Business District, 1860–2010

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Abstract

Fresno, California, has dramatically changed from a small agricultural community in the early 1800s to a sprawling metropolitan area 200 years later. While the city continues to expand, its downtown has suffered. Urban sprawl has caused residents and businesses to locate farther away, while the downtown struggles to survive with limited functions and a poverty stricken population. By investigating primary sources, this paper documents the history of Fresno's downtown, from its humble beginnings and prosperous expansion to its present-day revitalization efforts.

Urban sprawl and suburbanization has left many downtowns abandoned and blighted. Once a concourse of retail, manufacturing, and office functions, many downtowns are now desperately holding onto sundry administrative functions. The plight of many downtowns is often correlated with hegemonic ideologies of development and city life, particularly those associated with advancements in transportation. The transitions from horse and carriage, to streetcar, to train, subway, and finally, the automobile, have led to the decentralization of both business and population. It highlights the inefficiencies of obsolete downtown models and requires a reformation of downtown planning.

According to Robertson (1995), the "heyday" of U.S. downtowns began to abate after the 1920s, with continued decline after World War II. Deterioration increased with the rise of the automobile and shifting retail land-use (Robertson 1995). Obsolete buildings, congested roads, difficult access,

and increased crime rates coupled with lower land prices outside the city core, left downtown development projects precarious and less alluring than in previous decades. There remains a consistent lack of discourse between planners and developers. Planners are often aspiring for a livable city, while developers are often seeking a rapid return on investment. The citizens are left in the middle—wanting a clean, safe, prosperous downtown, yet sometimes unconvinced of the taxpayer costs versus the benefits.

Fresno, California, has undergone this classic growth and decline pattern. This article historicizes the evolving land-use change of Fresno's CBD from a thriving district, to a district of decline, to current revitalization plans.

Methods

As an urban history case study, research methods relied heavily on qualitative historiographic methods of investigating primary sources such as documents, photographs, and textual material. Records researched were held at various institutions including historical societies, several county and university libraries, and special collections. Additional information was gathered through extensive field investigations of the area and special permissions to enter historic properties.

Early History

Early in its history, the San Joaquin Valley was dotted with a bantam, white indigenous tree. According to legend, the Spanish called this little tree "Fresno," which roughly translates to ash tree. Fresno receiving its name from this source is unsubstantiated, however, as the only documented reference to the word "Fresno" prior to development is the Fresno River (Walker 1941). Fresno Slough, settled by the mouth of the Fresno River in the early 1800s, was the first community to adopt this name. This small mining hamlet consisted primarily of saloons, dance halls, and frontiersmen. In 1858, valley resident John Butterfield, placed a stage station approximately seventeen miles south of Fresno Slough. Fresno Slough residents saw this stage station as a strategically better location for business and moved—taking with them the name of their community. This thusly became the original settlement of Fresno (Smith 2004).

During the mid-1800s, the Central Valley was a vast grassy plain with little sign of fertility. Its primary occupants were sheep and cattlemen. Agriculture scripts sold by the state lured investors and homesteaders. The San Joaquin Valley Land Association, known as the "German Syndicate," bought 80,000 acres and divided the land amongst them to settle. A local well-known resident, A. Y. Easterby, also purchased land and built a thriving wheat farm east of the San Joaquin River (Elliott 1973).

In 1869, railroad investors were constructing a railroad through the valley and speculating on sites for new town development. Leland Stanford, a former California governor (1861–63), was the director as well as one of the investors of the Central Pacific Railroad. As he traveled through the valley, he encountered the farm of A. Y. Easterby and was impressed with the thriving wheat farm he had grown from the barren earth of the valley. Stanford, seeing the great potential for fertile agriculture in the valley, decided to build his town near Easterby's farm. The Contract and Finance Company (a subsidiary of the Central Pacific Railroad) bought 4,480 acres from the German Syndicate near Easterby's farm and surveyed it into 320- by 150-foot blocks with 25- by 150-foot parcels and 20-foot alleys. The parcels are said to have sold for $60 to $150. The new town site was formally named Fresno Station in 1874, was later incorporated into the city of Fresno in 1885 (Clough 1984), and flourished as an agrarian society.

The Construction of Downtown

The original surveyors laid downtown streets to the east and north of the Central Pacific Railroad tracks, resulting in a peculiar street pattern that does not align with true North and is slightly askew from the rest of the city (see Figure 1). J Street, for example, is forty-six degrees to the right of true North (Walker 1941). As the city expanded and businesses began to locate to the downtown area, a central business district emerged. At first it was an agglomeration of similar commerce such as saloons, hotels, dance halls, grocery mercantile, and livery stables (see Figure 2).

By the 1880s, land was becoming scarce and expensive, at approximately $600 a parcel. The high cost of land led to the establishment of a new "business block," whereby individual investors bought land and demolished any existing structures to make way for newer, grandiose buildings. These larger buildings could house several different types of industry, such as retail stores, offices, and living quarters (Clough 1984). The Grand Central Hotel, built by J. W. Williams in 1882, is an example of business block construction (see Figure 3).

During the late nineteenth century, the Grand Central Hotel was considered the most elaborate and distinguished hotel from San Francisco to Los Angeles. Local residents and visitors would assemble under its enormous porches to sit and appreciate the shade on a hot summer day, as well as

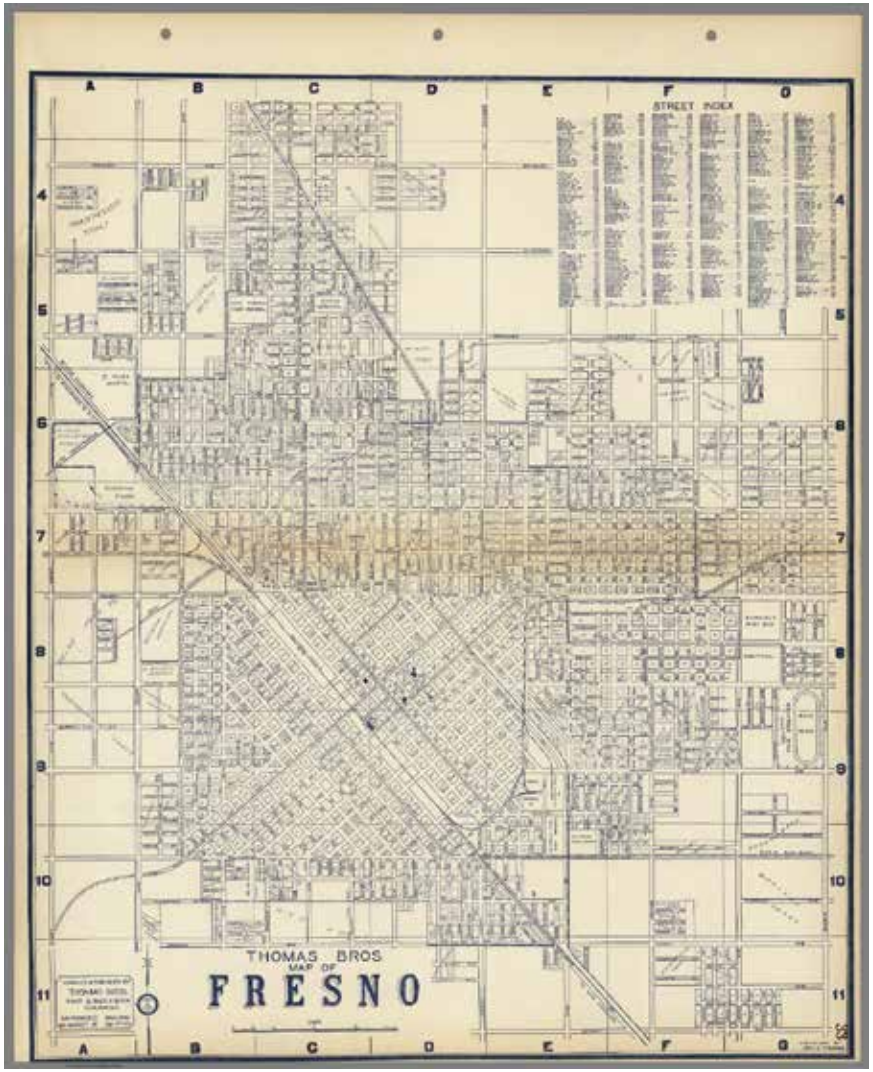

Figure 1.—Historical map of Fresno, circa 1938 (note downtown area with diagonal street pattern). (David Rumsey Historical Map Collection, Thomas Bros. Recreational and Statistical Atlas, California, Thomas Brothers.)

enjoy a variety of street activities. A few years after its completion in 1882, Fulton J. Berry purchased the hotel and owned it until 1910 (Eaton 1969).

In 1887, A. S. Edgerly created the Edgerly block from a $25,000 purchase of land on the corner of Tulare and J Street. A three-story building was constructed that housed the post office and *The Fresno Morning Republican*. The Forsyth block, on the corner of Tulare and J Street, was soon owned by

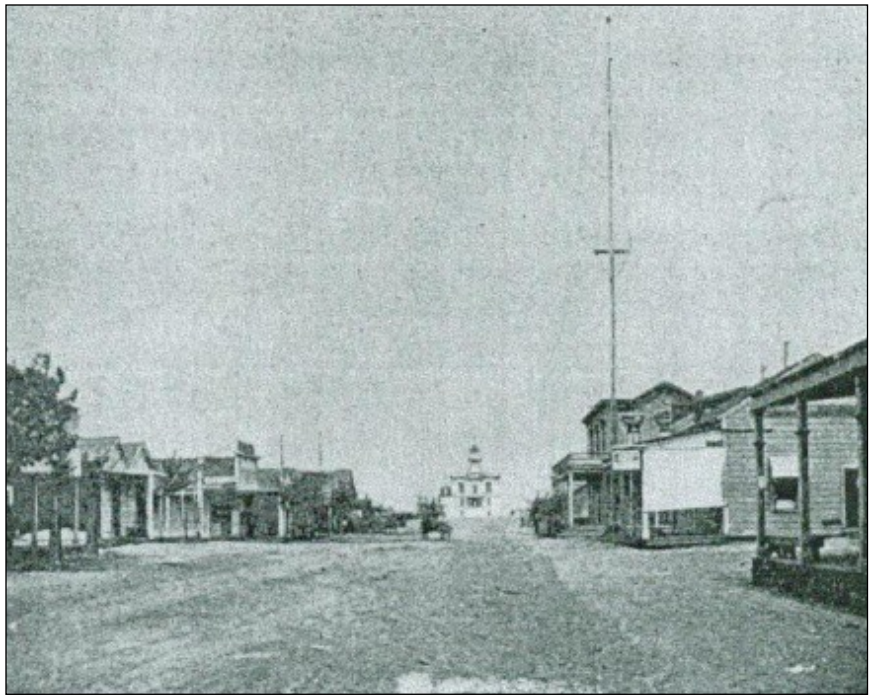

*Figure 2.—Fresno Mariposa Street, circa 1877. (*Fresno City and County Historical Company. Fresno California and the evolution of the Fruitvale Estate. *Fresno: Pioneer Publishing Company, 1980.)*

T. W. Patterson, Colonel William Forsyth, and Captain A. W. Neville. T. W. Patterson would ultimately own the land, buildings, and business interests of the four-corner section of Tulare and J Street (Eaton 1969). Industry was now flourishing and Fresno was growing exponentially. By the mid-1890s, the population had grown from approximately 500 in 1877 to 1,112 in 1890 (Walker 1941).

Streets and Transportation

Around the turn of the century, as Fresno began to grow and transform from a western frontier town to a classic Victorian city, its streets went through a major change as well. It was a common practice to name streets in alphabetical order, and therefore the streets that ran in a northwesterly direction were assigned letters of the alphabet and the streets that ran in a northeasterly direction were named after the counties in California. As Fresno was becoming a modern city however, many of the prominent businessmen felt that this style of naming streets was indicative of Fresno's wild frontier past and incongruent with its modern flair. Additionally mail delivery was often

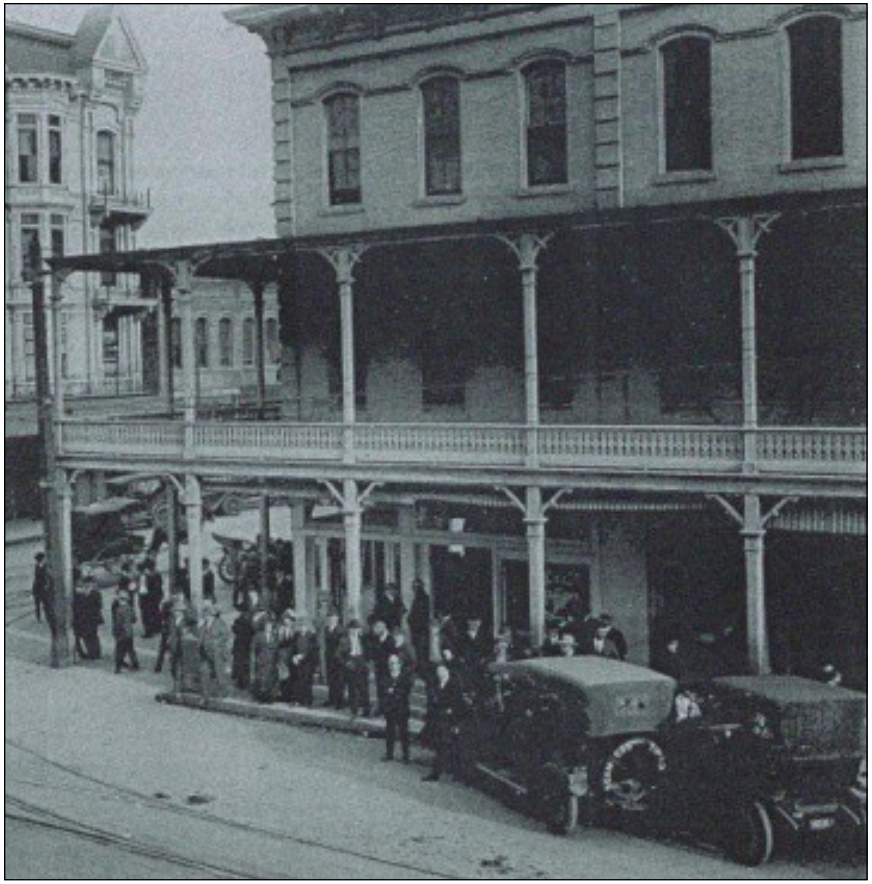

Figure 3.—The Grand Central Hotel, circa 1913. (Laval, Jerome D., As "POP" Saw It Vol. III: A Continuing View of the Great Central Valley of California as Seen Through the Lens of a Camera. *Fresno: Graphic Technology Co., 1985.)*

confused between J and I streets, which led to frustration of residents and business establishments.

In 1911, K Street was therefore renamed Van Ness Boulevard, and I Street was renamed Broadway. Four years later, J Street was renamed to Fulton, after Fulton G. Berry, a well-known and -loved businessman and owner of the Grand Central Hotel (Walker 1941).

Since the beginning, very shortly after the railroad was completed, Fresno has had several streets designated as thoroughfares of commerce. Fresno Street was designated to be the principal traveling thoroughfare and therefore was designed wider than other streets. The first buildings were erected

out of tents and simple, wood-framed buildings. James E. Faber opened the first store, and A. J. Massen established the first public water works (Elliott 1973; Thickens 1939). Early structures had an uncommon style for the region (see Figure 4).

Figure 4.—Early dwelling, circa 1879. (Laval, Jerome D., As "POP" Saw It Vol. III: A Continuing View of the Great Central Valley of California as Seen Through the Lens of a Camera. Fresno: Graphic Technology Co., 1985.)

The Fresno Canal and Irrigation Company later annexed Fresno Street. The downward slope of the road allowed for the creation of a canal down its center, which served a mill and later transferred water to the west of the city. Fulton Street was also developing into a main artery of commerce at this time (Walker 1941).

Modes of transportation began to progress at the turn of the century. Fresno established the Fresno Street Railroad in 1889—the first transportation system with a horse-car line to service the many establishments in the commercial district and, later, the residential streets that lay beyond the main city (see Figure 5).

The electric trolley, run by the Fresno City Railway Company, replaced the horse-car line in 1902. The electric trolley serviced Fresno until July 1929 (see Figure 6), and finally closed in 1934, due to a history of financial fluctuations as well as competition with the automobile (Hamm 1984).

Wooden Structures to Towering Skyscrapers

The skyline of Fresno has seen elementary to extraordinary reshaping as it has grown from a small town to metropolitan city over the decades. Early buildings were constructed primarily from wood, iron, and brick. Wooden structures in Fresno easily caught fire due to natural materials and oil lamps, along with the lack of an organized municipal system (Laval 2007). Despite this, wood was used throughout the 1870s through 1890s (see Figure 7).

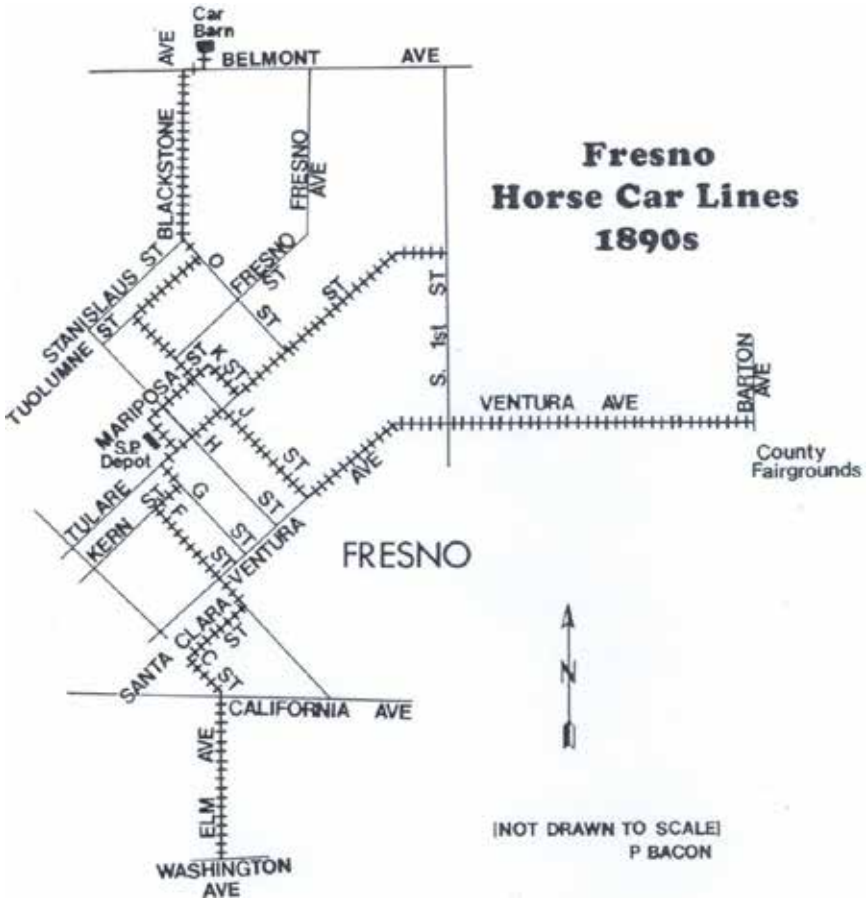

Figure 5.—Fresno Horse Car Lines 1890s. (Hamm Jr., Edward. Trolleys of San Joaquin: When Fresno rode the rails. *Fresno: Interurban Publishing, 1984.)*

Around the early 1900s it was apparent that Fresno had passed its infancy stage and was growing in maturity. The amount of construction within the city was a very strong indication of the substantial prosperity of Fresno and an evidence of the faith of its citizens. Due to the rush of construction taking place in the commercial district and residential areas, there even was a temporary brick shortage. T. W. Patterson and associates were building the new Forsyth building on the corner of Tulare and J (Fulton) Street at this time, fashioned in a mission style by architect B. C. McDonnell (Fresno 1900).

The Forsyth Building was a two-story building with a basement and an attic to help control cooling in the summer. It had an open center to allow light to penetrate into the interior. It also had an elevator—a still rather novel

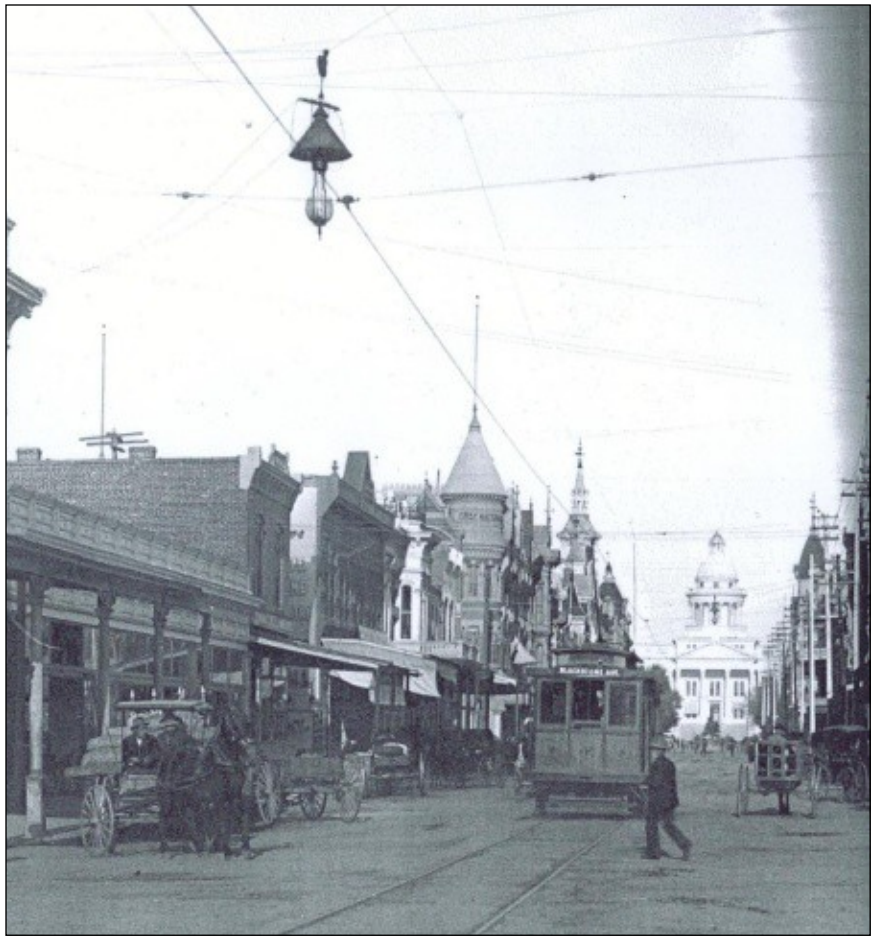

Figure 6.—The electric trolley. (Hamm Jr., Edward. Trolleys of San Joaquin: When Fresno rode the rails. *Fresno: Interurban Publishing, 1984.)*

convenience for new construction. The Forsyth Building had the potential to add floors in the future. However, at the time of construction, the additional stories were delayed because the current abilities of electricity in Fresno could not generate enough energy to propel an elevator higher than two floors. An elaborate sea of marble that started from the front entrance steps and continued into the lobby would greet patrons. The ground floor was used by a San Francisco department store, while the second floor was used as offices for physicians and commercial business (Fresno 1900). The Forsyth Building was one of the central gathering areas of the commercial district, but sadly, tragedy hit in 1922 when a fire blazed through the building, destroying it (see Figure 8).

Figure 7.—Wood structure, circa 1874. (Laval, Jerome D., As "POP" Saw It Vol. III: A Continuing View of the Great Central Valley of California as Seen Through the Lens of a Camera. *Fresno: Graphic Technology Co., 1985.)*

From the rubble of the Forsyth Building, T. W. Patterson constructed an innovative building that still stands today as part of Fresno's skyline. Built in 1923 by R. F. Felchlin, it was a state-of-the-art building that featured many new innovations and technology for its time. The T. W. Patterson Building was considered the largest building in the Central Valley, standing at eight stories high with abundant floor space (Stevens 2006). It featured the fastest elevators in the state, a new heating and cooling system, and noiseless corridors, and it was the first air-conditioned building in the state of California (*The Fresno Bee* 1935). In 1935, it was said that the T. W. Patterson Building was one of the most important buildings in the valley (see Figure 9). "The building might well be considered the headquarters of the army of enterprises that make up the bulk of activity here from which are issued the direction and orders that create development and progress for the valley and Fresno" (*The Fresno Bee* 1935).

Another building of importance was the Bank of Italy Building, built in 1918 on the previous site of the Fresno National Bank (Eaton 1969). The Italy Bank building is a reinforced steel structure with ornate terra cotta

Figure 8.—Forsyth Building, circa 1920. (Waiczis, Michael J., and Secrest, Jr., William B. A Portrait of Fresno 1885–1985: A Publication of the Centennial History Committee. *Fresno: Val Print, 1985.)*

moldings on the exterior, and was designed in the Italian Renaissance style by architect R. F. Felchlin (see Figure 10).

The interior of the building was considered quite elaborate and included a mahogany staircase, marble flooring, decorative ceilings, and etched brass elevator doors. (*Historic Preservation Review* 2010). Built during the successful 1920s and owned by A. P. Giannini, it housed several floors of banking and commercial businesses. The Bank of Italy consolidated Fresno National, People's Savings, and National Bank. Giannini first established a Bank of Italy in San Francisco in 1902 and then expanded branches throughout California. The Bank of Italy was said to be the third-largest banking company in the nation during the 1920s. By the 1930s Giannini was an established banker, and from this foundation he created Bank of America, which later became America's leading banking institution. Since the 1980s, the building unfortunately has stood empty. The current owner is planning on commercial and residential development, once it has been properly restored (Stevens 2006).

In 1922, Radin and Kamp bought the Edgerly Building for $500,000 and built a new five-story department store for the cost of approximately $1,500,000 (*The Fresno Morning Republican* 1922). During the height of its operation, the Radin and Kamp Department Store was considered a "shopping mecca" of downtown (Stevens 2006). Felchlin, Shaw, and Franklin designed

Figure 9.—T. W. Patterson Building. (Laval, Jerome D., As "POP" Saw It Vol. III: A Continuing View of the Great Central Valley of California as Seen Through the Lens of a Camera. *Fresno: Graphic Technology Co., 1985.)*

the building in an Italian Renaissance style, complete with beauty parlor, lending library, and floral shop. The Radin and Kamp Building still stands, although vacant, on the corner of Tulare and J (Fulton) Street (see Figure 11). The current owner is planning construction of lofts on the upper floors and retail on the bottom (Lloyd 2004).

By 1937, Fresno had more than doubled in size from its early beginning (see Figure 12).

Figure 10.—Bank of Italy Building, circa 2010. (Author photograph.)

Figure 11.—Radin and Kamp Building. (Author photograph.)

Post-War Revitalization

Fresno, like many cities, has experienced its periods of ebbs and flows in growth, decentralization, and decay. This sequence often signals the changing trends of city dynamics, and Fresno has had its share of successes and struggles throughout the decades (Kaplan 2009). Since the beginning of the century, the *Fresno Bee* has had article headlines such as "Industrial growth boom is encouraging to Fresno," "City's drawbacks must be altered to gain industry," and "Chamber strives to bring new plants to Fresno." In an effort to revitalize the decline of the downtown business district due to urban sprawl and decentralization of shopping centers to the north and east of the city, developer Victor Gruen introduced a plan to turn the already main retail street of Fulton into a downtown mall. It was a monumental plan, and the first of its kind in California and the nation. Their plan was to create a six-block pedestrian mall on Fulton, Merced, Mariposa, and Kern Streets. The project was completed in 1964 and would serve the entire Fresno Metropolitan area and the subsidiary towns in the valley. The mall featured modern art, extensive landscaping, top-notch stores, benches, fountains, and a people mover (see Figure 13). Although the plan was full of good intentions, the mall eventually began to decline with the opening of Fashion Fair Mall in a more centrally located part of town. Anchor stores such as Gottschalk's and J. C. Penny relocated to the new indoor mall (*Downtown Fresno* 2001, and customers followed.

Figure 12.—Aerial view of downtown Fresno, circa 1937. (Aerial map 1937: University of California at Fresno State, Henry Madden Library map references.)

Even though the Fulton Mall has proven to be unsuccessful, the city pressed forward with other revitalization plans and in 2002 built the Grizzly Stadium (later renamed Chukchansi Park, in 2006). This forty-six million dollar structure on Tulare Street also has not been as successful as Fresno had hoped (see Figure 14). The bleacher section now sits just beyond the alley behind the Radin and Kamp Building (*Chukchansi Park* 2010).

Figure 13.—Fulton Mall, 2010. (Author photograph.)

The city has also tried to help revitalize the downtown through historic preservation and gentrification of its older buildings and districts. A substantial amount of Fresno's history has been lost either by fires or progress and reconstruction—out with the old and in with the new seemed to be the theme of several decades. In 1908, *The Fresno Morning Republican* printed an article titled "Passing away of another landmark of old Fresno" (*The Fresno Morning Republican* 1908). It was not until March of 1977 that the Fresno and Clovis metropolitan area adopted the Historic Preservation Plan Element to the general plan. In thus doing, the city has been able to save several of Fresno's historic buildings, including the Radin and Kamp Building, the T. W. Patterson Building, and the Bank of Italy Building. These, as well as others, are now on the local historic registry or the national historic registry (John 1977).

Although Fresno's downtown area has been zoned as a commercial business district, a 1990 Fresno Bee article stated that the office market was stable downtown, with little increase in commercial interests. The vacancy rate in midtown was at 9.80 percent and in downtown 29.6 percent (Nax 1990). Office vacancy was down 4.4 percent in 1993, and retail space for small business is virtually nonexistent (*The Fresno Bee* 1996).

Currently Fresno is exploring the possibility of revitalizing the downtown Fulton Corridor. As of March 2010, the consultant team of Moule & Polyzoi-

Figure 14.—Gate to Chukchansi Park. (Author photograph.)

des has been working with the city of Fresno to develop another revitalization plan. They intend to focus on areas of continuity, multi-modal, compact development, diversity types, and investment in infrastructure. Proposed ideas include open green spaces, a trail that extends through downtown, street modifications, and rezoning of certain areas in the business district. They noted that Fresno had a traditional city layout and that many cities have gone through the same decay and decentralization. This offered some hope to residents, tempered with the awareness that such transitions take time (City of Fresno 2010).

What Does the Future Hold?

A future prediction can be difficult when so many external factors are at play. The demographics have not varied in the downtown area for several decades, and many residents envision a desolate future. However, growth stems from dreams and possibilities that often involve changing discourse. Many urban-growth projects are focusing on BID (business improvement district) projects. These projects focus on smaller-scale initiatives rather than large-scale, comprehensive projects. Several hundred BID projects have been

completed in the nation, seventeen of them in Los Angeles (Mitchell 2001). Larger-scale initiatives, such as stricter urban growth plans and citywide demolition projects, have their place, but revitalization could also mean a shift in city focus toward BID projects focusing on arts and education, green spaces, and growth and commercialization of ethnic enclaves.

A full-scale urban study following the patterns of other cities in similar positions in California would also yield potential options for Fresno, as development of California cities is tied to Proposition 13. This proposition reduces the availability of property taxes for development. Without this funding, cities have to look elsewhere and they are often left with sources such as sales tax from "big-box" retailers (Lubell et al. 2009). This can be challenging, as big-box retailers are unlikely to locate downtown, and thus the cycle of urban sprawl continues. Fresno also has the additional burden of limited developable land.

Sacramento, another valley city with limited available land, is focusing on infill projects and is almost doubling the size of its downtown in the process. Modesto is focusing on high-density development, as well as supporting regionalization of water and sewer services. Lincoln is utilizing "new urbanism," an approach that creates almost fully autonomous enclaves. In Lincoln's case, they are taking advantage of their agricultural roots and designing their enclaves to resemble semi-rural villages (Lubell et al. 2009).

Pitfalls can be explored as well. Multiple projects in Davis, for example, were canceled due to voter rejection or developers withdrawing due to environmental impact roadblocks (Lubell et al. 2009).

Fresno has risen from the dust of an empty plain to become a thriving metropolitan area with a population of more than 500,000. It has seen failures in the past and has triumphed over them. Fresno's rich history, diverse culture, and abundant resources could lend themselves to fresh and new revitalization ideas that are unique from paths other cities have taken. Fresno may once again rise from the shadows of urban decay, if realistic steps are taken that build from its history, its people, and its existing strengths. Working within realms of ideals, rather than reality, results in projects that ultimately fail due to lack of resident support. Existing demographics, city politics, and the normative value of residents must be considered. For example, building high-density communal living arrangements in a city with a population that prefers single-family housing with acreage is bound to fail, without a dramatic shift in ideology. Incentives for increased citizen participation therefore must be at the forefront of any new development project. As noted by Faulk (2006), "The revitalization process is different for each city. Projects should be tailored to the needs of the community." Social constructivism among citizens, planners, and development, along with divergent shifts in approaches, may lead to a reification of smarter growth and a new, dynamic downtown.

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Los Angeles Weather Station's Relocation Impacts Climatic and Weather Records

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Abstract

In August 1999, the official downtown Los Angeles weather station moved to the University of Southern California campus, 3.78 miles (almost 6 km) to the southwest of its previous location near the city center at the Department of Water & Power (DWP). This move resulted in a discontinuity in the weather records. A comparative study of daily temperatures and precipitation recorded at USC and DWP from 1999 to 2014 clearly shows that the move resulted in cooler, drier, and less-extreme conditions. Maximum temperatures averaged 2.4°F (1.3°C) higher at DWP, but minimum temperatures were nearly the same. Precipitation at USC for the study period averages about 0.77" (19.6 mm) less than the DWP location. Extreme record temperatures and precipitation are also less frequent at the USC site. Since the original station is still operational, DWP should remain the official LA downtown station, with USC becoming a Cooperative station, like UCLA.
Key Words: weather station relocation, data inhomogeneity, weather records, climatic impacts.

One of the challenging aspects of documenting climate change in long-term meteorological records is the integrity of the data. Often the history of a weather station includes one or several relocations and/or changes in recording instruments. Changes in location or instrumentation may create biases in the recorded data, which in turn impact interpretations and magnitude of climatic trends. Weather stations need to remain consistent, with unchanging environments, so that there are not external factors masking real climate change. Here we consider the impacts of station relocation and not of instrument changes, since the instrumentation has been consistent for the stations studied over the entire period of study.

In August 1999, the National Weather Service (NWS) moved the official downtown Los Angeles Civic Center weather station to the University of Southern California (USC) campus, or 3.78 miles (almost 6 km) to the southwest. Prior to the move, the station was located near the city center

at the Department of Water & Power (DWP). This move was not the first for the downtown weather station, but it was the largest one, and one that took it away from the built-up city center to a park-like setting on the USC campus (Figure 1). The station relocation to USC also placed it much closer to the coast, where coastal influences on local climate are considerable (Figure 2). The station elevation also changed from the original site, which is 270 ft. (almost 90 m) above MSL to the campus site at 180 ft. (almost 60 m). Since its establishment in 1877, the Los Angeles Civic Center station has been relocated seven different times, with resulting site elevation changes ranging from 4 to over 220 feet (approximately 1 to 67 m) above the ground (Bruno and Ryan 2000). Climatologists have suggested making a correction to data when a station moves substantially in the vertical (Davey and Pielke 2005; Karl and Williams 1987; Peterson 2006). Other station changes, such as a substantial horizontal movement or a shift to different land-use areas, can also alter the integrity of the climatic data significantly, so that a new station number is utilized (WMO 1996, NOOA 2014). Several studies have investigated weather station relocation issues and how to deal with discontinuities in climatic data (Alexandersson and Moberg 1997; Begert et al. 2005; Pandzic and Likso 2010; Yang et al. 2013). Most of these studies used

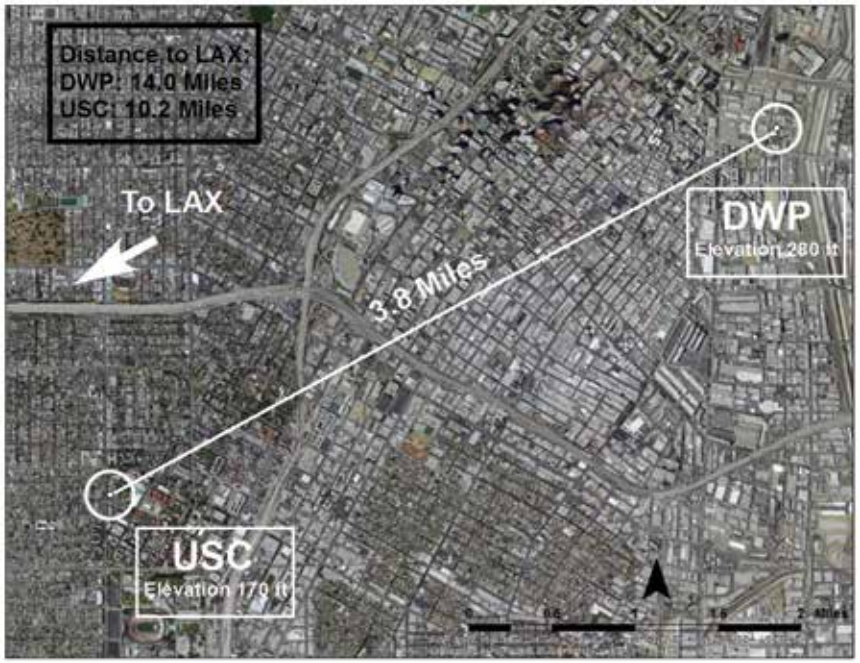

Figure 1.—The Civic Center station has been moved 3.8 miles (6 km) from downtown toward the coast (LAX).

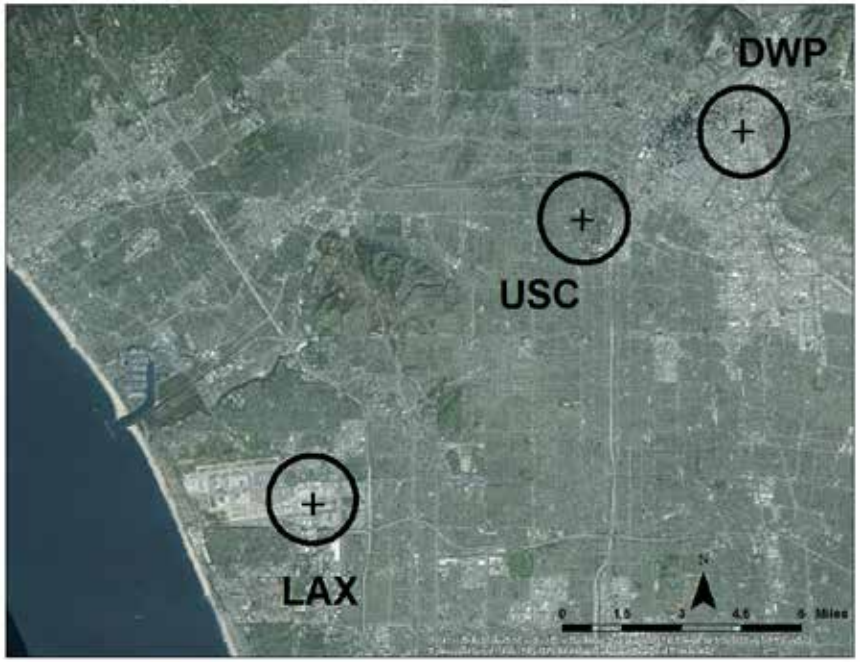

Figure 2.—The USC campus is about one-third the distance to the LAX airport.

the difference method, using differences in the means of an original station to a supplemented station, or the ratio method to adjust the supplemented station to an original station by applying an adjustment constant measured by the ratio of the sums of a variable (Thom 1971).

Aerial photos show that land-use differences exist between the two sites. The USC site resembles a park, with tall shade trees just west of the instrument shelter (Figure 3). The shelter is also above a grassy area at a standard 4 feet above the ground. The DWP site is located on the roof of a two-story downtown parking structure, approximately 8 feet above the parking surface and 48 feet above street level, with no immediate vegetation or obstructions

Figure 3.—USC weather station is situated in a park-like setting, with tall shade trees to the west.

Figure 4.—DWP weather station is located atop a downtown parking structure.

(Figure 4). The DWP location is also closer to where one would expect the urban heat island effect to peak (Landsberg 1981).

From the station relocation seaward and to lower elevation, as well as to a different land-use area, it is not surprising that significant changes in both temperature and precipitation records have occurred. In climatic studies, records from nearby stations can be used to test for discontinuities in the data and to determine whether the discontinuities are due to the relocation. In the present case, we are fortunate in that the DWP station is still in operation and that data collected from this site can be compared to the new site. This study builds on a previous investigation of the consequences of this station change by Patzert et al. (2007), which examined the magnitude of change in the records from 1999 to 2006. Here we combine previous data with additional data covering the period 2007–2014, to expand on earlier findings.

Relocation Differences

If this latest station move from DWP to USC resulted in the inconsistency of data between the two stations, then a new station name and number would be appropriate. The NWS has specific guidelines, which are presented below, to judge whether station relocation calls for a new station name and number (NWS 2012).

The preferred method for determining climate data compatibility is to conduct parallel observations at the old and new sites (NWSI 2005). Climate data compatibility is maintained when the difference in daily maximum and minimum temperatures and 24-hour precipitation (including snowfall) between the original location and the new location are expected to be equal to or less than the difference in measurements that would occur by replacing the instrumentation. For example, the functional precision of the Maximum Minimum Temperature System over the vast majority of the temperature range being measured is about 1°F. Thus, if the difference between two locations is expected (or shown by parallel testing) to be equal to or less than 1°F for the daily maximum and minimum temperatures, data compatibility for temperature between the locations is satisfied. A move is always assumed to be incompatible if the new equipment location is greater than 5 horizontal miles from the original equipment location and/or the difference in elevation is 100 feet or more. For moves less than 5 miles and/or elevation change of less than 100 feet, data compatibility still needs to be determined (NWS 2012). Here, we do a parallel comparison between the new USC location and old DWP station.

Data and Methods

Monthly temperature data (mean, max, and min) for LA/USC for the period August 1999 through June 2014 are available from the LA NWS website at http://www.nwsla.noaa.gov. Monthly precipitation values examined for the same period for LA/USC are from the same website. DWP records for the same period were made available by Dan Resch, LA DWP, and are available from the corresponding author.

Monthly temperatures (mean, max, and min) and monthly precipitation values were compared between USC and DWP on a seasonal and annual basis. Monthly differences between the two stations were averaged over the 15-year record and graphed for both temperatures and precipitation. Two months of precipitation (February and March 2014) were not included in the comparisons, due to missing data at both stations. While calendar years were used in comparing temperatures, water years (July 1–June 30) were used for precipitation totals, since most rainfall occurs in the cooler months. Since there were several records for extreme temperatures and precipitation broken during this period, we also compared the two stations for these record events.

Results

Temperature

Table 1 shows the comparative annual Tmax and Tmin for the USC and DWP locations. For the entire period of nearly 15 years, DWP was warmer by 2.4°F (1.3°C) for the maximum, 0.2°F (about 0.1°C) cooler for the minimum, and 1.1°F (about 0.6°C) warmer for mean temperatures. For Tmax, the largest differences are from late summer to early winter (Figure 5), while the smallest differences are from February through May. For Tmin, DWP was cooler than USC in spring and summer and slightly warmer in fall and winter (Figure 6). Two possible explanations exist for these observations. The first is related to the distance from the ocean. In Southern California, the cool California ocean current keeps the coast cooler in summer and milder in winter than the

Year	Tmax			Tmin		
	DWP	USC	Diff	DWP	USC	Diff
1999	79.5	77	2.5	56.6	56.3	0.3
2000	75.8	74.3	1.5	56	55.8	0.2
2001	74.3	72.8	1.5	55.2	55.3	-0.1
2002	74.9	73.5	1.4	55.1	55.4	-0.3
2003	76.7	74.5	2.2	56.4	56.4	0
2004	76.1	74.3	1.8	56.1	56.5	-0.4
2005	75.5	73.9	1.6	56	56.2	-0.2
2006	76.5	76.3	0.2	56.4	57.2	-0.8
2007	75.7	75	0.7	56.1	56.2	-0.1
2008	77.2	76.1	1.1	56.5	56.7	-0.2
2009	77	75.5	1.5	56.1	56.9	-0.8
2010	75	74.4	0.6	54.8	57	-2.2
2011	75.5	73.1	2.4	54.1	54.7	-0.6
2012	76.3	74.8	1.5	56.6	56.2	0.4
2013	75.7	75.3	0.4	56.1	56	0.1
2014	75.3	74.8	0.5	55.5	55.7	-0.2
AVERAGE	**77.1**	**74.7**		**55.9**	**56.1**	
DWP *minus* USC	**2.4**			**-0.2**		

Table 1.—Average temperatures for DWP, USC, and differences for Aug. 1999–June 2014.

inland areas. In comparing the differences between USC and the coastal airport, LAX, the downtown inland site is twice warmer than LAX in summer as it is in winter (Bruno and Ryan 2000). The other explanation relates to land use. Because of the abundance of trees and grass, the park-like USC setting tends to be cooler during the day than the urbanized DWP site. At night, the trees can block outgoing radiation, while the moisture from the watered lawns tends to absorb more heat than the drier, open DWP site, resulting in warmer Tmin at USC. In winter, the trees at USC provide more shading, resulting in less heating or cooling than in an open area such as DWP. Also, during spring and early summer, coastal cloudy conditions occur. The cloudiness along the coast extends inland more often during these months. Because it is closer to the coast, USC experiences more cloudiness than the inland DWP location, which in turn affects the range of temperatures at USC, with lower Tmax but higher Tmin. An example of the lessening penetration of the marine layer, with low clouds and fog, LAX averages 17 days of dense fog, while the Civic Center and Burbank airport average fewer than 2 days per year (Bruno and Ryan 2000). Overall, both land use and distance from the ocean

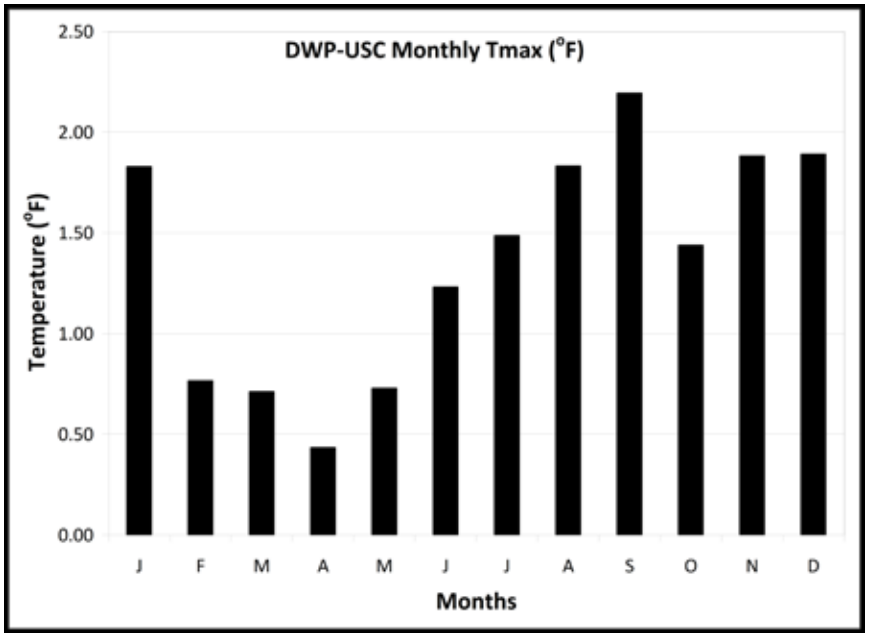

Figure 5.—Monthly Tmax differences between DWP and USC, 1999–2014.

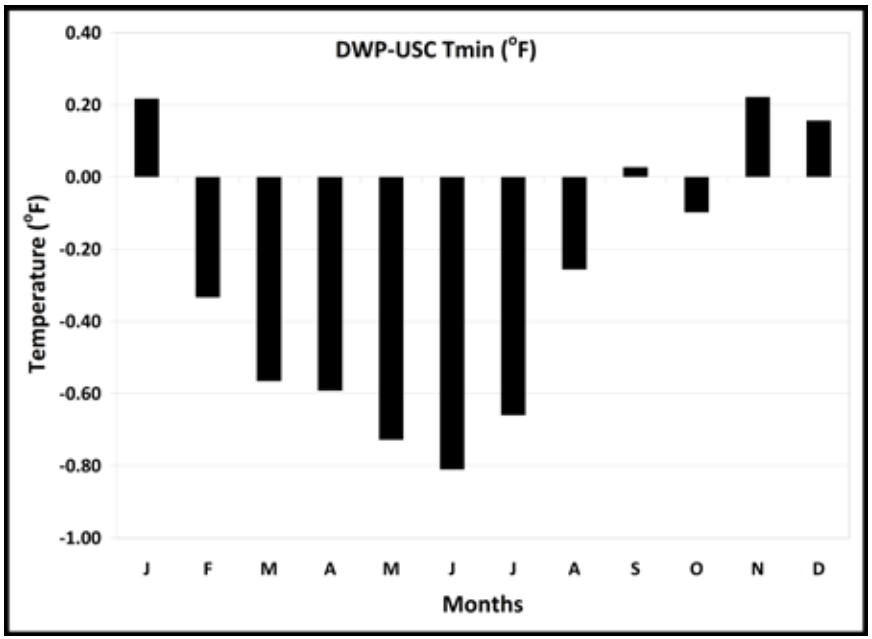

Figure 6.—Monthly Tmin differences between DWP and USC, 1999–2014.

account for the large drop in Tmax and very little change in Tmin between the two stations. At approximately 12 miles (20 km) between LA Civic Center (DWP) and LAX, the mean difference in annual temperatures is 3°F (1.7°C). The station move to USC of 3.8 mi, or nearly one-third the distance from DWP to LAX, resulted in an annual mean difference of 0.8°F (0.5°C). This mean difference in temperatures is roughly one-third of the temperature differences between DWP and LAX.

Precipitation

Table 2 shows the annual differences in precipitation for USC and DWP. For the nearly 15 years of records analyzed, DWP averaged 0.77" (nearly 19.6 mm) more precipitation than USC. The annual differences between the two stations (DWP-USC) vary considerably, from +3.21" to -0.39" (+82 mm to -10 mm). The decreased precipitation recorded at USC is not surprising, as rainfall in the Los Angeles Basin generally increases with elevation and distance from the coast (Bruno and Ryan 2000). Rainfall comes mainly from Pacific winter storms moving inland from a westerly direction. As the air mass is lifted by coastal mountains, precipitation increases with elevation on the windward slopes. As previously mentioned, DWP is about 3.8 miles, or 6 km, further inland than USC, and more than 100 ft (30 m) higher at street level. Comparing DWP with the coastal airport station, LAX, downtown shows nearly 3" (76.2 mm) greater in annual precipitation inland than at LAX (14.77 (375.16 mm), compared to 12.01" (305.05 mm). USC, which is one-third the distance between LAX and DWP, exhibits one-third the difference in precipitation that exists between DWP and LAX.

YEAR	PRECIPITATION		
	DWP	USC	Diff
1999	12.01	11.57	0.44
2000	17.64	17.94	-0.3
2001	5.49	4.92	0.57
2002	19.71	16.49	3.22
2003	10.33	9.35	0.98
2004	***38.32***	***37.96***	0.36
2005	14.52	13.16	1.36
2006	***3.13***	***3.21***	-0.08
2007	13.42	13.53	-0.11
2008	9.32	9.08	0.24
2009	15.99	16.36	-0.37
2010	22.9	20.2	2.7
2011	9.27	8.69	0.58
2012	6.96	5.85	1.11
2013	1.19*	1.32*	-0.13*
AVERAGE	**14.22**	**13.45**	
DWP minus USC	**0.77**		

*Table 2.—Average precipitation (in.) for DWP, USC and difference for the Water Years (July 1–June 30) 1999–2014. *Feb., Mar. 2014 are excluded from calculations. Italicized numbers represent record annual rainfall.*

Seasonally, DWP is wetter than USC in 7 out of the 12 months (Figure 7). Absolute differences are generally greater in the wettest months, October through April, while differences are least in the dry summer, which is to be expected. The low absolute differences in January and March may be a result of the high variability in southern California rainfall (Killam et al. 2014). In the rainfall year of 2004–05, the station relocation resulted in the official downtown station missing the designation of being the wettest year on record (see below).

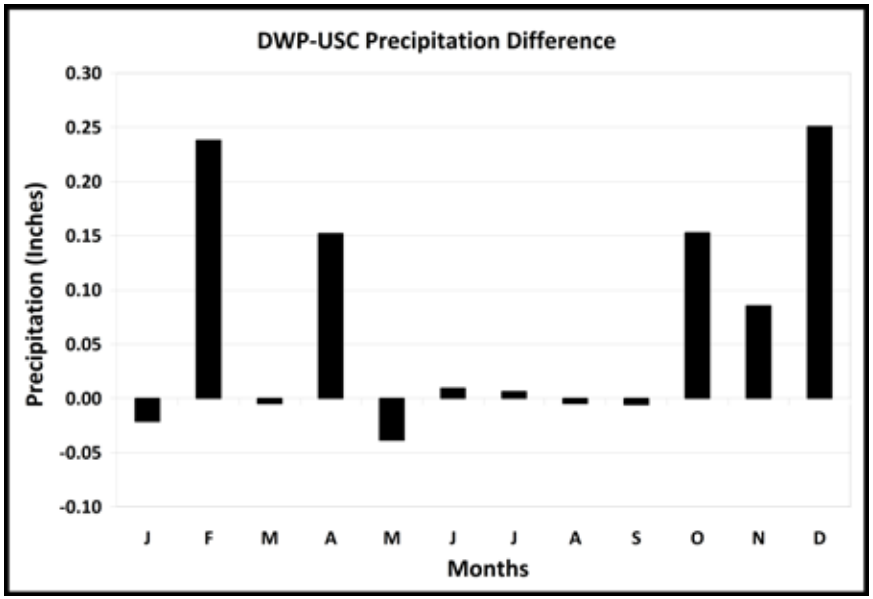

Figure 7.—Monthly differences between DWP and USC precipitation, 1999–2014. February and March data are missing for 2014 at DWP and is excluded in the comparison.

Effect on Weather Records

In the 2004–05 water year (July 1–June 30), the USC rain total was 37.25" (946.2 mm), second only to 1883–84, which had 38.18" (969.8 mm). However, DWP recorded 38.32" (973.3 mm) for the same period, which would have made it the wettest year on record for downtown Los Angeles, had the station not moved. Conversely, two years later, in 2006–07, USC recorded 3.21" (81.5 mm) of precipitation, breaking the record for driest water year ever. However, at DWP it was even drier, at 3.12" (79.2 mm). In 2001–02, the second driest year on record was broken at USC, with 4.92" (about 125 mm) precipitation. Had the station not moved, the 2001–02 water year still would have been one of the driest years recorded at DWP, at 5.49" (139.4

mm). Similarly, the annual precipitation for the water year 2013–14 was officially 6.08" (154.4 mm) at USC, while DWP recorded 3.27" (83.1 mm); however, some DWP data were missing for days when rain did occur. By excluding the USC data corresponding to the dates of the missing DWP data, DWP was again drier than USC.

Heat waves in June and July 2006 broke several temperature records throughout the state, including several in Los Angeles. An all-time record high for a city station of 119°F (48.3°C) was set on July 22 at Pierce College, Woodland Hills. That same summer at USC, the all-time record for highest temperature minimum for the date June 4 was set, at 68°F (20°C) (the previous record being 66°F (18.9°C) in 1997). At DWP, the Tmin was 70°F (21.1°C) for the same date. At DWP, the highest minimum temperature would have been broken for the 3-day period of June 3–5, 2006. In July of the same year, USC temperatures broke or tied 7 all-time records, mostly for highest minima. DWP broke or tied 9 records for the same period. July 2006 was the hottest on record at both USC and DWP. USC's average temperature was 79.9°F (26.6°C), while DWP averaged 80.0°F (26.7°C), both beating the record set in 1985 at 79.2°F (26.2°C). The monthly average maximum and minimum at USC was 89.7°F (32.1°C) and 70.1°F (21.2°C), breaking the records of 88.8°F (31.6°C, 1985) and 69.6°F (20.9°C, 1984). DWP's monthly max and min were 90.3°F (32.4°C) and 69.6°F (20.9°C). The all-time highest temperatures recorded for Los Angeles (USC) was 113°F (45°C) on Sept. 27, 2010. DWP also recorded 113°F for that date.

Conclusions

By moving the official LA downtown weather station location, weather is now recorded as cooler, drier, and less extreme than at its original DWP location. Climatologists have noted the problems concerning station moves. By shifting the official downtown Civic Center station to a park-like environment about 6 km closer to the beach, there appears to be a discontinuity in the records. Maximum and mean temperatures are cooler, especially Tmax. At over 2°F difference, non-compatibility is well beyond the 1°F NWS criteria. Minimum temperatures are similar for the two sites. DWP also records higher rainfall amounts, although there is great variability both monthly and inter-annually. Extremes occur less often at USC than at DWP. The USC landscape appears to make extremes less probable, and does not reflect a truly urban setting. Since the original downtown station is still operational, we suggest using DWP records as the official Los Angeles Civic Center station and making USC one of the many city Cooperative stations, such as its rival, UCLA.

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Examining the Maldistribution in Teacher Quality: A Spatial Analysis of the Distribution of Credentialed Educators in California Schools

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Abstract

Teacher quality is a primary factor influencing student achievement, which subsequently affects future earnings. Studies show that quality teachers are not distributed equally across the U.S., resulting in a maldistribution of quality teachers that disfavors minority groups. However, despite analyzing an outcome that involves distribution across geographical space, these studies do not employ the spatial econometric techniques needed to ensure accurate results. Exploratory Spatial Data Analysis (ESDA) and spatial regression analysis are used to test for spatial autocorrelation in the distribution of credentialed teachers throughout California's unified school districts. Those results are compared with a non-spatial regression analysis to uncover the implications of eschewing spatial modeling on these types of data. Spatial econometrics reveal that credentialed teachers are not distributed equally—non-random clustering of teachers exists—to the disadvantage of areas with higher populations of traditionally disadvantaged minorities. However, non-spatial techniques overestimate the significance of race and fail to uncover the significance of other important variables affecting the distribution of teacher quality: the distribution of neighboring districts and pre-established student achievement. This reaffirms claims that utilizing non-spatial techniques on spatial data can lead to bias and incorrect estimates.
Key Words: spatial econometrics, ESDA, spatial regression, spatial autocorrelation, teacher quality

I. Educational Egalitarianism

Educational egalitarianism—the notion that the public education sector should provide equal opportunities for students to succeed by ensuring a parity of education resources—should be a priority for any government seeking to create a stable and productive society. Educational attainment is a crucial variable affecting one's future socioeconomic status, job mobility, and salary attainment (Breen and Jonsson 2005). Providing equal educa-

tion opportunities to everyone can help mitigate the disadvantages that hinder the ability of those in some underprivileged groups to move up the socioeconomic ladder (Babones, Felmet, and Hwang 2007). Thus, because education equality reduces income inequality (Lin 2007), policy makers should strive to create egalitarian education systems by more equitably distributing resources that affect student achievement.

Education scholars have long debated the impact of education resources on student achievement. Some have argued that schools have little independent impact compared to social context and student background (Coleman et al. 1966), while others contend that schools do have an impact on student learning (Darling-Hammond 2000; Ferguson 1991; Mosteller 1995), a sizeable portion of which is attributable to teachers (Ferguson 1991; Sanders and Rivers 1996). Although a range of background factors, such as race and socioeconomic status, are related to student performance, research has shown that school-level factors also have considerable impact, and that, of these education resources, teacher quality is the most reliable predictor of student achievement (Darling-Hammond 1997, 1999, 2000).

As important as teacher quality is to student success (Seebruck 2015), quality teachers are not distributed equally across U.S. school districts (Prince 2002). Several studies have revealed a maldistribution of quality teachers across the U.S. that disadvantages lower-class and minority youth (Borman and Kimball 2005; Peske and Haycock 2006). However, extant studies do not utilize spatial analysis techniques to examine the spatial relationship between variables in their data, using instead non-spatial statistical techniques that do not account for geography. In a regression analysis, failure to consider the potential existence of spatial autocorrelation across neighboring units of analysis causes omitted variable bias and can lead to incorrect standard errors and inconsistent parameter estimates (Greenbaum 2002).

Accordingly, spatial econometrics can be used to determine whether teachers are non-randomly distributed across California's school districts. In line with the literature, the results reveal that credentialed teachers are not fairly distributed across California and that this maldistribution disadvantages traditionally disadvantaged racial minorities such as blacks and Latinos. However, in comparing the spatial regression model with the non-spatial regression model commonly found in the literature, it becomes clear that it is not race alone that is driving this maldistribution. Other significant variables influencing the distribution of credentialed teachers include the distribution of teacher quality in neighboring districts as well as the pre-existing capabilities of the student body—effects not captured by the non-spatial regression model. Of course, race has been shown to affect student achievement in the U.S., with racially based gaps beginning as early as elementary school (Bali and Alvarez 2004), making the causal relationship between these variables difficult to unpack. But, it is important to note that, even after controlling for the racial composition of schools, pre-existing student achievement still significantly affects the distribution of teacher quality across school districts. That non-spatial regression techniques fail to uncover these relationships reaffirms the need to consider proper research methods when analyzing the geographic distribution of inequality.

Teacher Quality and Student Achievement

Numerous studies have argued that factors such as teacher quality are so important to student achievement that they can explain away the performance gap that currently disfavors poor and minority students (Prince 2002). Coleman et al. (1966) long ago argued that teacher characteristics tended to explain more variance in student achievement than any other school resource. This claim was substantiated by a study of New York City schools in which differences in teacher qualifications (educational attainment, certification status, and experience) accounted for approximately ninety percent of the total variation in school-level student achievement in reading and mathematics at all grade levels tested, holding constant student characteristics (Armour-Thomas et al. 1989). In their study on teacher quality and educational equality in Washoe County, Nevada, Borman and Kimball (2005) used multilevel models, nesting students within classrooms, to show that classes taught by higher-quality teachers produced higher mean achievement than those taught by lower-quality teachers. Teacher quality was measured by teacher evaluation ratings and teacher experience. Their sample included nearly five thousand elementary students in urban, suburban, and rural schools and controlled for minority and poverty status and student pre- and post-test scores.

These studies are in line with numerous others demonstrating that teacher quality is one of the predominant predictors of student achievement (Darling-Hammond 1997, 1999, 2000), even more so than student background characteristics such as poverty, language background, and minority status (Rowan, Correnti, and Miller 2002). Prince (2002:13) asserts that "teacher quality is the single most important school variable affecting student achievement." Certainly student background characteristics affect achievement, but these are factors that schools cannot control. In order to promote educational

egalitarianism, schools and districts need to focus on providing a parity of education resources, by far the most important of which is teacher quality.

Given the impact of teacher quality on student achievement, and its subsequent impact on future earnings, the cumulative economic effects of teacher quality for a society are noteworthy. Hanushek (2011) estimates that, for a class size of thirty students, an effective teacher (ninety-third percentile) can produce annual macroeconomic gains of more than $963,000 over a less effective teacher (sixtieth percentile), based on total collective increases to those students' lifetime incomes due to higher student achievement. Thus, given the economic link between teacher quality and student achievement, it is in a society's best interest to distribute teacher quality more equitably, so as to avoid the detrimental effects of social inequality (Wilkinson and Pickett 2009).

Operationalizing Teacher Quality

While the literature agrees that teacher quality is important to student achievement, there remains to be a standard measure of teacher quality. Darling-Hammond (2000) lists several common measures of teacher quality cited in the sociology of education literature: intelligence and academic ability, knowledge of subject matter and having received education training, years of teaching experience, and certification status. While each of the aforementioned measures have been shown to contribute to the distinction between a high-quality teacher and a low-quality teacher, certification status—that is, teacher credentialization—is often considered one of the best predictors of teacher competence (Goldhaber and Anthony 2007; Goldhaber and Brewer 2000).

Some argue that such credentialization programs are unreliable estimators of teacher efficacy and should be replaced by systems designed around teachers' cognitive abilities or classroom competency. For instance, Walsh (2001) questions the reported causal relationship between teacher credentialization and student achievement, citing a lack of evidence that it is truly credentialization that positively affects student achievement and not a lurking variable such as subject matter knowledge. In the years since, there has been a volume of research demonstrating teacher credentialization as a significant predictor of teacher quality (Monk 1994; Seebruck 2015)—one that affects student performance at all grade levels (Goldhaber and Anthony 2007; Rockoff 2004). Furthermore, the subject-matter knowledge that Walsh (2001) puts forth is almost always a component of teacher certification programs, reaffirming its robustness as a measure of teacher quality.

For instance, teacher credentialization varies by state and school level, but for the most part requires a significant amount of formal education training, which has been shown to be positively associated with teacher performance (Evertson, Hawley, and Zlotnik 1985; Ferguson and Womack 1993; Guyton and Farokhi 1987). In the state of California, a multiple-subject, elementary-level teaching credential has several requirements (CTC 2014). First, one must complete a baccalaureate degree from an accredited university. Second, one must satisfy a basic skills requirement, usually done by passing the California Basic Educational Skills Test (CBEST)—a standardized test for basic proficiency in reading, writing, and mathematics—but can also be accomplished via other means, such as passing a similar exam in another state. Third, one must complete a professional teacher preparation program, which includes student teaching at the elementary level, from an accredited institution. Fourth, one must demonstrate subject matter competence by passing either a subject matter examination or an approved subject-matter program, if eligible. Following that, depending on the rigor of the teacher-preparation program one graduated from, some applicants may have to demonstrate additional competencies in reading, language skills, civics, or computer technology. The requirements for teaching secondary education are similar.

Admittedly, it is not possible to identify and measure all the characteristics of a quality teacher. As Ferguson (1998:351) writes, "No one characteristic is a reliable predictor of a teacher's performance. Nor are most teachers uniformly good or bad in every subject or with all types of students." This is true and it is also precisely why credentialization is the most robust predictor of teacher quality, for credentialization in most states requires formal education training in state-sanctioned education programs, including majoring in the subject field in which one will teach, in addition to student teaching (Darling-Hammond 2000). Because of the rigidness and robustness of credentialization requirements, credentialization is seen by both educational administrators and researchers as one of the strongest indicators of teacher quality.

In short, there are several reasons to examine the causes of the persistent maldistribution of credentialed teachers across schools in the U.S. First, credentialization is an important outcome variable because it is highly correlated with student performance across all grade levels (Clotfelter, Ladd, and Vigdor 2010; Seebruck 2015). Second, studies have found a maldistribution of credentialed teachers in the U.S. (Clotfelter, Ladd, and Vigdor 2006, 2007, 2010). Third, such studies did not employ the spatial econometrics

techniques necessary to test for variable distribution over geographic space, intimating the need to check the robustness of extant studies by examining these spatial data using the proper spatial analysis methods. Following that, the spatial distribution of credentialed teachers across California school districts is examined to determine whether students in California have an equal opportunity to be taught by quality teachers.

II. Methods and Data

Spatial Econometrics

Spatial econometrics consists of statistical tests and models used to address potential issues in regression analysis caused by the presence of spatial effects such as spatial dependence (Anselin 1988). Spatial dependence—that is, spatial autocorrelation, or a "lack of independence…among observations" (Anselin 1988:8)—is the geographic clustering of similar outcomes among neighboring observations (Darmofal 2006). The "auto" in spatial autocorrelation means that correlation occurs among a given variable, as opposed to cross-correlation between multiple variables (Anselin, Syabri, and Smirnov 2002). Positive spatial autocorrelation exists if neighboring units share similar values on the given variable; negative spatial autocorrelation indicates that neighboring units have dissimilar values on said variable (Darmofal 2006:4). If there is spatial autocorrelation in these data—that is, if there is non-random clustering of credentialed teachers among neighboring districts—then such findings could make clearer the role that geography plays in the distribution of teachers.

I use spatial econometrics techniques to examine California's school districts for spatial autocorrelation in teacher quality, operationalized as *teaching credentialization* (the percentage of teachers in a district who are credentialed), since credentialization has been shown to be strongly correlated with student achievement (Goldhaber and Anthony 2007; Goldhaber and Brewer 2000), including in California public schools (Seebruck 2015). There are two primary types of spatial econometrics techniques: preliminary analyses known as Exploratory Spatial Data Analysis (ESDA), which offer insight into the presence of spatial autocorrelation in the data, and complementary spatial regression analysis, which models the effects of independent variables on an outcome of interest, factoring in the characteristics of a unit's geographic neighbors. Both methods require the use of a spatial weight matrix.

Spatial Weight Matrix

Tobler's (1970:236) First Law of Geography states, "Everything is related to everything else, but near things are more related than distant things." This notion of spatial dependence—that is, that distance has effects on observations—implies the need to determine which other spatial units influence a particular unit, which is usually expressed via a spatial contiguity matrix or a spatial weight matrix of a unit's nearest neighbors (Anselin 1988). The spatial contiguity matrix defines as neighbors those spatial units that share a border. In this approach, the concept of neighbor is symmetrical, meaning that if A is B's neighbor, then B is also A's neighbor. In contrast, a spatial weight matrix considers both the distance between spatial units and the length of the common border between units, in order to determine a particular unit's nearest neighbors. Thus, the spatial weight matrix is asymmetrical: Even if A is one of B's nearest neighbors, B may not necessarily be one of A's nearest neighbors. This is preferable to the contiguity-based approach because imposing symmetrical relationships often makes little sense in the real world, particularly for units such as islands that technically have no shared borders. Thus, in accordance with Anselin's (1988:21) argument against the contiguity-based approach, the analyses in this paper use a spatial weight matrix to examine spatial autocorrelation, since it does not impose symmetric assumptions on the model.

Spatial weight matrices are further divided into two types: one based on distance that does not limit the number of neighbors a unit can have, and another based on nearness that does limit the number of neighbors. Choosing between the two is an important methodological issue, since different specifications can lead to different results (Anselin 1988:20). The first, based purely on distance, defines as neighbors those spatial units that are within a certain distance threshold. The second, while still based on distance, imposes a cutoff based on the k-nearest neighbors. One benefit of the latter approach is that it removes the problem of islands—spatial units that have no neighbors because they are outside the minimum threshold distance. However, in doing so, it often artificially constricts neighbors in nonsensical ways. For example, a k5-nearest neighbors matrix would, in dense areas such as New England where states are small, result in a constricted analysis, omitting influential neighboring states. In contrast, in the sparser West Coast, the nearest five states may span great distances that unrealistically overestimate a neighbor's impact. Distance-based matrices avoid this problem but bring about a new one: the concept of "islands," or units that lack neighbors if the distance cutoff is too large. One way to mitigate concern of islands in the distance-based approach is to set the threshold to eliminate islands (Repkine 2008). However, one must be cautious when doing so, as expanding the threshold to unrealistic distances can result in too many neighbors, which could decrease the theoretical relevance of the results (Repkine 2008). To

address this, many spatial researchers employ a minimum-distance threshold that ensures all units have at least one neighbor, while minimizing the overloading of neighbors on units in more-dense areas.

While there is no standard for choosing the right type of matrix, several scholars recommend analyzing different matrices and selecting the one that achieves a high coefficient of spatial autocorrelation with a high level of statistical significance for the response variable (Anselin 2002; Chi and Zhu 2008; Voss and Chi 2006). Accordingly, spatial weight matrices were tested ranging from k-1 to k-12 nearest neighbors, as well as those based on arc distance from a minimum threshold of 53.7 miles up to 100 miles. The minimum threshold, distance-based spatial weight matrix of 53.7 miles, yielded the highest Moran's I statistic for the dependent variable, making it the preferred matrix. Once the spatial weight matrix has been determined, spatial data analyses can be conducted.

Data

If teacher credentialization is one of the predominant predictor variables affecting student performance, then presumably a more egalitarian education system would more equally distribute its teachers. To determine whether California's education policies have produced an egalitarian education system, spatial econometrics can be used to examine California's school districts for spatial autocorrelation in the distribution of credentialed teachers.

Data come from the California Department of Education's online statistics database, DataQuest (2008), and the Alameda County Office of Education's online statistics database, Ed-Data for the 2007–08 academic year. The California public education system—the largest in the U.S. (Ed-Data 2008)—is divided into 977 school districts, which comprise 560 elementary school districts, 87 secondary school districts, and 330 unified school districts. Elementary school districts typically include elementary schools and middle schools ranging from kindergarten through sixth grade, but sometimes include schools up to eighth grade. Secondary school districts typically include high schools ranging from ninth to twelfth grade, but sometimes include middle school grades as well. The lack of uniformity makes it difficult to compare these districts statistically. In contrast, unified school districts unvaryingly include elementary, middle, and high schools in the same geographic area. Thus, to avoid comparison issues between different types of school districts, the analytic sample is restricted to unified school districts. Two unified districts are listwise deleted due to missing data, resulting in a final sample of 328 districts.

III. Exploratory Spatial Data Analysis (ESDA)

The first step in spatial econometrics is to explore the data for spatial autocorrelation—the spatial clustering of similar outcomes among neighboring observations (Darmofal 2006). Exploratory Spatial Data Analysis (ESDA) techniques can be used to determine the presence of spatial autocorrelation in the data and reject, or fail to reject, the null hypothesis. The null hypothesis on a test of spatial autocorrelation is that the values of a given variable are distributed randomly in relation to space (2006:4). A true null hypothesis implies that knowledge of an observation's spatial location does not aid in predicting that observation's values on the given variable.

Moran's I and LISA Statistics

Spatial autocorrelation can be measured at the global or local level. Analyses of spatial autocorrelation at the global level examine whether the data as a whole exhibit spatial autocorrelation, whereas analyses at the local level identify specific observations that exhibit spatial autocorrelation with their neighbors (Darmofal 2006). To measure spatial autocorrelation for continuous variables, Moran's I is used at the global level, and local indicators of spatial association (LISA) statistics are used at the local level. The global Moran's I defines value similarity as deviations from the mean (Darmofal 2006:12); LISA statistics measure the extent of significant spatial clustering around similar values among that unit's neighbors in proportion to the global indicator, Moran's I (Anselin 1995:94).

The value of Moran's I usually varies from -1.0 to +1.0—although it is not technically bound by these numbers (Darmofal 2006:12)—and measures whether the pattern expressed is clustered, dispersed, or random (Anselin 2003). A value closer to +1 indicates clustering (i.e., positive autocorrelation—the clustering of similar values on the random variable among neighboring observations), a value closer to -1 indicates dispersion (i.e., negative autocorrelation—the clustering of dissimilar values on the random variable among neighboring observations), and a value closer to 0 indicates random spatial distribution (Anselin 2003). Under the null hypothesis of no spatial autocorrelation, the expected value of Moran's I is 0 (Darmofal 2006).

Exploratory Spatial Data Analysis can help determine whether there is spatial autocorrelation in the distribution of teacher credentialization—an important predictor of student achievement, and therefore a crucial factor influencing educational egalitarianism. As previous studies on the distribution of teacher quality do not employ spatial econometrics techniques, the

following analyses will be beneficial in testing the robustness of previous studies that have argued of a maldistribution of teacher quality in the U.S.

ESDA Results

LISA statistics aid in identifying clustering of similar or dissimilar values of a given variable through the use of both the Moran scatterplot, which plots the values of an observation for a given variable against another variable, and the LISA cluster map, which plots the significant values of the Moran scatterplot on a map by type of association.

Figure 1A is a univariate Moran scatterplot of the dependent variable: the percentage of credentialed teachers in a school district. A univariate Moran scatterplot displays observed values of the given variable as standardized values (z-scores) on the horizontal axis against the weighted average of the values among each spatial unit's group of neighbors on the vertical axis (known as a spatially lagged variable) (Darmofal 2006:14). That is, the same variable is plotted for each observation and its neighbors. The Moran scatter plot shows spatial clustering in the upper-right and lower-left quadrants, and spatial outliers in the upper-left and lower-right quadrants (Anselin 2003). Significant values in the upper-right quadrant indicate positive local spatial autocorrelation above the mean of a variable (known as high-high correlation, because a given spatial unit and its neighbors have a high value on the given variable); significant values in the lower-left quadrant denote positive local spatial autocorrelation below the mean (known as low-low correlation, because a given spatial unit and its neighbors have a low value on the given variable); significant values in the upper-left quadrant indicate negative local spatial autocorrelation in which observations have lower values than their neighbors (known as low-high correlation); and significant values in the lower-right quadrant indicate negative local spatial autocorrelation in which observations have higher values than their neighbors (known as high-low correlation) (Darmofal 2006:14).

In a Moran scatterplot, Moran's I is visualized as the slope (solid line). The Moran's I statistic of 0.137 indicates the presence of positive spatial autocorrelation, as it is highly significant with a p-value of 0.0001. The scatterplot shows a fair number of observations distant from the slope in both the high-high (upper-right) and low-low (lower-left) quadrants, suggesting the presence of spatial autocorrelation. That is, the distribution of credentialed teachers across California's unified school districts is not random: Many districts have a significant overlap with their neighbors regarding the mean level of teacher credentialization.

Figure 1B

Figure 1A

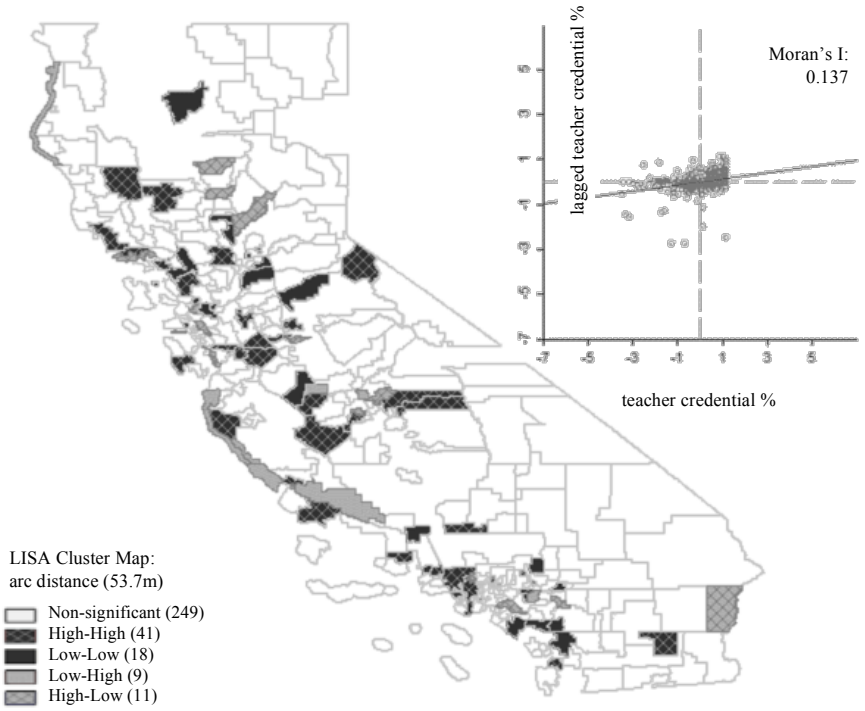

Figure 1.—Univariate Moran scatterplot (Figure 1A) and LISA cluster map (Figure 1B) of the percentage of credentialed teachers in California's unified school districts (N=328).

Complementing Figure 1A, Figure 1B is a univariate LISA cluster map which shows, by type of association (high-high, low-low, low-high, high-low), those observations in Figure 1A having significant local measures of spatial autocorrelation (Anselin 2003). Figure 1B shows several areas of California that have spatial autocorrelation with regard to teacher credentialization. The northwestern coastal region and Sacramento Valley is pocked with high-high autocorrelation (i.e., school districts with high levels of credentialed teachers neighboring other districts with high levels of credentialed teachers) among school districts in Mendocino, Lake, Glenn, and Napa counties. South of the Sacramento Valley, the San Joaquin Valley and southeastern interior regions see low-low autocorrelation among districts in El Dorado, Amador, Calaveras, San Joaquin, and Stanislaus Counties. Further south are several low-high districts acting as buffers for high-high districts, notably low-high districts in Monterey, San Luis Obispo, and Fresno sitting adjacent to high-high districts in those same counties. There is also a pocket of high-high spatial autocorrelation in Ventura and Los Angeles Counties, as well as a

pocket of low-low spatial autocorrelation in northern San Diego County. These findings are relevant to policy makers trying to create equal educational opportunities for all youth: There is a disparity in the distribution of credentialed teachers, meaning that where a child lives largely influences his or her opportunity to be taught by qualified teachers.

While the univariate analyses above are useful in revealing whether the outcome variable is randomly distributed across geographic space, bivariate analyses further illuminate the relationship between the dependent variable and influential independent variables. For instance, as race has been found in the sociology of education literature to be a crucial variable affecting a plethora of education outcomes (Darling-Hammond 2000; Peske and Haycock 2006; Prince 2002), examining the racial distribution of students may inform the maldistribution of teacher quality found above.

Accordingly, Figures 2A and 2B examine the bivariate relationship between the distribution of teacher quality and the racial distribution of students—in this case, the percentage of white, Asian, and Pacific Islander students in a district, as these groups consistently outperform other racial groups such as blacks, Latinos, and Native Americans on student achievement in California (Tucker 2009). Although it has been successfully established that Asians and Pacific Islanders are a diverse group and that the model minority stereotype is an unfair classification (Education Trust-West 2010), it remains that the Asian and Pacific Islander students, overall, significantly outperform other minority groups in California (Tucker 2009). My own supplementary analyses (not shown) on these data indicate that Asians and Pacific Islanders perform more closely to whites than other racial groups, and because they represent such a significant portion of the California student population, lumping them in with other minorities or leaving them out of the analyses altogether would be inappropriate. Thus, they are included with whites so as to shed light on how these groups compare to traditionally more disadvantaged groups: blacks, Latinos, Native Americans, and other minorities.

Following that, Figure 2A is a bivariate Moran scatter plot of the percentage of credentialed teachers in California's unified school districts (horizontal axis) on the percentage of students who are white, Asian, or Pacific Islander (vertical axis). A bivariate measure of spatial autocorrelation relates the value of a variable at a location to that of a different variable at neighboring locations (Anselin 2003). Correspondingly, in a bivariate Moran scatterplot, the vertical axis pertains to neighboring values for a different variable than the one listed on the horizontal axis—here, it plots the percentage of

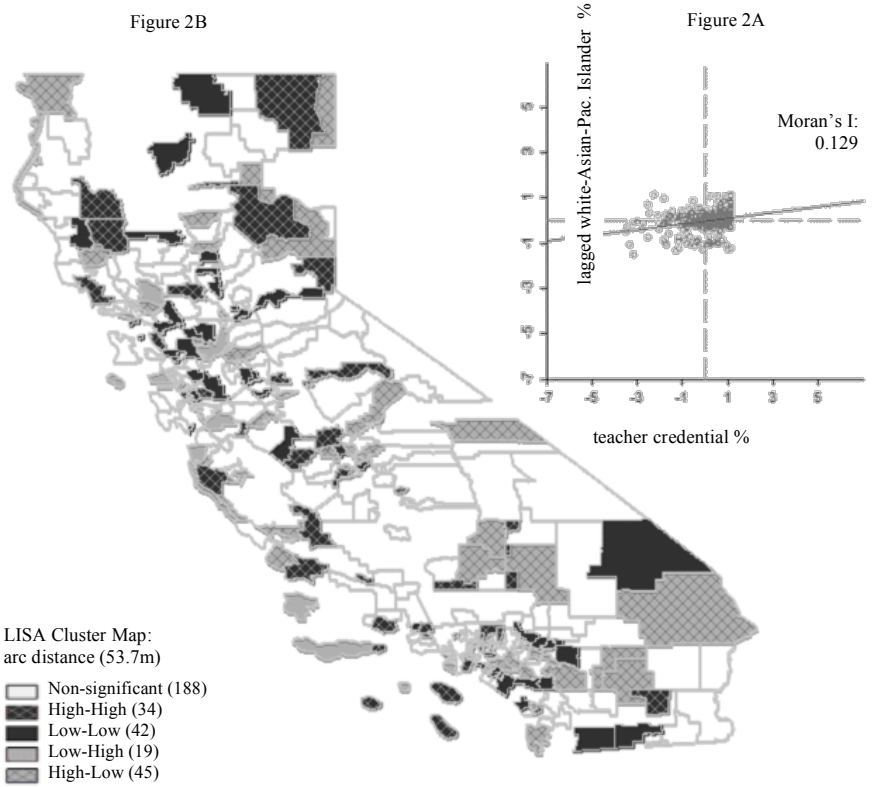

Figure 2.—Bivariate Moran scatterplot (Figure 2A) and LISA cluster map (Figure 2B) of the percentage of credentialed teachers by student race in California's unified school districts (N=328).

credentialed teachers in a district against the percentage of white, Asian, or Pacific Islander students in nearby districts. In Figure 2A, the Moran's I statistic of 0.1289 indicates the presence of positive spatial autocorrelation, as it is highly significant with a p-value of 0.0001. Values in the high-high (upper right) quadrant have high levels of teacher credentialization, while their neighbors have a high percentage of white, Asian, or Pacific Islander students. Values in the low-low (lower left) quadrant also indicate positive spatial autocorrelation in that they have low levels of teacher credentialization while their neighbors have a low percentage of white, Asian, or Pacific Islander students. These results indicate a link between the racial distribution of students and the distribution of credentialed teachers.

Further examining the link between the distribution of race and teacher quality, Figure 2B is a bivariate LISA cluster map which shows that several areas of California have spatial autocorrelation with regard to teacher cre-

dentialization and the racial distribution of students. In the north there is widespread high-high autocorrelation (i.e., school districts with high levels of credentialed teachers and neighboring districts with high levels of white, Asian or Pacific Islander students), particularly in the northwestern coastal and Sacramento Valley regions, among school districts in Mendocino, Trinity, and Colusa Counties. This pairs up well with the univariate analysis of Figure 1B, which found high-high spatial autocorrelation for districts in nearby counties. Furthermore, as with the univariate analysis in Figure 1A, in Figure 1B there are pockets of low-low spatial autocorrelation in the Sacramento and San Joaquin Valley regions, particularly in Napa, Yolo, and Solano Counties as well as Contra Costa, Alameda, San Joaquin, and Fresno Counties. Likewise, as with the univariate findings, there are notable low-low pockets in San Diego County. Therefore, one explanation for the clustering of teacher quality in California appears to be the racial composition of a region: The racial demographics of a school district and its neighbors are significantly correlated with the type of teachers who are clustered there.

The ESDA results show a great deal of inequality in the distribution of teacher quality throughout California. The univariate analyses of Figure 1B indicate that teacher quality is not randomly distributed throughout the state, but rather is spatially autocorrelated with neighboring districts. The bivariate analyses of Figure 2B indicate that this maldistribution may be linked to other factors such as the racial distribution of students in nearby districts. The next section features spatial regression analyses to explore further the maldistribution of teacher quality found in these ESDA tests.

IV. Spatial Regression Analysis

Because the dependent variable, *teacher credentialization percentage*, is a continuous variable, a non-spatial regression analysis would call for Ordinary Least Squares (OLS) regression. However, the appropriateness of OLS regression is dependent on several assumptions requiring that the parameter estimates be unbiased, consistent, and efficient (Allison 1999). The appropriateness of OLS regression assumes that the covariates are independent of the error term and that the error term is independently, randomly, and normally distributed—that is, uncorrelated with the error terms of any of the other covariates (Allison 1999). If these assumptions are violated, then OLS regression analysis could provide biased, inconsistent, or inefficient estimates, and thus should not be used. Instead, a spatial regression analysis is needed, as suggested by the exploratory analyses in the previous section.

Model Selection

Exploratory Spatial Data Analysis (ESDA) demonstrated that there are spatial components to these data, suggesting the need to eschew OLS regression in favor of a spatial regression analysis. Additional diagnostic tools can be used to reaffirm the need for a spatial regression model and to select the proper model by determining which type of spatial regression model best fits the data. Thus, the first step in spatial regression analysis is to reaffirm the results of the ESDA (i.e., that spatial regression analysis is needed). A Jarque-Bera test on the normality of errors is significant beyond the .000 level, meaning that the errors are not normally distributed. This confirms the inappropriateness of using OLS regression.

The second step is to determine the proper type of spatial regression analysis. There are two ways in which spatial interaction is incorporated into model specifications for spatial analysis: the spatial error model or the spatial lag model (Anselin 2002). Selecting the appropriate model is important because the different models induce different spatial correlation patterns (2002:248). In the spatial error model, neighboring units impact the dependent variable in the unit of interest through interrelated error terms (Beck, Gleditsch, and Beardsley 2005:6). In the spatial lag model, both the error term and the covariates in neighboring units impact the dependent variable in the unit of interest (2005:7).

A Lagrange Multiplier (LM) test examines spatial dependence in the residuals of the spatial lag and spatial error models as an indicator of which model is more appropriate (Beck et al. 2005:8). In line with Anselin et al.'s (1996) finding that the robust LM test is more suitable than the standard LM test as identifying the source of dependence—that is, lag or error—I rely on the robust version. Results indicate strong support in favor of the spatial lag model, with a statistically significant p-value of 0.02 for the lag model in comparison to a non-statistically significant p-value of 0.92 for the error model. To complement the statistical justification for selecting the spatial lag model, Beck et al. (2005) provide theoretical justification, arguing that the spatial lag model is usually preferred because in the error model, the effects of space matter only in the error portion of the regression model but not in the substantive portion of the model (2005:5). The error term represents unexplained variation in the dependent variable and can be thought of as the collective effects of omitted or unmeasured variables. Following that, adding a new independent variable to the model effectively moves its effects from the error to the substantive portion of the model. The spatial error model then assumes that this new variable no longer has

a spatial impact on nearby observations since, in a spatial error model, the only way that neighboring units have an impact on a particular unit is through interrelated error terms. Thus, because the error term is simply the disturbance left over from the variables that were not measures, Beck et al. argue in favor of the spatial lag model, unless there is strong theoretical and statistical justification otherwise.

Having selected the spatial lag model as the appropriate model, goodness-of-fit tests can reaffirm the proper weight matrix specification. For the ESDA above, goodness-of-fit tests preferred a distance-based spatial weight matrix set at the minimum threshold needed to prevent "islands." Though it is not always the case, as multivariate analysis is different from the univariate and bivariate analyses of ESDA, Lagrange Multiplier model fitness tests here reaffirm selection of that same spatial weight matrix. Subsequent tests confirm this as well, with that matrix having lower log likelihood, Akaike Information Criterion, and Bayesian Information Criterion values than other matrices. Thus, the same spatial weight matrix used in the ESDA analyses is also justified for use in the spatial regression analysis.

Spatial Regression Variables

The spatial regression model analyzes the effects of covariates on a continuous dependent variable, the percentage of credentialed teachers in a district. Independent variables affecting the distribution of this outcome come from Hanushek, Kain, and Rivkin's (1999) analysis of variables that affect teacher labor supply, such as salary, poverty, racial composition, and proficiency levels of students. Other education-related control variables that may influence a teacher's decision on where to live and work include student enrollment, average class size, the percentage of students who are English learners, the charter status of a school (Prince 2002), as well as the socio-demographics of the area, such as the median household income and population density of the area. Thus, predictor variables include measures of student enrollment, student poverty, student demographics including race and English language skills, average class size, student proficiency, teacher salary, the percentage of charter schools in a district, the median household income and the population density of the county in which a school district is located.[1]

Because teacher salary schedules are based on experience level and certification status, using average teacher salary would produce biased results (Greenbaum 2002). Consequently, the analyses in this paper use the average salary for those teachers on step ten of the certificated teacher salary schedule: teachers with a bachelor's degree and sixty continuing education credits.[2] Continuing education units refer to compulsory participation in continuing education or professional development programs. Rather than comparing the average salaries for all teachers in the district, which would be skewed by the number of senior and certified teachers in a district, comparing the average salaries for teachers who are at the same career and experience level provides a standardized comparison across districts.

Student poverty is measured as the percentage of students in a district who are eligible to receive free or reduced school lunch. Student demographics are measured as the percentage of students in a district who are white, Asian, or Pacific Islanders. Enrollment is measured as the district's total student enrollment, which measures the size of the school district. Average class size is measured as a district's average class size per school and will serve as a proxy for a teacher's working conditions, since higher class sizes typically result in an increased work load without increased remuneration. Population is the total number of residents in the county in which a school district is located. Finally, median household income is a three-year moving average of the average household income for the district's county. Data for these final two variables come from the U.S. Census Bureau (2007).

Student achievement is operationalized as the percentage of students in a district who achieve proficiency on the state-issued math exam. Other available data include the ability to test for proficiency on the state-issued English exam, but because of collinearity concerns with student demographics (namely, race and those whose native language is not English, a sizeable number in diverse California), math is used as a less-biased predictor. However, because the response variable has been shown to affect student achievement (Fetler 1999), to mitigate endogeneity—the problem of reverse causality—I adopt Rupasingha and Goetz's (2007) recommendation to measure the predictor variable at a point in time that precedes the measurement of the dependent variable. In this case, teacher credentialization for a given year cannot affect student achievement for the preceding year. Thus, to combat endogeneity, the student achievement measure comes from the 2006–07 school year, whereas the response variable is from the 2007–08 school year. While this technique mitigates endogeneity, it does not wholly eliminate such concerns, as these two variables are likely entwined in a long-standing, self-fulfilling prophecy. Nevertheless, given the autonomy of employment decisions in the U.S., particularly in the education realm where the academic calendar allows teachers the opportunity to change jobs more easily, controlling for students' capabilities in the year prior is a

fair indicator of teachers' employment decisions, as it indicates to them the types of students they would be teaching if they choose to work in a given district. Furthermore, the state-issued exams occur after the school year has begun, highlighting endogeneity concerns. In contrast, the other covariates' values are set at the beginning of the year, meaning that teacher traits for that year have no effect on them.

Regression Results

Model fitness tests and Exploratory Spatial Data Analysis (ESDA) above concluded that there are spatial components to these data and that spatial regression should be used to analyze them. However, to examine how results compare to non-spatial regression techniques, two models—an Ordinary Least Squares (OLS) regression and a spatial lag regression—are run on *teacher credentialization percentage* with ten independent variables. Table 1 displays results of both models.

The OLS model sees two variables with significant coefficients: charter schools and race. The coefficient for *charter schools* is significant (p-value < .002) and negative, indicating that for every one-percent increase in charter schools in a district there is a 0.09-percent decrease in credentialed teachers in the district. The coefficient for *race* is significant (p-value < .003) and positive: for every one-percent increase in white, Asian, or Pacific Islander students in a district, there is a 0.06-percent increase in credentialed teachers. These results suggest that districts with higher percentages of charter schools and black, Latino, and Native Americans are less able to procure credentialed teachers.

However, the spatial regression results indicate that the OLS regression results are flawed. Most importantly, because it is a spatially lagged regression analysis, the spatial lag term *(_lagged DV_)* of the dependent variable is included in the output and indicates that there is spatial autocorrelation in the variable of interest: Credentialed teachers in California are not randomly distributed across districts. The spatial lag term's coefficient parameter (ρ, rho) reflects the spatial dependence inherent in the data, measuring the average influence on a district by its neighbors. The coefficient for the spatial lag term is significant at the .0002 level and indicates that for every one-percent increase in credentialed teachers for a district's nearest neighbors, there is a 0.41-percent increase in credentialed teachers for that district. In fact, the coefficient for the spatial lag term is larger in magnitude and significance than any other variable in both the OLS and spatial regression models, re-

Table 1.—OLS and Spatial Regression on Teacher Credentialization (Maximum Likelihood)

[raw beta coefficients (β), standard errors (se), p-values (p)]						N=328
IVs↓ Models →	OLS Regression			Spatial Lag Regression		
	β	(se)	p	β	(se)	p
lagged DV				0.41***	(0.11)	0.000
average class size	-0.04	(0.07)	0.576	-0.03	(0.07)	0.610
population density	-0.00	(0.00)	0.690	-0.00	(.000)	0.473
salary	-0.00	(0.00)	0.428	-0.00	(0.00)	0.697
median household income	0.00	(0.00)	0.863	0.00	(0.00)	0.868
enrollment	-0.00	(0.00)	0.204	-0.00	(0.00)	0.122
charter school %	-0.09**	(0.03)	0.002	-0.10***	(0.03)	0.000
English learners %	-0.00	(0.03)	0.935	-0.00	(0.03)	0.918
free lunch %	-0.01	(0.02)	0.784	-0.01	(0.02)	0.792
math proficiency %	0.05	(0.03)	0.053	0.06*	(0.03)	0.014
race % (white, Asian, Pac. Isl.)	0.05**	(0.03)	0.003	0.05*	(0.02)	0.012
constant	92.39	(4.56)	0.000	52.17	(11.5)	0.000
	Adj. R^2 = .208 BIC=1961.42			Spat. Pseudo-R^2 = .242 BIC=1950.76		
n.b., two-tailed t-tests are reported for all models						
* p < .05 ** p < .01 *** p < .001						

affirming the importance of employing proper statistical techniques when analyzing variables with spatial components like teacher quality distribution.

As further evidence that the OLS regression is not suitable, the spatial regression model identifies another independent variable with a significant coefficient that was not found to be significant in the non-spatial model: the pre-established math proficiency of the students in the district. The coefficient for this variable is positive and highly significant (p-value < .014): For every one-percent increase in students who achieved proficiency on the state-issued mathematics examination in the year prior, there is a 0.06-percent increase in credentialed teachers who work in that school district the following year. This intimates that high-quality teachers prefer teaching more-proficient students—something that is not surprising but

clearly needs to be considered by policy makers seeking to create a more egalitarian distribution of teachers.

Not only did the OLS model fail to identify the significance of the proficiency level of students in affecting the distribution of quality teachers, it also overestimated the significance of race. In the spatial regression model, the racial composition of the student body was also found to significantly affect the distribution of teacher quality, but, compared to the OLS model, the coefficient and the p-value are both slightly smaller in magnitude. This suggests that the OLS model's inability to capture the spatial effects of the outcome (_lagged DV_) resulted in error that affected the estimation of other variables in the model. These results reaffirm Greenbaum's (2002) proclamation that failing to account for potential spatial autocorrelation in the data and subsequently running non-spatial regression analyses when spatial regression is required results in bias and incorrect estimates.

Nevertheless, race is still highly significant in the spatial model ($p < .012$), indicating that most minority students do not have the same opportunities to be taught be high-quality teachers as traditionally more-advantaged white, Asian, or Pacific Islander students. This is in line with Peske and Haycock's (2006) meta-analysis of studies that demonstrated that minority students are shortchanged when it comes to having access to more experienced teachers. Given the strong relationship between teacher credentialization and student achievement, this is an important finding: Minorities are disadvantaged when it comes to opportunities to be taught by credentialed teachers, which can have long-lasting effects on students' ability to excel in life and school (Hanushek 1992).

Other seemingly surprising findings are that neither salary nor student poverty have significant coefficients. Sensitivity analyses (not shown) explain the latter finding: Race is an intervening variable between poverty and the distribution of credentialed teachers. If race is removed from the model, a significant negative effect of poverty appears. Therefore, it is important that race is included. That salary is non-significant is explained by the fact that public school teaching salaries are fairly uniform across the state when cost-of-living differences are factored in. This suggests that salary incentives could be used to correct the maldistribution of teachers by encouraging quality teachers to migrate to disadvantaged districts by offering higher salaries there.

Collectively, the spatial regression model reveals a maldistribution of teachers throughout California, to the disadvantage of both underperforming students and minority groups such as blacks, Latinos, and Native Americans. That the clustering of quality teachers in certain school districts correlates highly with the percentage of proficient students suggests a self-fulfilling prophesy where quality teachers seek job placements in districts with a higher number of intellectually proficient students, who then enjoy the added benefits of being taught by better teachers, further exacerbating the achievement gap between districts. Correspondingly, that districts with higher percentages of black, Latino, and Native American students have lower levels of credentialed teachers exacerbates the cycle of disadvantage that minority students face when it comes to equal educational opportunities.

V. Conclusion

Results from spatial econometrics analyses reveal that there is spatial autocorrelation in the distribution of credentialed teachers, an important measure of teacher quality, across California's public schools. Neighboring school districts have similar levels of credentialed teachers, and this phenomenon is not a random occurrence. The racial composition of the students, a variable that is itself correlated with poverty, is highly correlated with the clustering of teacher quality. This finding of a non-random distribution of teacher credentialization is in line with extant studies that also reveal an unequal distribution of quality teachers in the U.S. that disfavors minority students (Borman and Kimball 2005).

However, extant studies on teacher quality distribution do not use spatial econometrics techniques, bringing into question the validity of those results. Indeed, comparing the spatial regression model with an Ordinary Least Squares regression model indicates that the non-spatial OLS model failed to identify two highly significant variables affecting the distribution of teacher quality: 1. the spatially lagged dependent variable, which reveals that the teacher quality levels of a district's geographic neighbors significantly affects the teacher quality level of that district; and 2. that the pre-existing capabilities of students also affect the distribution of quality teachers, with credentialed teachers significantly more likely to work in regions that have higher levels of proficient students.

The first finding should be of interest to policy makers interested in racial inequality in educational opportunities. The spatial econometrics analyses here have shown that a maldistribution in teacher quality permeates California's unified school districts and is highly correlated with the racial composition of the student population: Districts with higher percentages

of white, Asian, or Pacific Islander students, or that neighbor such districts, tend to employ a higher percentage of credentialed teachers.

The second finding suggests that credentialed teachers, usually having human-capital advantages in choosing where they work, tend to choose employment at schools with more-proficient students. This is likely a self-fulfilling cycle where schools with higher-quality teachers produce higher-achieving students, which in turn encourages the clustering of higher-quality teachers, thereby exacerbating the disadvantage that students who live outside of these districts face. When paired with the first finding, this is a troubling reality that likely traps minority students in a cycle of disadvantage. Consequently, both findings are germane to public policy makers interested in promoting educational equality, because teacher quality has been shown to be the prominent factor affecting student achievement, even more so than race, ethnicity, socioeconomic status, school spending, or class size (Darling-Hammond 2000).

Creating equal educational opportunities is important because educational attainment is one of the primary factors influencing socioeconomic status and salary attainment (Breen and Jonsson 2005). In their review of the literature on social inequality, Babones et al. (2007) found that educational attainment matters most and can usually overcome the negative effects of other demographic variables in achieving higher socioeconomic status. Thus, promoting educational egalitarianism should be a goal of any society, as education equality has been found to reduce income inequality: A lower educational inequality, as measured by an education Gini coefficient, will also cause a lower income inequality (Lin 2007). Given that inequality has a plethora of detrimental effects on a society (Wilkinson and Pickett 2009), engineering more equal societies should be a primary goal of any government.

VI. Discussion

The distribution of teacher quality in a district is spatially correlated with the distribution of its neighbors. Future research could examine the causes for such clustering and posit structural solutions to mitigating it. One explanation for the widespread maldistribution of teacher quality in U.S. school districts is because the U.S. has a more laissez-faire education labor market, in which teachers largely have autonomy over where they work (Prince 2002). This locally controlled system has led to numerous policies that inhibit educational egalitarianism, such as funding laws that enable schools in wealthy cities to attract teachers with higher salaries, teacher transfer restrictions that make it difficult to transfer to low-achieving districts, or seniority clauses that allow experienced teachers to choose their placements (Prince 2002).

A possible solution to mitigating this maldistribution in teacher quality is to adopt a mandatory teacher rotation system similar to the one employed in Japan (Letendre 2000; White 1987; Wray 1999). That system involves the systematic rotation of teachers to other schools within a prefecture every few years, throughout their entire careers. This system has been lauded by several qualitative scholars, who argue that it creates a more equal distribution of quality teachers by preventing the clustering of quality teachers at certain schools (Letendre 2000; White 1987; Wray 1999). These qualitative studies suggest that teacher rotation creates a more equal distribution of teacher quality, which should create more equal educational opportunities for students.

Implementing a more centrally controlled teacher education labor market such as Japan's may be one way to stanch the growing problem of educational inequality in the U.S., where reports have shown a trend in wealthy neighborhoods seeking to secede from large school districts in order to create new, separate districts with fuller coffers (Newkirk 2014). Because school districts in the U.S. are largely funded by local property taxes, larger districts that lose wealthy neighborhoods will suffer significant decreases in revenue, making it more difficult to lure in quality teachers and provide students with resources equal to those of their peers in the newly created, wealthier districts. Further fragmenting an already localized education system will only exacerbate the education inequalities discussed in this paper. However, such a rotation system, if implemented in the U.S., would need to be adapted to U.S. cultural expectations. For instance, instead of rotating teachers across all districts within a state, a smaller rotation zone such as counties would be more feasible in the U.S.

Although this study demonstrated that there is a maldistribution in teacher quality in California, it is limited in that it was restricted to one measure of teacher quality: credentialization. There are many other ways to operationalize teacher quality, such as the percentage of full-time teachers at a school, years of experience, the percentage of beginning teachers, teaching within one's field, having an advanced degree, and the prestige of one's university alma mater (Darling-Hammond 2000). Further research on this issue could examine the spatial distributions of other measures of teacher quality to determine whether there is spatial autocorrelation among them as well. Determining whether the maldistribution in teacher quality only

affects certain types of teacher quality could aid in combating the problem by enabling policy makers to allocate resources more efficiently.

Endnotes

1. Population was also tested as a variable. Results were nearly identical; there were no statistically significant differences between the two models. Population density was chosen for the final model so as to mitigate the modifiable areal unit problem (MAUP), where correlation coefficients increase for variables when area units are aggregated, providing a false correlation (Fotheringham and Wong 1991).

2. Alternative measures of salary were also analyzed, such as the ratio of the standardized teacher salary to the mean household income of the county, but never were they significant, and model-fitness tests always preferred the base standardized teacher salary used in the final models.

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The Sutter Buttes: Attachments to the Land

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Abstract

The Sutter Buttes are an isolated group of lava domes jutting out of California's flat Central Valley. They are a publicly valued icon, and have been compared to natural wonders such as Crater Lake and Yosemite, but unlike those icons, access into the Buttes is currently limited to authorized individuals and private landowners (Martin 1991). In 2003 the California Department of Parks and Recreation (State Parks) purchased 1,785 acres in the northern portion of the Buttes (CapRadio 2007). However, because the property is surrounded entirely by private land, the park is currently not available for public use (Rogers 2013). As a result, State Parks has offered many of the surrounding landowners exorbitant prices for their properties, with the intention of augmenting these properties to the park. By doing so, the state hopes to eventually border a county road, thus making the park accessible to the public. However, as of yet, no landowners have sold their properties to the state. This research investigates landowners' sense of place, and, more specifically, reveals that a positive sense of place is a strong factor influencing a number of the landowners' decisions to retain the titles to their properties.

The Sutter Buttes' prominence above the surrounding plains, their nearly perfect circular arrangement, and their geologic distinctiveness from other mountain ranges makes them anything but normal. Indeed, the physical features of the so-called "smallest mountain range in the world" are unique, but it is the human decisions surrounding these physical features that have allowed the Buttes to retain their character as an undeveloped rangeland.

The Sutter Buttes are a series of volcanic peaks situated in the middle of California's Central Valley, a mere fifty miles north of Sacramento (Figure 1). The Buttes, which are the valley's only major topographic feature, span ten miles across and have a total area of seventy-five square miles, a little more than one-and-a-half times larger than San Francisco (California Department of Parks and Recreation 2005, 3).

Because of their distinctiveness and isolation, the Sutter Buttes have garnered substantial cultural significance. They are a familiar icon in the neighboring

The California Geographer 55,

Figure 1.—Location of the Sutter Buttes. The nearest urban areas are Yuba and Marysville. Road generalization based on map featured in Laney and Coats 2005.

cities of Yuba City, Marysville, and Live Oak. Their namesake and silhouette is featured prominently on the signs, business names, street names, and billboards of that region (Figure 2). According to Peterson, "symbols and images" such as those of the Sutter Buttes "contribute to defining social groups' identities, as well as influencing individual identities," thus contributing to the local sense of place (Peterson 1983, 3). In addition, the mountains also hold religious significance to the Maidu and the Wintun peoples, who believe that one's soul returns to the Buttes after death (Stacy 2010). Moreover, hikers from San Francisco, Chico, and Sacramento come to the area in droves for the opportunity to attend a guided hike into the mountains. This is unsurprising, given that the peaks have been compared to renowned natural wonders such as Crater Lake and Yosemite (Martin 1991). However, unlike those natural icons, the Buttes are not open for the general public to explore freely. To visit the Buttes, one must join one of the guided tours, typically with an organization called Middle Mountain Interpretive Hikes. This is because the vast majority of the Buttes lie in the hands of roughly 150 small-property owners and about dozen families with properties that are 1,000 acres or larger, many of whom have ancestral ties to their lands that stretch as far back as 100 years (GreenInfo Network 2001; Hausback et al. 2011).

There is a large exception to the private land in the Buttes; it is a 1,785-acre State Park in the northern portion of the range that was purchased in 2003

Figure 2.—Local real-estate advertisement featuring the Sutter Buttes. Ads, business names, and logos featuring the Buttes are common in Yuba City, Live Oak, and Marysville.

(Figure 3) (Rogers 2013). The California Department of Parks and Recreation (State Parks) purchased the property from private hands for $2.9 million, which according to one of the Buttes landowners was "way above the going price of anything around." But despite being over a dozen years old, the park has never officially opened its gates because it is completely landlocked by private properties (Meer 2011). Only Park officials may enter the park through an unpaved private road that transects some of the private properties (CapRadio 2007).

State officials have reportedly offered exorbitant prices to many of the surrounding landowners for their properties. The state's hope is that they can annex enough land to the landlocked park so that it will eventually border a county road, thus becoming accessible. In the words of retired State Park spokesperson Roy Stearns, "If land becomes available from a willing seller, absolutely we'd be interested. We're most interested in giving the present lands we own now access to a county road" (CapRadio 2007). One of the landowners I spoke with claimed that a State Park official told him, "We'll be willing to buy any property you'll sell us, you just name your price, because we would like access to the state park we bought." Despite these offers, no landowners have sold their properties to the state since the original purchase of the park, back in 2003. It might be reasonable to conclude that it is eco-

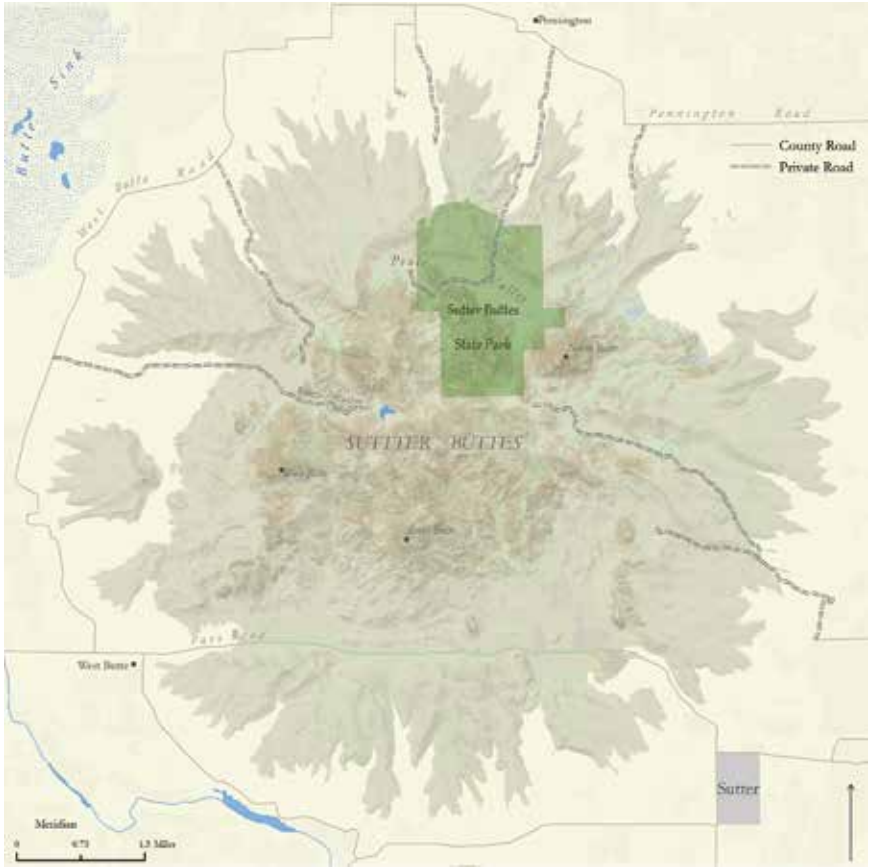

Figure 3.—Location of Sutter Butte State Park, featuring private roads surrounding the property.

nomically beneficial for the landowners not to sell their properties. However, landowners often do not make very much money from grazing, the primary land-use practice in the Buttes. One of the property owners even claimed "the money we get from rent, the cattle rent, doesn't even pay the property taxes, so we have to bring in money from elsewhere to maintain fences, and so it's a burden." Therefore, the landowners' reasons for holding onto their properties must extend beyond financial motivations. This research supports this statement, revealing that landowners often have a positive sense of place that creates emotional bonds to their lands, emotional bonds that supersede the economic benefits offered by State Parks.

Literature Review

The amount of literature explicitly dedicated to the opposition of conservation areas is strikingly sparse. The majority of this literature focuses on the Global South, where it is often the case that the central state will conserve areas that were once the primary resource bases for indigenous communities (Neumann 1998; Frias and Meridith 2004; Holmes 2007). Holmes compiles much of this literature and synthesizes it with resistance studies. Resistance studies portray the weaker classes' seemingly small, day-to-day acts of resistance as important symbolic statements against the dominant class that often have significant reverberations (Fletcher 2001; Jean-Klein 2001; Ortner 2006). In conservation areas, resistance may take the form of continued practice of agriculture in conservation areas, hunting, and/or slash and burn practices. Holmes and others provide two contributions to academia: (1) they emphasize the importance of resistance theory in conservation areas, and (2) they illustrate how conservation areas imposed by distant authorities, e.g., governments and NGOs, often overlook the needs of locals. However, this literature does not cover contemporary conservation issues in the Global North that undoubtedly have many nuanced differences that need to be explored.

The focus of more Western-oriented literatures typically centers on the history, success, or failure of conservation areas themselves, while resistance to conservation usually takes the role of side-character at best. An exception to this rule is Hampton's historical analysis of opposition to National Parks (1981). He highlights four primary motivations for opposing National Parks: (1) economic opposition, (2) "parks are for the elite" opposition, (3) bureaucratic opposition from internal governmental agencies, and (4) miscellaneous opposition. These oppositions are very broad and tend to ignore nuanced feelings of locals in the immediate surrounding areas, including their sense of place.

Unlike other literatures on the Global North, Mittlefehldt focuses her article on the people affected by one specific conservation area: the Appalachian Trail. She infers that her case study is representative of how conservation tactics in the United States have shifted over the past century (2010). Using the acquisition of the trail by the National Park Service illustrates how hardline policies often used in the 1970s, such as eminent domain, evolved into more successful public-private partnerships. For example, the project gained greater support when it became framed as "a community-based initiative rather than a federal mandate" (Mittlefehldt 2010, 655). Furthermore, private landowners responded more positively to local volunteers and greenspace

advocates than they did to federal employees. Ultimately, these tactics were not only more successful in gaining landowners' approval but also proved easier for the National Park Service itself, and have become dominant tactics employed by many conservation organizations today.

Mittlefehldt's findings may explain why local interpretive organizations in the Sutter Buttes have been more successful at working with landowners than the State. Indeed, Wotkyns' work reinforces this hypothesis as well. In Wotkyns' anecdotal essay set in Trinidad, California, he describes the overwhelmingly negative reaction landowners had to State Parks' threat to employ eminent domain to acquire local properties in the mid-1970s (1984, 28). Many of the residents felt that if the state owned more property, there would not be a large enough population base to sustain the town economically. Locals responded by organizing themselves and voluntarily conserving their own land by cooperating with the Humboldt-North Coast Land Trust. Similar to the locals in Trinidad, the Sutter Buttes landowners are often keen to protect their properties from development, which makes studying the effects of positive sense of place and voluntary private conservation pertinent, and deserving of further study.

On a different note, Stedman's article focuses on the ability of the physical environment to influence place meanings and sense of place. He provides validation for the claim that physical environments can have significant impact on people's sense of place, an assertion that contradicts previous assertions claiming that place meanings are completely social in origin. In his words, "Although social constructions are important, they hardly arise out of thin air: The local environment sets bounds and gives form to these constructions" (2003, 671). He exemplifies this by asking, "Are we really likely to attribute 'wilderness' meanings to a suburban shopping mall?" (2003, 673). He asserts that this perspective is not environmental determinism, but rather that the physical environment simply influences sense of place. Using an experiment in northern Wisconsin, Stedman reveals that new development projects often have a significant impact on people's sense of place. This provides an important baseline for my research, proving that although place meaning can be interpreted differently, the physical makeup of the Buttes sets limitations on how one can interpret that landscape. Since the physical environment influences place meanings, and place meanings have a profound effect on people's behavior, it is likely that the Buttes' physical environment affects the decision making, i.e., behavior, of its landowners. These decisions may include land-use choices, which entail landowners' decisions to retain their properties. It is then highly salient to study the correlation between physical environments and sense of place, and how these factors influence land-use decisions.

There is also a significant and well-established literature base focusing on why people resist landscape development, much of which highlights place attachment and sense of place as primary motives (Slattery 2002; Stedman 2003; Walker and Ryan 2008; Devine-Wright 2009: Collins and Kearns 2012; Collins and Kearns 2013). Collins and Kearns argue place attachment motivated resistance to coastal development in the community of Ngunguru, New Zealand, between 2008 and 2009 (2012). The owners of a sandspit proposed the development of 350 houses, which would have been widely visible to the rest of the community. Much of the community had strong feelings of anxiety and outrage over the developers' motivations, and a sense of urgency to stop the development. This, according to Collins and Kearns, was the result of respondents' strong sense of place "disruption," a feeling of anxious detachment from a sense of place. This argument reinforces the importance of attachment to natural places and the ability for "place attachment" to affect actions and decision-making—yet again strengthening the case that major land-use decisions can be emotional in origin, including that of the Sutter Buttes landowners.

Background: Conservation and Current Land Use

Until the past quarter-century, ownership of the Sutter Buttes was relatively homogeneous and comprised mostly of ranches (Sutter Buttes Regional Land Trust no date; Hausback et al. 2011). The first attempts to install a park in the Buttes came about in the late 1920s, both from within the community and from state officials, but for unknown reasons, neither of these proposals came to fruition (Cunningham 1928; Olmstead 1929, 33, 65). Despite private ownership, access was relatively open until the mid-1960s (Krock and Anderson 2006). For the first half of the twentieth century, visitors could freely explore the Buttes as long as they followed a few basic rules and refrained from hunting. However, after a series of abuses, including graffiti on rock faces, leaving gates open, driving off road, and a succession of arson fires, the landowners, backed by PG&G, barred access to anyone but residents and their acquaintances (Nadeau no date; Anderson 2004, 199).

The mid-1970s became a flashpoint between State Parks, landowners, and the surrounding community. In 1973 State Parks commissioned a survey of unprotected places in California that might benefit from State protection (Kunit et al. 1973). The study ranked potential sites based on how well they fit certain criteria: the Sutter Buttes ranked number one in the Central Valley.

These criteria included ecological value, developmental threats, and proximity to population centers, but did not take into account current owners' stances on park establishment. This preliminary survey was intended to inform Park officials as to what lands might be considered for acquisition should the 1974 Park Bond Act pass (California Department of Parks and Recreation 1974). The Act would release $250 million of park bonds, $90 million of which was designated for acquisition purposes (Norred et al. 1974). The State included the Buttes in the final plan, which proposed a 7,500-acre park that would consist of a "recent volcanic plug, blue oak woodland, valley grassland, [and] scenic geologic forms" (Kunit et al. 1973, 58).

The plans to acquire a park in the Buttes met with controversy when it reached Sutter County residents shortly after the Park Bond Act passed by sixty percent approval in the June primary of that year (McCreery 2010, 163). Fearing eminent domain, several landowners formed the Buttes Landowners Association and persuaded the Sutter County Supervisors to pass a vote opposing the park (*Appeal-Democrat* 1974a; *Sacramento Bee* 1974; Norred et al. 1974). Conversely, a few members from the surrounding community formed Save the Sutter Buttes, a small pro-park organization (Anderson 2004, 199; Krock and Anderson 2006). This resulted in a political battle between the Landowners Association and Save the Sutter Buttes, with both sides petitioning and allying themselves with prominent political figures, county officials, and nonprofit organizations (*Daily Independent-Herald* 1974a, 1974b; Davis 1974). By September, Parks Director,William Penn Mott Jr. announced that there were more projects than funds, and that there would not be enough money left from the grant to purchase land in the Buttes. He also mentioned that "where there is serious conflict, we obviously will consider other areas that are not in contention" (*Appeal-Democrat* 1974b). Walt Anderson, a Buttes aficionado, also attributed this decision to the controversy, asserting, "A chain of interactions between increasingly polarized sides led to the state shelving its park plans" (Anderson 2004, 199).

In 1976 landowner Peter Steidlmayer thought that by allowing visitors to tour his property he could reduce public demand for access, as well as reduce impetus for State Parks to acquire his land by force (Anderson 2004, 199; Krock and Anderson 2006). Steidlmayer took action by hiring Walt and Rebecca Anderson as directors of his new interpretive program: the West Butte Sanctuary Company. The Andersons worked with Steidlmayer until 1979, when they left due to differing management philosophies. After leaving, the Andersons reached out to more than thirty landowners and began a new interpretive/hiking organization called the Sutter Buttes Naturalists.

This coalition formed the framework for the interpretive programs in the Sutter Buttes that exist today.

The tone of the organization shifted when Ira Heinrich obtained nonprofit status in 1989 and renamed the organization Middle Mountain Foundation (Anderson 2004, 200). Heinrich, who had become director of Sutter Buttes Naturalists in 1985, considered environmental education paramount and took the organization in a decidedly more conservation-oriented direction. They began to take action on management and political issues for the first time, and fought a proposal that would have placed a dump and quarry within Buttes. The organization took another step toward becoming a conservancy in 1996 when they accepted from McClatchy Newspapers, Inc. the donation of 200 acres of land that contained the summit of North Butte (Sutter Buttes Regional Land Trust no date). By the late 1990s, the membership of the organization had grown so large that it necessitated the creation of a board committee (Hubbartt 2013).

The Middle Mountain Foundation's conservation focus expanded in the 2000s. In 2006 the foundation merged with the Yuba-Sutter Land Trust and gained two conservation easements outside the Buttes (Hubbartt 2013). In the fall of 2013, the organization split; the conservancy became the Sutter Buttes Regional Land Trust (SBRLT), and the interpretive/hiking branch became Middle Mountain Interpretive Hikes. According to SBRLT, "the perception that Middle Mountain Foundation has been an organization that allows public access into the private range lands of the Sutter Buttes is accurate, but incomplete" (Hubbartt 2013). The two remain sister organizations and coordinate with each other. It should be noted, however, that despite its name, Sutter Buttes Regional Land Trust has no conservation easements within the Buttes themselves as yet; they do, however, own the titles to two very small properties within the range.

The most dramatic change in ownership occurred when State Parks purchased a 1,785-acre property in Peace Valley, in the northern portion of the Buttes (Stienstra 2004). As before, the State received funds from a ballot—in this case from Prop. 40, which passed in March 2002 and authorized $226 million for park acquisition (Melley 2003).

As before, the concept of a park within the Buttes ignited controversy. One Buttes property owner said that it seemed like a "prelude to an attack on the middle or bigger chunks of the Buttes" (Melley 2003). Landowners feared that the park would become a "headache," as it could invite trespassing

and vandalism, and interrupt agricultural processes (Enkoji 2005). These concerns were widespread, despite the State's reassurance to landowners that the park's purpose would be for preservation rather than recreation, hikes would be guided, and there would be no campsites (Knapp 2007). Despite State Parks' promise, the surrounding property owners did not grant permission for the general public to use their private road for park access, making the property inaccessible. Roy Stearns, spokesperson for State Parks, claimed, "Until we have access to a county road with some property, we really don't have [public] access" (Rogers 2013). Due to budget deficiencies and legal controversy, the park remains unopened, and as of 2012 an estimated $874,000 had been spent on upkeep of the inaccessible park (Stacy 2010).

Methodology

Semi-structured interviews are the sole research method in this study. Interviews with landowners provide the most direct and clearest answer to the reasons why they have not sold their properties. These interviews were semi-structured, and thus included several prepared questions; however, respondents were free to deviate and converse as they pleased.

There were a total of three interviews with four landowners, including one interview with two interviewees. I selected interviewees by getting referrals from other landowners and from a widely circulated newspaper article that featured one of the landowners' contact information. These interviewees represent landowners on the east, west, and north sides of the Buttes. All of the interviewees hold properties adjacent to the state park or the private access road leading into the park. Three of the landowners admitted to being approached by State Parks inquiring about purchasing their property. The one landowner who claimed not to have been approached by the state was in the process of personally conserving her property with a conservation easement. Her thoughts were included in this study because they contribute to a greater understanding of how Buttes landowners feel about their properties in general. Three of the four landowners grew up interacting with their future properties and also have ancestral ties to it. Conversely, one of the interviewees had purchased his land from a friend twenty-five years prior to the interview. Furthermore, three of the four landowners had, or at one point had, homes directly on their Buttes properties, while one had her property outside the Buttes but had interacted with the mountains closely since childhood. Two landowners had properties that contained both agricultural land and grazing land, while one owner solely had grazing land, and another solely had agricultural property. For the sake of confidentiality, none of the interviewees' names are disclosed, rather they are simply referred to hereafter as Participant A, Participant B, Participant C, and Participant D.

Analysis

All interviewees expressed positive emotional ties to the Buttes, but some expressed stronger degrees of attachment than others. Participants B and C verbally expressed affection toward the Buttes that paralleled modern conservation values, whereas Participant A's previous involvement was as a member of SBRLT's Board of Directors, and her desire to establish a conservation easement on her property spoke of her conservation interest for her. Participants C and D were interviewed simultaneously. Participant D seemed to have an overall positive sense of place regarding the Buttes; however, he was considerably more understated than Participant C. This may be interpreted as either a more subtly expressed sense of place, or a comparatively lower sense of place. Furthermore, each individual emphasized different aspects of the Buttes that he or she felt attached to.

For organizational purposes, I borrow John Eyles' categories of sense of place (1985). Examples of these categories include "social," "nostalgic," "commodity," "roots," "way of life," "platform/stage," and "environmental" senses of place. In his study, Eyles sent a questionnaire to 162 individuals of Towcester, England, to measure residents' general impressions of the town. He then generalized each response into a single type, or category, of sense of place, including the several mentioned previously. However, unlike Eyles, I do not label individuals with one "type" of sense of place. Rather, I use three of Eyles' categories simply as a baseboard to describe aspects of this "complex emotional state" (Hays 1988, 54). Each individual may express multiple aspects of sense of place. For example, one might experience a deep "rootedness" in a place that may be partly informed by "environmental" appreciation and "social" ties. Therefore, in this research, Eyles' categories are only a loose organizational framework, as I divided the responses into three of Eyles' categories: "social," "environmental," and "platform/stage" senses of place. I use the social sense of place to refer to how individuals see a place as an epicenter for social ties between family and friends. The platform sense of place—or, as Eyles calls it, the "platform/stage" sense of place—refers to a sense of place that is informed by past experiences and activities; in other words, the events that have happened or will continue to happen at a specific place. My other category is "environmental" sense of place, which refers to the attachment that comes from meaning attributed to the physical features of a place. This may include natural, non-human made physical features, or human-made features on the landscape that physically exist.

Environmental

The physical features of a place, i.e., the environment, can have a significant impact on people's sense of place. For example, Stedman states, "Physical features do not produce sense of place directly, but influence the symbolic meanings of the landscape" (Stedman 2003, 674). These meanings are socially constructed; however, "social constructions […] hardly arise of thin air: The local environment set bounds and gives form to these constructions" (Stedman 2003, 671). In other words, because the Buttes have a physically distinct character from the adjacent Sacramento Valley, they also garner a different set of meanings that can potentially be applied to them. After applying meaning to physiographic features, "Humans then become attached to the meaning that they have constructed for the landscape." This attachment can be a major part of their sense of place (2003, 674). Based on some of the landowners' sentiments, physical features of the Buttes were often imbued with meaning and featured prominently in how they verbally expressed their sense of place.

Distinctiveness

Scholars often highlight distinctiveness, specifically physical distinctiveness, as an element that can produce a strong sense of place. According to Peterson, "Factors which help define the character or personality of a place […] may include such elements as distinctive physiographic features" (1982, 2). Furthermore, Hay asserts, "If the place has distinctive features and natural topographical boundaries in a regional sense, then it may be liked more and be more recognizable of a place" (1990, 389).

Two interviewees explicitly addressed the distinctiveness of the Buttes, especially Participant D, who emphasized the Buttes' distinctiveness more positively than any other feature, referring to it three times. When asked if he would sell his land, he replied, "This is a very unique area. I mean there's no other place like this in California, for sure, and there's probably not many like it in the country… that are preserved to this point." Emphasizing distinctiveness after being asked this question implies that the Buttes' unique character is a primary reason for holding on to his property. Separately, Participant D expressed appreciation for the mountains' unique human landscape as well, stating that they have a "very unique history" and shared with me his extensive knowledge of the history of his and his neighbors' properties. This suggests that the human draw to the distinctive features of a place may extend beyond the physical landscape and may center on immaterial features. Furthermore, Participant D revealed that his awareness of the Buttes' distinctiveness was a function of his intimacy with the land, stating, "When you really get to know this area, it's just so unique."

Participant A expressed a similar sentiment, explaining, "It's just part of your growing up—you don't realize they're special and how significant they are [until growing older]." She implies that a growing awareness of the Buttes' distinctiveness was a critical component for her creating a positive sense of place.

Aesthetics

A couple of the interviewees emphasized the Buttes' natural beauty as a main factor contributing to their attachment to the mountains. Participant C most clearly emphasized an aesthetic attraction to the Buttes. At the beginning of the interview, Participant C mentioned that the Buttes' scenery was "really incredible. And the view from up on the tower is spectacular." The tower he refers to is an elevated point on his property from which many of the surrounding peaks and valleys become visible. He mentioned several times that this hill was "very powerful and meaningful." After I concluded the interview, he took me up to the aforementioned hill and shared the vista with me.

Participant C's visual attachment to the Buttes was so strong that he stated he had no wish to plant more orchards in the flat areas of his property "because it would destroy the view." Revealing his aesthetic attraction to the mountains even more was a discussion he'd had with Participant D. Participant D originally grew almonds in the valley behind his house, but later switched to wine grapes, which are generally lower to the ground and less dense, thereby increasing his viewshed of the mountains. Participant C implied a certain level of envy toward Participant D's new backyard vista, stating "it's an incredible sight [referring to D's view of the mountains], and we don't have that sight on our ranch."

Similarly, Participant A was also attached to the aesthetics of the physical landscape; however, she did not go to lengths to verbally express it. However, I could ascertain that she appreciated the Buttes' aesthetics based on the fact that the walls of her home were lined with paintings of the mountains themselves.

Despite the fact that Participant D had earlier emphasized the Buttes' distinctiveness, he did not necessarily indicate he felt a strong aesthetic attraction to them, although it is possible that he may have. His more subtle, or perhaps slightly ambivalent, feelings regarding the Buttes' aesthetics are

encapsulated in a story he shared with us. He explained that he'd told his wife, "Maybe I'll get some of this vineyard out, because it's a lot of work. I'll put some more almonds in. And she [his wife] says, 'no way… not happening.'" He acknowledges that his wife feels an aesthetic appreciation for the Buttes; however, he does not express these feelings himself as strongly while recounting the story. In fact, it would not be inconceivable that he is less visually attracted to the Buttes than his wife, based on his willingness to convert his vineyard back into an orchard, which would obstruct his view of the mountains.

Development, or potential development, that might alter the mountains' appearance further exposed the interviewees' level of attachment to the Buttes' aesthetics. For example, Participant A negatively discussed the power lines that ran through the mountains, stating, "They're an eyesore. Here are the Buttes, just sorta a wild place, and they have these big towers marching through." These power lines conflicted with her symbolic meaning of the Sutter Buttes as a "wild place" and thus disrupted her sense of place. When discussing the communication towers on the summit of South Butte, she said, "I'm kinda used to that, but it's kinda nice to see pictures without them," meaning that because they had existed for many years she had become acclimatized to them, and thus they did not disrupt her positive sense of place as much. However, she did indicate they were something to be gotten "used to," and that she enjoyed visuals of the Buttes without them.

Similar to Participant A's distaste for the power lines transecting the Buttes, Participants C and D felt negatively about a proposal to install a separate set of power lines in and around their properties. Participant D told me, "It did not happen; I was on that. Man! I had everybody going on that one soon as I found out."

Similarly, when I asked Participant C how he felt about the proposal, he threw his hands up and exclaimed, "Ugh!" implying absolute disgust at the idea of having a set of power lines disrupting his view. Unlike Participant C, Participant D may have been less concerned with the aesthetics than with his property rights and proper legal etiquette, stating that "they [the electrical companies] didn't have any of the appropriate meetings in the area; they held them out of the area, and that just floored me. I was just so mad about that, and there's a whole protocol."

Furthermore, when asked about 1990's Measure A, which, if approved, would have allowed for the construction of 625 houses in the southeastern portion of the Buttes, Participant C acknowledged the importance of property rights,

then added, "Personally, I wouldn't want to see houses on the hillsides of the Buttes, because then you've got another ridgeline of lights."

Unlike Participant C, Participant B did not appear to be as strongly attached to the Buttes' visuals. When asked how he felt about the communication towers atop South Butte, Participant B replied, "They might be aesthetically ugly," but they were not "environmentally creating a problem." This suggests that Participant B's sense of environmental health is more focused on the habitat, and less with aesthetics. Reinforcing this, he stated, "I don't care one way or another; I'm sure they [the landowners surrounding the towers] are making some good money off the proceeds from the lease on that ground." He added that his main concern with development was the construction of new houses off Pass Road, "near the center of the habitat." It may be that Participant B's concern for habitat stems from his interest in quality hunting, and thus is linked to activities and his platform sense of place.

Platform

Hobbies and Activities

Activities are a way for locals to generate a positive sense of place. They intensify bonds with a place by establishing a routine connection with that landscape. Hay illustrates this, stating, "Human contacts are renewed through family, community, leisure and work involvements" (Hay 1990, 43).

For example, Participant A revealed that the Buttes serve as a venue for interaction with animals, stating, "One of my loves being up there is being on the horse. And taking care of the cows, and riding the hills. And in the spring when they have to calve, well I'm out on the horse going up and down the hills, looking for any cows having trouble having a new calf. So that's the best time to me."

Similarly, Participant C mentioned that the hill, referred to earlier, was a place where he liked to hold "parties up there just to enjoy the moonrise and the sunset."

Related but slightly different, Participant B was enthusiastic because having property in the Buttes would allow him to foster unique hobbies during his retirement in the future. In his words: "What a great place to retire, here. I got all these awesome preservation projects that I can be doing. […] I think one of my big ones I would love is to start [is the] bolstering of the blacktail deer here, and it really doesn't take that much money; it just takes time." This activity is slightly different from the other participants because it is

anticipative rather than ongoing, and will fulfill a different human need: staying busy during retirement (Hooker and Ventis 1984).

Activities in general may be the dominant factor crafting Participant B's positive sense of place. When discussing the possibly of selling the property, he stated that he and his family had "no intention […] to sell unless we were in financial burden, would we ever consider selling this because it's such a heritage: the bass fishing, the deer hunting, the quail hunting, the dove hunting…just the relationships we've got from the hiking tours, great friends just from all the hiking here." Amidst the numerous activities mentioned, he specifically emphasizes hunting and fishing. This passion for hunting may explain his significant interest in wildlife conservation in the Buttes, such as his plans to promote the blacktail deer population, mentioned earlier.

Past Experiences and Nostalgia

Two of the landowners emphasized nostalgia and past experiences as part of their relationship with the Buttes. Robert Hay claims that experiences throughout the lifetime of an individual are one of the most significant components for establishing sense of place: "It is the emotional experience of intimate places, that of our homes (and workplaces), which solidifies the realms of space and place, developing sense of place over the years if movement lies mostly within one region" (1990, 26). This is especially applicable in this case study because the interviewees have all worked in and around the Buttes at some point in their life, and three of the four individuals live or have lived on the mountain's flanks.

Participant C made it clear that his experiences were a main component of his attachment. When discussing his land, he said that "you have to live here to know what it's like." This implies that in order to appreciate the land to its fullest, one must spend significant time with it. He later stated that his intimacy with the land was what made being a property owner "worth it." Statements such as this suggest that non-absentee property owners may experience increased levels of attachment and sense of place, due to their wealth of experiences within a single region, a subject that requires further investigation. The experiences that Participant C recounted usually pivoted around the Buttes' aesthetic and physical characteristics: "The experiences that you have out here. You're away from the city. You're away from the noises. The hillsides almost block the light from Yuba City, and Oroville, and Gridley. Just on a clear night looking straight up, the stars are so bright. Watching the moon is just incredible, watching the sunsets. It's an experience that we are so fortunate to have."

Participant B also emphasized experiences. He explicitly stated, "The spectrum of experience in the Buttes is probably what gave me the appreciation for it." The experiences he refers to include the labor he invested in his property and the social experiences he had while recreating in the mountains. For example, Participant B explicitly made the connection between experiences and attachment, stating, "My connection is right down to the dirt, right down to the earth. I've had all the experiences up here that anyone could ever have… Getting cow poop in your mouth from cows kicking it up, and rolling in the mud. And when the corrals are empty after the cattle are in there, we got a little ATV and a rope and slid around in the cow poop having fun, skiing around in the—uh [catches himself]. Building fences up here: it's not where you wanna put the post, it's where it'll allow you to put post." His mention of building fences exemplifies Hay's assertion that investing labor reinforces connections with place, while his recreational and familial experiences give the Buttes personal meaning (Hay 1998).

Social

According to Eyles, a "social sense of place is dominated by the importance attached to social ties and interaction" associated with that place (1985). When positive social ties are made, it can change the meaning of the landscape, such that it is associated with friends, family, and community. Studies on neighborhoods and neighbors' sense of place reveal that sharing places with others and interacting with the community at large is often a determinant of positive sense of place. For example, Mesch and Manor reveal, "The higher the number of close friends and neighbors that are known to live nearby, the higher the attachment to the neighborhood" (1998, 504). There is little reason to believe that this principle should not apply to rural property owners as well. In the Sutter Buttes, landowners often engage with a large community, in the form of guided hikes.

Family

The landowners often discussed the importance of their immediate and extended families living on the properties. However, it is surprising that the landowners did not emphasize their families' deep histories with their properties as a major factor influencing their attachment, despite the fact that three out of the four interviewees had roots to their properties that extended several generations.

Participant D, a first-generation property owner, subtly implied that he valued keeping the property within his family. He did this when he asked his daughter, who happened to be present at the time of the interview, "would

you guys sell?" His daughter replied that neither she nor her sister would sell the property, to which Participant D responded, "You see, there's another generation that's not gonna sell it." Judging by his cadence and intonation, it seemed he was pleased with his daughter's choice to retain the property, although this cannot be claimed with certainty.

Conversely, Participant B explicitly expressed positive feelings in support of keeping the property within the family. Participant B stated, "There's never a discussion with my brothers, or I, or my family to ever sell. And my niece and nephew, my son and daughter, and my two other nephews from my other brother, they're pretty young, they don't understand, but they're all on board. They come up here often. We fish, we picnic. This is one of our Easter picnic spots, right here." Stating "they're on board" implies that the holding on the property is a shared family value. He follows this by listing the activities and traditions that the next generation is already involved in. It is possible that these traditions are an attempt to instill or foster a positive connection between the children and the Buttes' landscape, and thus be more likely for them to retain the property in the future. It is also possible that Participant B uses activities and events as a tactic to instill the youngest generation with a passion for the mountains, because it is how he became attached to the Buttes himself.

Participant B brought up the property's family value again, stating, "My mom intended to give one of the boys this ranch, one of the boys Colusa Ranch, and one of the boys Grimes [ranch], and instead when she handed it over to us we got back into family mode… We're gonna try and keep 'em all together if we can." For Participant B and his family, the Buttes property is too meaningful for it to be inherited by one family member.

Sharing and Community Interaction

Two of the interviewees frequently guide hikes onto their properties, often for Middle Mountain Interpretive Hikes. Both of these landowners emphasized guiding hikes as paramount to their attachment to their properties, but emphasized different aspects they enjoyed about the task.

Participant C emphasized teaching others and sharing his perspectives on the Buttes. When asked whether he would ever consider selling his property, Participant C said, "Well, I personally wouldn't sell. There isn't enough money [in existence] to buy the ranch. I guess my passion for the land is so great…that I mean…how fortunate we are to have it…and I love sharing it. When I lead hikes, I share stories, I want the people to have a feeling that they understand the land and that they understand my family's passion for the land." Positive sense of place—or, as Participant C calls it, "passion for the land"—is why he has not sold his property, and guiding hikes serves to more deeply entrench his attachment to the land.

Participant B, on the other hand, emphasized the emotional rewards of guiding hikes. For example, he explained that he valued guiding "the STARS program out of Marysville. It's underprivileged kids, and a lot of Air Force families from Beale Air Force Base. Their families are coming and going, and they don't have a lot of time for their kids, so we take 'em out on field trips. And it's very rewarding, because they probably haven't been into their own backyard, let alone into the wilderness, and this isn't like the Sierra Nevadas but at least its outdoors. And they're like, 'we're gonna climb to the top of that!' and the reward is very great." In this example, Participant B experiences an emotional reward from contributing to the local community. Participant B's negative comparison of the Buttes to the Sierra Nevada also provides more evidence to suggest that Participant B is not as strongly attached to the Buttes' aesthetics as he is to its other aspects.

To further emphasize Participant B's passion for guiding hikes, he also stated that the reason he would not sell his property is because of "the relationships we've got from the hiking tours." He brought this theme up later, stating, "I've met a lot great people on these [hikes]…very intelligent…educated me!" Lastly, he expressed that guiding hikes was one of his most favored hobbies, stating, "That's what I wanna do; I'd rather do this than farm. I mean, can you blame me?"

Conclusion

Three of interviewees had aesthetic, platform, or social senses of place. Participant D had either a more subtlety expressed or less intense sense of place than the rest of the interviewees. It should still be acknowledged that Participant D had a positive appreciation for the Buttes' physical and historical uniqueness. However, his more restrained enthusiasm might be explained by Hay's hypothesis, that residents raised in an area feel a greater sense of place than do immigrants (Hay 1998, 25). In this case, unlike the other landowners, Participant D was relatively new, having had ownership for only twenty-five years.

This research reveals that landowners can feel strong ties to their properties—i.e., a place—that may exceed their desire for economic betterment. However, it should be stated that economics are important, as they can limit inhabitants' ability to own/live in a place. For example, if the individuals

I interviewed had been suffering financially, they might have been more willing to compromise their properties. As Participant B stated, "Unless we were in financial burden would we ever consider selling this," suggesting that his attachment to the property could be trumped during financial straits.

A positive sense of place, or attachment to the land, such that it supersedes potential economic betterment, stands in contrast to what Simon Williams calls "orthodox" rational choice theory. Rational choice theory argues that "individual self-interest is the fundamental human motive, and…individual actors pursue their goals efficiently," often basing decisions on careful analysis of the costs and benefits of all possible options (Mayhew 2009). Williams asserts that "orthodox" rational choice has been the "dominant [economic philosophy] throughout the course of Western history" and that this iteration of the theory is "one in which a wedge is firmly driven between reason, on the one hand, and emotion, on the other" (2000, 58). Furthermore, when emotions are acknowledged, they are "banished to the 'irrational' margins of Western thought and practice" (2000, 58) In addition, Archer reveals that the theory relies on the assumption that most individuals are rational agents who use the means-ends calculus of the so-called "economic man" (2010, 36). This economic man is "a completely rational actor who enters into transactions solely to maximize his economic well-being. He is unconstrained by noneconomic impulses and desires" (Fineman and Dougherty 2005, xiii). Research on property owners in the Sutter Buttes contradicts these assumptions, and proves that, in many cases, economics are not the only factor driving major decision-making, thus calling "orthodox" rational choice theory's predictive currency into question. As Matthews and Herbert state, "In reality, people often behave in suboptimal ways, with much less than full information and perhaps influenced by emotional value" (2008, 57).

The Sutter Buttes represent a case study in which positive sense of place has had a major role in the legal administration of publicly desirable property. It does not prove that sense of place is the only reason why landowners choose to keep the titles to their lands, and indeed there may be, and likely are, other factors as well. However, it does indicate that positive sense of place is a major factor in their decision-making and should be considered in the future by organizations who may be seeking to acquire property from private hands. Furthermore, the behavior of many of the landowners was often aligned with modern conservation values. Participant A was in the process of placing a conservation easement on her property, Participant B strongly emphasized native wildlife promotion, and Participant C emphasized a strong distaste for development in the mountains, while also acknowledging the importance

property rights. This suggests that it may be possible to harness a positive sense of place to inspire private conservation, and thus brings forth the need for further research on this topic.

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Reflections on Humboldt Bay in 2015

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Prelude

In the year 2000 I wondered about that famous German name when I attended the Association of Pacific Coast Geographers (APCG) meeting at Humboldt State University. It was so conspicuous throughout the region. Could I have missed knowing about a visit to California by Humboldt? Fifteen years later, when the California Geographical Society was to meet there, I needed to satisfy my curiosity about these eponymous places. Did Humboldt really visit this part of the world?

We geographers know Alexander von Humboldt (1769–1859), the Father of Geography; the man who ascended Mount Chimborazo, believed then to be the highest mountain on earth;[1] his influential ideas in biogeography introduced the concept of altitudinal zonation; he is commemorated in the Humboldt Current, a vital factor in the El Niño phenomenon. Though no Humboldt expert, I had long been an admirer. Humboldt's adventures in the New World tropics had resonated in my (less exciting) student years in tropical north Queensland. During graduate studies in Germany, I became fascinated by his impressive achievements in a productive, long, and much traveled life. Of course I photographed his statue at the entrance to the Humboldt University in Berlin, and found time to read an old leather-bound copy of *Cosmos*. In New York I located his bust at the edge of Central Park.

Figure 1.—Portrait of Alexander von Humboldt by Charles Wilson Peale, 1805–06 (Wikimedia Commons).

It was easy to ascertain that, indeed, Alexander von Humboldt never visited California.[2] He made only a brief sojourn in the eastern United States in 1804, to Washington, D.C., and Philadelphia (Mathewson 2006). There he met with Jefferson, whom he knew not only as President of the Republic he so admired, but as President of the American Philosophical Society. He also found time to sit for a portrait by Charles Wilson Peale (Figure 1). After his return to Germany,

Humboldt maintained correspondence with many American men of science over the next half-century. His influence on American scientific thought persisted throughout the great period of nineteenth-century American westward expansion (Sachs 2006).

Now it was time to satisfy my curiosity about Humboldt in California. The name must have originated with some voyage of European "discovery," when the name Humboldt Bay was bestowed and recorded for posterity. But who among the host of Spanish, English, Russian, and finally American voyagers on the northwest coast had chosen to honor a German? When did this happen? So it was back to the men who sailed the California coast to seek the answer.

Naming the Landscape—Indigenous Names and European Names

Reading the research of others regarding the complex sequence of European exploration along the California coast, we encounter a too-familiar conquest story, beginning with the original residents of the bay, the indigenous Wiyot people. California maps show very few indigenous names, and we often do not know their meaning, but the waters known as *Qual-a-wa-loo* formed the center of the Wiyot world (Davidson (1891).[3] Nomland and Kroeber (1936) mapped forty-four villages between Eel River and Mad River, with an estimated population of 800 to 1000 people. Twelve Wiyot settlements were recorded around Humboldt Bay.

The whole quest to know who brought Humboldt to the bay highlights again the difference between indigenous place-naming practice and European naming conventions. Native peoples knew their environment intimately, regarding it with respect and gratitude. Their land sustained them, and it was also a landscape where they walked in the footsteps of their ancestors and felt their spirits. Yet personal names were never used for places; as with other indigenous and traditional cultures, the Wiyot never spoke the names of the deceased. Their toponyms came from creation stories, from animals, from experiences and feelings; place-names did imply a sense of ownership of the physical world, but more importantly demonstrated the sacred symbiotic bond between people and their inanimate world. I love their concept that *names speak the world into existence*. Few of these indigenous names can be seen or heard today.

Naming may be a basic human tendency, but the European practice of naming is different. It dates perhaps from Aristotle, and belongs not to the spirit

world but to a desire to construct a different sort of knowledge. One familiar and lasting legacy of European naming is the Linnaean binomial system, which constructs a fixed identity for every organism, and sets its place in a rigid and highly compartmentalized system. Through naming and classifying, all of Nature is organized into a world scheme. This process produces a special view of the natural world, and an implied value.[4] Humboldt, in contrast, held an ecological belief that the multiplicity of natural life-forms represented a unity. His Cosmos was interconnected and interdependent, living and changing.

Power is implied in European toponyms. We still seek to imprint personal names on landscape features. For monetary consideration, a name can be recorded for a crater on our moon; more than one million people have names recorded on a microchip on Mars. In seeking to explain this aspiration of European settler societies, the United States Geological Society produced a Factsheet (1999) on commemorative naming. It states that: "Naming rivers, mountains, and valleys after individuals was one way *settlers marked the land*; it signified their *lives on these lands were important* and, in addition to being *a point of reference*, usually satisfied the *need for stability* and enhanced the general concept of *sense of place*" (emphasis mine). This seems so reasonable to us. The factsheet also notes that: "…what may be most significant about the present commemorative naming decisions is their *permanence*." So the traditional oral name *Qual-a-wa-loo* was eventually replaced by Humboldt Bay, a name printed on a chart.

Imperial Naming-and-Claiming and Humboldt Bay

Naming to claim physical possession of territory represents a further step in the dispossession of indigenous peoples. There is no doubt who owns California now, but our current Californian place-names, multifarious and sometimes mysterious, reflect the imperial ambitions of several European nations and, finally, of young America. As the first European ships "discovered" these "new" lands, their captains made charts dotted with names, in a process that brought remote landscapes into existence in European consciousness. Familiar names of saints and famous personages turned unknown lands into knowable places. When we look now at maps of the New World, we are reading messages from the past, conjuring magical stories of geography.

The topography of *Qual-a-wa-loo* meant that it remained hidden from the view of European ships throughout some 250 years of sailing the coast. The long and low-relief coast of sand bars sheltering the lagoon meant it was not visible to Europeans. Frequent storms also forced ships to keep their distance

offshore. It was not seen in 1542, when Juan Rodríguez Cabrillo sailed as far north as the (now) Russian River, encountered indigenous peoples, and bestowed many now-forgotten Spanish place-names on islands and bays before his untimely death. The English buccaneer Francis Drake brought a new era when he landed in 1579, mapped a large bay on the coast, and claimed this new land for England under the name *Nova Albion*.[5] He was followed by several more Spanish ships in the latter part of the eighteenth century. Vizcaino in 1603 mapped an unexplained *Bahia Grande*, but this does not resemble the physical reality of Humboldt Bay (Davidson).

After a long hiatus, Spanish exploration by land reached San Francisco in 1769, and several Spanish captains sailed the northern coast over the next decades. Notable among them is Juan Francisco de la Bodega y Quadra, who named Trinidad, and whose own name lives on at Bodega Bay. He met with George Vancouver, who sailed this coast in 1792–94 and wanted to name the great island where they met amicably the Island of Quadra and Vancouver. Twenty years earlier and further north, James Cook had made a symbolic claim for England, but Vancouver again formally claimed for England the whole West Coast north of 32 degrees south latitude (Sumner 2013). Still, the traditional lives of the undiscovered Wiyot people continued undisturbed.

"An American Captain, an American Ship and an American Crew"

This was how the enthusiastic narrator on the good ship *Madaket* in 2015 described the first discovery of Humboldt Bay, as geographers cruised there in 2015; but there is a backstory that deflates this patriotic claim. In the summer of 1806, the ship *O'Cain*, under command of Jonathan Winship of Boston, saw the bay but could only enter and explore it in ships' boats and canoes. They were sailing, however, for the Russian-American Company, carrying indigenous Inuit and their canoes (*bidarkas*) south from New Archangelsk (Sitka) to hunt sea otter. Winship's men mapped the bay, referring to it first as the Bay of Indians. On their map, however, *Qual-a-wa-loo* became Rezanov Bay.[6] The name appears on a manuscript of the Winship chart (1807) in the St. Petersburg naval archives, and on updated printed Russian charts from 1848 and 1852 (Giesecke 1997). A second superseded Russian name was the nearby Bay of Rumyantsev,[7] now Bodega Bay, where the Russian American Company took the daring step of founding in Spanish California a colony we know as Fort Ross.

Humboldt Comes to California—The Golden 1850s

We need not discuss here familiar events of the Mexican-American War, the annexation of California, the gold discoveries of 1849 when the *world rushed in*, and the rapid admission to statehood as the thirty-first member in 1850. That same year, the bay was again "found" and renamed twice. American miners on the rich Trinity and Klamath River diggings wanted to find a port closer than San Francisco to obtain their supplies. An enterprising group walked overland and in December came eventually to the bay, which they named Trinity Bay, believing it to be the mouth of the Trinity River. One member, in self-assured style, carved his name "David Buck" on a tree and claimed a large portion of land. The town of Bucksport (now Eureka) soon rose (Figure 2).

Figure 2.—The last reminder of Bucksport, now part of the city of Eureka (personal photograph).

At that same time, ships seeking northerly harbors were setting out from San Francisco. A hastily formed group of men chartered the schooner *Laura Virginia,* established the Laura Virginia Association, and set out with fifty passengers/ investors. In March 1850, Captain Douglas Ottinger saw from the masthead the waters of the bay, but a heavy-breaking swell hid the entrance, so they continued north. When they sailed south again, in early April, Second Officer Henry Hans Bühne and some of his men took a small boat through the breakers and into the "unnamed" bay, where they camped on the shore at what is today known as Bühne Point. Then he located the passage and took the *Laura Virginia* in on April 14. The first American ship had entered the bay. Most histories note merely that the bay was then named Humboldt "in honor of the great naturalist."

A Deed Without a Name?

The informative and verbose Bledsoe (1885) wrote only that the name Humboldt was given "at the earnest solicitation of a member of the expedition whose enthusiastic admiration for the illustrious Prussian was as boundless

as the latter's knowledge." My suspicion that it was probably Bühne who chose that name lies in his own Danish-German origins, and even more in the naming of his second son, Alexander Humboldt Bühne. Another early writer stated confusingly: "Douglas Ottinger…gave to the bay the name of Humboldt, after the great German scientist and traveler; but it is also claimed that Major E. H. Howard, now of Eureka, gave this name to the bay" (Lewis Publishing 1891). But still further mysterious hints led to new details and revealed that the true namer of Humboldt Bay was "Mr. Shaw, now of San Francisco" (Elliott 1881). Further searching finally uncovered the story of this true protagonist.

Stephen William Shaw (1817–1900) was a portrait painter from Vermont who had joined a group of '49ers in Panama bound for California. Finding no gold, Shaw soon returned to portrait painting in Sacramento and San Francisco, where he then became a member of the Laura Virginian Company. On their vessel's return voyage, Shaw was chosen as one of a land party sent to walk south from Trinidad to scout for an entrance to that "nameless" lagoon sighted previously on the voyage north. With Wiyot's assistance they reached the end of the northern spit, camped, and returned to Trinidad with details of a favorable location. And so Bühne piloted the vessel into the bay. Pleased at the prospect of wealth from this new harbor, the men now claimed land for themselves. As Ottinger carefully sounded and charted the waters, Shaw's choice of Humboldt Bay was the name entered. But did Shaw really have a "boundless knowledge of the great man"? Or is it perhaps more likely that the name had been etched into his mind through his grim 102-day voyage from Panama to San Francisco, aboard a ship named *Alexander von Humboldt*? So arduous was this voyage that wealthy fellow-passenger Collis P. Huntington (soon one of the Big Four railroad magnates), established the Society of the Humboldters; survivors of the arduous Panama-San Francisco voyage met each year in San Francisco at a banquet on the anniversary of their arrival date.

Soon the "newly discovered" bay was the destination of official visits by the United States Coast Survey, and the name Humboldt Bay was entered onto their official charts for navigation.[8] By 1852, Alexander Dallas Bache, Superintendent of the Coastal Survey and a long-time friend of Humboldt, issued the detailed *Official US Coast Survey Preliminary Survey of Humboldt Bay California* (Figure 3). Now the name Humboldt was permanently placed on this American landscape, supplanting all previous names.

Figure 3.—Official US Coast Survey Preliminary Survey of Humboldt Bay California 1852 (David Rumsey Map Collection, used with permission).

What Remains?

The men of the Laura Virginia Association were, like others, namers-and-claimers. They thought their fortunes assured as they "took possession" of sufficient land to found the emergent Humboldt City, comprising about four miles of coastline and extending one mile inland. Blocks were roughly measured and a tent city sprang into existence; buildings followed. S W Shaw and his brother S Lewis Shaw farmed on table Bluff in the 1850s, but the former sold up and returned to a successful career in San Francisco.[9] The latter established a village—which took the name of his own house, "Ferndale"—and became the first Postmaster.

In 1853 came both the establishment of Fort Humboldt and the incorporation of Humboldt County. Today the Fort is a State Park with a number of restored or reconstructed buildings. It now pays tribute to the unconscionable mistreatment of the decimated indigenous peoples. Though its charter ironically stated that it was set up to *provide protection for inhabitants from Indian hostiles* (my emphasis), the reality was quite the opposite.[10]

Humboldt City was situated in the southern part of the bay. The land party members had founded their cities to the north, and a road to the mines soon led to the ascendancy of Union (Arcata), and the rapid decline of Humboldt City. Elliott referred to it as an "imaginary city" where only one house remained, while the prolix Bledsoe wrote: "… the city faded from the visionary projects of the adventurers' dream. Humboldt City succumbed to the inexorable decrees of fate, and to-day the scene of its once bustling life is abandoned to its original pastoral simplicity" (Bledsoe 1885). As a final blow, the site of the former Humboldt City was later chosen by Pacific Gas and Electric for the Humboldt Bay Nuclear Power Plant, in operation 1963 to 1976 and now decommissioned (Par Environmental Services Inc. 2003).

Gold has long ceased to be important in this region, but it was the stimulus for the first four Californian "Humboldts"—the Bay, the City, the Fort, and

the County. Subsequently it was attached to forests, parks, and a peak, together with many commercial uses of the name seen today.

Coda

My enjoyable quest is over, but there remains a new adventure for some other investigator. Alexander von Humboldt was, throughout his life, a prolific correspondent. When the Laura Virginians took up their land, they decided to "*give the Baron Von Humboldt a choice lot in the city of his name; and a deed of the same was written and sent to him, with a full account of the adventures of the company, for which the Association in due season received his kind acknowledgements over his own signature*" (Bledsoe). Where is the letter from the namesake of this part of California? Was it perhaps retained by HH Bühne, who stayed on to become the wealthy patriarch of a prominent Eureka family (Irvine 1915)? Perhaps it passed to the elder son (also HH Bühne)? Or perhaps it was kept by Ottinger? Or one of the members of Laura Virginia Association? This is a trail that might lead some future researcher to a splendid tangible relic of that intriguing spatial history linking Alexander von Humboldt with northern California.

Notes

1 Chimborazo truly deserves this honor, because the distance from its peak to the center of earth is considerably greater than that of Mount Everest. It can be argued that sea-level is an arbitrary and changing reference.

2 Just as Charles Darwin visited Australia, but never the place now known as Darwin.

3 This scientist-geographer was employed for fifty years by the US Coastal Survey, spending two long periods in California; after retirement he was the first Professor of Geography at UC Berkeley. The US Coastal Survey, founded by Jefferson in 1807, attracted some of the best scientists and artists of the nineteenth century.

4 For the young E. O. Wilson, learning Latin names of species was a childhood revelation. He recalled finding a "jelly-fish" on the shore: "…what a spectacle…but how inadequate, how demeaning the word used to label it. I should have been able to whisper its true name *scyphozoan*…The name would have been a more fitting monument to this discovery" (Wilson 1994).

5 Historians still disagree on the actual location of the bay Drake visited.

6 In honor of Count Nikolay Petrovich Rezanof, founder of the Russian-American Company, who was currently visiting the Alaskan settlement and had just been in San Francisco.

7 Honoring the Russian Minister of Commerce, Count Nikolai Rumyantsev, who had sponsored the first Russian global circumnavigation.

8 James Alden had charge of the Humboldt Bay survey, but George Davidson was surely acquainted with this work.

9 In 1852 Stephen William Shaw made the painting of Wiyot leader Ki-wi-lat-tah. Back in San Francisco he painted many of the rich and famous men of the time.

10 The tragic stories of "when the Great Spirit died" are revealed in the title of one source consulted, *Indian Wars of the Northwest*, conspicuously dedicated to "The Pioneers of California" (Bledsoe 1885).

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Geographic Chronicles

2015 CGS Annual Conference Award Winners

JOE BEATON POSTER AWARDS

Undergraduate Posters

First Place:

Cristina Bauss, et al., Humboldt State
Mapping Marijuana Cultivation and Water Storage in the Redwood Creek Watershed

Second Place:

Elizabeth Smith, CSU Northridge
The Ideal Locations for Portable Ground Telescopes within California

Third Place:

Jonathon Martinez, CSU East Bay
San Francisco Underwater

Graduate Posters

First Place:

Joel Clark, San Jose State
Apping for Mapping: An Evaluation of Mobile Data Collection System Applications

DIGITAL MAP AWARDS

First Place:

Amber Salmon and Alicia Evans, Cosumnes River College
Empire Mine State Park: An Interactive Trail Guide to Historical Sites within the Park

Second Place:

Ashlee Fleming, Humboldt State
The Home(s) of the Internet

PAPER MAP AWARDS

First Place:

Christine Rosin, CSU Chico
The Great Trek

Second Place:

Alex Veasey, CSU Stanislaus
Archaeological Site Risk Assessment within the Rim Fire Boundary, Stanislaus National Forest, CA

Third Place:

Benjamin Wright and Stephanie Lopez, CSU Stanislaus
Examining the extent of Potential Future Sea Level Rise and its Impacts on Coastal Habitat

TOM MCKNIGHT PAPER AWARDS

Undergraduate Papers

First Place:

Kristopher Anderson, Humboldt State
Preserving Identity, Tourism in Tibet

Second Place:

Kinsey Brown, University of Nevada, Reno
Household Kitchens and the Construction of Gender in Domestic Space

Third Place:

Andrew Shensky, CSU Fullerton
Enhancing Food Systems Education Through the Integration of Technology into a School Garden Curriculum

Graduate Papers

First Place:

Kathleen Koscielak, Humbolt State
If These Walls Could Talk: Graffiti, Place & Culture in Iztapalapa, Distrito Federal, Mexico

Second Place:

Zawisza Grabinski-Parker, Humboldt State
Prior Burn Severity Predicts Reburn Severity in the Klamath Mountain Ecoregion

Third Place:

Sarah Harris, UC Santa Barbara
Characteristics of Atmospheric Rivers Impacting Southern California

GEOSYSTEMS AWARD

Mike Johnson, Cal Poly San Luis Obispo
Developing a Decision-Support System for Forecasting Future Water Availability in California

Theodore Dingemans, University of Nevada, Reno
Climatic and Cultural Implications of 3000 Years of Environmental Change from Zaca Lake, California

DAVID LANTIS SCHOLARSHIPS

Undergraduate Award

Stephanie Lopez, CSU Stanislaus

Graduate Award

Heather Lewis, CSU Stanislaus

FRIEND OF GEOGRAPHY AWARD
Jerry Rohde, Author

DISTINGUISHED SERVICE AWARD
Robert Voeks, CSU Fullerton

OUTSTANDING EDUCATOR AWARD
Joe Leeper, Humboldt State University Professor Emeritus

STUDENT TRAVEL AWARD WINNERS
Bertha Garcia Munoz, Cal Poly Pomona
Ben Wright, CSU Stanislaus
Claire Serraille, CSU Stanislaus