

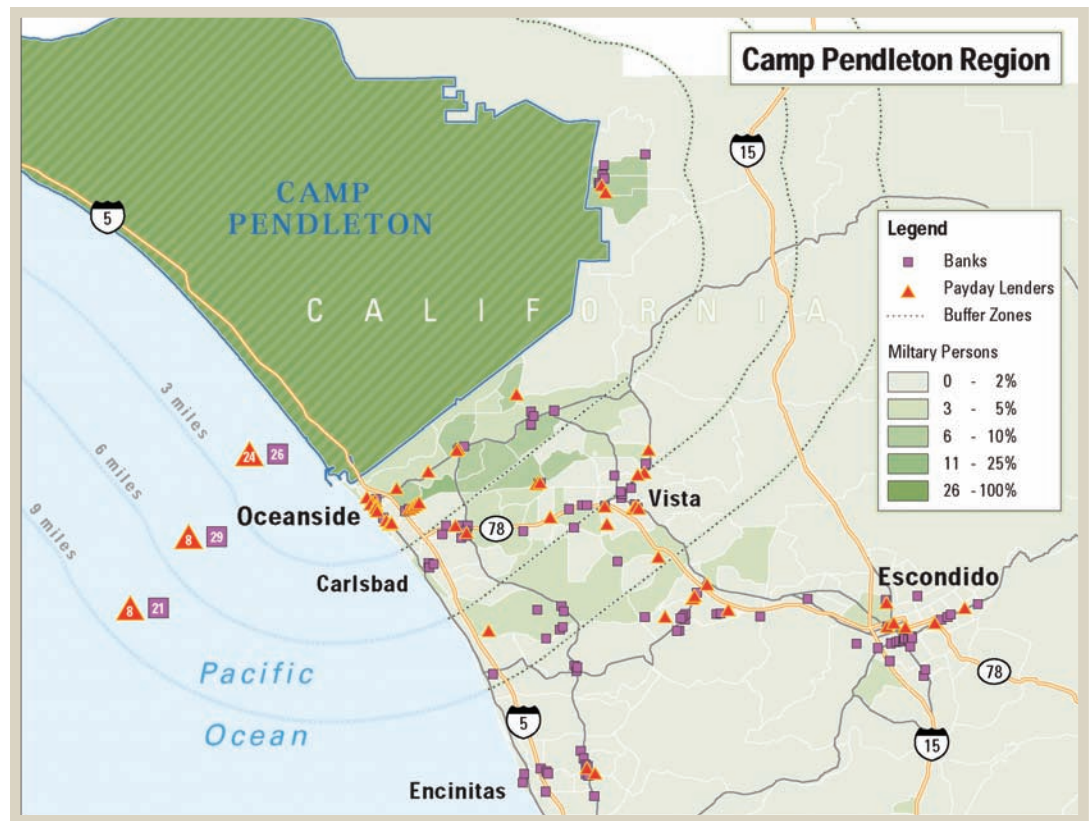
## Northridge

### Payday Lending

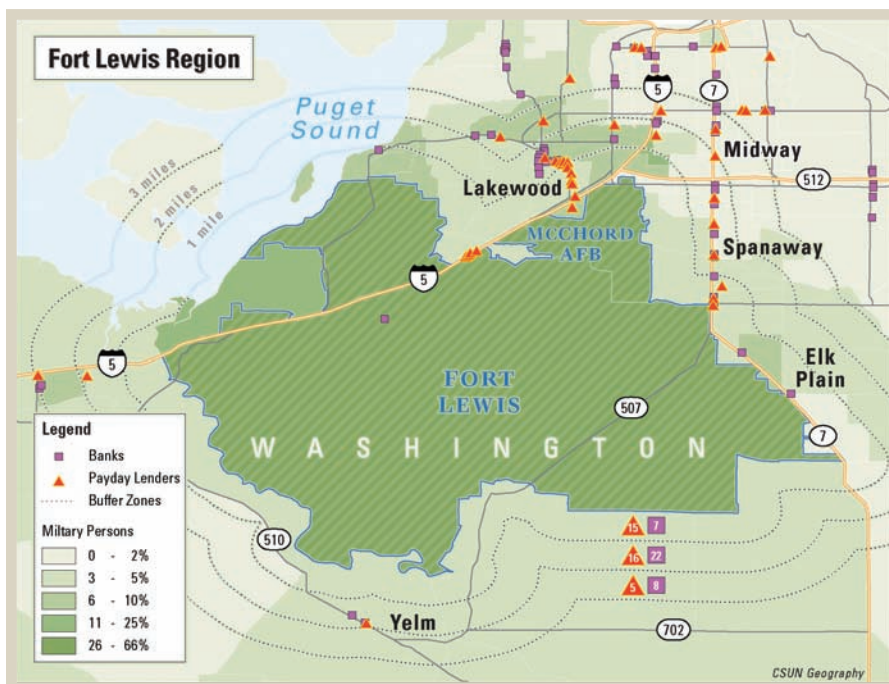
Maps play a key role in federal legislative action

How do you know when you're in a tough neighborhood?" That question prompted a short field investigation, and later a GIS project that eventually found its way into a piece of federal legislation. Steve Graves, a geography professor at California State University, Northridge suspected that payday lenders, companies that offer high cost, short-term loans, tended to cluster in impoverished and minority neighborhoods. By geocoding the addresses of payday lender and comparing them against the location pattern of banks, Graves was able to show that indeed poor,

cont. page 2



**Figure 1:** Location of payday lenders and banks near Camp Pendleton, California. Includes buffer zones, and counts by buffer zone.



**Figure 2:** Pattern of Banks and "predatory lenders" around Fort Lewis and McChord AFB, near Tacoma, Washington.

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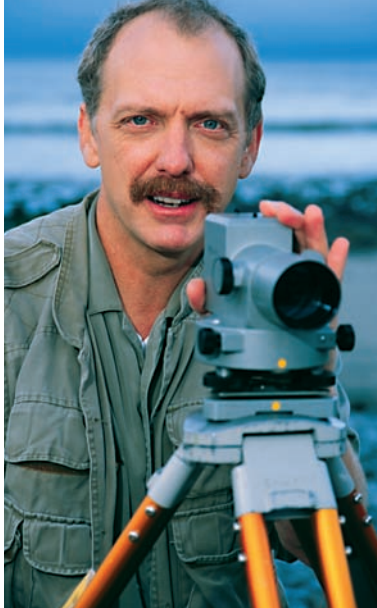
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## Director's Message 2007

### Bringing Geographic Information Science to the Community

#### THE GEOGRAPHIC INFORMATION SCIENCE

technologies of GIS, remote sensing, spatial analysis and cartography have long been applied to studying and

addressing social and environmental issues, and CSU faculty have developed a well-deserved leadership reputation in these applications. In recent years we have seen an increasingly community-integrated role for GIScience research, including the development of community-based GIS programs in remote rural locations, both domestic and international.

In this issue, we see some of these community-oriented studies, ranging from rural counties in northern California to the northern coast of Australia. Kathryn Davis (San Jose) worked with Habitat for Humanities teams in Guatemala to identify good building sites, considering local hazard issues like hurricane paths. Ellen Hines (San Francisco) worked with indigenous cultures in northern Australia to find ways to better manage coastal resources and protect endangered dugongs and sea turtles. In California, Jessica Van Arsdale (Humboldt) worked with local rural communities in northwestern California to improve health programs. All of these efforts have significant community involvement, and demonstrate how academia can help the community by working in the community and contributing valuable geospatial analytical expertise.

In this issue, we also see the influence of GIScience methods and products on influencing policy. Steve Graves (Northridge) applies GIS methods to equity issues in lending institutions around military bases, and his maps have influenced federal and state legislators to act to stop unethical practices by lenders. Jim Woods (Long Beach) shows how GIS analysis can guide university planning efforts and alumni campaigns.

As we have seen, CSU faculty from San Diego to Humboldt have no hesitation to venture from the ivory towers of academia. Our GIScience specialists on all campuses have shown that we have a lot to offer to help solve societal and environmental problems.

Jerry Davis, *Director*, CSU GIS Specialty Center  
San Francisco State University

## *Payday Lending (cont.)*

non-white neighborhoods are more likely to have payday lenders than county-wide averages. During the course of the initial investigation, Graves noticed neighborhoods near military bases also had unusually high numbers of these lenders. A comprehensive study of the location of payday lenders involving 20 states and more than 15,000 ZIP codes, demonstrated that "military towns", like Oceanside, California, frequently had more payday lenders, greater per capita densities and greater retail densities than their civilian counter parts. The study, co-authored by Christopher Peterson and published in *The Ohio State Law Journal*, (66:4-2005), caught the attention of the media and the military brass who had noticed an alarming rise in debt problems among soldiers using payday lenders.

Eventually lawmakers at the state and federal levels began to take action on the complaints leveled by the Pentagon at the payday lending industry. Because the maps showed the spatial behavior of this industry so vividly, legislators around the country requested additional maps from Graves to better make their case for greater regulation of this industry to fellow lawmakers, many of whom were favorably disposed toward payday lending. With the help of David Deis, the CSUN staff cartographer, Graves sent maps of payday lending to legislators in California, Washington North Carolina, Missouri, Florida, Texas, Illinois and a number of municipalities. Numerous congressional staffers, bureaucrats and lobbyist noted the powerful effect the maps had in persuading fellow lawmakers to support regulatory action. One congressional staffer said, "We have had a SURGE of co-sponsors (of a bill) after I distributed the maps to a variety of members of Congress. We have obtained over 75% of our co-sponsors since I sent out the state-specific maps". Senator Dole (NC) used the Graves' maps to great effect in hearings. The maps were also prominently featured in a Department of Defense report prepared for Congress.

The power of geography as a way of shaping an argument has been undeniable in this instance. In the wake of the release of the Graves-Peterson study, several states have completely banned payday lending and others have restricted it in some fashion. This September, the President signed into law a bill that also made it illegal for anyone to make high cost loans to service members, effectively dropping the maximum APR on any loan to soldiers and sailors in California from 459% to 36%. Graves plans on mapping the pattern of payday lending around the country again, once the provisions of the bill are enacted nationwide.

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## Disaster GIS

Habitat for Humanity

With a goal to build 1.5 million homes in a country that constantly encounters hurricanes and tectonic activity, Habitat for Humanity (HFH) in Guatemala and the San Jose State University Department of Geography are collaborating on a GIS application to model appropriate building site selection, assess natural disaster risks, and develop a much needed disaster response and recovery plan. Professor Kathryn Davis and students Charlie Chapin and Sharon Ordeman spent two weeks in Guatemala focused on data analysis, GPS training/field work, and prototype map production while student Jamie Ratliff is currently developing the GIS application.

The foundation of the GIS is a set of logged GPS waypoints of existing homes that the Guatemala HFH team provides to SJSU on a bi-weekly basis. As this is a learning experience for everyone, a few steps have had to be repeated. Currently the basic layout for the application is being re-arranged to simplify data entry. Geo-integration of the waypoints to the topographic maps (some of which are very old) is an iterative process, but the resulting databases and maps provide the needed perspective between the home (GPS) locations and the terrain thereby giving HFH a better understanding of the risks inherent in particular locations. As shown in Figure 1, the path of Hurricane Mitch passed through the current study area in the department of Quetzaltenango in October 1998. In October 2005, Tropical Storm Stan struck Guatemala with torrential rains and caused massive landslides in the same vicinity (Figure 2).

This long-term project provides SJSU students with fieldwork experience and the opportunity to develop a web-based GIS application. The ultimate goal is to provide HFH with a way to track the structures they have built and to provide a disaster response and recovery model that will ultimately aid Guatemala in coping with natural disasters.

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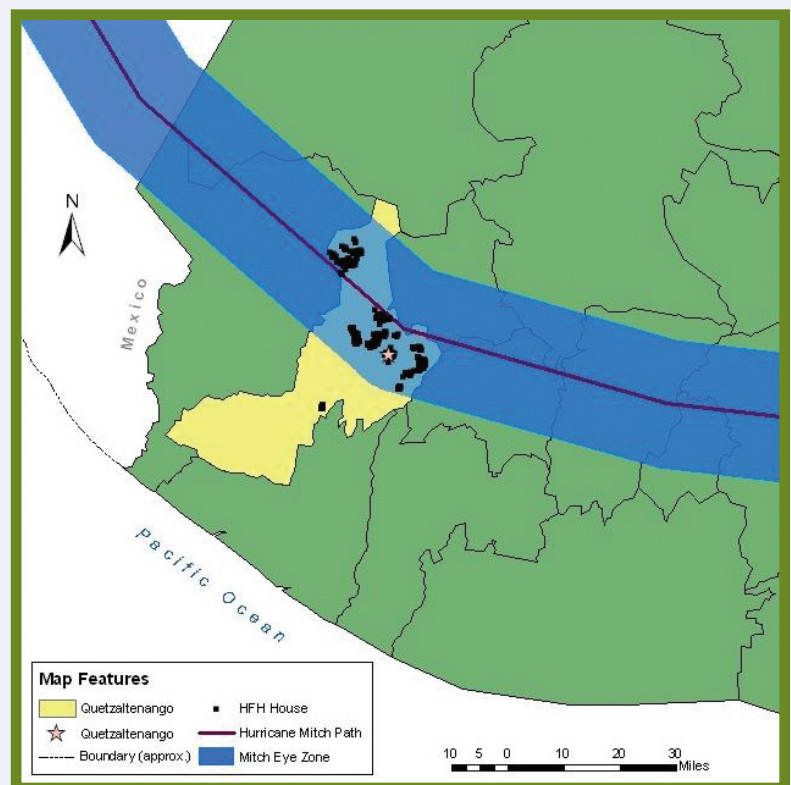


Figure 1: Path of Hurricane Mitch through Guatemala



Figure 2: Effect of landslide from tropical storm Stan.

## Child Poverty, 2000

California Center for Rural Policy (CCRP)

The California Center for Rural Policy (CCRP) is a rural policy consortium of research centers at Humboldt State University located in Arcata, California. A major focus of the CCRP is to use GIS to conduct policy-relevant research for rural communities.

One of the major efforts of the center is to conduct meaningful rural research that can translate into action (policy). A primary goal is to make rural data easily understood and accessible to members of the community. The CCRP considers health of individuals within the biological, familial, social, geographic, economic, and policy contexts. Health implies a healthy community that has access to clean, safe, natural environments, healthcare, schools, living wages, housing and safe living environments. Location is an essential consideration when examining rural social issues, particularly issues related to health. In rural northwestern California, a 30 mile drive to the doctor may require an hour or more by car, assuming the road is not-closed due to landslides or snow.

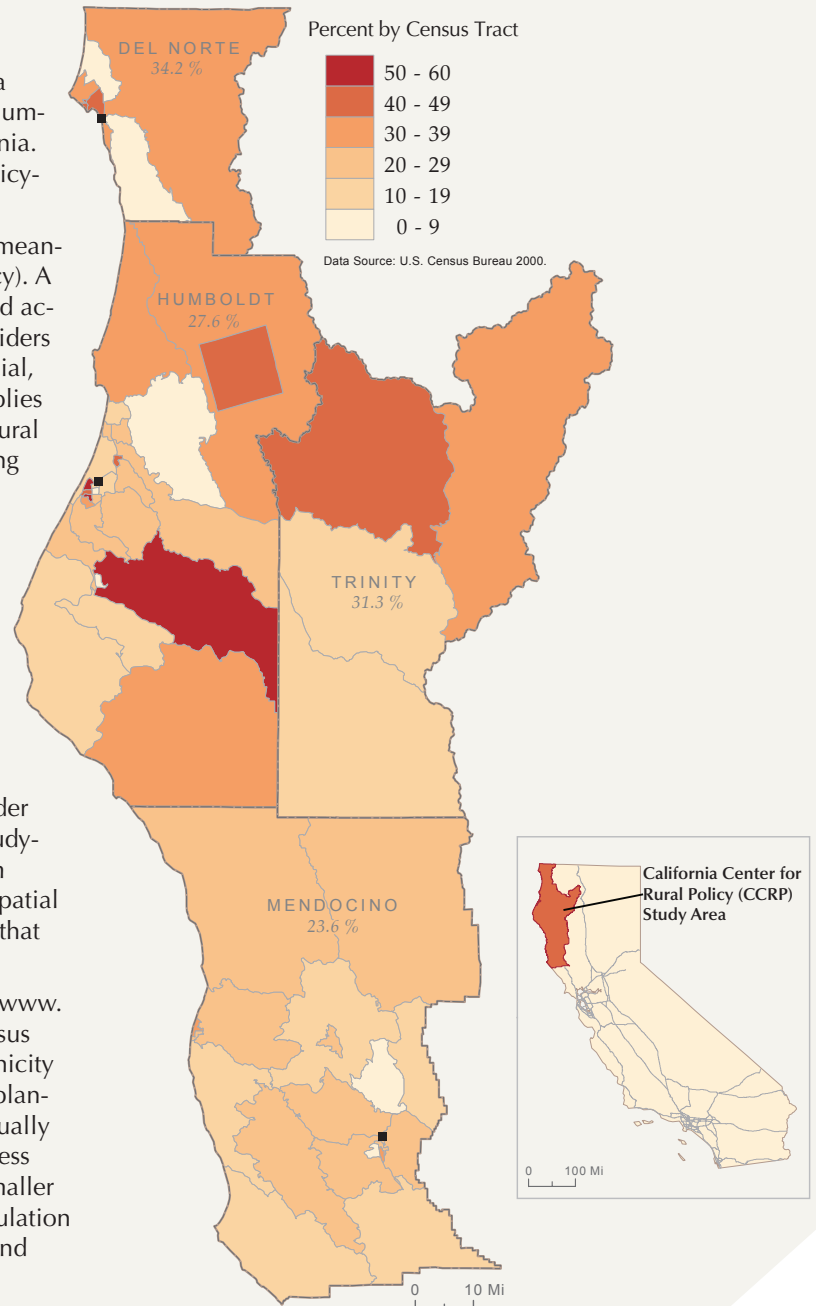
The center is using GIS to employ a sociospatial approach to study these issues. This perspective gives an active and integrated role to space, place and social indicators considering both social and environmental factors that may impact an issue or problem under study. Dr. Sheila Steinberg notes, "When it comes to studying the concept of 'rural' you can't separate health from environment, the two are inextricably linked." A sociospatial perspective is useful for measuring the multiple factors that can influence a person's health.

The CCRP has posted all of its maps online at <http://www.humboldt.edu/~ccrp/>. The center creates and posts census tract and zip code tabulation area maps of poverty, ethnicity and population density. These maps are of use to rural planners and organizations who seek to understand and visually learn about their communities. It is a value-added process to create these maps that have local relevance at the smaller units of analysis such as census tracts and zip code tabulation areas. The CCRP is also a training ground for students and community members interested in rural policy at HSU.

CCRP is community driven, a characteristic that sets it apart from many other research institutes. Social inequalities in health occur at different levels, across many different populations and in different geographic locations. Through our ongoing study of health inequalities we seek to identify and understand factors leading to these health disparities.

To investigate rural health disparities, CCRP conducted a Rural Health Information Survey in the summer of 2006. 24,000 surveys were mailed to rural post office box-holders within a four county area (Mendocino, Trinity, Del Norte and Humboldt counties). GIS was used to develop a sampling frame to accurately reflect the social and environmental diversity of the region. To capture the various degrees of "rural," surveys were sent to remote rural, semi-rural and population center regions. Designations were determined based on

### Children Under Age Five Below Poverty Level



population density and degree of geographic isolation. GIS will be used in the analysis to map geographies of inequality as well as community strengths.

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## 2007 CENSUS WORKSHOP



## Coming Events

### June 27-28, 2007

University Consortium for GIS Summer assembly in Yellowstone National Park. [www.ucgis.org](http://www.ucgis.org)

### June 18-22, 2007

Twenty-Seventh Annual ESRI International User Conference at the San Diego Convention Center, San Diego, California. [www.esri.com/events/uc](http://www.esri.com/events/uc)

### April 15-19, 2008

AAG Annual Meeting, Boston, Massachusetts 

GIS users will gather June 18-22 in San Diego, CA to connect, learn, and share at the 2007 ESRI UC.

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## What is Geographic Information Science (GISci)?

**G**EOGRAPHIC INFORMATION SCIENCE is the synthesis of spatial theory, methods and technologies used to study and map geographic relationships, distributions, networks, temporal change and other spatially aware information in order to better understand and manage limited earth resources. It includes:

### GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Comprehensive databases tied to location, with an integrated set of tools for querying, analyzing, and displaying information. Important classes of GIS tools include those that support: (1) logical map overlay, (2) proximity analysis and spatial buffering; (3) network analysis (e.g. of roads or streams); (4) geocoding and address matching; and (5) three-dimensional surface modeling.

### REMOTE SENSING

Analysis of the earth's surface and interpretation of its features using imagery collected from air or space platforms. Image processing methods use visible and invisible (e.g. ultraviolet and infrared) parts of the electromagnetic spectrum as well as active radiation (RADAR and LIDAR) to interpret land cover patterns of vegetation, soil, land use, and environmental systems, including up-to-the-minute changes in these systems.

### CARTOGRAPHY

The art and science of making maps. Cartographical theories and methods focus on information content, symbolization and design to appropriately communicate the results of studies.

### GLOBAL POSITIONING SYSTEMS (GPS)

Provides a means for determining earth location and navigation, using a constellation of satellites and the technology for interpreting their signals. Field data collection for GIS and remote sensing projects is increasingly dependent on GPS.

**W**HILE HAVING ITS ROOTS in geography, many disciplines have contributed to the development and use of Geographic Information Science.

In the CSU System, anthropologists, biologists, business marketers, computer scientists, economists, engineers, environmental scientists, foresters, geologists, historians, journalists, landscape architects, natural resource planners, oceanographers, political scientists, sociologists, urban planners, and wildlife scientists also use these technologies in their classes and for their research. 

## Community Based GIS

Northern Australia Aboriginal and  
Torres Strait Islander Communities

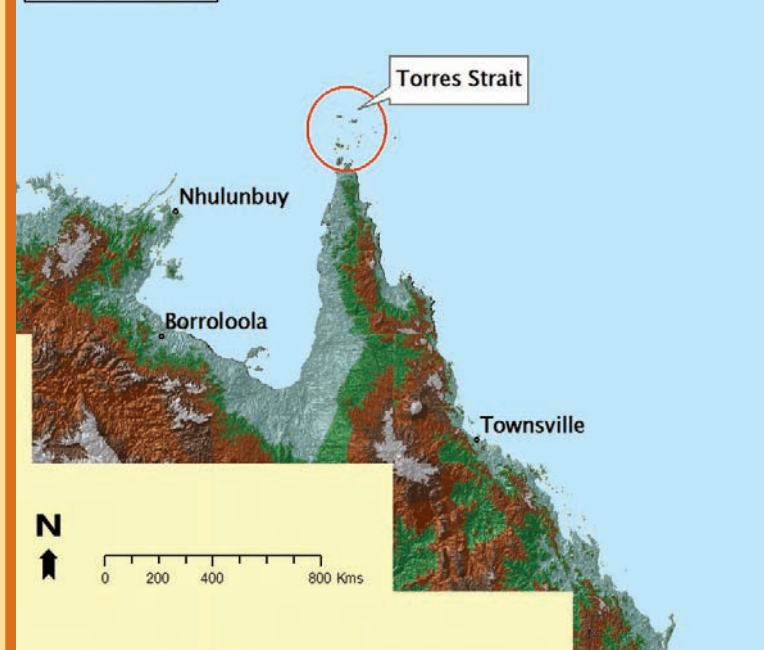
6] During fall of 2005, Dr. Ellen Hines went to northern Australia to establish a community-based geographic information system (GIS), in a collaboration with community stakeholders to use geographic technologies to recognize 1) traditional use of coastal and marine resources in customary territories in Aboriginal and Torres Strait regions of northern coastal Australia, and 2) historical and cultural relationships involved with the use of threatened marine species. An important goal of this GIS is to increase our understanding and effective management of the endangered dugong, sea turtle, and coastal ecosystem in northern Australia. A project objective was to explore methods to creatively expand data collection techniques from oral communication with indigenous cultures, to advance the use of accessible community-based GIS and visualization methods, at the same time integrating local cultural knowledge. A related goal is to enhance involvement of local stakeholders in marine resource management and dugong protection. For this planning project she visited various Indigenous groups in the Northern Territory and Torres Strait, with the objective of choosing two groups as long-term case studies.

Training methods were three-fold: in-class training on GIS theory and software, field and mapping training using global positioning systems (GPS) units, and mapping areas of local concern as chosen by the trainees. For the GPS exercises, participants went outside and practiced using the units, then drove around to various areas of their choosing. Back in the classroom, they downloaded the GPS points and tracks and created maps. At the computer, groups from the community used their own perceptions to map threats to the diversity and productivity of the local areas. Each group chose factors that they felt most directly threaten their coastal area, and the indirect causes that contribute to that threat.

Based on post-training surveys, participants agreed the course and contents were useful, and that there were many uses for GPS and GIS. Participants also noted that the training needed to be more practical than theoretical, especially for those with varying English and computer skills. They were excited about the possibilities, but anticipated needing further support in using the GIS software.

Creating community-based mapping is a slow and complicated process because of the social process of identifying and agreeing on issues of accuracy, authority, and secrecy. Nevertheless there was quite a bit of interest and support for this idea, and sufficient computer infrastructure. Future plans call for creating a team to work on islands in response to requests for mapping with various themes: sacred sites, videos of elders, management and monitoring of sea country resources and threats and continued training. In summer of 2007, Dr. Hines will be returning to Torres Strait to do video interviews and start coordinating the mapping project.

GPS training  
exercise for  
indigenous  
Sea Rangers  
in North East  
Arnhem Land  
in Nhulunbuy.



Training Sites: Torres Strait, Borroloola, and Nhulunbuy

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## Geographic Distribution of Graduates of CSU, Long Beach

In January 2006, California State University, Long Beach (CSULB) welcomed Dr. F. King Alexander, its 6th president since its founding in 1949. One of the first things he wanted to find out was where all of the graduates of CSULB lived. This question was tasked to the Alumni Records Office, and while they have over 192,000 records in their address list of graduates (out of the then 205,000, and now over 217,000, who have graduated), they had never viewed this information on a map.

Alumni Records contacted the Geography Department on campus to help them produce a single map showing the location of all of the alumni in a 'push pin', dot distribution format. They were unaware of the full analytical and cartographic capabilities of a Geographic Information System (GIS), so other options for analyzing and displaying of the data were discussed and agreed upon.

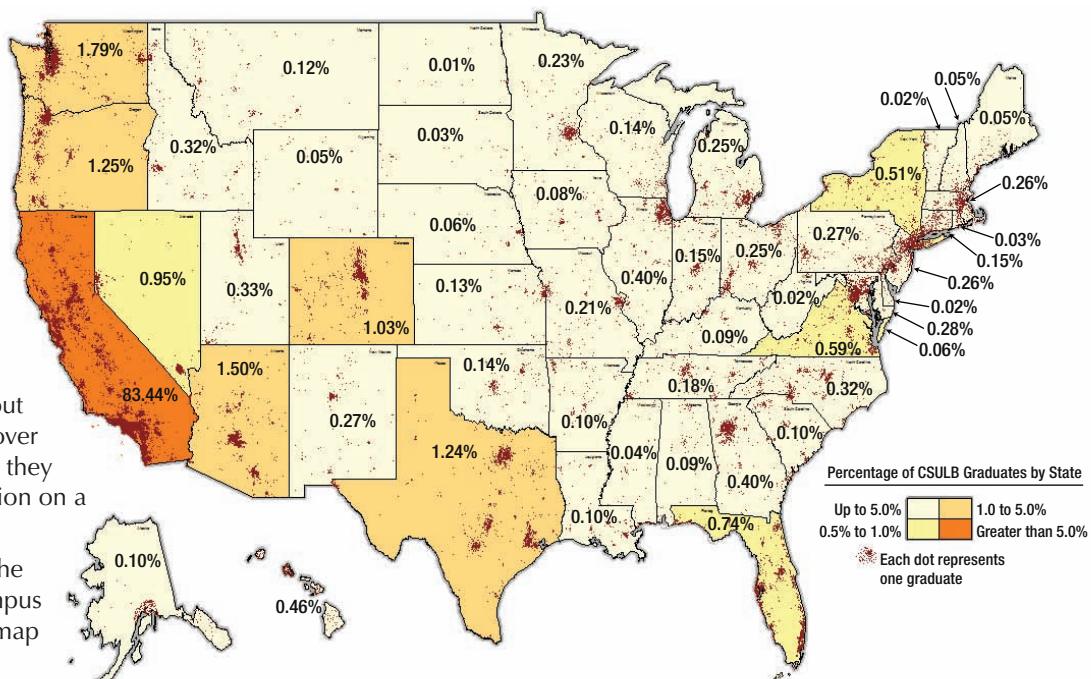
### DATA ISSUES

Preliminary analysis of the data indicated that it was quite 'dirty' from a geocoding standpoint, with spelling errors, name variations, and data in the wrong fields. The entire data base was cleaned up and rectified using Coding Accuracy Support System (CASS) software. The CASS software cleaned up and rectified the addresses, and evaluation has indicated that this process increased the hit rate from 62% to 72% on just the initial geocoding pass alone.

The cleaned address list was then geocoded using the built-in geocoding software in Atlas GIS 4.0 ([www.esri.com](http://www.esri.com)). A multiple-pass method, involving various levels of relaxing options and combinations, was used to get the highest hit rate on the addresses. After all of the passes were completed, about 1,860 (or about 1% of the total) records still could not be geocoded for various reasons. As these were well within the 5%-7% margin of error that the Alumni Office was expecting, no further effort was made to try to map these addresses.

### MAP PRODUCTION

The geocoded records were used to produce four maps. One showed the entire United States; a second, the U.S. with California broken out; the third, California alone; and fourth, Southern California. The fourth map concentrated on the spatial distribution within Southern California. Cells of approximately 1/4 mile squared (approximately 40 acres per cell) were created and the number of addresses within each cell were calculated. Buffer zones of 5 miles each were also created around CSULB.



### ANALYSIS

Over 83% of the alumni of CSULB reside in California, with the largest concentration being in Southern California. There is also a relatively large concentration in the Bay Area and in and around Sacramento.

Analysis of the five mile buffer zones around CSULB shows that over 63% (120,000 plus) of the alumni still reside within 35 miles of CSULB.

### HOW THE MAPS ARE BEING USED

The maps were presented to President Alexander in both hard copy and electronic format and he has indicated that the maps exceeded his expectations. The maps have become a major part of an entire 'alumni awareness' campaign that the President has initiated. The maps are also being used to help the Alumni Records Office better focus their fund-raising efforts as part of a major campaign. Plans are already in the works to update and annually revise the data base during summer after each graduation. In one of the more unique uses, the Athletics Department has been asked to use them to help schedule away games in cities and regions that have high concentrations of alumni.

The maps have become such an important part of the President's plans, that an article was recently written about them, and how they are being used, and it ran as a front page story in the *Long Beach Press-Telegram* (Sunday, 2/11/06).

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## Landscape as Art



This photo, RM 104: China Bend, was scanned from a color infrared print taken in 1996 and used to map riparian vegetation on the lower Sacramento River. China Bend is located at River Mile 104 above Knights Landing.

### Chico

The current show at the Chico City Hall gallery is titled Landscape as Art and includes aerial photography from CSU, Chico's Geographical Information Center (GIC). To compile the show, GIC director Chuck Nelson revisited the GIC archives looking for interesting images of landscapes.

The aeriels were selected from over three file cabinets and represent over 15 years of GIS assistance to federal, state and local governments throughout northern and central California. They include examples of both true color and color infrared images.

Prints were scanned, cropped, enlarged and printed on a thick watercolor paper so that framed images resemble art pieces. Also, many of the scenes were reoriented to help better visualize the physical geography of each area (north at the top).

"Hanging the show was an all day process," Nelson explained. "It took five to ten minutes each to measure, center and hang each piece and another 50 minutes of discussion as people passed by and added commentary or asked questions. People love airphotos as much as they love maps."

Anyone who has seen California from the air or uses Google Earth understands the concept of connecting landscape to art. The show adds a more personal touch because it includes a northern California backdrop. It will be on display until June, 2007. The gallery is in downtown Chico at 411 Main Street.