

EXPLORING TRENDS IN CONSERVATION AND RURAL DEVELOPMENT

By Patricia Gude and Erin Quinn

Abstract

The Sonoran Institute has developed new GIS tools to facilitate research and collaboratively engage communities and land management agencies in a discussion on the connection between local economies and land conservation. In this paper, we discuss the steps involved in setting up a GIS Library and developing an ArcMap toolbar that links conservation with economic concepts. The lessons learned are relevant to agencies, businesses, and non-profits seeking to implement a GIS and streamline common project tasks. Design of the toolbar involved automating the linking of economic and spatial datasets, providing tools for querying and exporting data, and providing display settings and layouts. These tools improve our efficiency at generating hypotheses, performing analyses, and creating maps. In fact, they allow us to do these tasks on the fly with clients and public audiences. We provide examples of applications, including an analysis of how land protection affects local economies.

Introduction

Vast open spaces, cowboys, miners, and loggers –These *were* the defining characteristics of the Old West. But in the 21st Century West, you are more likely to run into an engineer, an architect, or a retiree on their “ranchette”. What does this transition mean for the people and the economy of the West today? What is the relationship between open space, growth, and prosperity? These are the types of questions the Sonoran Institute is answering with the help of GIS.

The Sonoran Institute, a non-profit organization established in 1990, works with communities to conserve important natural landscapes in western North America. A key part of the Institute’s approach to conservation is accomplished by the SocioEconomics Program, which helps rural communities and land managers in the West understand changing economics, make connections between environmental health and economic vitality, and develop the ability to use this knowledge to advance conservation and economic prosperity. And, the Sonoran Institute’s new GIS lab has proved to be critical in accomplishing these goals.

Since setting up a GIS lab in 2003, the Sonoran Institute has developed a GIS library, allowing them to analyze and map thousands of physical, biological, demographic, and economic concepts. The SocioEconomics Program also created a custom ArcMap toolbar that integrates GIS with the Economic Profile System (EPS), free software they developed to generate custom profiles for any region in the United States. The profiles synthesize Census and U.S. Department of Commerce data into tables and figures that illustrate long-term population, employment and income trends. The integration of the Economic Profile System (EPS) with GIS allows the SocioEconomics Program to analyze how population, employment, and income trends relate to land management, infrastructure, wildlife habitat and other GIS layers within their library.

These tools have enabled the Sonoran Institute to more efficiently analyze and communicate:

- How the West is changing;
- What connections link land protection and economic prosperity; and

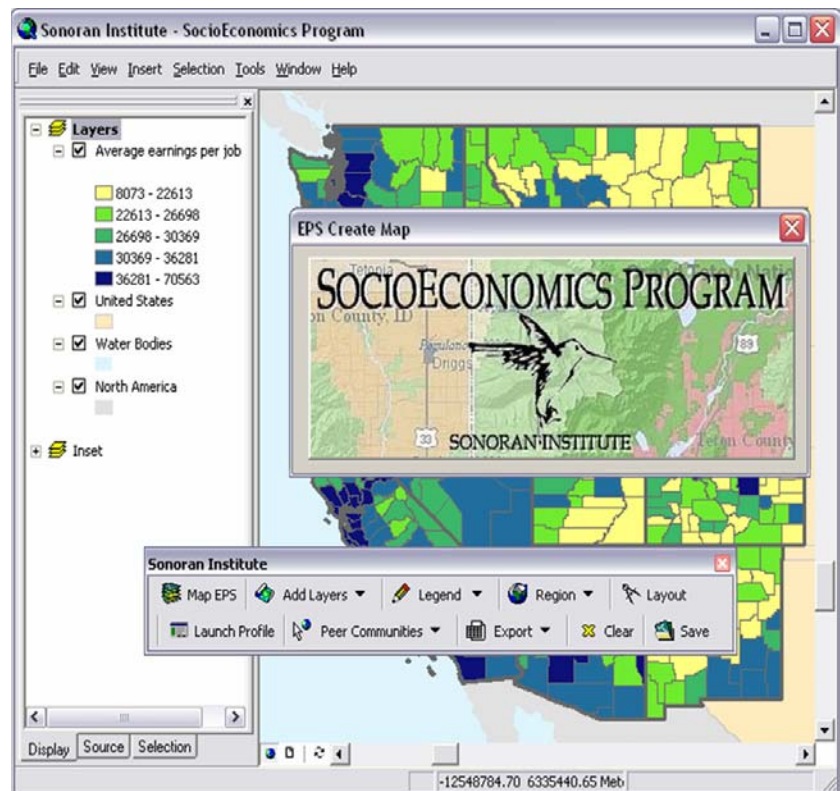
- How communities can look to their peers to discover economic opportunities and potential pitfalls related to different land management decisions.

The Sonoran Institute Geographic Data Library (SIGDL)

The Sonoran Institute Geographic Data Library (SIGDL) is a compilation of personal geodatabases that store all of the Sonoran Institute’s GIS data. After planning the library’s directory structure, agreeing upon quality control standards, and setting up a metadata system, the benefits of housing the organizations GIS data in a library were soon realized. When a dataset becomes a part of the library, the SIGDL website is updated and all Sonoran Institute staff are aware of the new addition. Too often, multiple people within an organization spend time collecting the same dataset, and spend disk space storing the dataset. With a GIS library, this problem is avoided. Also, by instituting a GIS library, individuals that collect GIS data are encouraged to follow quality control and metadata standards that may not have otherwise been implemented. That way, datasets are more likely to be used by multiple staff for multiple projects. The library has a “key holder”, an sole individual with write permissions, which enables better enforcement of the agreed upon standards. While there are many options for distributing data within an organization, the Sonoran Institute’s GIS library is currently stored on external portable hard drives rather than a network due data transfer speed limitations.

Customizing ArcMap

The Sonoran Institute’s SocioEconomics Program created a custom ArcMap toolbar that automates many complex GIS queries and tasks, and the time invested in Visual Basic programming has already paid off. The toolbar integrates ArcMap with the Economic Profile System (EPS), which allows the SocioEconomics Program to map and query the relationships between thousands of socio-economic variables and SIGDL layers such as transportation infrastructure and wildlife habitat. The following sections of this paper demonstrate how these tools have facilitated hypothesis testing, analyses, and communication of important conservation topics in the Western US.



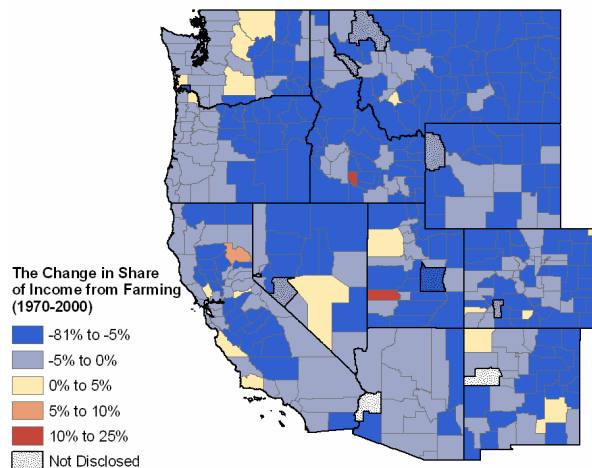
A custom toolbar integrates the Sonoran Institute’s Economic Profile System with ArcMap.

The West Today

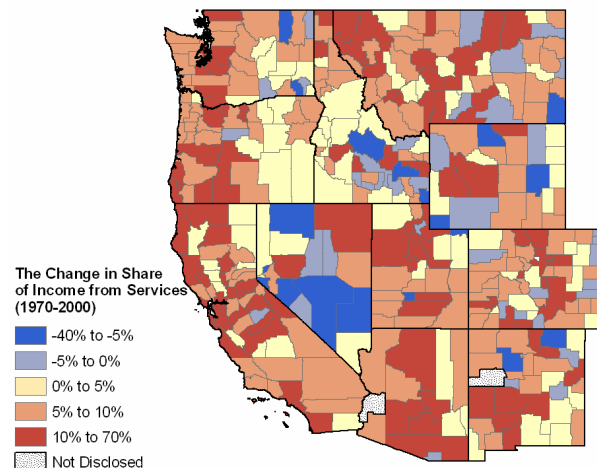
Today's West is a product of our global economy, where service-related components of production can be located in remote areas. People with foot-loose jobs are moving west, and along with the newcomers, come political, land use, and local economic changes. Any region in transition can expect growing pains, and the West is no exception. Decision-makers and citizens are asking: "How has our competitive advantage changed in today's global marketplace?"; "What are our economic strengths?"; and "What will be our strategy for ensuring prosperity?"

The long term residents of the West have seen family and friends suffer from job losses in mining, logging, and ranching. Today, only eight percent of personal income in the rural West is from the industries that historically supported the economy: mining, oil and gas development, logging and other wood products sectors, farming and ranching. This is down from twenty percent three decades ago. These resource-dependent and agricultural sectors are often seen as the West's traditional economic staples, and their decline has many Westerners worried. Many feel the West has entered an economic depression, and that only by slackening environmental regulations and subsidizing extractive industries can the West bounce back.

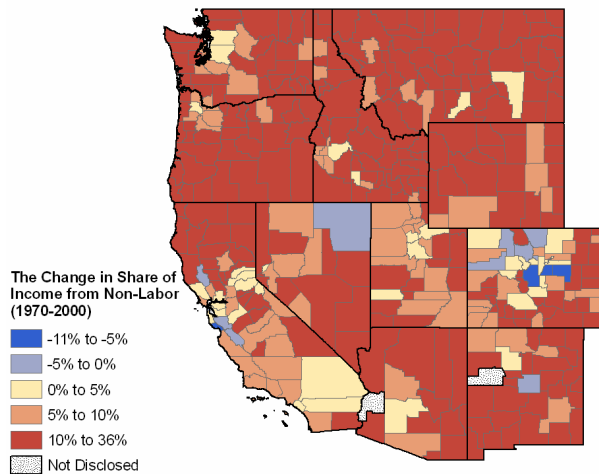
The Sonoran Institute's SocioEconomics Program uses GIS to help Westerners understand that the decline in mining, logging, and ranching has been accompanied by a simultaneous increase in service industries, such as business and health services, and non-labor sources of income. Wealth in the West today is increasingly created by engineers, researchers, designers, managers, and other occupations labeled as "services". In fact, job creation is more rapid in the West than in the nation as a whole. What's more, increases in non-labor income, including 401K investments, pensions, and age-related assistance from the federal government, translate into a great deal of disposable income for many Western communities. In the last three decades more than half of all net growth in personal income in the West, in real dollar terms, was from service and professional industries. Another third was from non-labor sources of income. Less than 1 percent of the growth was from mining (including oil and gas development), and the agricultural sectors and agricultural support sectors added one percent to the growth.



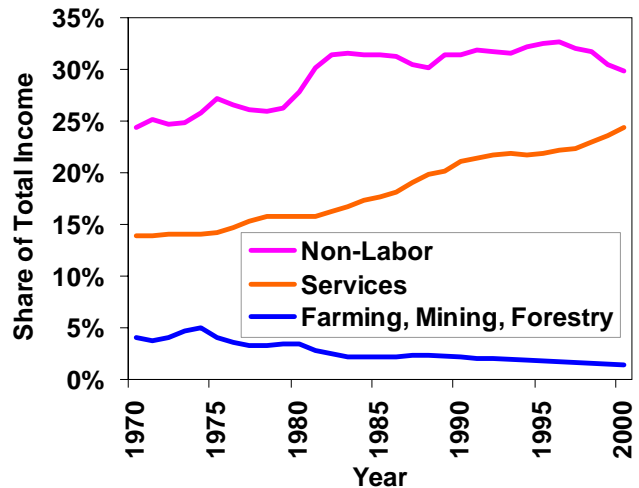
The share of income from farming has decreased in most Western counties.



The share of income from services has increased in most Western counties.



The share of income from non-labor earnings has increased in nearly all Western counties.



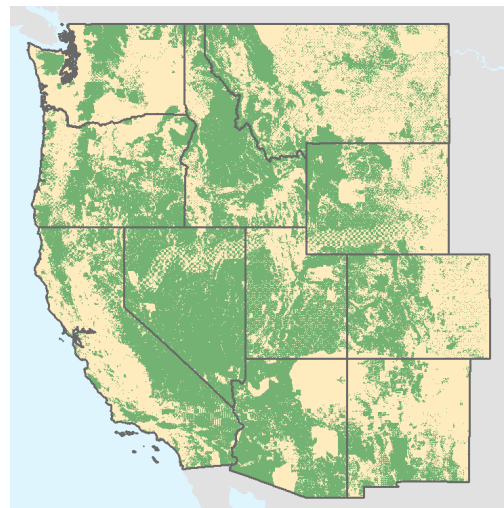
The decline in farming, mining, and forestry in the West has been accompanied by significant increases in service and non-labor income.

What economic strategy will ensure prosperity in the West? With today's telecommunications technology it is often assumed that software engineers and financial advisors can live in remote parts of the West. However, they need to be able to visit with their clients, so one solution for the West is to develop the transportation infrastructure, such as roads and airports, that ensures easy access to larger markets. This will be key for the continued creation of the high-wage jobs in service industries. But, an even greater challenge lies in preserving the qualities of the West that will continue to draw professionals and retirees from around the world: natural landscapes, friendly communities, and abundant recreational opportunities.

The Role of Conservation

More than half of the West is in public ownership, and in some counties, over ninety percent of the land is publicly owned. It is no surprise that the debate over how these lands should be managed so frequently makes headline news in the West. Westerners argue over which form of management, conservation or commercial use such as logging, gas development, and mining, will most effectively stimulating the economy of Western communities?

This debate prompted one of the first projects in which the SocioEconomics Program realized the full potential of their new GIS capabilities. Utilizing map layers representing land ownership, transportation infrastructure, population centers, and economic indicators of growth, the SocioEconomics Program set out to analyze the relationship between protected public lands and economic growth. What they learned has helped to dispell the myth that environmental protection and economic growth are at odds.



The West is over 50% publicly owned.

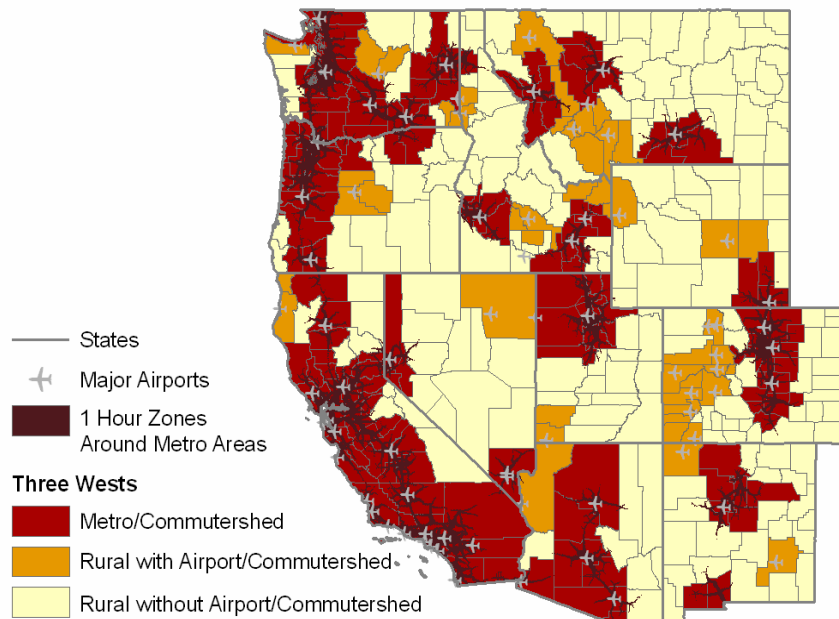
The SocioEconomics Program discovered that Wilderness, National Parks, National Monuments, and other protected public lands, set aside for their wild-land characteristics, can and do play an important role in stimulating economic growth –and the more protected, the better. Counties with historic dependence on resource extraction industries have the slowest long-term growth rates. Diverse economies –especially those with high-end service industries like finance, engineering, real estate and business services –grow the fastest. Communities in the West with easy access to larger markets and with nearby protected public lands are ideally positioned to attract these types of industries. The West’s competitive advantage in a global marketplace is its unique landscape and quality of life. For a copy of the study, please see www.sonoran.org/programs/prosperity.html

Learning from Peers

There are many important pieces of the economic development puzzle, and not all communities can benefit from the same economic strategy. For example, some Western communities, in spite of being surrounded by spectacular scenery and abundant recreational opportunities, tend to struggle. What is different about these places?

To answer these types of questions, the SocioEconomics Program uses its GIS-based peer communities tools. Peer communities, regions with similar socio-economic characteristics, can learn from each other which economic development strategies work in similar places, and which pitfalls to avoid. The SocioEconomics Program’s tools for identifying peer communities range from county classifications to automated ArcMap tools written in Visual Basic.

The “Three Wests” is one of the SocioEconomics Program’s novel approaches to identifying peer communities. It is a grouping of Western counties defined by access to markets via road and air travel. Using GIS criteria, the SocioEconomics Program grouped Western counties into three classes: (1) Metropolitan or within a metropolitan commuter-shed, (2) Rural with access to airports with daily commercial flights to metropolitan areas, or (3) Rural and isolated.



The “Three Wests” map groups counties by access to markets.

The SocioEconomics Program used the “Three Wests” classification to understand why certain communities benefited more from the presence of protected public lands than others. What they discovered was that rural areas with access to metropolitan areas tend to share many other socio-economic qualities such as the education of the workforce, and the immigration of newcomers. Communities with these economic assets are able to take advantage of protected lands as part of an economic development strategy. For communities without these economic assets, the protected lands can be a benefit to the economy, but they are not enough. These counties need to work on providing transportation infrastructure, arts, an educated workforce, and other factors that attract high-wage occupations.

Conclusions

The people and the economy of the West are undergoing a significant transformation, and the Sonoran Institute is helping communities emerge from the transition with economic vitality and healthy landscapes. GIS is helping the SocioEconomics Program generate and test hypotheses, conduct analyses, and communicate important information about community development and land stewardship to a wider audience than ever before. Other Programs within the Sonoran Institute are utilizing GIS for community education and technical assistance with land use planning and growth management. With the help of GIS, the Sonoran Institute is contributing to a day when people embrace stewardship as a fundamental value by caring for their communities, economies, and natural landscapes.

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For more information, please contact Patricia or Erin, or visit one of the following websites: www.sonoran.org for information about the Sonoran Institute, or www.sonoran.org/eps for information about the Economic Profile System..
