Refining Community Asset and Attribute Modeling: Applying Social Data to Inform Bio-Fuel Project Site Selection in the NARA Region

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1 Introduction

Site-selection is an important decision that can critically impact the success of aviation biofuels, yet these decisions are often made without considering important social assets that impact success. While site-selection tends to focus on various economic and biogeophysical resources, these resources constitute only a fraction of the assets necessary for successful implementation of these highly technical projects. As can be seen in Community Capitals Framework (CFF) , which models key community assets using seven capitals, social capital, cultural capital and human capital are essential components of community assets. However, these necessary assets are often overlooked. This paper seeks to facilitate site-selection for highly technical projects by providing the tools necessary to include cultural, human and social capital in siting decisions. Building on the exploratory analysis of Martinkus et al. (2014), this study refines the measures utilized in this initial analysis and creates benchmark measures of social capital, creative vitality, public health and education that will help researchers identify communities that meet or exceed the necessary levels of these capitals that contribute to success. In combination with other resource considerations, these benchmarks will aid in site selection. This methodology is currently being utilized in the Western Montana Corridor (WMC). It will soon be applied to the entire NARA region and serve as an exemplar for other regions in the United States.
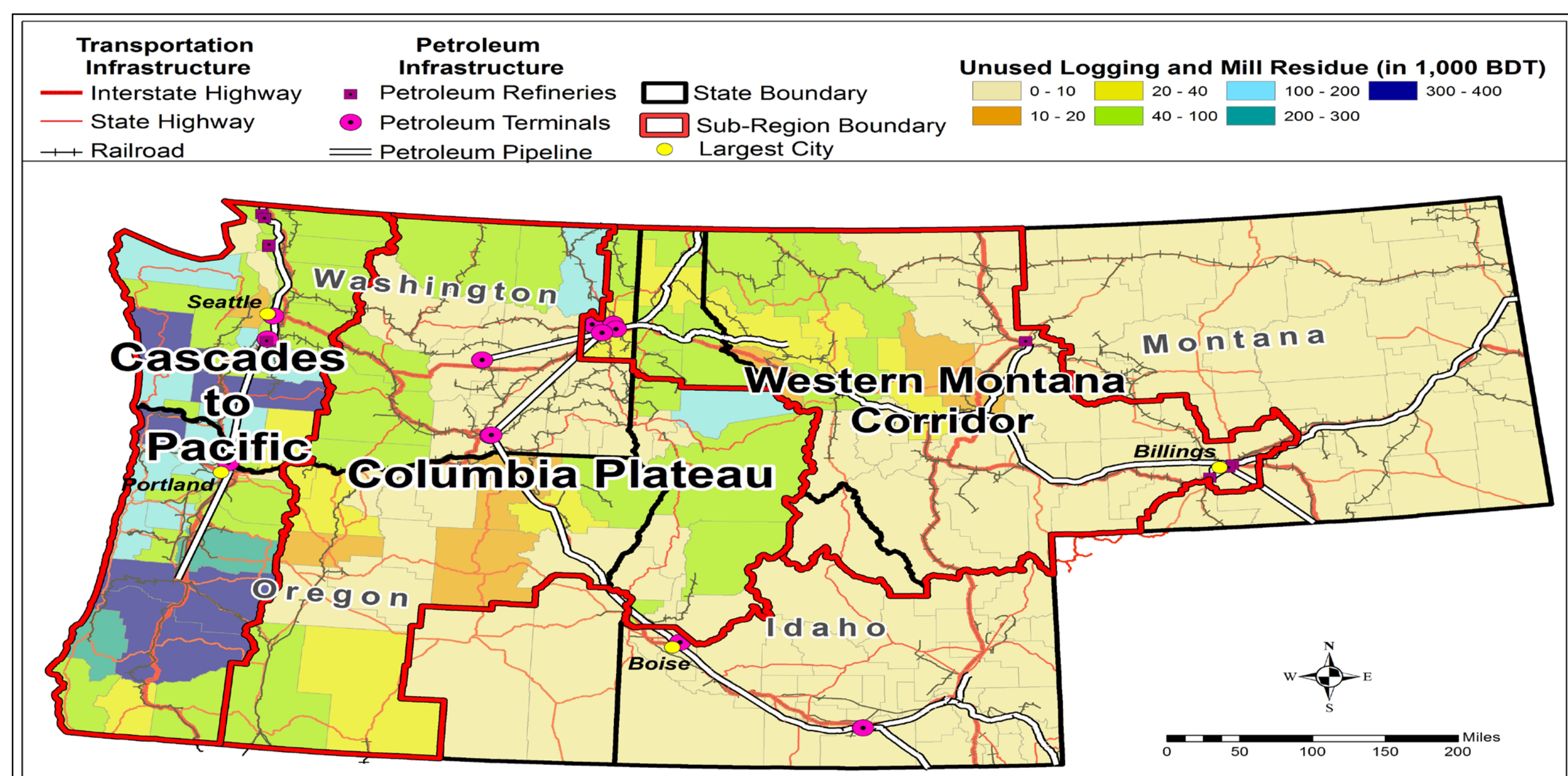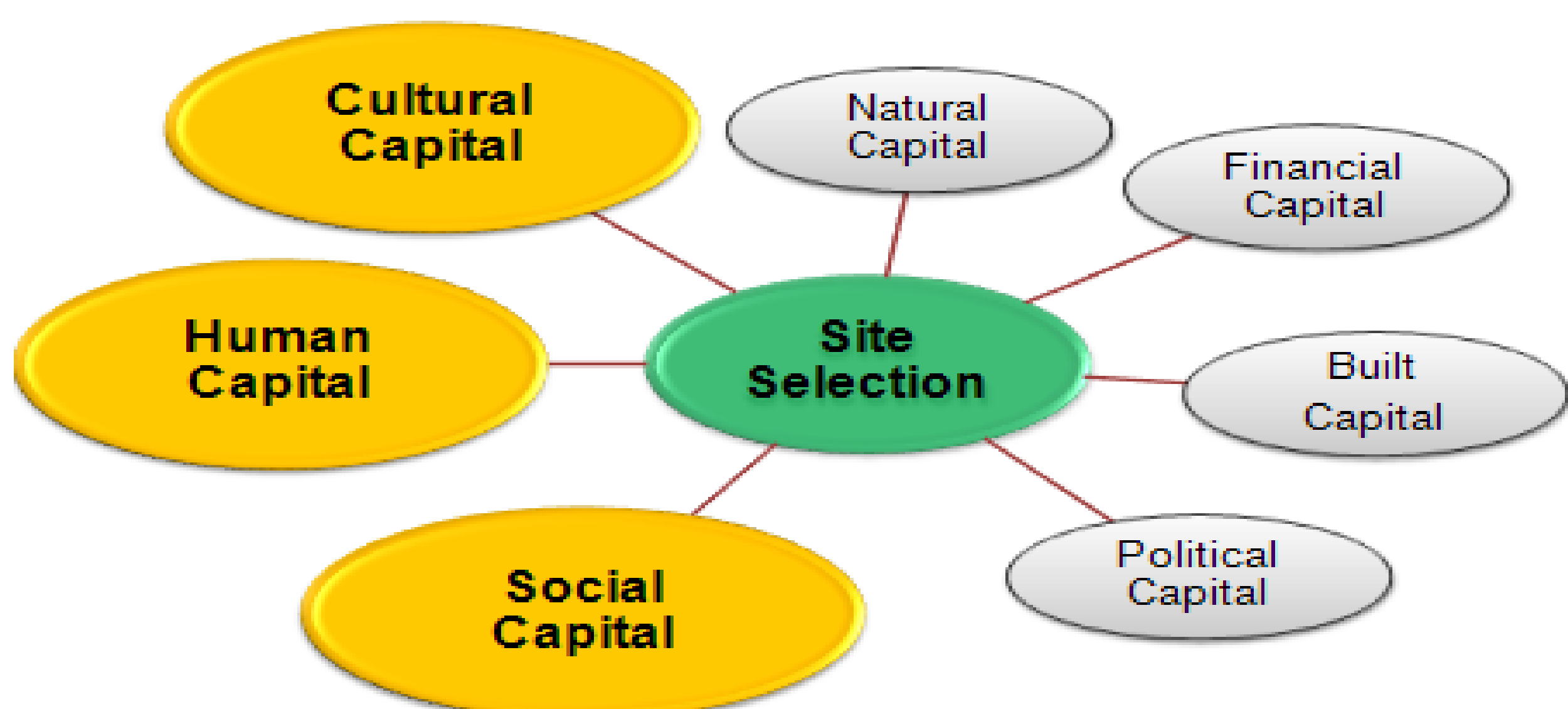
2 Background and Framework

FIGURE 1 – NARA Supply Chain Sub-Regions

FIGURE 2 – Framework for this Study

3 Methodology

The community capitals framework provides significant insight into the successful site selection for biofuel activities beyond the biogeophysical assets of these communities. In order to aid site-selection, this study utilizes various national datasets to analyze county-levels of social capital, creative leadership (cultural capital), public health and education (human capital). The analysis refines the measures employed by Martinkus et al., (2014) in their exploratory analysis of social assets and creates more robust measures of each capital using updated data for each county. The measures utilized in this study and the previous exploratory analysis are included in Table 1 below. Rather than combining these measures into a single social assets factor, this refined model consists of three separate scores that capture more completely the levels of social capital, creative capital, and human capital.   For this we use data by Rupasingha et al., (2006), WESTAF and the County Health Rankings. Based on this information, regional averages of the three capitals are used to create benchmark measures to which communities are compared when considered for site-selection. We employ a refined retrospective prediction approach from the one utilized by Martinkus et al. (2014) to test the reliability and validity of our new measures to explain project success. In other words, we test whether successful community collaboration projects are linked to higher-levels of each of these indicators. These new measures are combined with the biogeophyscial analysis conducted by Martinkus et al. (2014) to identify communities in the NARA region for potential site-selection for bio-fuel activities.

4 Measures

TABLE 1: Comparison of Measures used in Current Study and Martinkus et al., (2014).

Community Assets	Preliminary Model	Refined Model
Social Capital Rupaingha et al. (2006)	# Rent-Seeking Groups: political, labor, professional and business organizations	# Rent-Seeking Groups: political, labor, professional and business organizations # Non-Rent Seeking Groups: civic organizations, bowling centers, golf clubs, fitness centers, sports organizations and religious organizations # Non-Profit Organizations % Voter Turnout
Creative Capital WESTAF	$ Average annual revenues of arts related goods and services based on all revenues between 2002 and 2010	*Creative Vitality Index including:* # Arts related organizations # Arts related business # Occupational employment in the arts $ Revenues of arts related goods and services
Human Capital County Health Ranks	% Self-reports of poor health condition (physically and mentally)	% Obese (BMI >30) % Low birth-weight % Premature deaths % Self-reports of poor health condition (physically and mentally) % Poverty (and % children in poverty) % Uninsured % No access to health due to costs % Between age 25 and 44 with some post-secondary education % Non-proficiency in English

Note: Table shows what variables were used to measure the community assets in each model. The first study provided an outset of community assets on which the second model builds forth. This refine and reliable model can be used to predict the likelihood of community cooperation.

Note: All counts (#) and amounts ($) are calculated as a rate of the population per 10.000.

5 Analysis Results

Table 2: Case Analysis of Social Capital, Cultural Capital and Human Capital

Variable	Cut-off	Bonner Idaho	Kootenai Idaho	Boundary Idaho	Spokane Washington	Lincoln Montana	Lake Montana	Flathead Montana	Missoula Montana
Soc. Cap. 2005	> .1099	-.300	-.780	-.730	-.400	.730	-.110	.980	2.18
Soc. Cap. 2009	> .0413	-.200	-.800	-.040	-.590	.770	.110	.700	1.88
CVI 2009	> .705	.676	.558	.277	.756	.528	.487	1.130	1.661
CVI 2010	> .686	.750	.614	.283	.742	.515	.450	1.246	1.632
Health 2013	< -1.4247	-1.90	-3.12	-2.94	-1.45	-.33	-.20	-3.12	-3.80
Obesity 2013	< 25.8	22.7	25.6	23.7	28.0	25.6	27.6	21.8	20.5
Poverty 2013	< .3337	1.76	.40	2.42	-.67	3.59	2.40	.53	-.62
Education 2013	> 58	55.9	65.8	35.2	70.1	47.3	61.6	61.1	74.0
Language 2013	< 3.2	.3	.4	.0	1.5	.0	.2	.1	.3

Note: Shaded cells represent scores that are better than the cut-off points. Cut-off scores are based on averages for the respective years and variables for the region West (US census region) over 446 counties. For social capital and cvi scores data from Alaska and Hawaii is missing. See tables A6 through A11 for averages for other regions.

6 Conclusions

Combining the social assets analysis with the biogeophyscial analysis conducted by Martinkus et al., (2014), this study identifies 5 counties in the NARA WMC region that have the necessary capitals to be considered for site-selection (**Flathead, MT; Missoula, MT; Kootenai, ID; Benton, OR; Spokane, WA**). Utilizing more robust measures of these important social assets, the findings of Martinkus et al, (2014) are confirmed, which further bolsters support for these counties in future site-selection decisions.

This study asserts that social capital, human capital and cultural capital cannot be excluded from site-selection decisions. However, many of these important decisions are made without considering these necessary community resources. It is likely that the difficulties obtaining these various social asset measures potentially discourage decision-makers from including these resources. However, this study simplifies this arduous task by creating benchmark measures of social capital, creative vitality, public health and education. This is a very important tool that will aid site-selection decisions for aviation biofuels and other highly technical projects.

Currently, the model and the benchmark measures have only been employed in the WMC. Future analysis will include refining the model for the MC2P and the entire NARA region. Benchmark measures for each of these three important capitals will also be created to aid site-selection in other regions of the U.S.

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NARA Northwest Advanced Renewables Alliance