

# *USING MOUNTAIN ECOSYSTEM SERVICES TO PROVIDE SUSTAINABLE ECONOMIC GROWTH AND JOB DEVELOPMENT IN RURAL COMMUNITIES*

Dr. Catherine Keske  
AFRI-NIFA Project  
Director's Meeting

November 7-9, 2011



**Project supported by the National Research Initiative of the  
National Institute of Food and Agriculture, USDA  
Grant#2008-02698**



## PROJECT BACKGROUND

- Overall objective: Sustainable economic development within mountain ecosystems
- Extension of 2006 Keske/Loomis non-market valuation study of Colorado Fourteeners (peaks above 14,000 feet) showing “high economic value”
- Current project has been leveraged to develop multiple collaborations (e.g. Niwot Ridge NSF LTER project 2008-2015; Clean Energy Supercluster grants; DOE biomass grants)
- Multi-disciplinary, integrated project
- Study areas: Communities in Park County and Lake County, Colorado



## STUDY AREA

- Two highest incorporated towns in U.S.
  - Park County (population 17,004)
    - Population of Alma: 175; Elevation: 10,578
  - Lake County (population 7,913—declining since 1880)
    - Leadville pop: 2,729; Elevation: 10,152
- Traditional extraction economies *transitioning* to “heritage and recreation” economies?
- Different preferences to balance traditional and recreation/heritage economies
- Future job growth correlated with:
  - Private entrepreneurship
  - Infrastructure development (eg. Government jobs and highways)
  - Community attachment
  - Outdoor amenities and outside expenditures



## SUMMARY OF FINDINGS, TO DATE

- New job growth depends upon successful entrepreneurship, community collaboration, and government partnerships
- Biomass/bioenergy opportunities can create new energy economy, but requires agency partnership
- Rural communities vulnerable to macroeconomic risk
- Lack of infrastructure contributes to difficulties in making low cost, competitive products
- Citizens in rural communities conflicted in preferences for growth and self-containment



## SUMMARY OF FINDINGS (CONTINUED)

- Repeated economic valuation study on Colorado Fourteeners indicates that recreator expenditures are not statistically different in 2009 (recession) compared to 2006 (economic expansion).
- Validates high expenditures/high WTP in these regions, compared to other hiking experiences.
- Indicates high mountain recreation is appears to be “recession proof” and may economically infuse rural communities.
- Measurements of soil qualities indicates crowding/overuse may affect sections on trail.  
Workforce needed for trail management/restoration



# 2006/2009 STUDY SITE



# EXPENDITURE RESULTS

Category	2006 Mean	2009 Mean	T-Stat (P-value)
Miles Driven	264	214	1.12 (.267)
Gasoline Purchases	\$61.04	\$42.00	1.69 (.092)
Retail Supplies	\$13.24	\$15.85	-.363 (.717)
Equipment Purchases	\$25.14	\$28.28	-.441 (.659)
Hotel	\$81.62	\$129.40	-1.29 (.196)
Food in Restaurants	\$78.32	\$80.48	-.401 (.689)
Total Expenditures	\$246.11	\$271.17	-.760 (.447)
Est. Total Seasonal Use*	1936-2126	2208-2665	NA
Est. Total Expenditures*	\$476,469-\$522,147	\$543,411-665,031	NA

T-Statistics, which is the difference in means over the standard error, indicate overall that there is not a difference in expenditure spending between the two time periods at the 95% level. We failed to reject the null hypothesis—there is not a difference in means of 2006/2009.



# REGRESSION RESULTS

	<b>2006 and 2009</b>
<b>Constant</b>	0.861***
<b>(T-statistic)</b>	(4.280)
<b>\$ Bid Amount</b>	-0.00579***
<b>(T-statistic)</b>	(-8.021)
<b>Travel Distance</b>	0.0023***
<b>(T-statistic)</b>	(4.090)
<b>2006 Dummy</b>	0.2182
<b>(T-statistic)</b>	(.634)
<b>2006 Travel Dummy</b>	-0.000144
<b>(T-statistic)</b>	(-.1278)

- Bid coefficient indicates that the probability of a “yes” response decreases by .006 for every dollar increase in bid amount.
- Travel distance coefficient indicates that yes response increases by .002 for every mile increase in travel distance.
- Findings show the coefficients of the dummy variables are not significant with p values, respectively, of 0.5258 and 0.8983.



# WTP RESULTS

(CORRECTED FOR INFLATION)

	<b>Mean WTP</b>	<b>90% Lower CI</b>	<b>90% Upper CI</b>
<b>2006 data</b>	\$152	\$123	\$190
<b>2009 data</b>	\$139	\$119	\$167

- Overlapping confidence intervals indicate that these means between time periods are not statistically different (Creel and Loomis, 1991). Therefore, we can reject the null hypothesis—there is not a difference in MeanWTP 2006/2009.

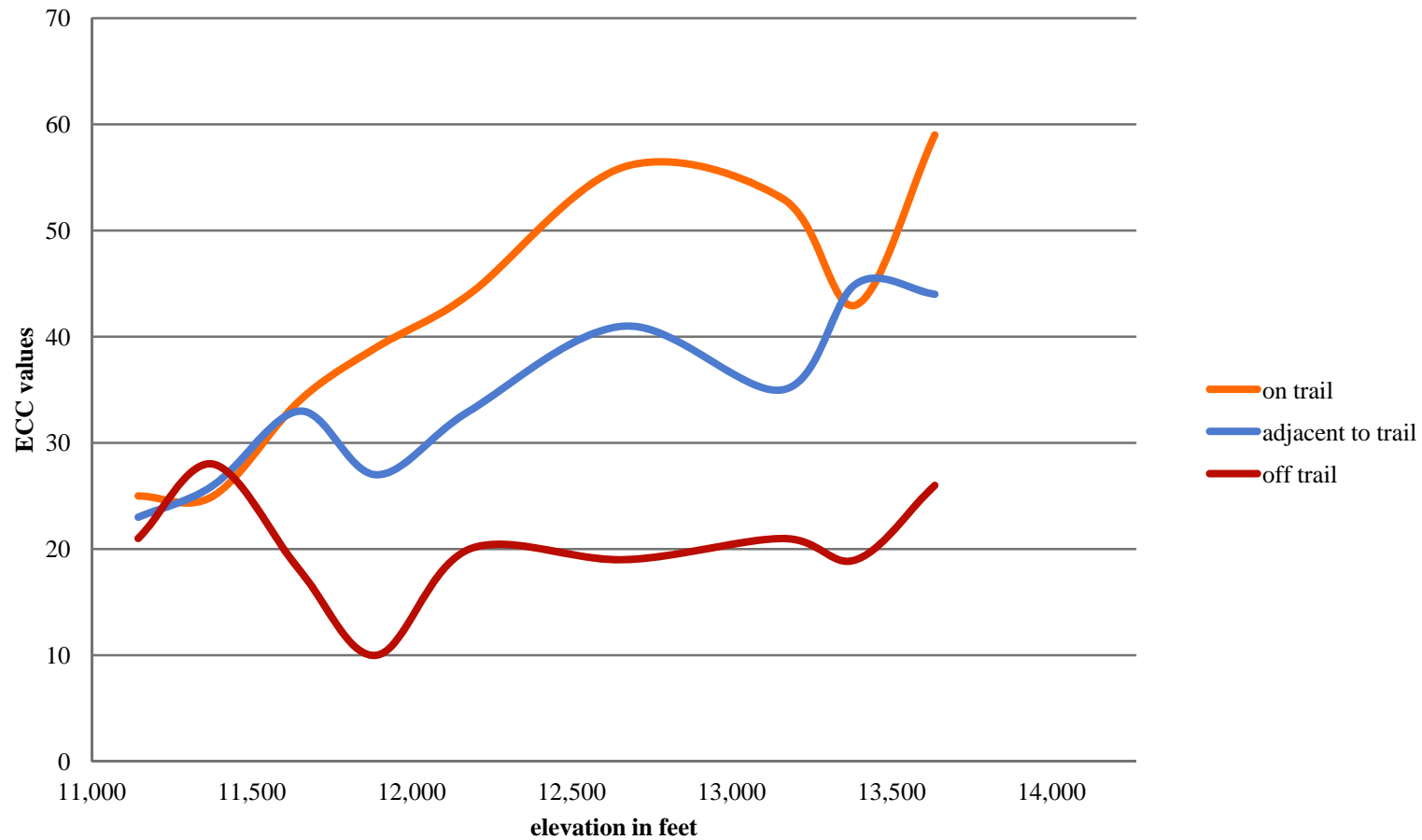


# ENVIRONMENTAL SOILS STUDY



# RESULTS

## Erosion Condition Classification





# STUDY IMPACTS AND PRODUCTIVITY

- 1) Directly influenced **Transportation Research Board and CDOT** highway protocols
- 2) Directly influenced **South Park National Heritage Area** designation
- 3) Directly influenced **USDA USFS** Policy
- 4) Directly influenced **DOE** grant proposals
- 5) **Dissemination of extension information**

USDA Forest Service, City of Alma, City of Leadville, Colorado Fourteeners Initiative, Colorado Mountain Club, High Timber Times, Colorado State University Ag Family Newsletter, CDOT, South Park Heritage Foundation



# STUDY IMPACTS AND PRODUCTIVITY (2008-2011)

Peer reviewed journal articles published (4)

Peer reviewed journal articles in review (2)

Peer reviewed book chapter published (3)

Peer reviewed journal articles in progress (3)

Master's thesis (2)

Professional poster/meetings papers (7)

Major popular press articles (3)

Grant proposals (7)

Additional funding sources obtained to continue  
work (NSF CNH, NSF LTER, ACRE, TRB) (4)

Extension presentations (7)

