STATISTIC SAMPLE OF TREES IN MOSCOW, IDAHO

By Cody Willmore

University of Idaho
College of Science

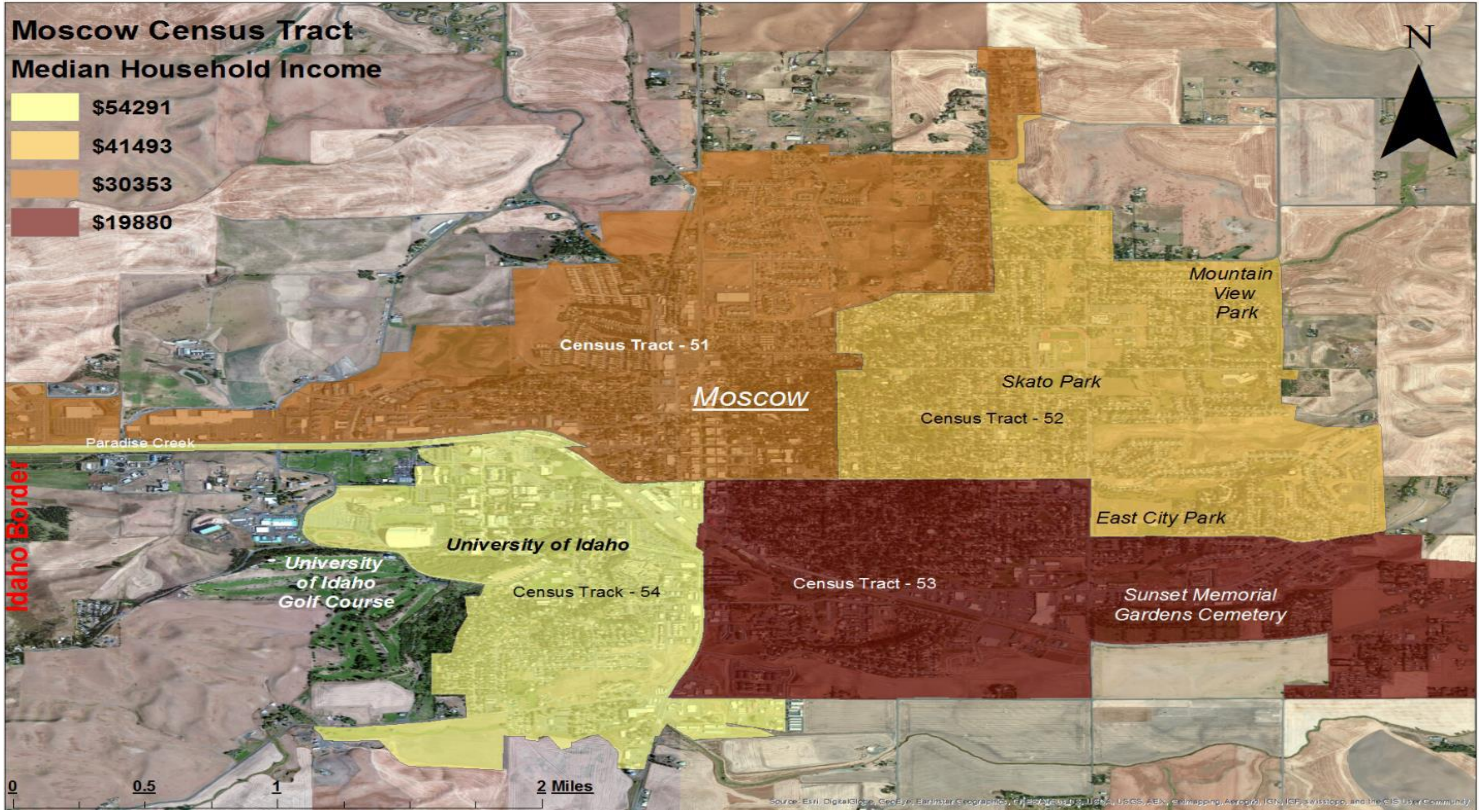
INTRODUCTION

The interest in sustainability is becoming more popularized, due in part to the effects of climate change and the changes observed in seasonal precipitation.

To improve sustainability, this study is interested in implementing a pilot study to see the average tree counts within Moscow based on economics, to determine if an higher average income results in more land cover, thus requiring more water resources to maintain vegetation.

SAMPLING DESIGN

- Elements: Count of trees visually see on a housing lot
- Population: Total households within a census block
- Sampling units: 2013 U.S. Census track
- Frame: Census tracks: 51, 52, 53, and 54
- Sampling designs: Stratified random sampling
  - To optimize any further studies/resources, knowing where is optimal is desired. Thus a stratified random sampling will help determine where further efforts are best suited.



University of Idaho
College of Science

METHODS

- The 2013 U.S. Census was selected, as it has total population of residential houses.
- Samples were measured using systematic sampling.
- The systematic sampling interval was calculated as every 7th home,
- Elements are the counts of all observed vegetation from the road.
- The use of Google maps was implemented for cost and time efficiency.
- A total of 50 samples were obtained within each tract to determine if any significant difference to peruse.

METHODS CONT.

- Approximate sample size required to estimate $\mu \ and/or \ \tau$:
  - $n = \frac{\sum_{i=1}^{L} N_i^2 \sigma_i^2 / a_i}{N^2 D + N_i^2 \sigma_i^2}$
- Estimator of the population μ:
  - $\bar{y} = \frac{1}{N}[N_1^2 \bar{y}_1 + N_2^2 \bar{y}_2 + N_3^2 \bar{y}_3 + N_4^2 \bar{y}_4] = \frac{1}{N}\sum_{i=1}^{L} N_i \bar{y}_i$
- Systematic sampling interval
  - $k = \frac{N}{n}$

DATA

- $n = \frac{2.46E^{11}}{149{,}127{,}349} = 1{,}651$
- $\bar{y} = \frac{1}{11{,}439}[3{,}787(7.3) + 2{,}731(6.1) + 3{,}115(6.54) + 1{,}806(10.24)] = 7.3$
- $k = \frac{11{,}439}{1{,}651} = 7$
  - Average tract 51 = 7.3
  - Average tract 52 = 6.1
  - Average tract 53 = 6.5
  - Average tract 54 = 10.2

CONCLUSION

The conclusion from this pilot examination yields that there is a difference within the different tracts, as tract 54 has the highest yield with an average of 10.2 trees per home while also being the tract with the highest average income. Interestingly tract 51 yields the second at 7.3 trees per home while being the lowest average income. However there is cause for potential error, as google maps is cost efficient, it is limited in resolution as well there was issues faced with accurately maintaining systematic counts, thus that could be cause for possible errors.

Overall this preliminary data indicates there is a difference, within trees per home, and enough reasoning to have a larger survey within each tract to more accurately determine the total count of trees.