



Surviving “No Man’s Land”: Using Historical Geographic Information Systems (HGIS) to explore family history, resource access and land-use/land-cover change in Cimarron County, Oklahoma

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INTRODUCTION

The landownership history of Oklahoma’s panhandle has evolved greatly over the past two centuries. Earning the name “No Man’s Land” as an ungoverned strip of land from 1845 to 1890, the territory became part of Oklahoma when it was granted statehood in 1907. As the epicenter of the 1930s Dust Bowl and six major droughts, numerous environmental and socio-economic challenges have impacted farming and ranching in the region (Vadjunec and Sheehan 2010). While many families left in the ‘30s (à la Steinbeck’s *The Grapes of Wrath*), others endured and, often, acquired the land that was left behind. In a region where agriculture is still the main economic driver, landowners’ decisions nearly a century ago have shaped the landscape today.

Previous land ownership research has suggested that initial landholdings can have strong effects on future land use. For example, Coomes et al. (2010) found that households with larger landholdings were more likely to increase the area of their cultivated land than those with smaller landholdings. Further, they identified a “dynasty effect” where households receiving land from previous generations were less likely to live in poverty.

Another major factor dictating landownership has been leasing of state school trust land, which comprises over 20% of Cimarron County’s acreage (Fagin et al. 2016). While some families have relied heavily on state land leases to meet their farming and ranching needs throughout several generations, a new open bidding policy has forced some lessees off their land and, in some cases, out of the county.

Here, we focus on Cimarron County landownership change from 1931–2007. In our analysis, we sought to answer three primary questions:

- 1) How has the size of parcels and individual landholdings changed during our study period?
- 2) How has the type of landowner (government/private/corporate or emigrant/survivor) and land use changed over time?
- 3) Are families with a larger initial geographic footprint more likely to “survive” in the county through multiple generations?



◀Fig. 1 Cimarron County is Oklahoma’s westernmost county and borders Colorado, Kansas, New Mexico, and Texas.

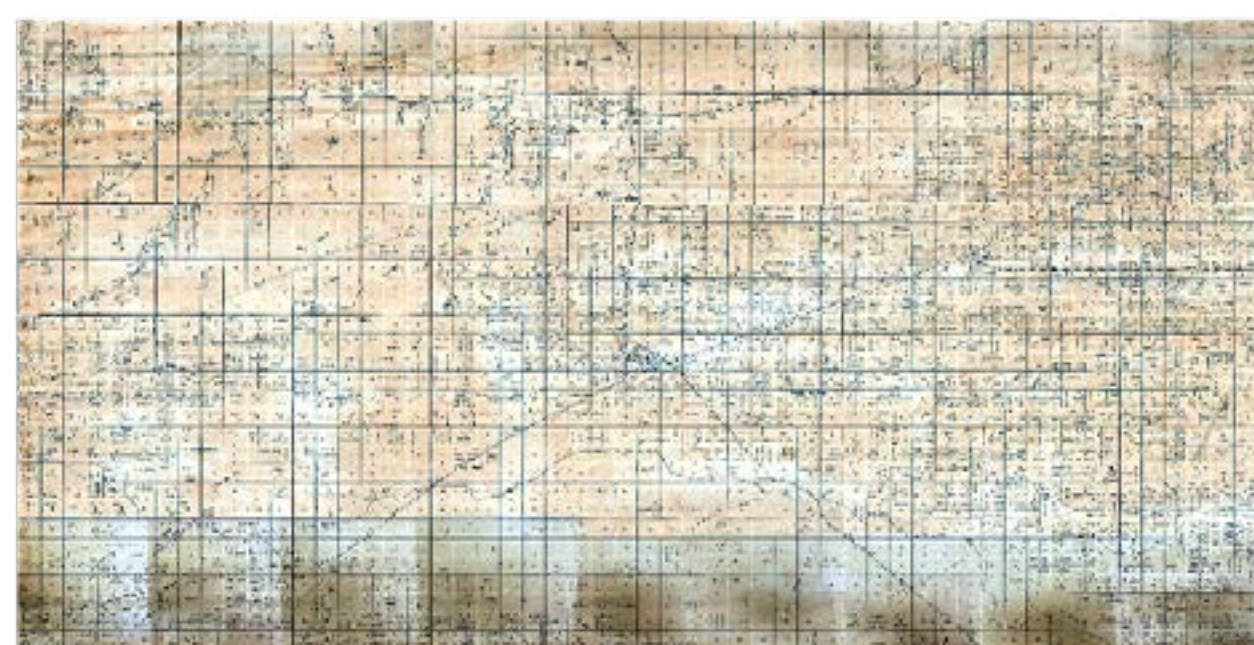
METHODS

We obtained Cimarron County Assessor’s Office landownership plats from museums and historic residences in the region for the years 1931, 1946, 1954, 1963, 1983, 1998, and 2007. We scanned the maps and digitized each parcel using digitizing tools in ArcGIS 10.3. Landowner name and type (state, federal, city, private, or corporate) was entered as attribute data based on plat landowner descriptions.

To quantify landownership change trends, we queried data by type of landowner and by owner’s last name (as a proxy for family relationships). To triangulate the causes underlying these trends, we relied on key informant interviews conducted with landowners and lessees from 2014 to present.

To easily compare the landownership strategies that families used during and after the Dust Bowl, we classified families into five categories: *Emigrants*, which left Cimarron County between 1931 and 1946; *Declining Survivors*, which remained in the county after the ‘30s and sold off a portion of their landholdings; *Steady Survivors*, which remained and kept the same amount of land; *Risk-Taking Survivors*, which survived and expanded their landholdings; and *Late-Comers*, which purchased their first Cimarron County landholdings after 1931.

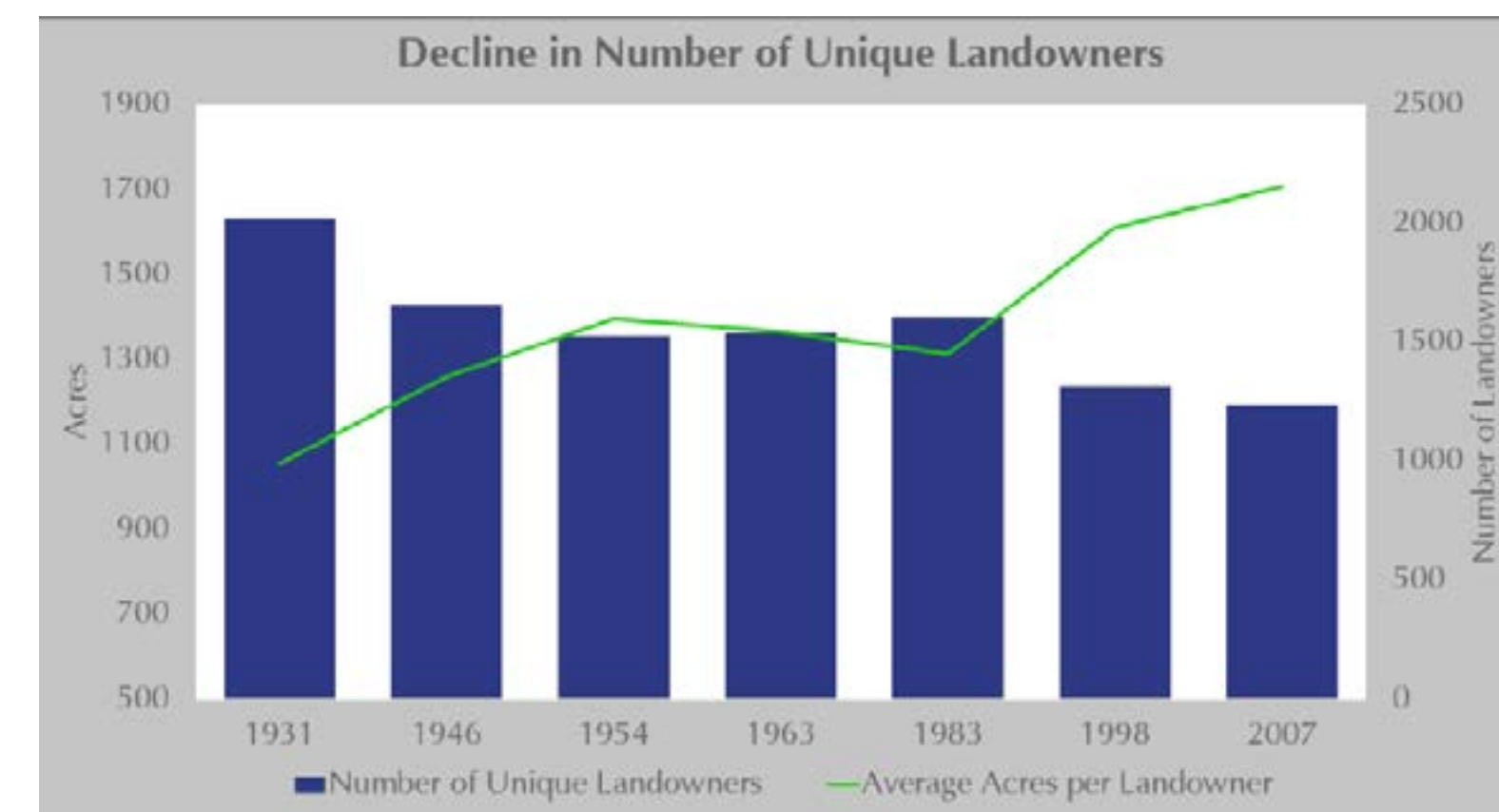
Additionally, we separated families into two groups based on those owning more than or less than 640 acres (one section) in 1931 to determine if initial landholdings affected survivability.



▲Fig. 2. Scanned plat of Cimarron County from 1931.

RESULTS

1) The number of unique landowners has decreased since 1931, and average acres owned has increased.

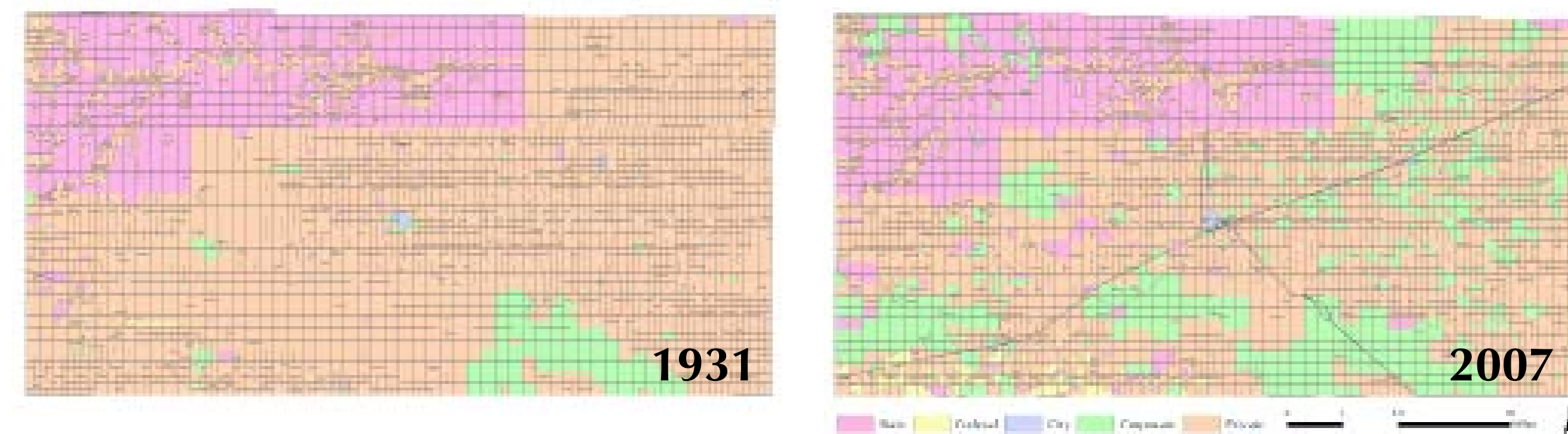


◀Fig. 3 indicates that the number of unique landowners (including individuals, companies, and government entities) has declined from a high of 2,022 landowners in 1931 to only 1,239 in 2007. The largest dip in landowners occurred in the 1930s, as hundreds left the county in the midst of the Dust Bowl and the Great Depression (Worster 2004).

Average acres per landowner followed an inverse pattern, increasing from 1,055 acres (1.6 sq. miles) in 1931 to 1,708 acres (2.7 sq. miles) in 2007. These values, however, are influenced by a small number of landowners occupying vast stretches of property. In 1931, half of the land in the county was held by only 3.7% of the unique landowners. This observation hadn’t changed in 2007, when only 45 landowners (3.8%) occupied half the county’s acreage.

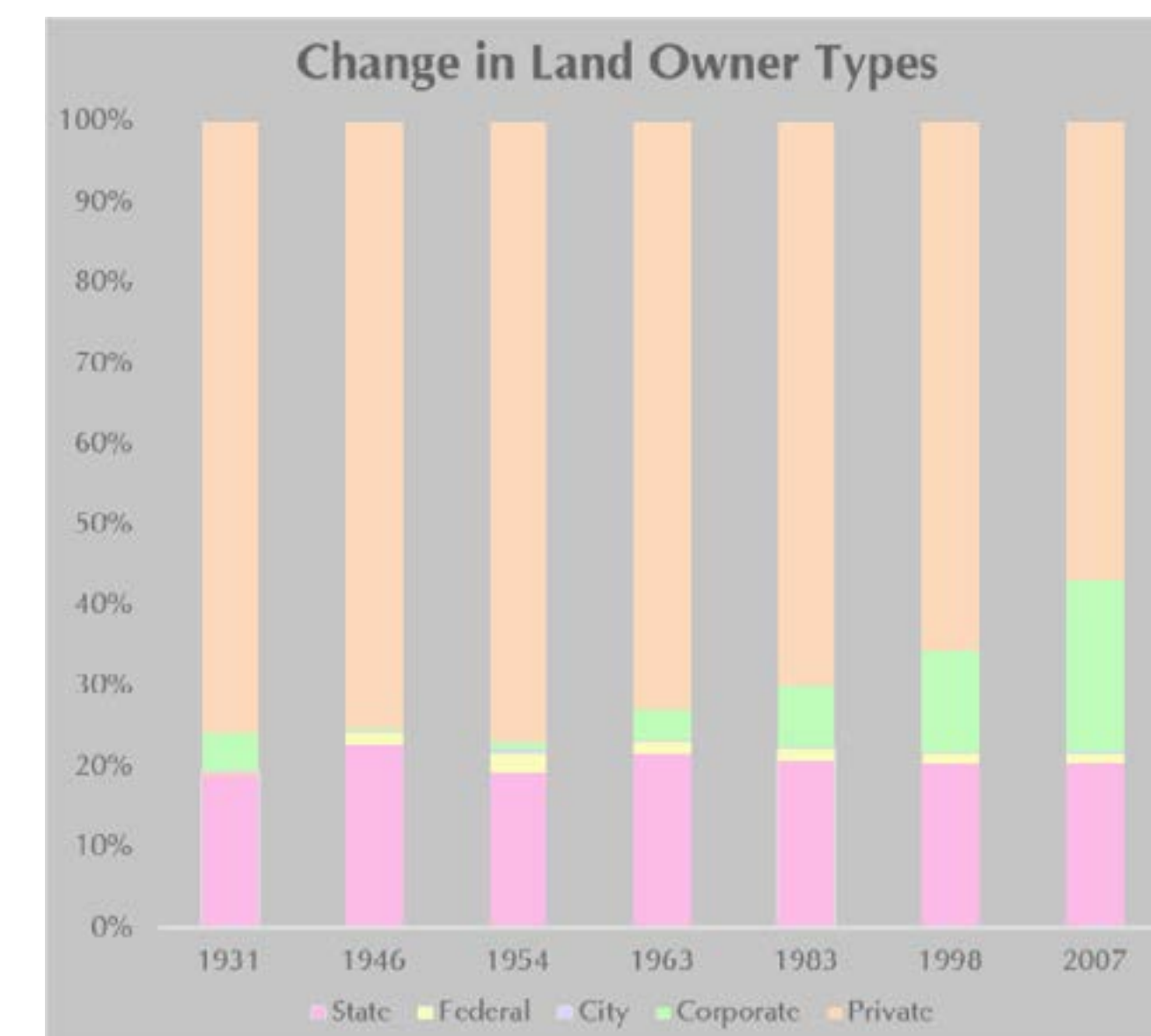
Average parcels per landowner also steadily increased over the decades, from 4.0 parcels in 1931 to 7.5 in 2007. This was due partially to the decrease in the number of unique landowners, but also was a result of the fragmentation of parcels over the decades. Parcels were frequently divided as they were sold or as mineral leases were granted. The average parcel size decreased by 13% over the decades, from 270 acres to 235 acres.

2a) Land ownership by individuals and families has declined, while corporate land ownership has risen.



▲Fig. 4 illustrates the dramatic increase in corporate landownership from 1931 to 2007. The large block of green sections on the southern border belonged to a single oil company in the ‘30s, but corporate land ownership gradually spread throughout the county as agricultural corporations moved in and long-term landowners formed their own companies to mitigate risk. The northwestern land set aside for the state school trust is still leased for ranching.

Fig. 5. ▶ The proportion of private landownership has decreased in relation to corporate landownership. Federal land increased in the late 1930s when the government began purchasing failed cropland.

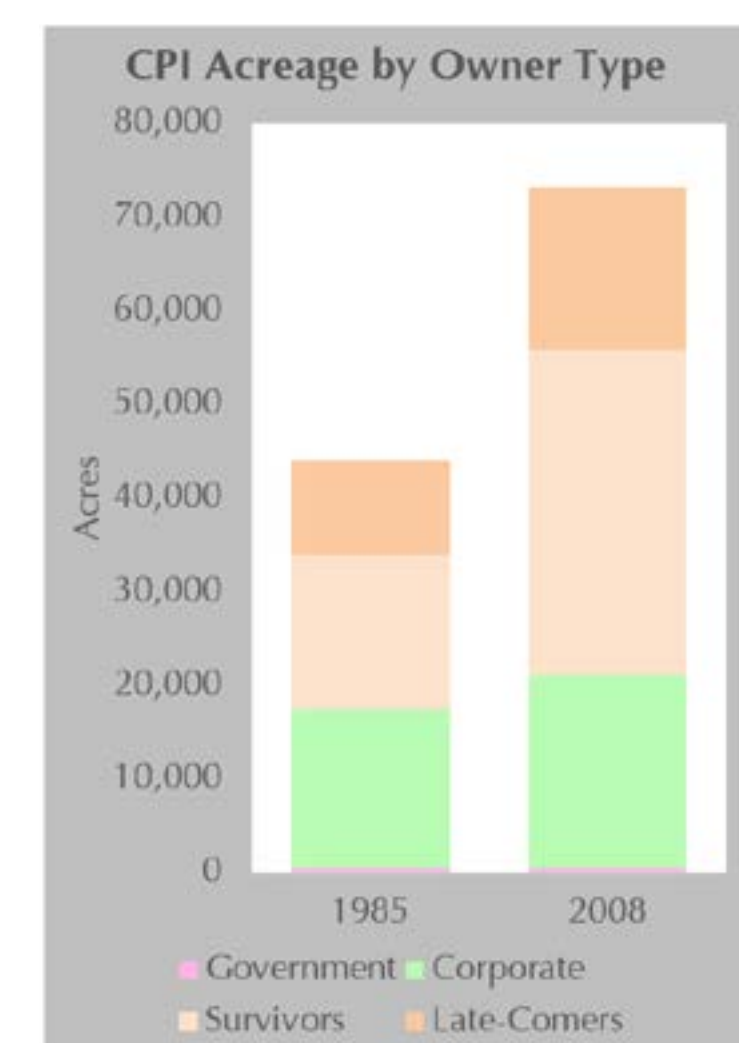


2b) Families can be grouped into common narratives describing their fate after the 1930s.

	Emigrants	Declining Survivors	Steady Survivors	Risk-Taking Survivors	Late-Comers	Corporations
Class Description	Left in 1930s	Survived ‘30s and sold some land	Survived ‘30s and did not change landholdings	Survived ‘30s and acquired more land	Arrived in 1946 or later	Number of unique companies in 2007
Number of families	432	353	32	108	904	135 corporations
Percent of all unique families	21%	17%	2%	5%	44%	60% of all unique corporations

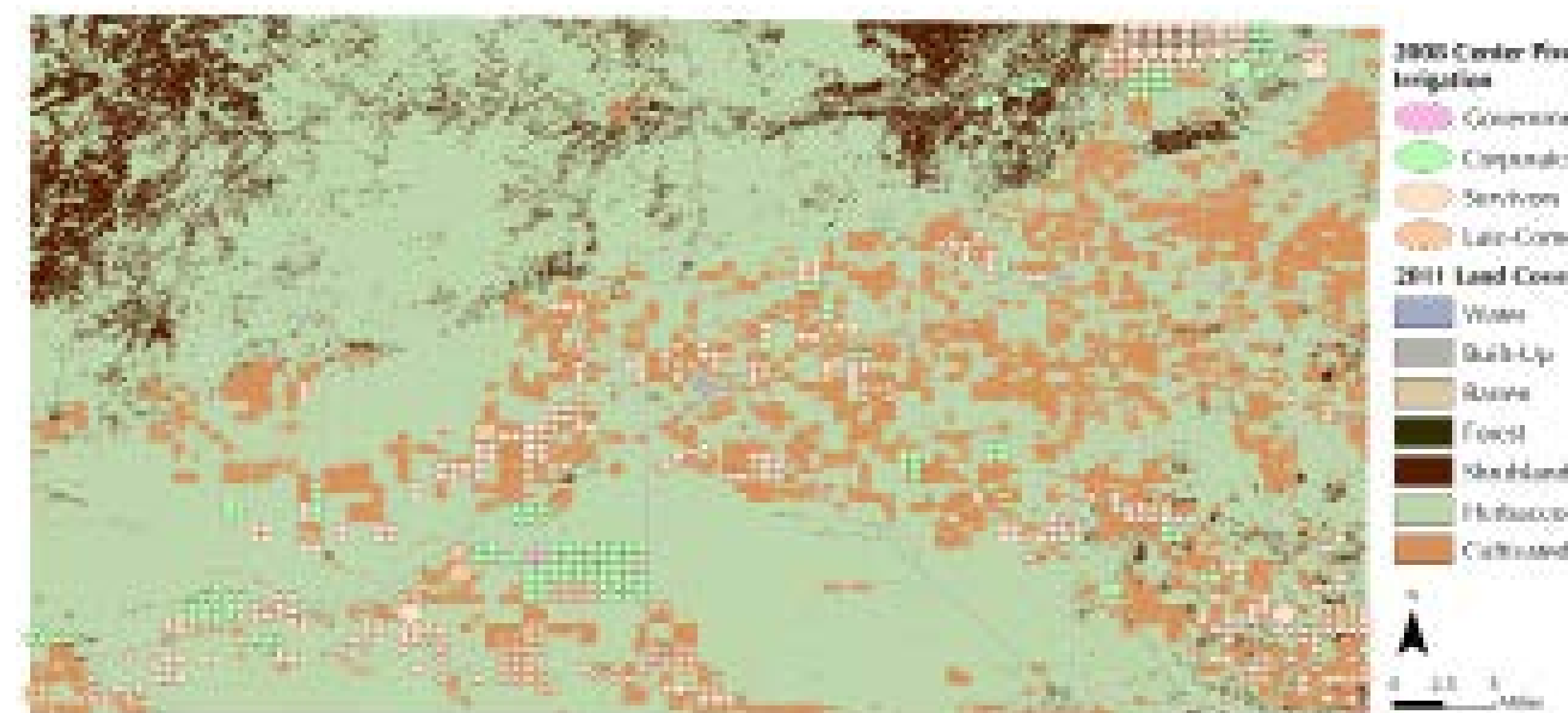
◀Table 1. We identified 2,062 unique families that owned land in Cimarron County during our study period. One in five families appeared only on the 1931 plat, while less than half first appeared in 1946 or later. Of the families that survived the Dust Bowl and Great Depression, the most common narrative was the Declining Survivor, which sold off portions of their land in subsequent decades.

2c) Center pivot irrigation (CPI) was rapidly adopted by corporations, with private landowners soon following.



◀Fig. 6. By the 1980s, corporate landowners had aggressively adopted center pivot irrigation, with 18.2% of that group’s landholdings having CPI installed. Only 6.7% of private landholdings had adopted CPI in 1980, but this rose to 15.8% by 2008. In 2007, Survivors held about twice the acreage of Late-Comers, but there was no significant difference in CPI usage between the two groups. Each had adopted the technology on about 8% of their land.

Fig. 7. ▶ CPI was distributed through most of the county, with the exception of state lands in the northwestern corner. (Source: Wenger et al. 2017, Fagin et al. 2016)



3) Families with large 1930s landholdings were more likely to survive into later decades.

Table 2. ▶ Families with over 640 acres (1 sq. mile) of Cimarron County landholdings in the 1930s remained in the county for an average of 18 additional years, compared to those with smaller landholdings (t=13.04, p<0.0001). The large landholders were 28% more likely to survive through the challenges of the 1930s, and 27% more likely to still own land in the county in 2007.

	Family’s Average Number of Years in County	Percent of Families Still Present in 1946	Percent of Families Still Present in 2007
Families Owning >640 acres in 1931	45	77%	44%
Families Owning <640 acres in 1931	27	49%	15%

DISCUSSION

Our initial finding that the number of landowners has decreased over the decades was not surprising, given the known exodus of landowners from the region in the midst of the Dust Bowl and the Great Depression. However, the rate of turnover in subsequent decades was unexpectedly high. Of the 2,062 unique families we identified, 42% owned land in only one decade’s plat; 58% appeared on only two decades’ plats.

The inequality in land ownership throughout all decades of our study period raised questions of constraints on expansion for those with smaller landholdings. With just under 4% of the landowners holding a majority share of the county’s acreage, farmers and ranchers may have been forced to lease fragmented parcels to make ends meet.

The increase in corporate landholdings was expected and reflects our interview findings. Only 16 corporations (mostly banks) owned land in 1931. By 2007, this number had increased to 135 corporations, with farming and ranching as the dominant industry. Federal lands increased in the late 1930s when the government began purchasing failed cropland, much of which eventually became the Rita Blanca National Grassland.

As shown in result 2b, most landowners in the earlier decades appeared to be risk-averse. Of the 2,062 unique families in the county, 21% left in the ‘30s and never returned, with another 17% decreasing their landholdings after the Dust Bowl. The small group of Risk-Taking Survivors represent a perspective cited by many interviewees, where the tenacity of a family’s grandparents drives the ambition in today’s landowners.

CPI, a critical technology to agriculture in a semi-arid county, was distributed throughout cultivated lands in the southern and eastern portions of the county. The lack of irrigation in northwestern Cimarron County reflects previous findings that state land lessees are reluctant to improve leased lands for fear of losing their lease, and therefore, any investments made to the land (Vadjunec and Sheehan 2010).

Our most notable finding, that families with a larger initial footprint survived in the county longer, perhaps mirrors trends found in other localities and helps explain the grit observed in survivor families. However, as corporations acquire increasingly large landholdings in the county, questions are raised about the survivability of families in decades to come.

SCOPE & LIMITATIONS

One limitation of our research relates to our finding that corporate land ownership has increased in recent decades. We are unable to delineate between large new-comer corporations and small businesses established by local families. Interviews confirm many families have established partnerships or LLCs to mitigate risk of financial loss or litigation. Additionally, the types of corporations have shifted over the decades from resource extraction to primarily agricultural today.

Using last names as a proxy for families introduced some potential error, particularly in common last names such as “Smith” or when names changed in marriage. However, our results do illustrate the importance of family landholdings that may have developed a “dynasty effect” as parcels were passed down through generations.

Future investigations related to this research include an examination of how state land ownership constrains the expansion of individual landholdings in areas adjacent to state land, since nearly a quarter of county land is state-owned. Further, we intend to implement hydrology data in our analysis to determine what role aquifer access may have in land retention and family survival. In a semi-arid region where farming plays such a critical role, we hypothesize that parcels with a more dependable groundwater supply will retain long-term owners and potentially promote more aggressive landholding expansion.

ACKNOWLEDGEMENTS

We thank the Cimarron Heritage Center and residents of Cimarron County for providing historical plats and Teddy Breig for map digitizing efforts. This research has been funded by a National Science Foundation (NSF) research grant (RCMM-1266381: Vadjunec, Phillips, & Fagin). Any opinions, findings, and conclusions or recommendations expressed here are those of the authors and do not necessarily reflect the views of our funders.

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