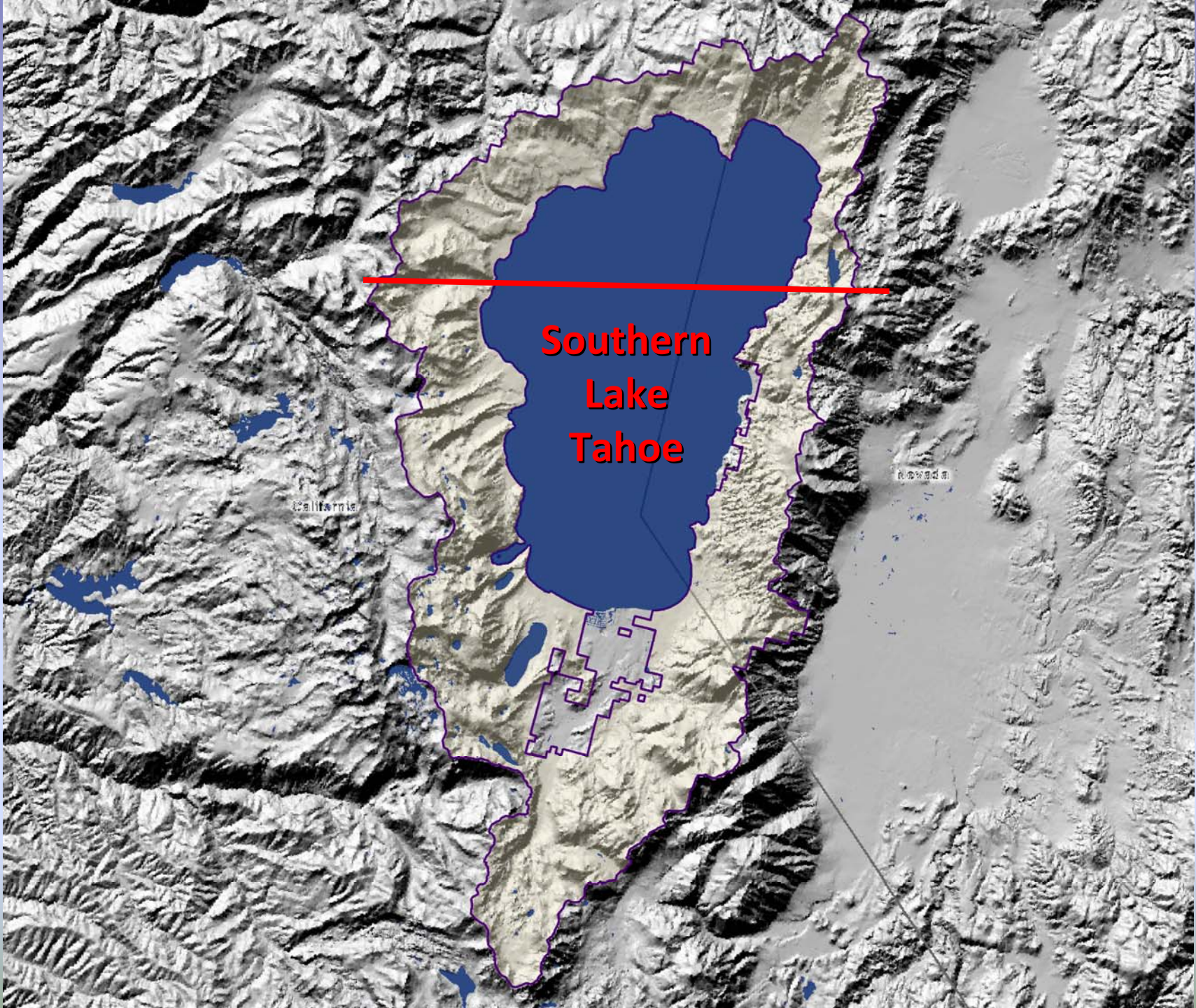


A Century of Jeffrey Pine Beetle-Caused Mortality in Southern Lake Tahoe (1912-2009)



Joel M Egan, FHP Entomologist

John Wenz, Retired, FHP Entomologist



**Southern
Lake
Tahoe**

California

Nevada

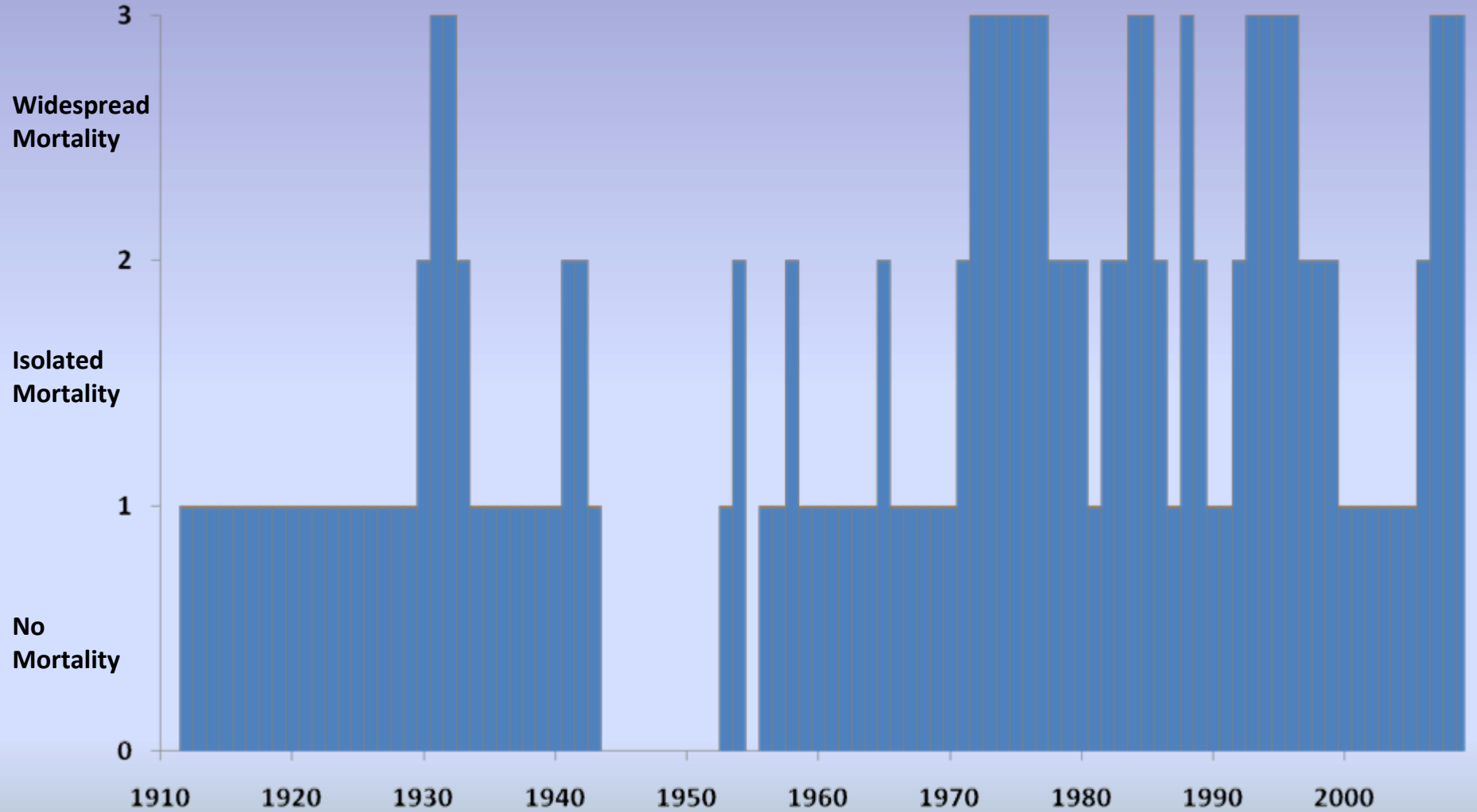
Historic Jeffrey Pine Beetle Records for South Lake Tahoe

- Bureau of Entomology and Plant Quarantine Reports (1912-1943)
- CA Forest and Range Experiment Station
 - Annual Pest Conditions Reports (1953-1959)
 - Outbreak Summary w/ Research Plots (1971-1978)
- CA Forest Pest Council Annual Condition Reports (1960-2009)
- State & Private Forestry, Forest Health Protection (1987-2009)
 - Biological Evaluations
 - Mortality Surveys
 - Forest Health Monitoring R5 Insect & Disease Atlas

Jeffrey Pine Beetle-Caused Mortality Index

- 0-3 numerical value
 - 0: No records
 - 1: No Mortality reported
 - Records available
 - 2: Limited Mortality reported
 - 1-2 spatially-isolated locations
 - “increasing, sporadic, scattered” mortality
 - 3: Widespread Mortality reported
 - > 2 locations
 - “outbreak, epidemic, widespread”, mortality

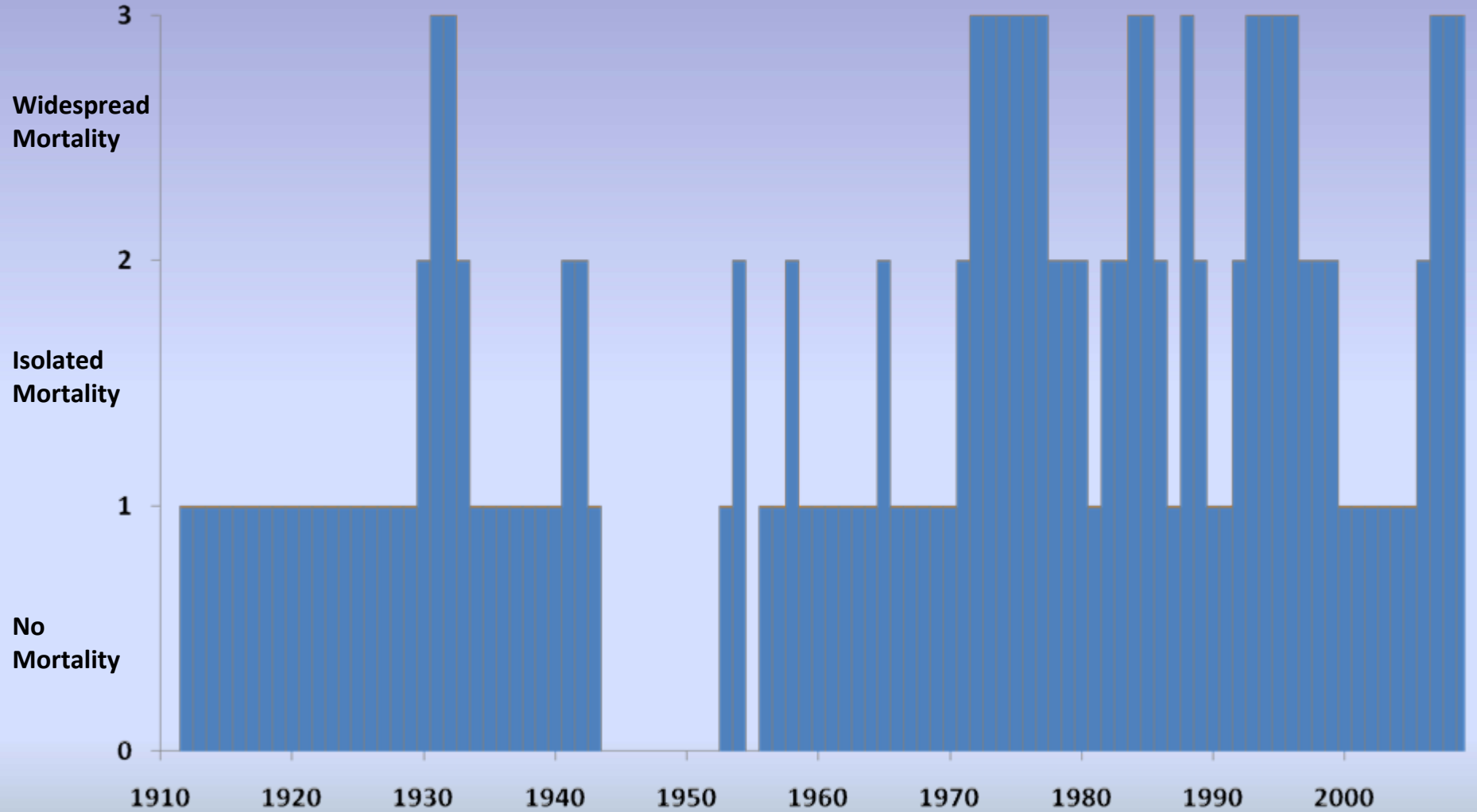
Jeffrey Pine Beetle-Caused Mortality Index for South Lake Tahoe 1912-2009



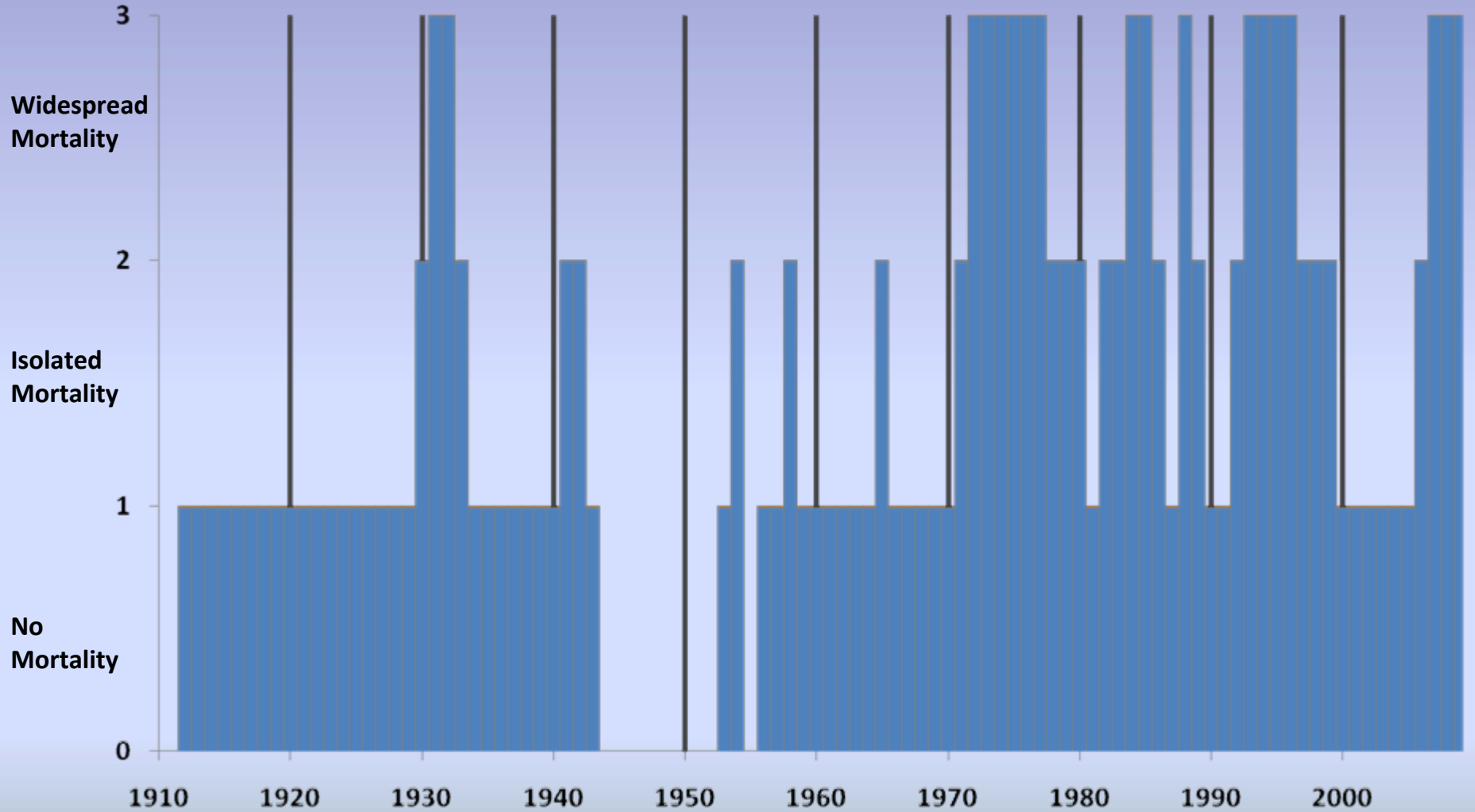
Jeffrey Pine Beetle-Caused Mortality 1912-2009

- All descriptions of isolated mortality referred to “large-diameter trees”
- Outbreak = multiple (>1) years of Widespread Mortality (Historic Index 3)
 - 5 outbreaks recorded in last century
 - Temporal extent: average 5 years (range 4-8)
 - Since 1970s: an outbreak every decade

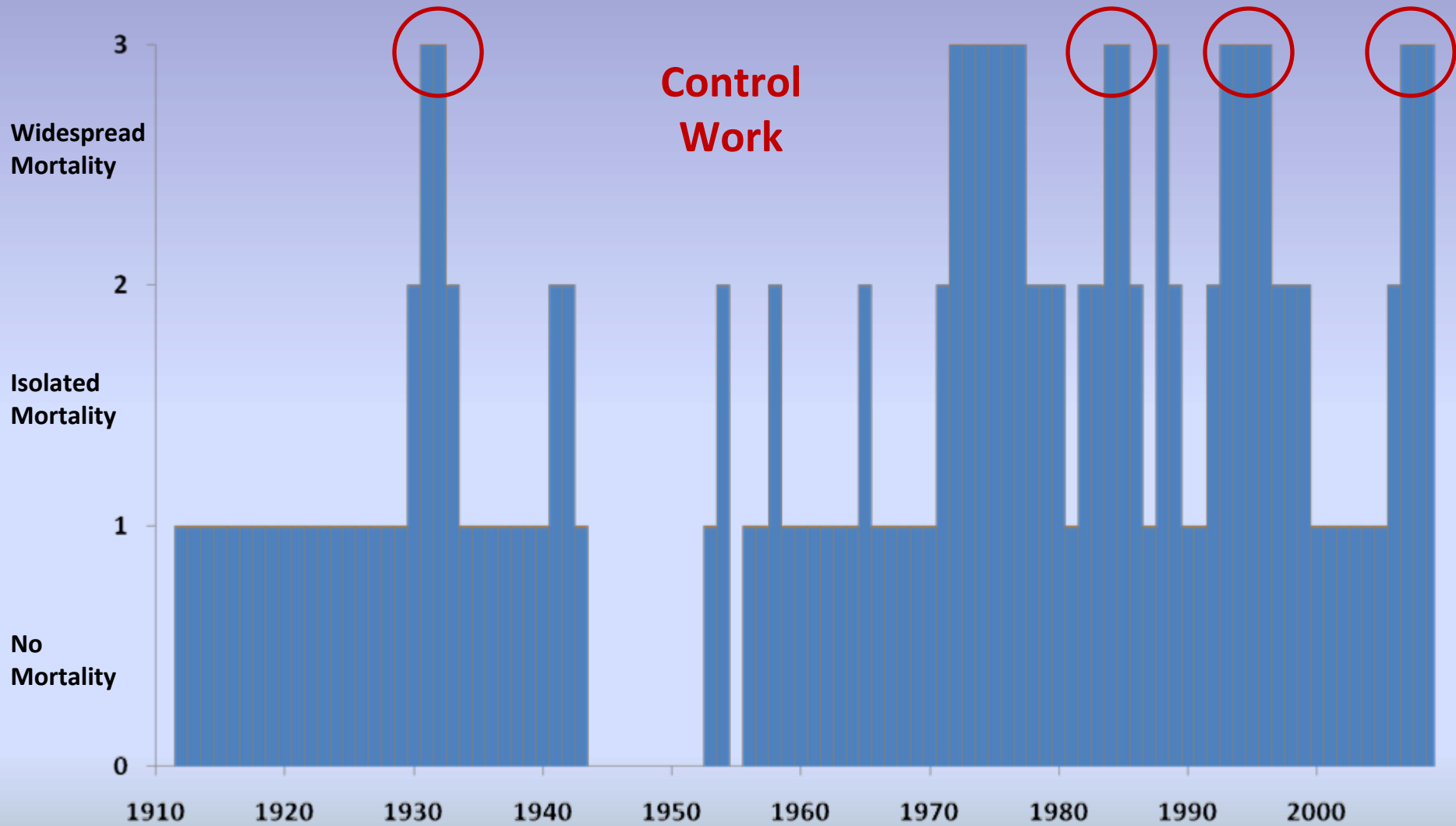
Jeffrey Pine Beetle-Caused Mortality Index for South Lake Tahoe 1912-2009



Jeffrey Pine Beetle-Caused Mortality Index for South Lake Tahoe 1912-2009



Jeffrey Pine Beetle-Caused Mortality Index for South Lake Tahoe 1912-2009



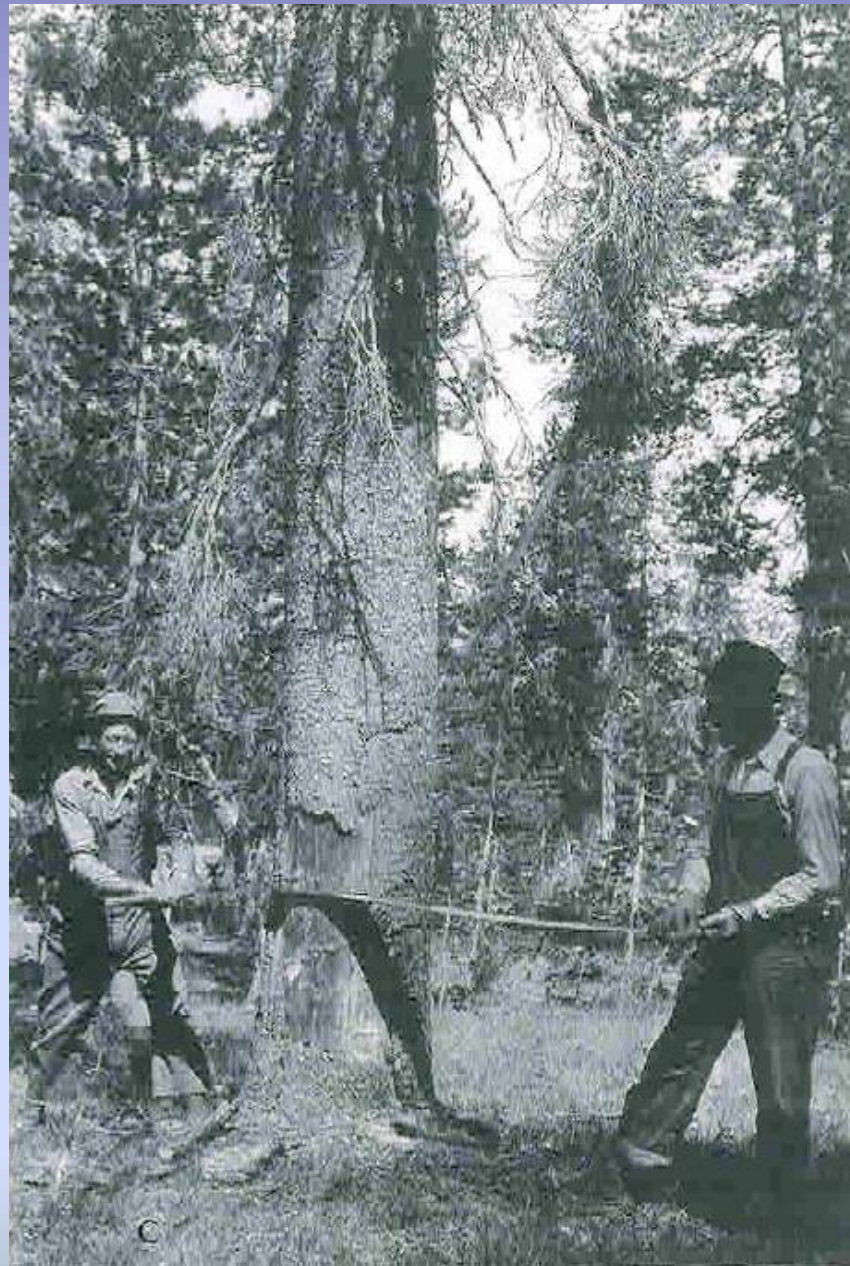


Photo #6103 by J.E.
Patterson 1929



Photo #488, H.J. Rust,
Coeur d'Alene Forest
Insect Laboratory

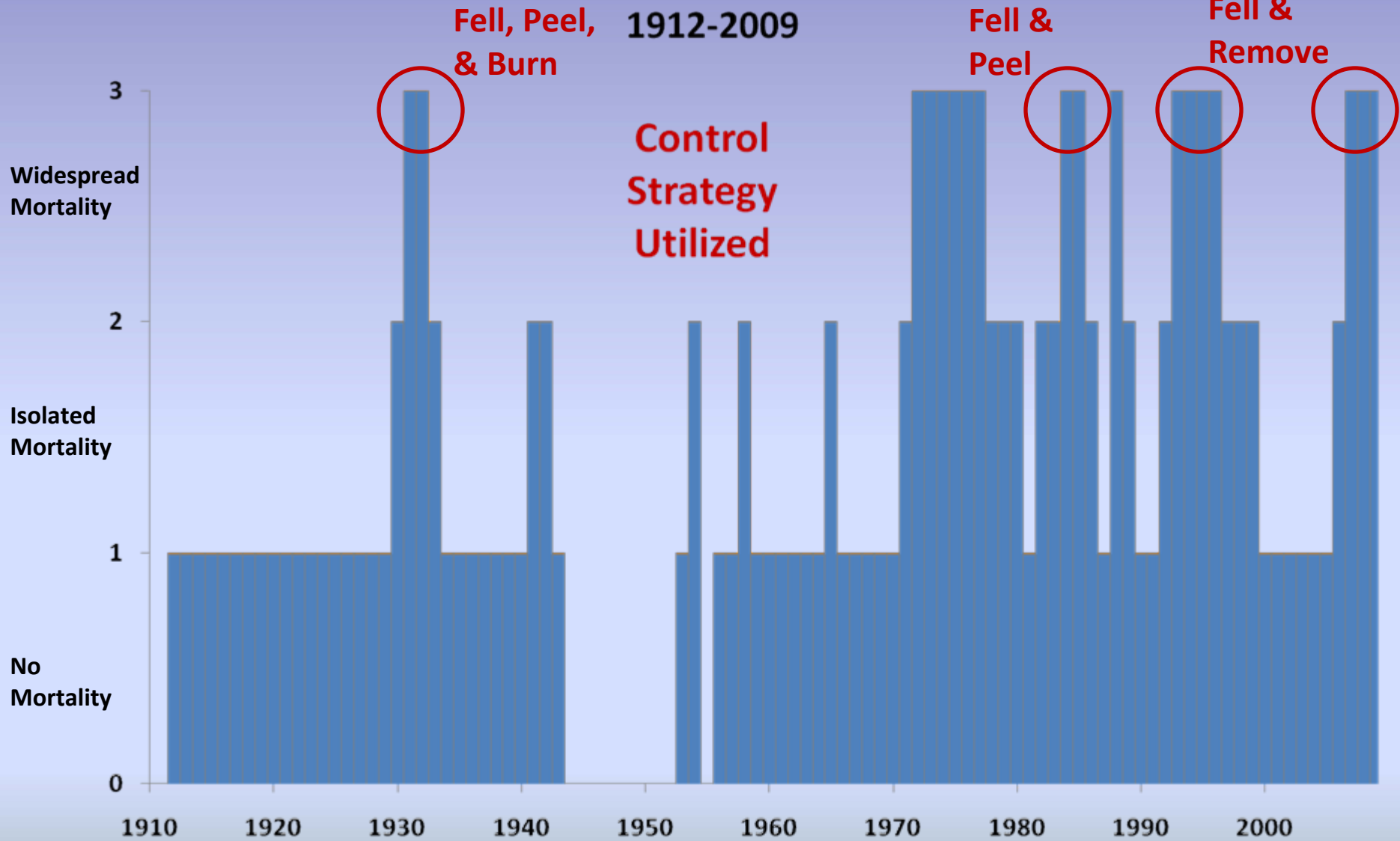


Photo #3204 by F.P. Keen



Miller and Keen (1960, p.277)

Jeffrey Pine Beetle-Caused Mortality Index for South Lake Tahoe 1912-2009



Jeffrey Pine Beetle Control in South Lake Tahoe

- 1933 – Fallen Leaf Lake & Baldwin estates
 - Results: **44% mortality reduction** post-treatment^a
- 1941 – Land owners would not let Feds treat infested trees
- 1980s – South Shore Recreation Complex
 - Results: **56% mortality reduction** post-treatment^a
- 1990s – Recreation sites throughout South Lake Tahoe
 - Results: **37% mortality reduction** post-treatment^a
 - Results: **7% treated vs. 42% non-treated** total mortality (1992-1997)
- 2009 – Fallen Leaf Lake
 - Preliminary Results – **80% mortality reduction** post-treatment^a

^a % is mortality reduction based on pre-treatment mortality vs. 1 year post-treatment mortality

Jeffrey Pine Beetle-Caused Mortality in Nevada Beach 1992-1997



Map created by:
Joel M Egan on
9/21/09 using data
collected by J. Wenz
& D. Fournier with GPS
accuracy of +/- 5 feet for
trees surveyed

0 120 240 480 720 960
Feet

1:3,290

1992
0.0%

Purple = Live Tree
Red = Dead Tree

Treated

Jeffrey Pine Beetle-Caused Mortality in Nevada Beach 1992-1997



1993
4.0%

Purple = Live Tree
Red = Dead Tree

Treated

Jeffrey Pine Beetle-Caused Mortality in Nevada Beach 1992-1997

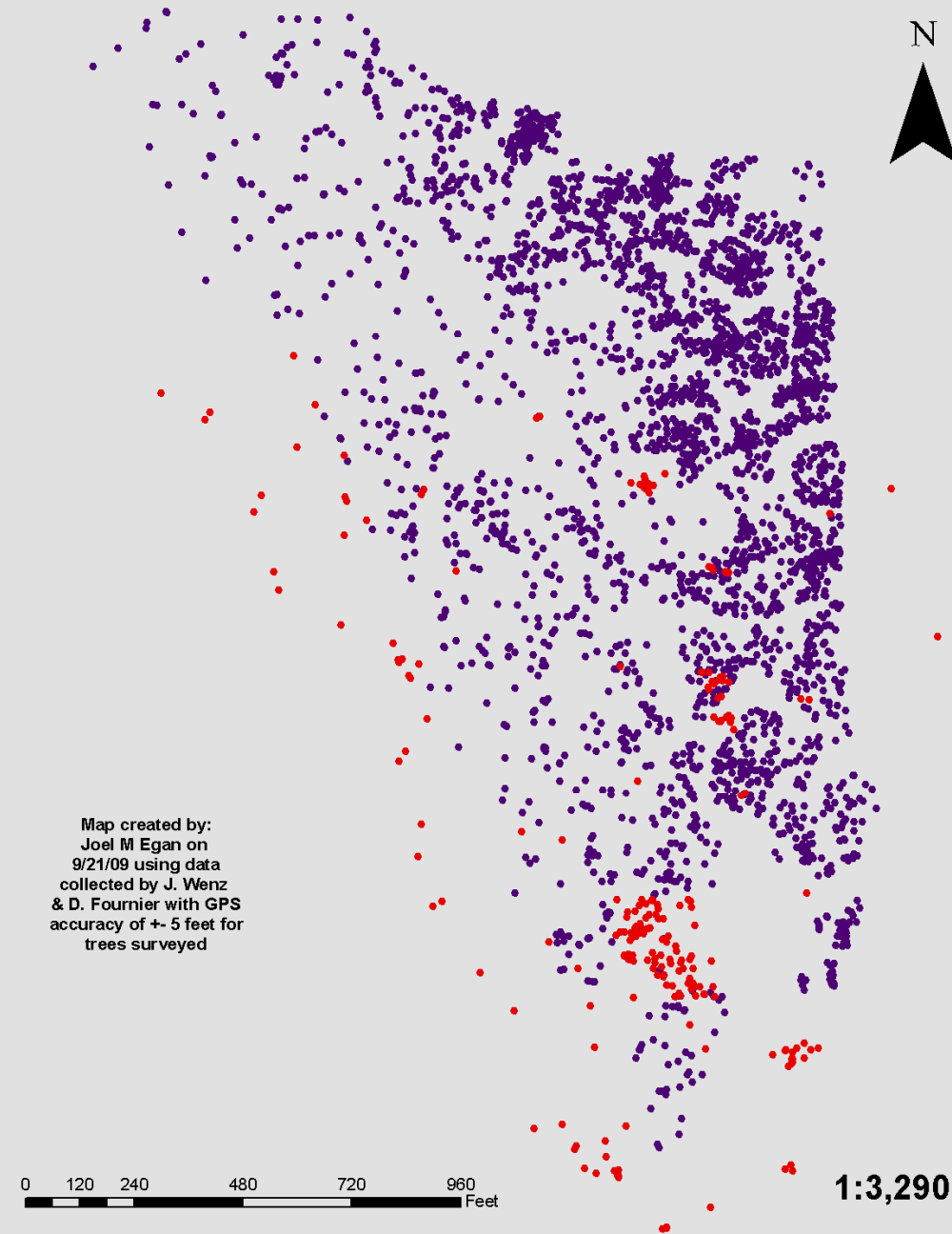


1994
6.6%

Purple = Live Tree
Red = Dead Tree

Treated

Jeffrey Pine Beetle-Caused Mortality in Nevada Beach 1992-1997

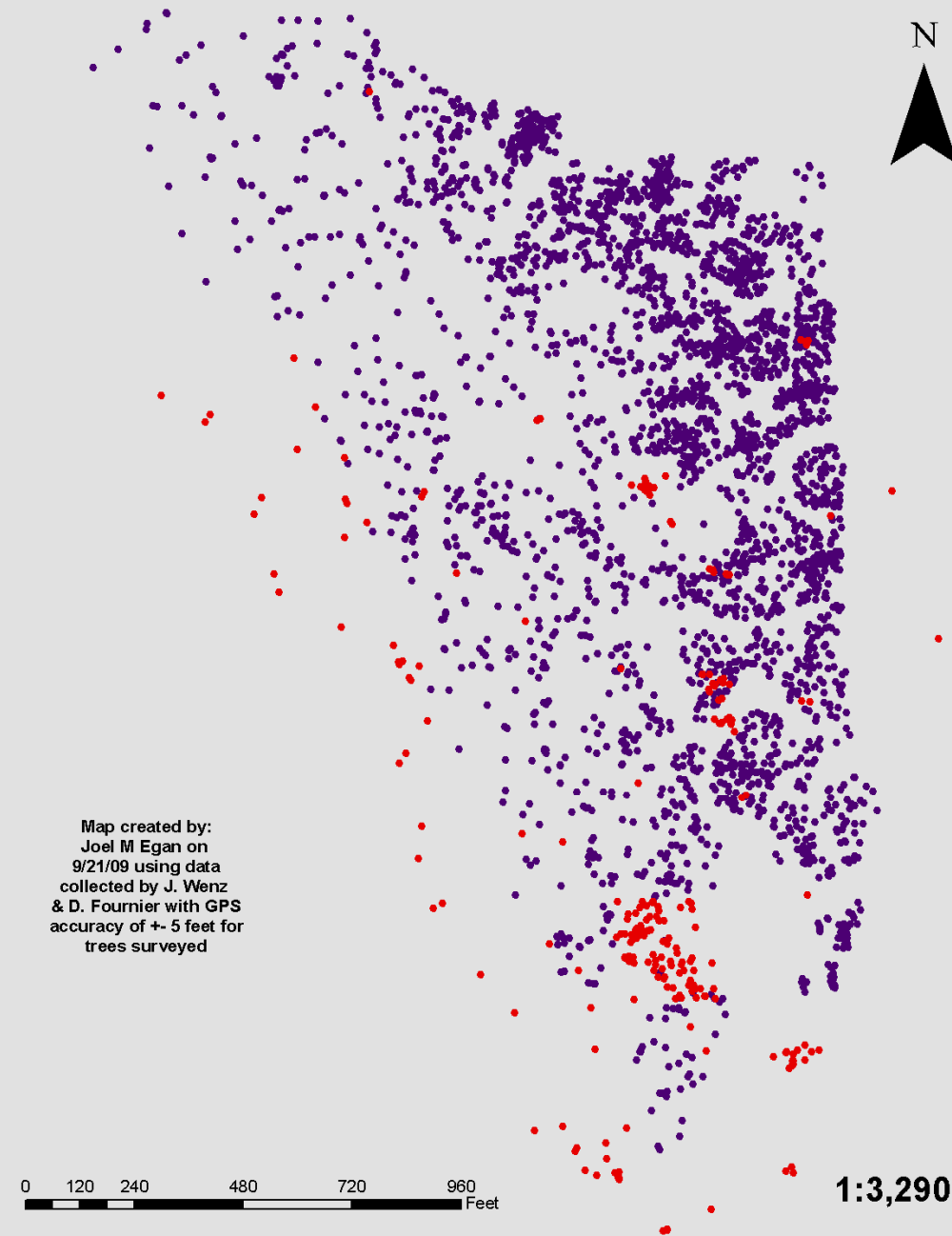


1995
7.1%

Purple = Live Tree
Red = Dead Tree

Treated

Jeffrey Pine Beetle-Caused Mortality in Nevada Beach 1992-1997



1996
7.4%

Purple = Live Tree
Red = Dead Tree

Treated

Jeffrey Pine Beetle-Caused Mortality in Nevada Beach 1992-1997



Map created by:
Joel M Egan on
9/21/09 using data
collected by J. Wenz
& D. Fournier with GPS
accuracy of +/- 5 feet for
trees surveyed

0 120 240 480 720 960
Feet

1:3,290

1997 7.4%

Purple = Live Tree
Red = Dead Tree

Treated



Jeffrey Pine Beetle-Caused Mortality in Spooner Junction 1992-1997

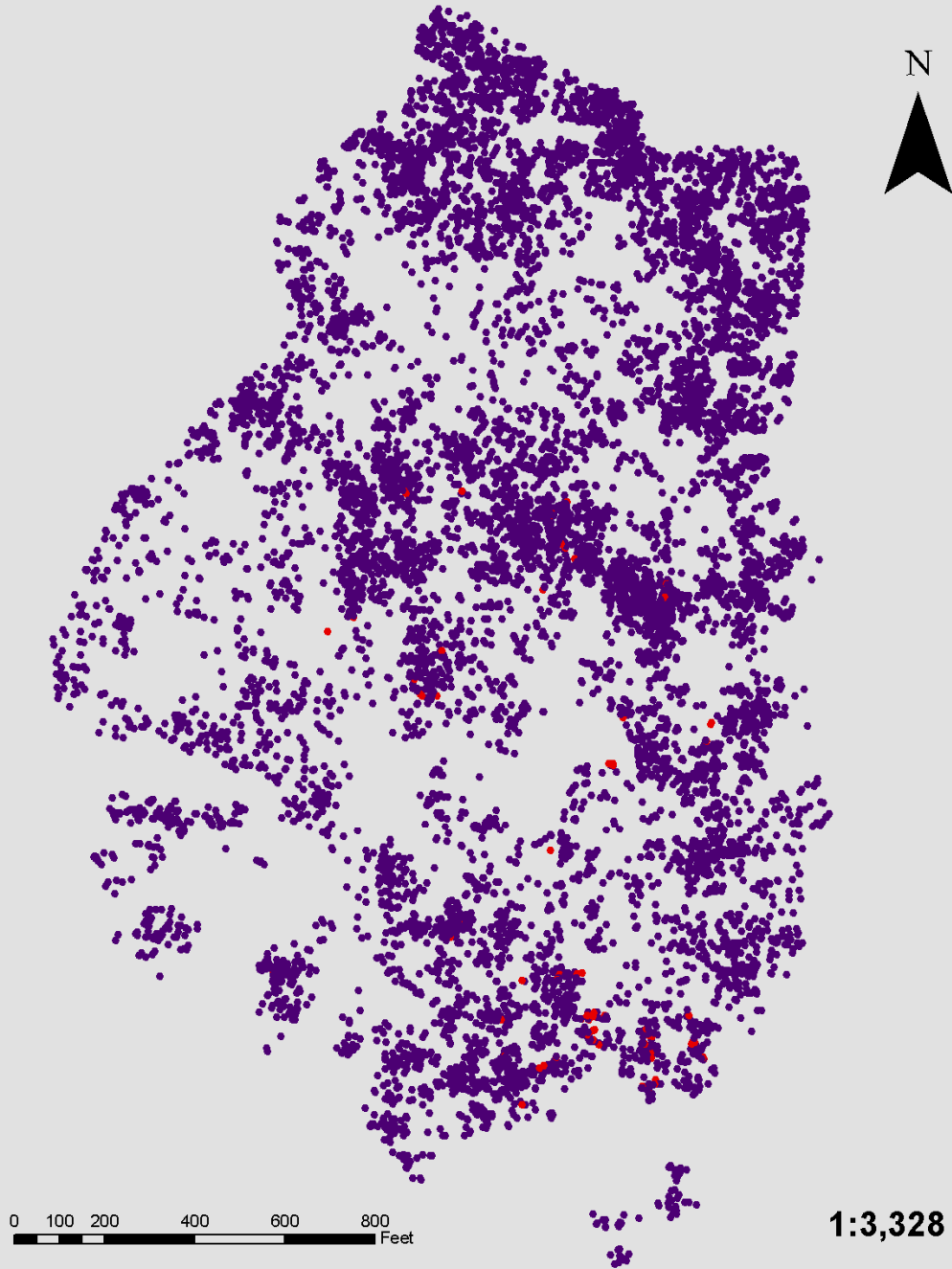


1991
0.0%

Purple = Live Tree
Red = Dead Tree

Non-
Treated

Jeffrey Pine Beetle-Caused Mortality in Spooner Junction 1992-1997



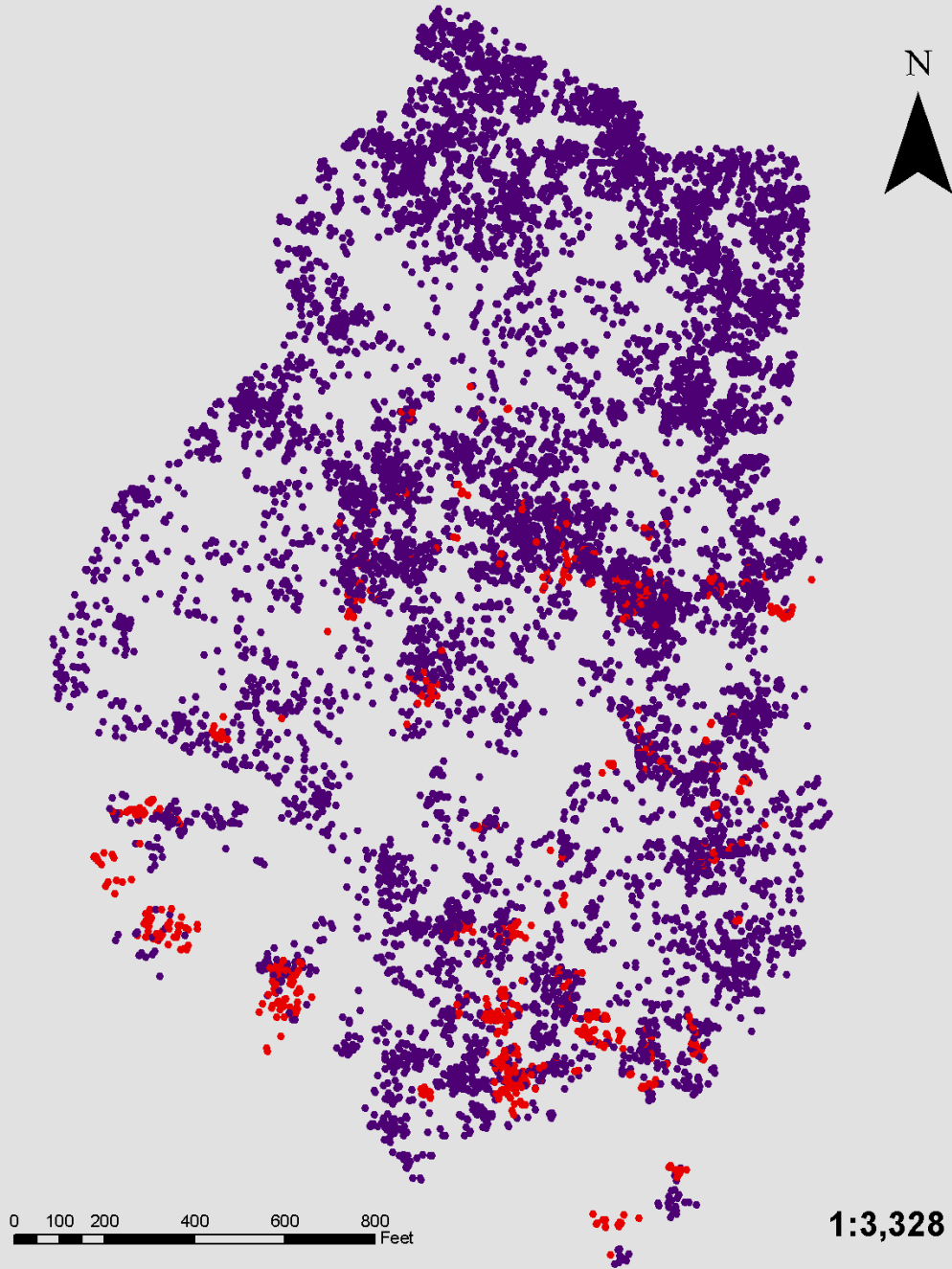
1992
0.8%

Purple = Live Tree
Red = Dead Tree

Non-
Treated

1:3,328

Jeffrey Pine Beetle-Caused Mortality in Spooner Junction 1992-1997



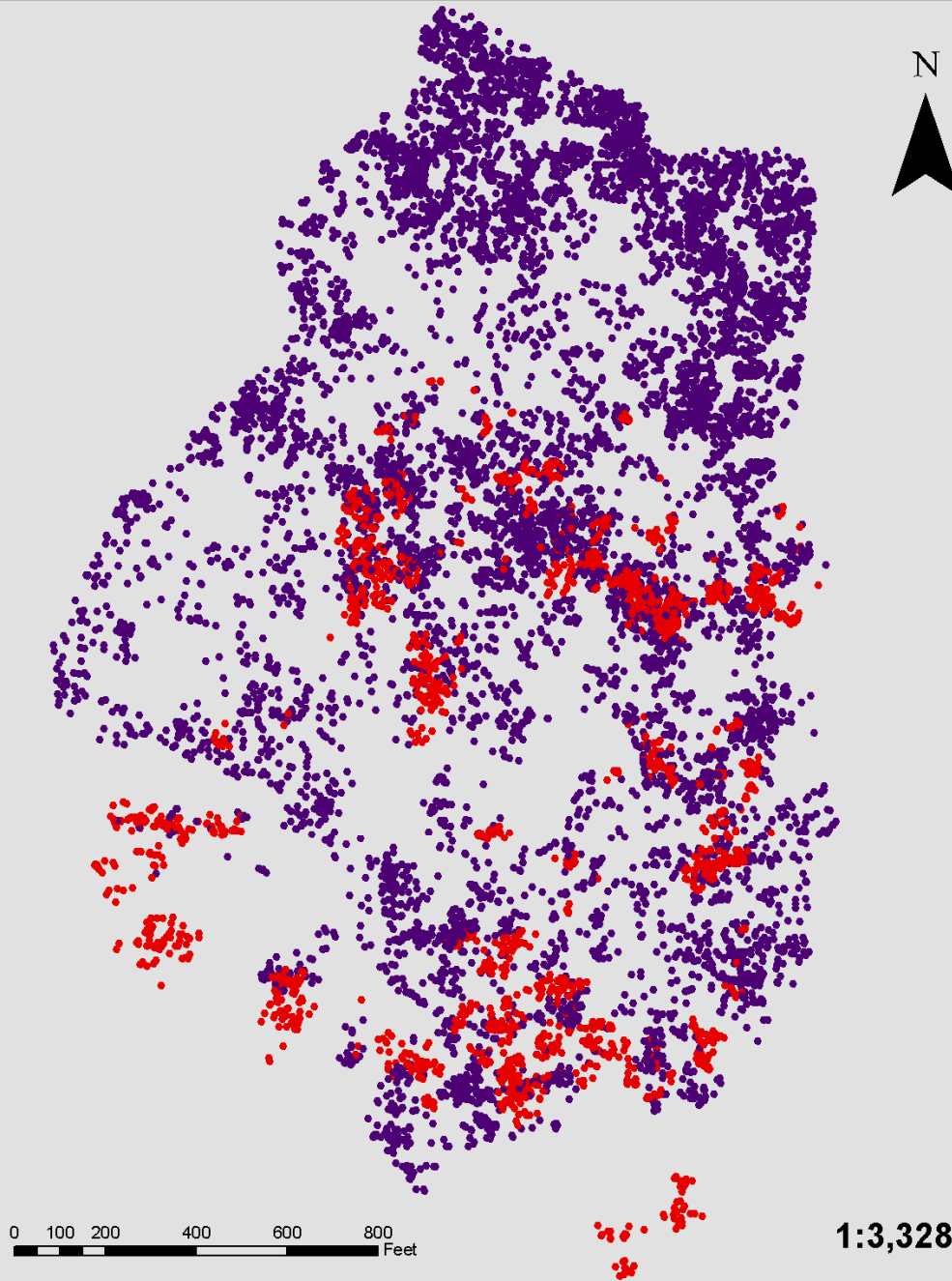
1993
7.2%

Purple = Live Tree
Red = Dead Tree

Non-
Treated

1:3,328

Jeffrey Pine Beetle-Caused Mortality in Spooner Junction 1992-1997



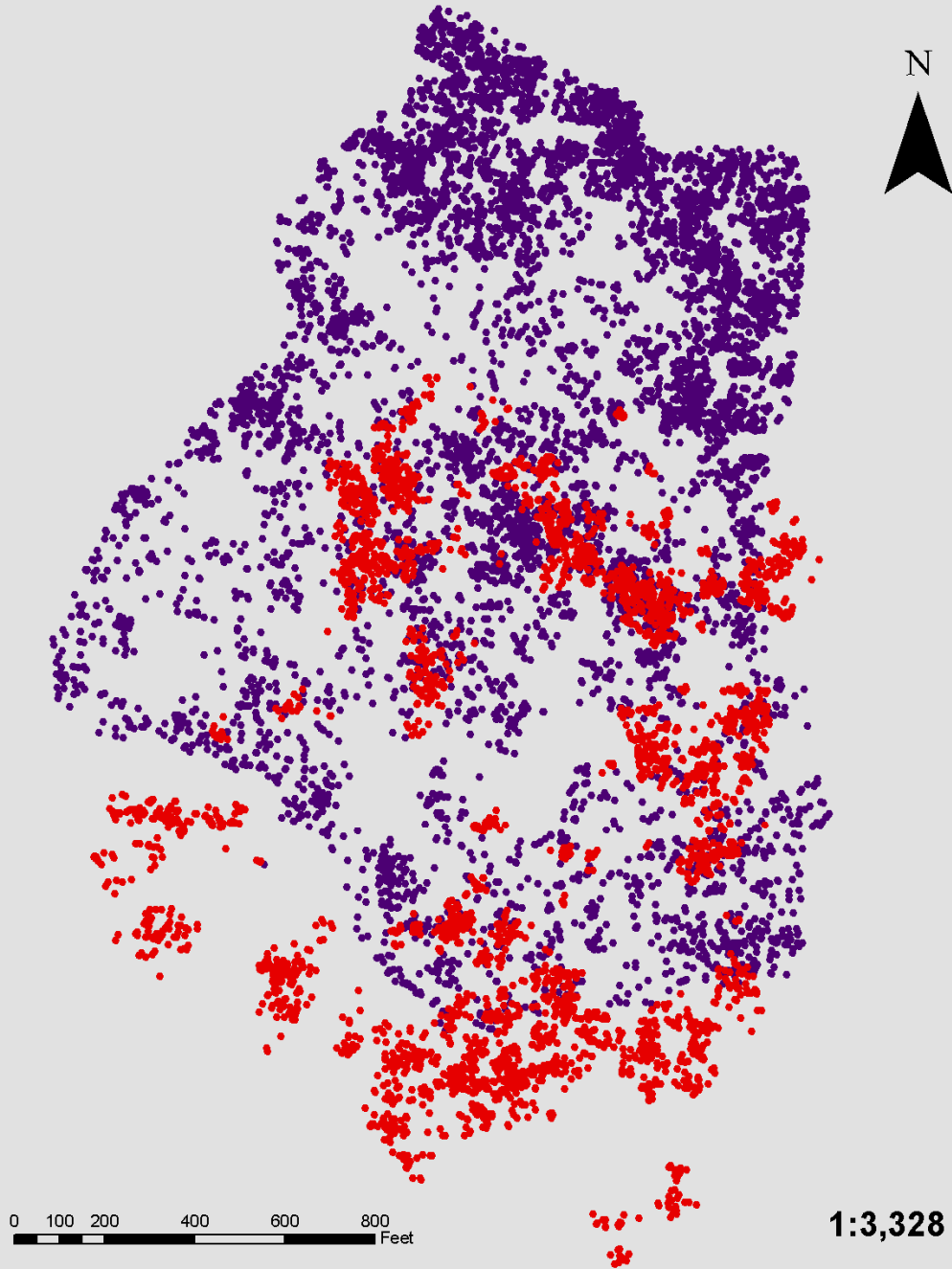
1:3,328

1994
18.7%

Purple = Live Tree
Red = Dead Tree

Non-
Treated

Jeffrey Pine Beetle-Caused Mortality in Spooner Junction 1992-1997



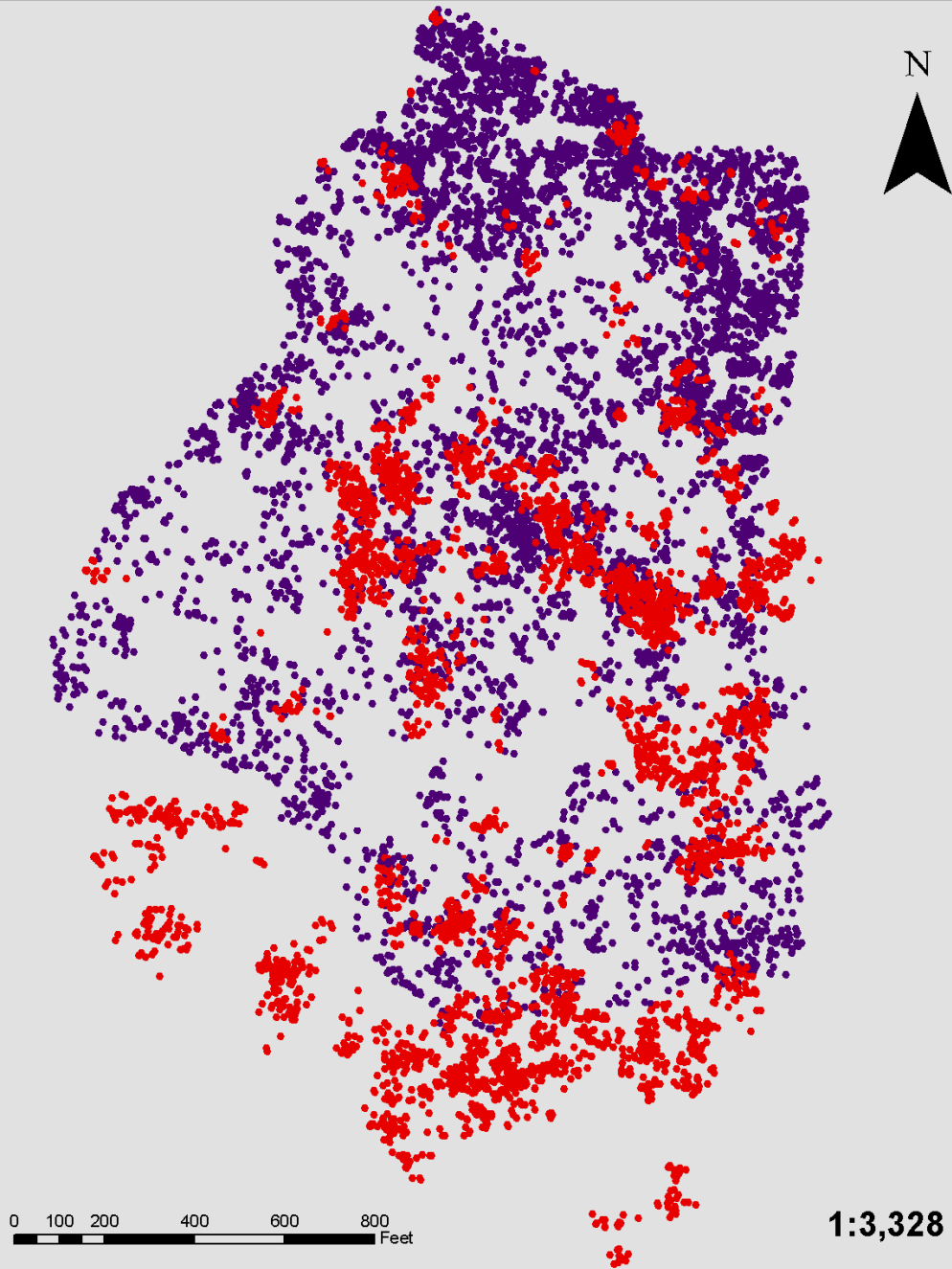
1995
32.8%

Purple = Live Tree
Red = Dead Tree

Non-
Treated

1:3,328

Jeffrey Pine Beetle-Caused Mortality in Spooner Junction 1992-1997



1996
39.5%

Purple = Live Tree
Red = Dead Tree

Non-
Treated

1:3,328

Jeffrey Pine Beetle-Caused Mortality in Spooner Junction 1992-1997



1997
42.3%

Purple = Live Tree
Red = Dead Tree

Non-
Treated

1:3,328

Lessons from Historical Reconstruction

- Recording accurate data in standard format is important
- Tree mortality
 - Outbreaks occurred regularly from 1970s-2009
 - JPB-caused mortality often reported in large-diameter trees
 - Appeared strong spatial component to mortality
- Control work
 - Accounts of JPB control indicated reduced mortality
 - Expensive management
 - Short-term solution
 - Preventative management

Thank you for your time!