Pilot Project: Lower Portneuf River Watershed
Social & Environmental Context

- 85,000 people with ~1% annual growth
- Urban expansion upstream and into foothills, replacing farming & grazing
- City has Comprehensive Plan to emphasize healthy lifestyles, business growth, and outdoor recreation
- Stakeholder groups include government, business, and community activist groups

Growth ➔ Water Shortfall
Septic ➔ Nitrate Pollution
Flood Control ➔ No Purification
Research Questions

• **Question 1:** What are the patterns of ecosystem services change associated with urban growth in the Portneuf Watershed, and what is the magnitude and rate of ecosystem change?
  - Focus on water quality, flood control, native plant/animal diversity, and outdoor recreation

• **Question 2:** How do societal drivers influence changing patterns of ecosystem services, and how do human communities respond to changes in ecosystem services?
  - Identify stakeholder groups in Lower Portneuf Watershed
  - Survey their perceptions, their satisfaction, and the relative importance of different services
  - Ask who they trust to make decisions concerning ecosystem services

• **Question 3:** How will these ecosystems and associated ecosystem services likely change into the future and what are the key decisions that may alter those trajectories?
  - Use INVEST/ENVISION models to create future scenarios based on historical change and current societal and climate drivers
  - Develop visualization tools to communicate scenarios to stakeholders
Conceptual Model – Portneuf Project
Research Capacity

Expertise

Historical Analysis of Ecosystem Services (Marsh)
Surface and Groundwater Hydrology (Godsey, Shapley, Thackray, Welhan)
Social Characterization (Lybecker, McBeth, Running, Stoutenborough, Youngs)
Ecosystem Characterization (Baxter, Larson, Lohse, Peterson, Reinhardt)
Cyberinfrastructure (Delparte, Edsall, Weber, Wu)
Modeling (Kobs-Nawotniak, Godsey, Edsall)
Visualization and Virtualization (Delparte, Edsall)
Diversity & Workforce Development (Green, Smith)
Management (Rodgers)
Finance (Bachman)

Data Acquisition

National Land Cover Database
2013 NAIP 0.5 m imagery
National Elevation Dataset (NED - 10 m)
USDA National Cropland Statistics
Bannock County Parcel Layer
National GAP Analysis Program - Land Cover Data
USDA SSURGO Soils Data
LiDAR Data of Portneuf Valley
Census Data
1941 Aerial Photograph dataset for Portneuf Valley

Establishing cross-disciplinary relationships was a major accomplishment in Year 1
Year 1 Research Activities in Social Characterization

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<th>History of Flood Control</th>
<th>Stakeholder Networks</th>
<th>Stakeholder Values</th>
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Idaho NSF EPSCoR Grant Number IIA-1301792 ~ Managing Idaho's Landscapes for Ecosystem Services (MILES) Yr 1
Year 1 Research Activities in Biophysical Characterization

Aquifer Vulnerability

River Vulnerability

Idaho NSF EPSCoR Grant Number IIA-1301792 ~ Managing Idaho’s Landscapes for Ecosystem Services (MILES) Yr 1
Cyberinfrastructure Activities

New server with 96GB RAM, 12 cores, and more than 1 TB of hard drive space within its fault-tolerant RAID-5 architecture.

Also available is the new GIS TReC’s Hadoop headnode server for advanced processing.
We can inform the public how to develop ecosystem services in concert with urban expansion, in a way best suited to community values.