

# THE UNIVERSITY OF ARIZONA® SANTA RITA EXPERIMENTAL RANGE



A Range  
of Discovery



COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES

# The Santa Rita Experimental Range



## History and Status



# Disclaimers

- I am not an accredited historian
  - Dilettante: “a person who cultivates an area of interest without real knowledge”



# Disclaimers

- I am not an accredited historian
  - Dilettante: “a person who cultivates an area of interest without real knowledge”
- **A lot of material here**
  - Some slides will be treated quickly... see PDF



# Disclaimers

- I am not an accredited historian
  - Dilettante: “a person who cultivates an area of interest without real knowledge”
- I’ve given this talk dozens of times but hate to give the same talk twice
  - Some slides will be treated quickly... see PDF
- I am in love with SRER, especially the early history
  - Consider this a “love letter”





**The Santa Rita Experimental Range history is closely tied to ranching in Arizona**

**Photo on SRER in 1922**

***Branding Calves***

Photographer unknown.  
May 23, 1922.



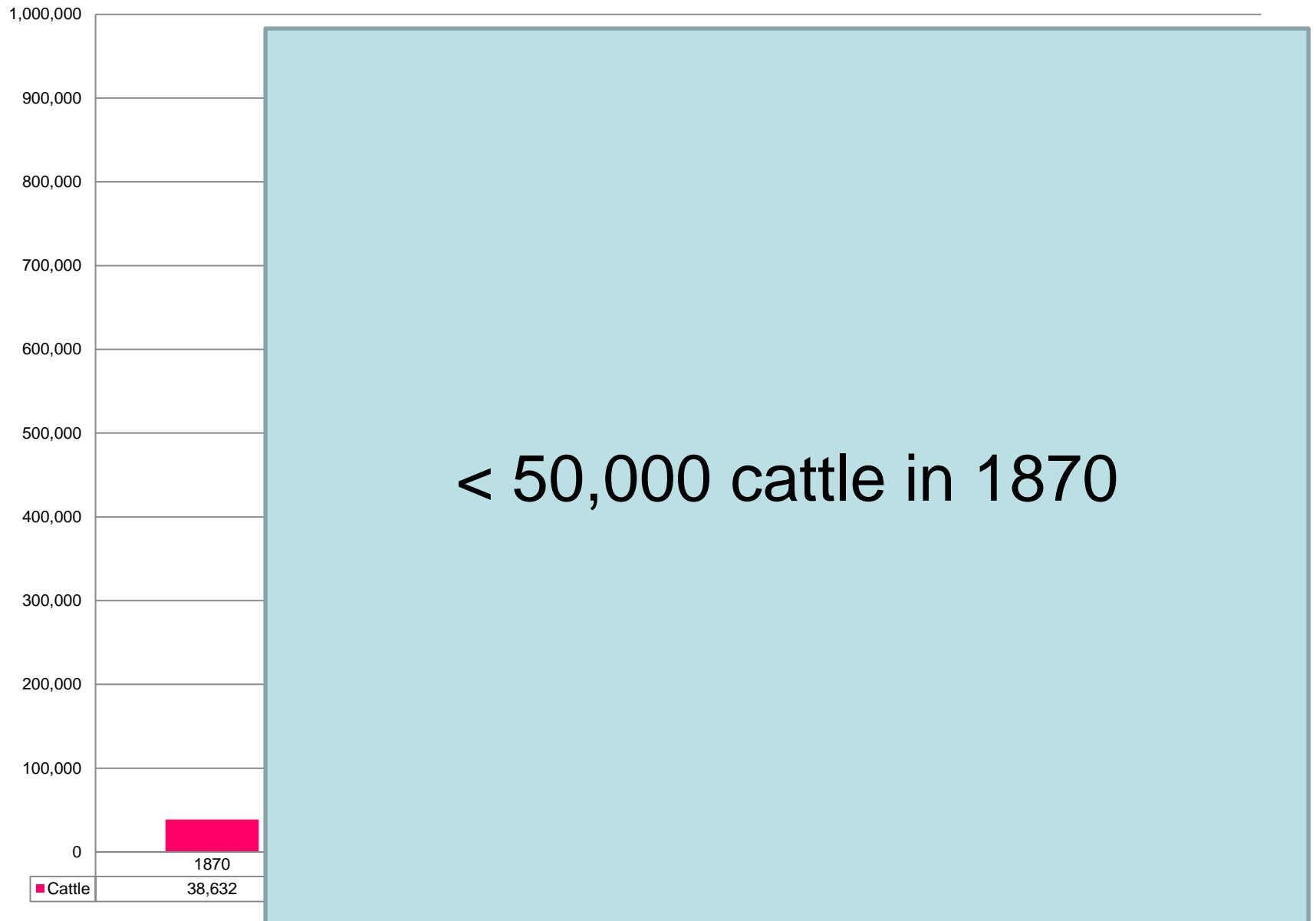
# Early livestock and ranching history influenced the establishment of SRER



Let's look at cattle numbers...

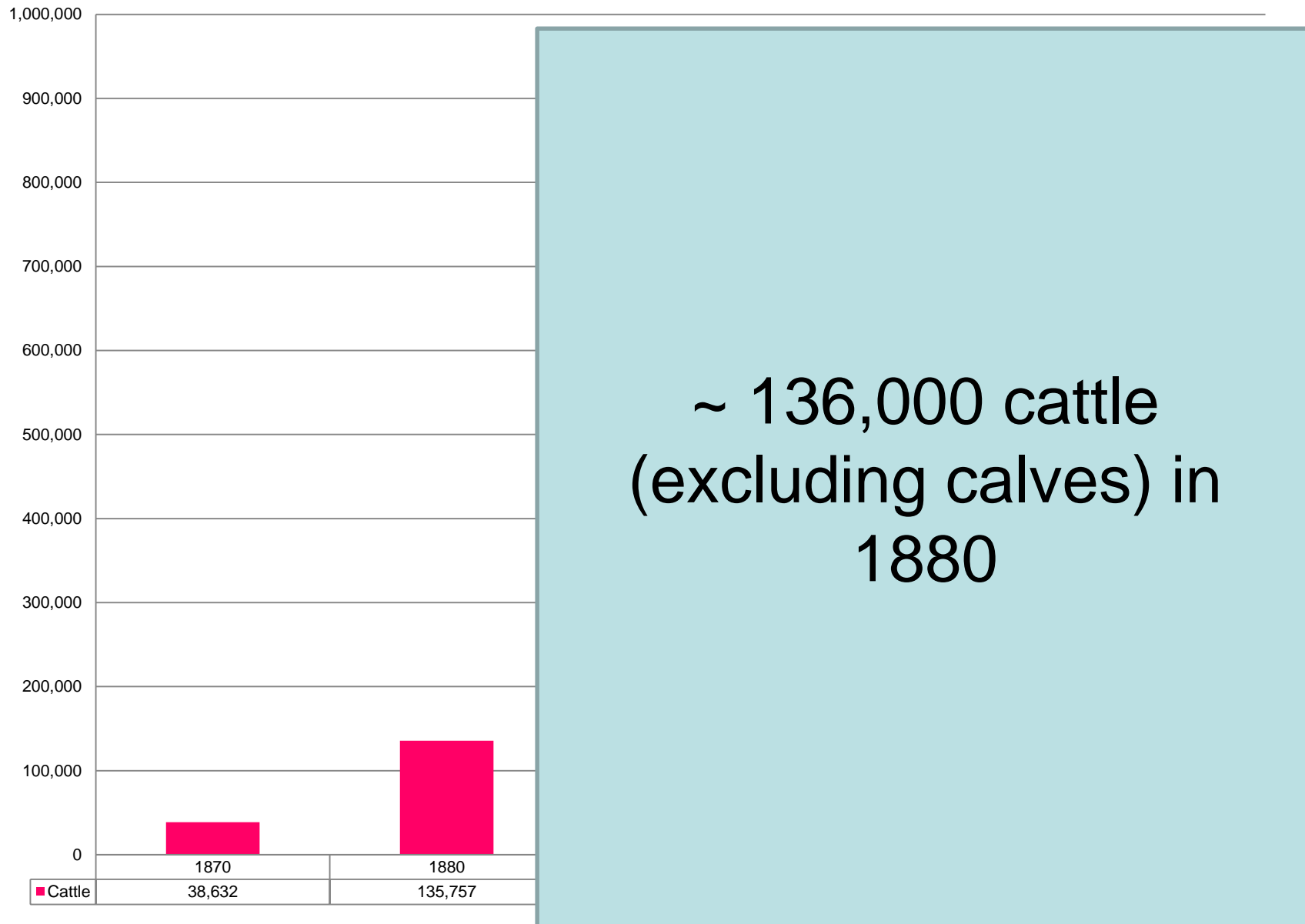


**AZ Cattle, U. S. Census**  
(cattle 1870, cattle excluding calves  
1880 - 1910)

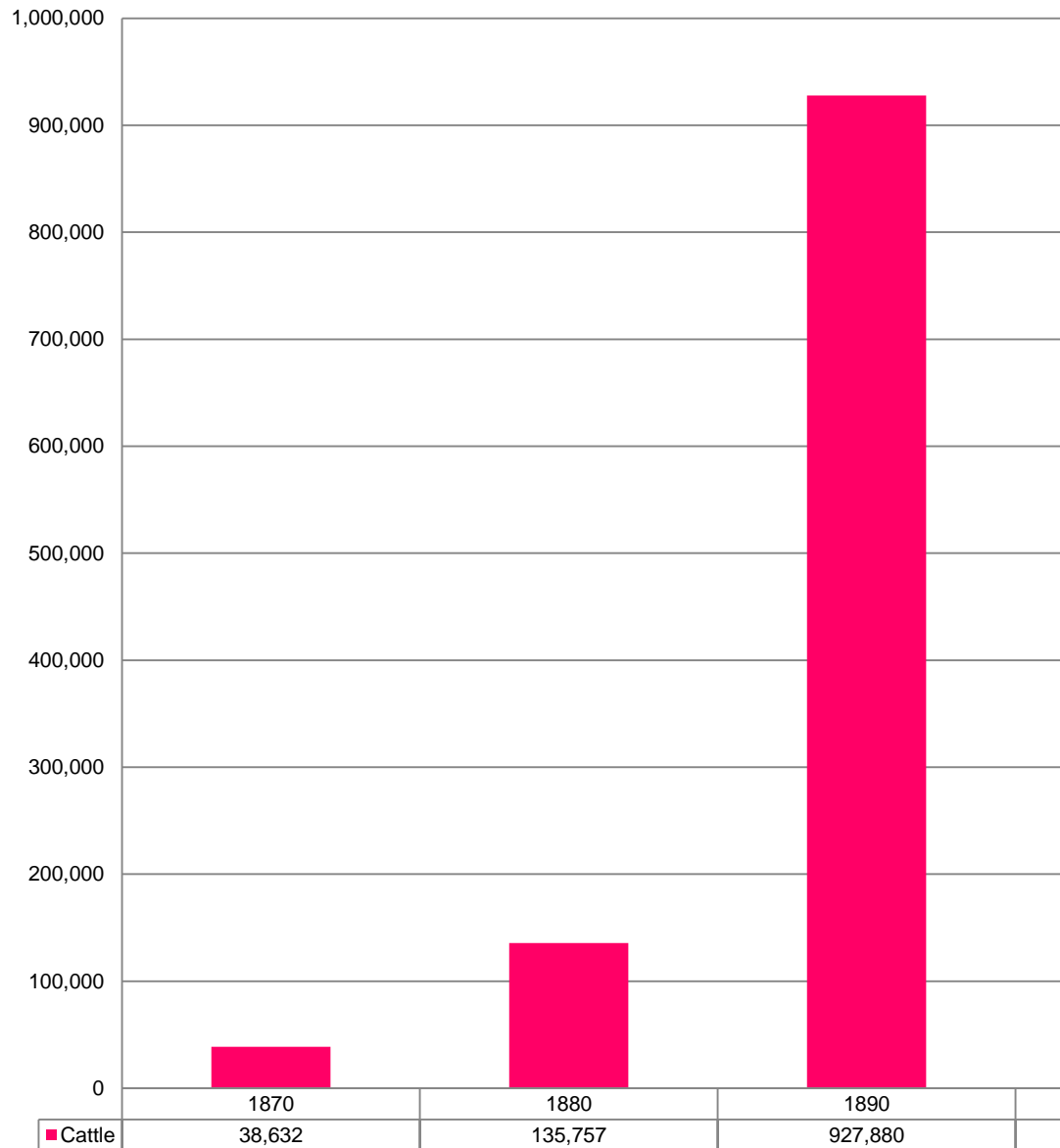




**AZ Cattle, U. S. Census**  
(cattle 1870, cattle excluding calves  
1880 - 1910)



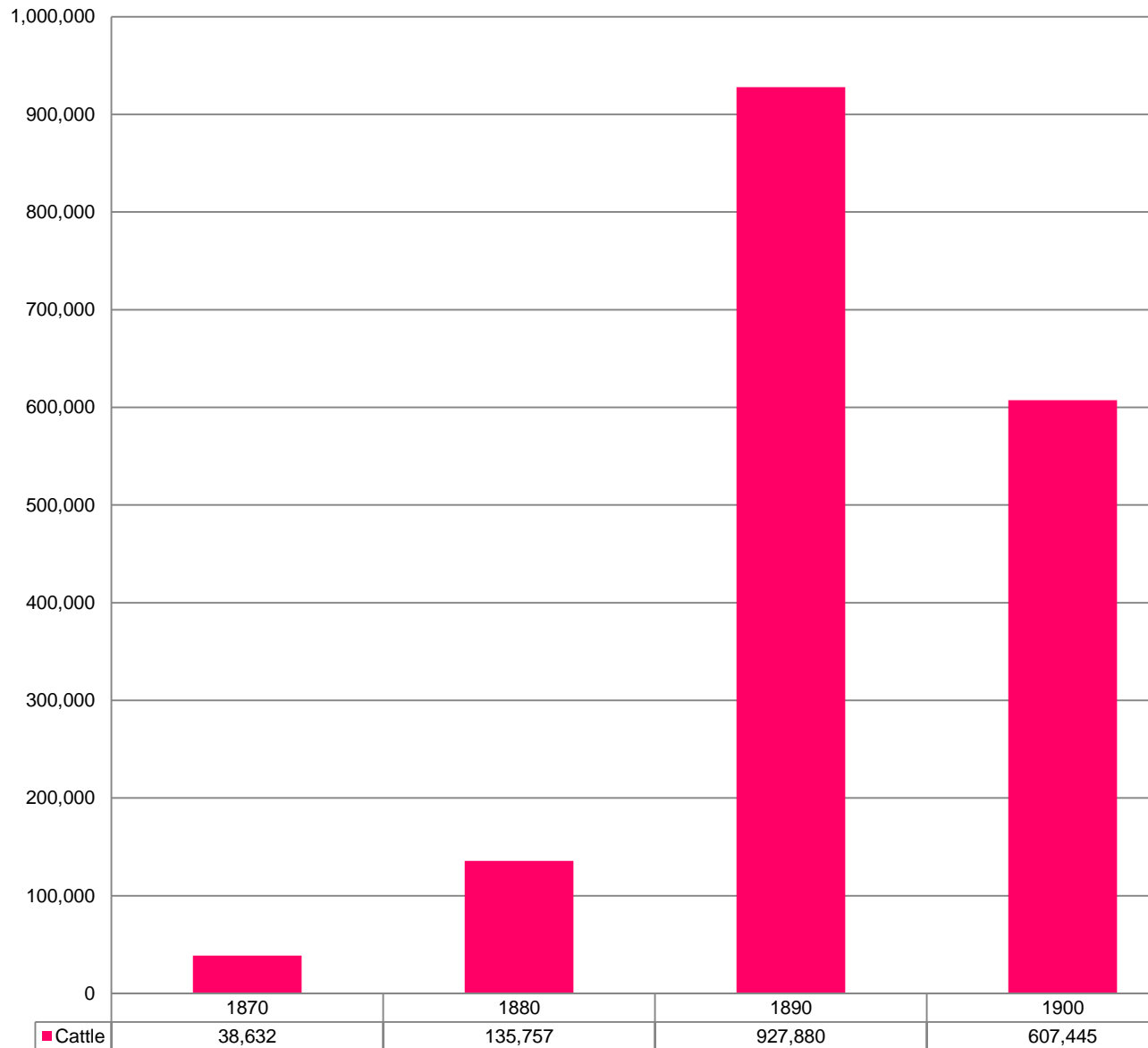
**AZ Cattle, U. S. Census**  
(cattle 1870, cattle excluding calves  
1880 - 1910)



**928,000**

**~ 1 million  
cattle  
(excluding  
calves) in  
1890**

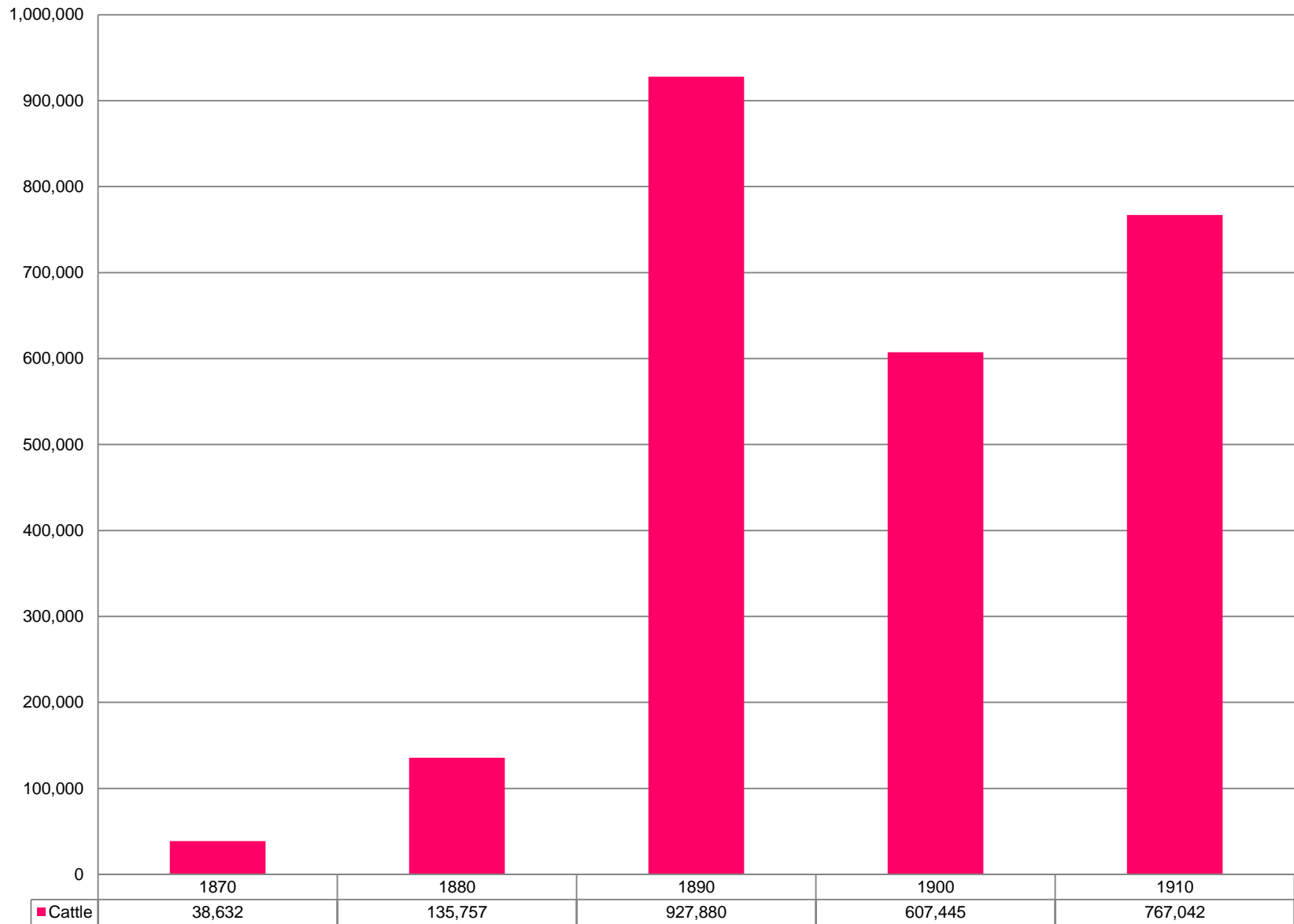
**AZ Cattle, U. S. Census**  
(cattle 1870, cattle excluding calves  
1880 - 1910)



~608,000  
(~230,000 decrease)

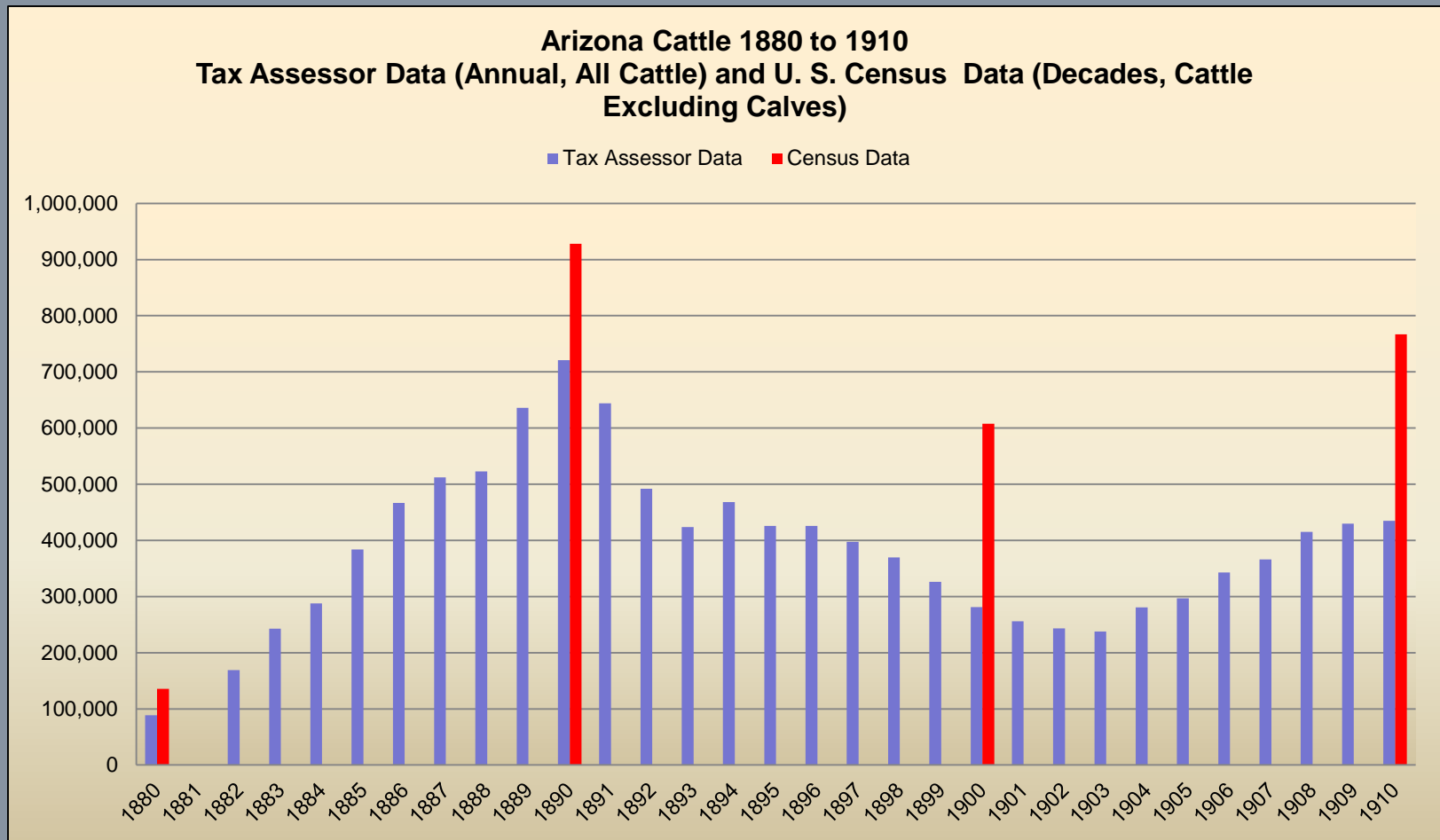
About one-third of the AZ cattle herd was gone

**AZ Cattle, U. S. Census**  
(cattle 1870, cattle excluding calves  
1880 - 1910)

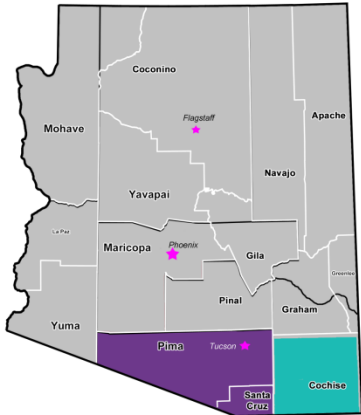


# AZ Governor's Reports give **Tax Assessor data.**

Note: reported for the fiscal year July – June.

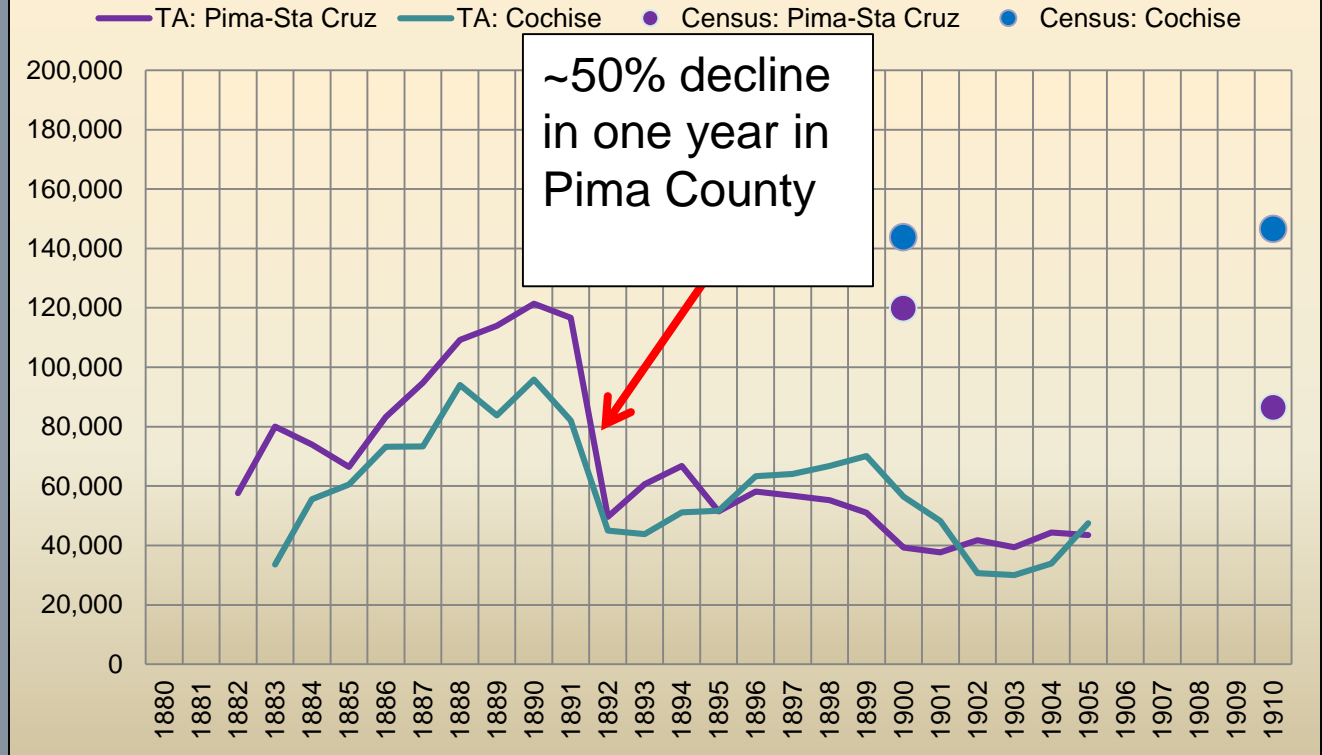


Tax assessor data suggest cattle in Arizona  
troughed in 1902 – 1903



Arizona counties grouped into sections. Current county lines in white, 1880 county lines, where different, in black. Santa Cruz County separated from Pima County, 1899.

### Cattle in Pima and Cochise Counties of Arizona Tax Assessor Data ("TA"), 1882 to 1905, Cattle) and U. S. Census, 1890 to 1910, Cattle Excluding Calves)



**1891 – 1892 cattle numbers decline ~50% in Pima County, almost as bad in Cochise County**







Cattle bones stacked for shipping at Vail's Siding near Rincon Mountains.

Photo by David Griffiths, 1902

Cattle bones were shipped to fertilizer plants



COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES



# Cattle bones stacked for shipping at Vail's Siding near Rincon Mountains.

Photo by David Griffiths, 1902

There is confusion in the historical literature regarding **how many cattle died and how many were slaughtered and shipped out.**



COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES





Cattle bones stacked for shipping at Vail's Siding near Rincon Mountains.

Photo by David Griffiths, 1902

R. Forbes wrote that near Willcox losses of cattle due to starvation were **15% to 50%**.



COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES

The cattle boom and bust helps us understand the establishment and early thrust of SRER research...





... particularly the historical narratives of ranching and grazing



# Arizona Cattle Boom and Bust... conflicting & inconsistent historical narratives

- “The primary objective of cattlemen was numbers”  
J. J. Wagoner, 1962, “Overstocking the ranges in southern Arizona during the 1870’s and 1880’s”

So, rancher greed was responsible!

Or was it?





# External investment drove cattle herd expansion

- 1870's and 1880's: ~\$284 million invested in western US ranching (Sayre, 1999)



# Cattle Die-off in the Great Plains added pressure in the SW

- 1883 – 1887: Cattle deaths in the Great Plains due to drought and blizzards left “much of the western ranching industry... lying in ruins...”  
Worster 1992



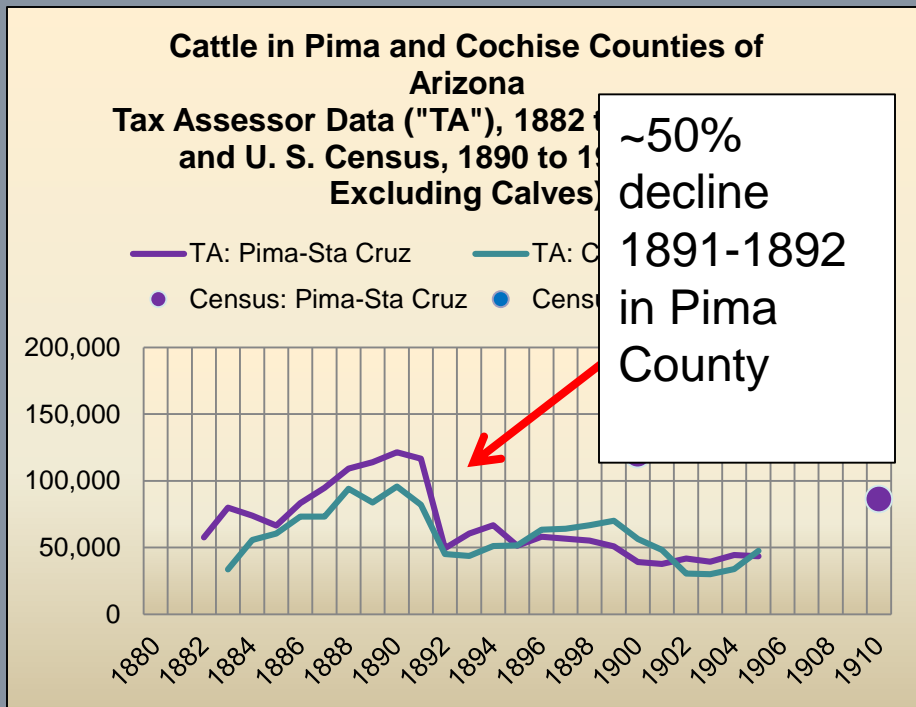
# Cattle Die-off in the Great Plains added pressure in the SW

- “...operators had little choice but to default or move, and **Arizona** was one of the last places where **free grass remained.**” Sayre 2002



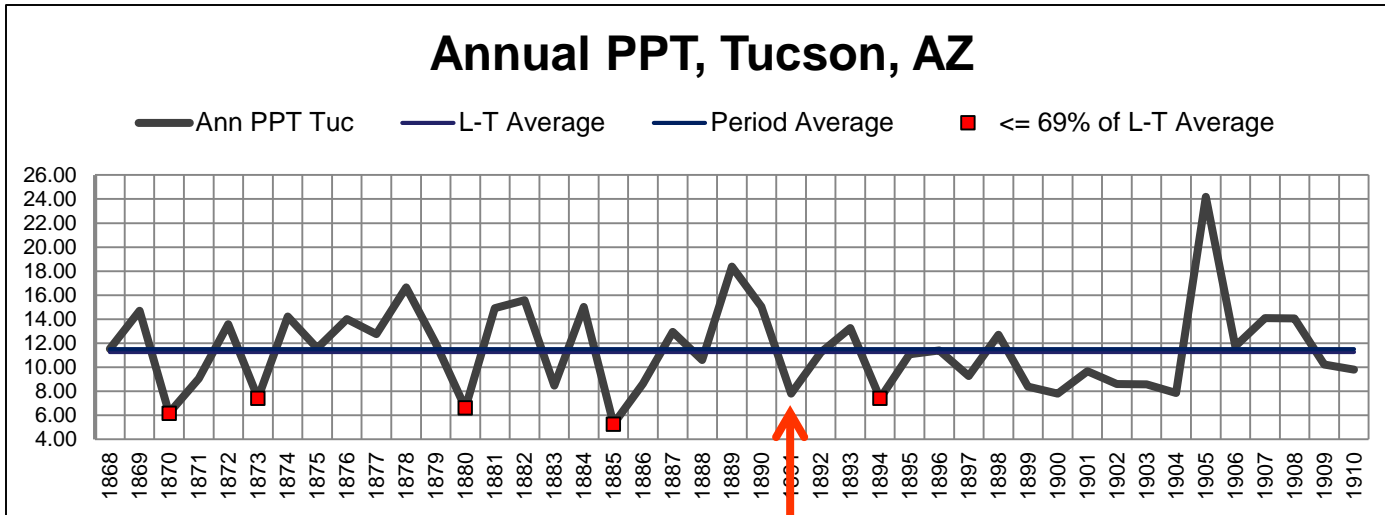
# Drought and the cattle-crash narrative

- A period of drought started in **1891**. “Without rain there was no grass and soon very little water. Many cattle died....”

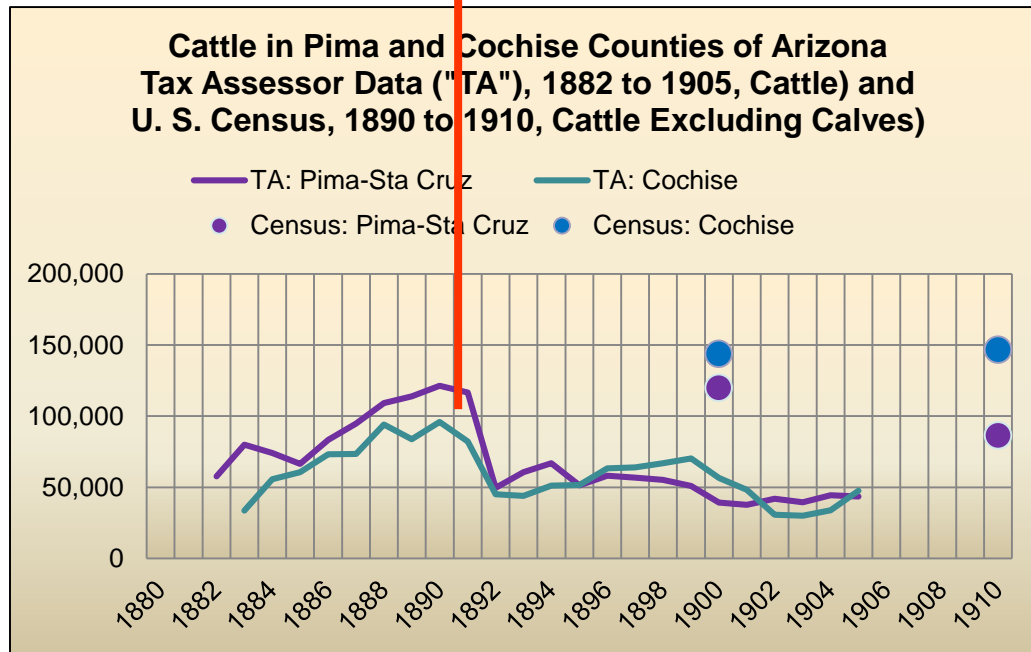


J. J. Wagoner, 1962,  
“Overstocking the  
ranges in southern  
Arizona during the  
1870’s and 1880’s”

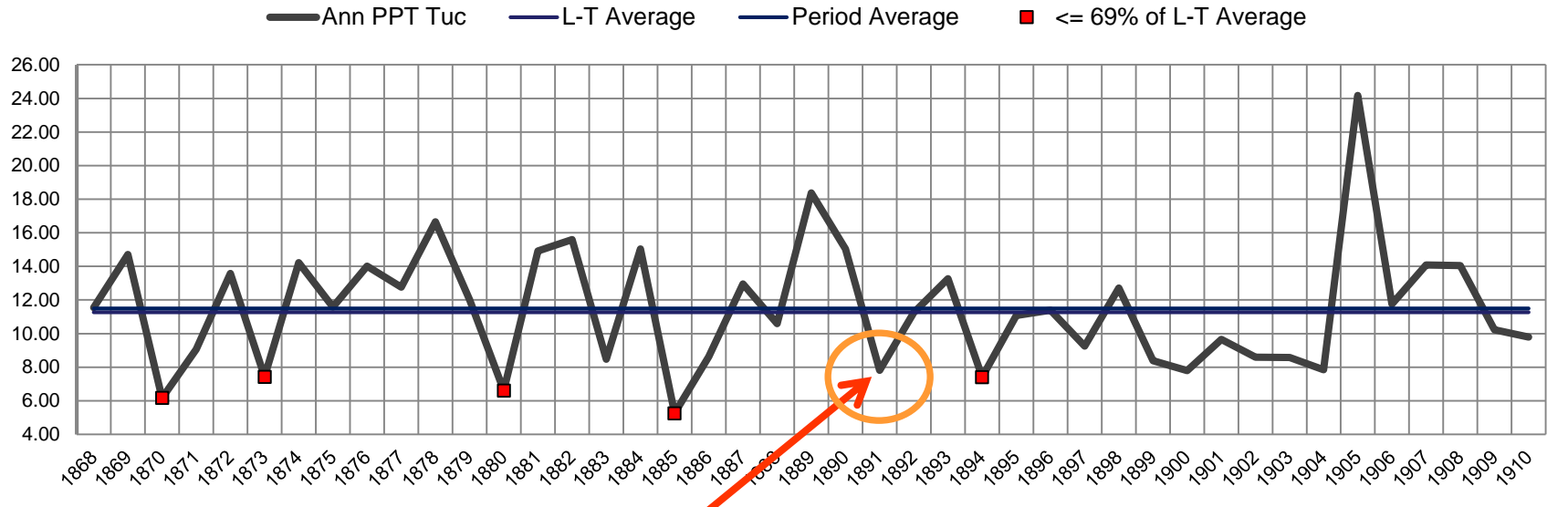
1868  
to  
1910



100% concurrence  
between 1891  
weather and the  
“beginning of the  
end” for the Pima  
County cattle herd.



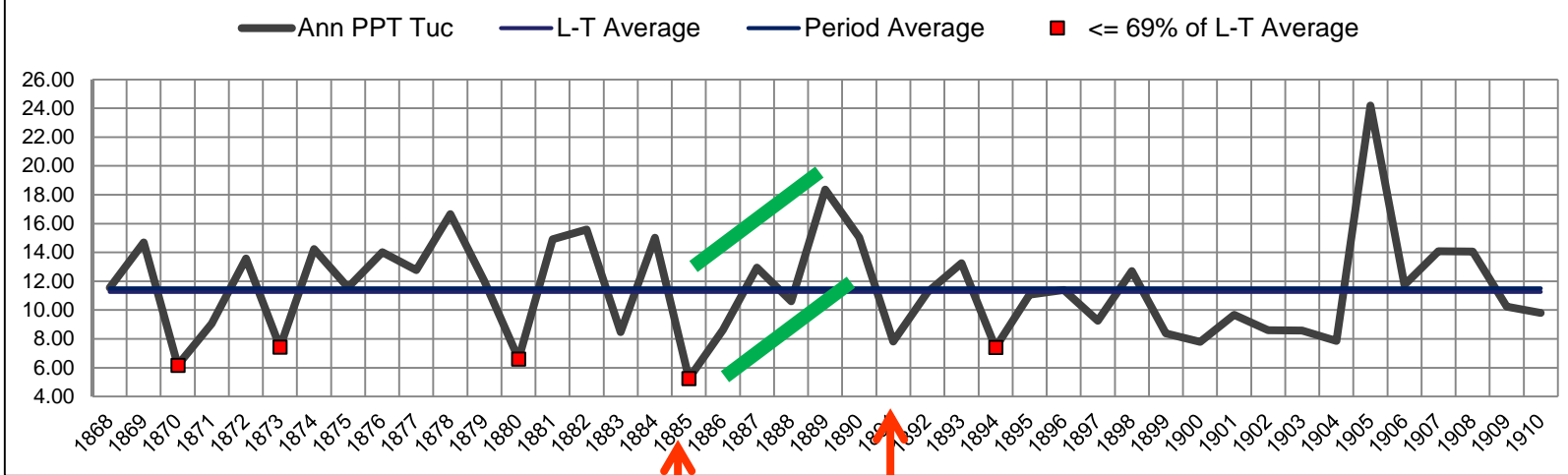
## Annual PPT, Tucson, AZ



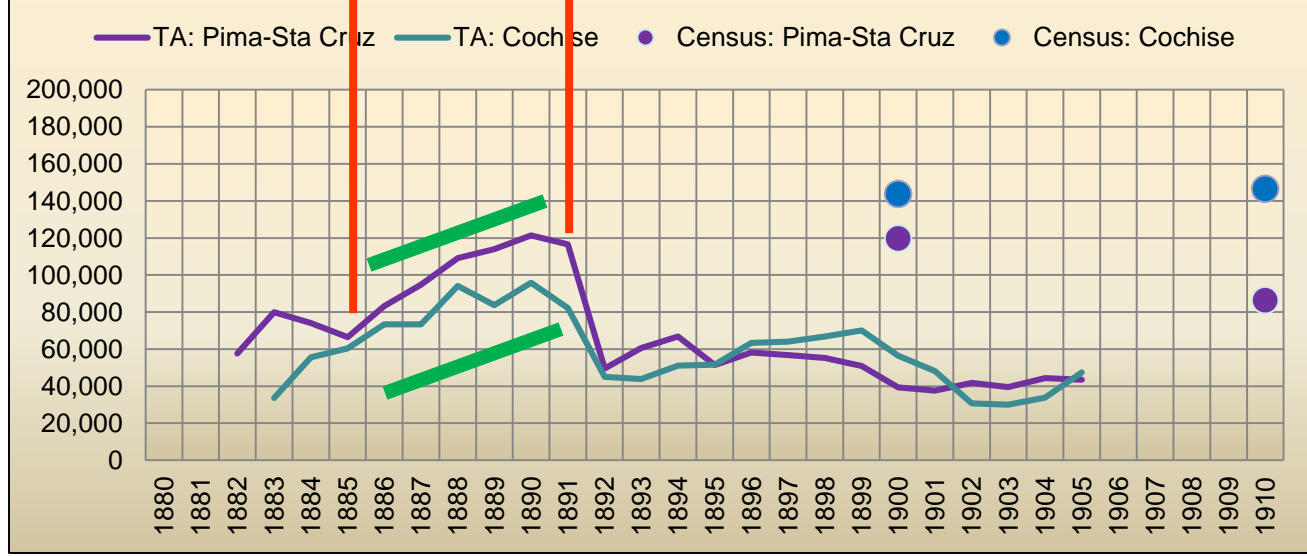
- 1891, about 70% of the longer-term average
- Red dots were all drier years

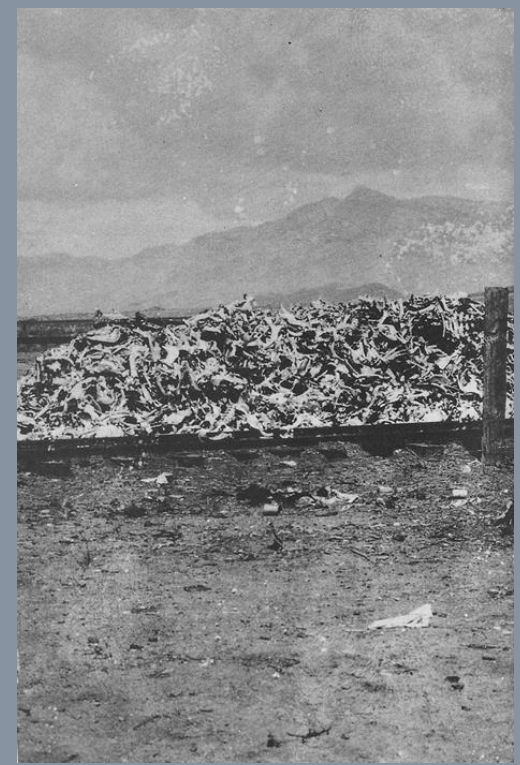
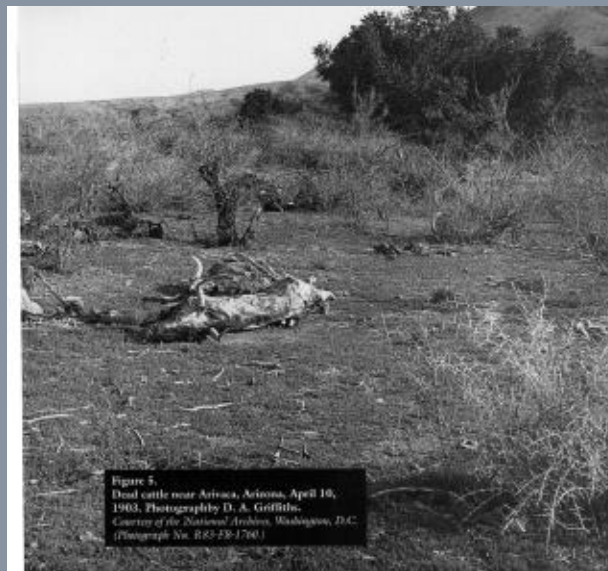


# Annual PPT, Tucson, AZ



## Cattle in Pima and Cochise Counties of Arizona Tax Assessor Data ("TA"), 1882 to 1905, Cattle) and U. S. Census, 1890 to 1910, Cattle Excluding Calves)





- Beginning in 1890, UA faculty began to shift focus to:
- Scientific understanding of range management
  - Administrative responses
  - And away from over-simplifications



J. W. Toumey, published  
“Overstocking the Range” in  
part two of AAES Bulletin  
Number 2, September 1891.



Toumey's botany laboratory, Old Main, about 1896.

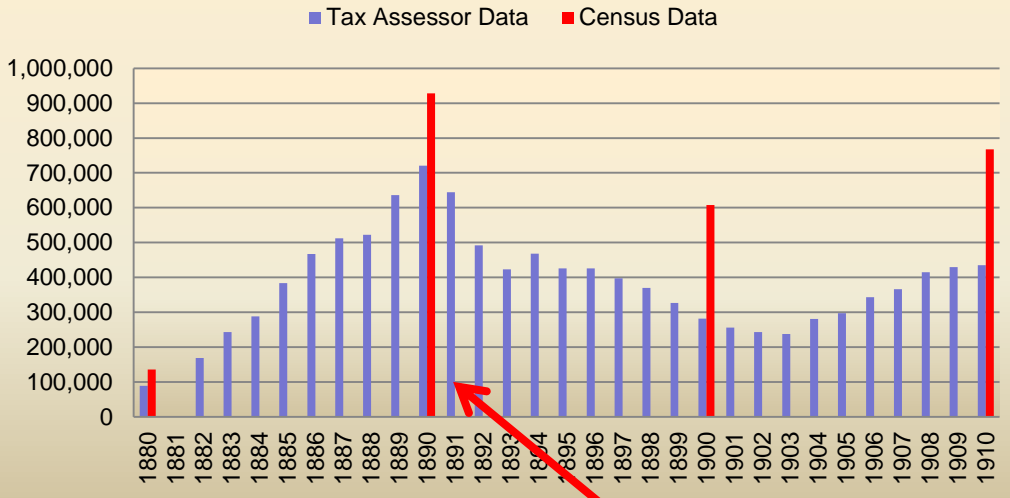


James W. Toumey, botanist, entomologist, 1891-99.  
Dates reflect years at Univ. of Arizona

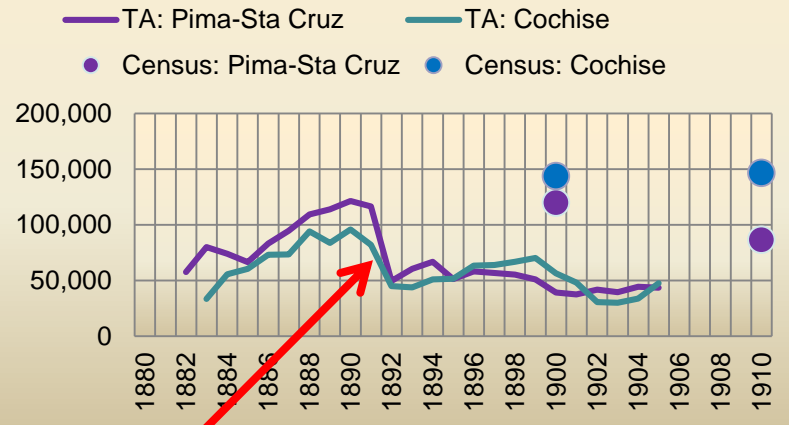




### Arizona Cattle 1880 to 1910 Tax Assessor Data (Annual, All Cattle) and U. S. Census Data (Decades, Cattle Excluding Calves)



### Cattle in Pima and Cochise Counties of Arizona Tax Assessor Data ("TA"), 1882 to 1905, Cattle) and U. S. Census, 1890 to 1910, Cattle Excluding Calves)



James W. Toumey, botanist, entomologist, 1891-99.  
Dates reflect years at Univ. of Arizona

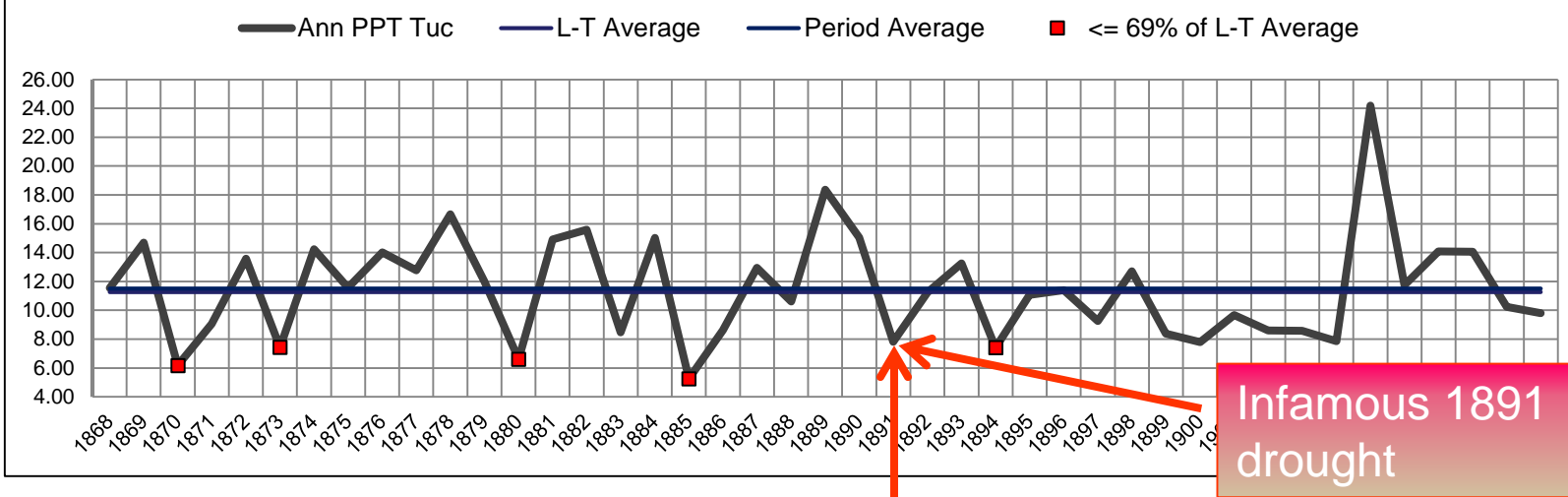
J. W. TOUMEY,  
TUCSON, ARIZONA, September 15, 1891.

**Overstocking the Range.**

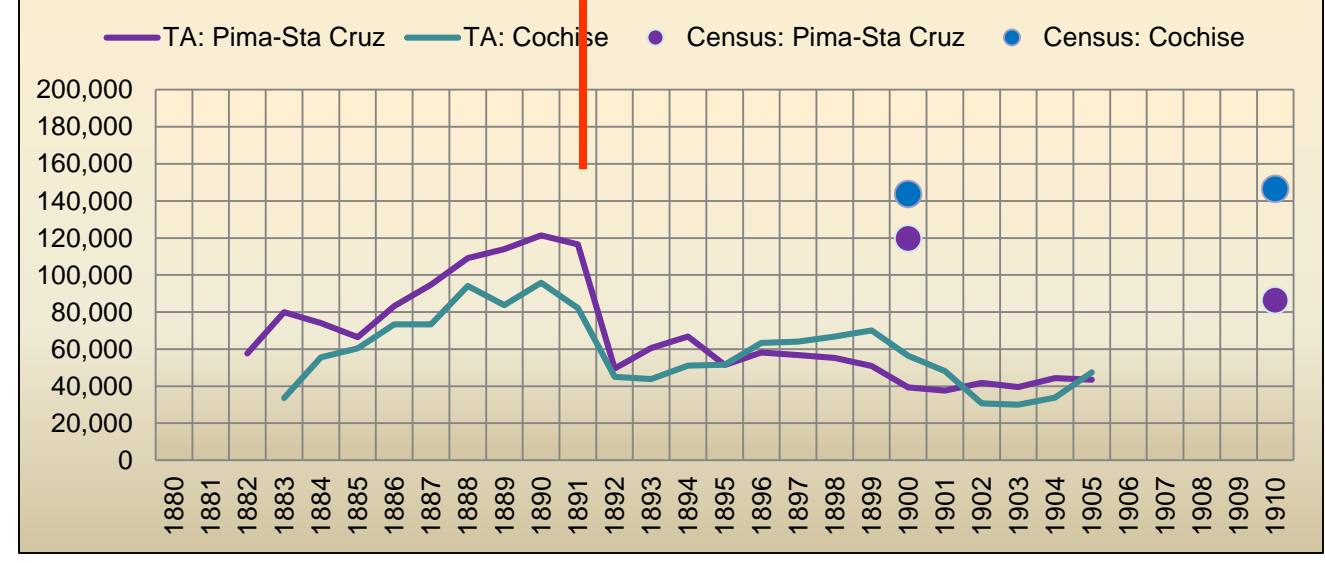
In nearly all cases, overfeeding a range has a tendency to kill out the better grasses. On the vast ranges of Western Kansas and Nebraska...

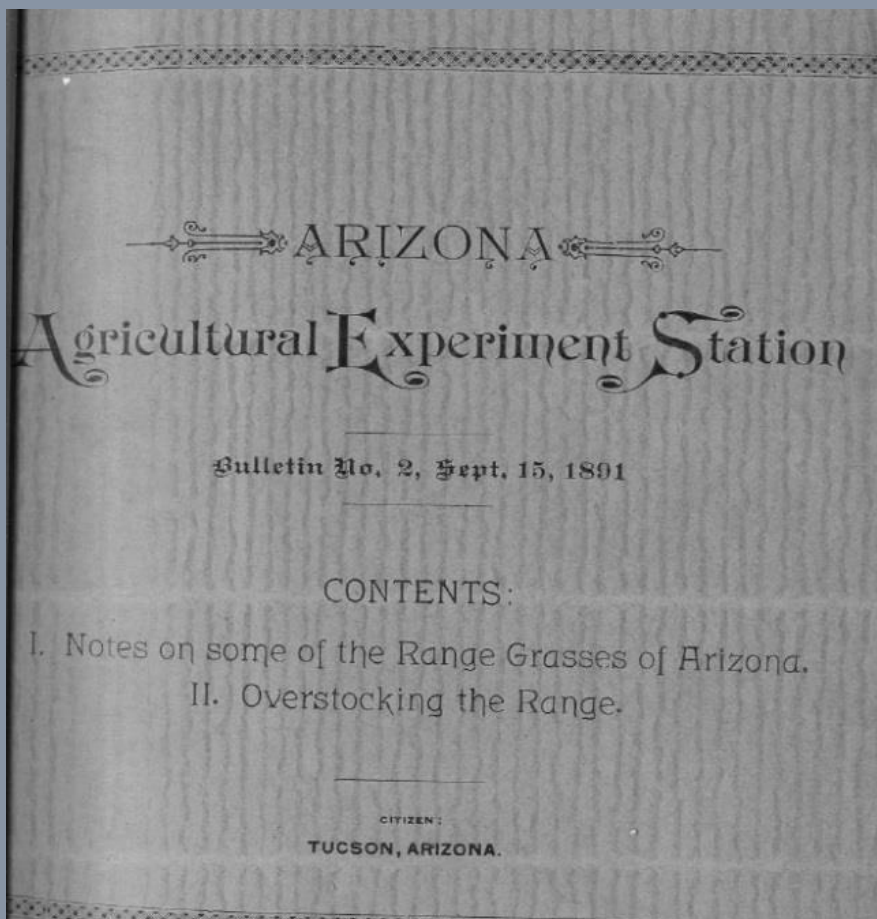


# Annual PPT, Tucson, AZ



## Cattle in Pima and Cochise Counties of Arizona Tax Assessor Data ("TA"), 1882 to 1905, Cattle) and U. S. Census, 1890 to 1910, Cattle Excluding Calves)





Many stockmen, he lamented, “have commented upon **the fact of the gradual disappearance of certain grasses that but a few years ago were a major part of the forage....**”

## Overstocking the Range.

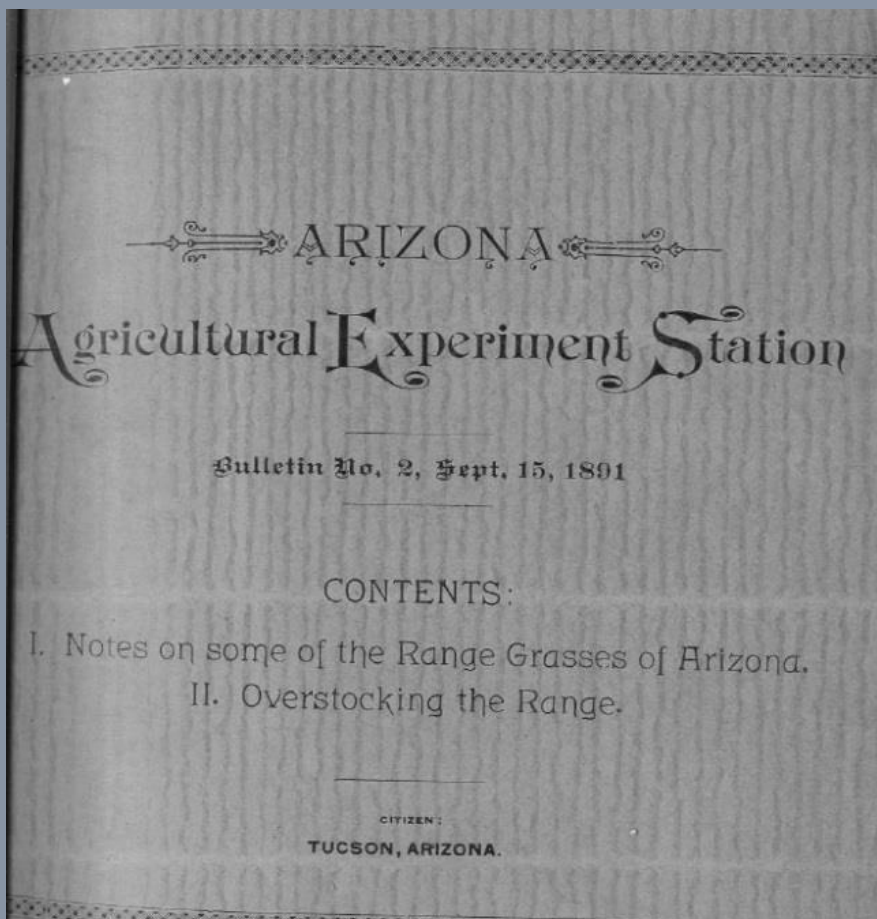
In nearly all cases, overfeeding a range has a tendency to kill out the better grasses. On the vast ranges of Western Kansas and Nebraska...

J. W. Toumey, “Overstocking the Range” in part two of AAES Bulletin Number 2, Sept. 1891.

SRER







Toumey did not mention drought or the greedy cattlemen.

“As elsewhere this is **only true** of regions supporting **more stock than the food supply will justify.**”

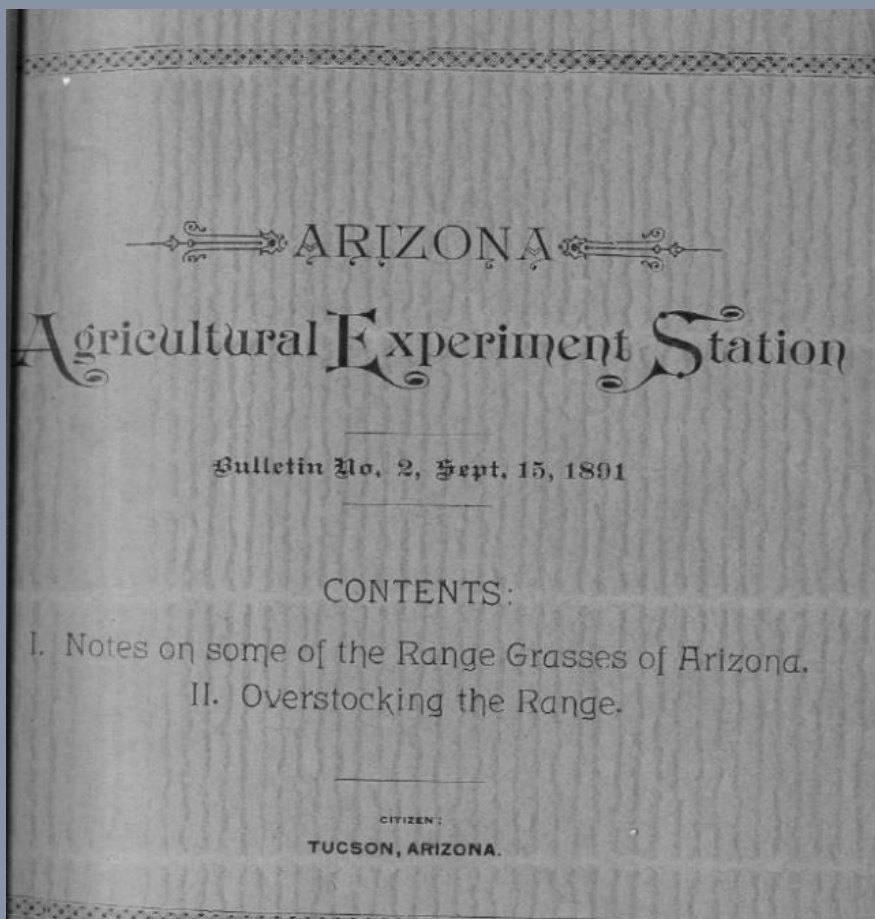
## Overstocking the Range.

In nearly all cases, overfeeding a range has a tendency to kill out the better grasses. On the vast ranges of Western Kansas and Nebraska...

J. W. Toumey, “Overstocking the Range” in part two of AAES Bulletin Number 2, Sept. 1891.

SRER

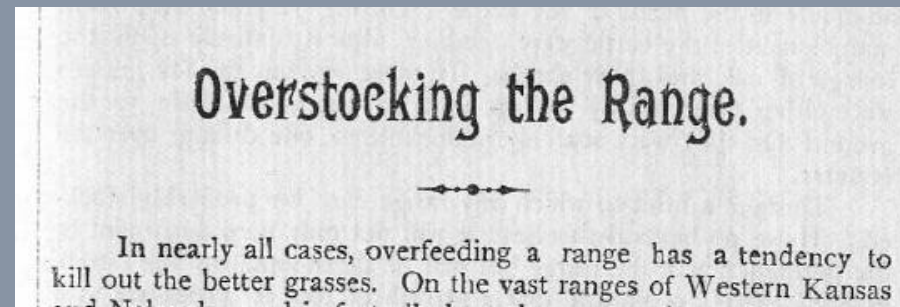




Toumey described the problem of intense and frequent grazing.

“If the top be continually eaten to the ground or even very near it, the roots will gradually become extinct....”

1891 (emphasis added)



J. W. Toumey, “Overstocking the Range” in part two of AAES Bulletin Number 2, Sept. 1891.

# Robert H. **Forbes**, AZ Ag Experiment Station **1894**, director 1899 – 1917



Robert H. Forbes, about 1900.



The Forbes Building, College of Agriculture and Life Sciences, UA

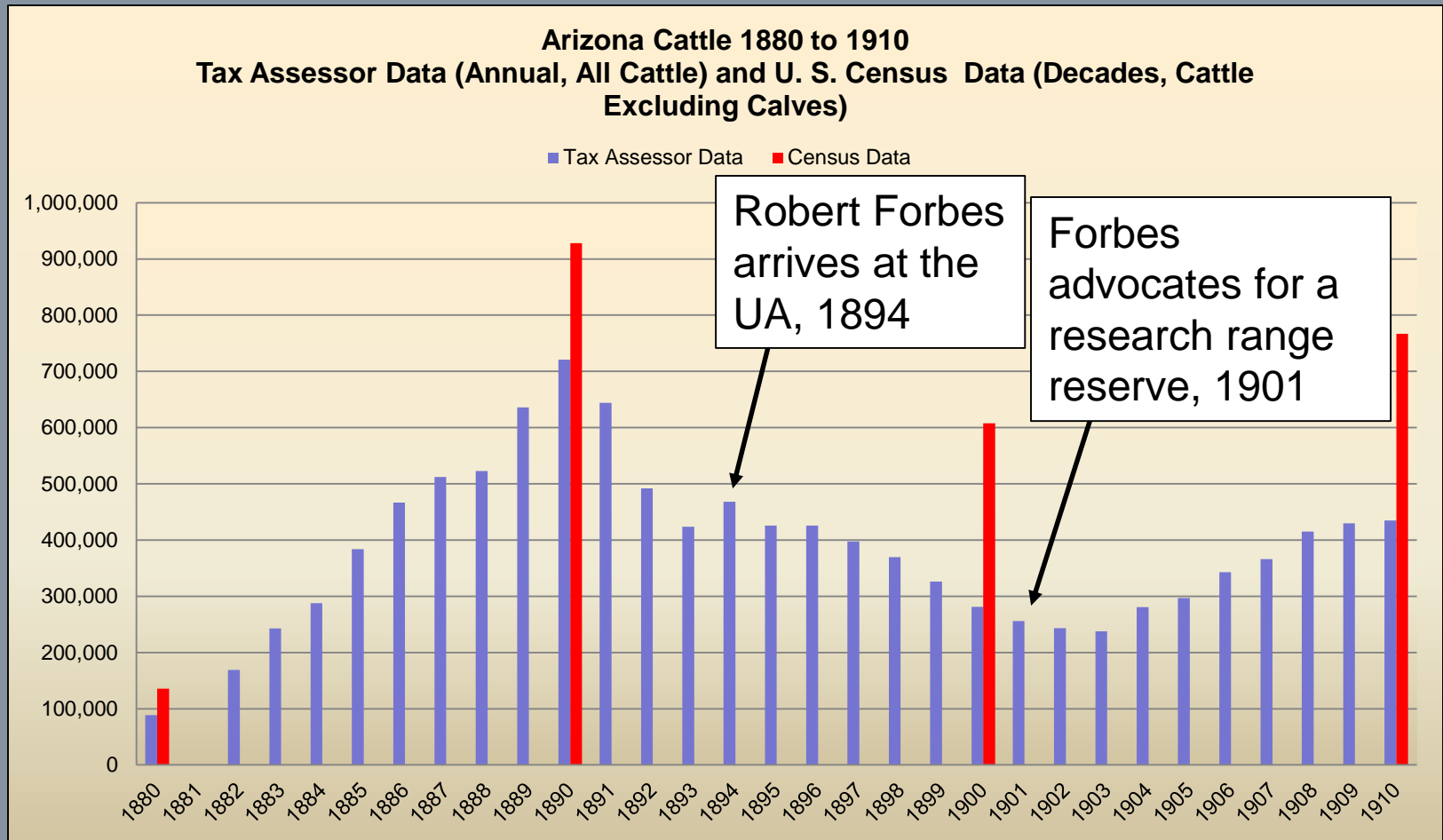


SRER



COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES

AZ Governor's Reports give Tax Assessor data (cattle and other livestock). Note: reported for the fiscal year July – June.



Robert Forbes arrives at the UA, 1894

Forbes advocates for a research range reserve, 1901

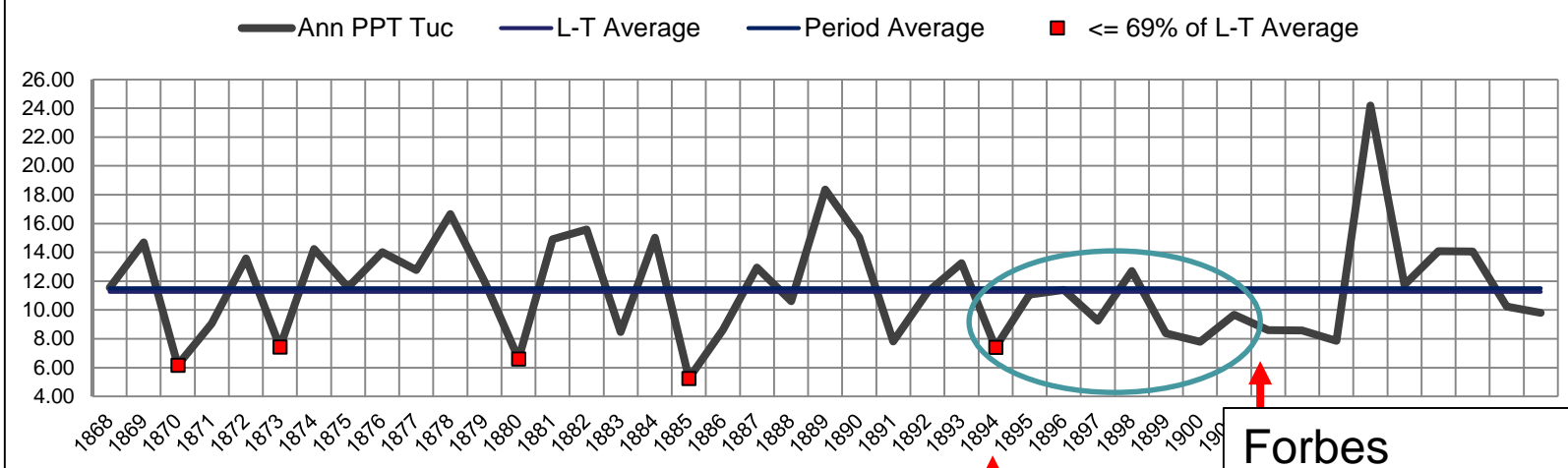


Tax assessor data suggest cattle in Arizona trenched in 1902 – 1903 (=SRER founding)





# Annual PPT, Tucson, AZ

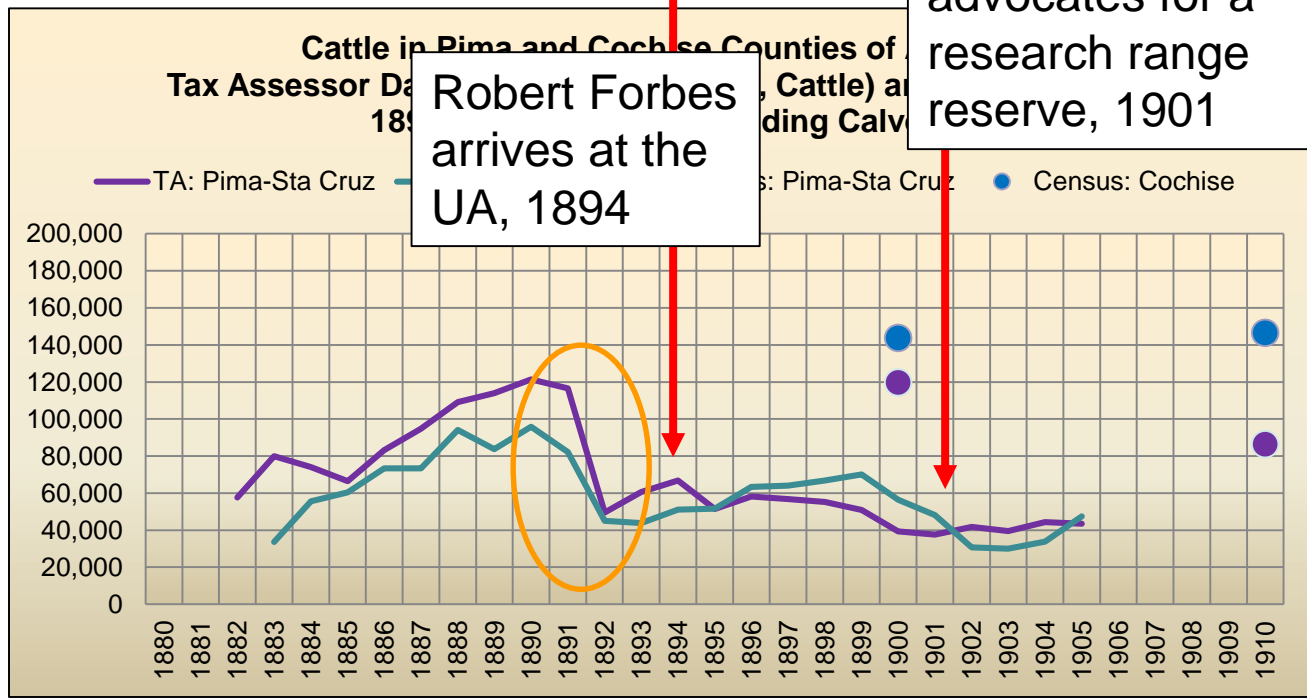


Forbes advocates for a research range reserve, 1901

Robert Forbes arrives at the UA, 1894



Robert H. Forbes, about 1900.



Robert Forbes, AZ Ag Exp Station 1894, director  
1899 – 1917

In a series of papers Forbes described the  
interconnected ecological, hydrological,  
economic and human behavior components  
of “unrestrained grazing.”



Robert H. Forbes, about 1900.



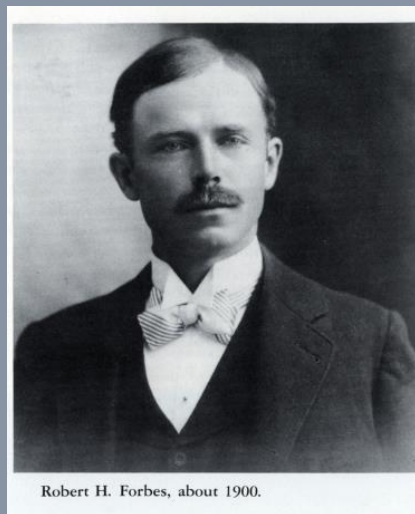


Robert Forbes, AZ Ag Exp Station 1894, director  
1899 – 1917

Forbes connected the cattle bust to open  
range grazing.

“The ruinous methods which seem  
inevitable upon a public range, which, being  
everybody’s property, is nobody’s care....”

Robert H. Forbes, University of Arizona,  
1901

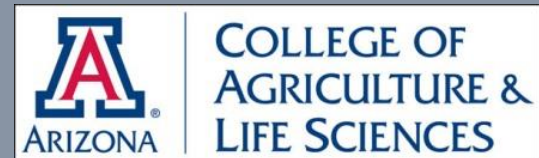


# Open or Free Range persisted into first decades of the 20<sup>th</sup> century

Not the absence of fence  
between roads and  
pastures



Not the joke:





**Open or free range:** the unassigned, unfenced, unreserved public (government) land used by anyone with livestock, access to water, and enough influence.



No. 49727A 3-28-20 [28 March 1920]

“Showing contrast between inside of Pasture 8A [enclosed] and unenclosed range.

”On outside only weeds... inside a good stand of slender grama, black grama, etc.

”At this time poppies in blossom inside, grazed off on outside.

”Santa Rita R. R. [Santa Rita Range Reserve, name of SRER from 1910 - 1921].”



SRER

**1920 photo.** Left: open range. Right: Santa Rita range **fenced off** from the open range **before 1915.**



COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES

Open range “created chaotic conditions in many western range areas by the late 1880’s and 1890’s.” W. D. Rowley, 1985, p. 15.



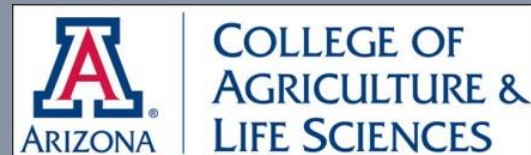
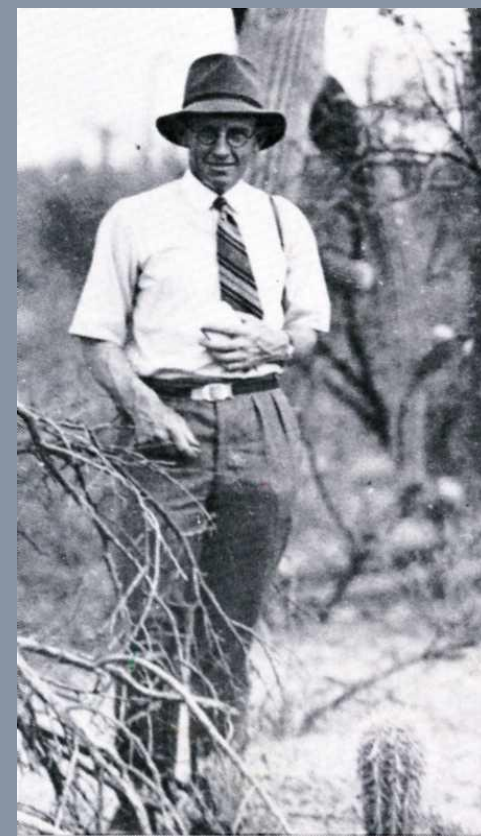
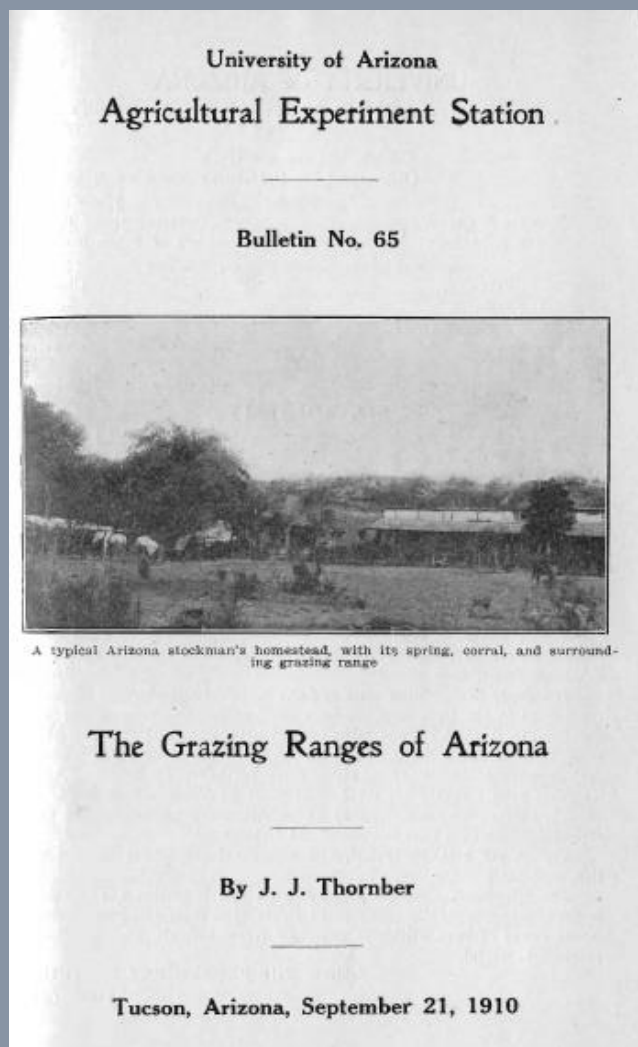
Forbes derided it as “the **open range regime.**”



Robert H. Forbes, about 1900.



# J.J. Thornber, colleague of Forbes, botanist and range scientist, published “The Grazing Ranges of Arizona” in 1910







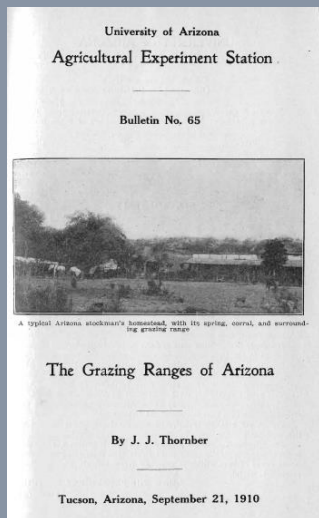
# John J. Thornber

The name of John J. Thornber is familiar to botanists around the world because it has been given to a number of species he found that were named in his honor. For years he was the acknowledged expert on flora of the southwestern United States.

Student and faculty at the University of Arizona today may not be aware that many of the ornamental plants that grace the campus were acquired through his efforts or that he contributed almost 100,000 plant specimens to the University Herbarium.

Thornber's book on grazing, *Grazing the Ranges of Arizona*, was the result of 10 years' study and was published in 1910 as AAES Bulletin No. 65. Three years later he began to teach a course in grazing range studies, the first such class at the University.

The University of Arizona, College of Agriculture: A Century of Discovery, 1985

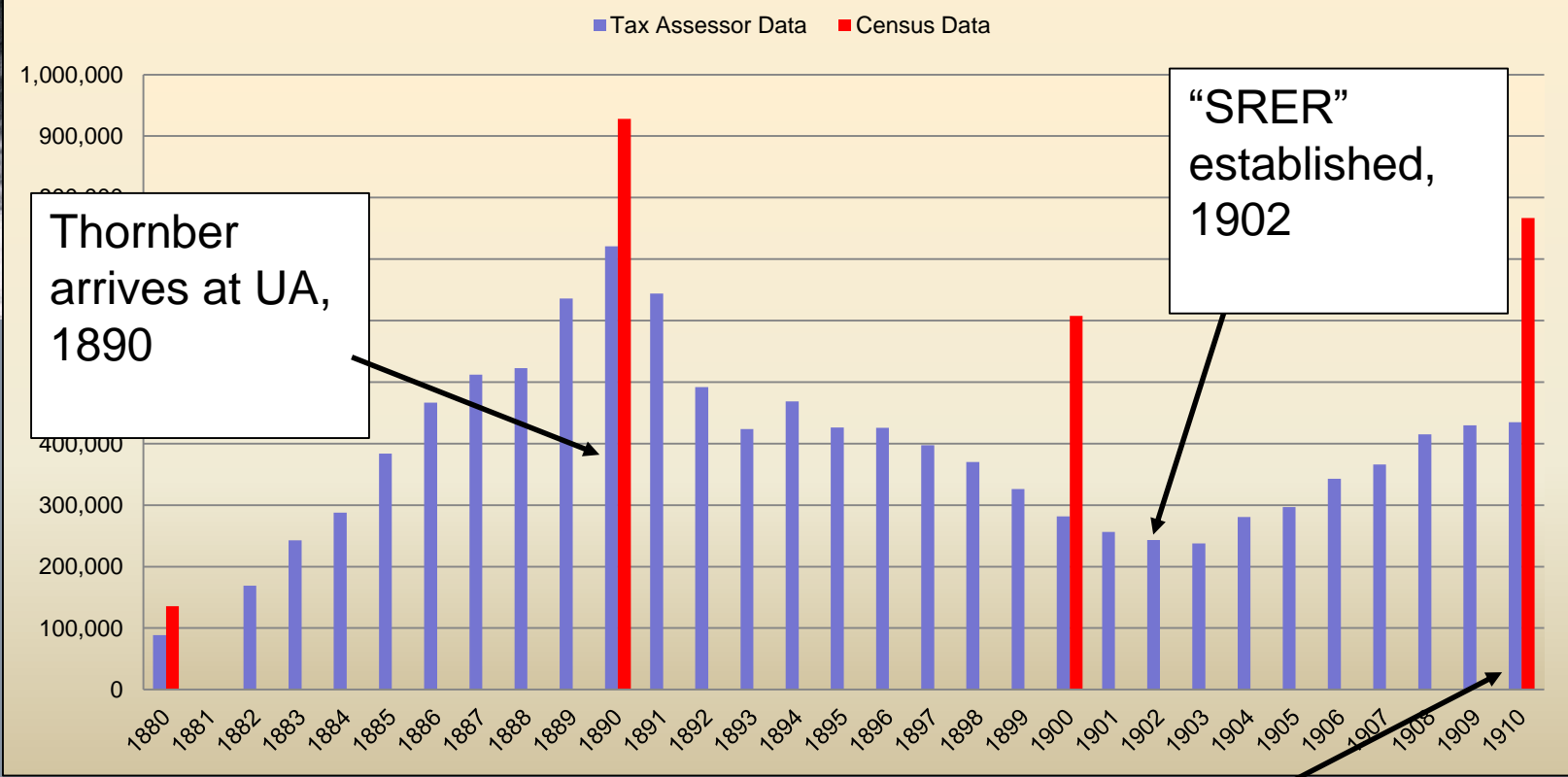


COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES





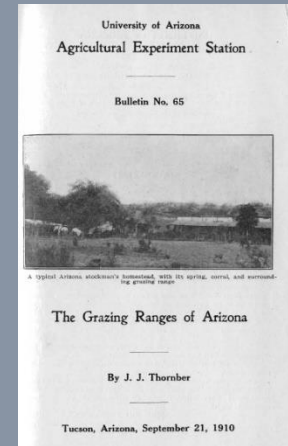
## Arizona Cattle 1880 to 1910 Tax Assessor Data (Annual, All Cattle) and U. S. Census Data (Decades, Cattle Excluding Calves)

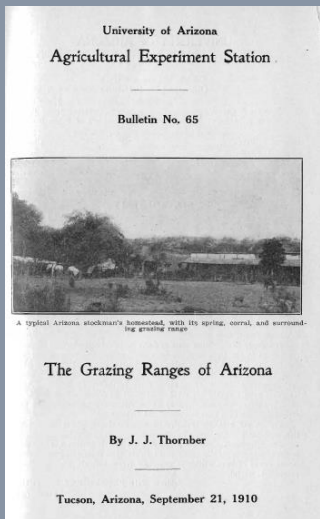


Thornber's monograph was published after experiencing first-hand the most traumatic 20 years in AZ rangeland history.



**SRER**



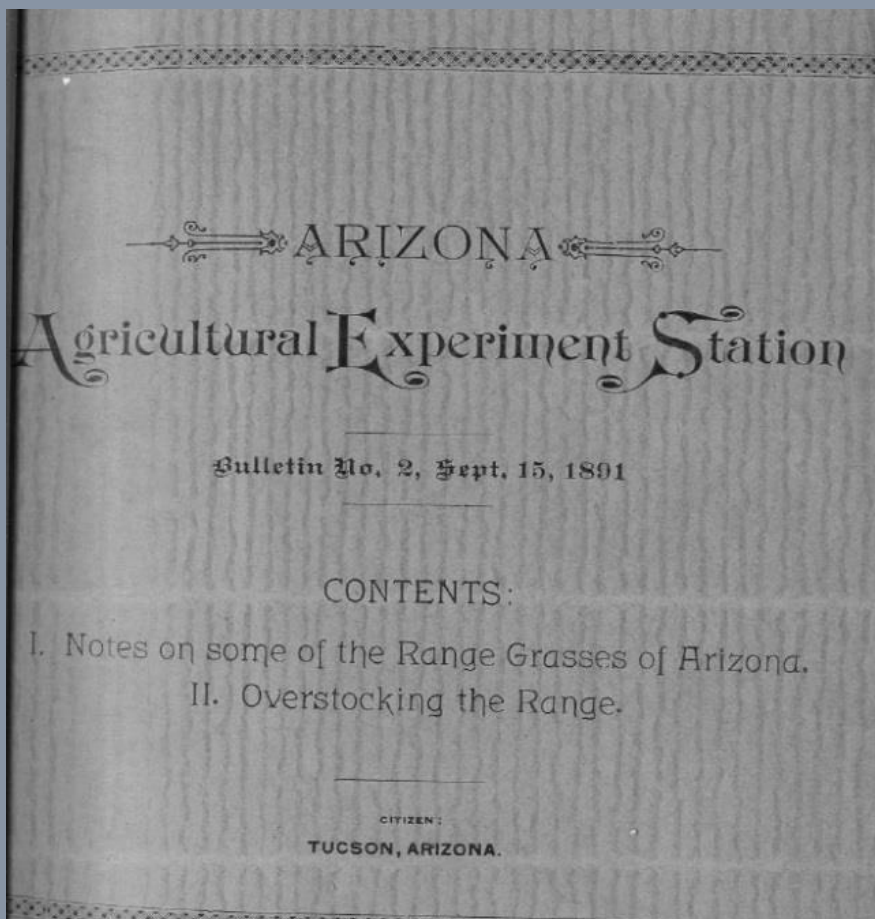


“It would be considered very poor business management, indeed, for [a person] A, to improve the public grazing lands adjoining his [privately owned] holdings, however much he desired, so long as B, C, and D, his neighbors, could share equally with him all the advantages and none of the expense and F, and G, tramp sheepmen, could drive in their herds from another section of the country, and appropriate the last mouthful of grass, if necessary, for their own use.”

On  
open  
range  
grazing

J. J. Thornber, 1910





As Toumey wrote in 1891:

“If the top be continually eaten to the ground or even very near it, the roots will gradually become extinct....”

1891 (emphasis added)

## Overstocking the Range.

In nearly all cases, overfeeding a range has a tendency to kill out the better grasses. On the vast ranges of Western Kansas and Nebraska...

SRER

J. W. Toumey, “Overstocking the Range” in part two of AAES Bulletin Number 2, Sept. 1891.



Ranchers were caught in an untenable position: damned if they did overgraze, damned if they didn't.



No. 49727A 3-28-20 [28 March 1920]

“Showing contrast between inside of Pasture 8A [enclosed] and unenclosed range.

”On outside only weeds... inside a good stand of slender grama, black grama, etc.

”At this time poppies in blossom inside, grazed off on outside.

”Santa Rita R. R. [Santa Rita Range Reserve, name of SRER from 1910 - 1921].”



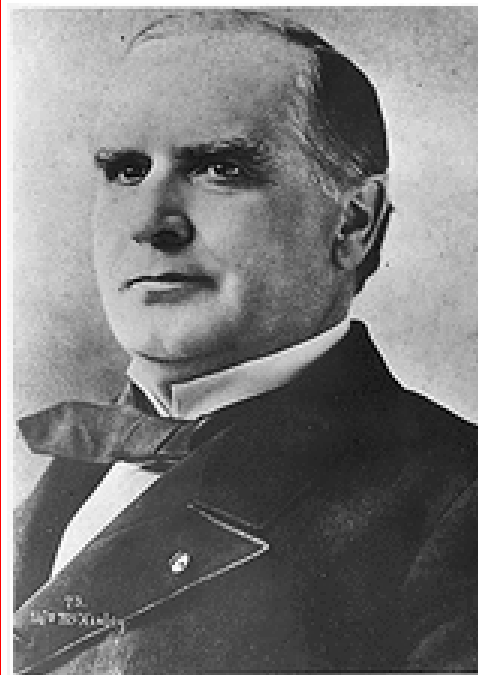


Who would save the day? TR is part of it....

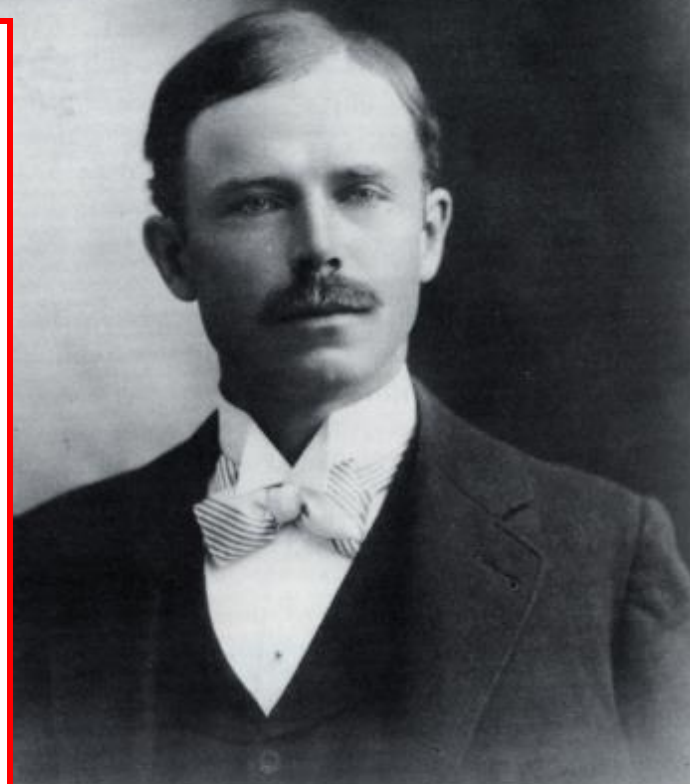




Gifford Pinchot



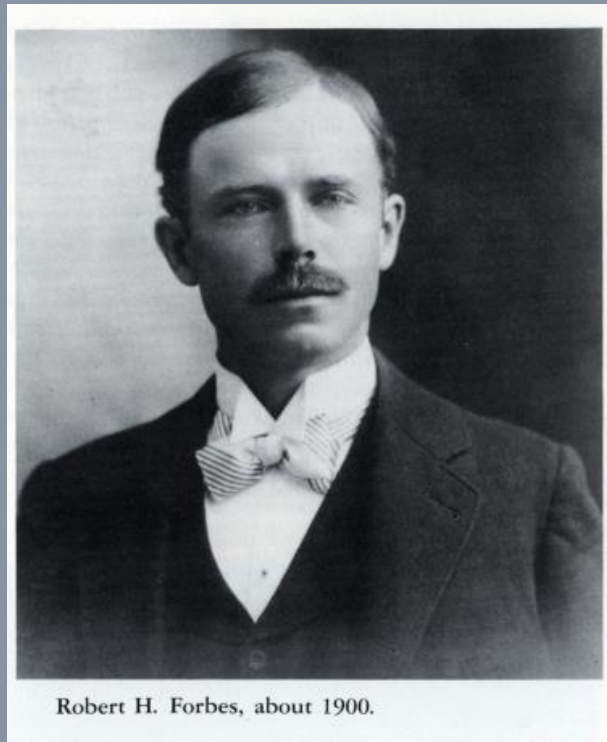
President William McKinley.  
*Picture courtesy of the U.S.  
National Archives and Records  
Administration.*



Robert H. Forbes, about 1900.



- Forbes wished to learn how to **recover devastated rangeland** and how to **avoid repeating the cattle bust catastrophe**



Robert H. Forbes, about 1900.



SRER

Robert Forbes, ready  
for Africa



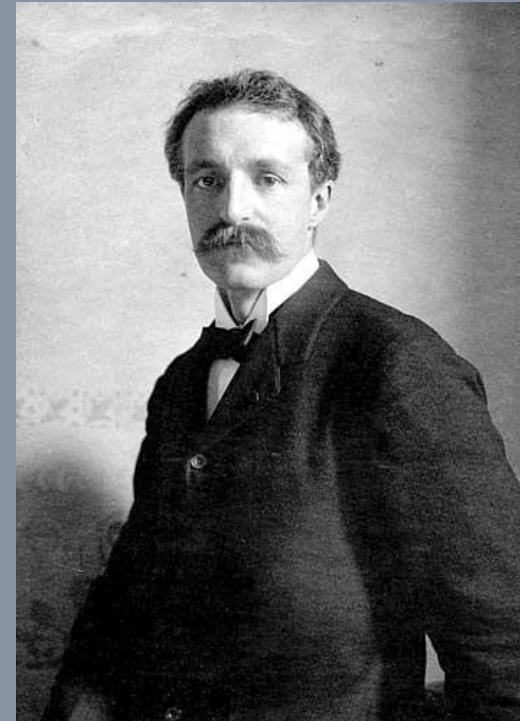
COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES

- In **August 1901** at the annual meeting of the American Forestry Association, in Denver, **Robert Forbes (UA)** presents a talk at the same session where Pinchot is also presenting.



Robert H. Forbes, about 1900.

Robert Forbes



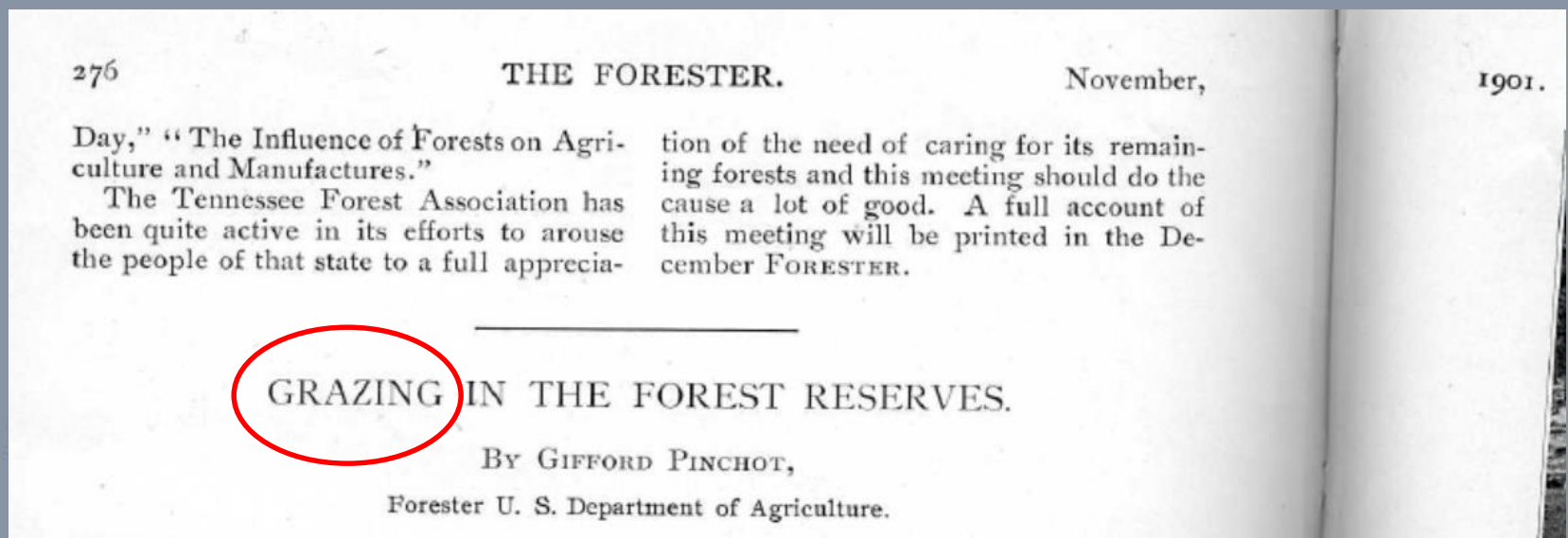
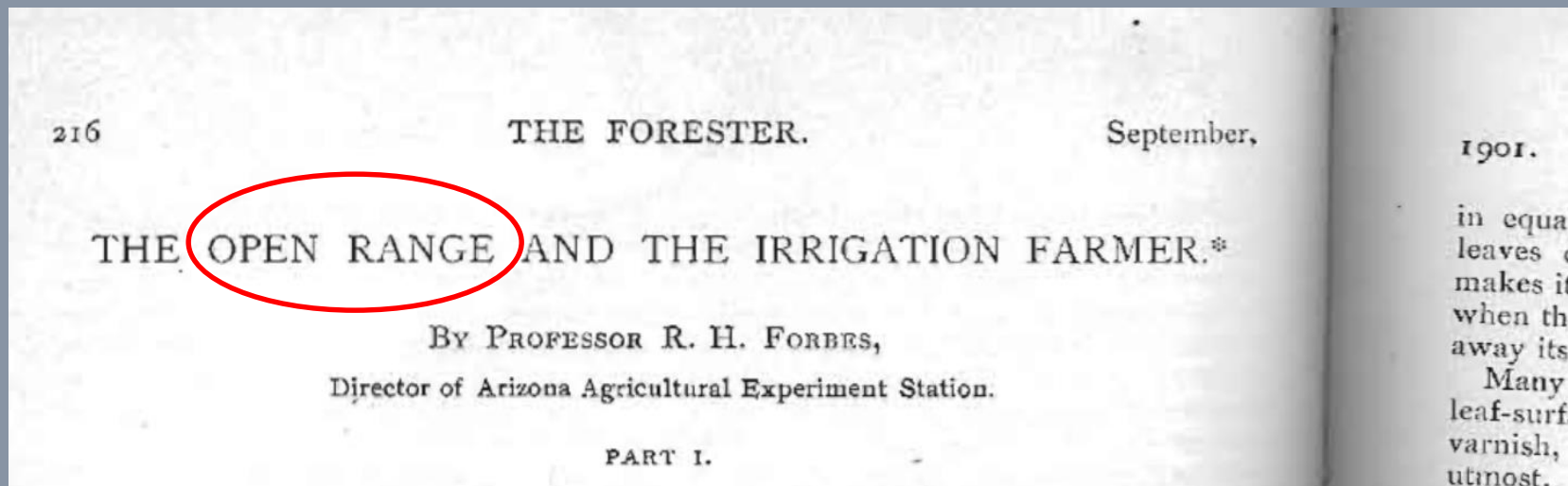
Gifford Pinchot, most powerful force in Washington, DC regarding forest protection and management



SRER



Papers presented by Forbes and Pinchot, same session, AFA, in August 1901 – published in *The Forester* journal



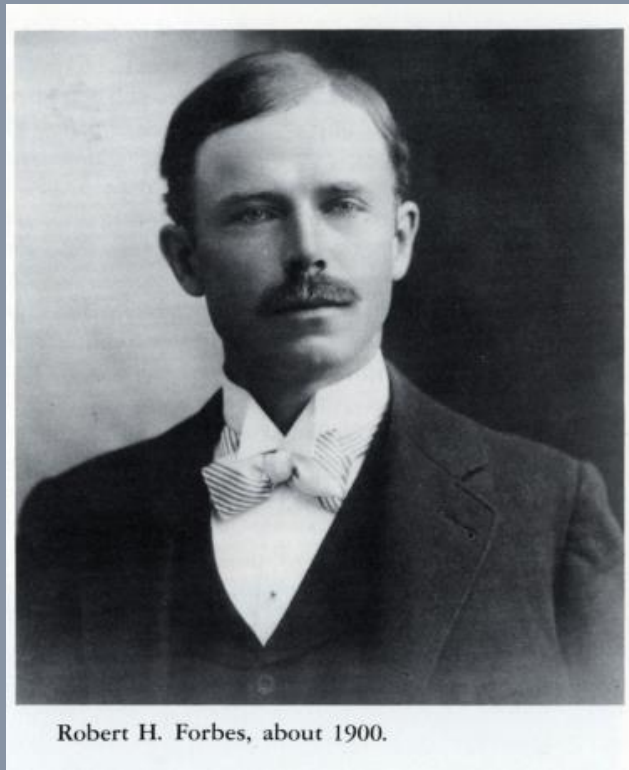
Forbes proposes **new federal reserves** “for a **proper economic and scientific study** of the problems involved [in unrestrained, open range grazing].”



**SRER**

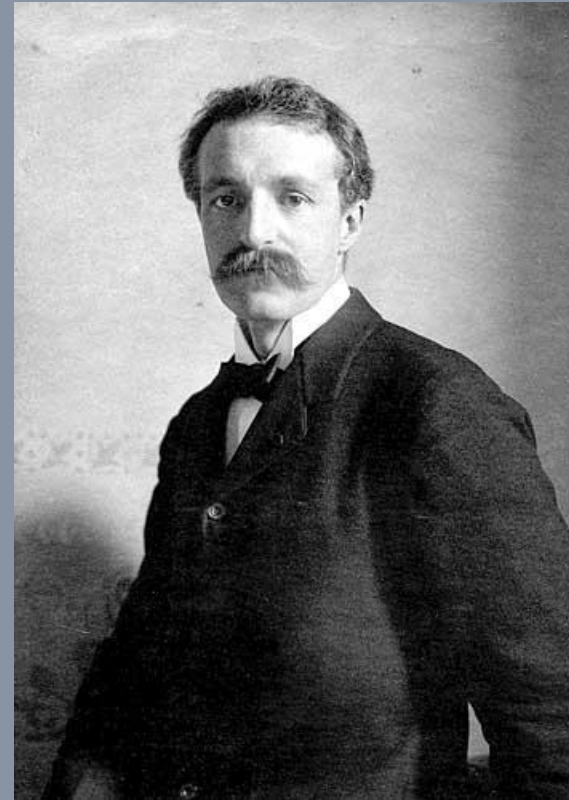


- **Pinchot embraces** Forbes' proposed range reserve for study and demonstration on a convincing scale.



Robert H. Forbes, about 1900.

Robert Forbes



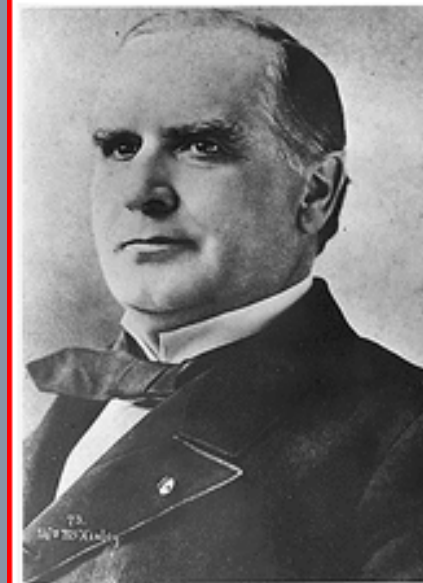
Gifford Pinchot, “father” of the US Forest Service, a founder of “wise use” conservation philosophy



- (Forbes and Pinchot together August 1901)
- McKinley is assassinated September 1901 during his first year in office



Leon Czolgosz shoots President McKinley with a concealed revolver.



President William McKinley.

*Picture courtesy of the U.S. National Archives and Records Administration.*

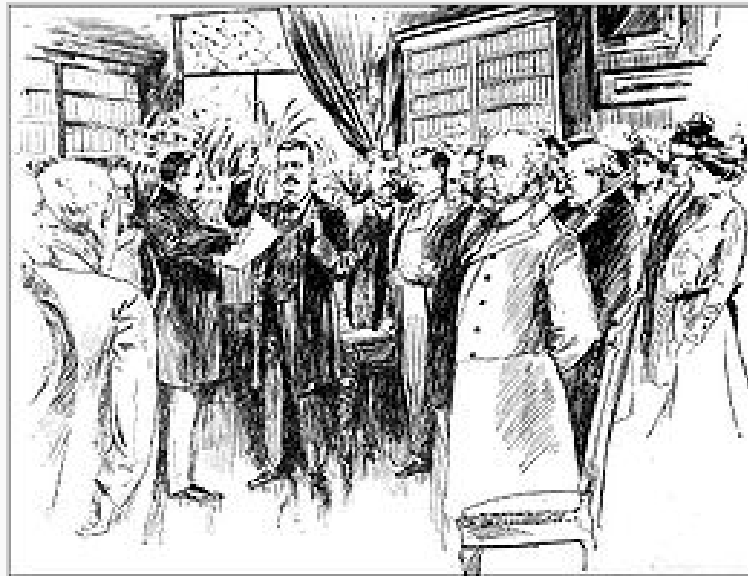


SRER

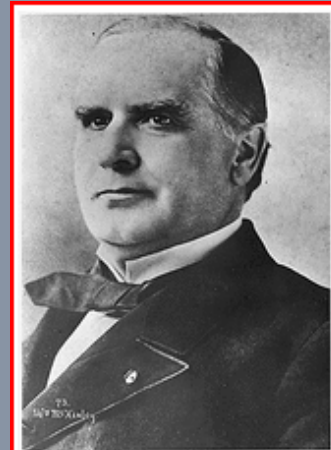


COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES

- (Forbes met with Pinchot August 1901)
- (McKinley was assassinated September 1901 during his first year in office)
- Theodore Roosevelt, VP under McKinley, ascends to presidency



Newspaper sketch of Theodore Roosevelt's inauguration, minus the customary Bible.

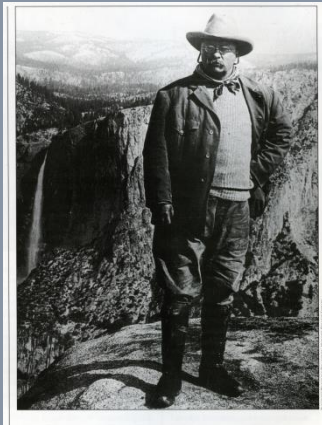


President William McKinley.

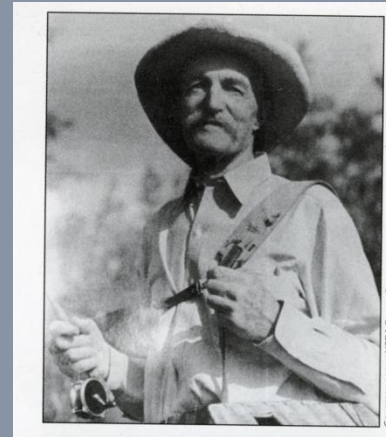
*Picture courtesy of the U.S. National Archives and Records Administration.*

- “Our independent boundary work began after Dr. Forbes, of the University of Arizona, suggested the establishment of an experimental *range reserve* in southern Arizona...”

Gifford Pinchot’s autobiography, ***Breaking New Ground*** (1947).



Teddy Roosevelt

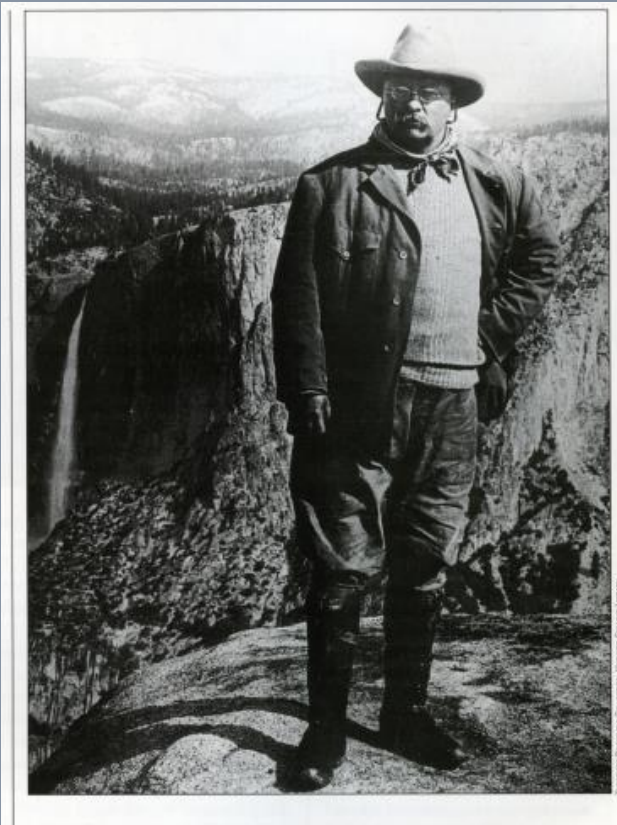


Gifford Pinchot



SRER





Teddy Roosevelt establishes the **Santa Rita Forest Reserve** by executive action on **April 11, 1902**, just eight months after Robert Forbes introduced the idea of a Range Reserve to Gifford Pinchot

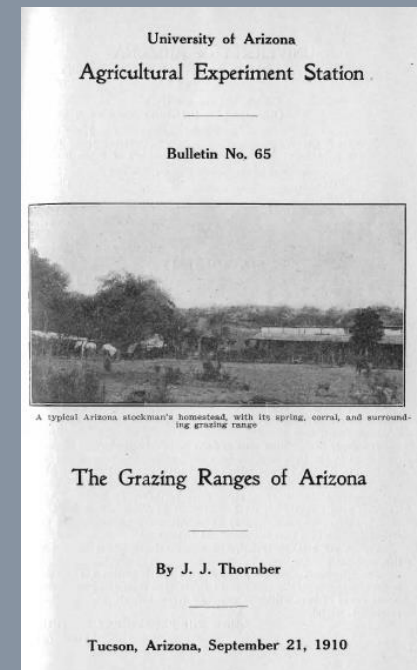
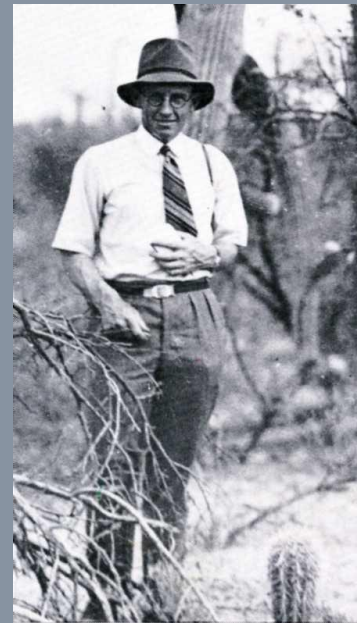


**SRER**



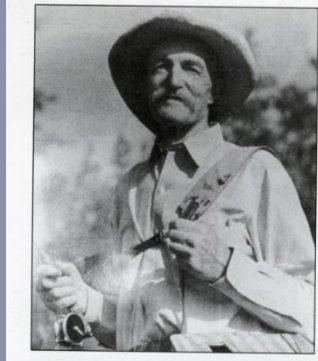
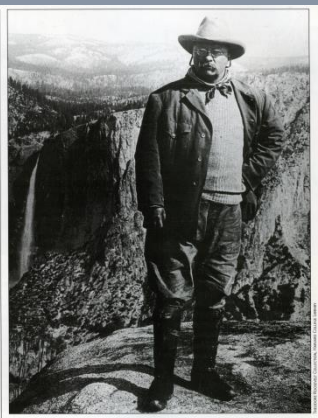
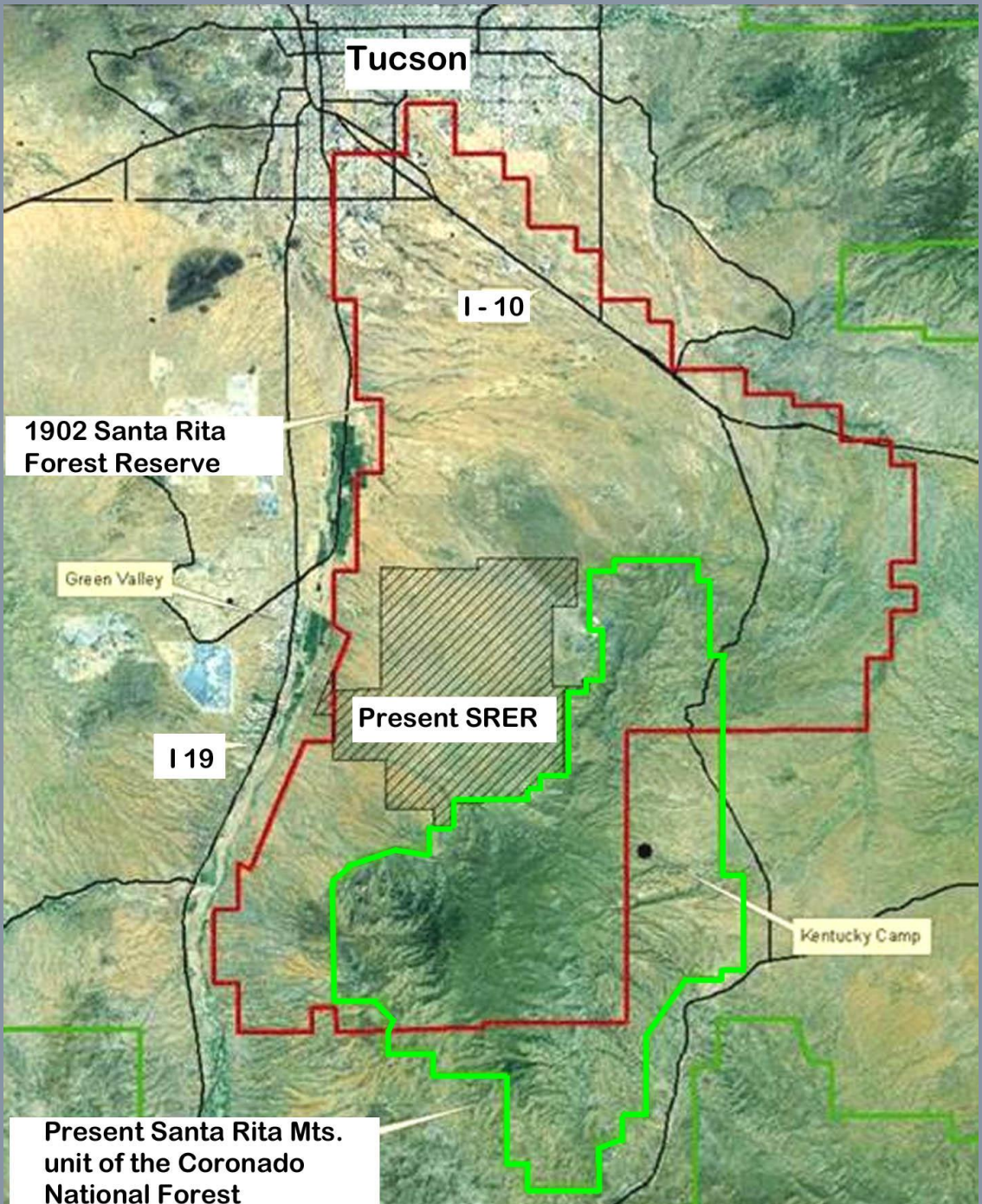
“At the time the [Santa Rita forest] reserve was created, however, its purpose was expressly understood to be the study of grazing range problems with a view, if possible, to a demonstration on a large and convincing plan, of range restoration and control.”

emphasis added  
J. J. Thornber, Page 247





# Red outline: The Santa Rita Forest Reserve Established in 1902



Robert H. Forbes, about 1900.

Map by W. Gillespie, CNF, USFS

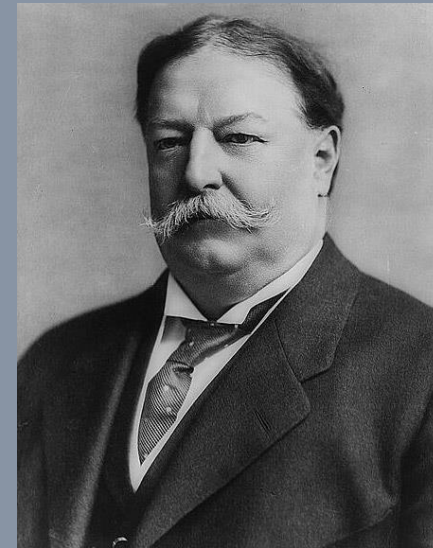
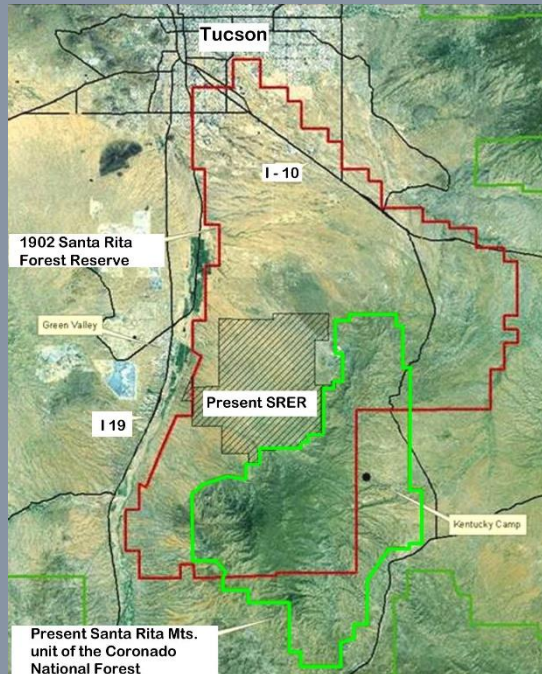


# SRER





- On July 1, 1910, President William Taft issued executive orders:
  - Over 400 square miles of low elevation Forest Reserve land returned to the public domain (available to be reserved for other uses, and to homestead)
  - The forested portion became a federal forest (the Santa Rita National Forest)



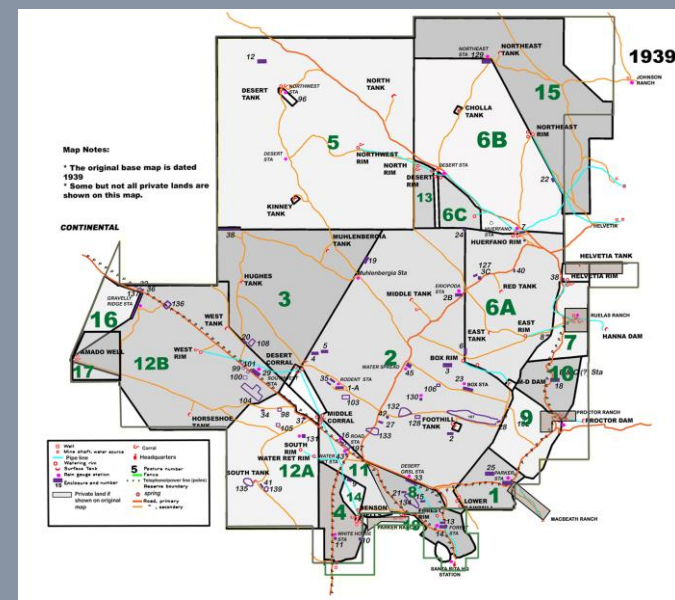
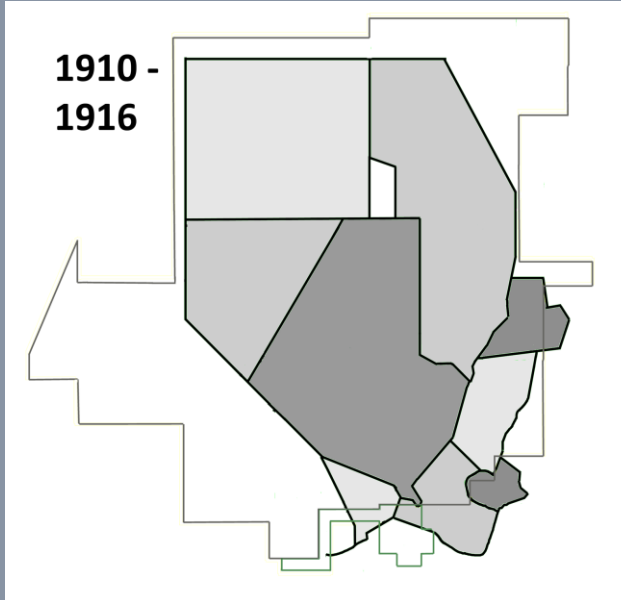
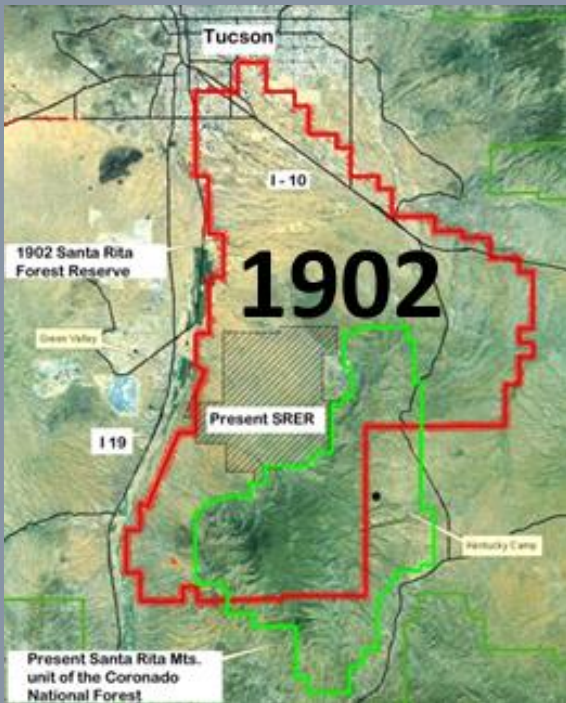
An area of approximately **65 square miles** was proclaimed as a reserve for experiments in “**improving forage production**” – named **the Santa Rita Range Reserve**



**SRER**



1902 = Santa Rita **Forest Reserve**  
 1910 = Santa Rita **Range Reserve**  
 ~1921 = Santa Rita **Experimental Range**



Taft in 1910  
 65 sections

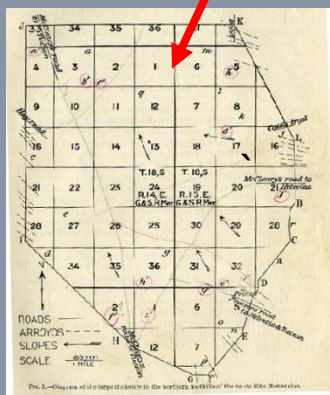
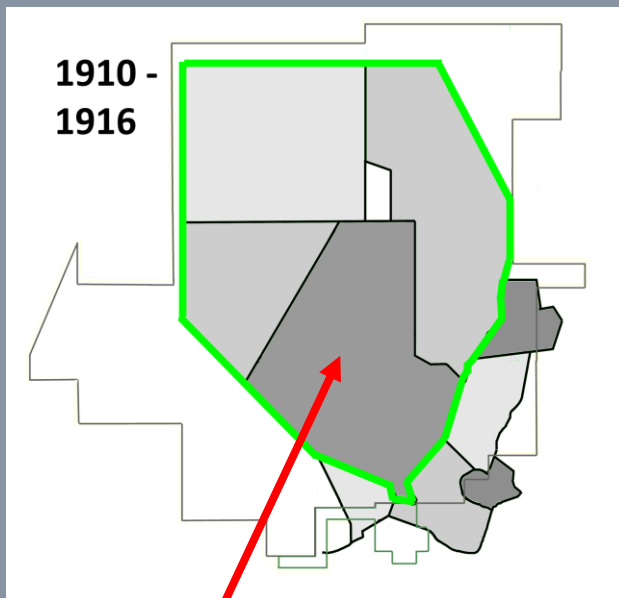
By 1939  
 ~80 sections



SRER



The ~50 section area, fenced in 1903 and remaining in SRER to the present day, is the oldest continuously studied and protected rangeland in the world.



David Griffiths, 1904, Range Investigations, Bureau of Plant Industry, Bulletin # 67.

RANGE INVESTIGATIONS IN ARIZONA.

BY

DAVID GRIFFITHS,

ASSISTANT IN CHARGE OF RANGE INVESTIGATIONS.

GRASS AND FORAGE PLANT INVESTIGATIONS.

ISSUED OCTOBER 6, 1904.



SRER







## ***The Santa Rita Experimental Range***

- ***How to recover the range from overgrazing***
- ***How to prevent overgrazing and boom - bust cycles (rangeland control/management)***
- ***I.e. sustainable range management (G. Ruyle)***



***Observing Grazing Behavior from a Truck***

Photo by Matt Culley.  
December 1937.

- From 1902 – 1988 the federal government managed the Range
- University of Arizona was involved as a cooperator



***University of Arizona Bus at Box Canyon***

Photographer unknown.  
January 10, 1930.

In 1988 almost all of SRER became state property (Trust Land), assigned to the UA for research and education.



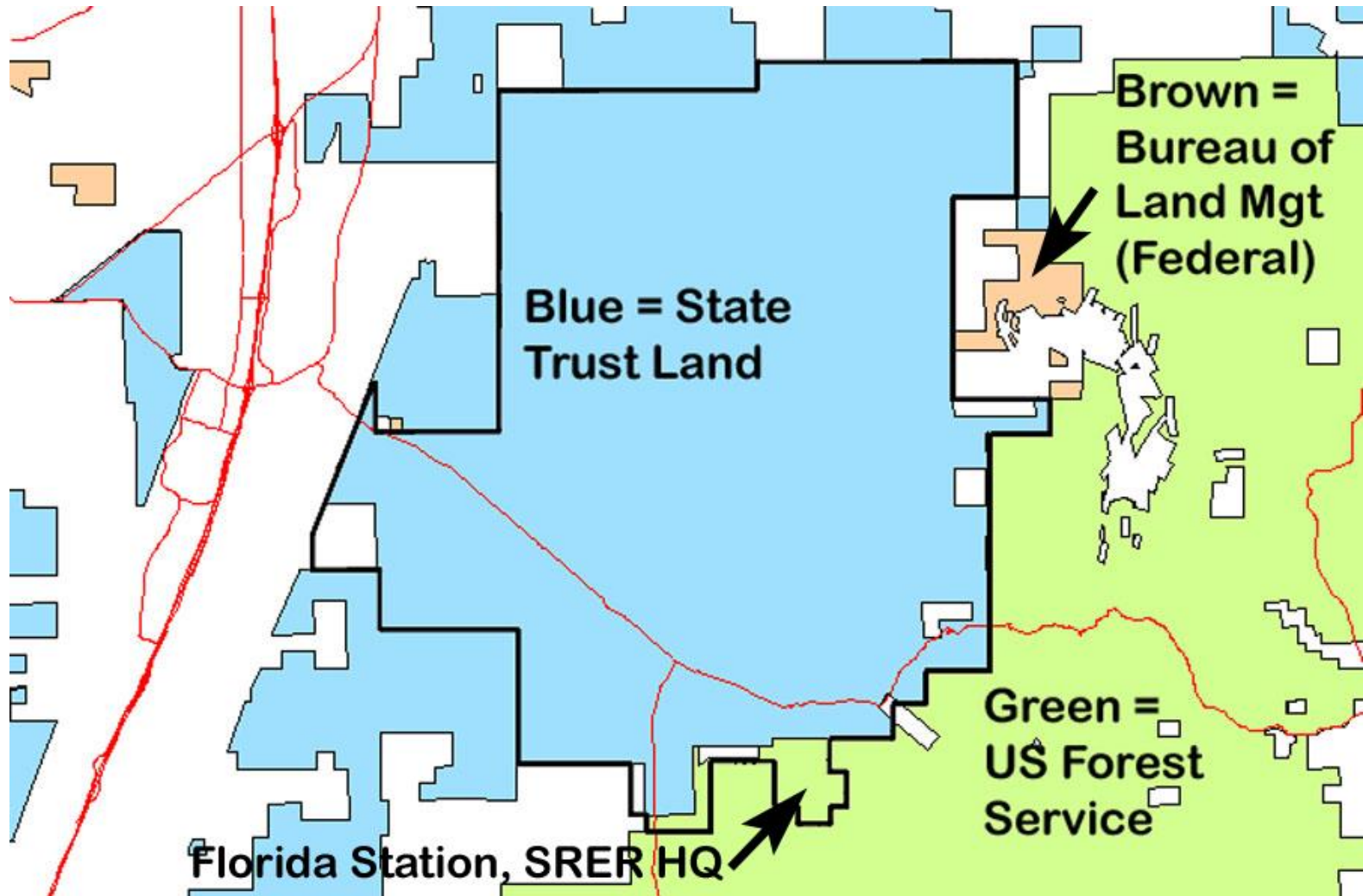


# 2003 Pima County announces SRER is Open Space in its Sonoran Desert Conservation Plan





# SRER HQ (Florida Station) is on USFS administered land

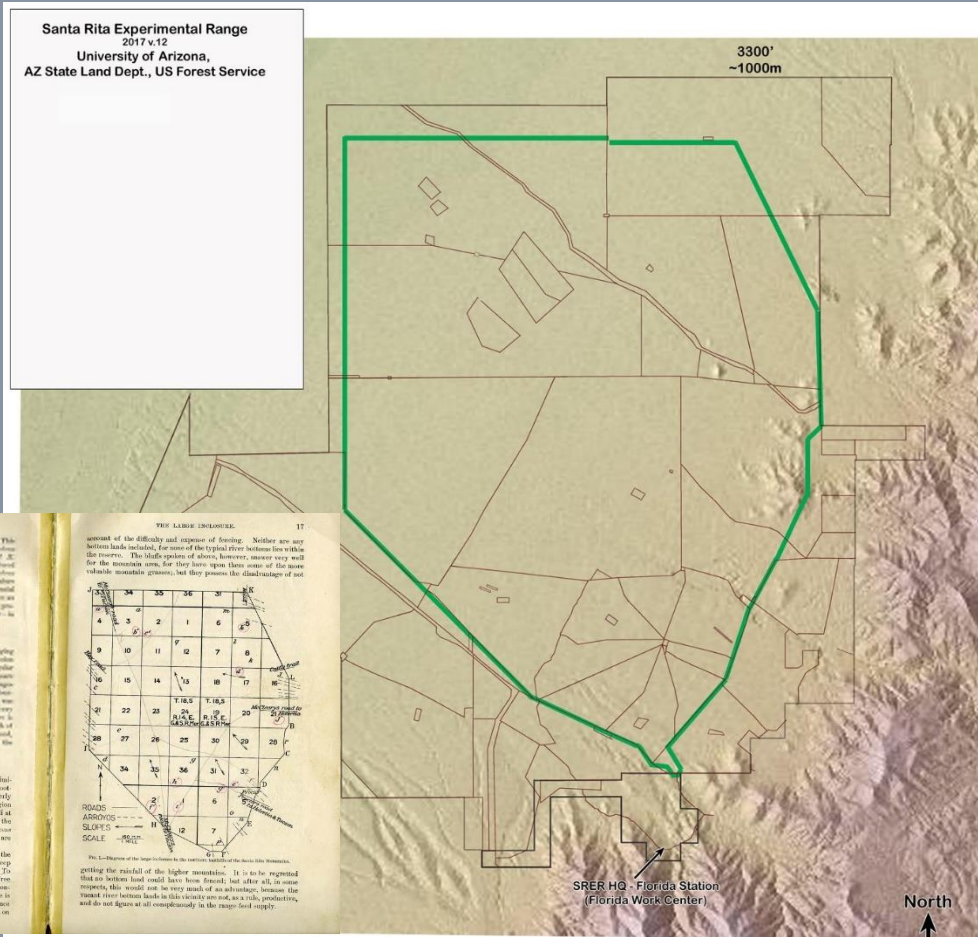








# The "Large Enclosure" – 50 sections - fenced 1903

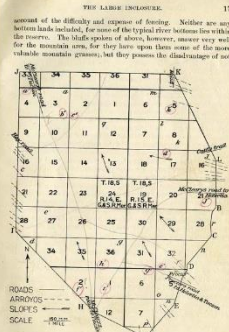


Cattle were excluded in 1903... and were still excluded in 1910

**THE LARGE ENCLOSURE.**

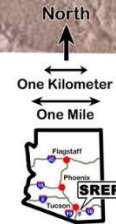
17

amount of the difficulty and expense of fencing. Neither are any bottom lands included, for most of the typical river bottom lies within the inclosure. The high spots of above, however, insure very well valuable mountain grasses, but they possess the disadvantage of not

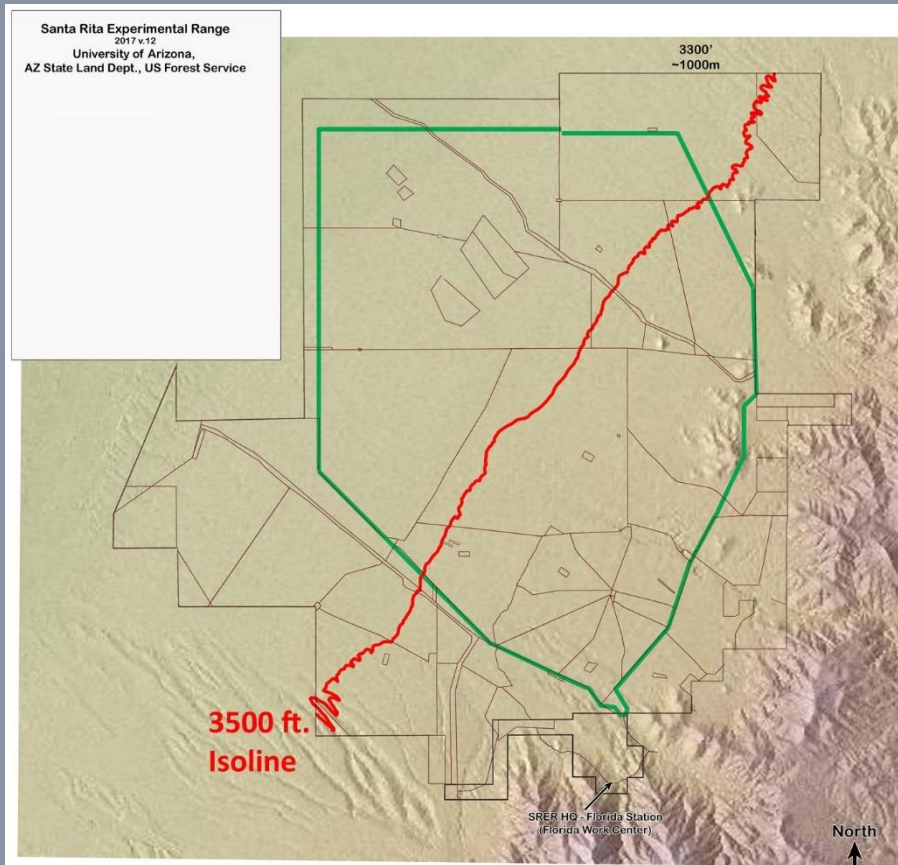


getting the rainfall of the higher mountains. It is to be regretted that no bottom land could have been fenced, but after all, in case respects, this would not be very much of an advantage, because the usual river bottom lands in this vicinity are not as a rule productive, and do not figure at all conspicuously in the range food supply

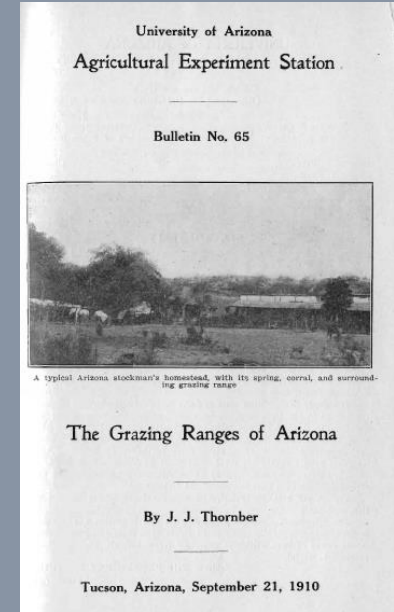
**Santa Rita Experimental Range.**  
Green line is ~ "large enclosure" fenced from open range in 1903. David Griffiths, 1904, "Range Investigations."



# J. J. Thornber discusses this enclosure, and distinguishes **lower** and **higher elevation zones** divided by 3500 foot elevation

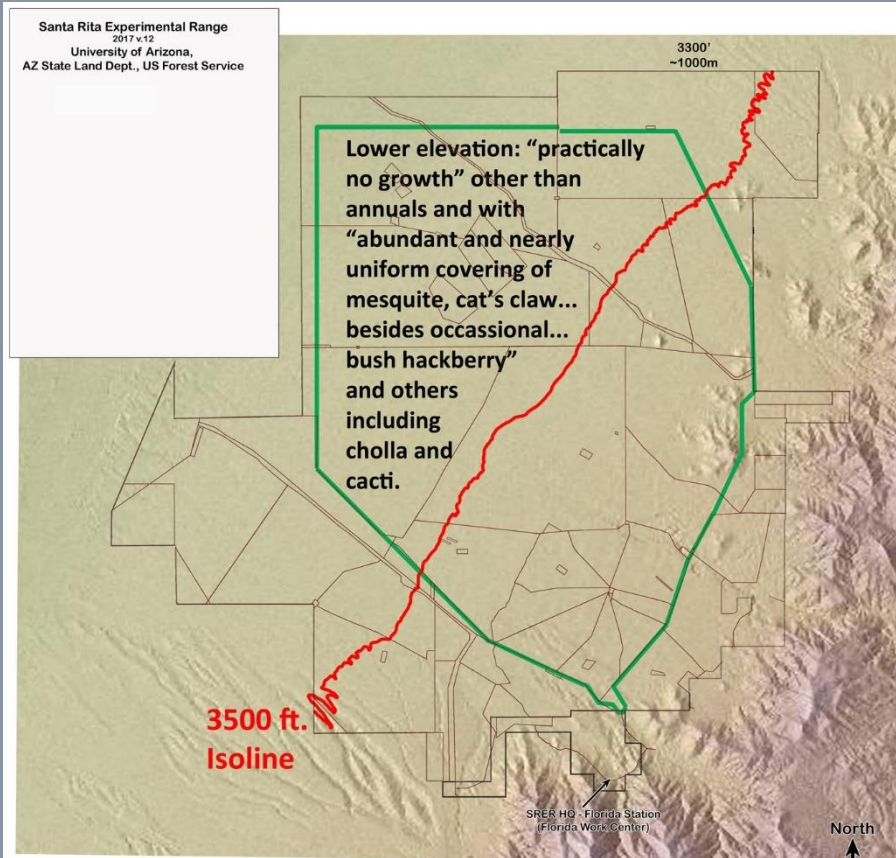


**Santa Rita Experimental Range.**  
Green line is ~ "large enclosure" fenced from open range in 1903. Red line divides "lower" and "higher" elevation areas distinguished by J. J. Thornber, 1910, "Grazing Ranges of Arizona," pages 295-298.

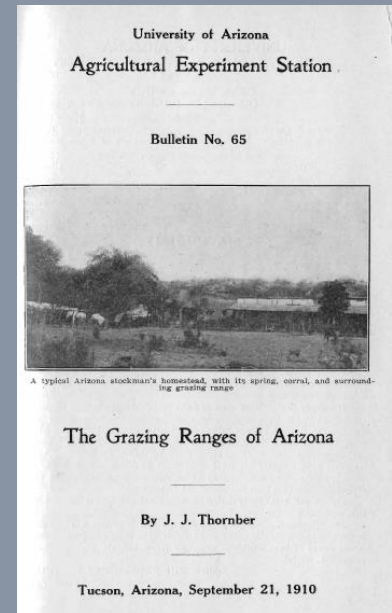




Lower elevation: “practically no [perennial grass] growth” but “abundant and nearly uniform” mesquite and acacia..., as well as other species



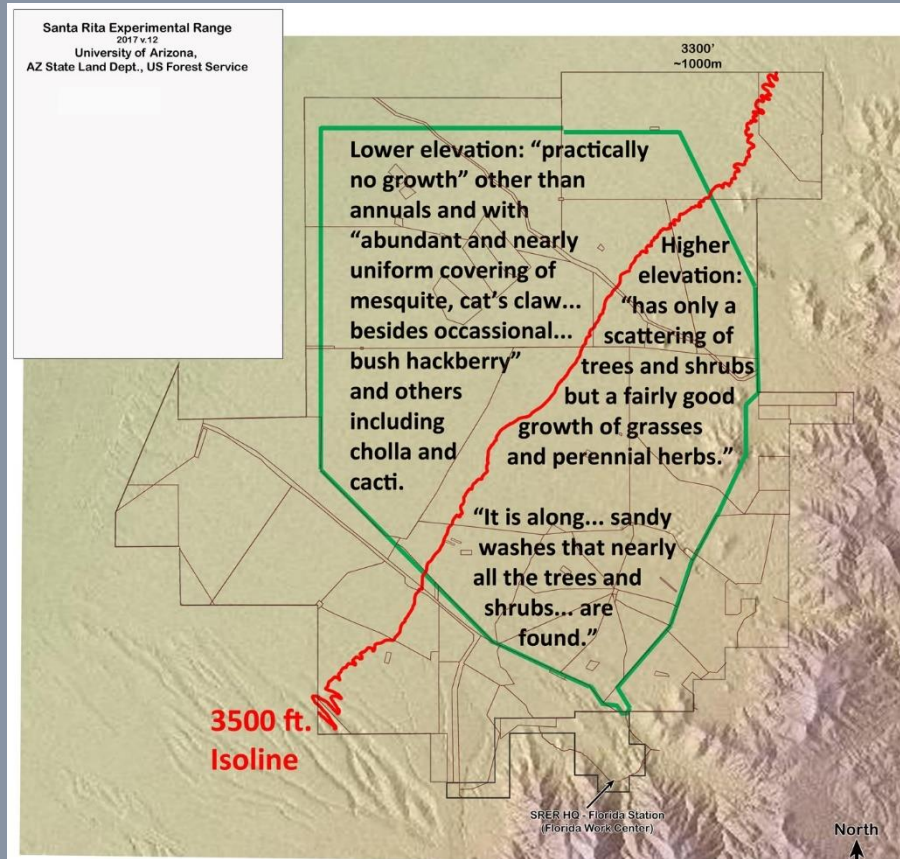
**Santa Rita Experimental Range.**  
Vegetation description in “lower” and “higher” elevation areas distinguished by J. J. Thornber, 1910, “Grazing Ranges of Arizona,” pages 295-298.



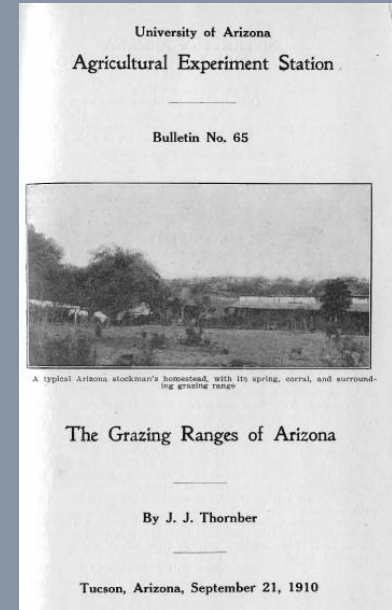
SRER



# Higher elevation: “fairly good growth of grass” and trees and shrubs found “along sandy washes”



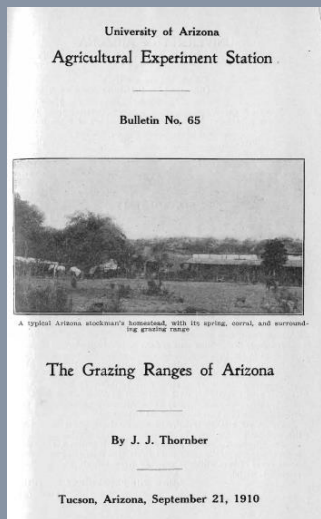
**Santa Rita Experimental Range.**  
Vegetation description in “lower” and “higher” elevation areas distinguished by J. J. Thornber, 1910, “Grazing Ranges of Arizona,” pages 295-298.



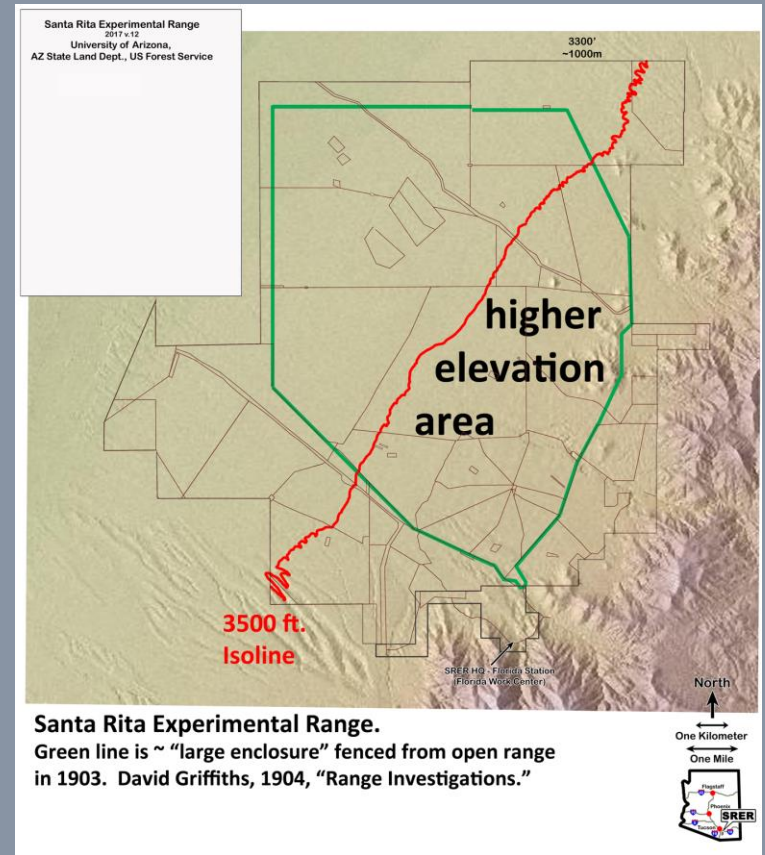


# Thornber writing in 1910 about the large enclosure:

“Young mesquite plants are coming in quite thickly... [in] grassy [higher elevation] portions of this [fenced] tract.”

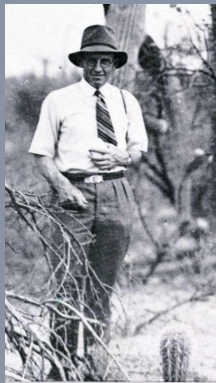
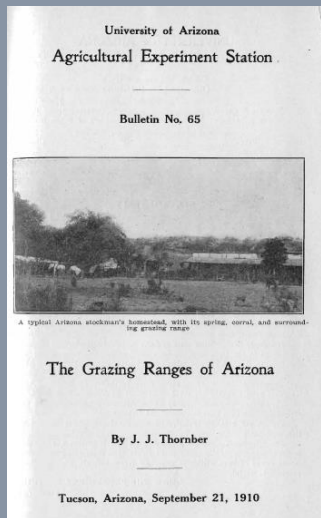


Pages 295 - 298

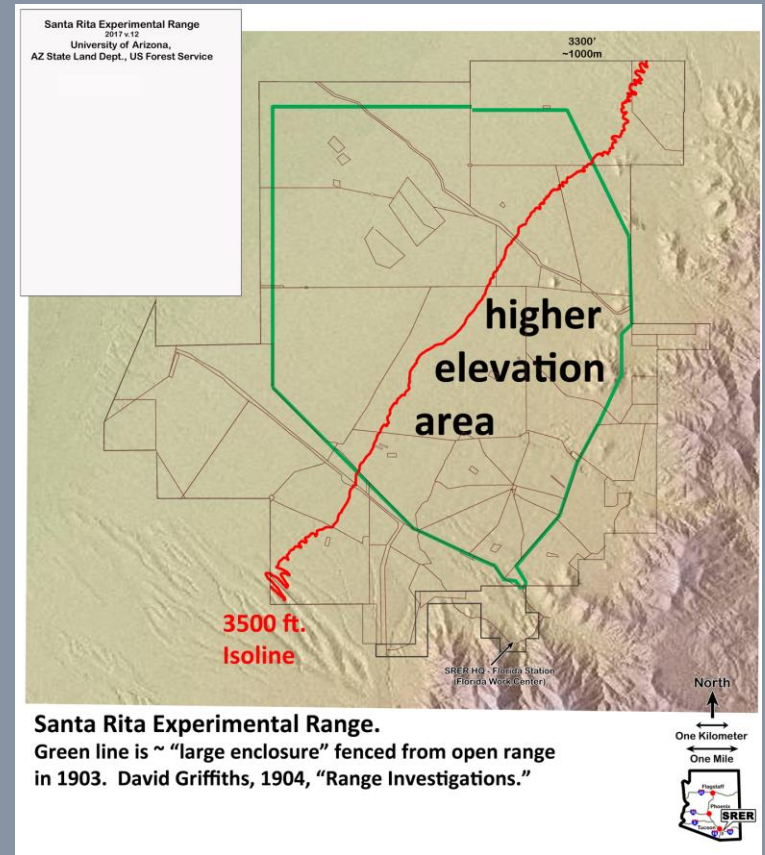


# Thornber writing in 1910 about the large enclosure.

With heavy stocking of the open range, “close grazing would come to play the part... that fires had formerly done....”



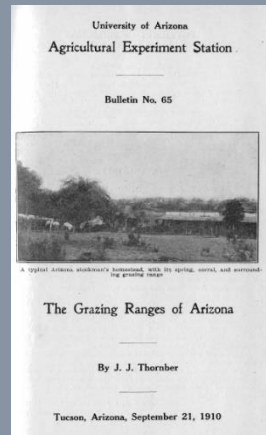
Pages 295 - 298





# Thornber writing in 1910, summary:

- Due to close grazing during Open Range Era, livestock kept mesquite in check [a contrast to the cattle-spread-mesquite narrative]



Pages 295 –  
298

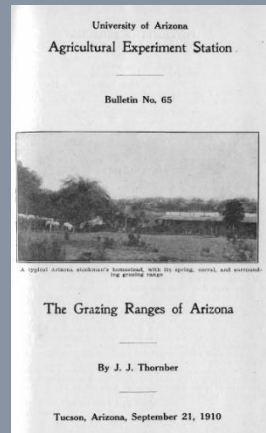


SRER



# Thornber writing in 1910, summary:

- Due to close grazing during Open Range Era, livestock kept mesquite in check [a contrast to the cattle-spread-mesquite narrative]
- Mesquite shrub growth was “abundant and nearly uniform” in lower elevations c. 1910



Pages 295 –  
298

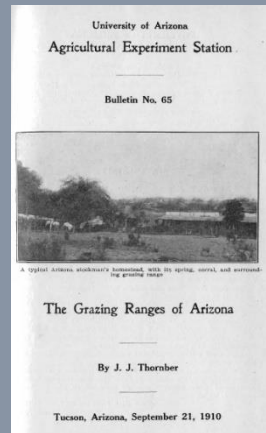


SRER



# Thornber writing in 1910, summary:

- Due to close grazing during Open Range Era, livestock kept mesquite in check [a contrast to the cattle-spread-mesquite narrative]
- Mesquite shrub growth was “abundant and nearly uniform” in lower elevations c. 1910
- Mesquite “reassertion” occurred in higher elevations <7 years following exclusion from cattle grazing



Pages 295 –  
298

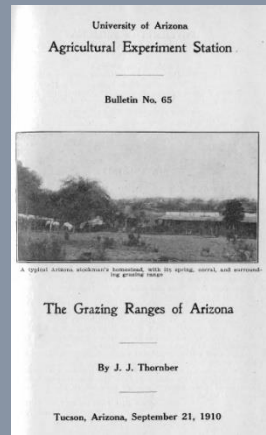


SRER



# Thornber writing in 1910, summary:

- Due to close grazing during Open Range Era, livestock kept mesquite in check [a contrast to the cattle-spread-mesquite narrative]
- Mesquite shrub growth was “abundant and nearly uniform” in lower elevations c. 1910
- Mesquite “reassertion” occurred in higher elevations <7 years following exclusion from cattle grazing
- **Why did he use the word “reassertion”?????**



Pages 295 –  
298

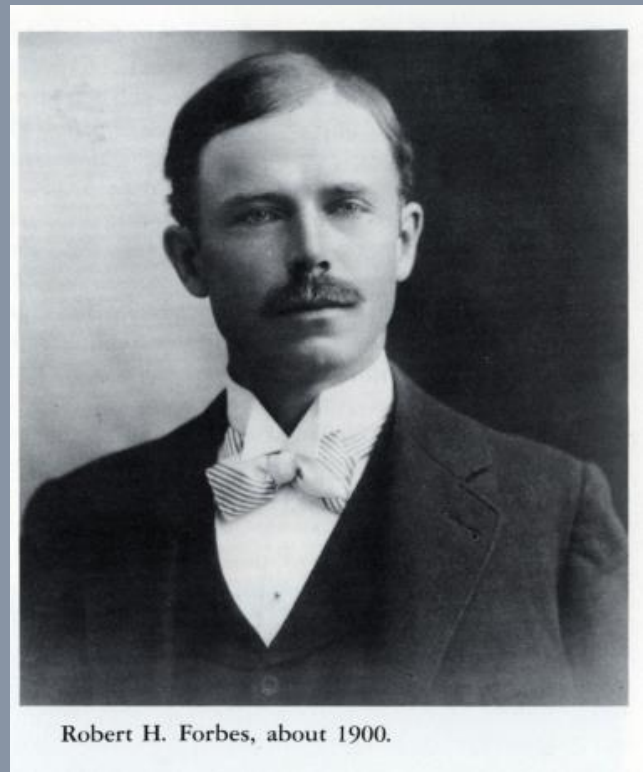


SRER





“We must know this primitive nature in whose lap we live if we would win her smiles.” Robert H. Forbes, 1895, in a teaching aid for Arizona public school teachers.



Robert H. Forbes, about 1900.



COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES

# Professor Forbes: >120 years later ...we are still learning

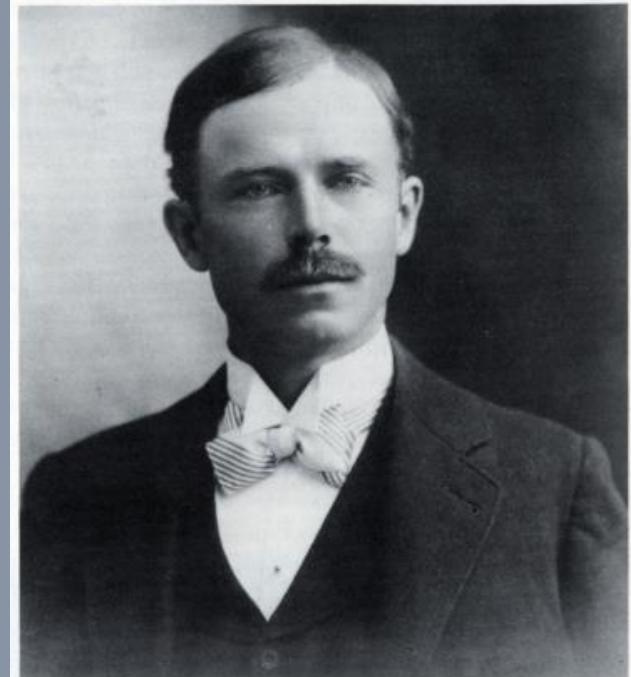


College of Agriculture  
& Life Sciences

**You are Invited!**

**Brush Management Workshop (first in a series of three)**

Funded by Western SARE  
(Sustainable Agriculture Research and Education Program)



Robert H. Forbes, about 1900.



**SRER**



**COLLEGE OF  
AGRICULTURE &  
LIFE SCIENCES**



Thank you





# Questions?

