Determining the Relationship Between Development Pattern and the Costs of Public Services in the Mountain West.

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Project Director Meeting
Prosperity for Small and Medium-Sized Farms and Rural Communities Programs

November 8, 2011
10:30 AM
Panel #4 Rural Communities – Public Services

HYATT REGENCY MIAMI
400 SE 2nd Avenue
Miami, Florida 33131

United States Department of Agriculture
National Institute of Food and Agriculture

University of Wyoming

Today's Agenda

- Introduction
- Goals, Rationale and Objectives
- Prior Research
- Cadastral data for land-use change modeling
- The state of data for econometric modeling
- Outcomes: Concurrent Research and AgExp Grant Application
- Next steps / Timeline for finishing

Goals and Rationale

USDA Goals:

AFRI Priority area 6A, Program Area Priority 5:

"Identify optimal regional land use and architectural decisions that protect the rural environment and promote economic development while reducing poverty and enhancing rural quality of life."

The Situation:

Most local governments do not know the true cost of development decisions and do not know if their land use plan is fiscally sustainable (Tischler-Bise).

Rationale:

Economic efficiencies may improve if governments can be made aware of the relationship between the built environment and costs of service provision.

Rural Communities benefit from Agriculture; protecting agricultural lands secures agriculture and in turn supports economic robustness of rural communities

Research Opportunities:

Protect Agricultural Lands by Indicating Fiscally Efficient (and inefficient) areas for development

Protect Agricultural Lands by Indicating More Damaging to Environmental Attribute (and less damaging) areas for development.

Objectives

1. To examine cadastral data in Colorado, Montana and Wyoming in order to determine which county datasets contain the necessary attributes for spatially precise fiscal modeling of local government services.

2. To examine local government time series expenditure data and associated time series level of service measures in Colorado, Montana and Wyoming for county government services that may have a spatial component to the cost of service provision.

3. To investigate the availability of spatially attributed panel data that capture environmental characteristics (e.g. prime agricultural lands, big game species habitat). These data will allow the fiscal analysis to be expanded to a more general community welfare analysis. This provides potential insights into opportunities for optimal rural design and land use planning.

Prior Research

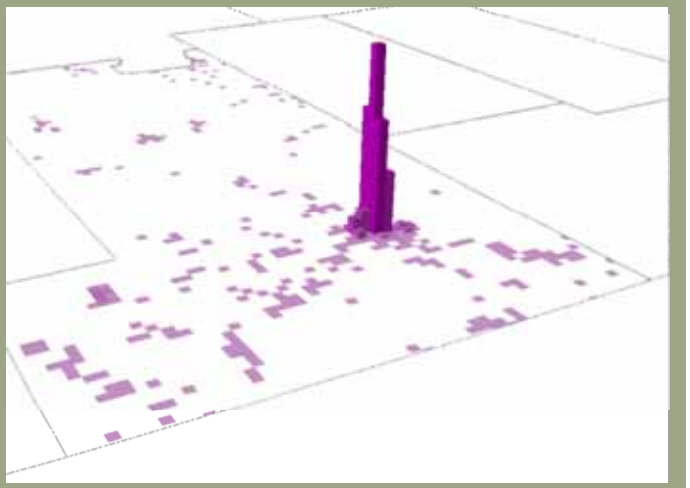
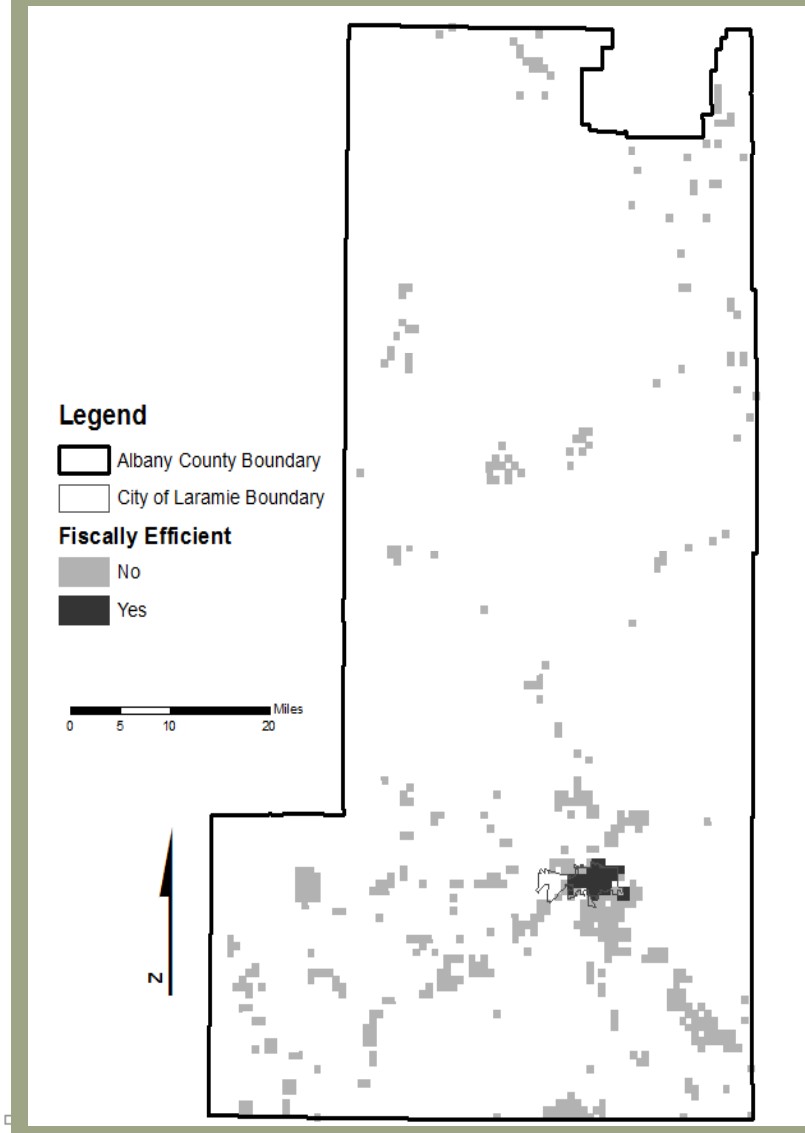


Table 2. Allocation and Production Estimations.

	(1) 1K Grid b/(se)	(2) 1 Sq. Mile Grid b/(se)
Allocation Fn: LE_{EXP} = dependent variable		
1/Res	373.794*	127.747**
	(138.06)	(41.20)
Res^2	0.021***	0.079*
	(0.00)	(0.03)
Unemployment	-0.330***	-0.310*
	(0.09)	(0.13)
Population	-0.000	-0.000
	(0.00)	(0.00)
LEO	-0.157	-0.221
	(0.11)	(0.13)
LEO^2	0.003	0.004
	(0.00)	(0.00)
t	-0.228	-0.036
	(0.20)	(0.14)
constant	-18.729	-5.588
	(11.02)	(9.85)
R-sq	0.895	0.866
Production Fn: PSI = dependent variable		
LE_{EXP}	16.657**	17.770**
	(5.92)	(6.05)
SE	-4.472*	-4.547*
	(1.88)	(1.88)
t	0.628	0.581
	(0.41)	(0.41)
constant	36.557***	35.909***
	(8.32)	(8.34)
R-sq	0.693	0.694
dfres	24	24

* p<0.05, ** p<0.01, *** p<0.001

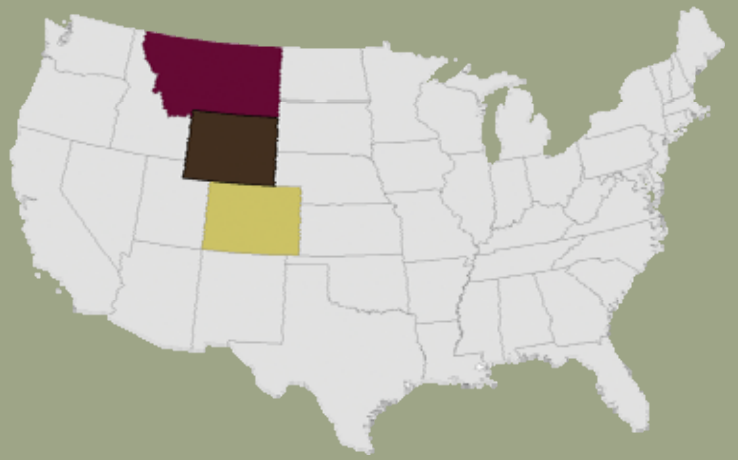


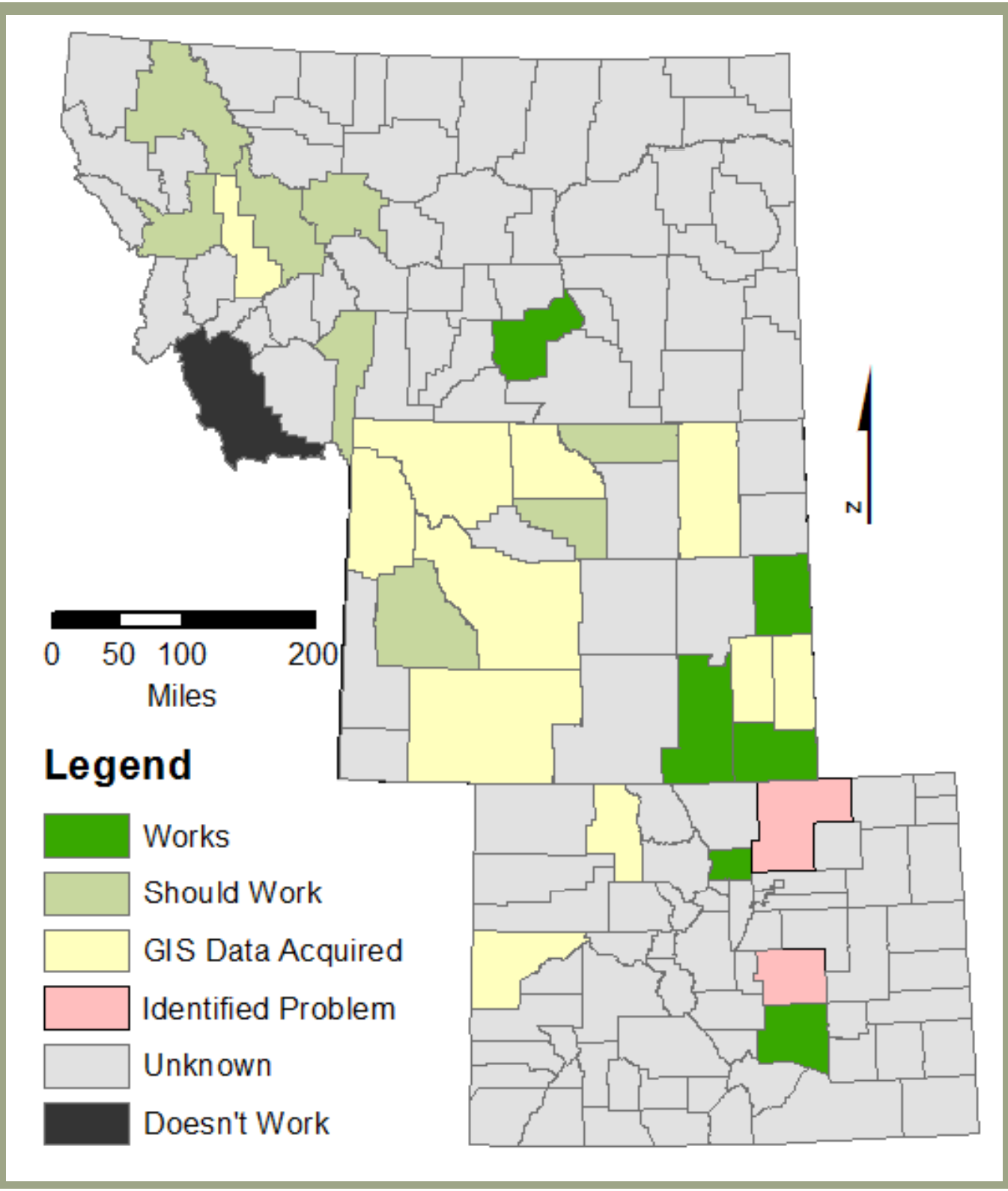
Lieske S.N., McLeod D.M., Coupal R. and Srivastava S. 2012. 'Determining the relationship between urban form and the costs of public services.' *Environment and Planning B* 39(1).

Objective 1: Cadastral data for Land-Use Change Modeling

1. Parcel boundaries (GIS layer)
2. Parcel ID number (attribute)
3. Land Use Designation (often tax code classification)(attribute)
4. Year of construction (attribute)
5. Building Value; the assessed valuation of structures in dollars (attribute)
6. Land Value; the assessed valuation of land in dollars (attribute)
7. Total Value (attribute)
8. Assessed valuation (attribute)
9. Other data attributes that might provide more detailed information on land use, such as vacant (Y/N), general ownership etc…(attribute)
10. Tax District (GIS layer or attribute)

Objective 1: Cadastral data for Land-Use Change Modeling Outcomes (as of 3 Nov. 2011)



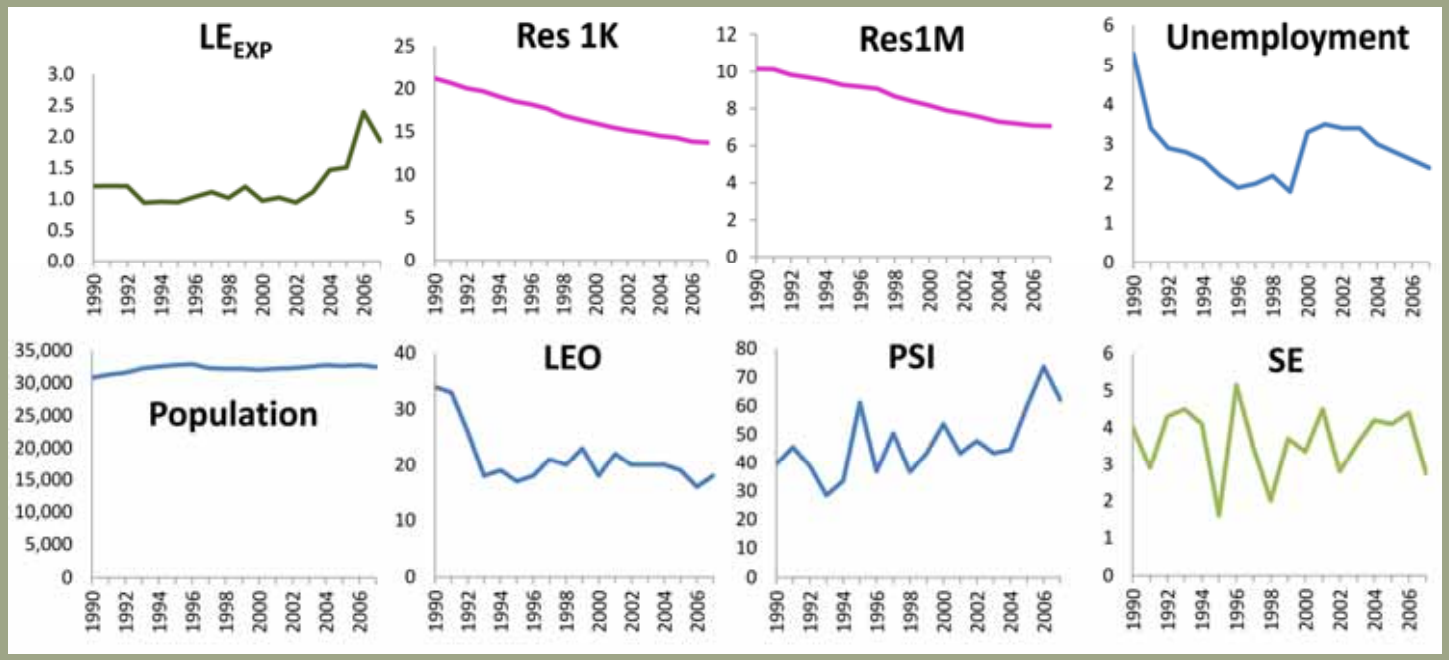


Objective 2: Time Series Expenditure Data and Level of Service Measures

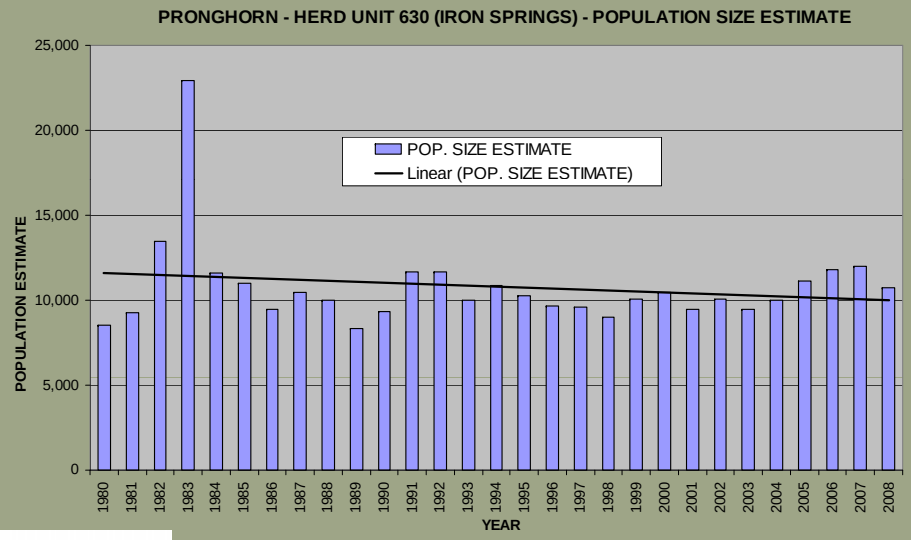
Wyoming is the only state that compiles budget/expenditure, socioeconomic data, and crime data at the state level.

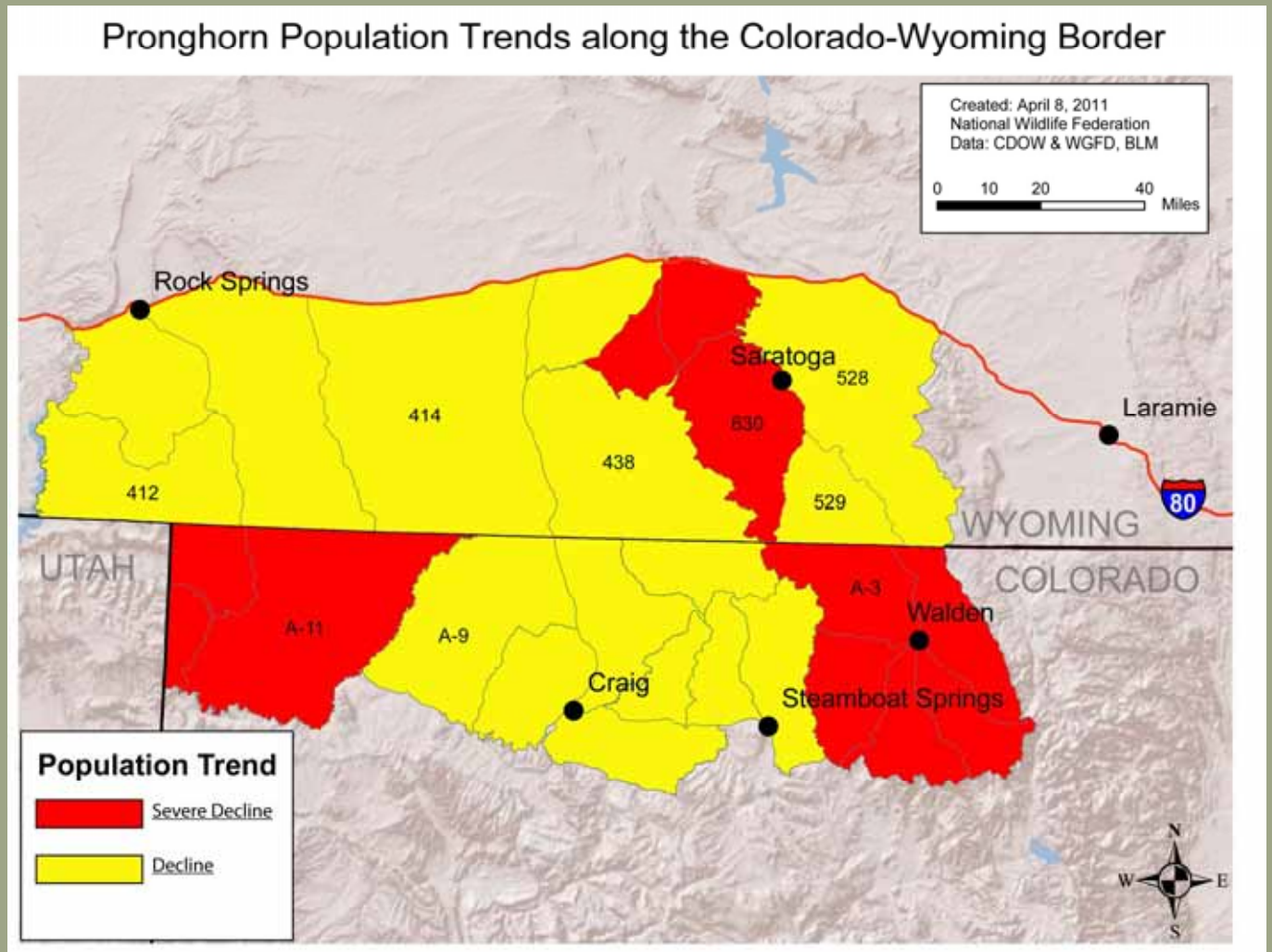
Data for Colorado and Montana is kept at the county-level, and is generally more problematic. Issues associated with the data include:

Data gaps – (FBI, colorado and Boulder County are unreported in the Uniform crime reporting system).
Inconsistent collection methods (e.g. Yellowstone County MT.)
Discrepancies between data reported in multiple locations
Mismatched time frames--we have data for our years of interest for some things but not others

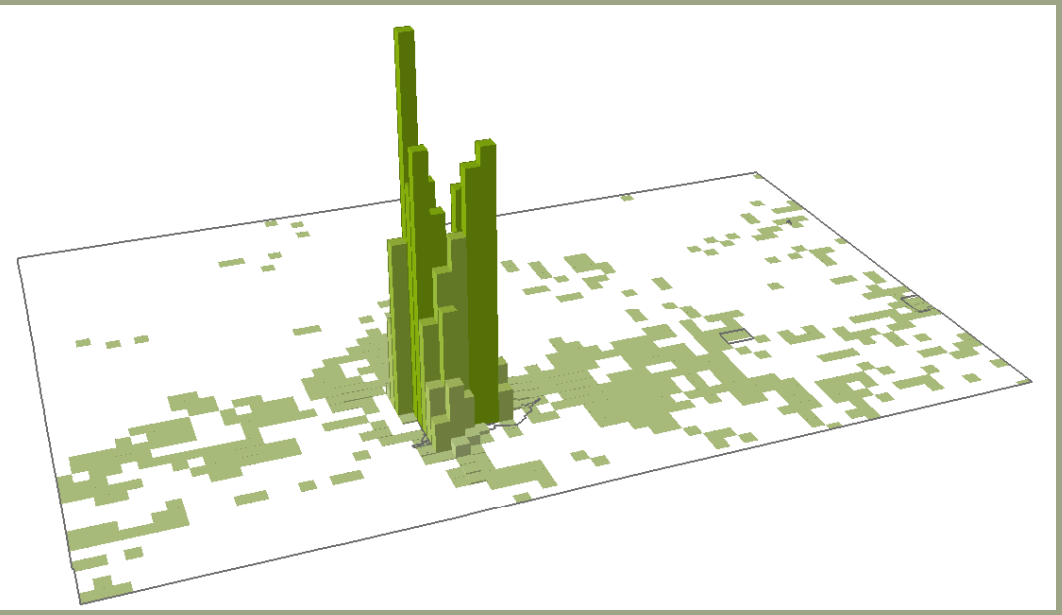


Objective 3: Time-series Environmental Data



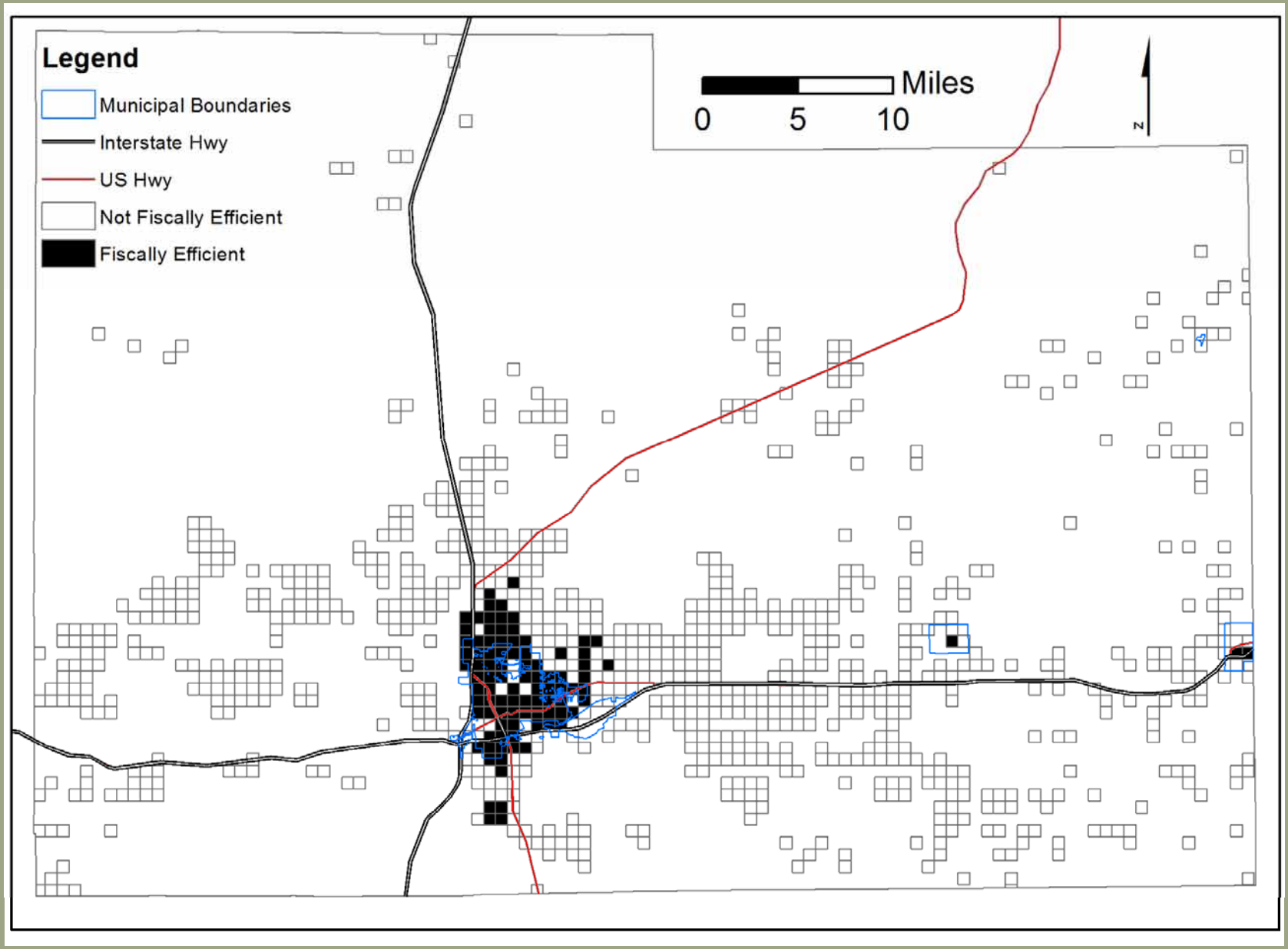


Outcomes: Concurrent Research



	(1) 1M SUREG PLE b/se	(2) 1K SUREG PLE b/se
PLE		
1/res	116.838***	78.343***
	(16.45)	(21.28)
res2	0.467**	0.139***
	(0.17)	(0.03)
RuralPop	0.001***	0.000
	(0.00)	(0.00)
officers	0.050*	0.060*
	(0.02)	(0.02)
officers2	-0.000*	-0.000*
	(0.00)	(0.00)
t	-0.505**	-0.134
	(0.16)	(0.20)
constant	-44.496***	-22.250**
	(6.59)	(7.03)
R-sqr	0.9110	0.8826
RSI		
PLElag1	6.318*	6.914**
	(2.62)	(2.64)
WageSalaryDist	30.865*	30.702*
	(12.78)	(12.88)
t	-0.829	-0.849
	(0.57)	(0.57)
constant	-29.082	-30.849
	(18.76)	(18.89)
R-sqr	0.7077	0.7085

Outcomes: Concurrent Research



Lieske S.N., McLeod D.M. and Scofield A.M. (Accepted). *Determining fiscally efficient locations for public service provision*. 58th Annual North American Meetings of the Regional Science Association International and Second Conference of the Regional Science Association of the Americas. **November 10, 2011. 51. 4:00 PM-6:00 PM Gardenia AB**

Data Partnerships

Numerous Municipal and County Governments
Wyoming Department of Revenue
Wyoming Division of Economic Analysis
Wyoming Wildlife Federation

Research Partnerships

The Nature Conservancy
USDA Regional Research Committee Member
W-2133 Benefits and Costs of Public and Private Lands Mgmt.

Universities:

Colorado State University
Idaho State University
Montana State University
University of Colorado
University of Montana
University of Wyoming

Timeline

We originally propose an 18 month time ending in July of 2012.

We know anticipate finishing in early 2013 and applying for a standard AFRI Foundational Program grant in June 2013.

For More Information:

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