

WYOMING'S CHANGING AGRICULTURAL LANDSCAPE

DEMOGRAPHIC TRENDS AMONG FARM AND RANCH OPERATORS, 1920-2007

UCROSS HIGH PLAINS
STEWARDSHIP INITIATIVE

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 UCROSS
FOUNDATION

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Wyoming's Changing Agricultural Landscape: Demographic Trends Among Farm and Ranch Operators, 1920-2007 © UHPSI 2014 (Adapted from posters)

The Ucross High Plains Stewardship Initiative (UHPSI) is a collaborative effort between the Yale School of Forestry and Environmental Studies and the Ucross Foundation of Clearmont, WY. UHPSI seeks to support land stewardship on the High Plains of the Western United States by enhancing traditional wisdom and intuition with science-based land management solutions. More information is available at <http://highplainsstewardship.org>

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OVERVIEW

Wyoming, like many of the Western states, maintains its share of beautiful landscapes. Wide open range-land stretches for miles between the Bighorn and Rocky Mountain ranges, dotted with livestock, quiet villages, and the sound of wind passing through sagebrush. These High Plains are at once majestic and unforgiving, though it's here on the land that Wyoming's history lies. While in recent decades its economy has been largely supported by extractive industries, the State has traditionally relied on its agricultural roots. Since its earliest days, the 44th state has been home to farmers and ranchers who have worked hard to coax their livelihoods from this rugged land.

You will likely recall that over the last hundred and fifty years, people across America have traded life on the land for that of the city. Early naturalists and ecologists, such as Henry David Thoreau and Aldo Leopold, wrote of this shift. Today, those who are still connected to the land continue to bear witness to this trend. Wendell Berry, an environmental activist and farmer, reminds us that "A deep familiarity between a local community and the local landscape is a dear thing, just in human terms. It's also, down the line, money in the bank because it helps you to preserve the working capital of the place." While on the surface it's easy to embrace Berry's sentiments, land-based occupations can be financially taxing, effectively pushing that deep familiarity far out of reach.

Over the last 100 years, Wyoming has seen dramatic shifts in its local farming and ranching communities. As these ways of life have become less lucrative in the face of technological development and an under appreciation of the land, younger generations have not followed in their parents', grand parents', and great grand parents' footsteps to the same degrees as in the past. As farm and ranch operators grow older, we face a fundamental challenge in how to maintain their knowledge, wisdom, and ultimately, the State's cultural heritage.





Management of rangeland in Wyoming was traditionally done by property owners who, together with their families and local communities, made a living growing crops and grazing livestock. As farm and ranch operators age, however, we will begin to see a shift towards professional management. Those who make farming and ranching their business will be brought in to provide expertise where younger generations have no time, interest, or investment. With this shift comes risks associated with loss of knowledge, loss of tradition, and loss of investment that stem from a deep rooted sense of place.

In order to provide useful management recommendations, researchers at the Ucross High Plains Stewardship Initiative (UHPSI) have sought to embrace research topics that support the triple bottom line – social, economic, *and* environmental sustainability. To improve the returns, yields, or health of one bottom line to the detriment of another, provides little resiliency over time. The health of an agricultural business or landscape is nothing if there is not also a healthy citizenry to care for and appreciate it, and a healthy economy to ensure the citizenry and landscapes receive the recognition, compensation, and use they deserve. To better understand socially responsible land management in Wyoming, and to visually highlight the widespread trends noted above, UHPSI presents here a demographic analysis of the State's farm and ranch operators.

Native residents of Wyoming may be familiar with the Census of Agriculture conducted every five years by the U.S. Department of Agriculture's National Agriculture Statistics Service (NASS). In this study we have drawn on many decades of census statistics to develop cartographic and statistical representations of both county and state-level demographic trends. This data has been presented to resource managers operating at local, national, and international levels, from Sheridan, Wyoming to Washington, D.C.; from Sweden to the Ivory Coast. We believe it will lend important perspective to legislatures and economists in understanding the present state of farming and ranching communities in the Western U.S. and beyond.

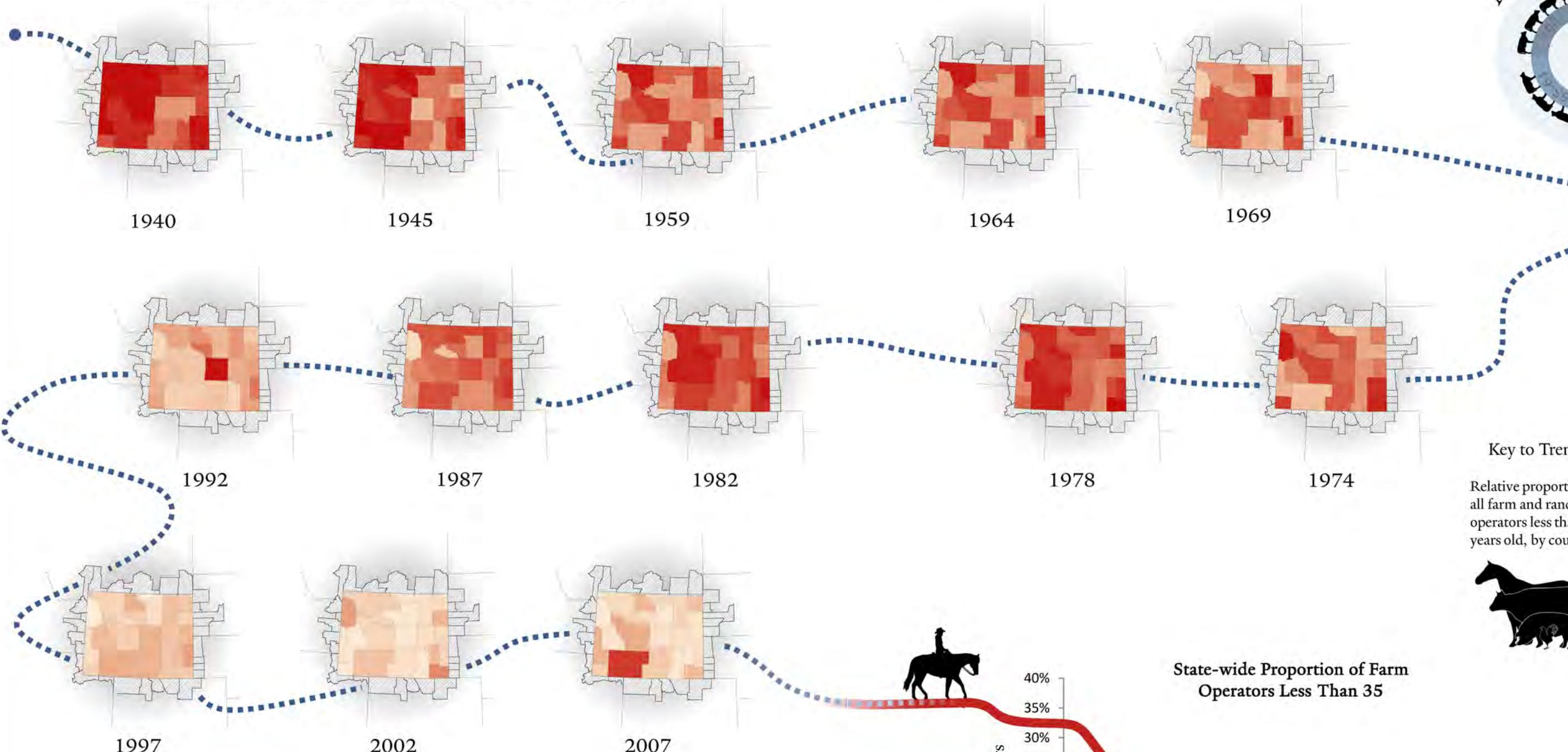
Given the most recent “back to the land” enthusiasm that has swept the country in the past decade, this is a time for optimism. Past trends have not spoken favorably for the future of Wyoming’s agriculture, but this may be a period of transition. The State’s well supported educational system is training new generations of critical thinkers, equipped with the tools and technologies that can make sustainable land management the norm. When the most recent (2012) census statistics become available, we may very well see a younger generation investing in, and taking up stewardship in healthy, productive, and resilient lives on the land.

TRENDS WITHIN AGE CLASSES AT COUNTY AND
STATE LEVELS, 1920-2007

Wyoming's Changing Agricultural Landscape

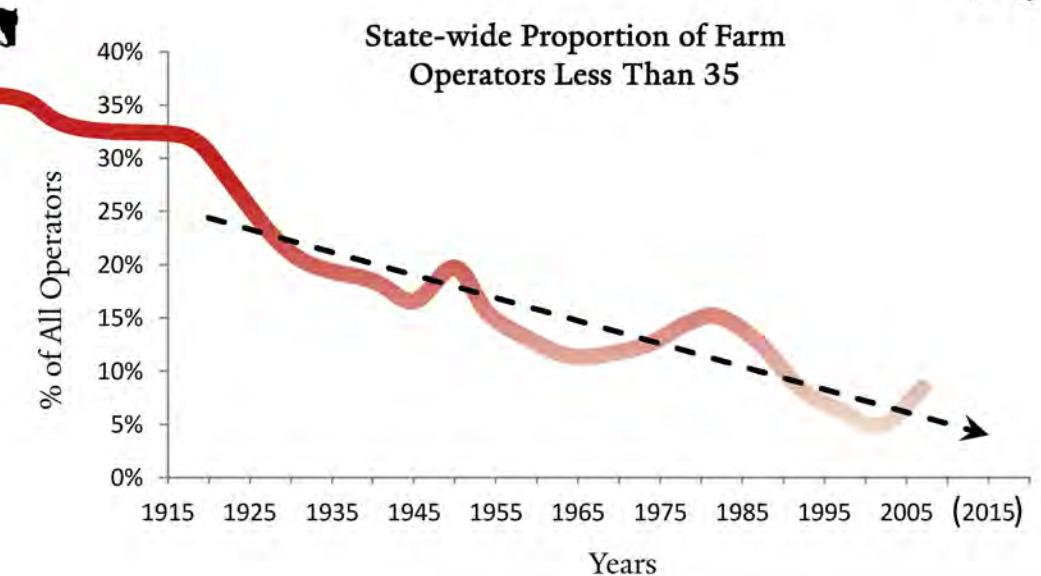
- County-Wide Trends for Ages 34 and Younger •

Age Analysis - Part I



Trends in the Proportion of Farm Operators Ages 0-34

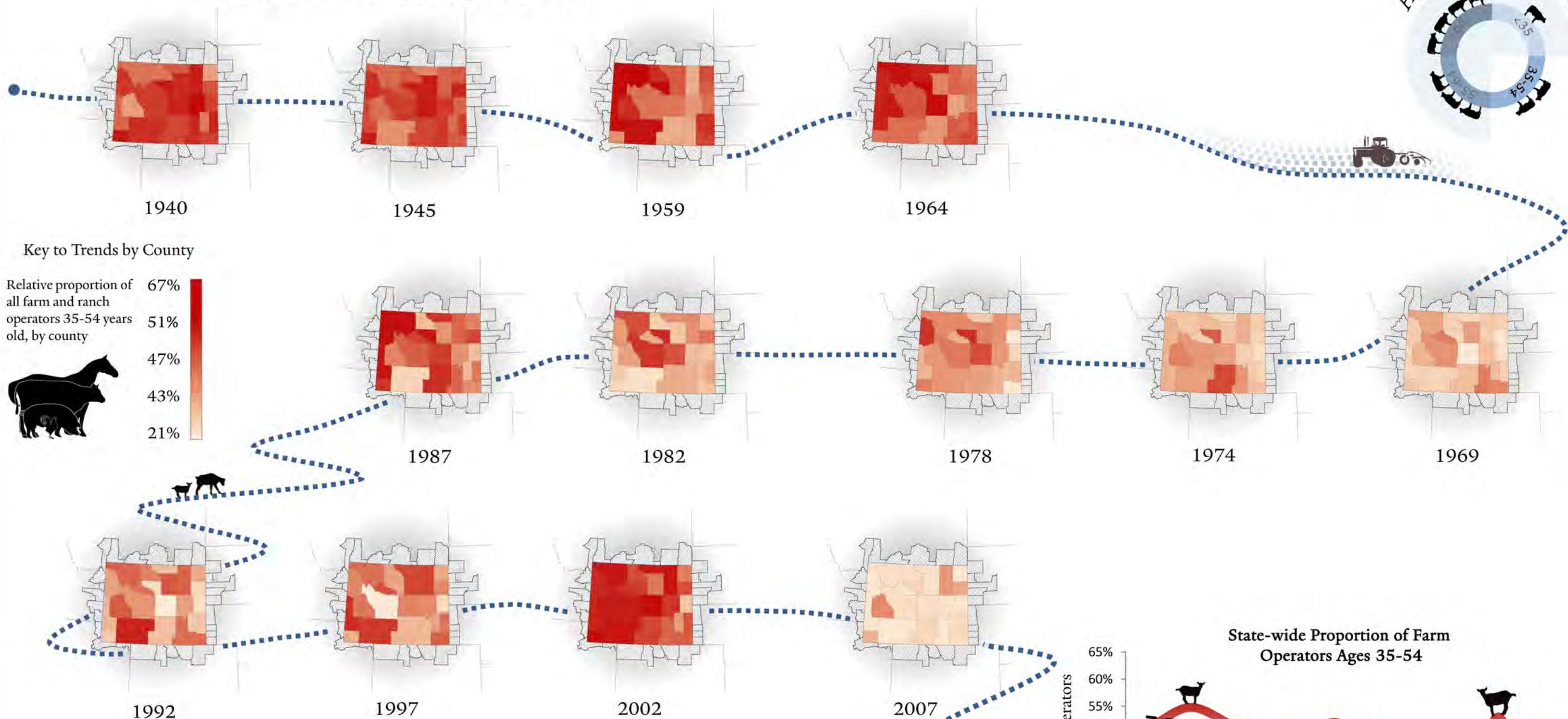
- Here we illustrate the declining proportion of young farm operators in Wyoming at both county and state levels. Since 1920, fewer and fewer residents below the age of 35 have followed in the footsteps of senior generations. This sharp decline in the relative proportion of young farmers suggests that the state's agricultural heritage is at risk. Where fewer young farmers and ranchers take part in these age-old livelihoods, agricultural operations may change direction. As local involvement dwindles, agricultural enterprises may shift into the hands of managers who make farming their business, but who may not share the same investment in Wyoming or its agricultural roots, as has been exhibited by prior generations. •
- Linear least-squares regression indicates that 80% of the variability in the proportion of young farmers can be explained by time, with -0.22% change per year. If the current trend continues, there will be no farm or ranch operators younger than 35 by the year 2034. •



Wyoming's Changing Agricultural Landscape

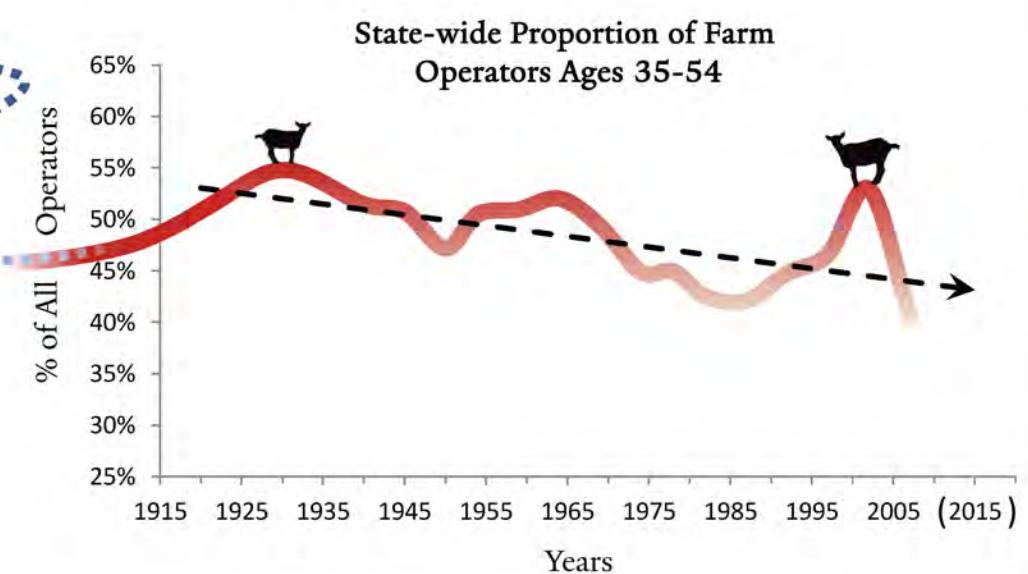
• County-Wide Trends for Ages 35-54 •

Age Analysis - Part II



Trends in the Proportion of Farm Operators Ages 35-54

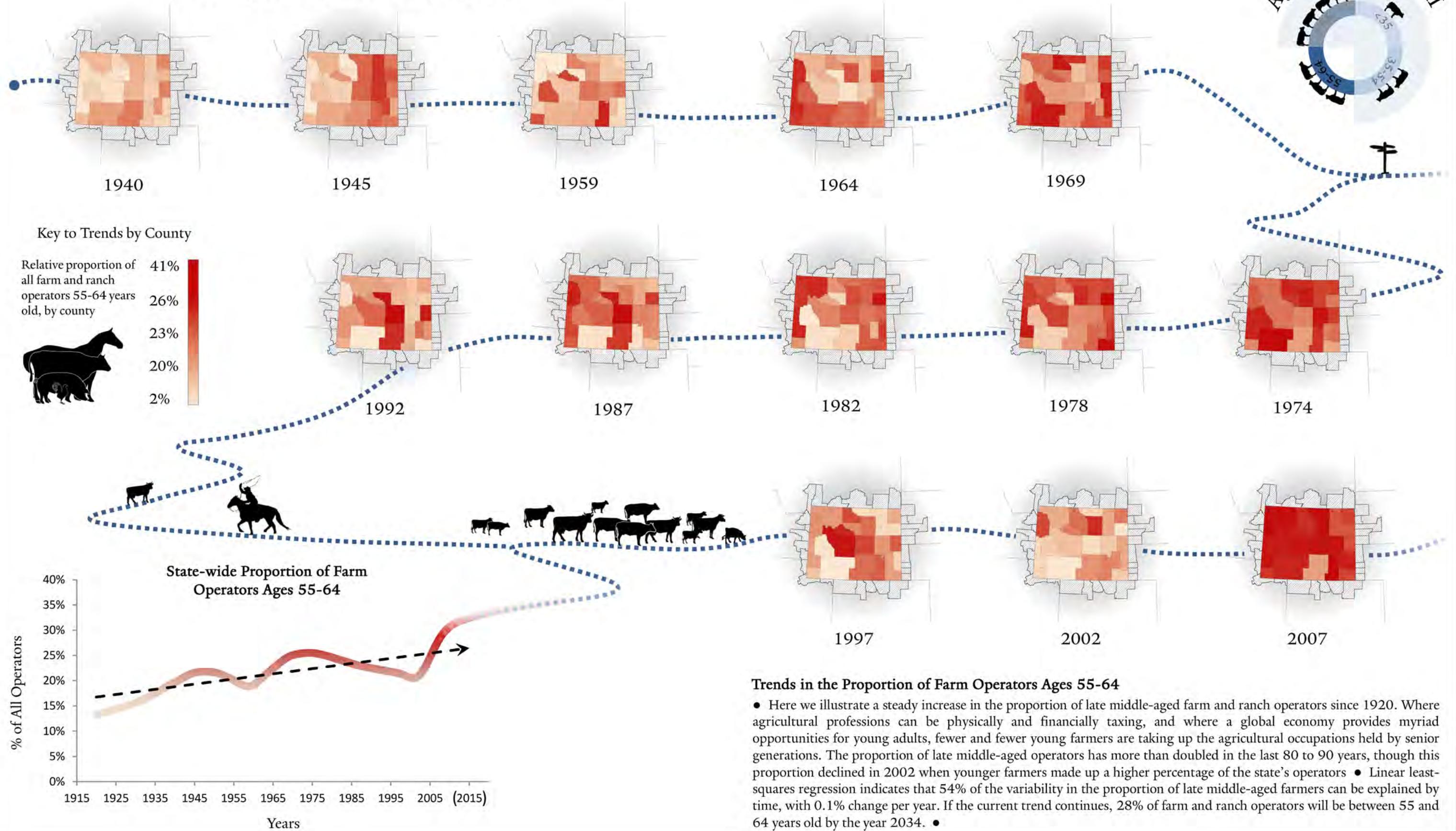
- Here we illustrate the slight decline in the proportion of early middle-aged farm operators across Wyoming. The state-wide trend is negative, but since 1920 there have been several periods where this age group has made up more than half of the farming community. In 2002 the proportion of early middle-aged farmers increased markedly. Whether this is a function of an increase in farmers of this age class, or a decrease in total number of farmers overall, has not yet been assessed. State-wide trends are likely influenced by a variety of economic and socio-political factors, including a nation-wide resurgence in agricultural enthusiasm among young adults in the last decade.
- Linear least-squares regression indicates that 40% of the variability in the proportion of young farmers can be explained by time, with -0.1% change per year. This is a relatively low degree of correlation, and forecasted figures provide little insight into the future. That said, if the current trend continues, 41% of farm and ranch operators will be between 35 and 54 years old by the year 2034.



Wyoming's Changing Agricultural Landscape

• County-Wide Trends for Ages 55-64 •

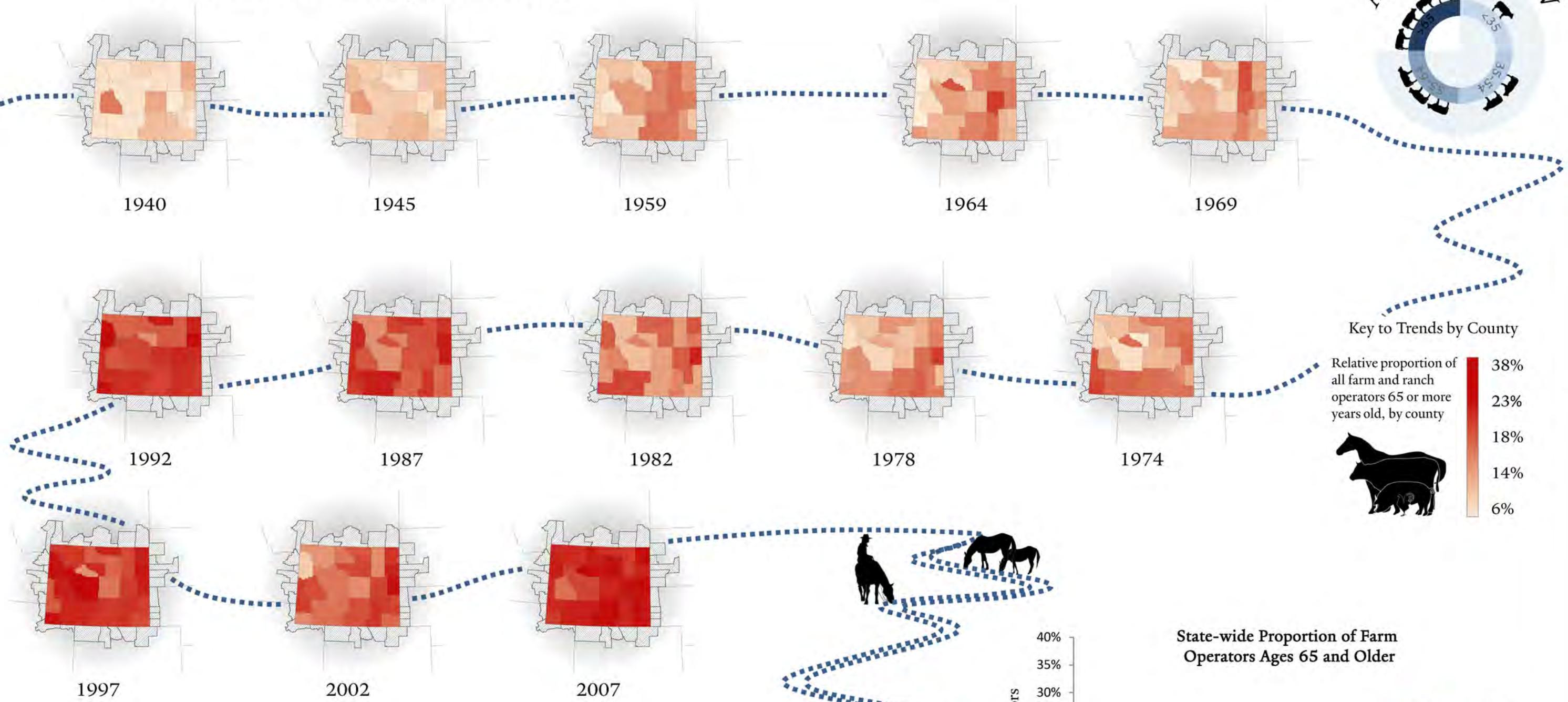
Age Analysis - Part III



Wyoming's Changing Agricultural Landscape

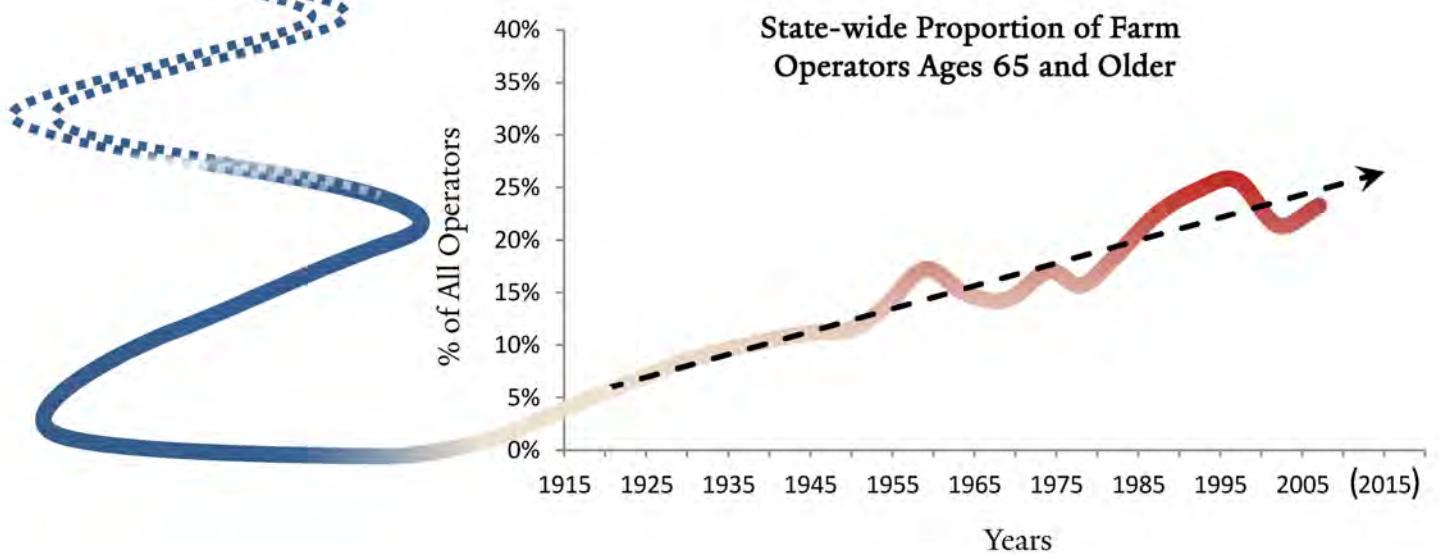
- County-Wide Trends for Ages 65 and Older •

Age Analysis - Part IV



Trends in the Proportion of Farm Operators Ages 65 and Older

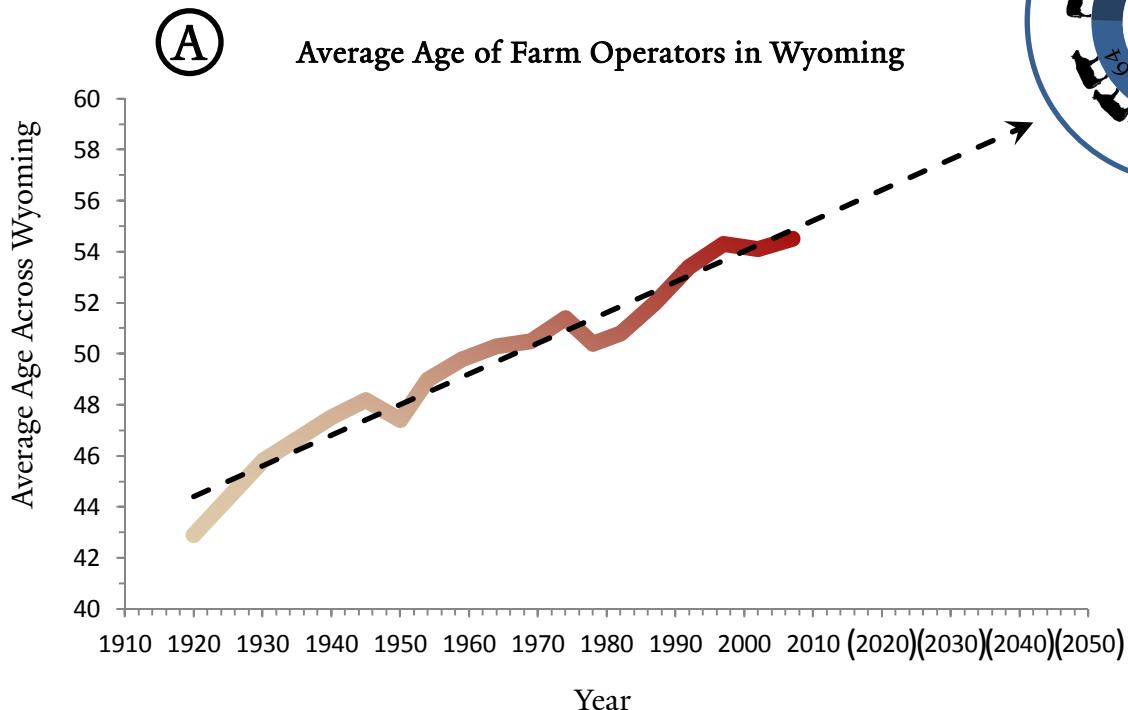
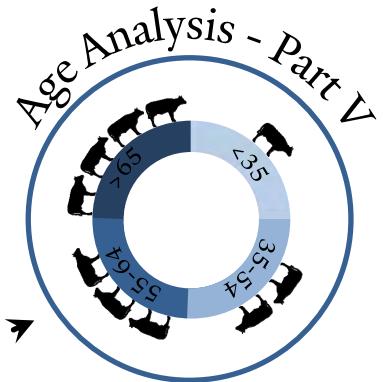
- Here we illustrate a significant increase in the proportion of senior farm and ranch operators since 1920. Over roughly 70 years, this age group has more than quadrupled its relative presence in Wyoming's state-wide farming community. While health care has improved and average lifespan has increased since the early 20th century, much of this trend can be attributed to a decline in younger operators. As these older operators begin to retire, we are left wondering who will replace them.
- Linear least-squares regression indicates that 90% of the variability in the proportion of senior farmers can be explained by time, with 0.22% change per year. If the current trend continues, 31% of farm and ranch operators will be at least 65 years old by the year 2034.



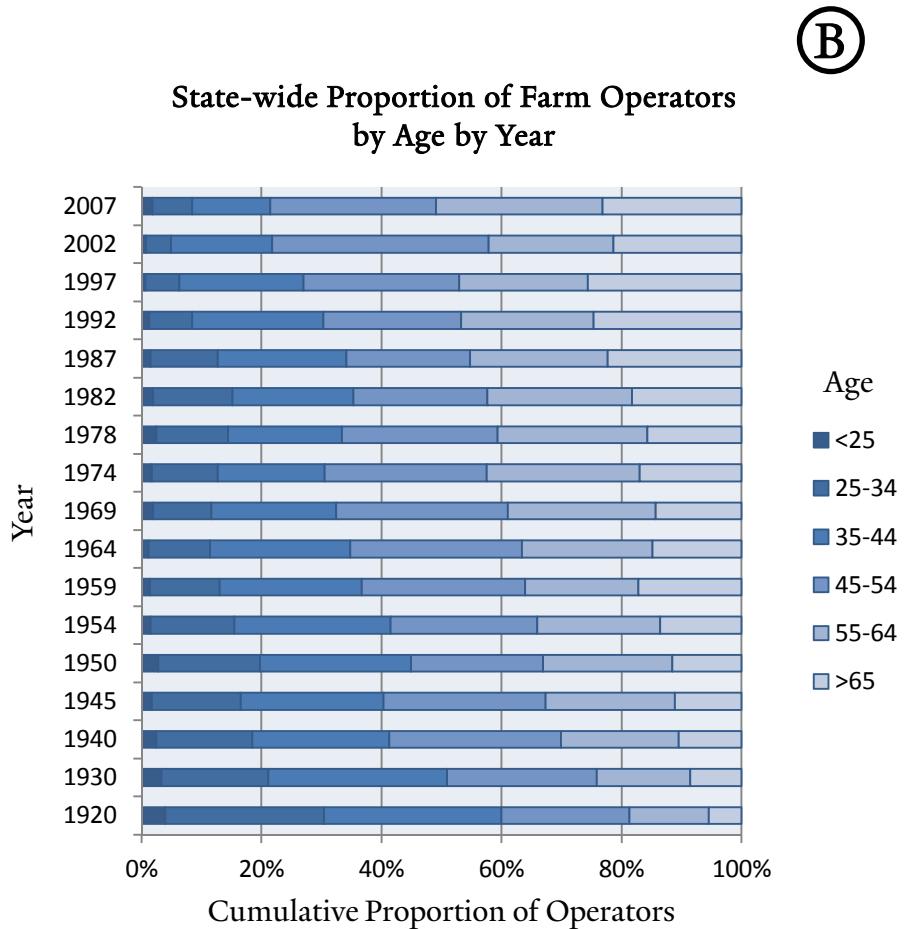
TRENDS ACROSS AGE CLASSES AT COUNTY AND
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Wyoming's Changing Agricultural Landscape

• Average Age and State-Wide Trends •

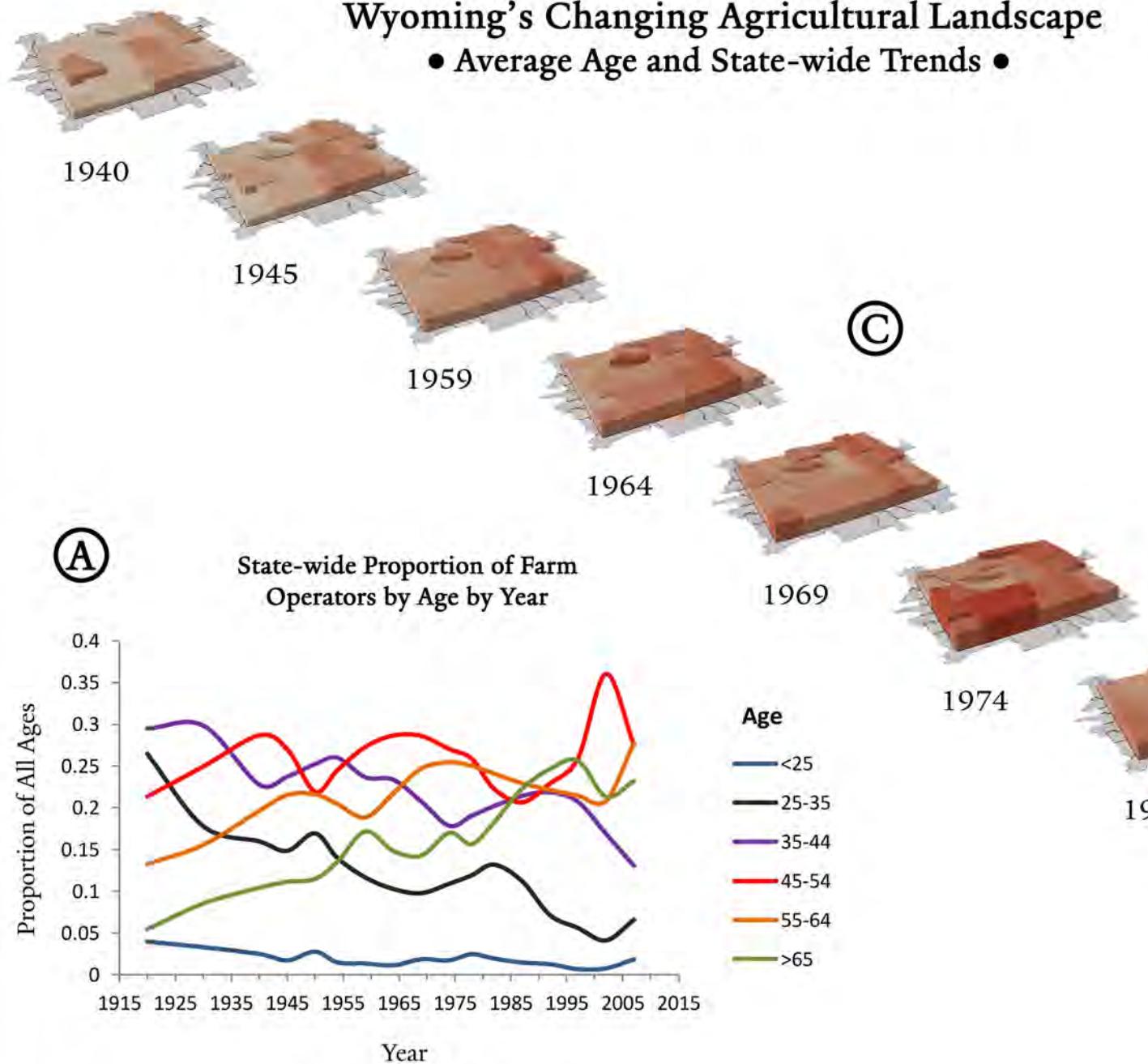


- Here we illustrate the state-wide trends for both the average age of farm operators and the proportion of farm operator age classes. **Figure A** summarizes all state-wide age statistics, highlighting the rapid increase in age that has come over time. Here, 95% of the variability in age can be explained by time, allowing us to predict into the future with moderate confidence. The average age is increasing at a rate of about a 1.5 months (~44 days) per year, and by 2050 we predict a 35% increase in age over operators from 1920. **Figure B** illustrates the proportion of each age class across Wyoming over time. This plot allows for easy comparison across years, helping to highlight longitudinal trends.



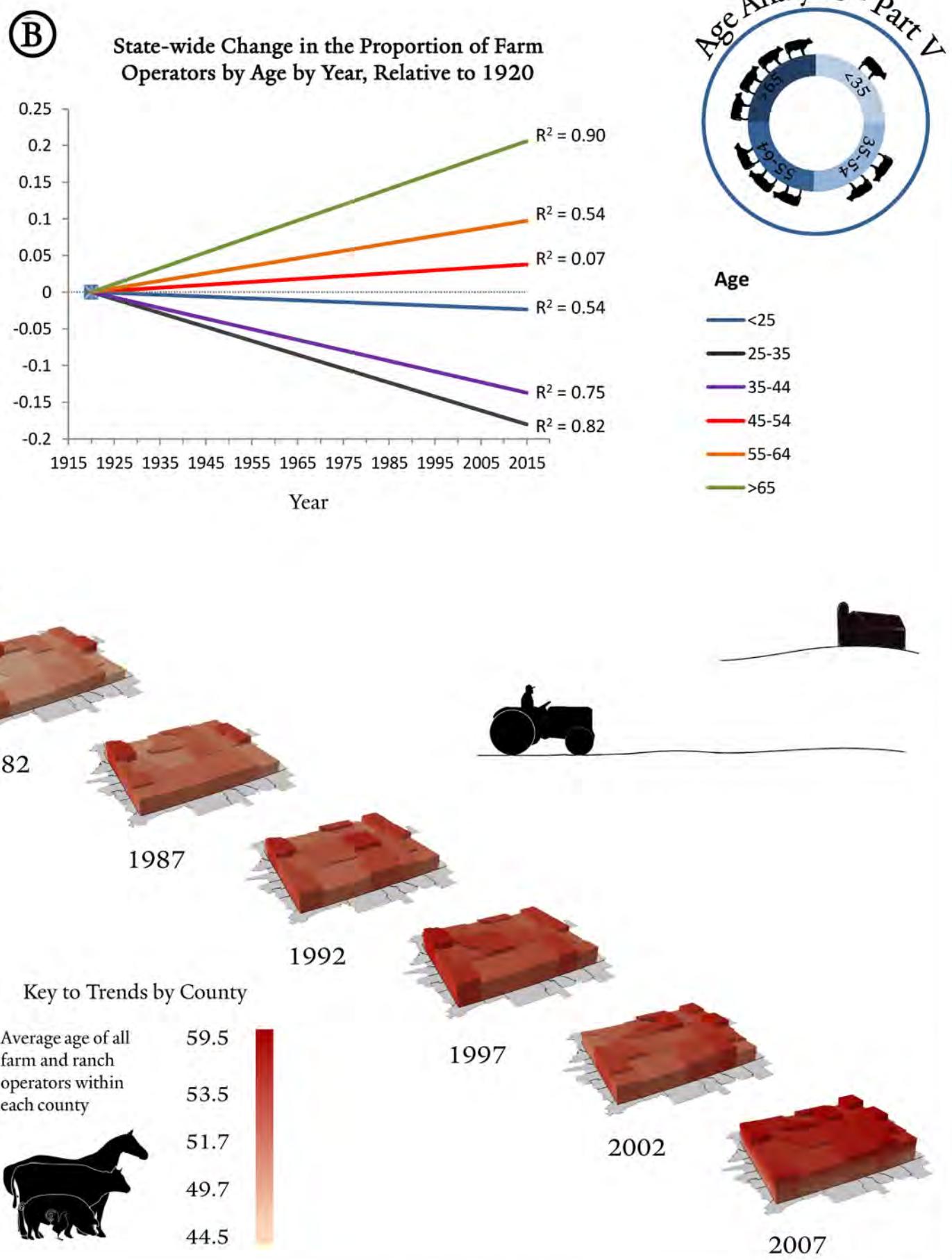
Wyoming's Changing Agricultural Landscape

- Average Age and State-wide Trends •



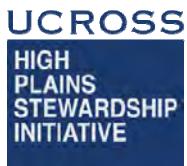
Trends in the Average Age and Proportion of Farm Operators Across Wyoming

- Here we illustrate trends for the average age of farm operators at county and state levels, and state-wide trends in the proportion of farm operator age classes. **Figure A** illustrates the relative proportion of each age class across the entire state over time. In **Figure B** the underlying trend for each of those age classes is modeled using linear least-squares regression, with respect to each class' proportion in 1920. Each regression model can be coarsely evaluated using a coefficient of determination (R^2 , 0 to 1 scale). Where a value of 1 indicates that 100% of the variability in the response variable (vertical axis) can be explained by the predictor variable (horizontal axis), and where a value of 0 indicates no correlation at all, we can consider the degree to which time explains the variability in age class proportions. The high R^2 for operators 65 and older indicates that a linear regression model is appropriate for this age class, while the low R^2 for ages 45-54 suggests that time alone cannot easily predict the changing proportions of this class. **Figure C** expands on Parts I through IV of this analysis by looking at the average age for each county through time in three dimensions. Here, both deeper shades of red and taller surfaces reflect greater age. •



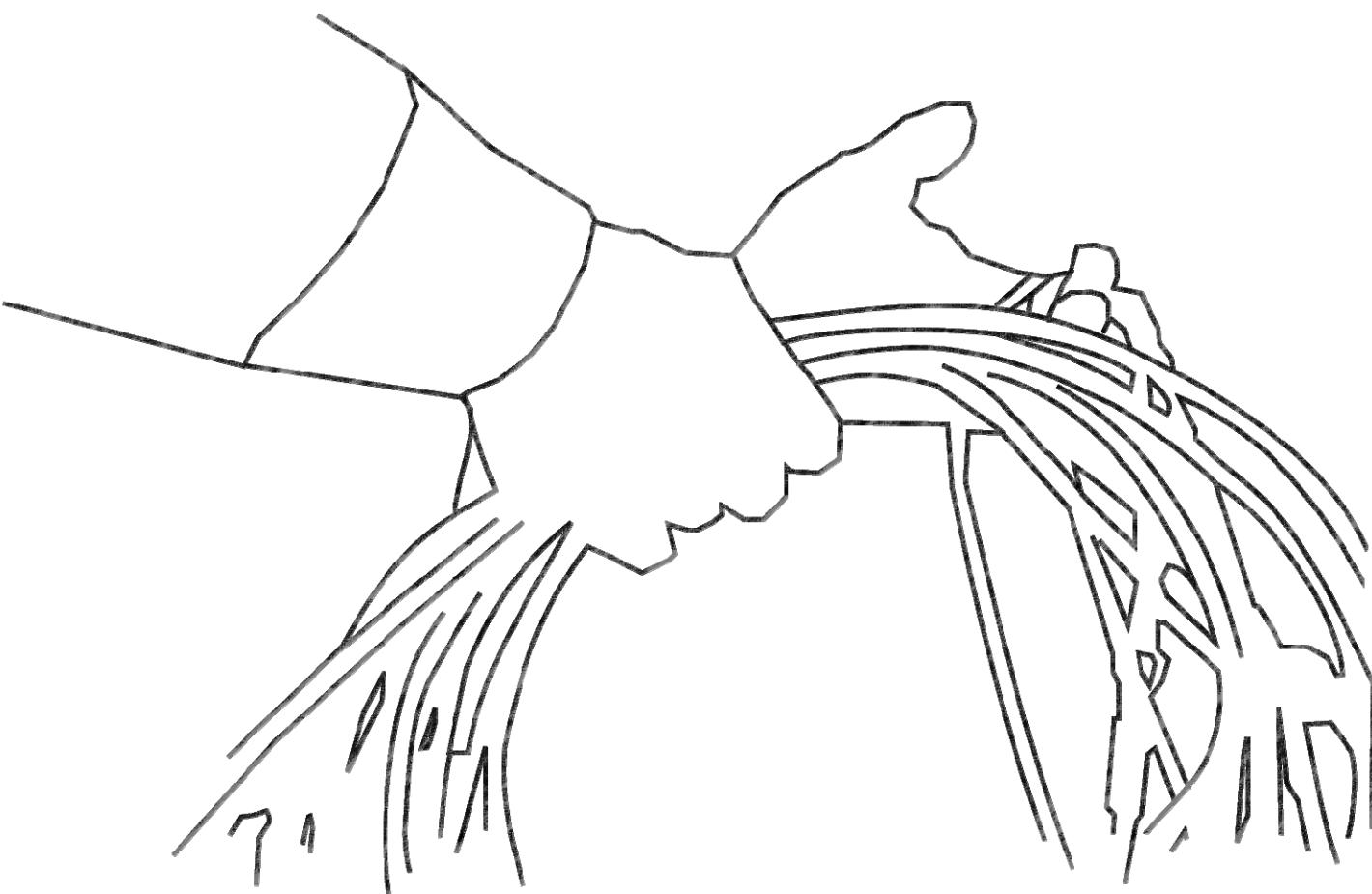


- Through the visuals presented in this publication, we are better able to assess Wyoming's agri-social landscape through time, and bring into focus the state's aging farming and ranching communities. If social action (e.g. community organization), political action (e.g. new legislation), and economic action (e.g. subsidies for new farmers) are not taken to inspire and support Wyoming's youth in taking up local agricultural occupations, the state's cultural heritage may soon become imperiled. •



The Ucross High Plains Stewardship Initiative, or UHPSI, is science-based research program focused on land stewardship in the American West. At its core, UHPSI seeks to expand current rangeland management practices to further embrace our ever changing ecological, social, and political landscapes with strength and resiliency. UHPSI was formed through the vision of Wyoming entrepreneur Raymond Plank, who was galvanized by his personal experiences to use his local landscape as a demonstration site for cutting-edge stewardship practices. At the heart of our work is the Ucross Ranch, a 22,000 acre working cattle and sheep ranch in Clearmont, Wyoming. The Ranch serves as a living laboratory where a highly collaborative team of students and alumni from Yale University's School of Forestry and Environmental Studies focus their efforts. Under the Direction of Pinchot Professor of Forestry and Environmental Studies Chad Oliver, the team works closely with local land managers and stakeholders, including the Ucross Foundation, Apache Foundation, and a suite of academic and political interests across the West.

More information can be found at: <http://highplainsstewardship.org>





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