

STATEMENT OF INTEREST, COMMUNITY DATA INTEGRATION October 5, 2015

SECTION 1. PROJECT ADMINISTRATIVE INFORMATION

CDI Science Support Framework Elements: Data & Information Assets, Data Management, Science Data Lifecycle

Project title: A web-based application for the management and visualization of land-use scenario data.

Name of USGS PI:

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Additional principal collaborators/collaborators:

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Project description: Land-use researchers need better tools for managing, sharing, and visualizing land-use change scenario datasets. The proposed request is to support the development of a database schema designed for land-use scenario datasets as well as a web-based visualization application for scenario data. This web application would allow for exploration of land-use and scenario spatial and non-spatial data over multiple scenarios, spatial scales, and timesteps.

Anticipated deliverables:

1. A MySQL database for land-use change datasets.
2. An example land-use change dataset and documented database ingest process.
3. A web application for displaying land-use trajectories over multiple scenarios, time-steps, and spatial strata.

SECTION 2. ESTIMATED BUDGET

Budget Category	Federal Funding "Requested"	Matching Funds "Proposed"
1. PERSONNEL (SALARIES including benefits):		
Federal Personnel Total:	\$23,000	\$23,000
Contract/Collaborator Personnel Total:	\$10,000	\$0
Total Salaries:	\$33,000	\$23,000
2. TRAVEL EXPENSES:		
Travel Total (Per Diem, Airfare, Mileage/Shuttle) x # of Trips:	\$2,500	\$2,500
Other expenses (e.g. Registration fees):	0	0
Total Travel Expenses:	\$2,500	\$2,500
3. OTHER DIRECT COSTS: (itemize)		
Equipment (inc. software, hardware, purchases/rentals):	\$500	0
Publication Costs:	0	0
Office supplies, Training, Other expenses (specify):	0	0
Total Other Direct Costs:	\$500	0
Total Direct Costs:	\$36,000	\$25,500
Indirect Costs (%):	0	0
GRAND TOTAL:	\$36,000	\$25,500

SECTION 3. PROJECT SUMMARY

Background

The USGS is involved in a variety of scenario-based modeling projects aimed at projecting land-use change into the future. The Land Use and Carbon Scenario Simulator (LUCAS) and FOREcasting SCEnarios of Land-use Change (FORE-SCE) framework are two recent examples. While a range of techniques and software products are used in these efforts, resulting land-use change datasets typically share several common characteristics: (1) change projections are scenario-based and often reported over several scenarios, (2) projections are run over a temporal period with a fixed interval, and (3) projections have a spatial component. These datasets also typically contain class total data as well as transition amounts between classes.

Problem Statement

Managing, sharing, and visualizing large land-use change datasets, which often contain a mixture of tabular and spatial data, is a difficulty shared by land-change researchers. While modeling software applications may provide some management and visualization capabilities, they typically do not provide solutions for sharing model results beyond the export of tabular and spatial data. As such, land-use change datasets are often distributed in the form of large tabular and spatial files. As land-use researchers, we typically need to compare multiple scenarios in several ways: (1) over a defined timestep, (2) by land-use class or transition, or (3) according to a spatial boundary. We also need the ability to compare spatial outputs. These same capabilities would be helpful for sharing scenario research with the public in a way that encourages interaction with and understanding of land-use scenario data. Tools that allow us to more efficiently manage and share land-use change datasets with the public and fellow researchers are needed.

Proposed Solution

Our goal is to facilitate management, sharing, and visualization of land change datasets with the creation of a database driven web application. In particular, the proposed funding request would support the creation of: (1) a MySQL database schema for land-use change datasets (2) an example land-use change dataset and automated database ingest process (3) a web application for displaying land-use trajectories over multiple scenarios, time-steps, and spatial strata. The database and web application will be designed to allow for the management and display of spatial results as well as tabular data. The initial web application will summarize results from the Scenarios of Land-use Change (CLU R&D) and LandCarbon projects (LCS), ongoing national scale scenarios efforts. The combination of a database and a web viewer application facilitates the management and sharing of land-use scenario projections and will serve as a framework for managing a range of other scenario-based change datasets.

Project Experience and Collaboration

The principal investigator has experience developing web applications and working with land-use change scenario data. He has successfully completed web development projects at USGS, including an interactive web map and photo viewer application for a 2015 CDI funded project. The co-principal investigator is the principal investigator for the Scenarios of Land-use and Land-cover Change and LandCarbon projects and has expertise on a range land-use scenarios. The project collaborator has led multiple web development projects at USGS and has expertise in web application development and database design.