The use value of grasslands in the Tallgrass Prairie Region of the United States

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Introduction

- The Tallgrass Prairie Region consists of parts of 12 states (See Figure 1) including Illinois, Iowa, and Minnesota
- Less than 1% of native prairie (i.e., native grassland) remains in Illinois, Iowa, and Minnesota (Samson and Knopf 1994)
- Grasslands provide ecosystem services including recreational opportunities (Zhao, Liu and Wu 2020; Chang et al. 2021)
- Public and private groups like USDA and The Nature Conservancy are actively involved in restoring and preserving grasslands
- The public can recreate at grasslands to varying degrees
- First travel cost study of grassland recreation focused exclusively on the Tallgrass Prairie Region

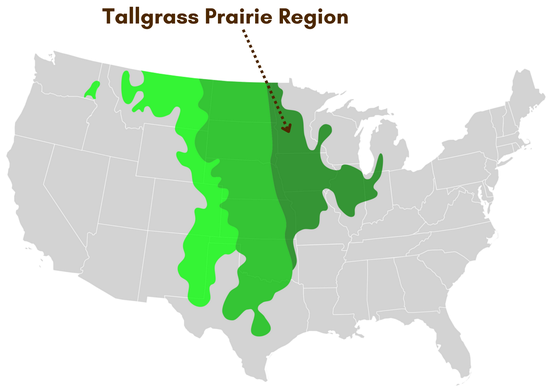


Figure 1. Historical extent of short grass, mixed grass, and tallgrass prairies. Source: "United States Prairies" by Theshibboleth and Howpper licensed under CC BY-SA 4.0

Research Questions

1. What is the recreational value of grasslands in three Tallgrass Prairie Region states (Illinois, Iowa, and Minnesota)?
2. Which individual characteristics influence demand for grassland trips?

Methods

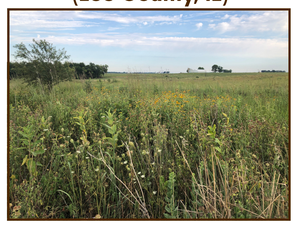
The travel cost method uses data on the cost and frequency of trips as well as individual and site-specific information to estimate demand for trips to that site or a group of sites (Parsons 2017). The use value of the site or sites is then calculated based on the consumer surplus derived from trips.

- I estimate demand using trip count models (i.e., negative binomial, zero-inflated negative binomial, and hurdle negative binomial models)
- Demand is an exponential function of travel cost and individual and site-specific variables in all models
- The decision to visit any grassland is also modeled in the zero-inflated and hurdle models as a function of respondent-specific characteristics like race, age, income, and car access
- Parameters are estimated by maximum likelihood

Data

- Data from a Summer 2021 online survey of adults living in Illinois, Iowa, and Minnesota
- Only people who made at lease one single-day trip to a grassland since March 2020 provided trip information including grasslands visited, number of visits, trip activities, and more specific information on most recent trip
- For visitors, roundtrip travel cost depends on mode of transportation, entrance fee, number of people sharing expenses, and household income
- Non-visitor travel cost is based on the average travel cost of visitors using the same mode of transportation
- 928 responses (1,143 observations)
- Demographics are generally consistent between the sample and population
- Average round trip travel cost was $12.54
- Among visitors, average round trip travel time and distance were 1.54 hours and 81.33 miles

Nachusa Grasslands (Lee County, IL)



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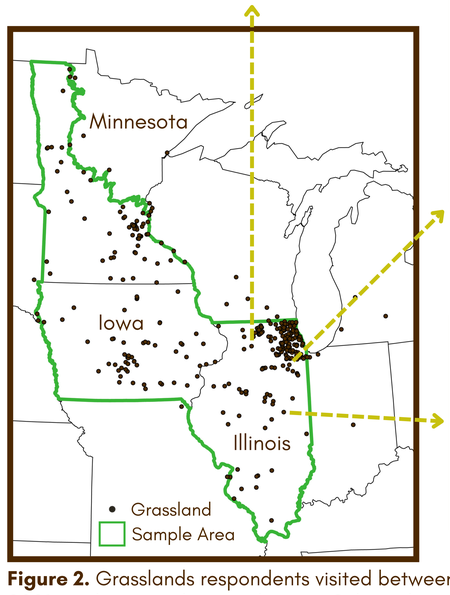
Midewin National Tallgrass Prairie (Wilmington, IL)



Buffalo Trace Prairie (Mahomet, IL)

Figure 2. Grasslands respondents visited between March 2020 and Summer 2021 in relation to the sample area. Selected grasslands also pictured. Sources: "TIGER/Line with Selected Demographic and Economic Data" (U.S. Census Bureau 2018) and "USA States (Generalized)" (Esri 2021)

Results

- As expected, the travel cost coefficient is negative and significant in the demand portion of all three models
- Travel cost is not a significant determiner of the decision to visit as modeled in the zero-inflated and hurdle models
- Increasing age significantly decreases trip demand as does being black relative to being white and non-Hispanic
- Decrease in trip demand among these groups seems to be driven by non-participation.
- Mean consumer surplus (CS) and willingness to pay (WTP) estimates are consistent across models
- Mean per-trip CS is approximately $50
- Mean CS and WTP over a 16-month period are approximately $78 and $98

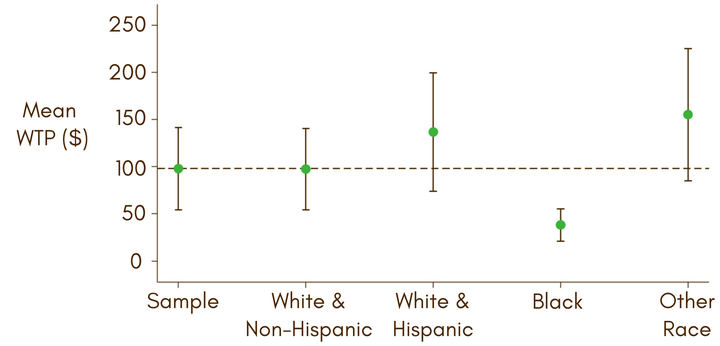


Figure 3. Mean WTP for grassland trips over a 16-month period by race and ethnicity based on estimates from the negative binomial model. Bars around point estimates are 95% confidence intervals, which were calculated using the delta method.

Conclusions

- People who visit grasslands like to "escape" their usual surroundings on these trips
- Individual characteristics appear to influence the decision to visit more than the intensity of visitation

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