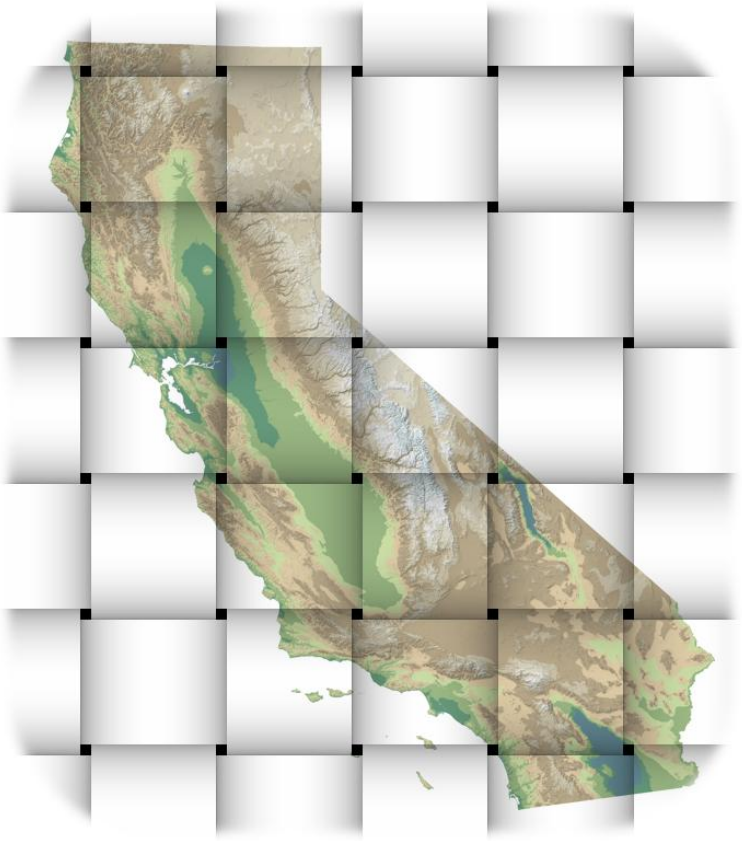

Visualizing California

A Strategy for Enhanced Decision-making Tools for Public Policy Makers and the Public

Recommendations of the California Geographic Information Systems Task Force

Office of the State Chief Information Officer
September 1, 2008

OCIO
Office of the State Chief Information Officer

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Contents

Revision History

Version	*Date*	*Name*	*Description*
Version 1.0	08/08/08	John Ellison	Original Draft Report
Version 2.0	8/11/08	John Ellison	2nd Draft
Version 3.0	8/14/08	Mark Greninger	Edits and reformatting
Version 3.1	8/15/08	Michael Byrne	Final Draft Edits compilation
Version 3.1.1	8/15/08	Michael Byrne	Edits to 'Agriculture' area
Final	02/02/09	OCIO	Final edits and formatting

Purpose and Need for the GIS Task Force

In May 2008, Governor Schwarzenegger directed his newly established Office of the State Chief Information Officer to create a California Geographic Information Systems (GIS) Task Force to develop a statewide strategy to employ the technology for environmental protection, natural resource management, traffic flow, emergency preparedness and response, land use planning and health and human services.

In July 2008, State Chief Information Officer Teri Takai said, "The Governor recognizes the value of GIS to better serve our people and give policy makers and the public enhanced decision-making tools. I look forward to working with the task force and my colleagues throughout the state to streamline the deployment of GIS applications to maximize the use of this technology."

The power of GIS lies in its ability to allow decision makers and the public to readily visualize and manipulate differing types of information in terms of both place and time. The ability to make on-going, accurate, timely, data-informed decisions in these dynamic and long-term policy areas is critical to California's economy and the health and safety of its citizens.

The recommendations contained in this report will help California meet the policy needs stated above. The implementation of these recommendations will allow California to take full advantage of the potential of GIS technology by (1) establishing leadership for GIS within California, (2) obtaining and maintaining more robust GIS data and (3) cost effectively investing in more integrative and dynamic GIS tools that will make this technology more relevant and useful to decision makers and the public.

Role of GIS in 21st Century State Government

Decision makers, in both the public and private sector, are realizing that effective action in complex and dynamic policy areas require both new analytic tools and new ways of collaborating between disparate stakeholders. These tools must be sophisticated enough to deal with the complexities of the public policy arena and must also be user friendly. Geographic Information Systems (GIS) meet this sophistication / user friendly requirement.

GIS are powerful technologies that use digital map information to connect vast amounts of data by their geographic location. GIS helps decision makers visualize and understand complex situations and relationships, identify and compare the relative merits of alternate scenarios, more accurately and comprehensively predict outcomes, productively engage stakeholders and build consensus, and evaluate the effectiveness of actions taken. With GIS technology, maps can represent layers of information that can be combined, analyzed and displayed in space and time to show multi-stakeholder group patterns that they could not otherwise see of or determine with paper maps or single-factor databases.

Specifically:

- GIS technology is capable of integrating, analyzing and displaying geographically referenced information
- GIS is a tool that allows users to analyze spatial and temporal information and display the relevant structures and operations that exist in a designated area
- GIS technology has a number of value-added functions including: infrastructure planning resource and asset management and environmental impact assessment.

Deploying GIS technologies throughout California will enable improvements in healthcare, public safety, education, and the economy for citizens of the State.

GIS embodies the notion of a digital or electronic map as an interface to a rich array of information linked to or associated through geographic location. GIS helps visualize and understand complex situations and relationships, identify and compare the relative merits of alternate scenarios, more accurately and comprehensively predict outcomes, productively engage stakeholders for building consensus, and evaluate the effectiveness of actions taken. In short, GIS is an important and powerful technology helping government make more effective and adaptive decisions in the face of emerging and changing conditions.

Findings

The Task Force found that the State, and many of its partners, is well positioned to realize considerable value from GIS. The major opportunities and challenges to attain this are:

Status of Agency Use of GIS

GIS is used throughout state government in at least 29 departments and has great potential to serve more. Areas of public policy that are or can be served by GIS are illustrated in the following table. Appendix A contains more detailed information and Appendix D lists current agency GIS profiles.

Policy Areas Supported by GIS

Policy Area	*Examples of the use of GIS*
Public Health, Healthcare, and Human Services	• Respond to disease outbreaks • Track food borne contamination • Improve delivery of health services • Link pollution sources and threats to public health • Bio-Terrorism • Child support services

Policy Area	*Examples of the use of GIS*
Homeland Security/Emergency Response	• Border Security • Common Operational Picture/Situational Awareness • Earthquake Preparedness • Fire Response • Manage Critical Infrastructure • Communication with the Public • Terrorism Threat Assessment • 911 Dispatch
Strategic Growth / Land Use	• Capital Projects (bridges, roads, critical infrastructure) • Population growth estimates • Transportation Planning • Support Sustainable Economic Development • Resource Allocation • Supply and Demand Studies • Housing design • Land Use Planning
Energy / Water / Utilities	• Mapping of utilities • Demand forecasting • Drought and Natural Resource Management • Flood mitigation, planning, and response
Environment	• Global Climate Change impact mitigation • Reduction in Greenhouse Gas Emissions • Identification and development of alternative energy sources • Protection of endangered species.
Agriculture	• Crop Safety • Response to animal and plant disease outbreaks • Ensuring a safe and secure food supply • Preventing spread of exotic plants

Status of Available Data

Significant GIS data is available at the county, Metropolitan Planning Organization (MPO) and regional levels that can be shared with the State. Many counties, including Los Angeles,[1] have voted their data into the public domain. County parcel data can now be acquired for minimal reproduction cost from a variety of counties. No statewide effort to standardize this

[1] Prior to this vote, the County charged $1 per parcel for the data or about $2,200,000 for the entire county dataset.

data and distribute it for business uses - such as e911, VOIP, broadband deployment, taxation, or planning - currently exist.

Opportunity for California to build new Applications for Global Markets

At a time where complex challenges require timely, data-informed collaboration by Agencies and partners in the public and private sectors, potential applications of GIS are limited only by our collective imaginations. State action can stimulate investment in, stimulate adoption of, and remove further organizational barriers to the development of world-class GIS technologies. The creation of a mechanism for covering the cost associated with the information technology infrastructure necessary for the research, development, demonstration, and deployment of GIS technologies and techniques could leverage OTROS/FSR review.

Regional Interest

In June 2006, Governor Arnold Schwarzenegger supported the Western States Governor's Association Policy Resolution 06-14, which defines geospatial data as part of the Nation's Critical Infrastructure.[2] This Resolution calls for increased statewide GIS coordination in the Western states. It further articulates data supporting emergency response efforts (e.g., roads) as a critical for development.

Federal Interest

The recently developed National Geospatial Advisory Committee (NGAC) is developing a suite of recommendations to further strengthen the Federal Governments approach to GIS coordination and proliferation. The US Environmental Protection Agency, the US Department of Transportation and soon to be the US Department of Interior have all appointed Geographic Information Officers. In addition the National States Geographic Information Council (NSGIC) has long called for strong states GIS coordination to build the National Geospatial Data Infrastructure outlined by the Office of Management and Budget's Circular A-16.

Challenges

The GIS Task Force identified a number of issues:

- Lack of coordination - GIS programs are scattered among agencies with no coordination of activities leading to the missed opportunities to pool or share resources.
- Lack of data sharing - GIS data are often locked away in individual program "islands" where they are difficult to find, access and distribute for other valuable purposes.
- Duplicate investment - State agencies fail to collaborate in the acquisition of framework data sets (e.g., imagery, water bodies, elevation, land cover, etc.) that are basic to many GIS operations, not taking advantage of collective buying power, and often re-licensing the same data sets .

[2] http://www.westgov.org/wga/policy/06/Geospatial.pdf.

- Lack of collaboration with local and federal agencies – Opportunities for joint GIS planning, data development, and data sharing are limited by the absence of guidelines, policies, and contacts.

If GIS implementation continues as a series of uncoordinated, incremental, program focused efforts, it is very likely that these efforts will result in fewer opportunities to leverage current investments and ever-increasing implementation costs.

Proposed Executive Action

The public is best served if government decision makers have quality GIS data and systems to plan, deliver and operate effective government services for a healthier, safer, more secure, and economically prosperous California. This requires better coordination of its GIS investments.

The Task Force recommends the following four primary actions by the Governor's Office.

1. Establish the State Geospatial Information Office (SGIO)

   The SGIO should be established and funded through legislation or executive order. The SGIO will be report to the State Chief Information Office, and have the authority, status and capacity to work across state agencies and with agency partners in other government, private and academic sectors to implement policies and priorities of the Administration.

   Specifically the SGIO will:

   - Review strategic GIS related projects.
   - Represent the State of California for national geospatial policy issues
   - Provide Executive oversight and accountability to help ensure proper alignment with program needs and strategies via Executive Leadership Council
   - Establish effective and sustainable coordination with working partners and stakeholders to ensure the maintenance of critical data sets
   - Build and maintain a California Spatial Data Infrastructure.
   - Establish project approval, funding and procurement processes that promote statewide strategies and standards.
   - Make California a world class leader in implementing GIS technology

2. Direct Agencies to establish GIS leads (e.g. Agency GIOs) responsible for using data, and collaborate with the SGIO to align state GIS investments.

3. Establish a competitive GIS matching grant program to support the broader and collaborative use of GIS to solve significant public policy issues in communities and regions throughout California.

4. An integrated program of outreach and public education activities with industry, academia and local governments that helped communities and businesses better understand the value of GIS technologies and techniques.

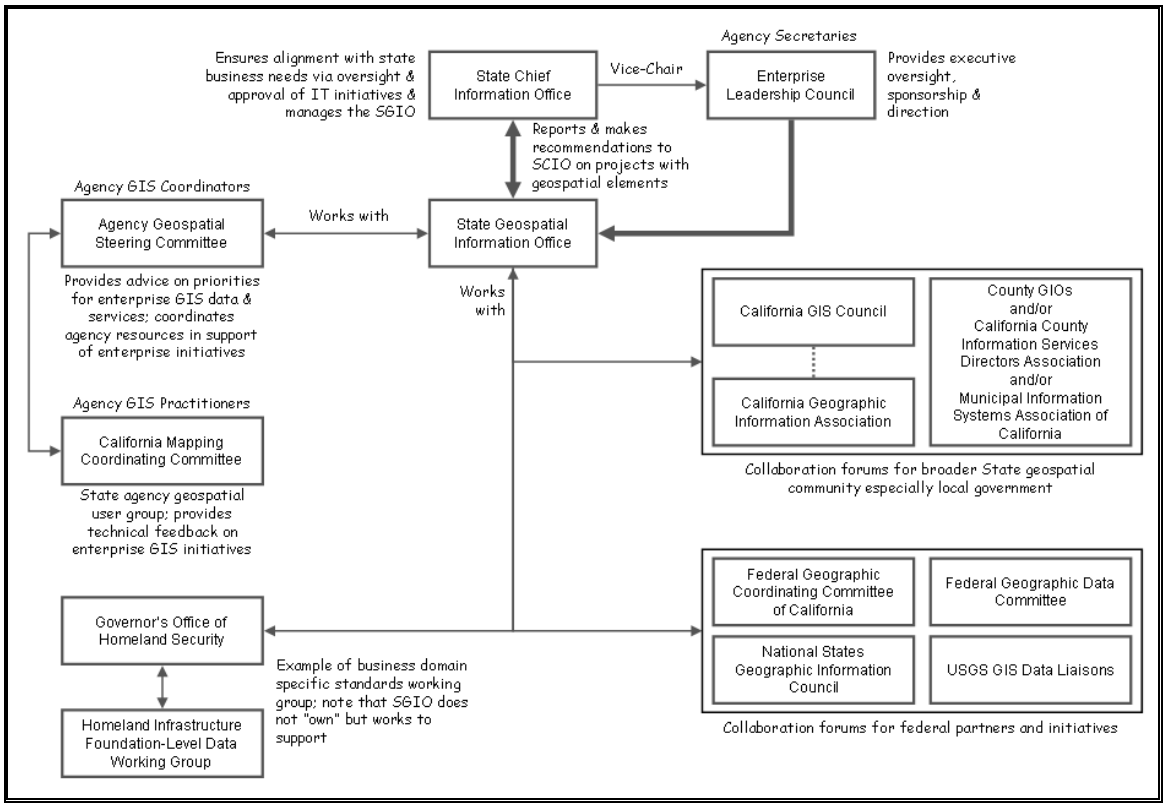
Benefits

- **Increased Data Access and Sharing** – A statewide GIS will facilitate public and inter/intra-departmental access to GIS data by placing integrated, standard data in a central, highly available location. **Reduced GIS duplication and costs** – Creating a central GIS data repository storing the California Geospatial Data Infrastructure will enable all state agencies to share the cost of storing, accessing, and distributing GIS data, thereby avoiding the cost of building and maintaining redundant systems. In addition, it will allow heavy GIS user departments to reduce their ongoing GIS costs by leveraging a central storage infrastructure and GIS applications.
- **Development of GIS Standards** – The SGIO will support the development of countywide standards for GIS data, software, and applications, ensuring system interoperability and enhancing the usefulness of GIS.
- **GIS Center of Expertise** – The SGIO will support departments as they implement GIS by providing best practices, strategic advice, and expertise, to departments as they deploy GIS. The program will leverage existing investments to distribute the advantages of GIS across the state.
- **Public Outreach –** The SGIO's office will leverage the full potential of the State's GIS data and technology, which will make spatial information more readily accessible to the public and other outside stakeholders.
- **Increase Collaboration –** The SGIO will support the collaboration between and among the state and its stakeholders leading to better results, and coordinated responses for public policy issues.

Appendix B contains operational policies for the recommendations. Appendix C lists duties for the State GIO, Deputy GIO (Operations) and Deputy GIO (Strategy and Planning).

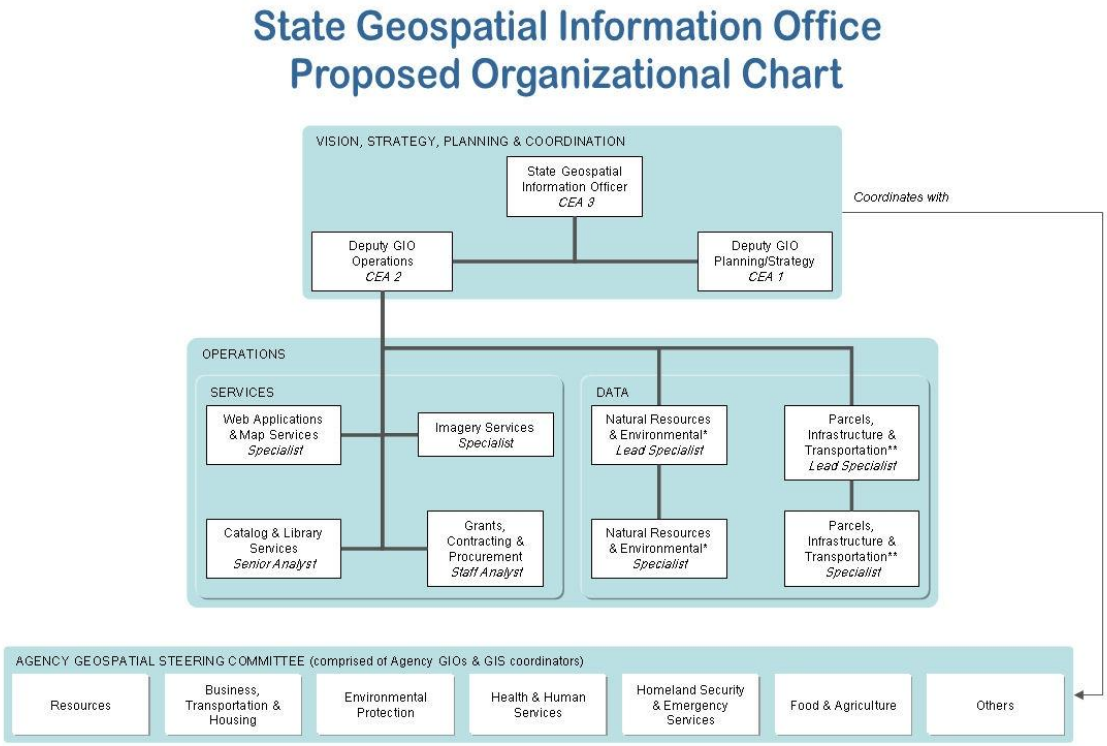
The figure on the next page shows the proposed governance of the SGIO.

Figure 1 - SGIO Governance



The figure below shows the organizational structure for the SGIO office.

Figure 2 - SGIO Office



* Includes land cover (e.g., vegetation), elevation, hydrography, biological diversity and natural hazards (e.g., earthquake, flood, wildfire, etc.)
** Includes land use (current and proposed), geodetic control and administrative units (e.g., e911 districts)

Implementation Timeline

Major Milestone	Target Date
Issue Executive Order establishing SGIO	October 2008
Appoint a State GIO team (top 3 executive positions)	November 2008
Develop funding, staffing and location of SGIO	December 2008
Form the Agency Geospatial Steering Committee	January 2009
Fully staff the SGIO office	March 2009
Appoint custodians for California framework data sets	April 2009
Evaluate and determine location for hosting of statewide geo-services	May 2009
Fully populate & maintain state geospatial catalog and library	June 2009
Plan, procure and deploy “Virtual California”	July 2009

Appendix A

Statewide Policies and GIS Benefits

HealthCare

GIS promotes public health by helping to identify and respond to disease outbreaks, food borne contamination, properly locating and delivering health services, and understanding the link between sources of pollution and threats to public health. GIS provides a common analytical framework in which health authorities can understand problems and formulate a response, improving incident management and health planning. Already making liberal use of GIS technologies, the health field can map disease outbreaks, stockpiles for emergency response, understand patient needs, identify access to care issues, plan for better healthcare delivery, identify vulnerable population needs, and develop a greater understanding of the supply and demand of healthcare.

Investor Partners: Health and Human Services Agency, Office of Statewide Health Planning and Development, Department of Managed Healthcare, Department of Healthcare Services, Department of Public Health, Department of Social Services, Department of Mental Health, Department of Alcohol and Drug Programs, Department of Child Support Services, Emergency Medical Services Administration, Air Resources Board

Overview of Analysis Potential

- Identify Disparities in Health Care
  - Is there a disproportionate ratio of physicians to population?
  - Are there areas of certain Socio-Economic Status with greater / less than access?
  - Is there consistent and appropriate delivery of care across time, place, and demographic?
- Improve Processes for Access to Care
  - Use evidence based state of the art evaluation for Health Management Organization contract approval
  - Use internet based information for integration of health data between health agencies
- Identify disease outbreak and spread
- Identify health needs of the state
- Find associations between sources of pollution and health effects

Homeland Security/Emergency Response

GIS enables public safety and homeland security by helping government agencies safeguard our citizens, borders, and critical infrastructure as well as reduce crime, and prepare for, respond to, and recover from disasters. GIS provides a Common Operating Picture (COP) that is used for daily operations in mitigation, preparedness, response and recovery from all kinds of emergency events. GIS is a core component of situational awareness and can integrate various sensors, field activity, road closures, threats, assets, critical infrastructure, and weather to better inform emergency and security concerns.

Investor Partners: California Office of Homeland Security, California Office of Emergency Services, California Department of Forestry and Fire Protection, California Department of Conservation, Regional Terrorism Threat Assessment Centers, California Department of Justice, US Department of Homeland Security, US Department of Defense, California Highway Patrol

Overview of Analysis Potential

- Common Operating Picture – Develop a single COP for all state, regional, and local response agencies which integrates the best local information with the most commonly used statewide framework data in one environment. This ensures sound decisions made on the best available data to all.
- Terrorist Threat – Coordination with partner agencies on critical assets and key infrastructure threats and risks, in a common map base. This potential identifies a real understanding of the situational awareness.
- Coordinate Emergency Dispatch – Coordinate the approximately 400 local public safety answering points (PSAPs), in cooperation with the Department of General Services, and the California Highway Patrol (CHP) for more effective and timely dispatch.
- Emergency Evacuations – Develop the information necessary for a common road base, such that the Department of Transportation, Department of Forestry and Fire Protection, OES, and Health and Human Services Agency can effectively determine appropriate evacuation of vulnerable populations during a significant event.
- Flooding – Develop, in conjunction with the Department of Water Resources, State Water Resources Control Board, US Corps of Engineers, US Bureau of Reclamation and the Federal Emergency Management Agency best available flood risk evaluations including floodplain management and level analysis
- Fire Management – Evaluate and determine fire risk. Evaluate and determine fire threat.
- Earthquake – Evaluate the damage of critical infrastructure like hospitals and skilled nursing facilities. Determine infrastructure closing like roads, rail and utility outages and how best to identify alternatives for these infrastructure needs.

Strategic Growth/Land-use

GIS helps local government and citizens understand how to plan land use with the following goals: the construction of critical infrastructure to accommodate growing populations while balancing quality of life, economic growth, preservation of natural resources, avoiding disproportionate impacts to disadvantaged communities (e.g., environmental justice) and minimizing our carbon foot print. GIS provides the ability for multiple stakeholders to view current supply and demand of competing resources in a map. With these views, consensus on growth strategies and effective design of housing, transportation, resources and economic development can all win, rather than compete against each other. This approach supports decision making and promotes better organizational integration and knowledge management to improve the quality of life for future generations.

Investor Partners: Office of Planning and Research, California Resources Agency, California Air Resources Board, California Attorney General, California Department of Transportation, the Metropolitan Planning Organizations, County Government, Local Government, Utility Districts

Overview of Analysis Potential

- Identify growth strategies – GIS enables us to understand the costs and benefits of growing in certain areas, directions and timeframes. Costs can be in actual build, and future demand or mitigation costs. Likewise, benefits can be direct or indirect.
- Develop zoning, transportation, housing best practices – GIS can illustrate where best practices worked, and how well they were developed.
- Develop multi-modal strategies – With adaptive management alternatives in GIS, we can see, plan for and implement where multi-modal transportation reduces congestion and maximizes travel for people and goods and services.
- Develop business partnerships – With development scenarios in GIS we can identify where business strategies are aligned for mutual gain in non-intuitive sectors like conservation and development.

Energy/Water/Utilities

GIS provides networking approaches to better understanding resource availability and delivery in energy, water and utilities. Viewing these data in maps, concurrently with demand side variables, allows planners, decision makers and consumers the ability to analyze how these resources are impacted by the dynamics of growth and development.

Investor Partners: California Public Utilities Commission, California Energy Commission, Office of Planning and Research, California Department of Conservation, California State Fire Marshal, Department of Public Health, State Water Resources Control Board, Department of Transportation, Department of General Services

Overview of Analysis Potential

- Streamline project approval – Multiple jurisdictions are often required to evaluate utilities. GIS would allow both applicants and reviewers a better understanding of how these regulations change through multiple jurisdictions and coordinate review and application procedures by automating workflow.
- Coordinate permitting – Using GIS can help the permitting process by allowing both applicants and reviewers the ability to understand the regulatory constraints on project locations better and to more quickly assess permits for following all required procedures.
- Evaluate vulnerabilities – Using networking tools (e.g. understanding constraints in utilities as they flow through the interconnected system), planners can evaluate risks and threats to the system from terrorists and/or natural disasters
- Effectively manage distribution – Using GIS allows state managers to identify when and where constraints might happen statewide, due to extreme events and high demand situations (e.g. summer heat waves, or winter blizzards)
- Provide consumer choice – Having a complete understanding of what utilities and services are available to consumers at their home, gives them a better opportunity to choose the most appropriate and cost effective services available.

Environment

GIS can help us understand the consequences of our activities on global warming, identify and mitigate sources of greenhouse gases, find, plan, build and exploit alternate energy sources, and monitor the effectiveness of our efforts. GIS is capable of integrating data to better understand the geographic distribution of sources contributing to greenhouse gas increases, where mitigating alternatives might best be effective and understanding at risk areas for health, infrastructure, natural resources, species preservation and food development due to the resulting climate changes.

Investor Partners: Office of Planning and Research, California Energy Commission, California Resources Agency, California Air Resources Board, Department of Fish and Game

Overview of Analysis Potential

- Impact Analysis – With GIS we can identify impacts to specific places from the effects of climate change and greenhouse gas increases such as sea level rise, changes in vegetation, wildlife regimes, extreme heat events or air quality conditions. Sea level rise has specific impact in coast and low lying zones, where significant populations now live. Changing climate conditions affect food production, forests, water and energy use among other things.

- Model Alternatives – GIS can model different scenarios in the changing climate and how these changes might vary over time and place. Visual modeling of this nature is highly effective for further understanding of climate change on regional and global scales.
- Monitor Effects – As change occurs, we need to monitor real change over time and place. GIS again helps visualize these changes and the magnitude of these changes to local entities.

Agriculture

Agriculture is important both as a food supply, and a basic economic engine that generates dollars back into the State's economy.

California must maintain a safe and reliable food supply for its citizens; and for the people of the United States and other countries of the world that rely on California's agriculture to feed them.

Agriculture is a major industry for the Golden State. With 88,000 farms and ranches, California agriculture is nearly a $32 billion dollar industry that generates $100 billion in related economic activity.

Investor Partners: Department of Public Health Services; County Agricultural Commissioners Association; Department of Pesticide Regulation; Department of Fish and Game; Department of Water Resources, Department of Conservation, Department of Pesticide Regulation, US Department of Agriculture, Animal and Plant Health Inspection Service.

Overview of Analysis Potential

GIS is used to analyze information, develop and maintain spatial datasets and maps used in planning for agricultural water supply and delivery, agricultural production, land conservation, pesticide management and regulation, crop safety, responding to animal and plant diseases, and for livestock, dairy and poultry management activities.

Insurance of a safe and secure food and fiber supply is based on the premise that it is more economically and environmentally sound to prevent entry and establishment of dangerous animal disease and plant pests than to live with them.

<u>Agricultural Water Supply and Land Conservation.</u>

- GIS combined with remote sensing is used to map agricultural land use and analyze future water needs for crop irrigation. Urbanization of agricultural land is monitored along with new lands coming into agricultual production. Pesticide permitting and application are monitored to protect both water supply and a safe working environment for crop harvesting. County general plans and land conservation zones help ensure well planned urban growth and preserve agricultural land for future generations.

<u>Animal Health and Food Safety</u>

- As a first responder to animal disease outbreaks and dairy food contamination incidents, GIS is used to respond to and manage naturally occurring outbreaks of animal diseases which include Exotic Newcastle Disease and avian influenza in poultry, tuberculosis in cattle and West Nile virus in horses.
- GIS is used for conducting emergency preparedness exercises with local, regional and national stakeholders to evaluate readiness to an emerging disease or act of bioterrorism.

Plant Health and Pest Prevention

- GIS is used in plant pest prevention and management programs that protect California's agriculture, horticulture, natural resources, and urban environments from invasive plant pests.
- GIS is used extensively for tracking pest finds, reporting damage, for emergency and quarantine response.

Appendix B

Proposed Operational Policies

Executive Sponsorship and Oversight

The Executive Leadership Council will, among its other duties, provide executive oversight of the State Geospatial Information Office and sponsorship for enterprise geospatial initiatives.

Agency GIS Coordination

Agencies and unaffiliated Departments will appoint a liaison (e.g., Agency GIO or GIS Coordinator) to represent them and serve on the Agency Geospatial Steering Committee (AGSC). The AGSC will function as a steering committee for the State GIO to provide advice on priorities for the development of enterprise GIS data and services. AGSC members will commit and marshal agency resources in support of enterprise geospatial initiatives and will work to improve their agencies' efficiency and effectiveness and that of overall state GIS operations with respect to the planning, acquisition, sustainability and use of geospatial information. A member of the AGSC will chair the California Mapping Coordinating Committee.

California Mapping Coordinating Committee

Operational units (e.g., departments, offices, commissions, conservancies, etc.) that use GIS will maintain representation on the California Mapping Coordinating Committee (CMCC). The CMCC will meet monthly and be chaired by a member of the Agency Geospatial Steering Committee (AGSC). The CMCC will act as a state GIS users group and will provide technical feedback to the AGSC on proposed enterprise GIS initiatives.

Catalog of Geospatial Data and Services

State agencies that produce and maintain geospatial data and services will catalog and maintain up to date information on these information resources in the California Environmental Information Clearinghouse (http://ceic.resources.ca.gov/).

Accessibility of Framework Geospatial Data and Services

State agencies that have stewardship or custodial responsibility for framework geospatial data will provide or arrange for appropriate access to these information resources. At a minimum this will include posting data to the California Spatial Information Library (http://casil.ucdavis.edu/casil/) making these data available for download and as web map, feature and image services.

Data Stewardship

Agencies will be given responsibility and helped to secure appropriate funding to produce, maintain and provide access to framework and other important geospatial data as appropriate to their expertise, capacity and business domains.

Examples:

Transportation – Department of Transportation (Caltrans)
Land Cover (Natural Vegetation) – Department of Fish and Game
Land Use – Department of Water Resources or Department of Conservation
Biological Diversity – Department of Fish and Game
Natural Hazards (Seismic, Landslides, Tsunamis) – Department of Conservation
Natural Hazards (Flooding) – Department of Water Resources
Natural Hazards (Wildfires) – Department of Forestry and Fire Protection (CAL FIRE)
Critical Infrastructure – Governor's Office of Homeland Security and Emergency Services
Hydrography – Department of Water Resources
Environmental Quality – California Environmental Protection Agency
Demographics – Health and Human Services Agency
Parcels/Cadastral – Office of the State GIO
Imagery – Office of the State GIO
Elevation – Office of the State GIO

Security and Confidentiality of Data

Agencies will act in full compliance with all applicable policies, laws, regulations, guidelines and best practices to protect and ensure appropriate security and confidentiality of data. All other data not so encumbered will be stewarded in the public domain.

Appendix C

State GIO Duties

State GIO Duties

- Coordinate the State's geospatial information activities
- Develop program authority, policy, standards, staff, computing, data, and coordinating infrastructure for the continued use of GIS technology for policy and state business
- Establish relationships with investor partners at federal, state and local levels
- Implement standards to facilitate interoperability of information used to support State services
- Establish the GIS Matching Grant program
- Create information sharing agreements with federal, state, local, and tribal governments
- Facilitate the development of framework spatial data for statewide use
- Work with Cabinet Secretary appointed AGIO in each State agency in order to more effectively develop GIS activity
- Provide leadership in collaboration and sustainability of critical framework geospatial data
- Maintain expertise on GIS and related technologies and provide expert advice on application and use
- Report to the State CIO

State Deputy GIO (Operations) Duties

The DGIO for Operations (DGIO Ops) will report to the SGIO and will facilitate and coordinate the creation/sharing of, and updates to, the following kinds of data and related services including a metadata catalog:

- Street Centerlines: The physical location of streets and have comprehensive address associated with each line.
- Digital Lands Records Inventory (Parcels/Cadastral): The boundaries of all real owned property. The DGIO Ops would coordinate the development of a county stitched fabric of this data for statewide use.
- Government Boundaries: Emergency responders need to know the boundaries of local jurisdictions when determining where an event occurred and which entities should become involved. Maintaining these data is critical to ensuring a successful response and coordination effort.
- Critical Infrastructure/Key Assets: These data include bridges, key land marks, hospitals, first responders, and other assets required in an emergency. Buildings and facilities footprints also may fall in this category. The DGIO Ops would ensure these data are current and reflective of the source information. Currently the Office of Homeland

Security has a list of seventeen sectors that make up this category. Data on all seventeen sectors – which include agriculture and food; energy; and commercial assets – have business uses in other areas of State Government.

- Utilities: Utilities data include the location of natural gas, oil, electric, water, wastewater, and communications lines.
- Hazards: These data include but is not limited to floods, earthquakes, fire, and landslides. The DGIO Ops will coordinate between the many federal, state, and local departments responsible for creating these data.
- Planning: These data include biological information, vegetation, roads, growth areas, and key infrastructure on which the state will rely for future development. Many of these data currently do not exist, but they would provide policy makers with a keen understanding of how a future California would be shaped.

State Deputy GIO (Planning & Strategy) Duties

The DGIO for Planning and Strategy (DGIO P&S) will report to the SGIO and will do the following:

- Ensure that GIS policies and projects support the mission of, as well as add demonstrable value to, the State government agencies, boards and commissions; as well as local and federal partners.
    - For example, in the context of emergency services, the DGIO P&S will provide leadership in meeting the information requirements of responsible State agencies and will coordinate GIS users to assure interoperability and prevent unnecessary duplication
- Establish cooperation among and between State Agencies in the use of GIS technologies in providing solutions to interagency, multi-organizational, multi -stakeholder, cross-jurisdictional public policy issues
- Maintain relationships with investor partners at federal, state and local levels
- Implement a strategy that includes regional/local GIS practitioners as partners; allowing the State CIO to take the role of an investor partner
- Implement a policy that supports and sustains a continued and concerted effort to work with regional and local governments and organizations, many of whom will have diverse and, at times, conflicting priorities with respect to the use of state resources
- Request that other entities of State government not under direct executive authority, including the CPUC, the University of California, the California State University, California Community Colleges, constitutional officers, and legislative and judicial branches make use of GIS technologies in providing solutions to relevant interagency, multi-organizational, multi -stakeholder, cross-jurisdictional public policy issues
- Review, track and provide expert advice on legislation affecting GIS including funding and data access/public records issues
- Operate a user maintain registry of local, state, federal and tribal government and utility GIS experts

Appendix D

California State Agency GIS Programs

Profiles for the GIS capabilities of the following agencies are provided here:

- California Air Resources Board
- California Coastal Commission
- California Department of Boating and Waterways
- California Department of Conservation
- California Department of Fish and Game
- California Department of Food and Agriculture
- California Department of Forestry and Fire Protection (CALFIRE)
- California Department of Justice
- California Department of Parks and Recreation
- California Department of Public Health
- California Department of Toxic Substance Control
- California Department of Transportation (Caltrans)
- California Department of Water Resources
- California Employment Development Department
- California Energy Commission
- California Integrated Waste Management Board
- California Office of Environmental Health Hazard Assessment
- California Office of Statewide Health Planning and Development
- California Resources Agency
- California State Lands Commission
- California State Water Resources Control Board
- Governor's Office of Emergency Services
- Governor's Office of Homeland Security
- California Tahoe Conservancy

Other agencies known to have GIS capabilities but with no available profiles are:

- California Department of Alcohol and Drug Programs
- California Department of Corrections and Rehabilitation
- California Department of Health Care Services
- California Highway Patrol
- California State Board of Equalization

California Air Resources Board

The staff of the California Air Resources Board (ARB) uses GIS mapping and analysis functionality extensively in many program areas. GIS is used in developing spatially resolved emission inventories of greenhouse gases, smog-forming and toxic air pollutants, in modeling the atmospheric dispersion of these pollutants, in studying the association between air pollution and heath effects, and in estimating health risks to surrounding populations, including parameters such as distances to sensitive receptors (like schools and hospitals). GIS is integral to models used to develop air pollution emission estimates from wildfires, biogenic sources (such as forests and cropland), greenhouse gas sources, vehicular traffic, and goods movement by trains, ships, and trucks. The locations of air monitoring stations and their measured air pollutant levels are mapped using GIS, and statistical estimates of regional population exposures use GIS analysis. Poster-size maps are used for communicating air pollution emissions, exposure, and risk information to the public in our community health and environmental justice programs. GIS mapping tools are being used to help begin to understand cumulative exposures across environmental media.

The ARB maintains and provides GIS maps and layers that delineate the legal boundaries of air basins and air districts. The ARB provides interactive web-mapping tools to the public through the Community Health Air Pollution Information System (CHAPIS) application (www.arb.ca.gov/chapis) for viewing what sources are in one's neighborhood, and the Air Quality and Meteorology Information System (AQMIS) application (www.arb.ca.gov/airqualitytoday) for viewing historic and near real-time air quality levels.

California Coastal Commission

The Coastal Commission's mapping program is currently operated out of the department's San Francisco headquarters office for the purposes of providing the geographic analysis and thematic map production required for the normal operation of the agency. All of the Commission's regulatory and planning activities are supported and work requests from the six area offices are also undertaken routinely.[3] In addition, the program supports a variety of grant-funded efforts that require spatial analysis and cartographic work, and is concurrently undertaking GIS development, management, coordination, and data development tasks that have no formal funding mechanism presently identified.[4]

[3] The Commission maintains area offices in San Francisco, Santa Cruz, Ventura, Long Beach, and San Diego. Work requests are received less frequently from the Commission's Sacramento legislative office.

[4] Grant-related projects range from C-CAP (image analysis) to the Southern California Coastal Wetlands Inventory (mapping historical wetland extent). Examples of unfunded GIS activities include coordination

Staff Resources: Under the general direction of the Deputy Director for Energy, Ocean Resources, and Technical Services, the Mapping/GIS Program Manager presently supervises a staff of four Coastal Program Analysts.[5]

Roles & Responsibilities: The Mapping/GIS program is responsible for providing the Commission, its staff, the public, and the coastal zone community at large spatial information, primarily in the form of maps and images of aerial photography, and geographic analysis in order to better manage and monitor coastal resources, development activities, public access, and land use/land cover changes within the coastal zone. The staff of the mapping/GIS program performs complicated geographic change detection, and produces work of statewide significance, critical to carrying out the regulatory and planning responsibilities that form the core mission of the Coastal Commission. Major areas of emphasis in the program include the following:

1. Map production and geographic analysis for these other CCC programs:
    - Public Access
    - Wetlands and Coastal Resources
    - Land Use
    - Enforcement
    - Energy/Oil Spill Prevention and Response
    - Vessel Traffic/Harbor Safety
    - Federal Consistency
    - Grant-Funded Projects

2. Recurrent acquisition of Coastal Zone aerial photography and other imagery.

3. Production of a digital atlas of California's Coastal Zone.

4. Development of an environmental information system for the Coastal Zone that provides integrated access to Coastal Zone spatial information in the form of maps, geocoded tabular data, and high-resolution imagery.

with state level policy entities (e.g., The California Natural Resources Agency of Ca CERES Program, the California Geographic Information Association and others), as well as pilot GIS projects (e.g., Elkhorn Slough Aerial Photo/Water Quality GIS project).

[5] The mapping staff has fluctuated from a high of four permanent staff and several interns in the late 1970's to a low of one permanent staff in the early to mid 1980's, and then to one staff and several interns in the later 1980's to mid 1990's. The current staffing level has been maintained since 1995.

5. Coordination with many other Coastal Zone, land, water, and resource management entities involved with the production and use of maps, imagery, and other spatial information at all levels, and the development of systems to integrate that information more fully into the decision-making process.

The CCC has the legal responsibility under the California Coastal Act to provide state and local government agencies with integrated, coordinated studies and technical data relevant to resources located within the coastal zone, technical information needed to carry out consistency review in regard to the federal Outer Continental Shelf oil leasing policies and programs, and for local governments to implement their local coastal programs.

The CCC is directed under the Coastal Act to store existing studies and data pertaining to marine, estuarine, and terrestrial environments and integrate and coordinate the material to provide a referral service for ongoing studies and policy decisions. It is mandated to carry out those functions through the use of an automated data storage and retrieval system that tie in with existing compatible systems. Furthermore, the CCC is mandated to produce reports and data free of charge, where feasible, to any governmental agency and members of the private sector in order to further the wise use of all relevant knowledge and to avoid costly duplication of studies and data gathering.

The CCC uses GIS to fulfill its mandated requirements outlined above. Currently GIS is used for map production and analytical work to determine jurisdictional boundaries for public trust lands, permits, appeals, and categorical exclusion areas; preparing staff reports of permit and appeal area jurisdictions; analyzing and preparing staff recommendations for proposed boundary adjustments; preparing multiple resource and hazards maps, graphics and exhibits to assist in regulatory, planning, management, and enforcement programs; determining local and regional land use patterns through map and aerial photo interpretation; reviewing maps and resource elements of Local Coastal Programs (LCPs); and providing natural resource and related coastal zone data to local governments in support of work on LCPs.

We believe it is crucial to continue the development of the Coastal Commission's GIS to support public access, the processing coastal development permits, appeals, local coastal programs and amendments, and other cartographic design and production services.

The goal of the CCC with respect to further GIS development is the continued construction and implementation of a coastal zone information system to support the Coastal Commission's land and ocean planning, regulatory, enforcement and education activities. The system should include the capability for and access to automated map production, analysis of documents, images, tables, text, spreadsheets, maps and plans by CCC staff (headquarters and area offices) and others using personal computers and commercially available software. Additionally, the

system should functionally be capable of integrating future data sources such as those generated from Global Positioning Systems (GPS), satellite imagery, and digital cameras.

In the short term the Commission requires the use of desktop GIS tools and existing datasets. In the long term the coastal zone information system would essentially be a regularly-maintained digital coastal atlas providing a consistent, "seamless" statewide view of contemporary and historical spatial datasets. Both should provide the analytical tools required to produce information useful to the Coastal Commission's decision-making process as well as supporting their mandated responsibilities under the California Coastal Act.

Coastal Commission maps can be seen at http://www.coastal.ca.gov/pubs.html.

California Department of Alcohol and Drug Programs

No profile available.

California Department of Boating and Waterways

DBW utilizes GIS in the following areas:

Aquatic Weed Program – DBW is legislatively charged with management of the invasive species, *Egeria densa* and Water Hyacinth, in the Sacramento-San Joaquin Delta. Data is collected on all treatment in the field for reporting purposes and adaptive management of the program.

Facilities Programs – DWB staff are providing access to information about boating related facilities to promote safe and environmentally sound boating practices. The Clean and Green program is conducted by DBW and the Coastal Commission, http://www.dbw.ca.gov/Environmental/ . The Boating Facilities Locator is at http://www.dbw.ca.gov/maps/Default.aspx .

Safety and Education – DBW is currently developing their GIS for accident reporting to enhance the department's ability to analyze trends and increase the ability to educate the public in more targeted areas.

California Department of Conservation

CALIFORNIA GEOLOGICAL SURVEY

Seismic Hazard Assessment Program

The California Geological Survey Seismic Hazard Assessment group is a co-author of the California portion of the USGS National Seismic Hazard Map. Results from the National Seismic Hazard Map program are used in many engineering applications, including the building code. We supply consultants with a user-friendly version of this data on our website that allows them a quick look and ground motion estimate before they create their own site specific study.

The Seismic Hazard Assessment group also has a vast collection of historical (1800-1930) earthquake data. For decades CGS has been creating and maintaining catalogs of pre-instrumental earthquake size and location. This data is very important due to California's relatively short instrumental earthquake catalog (1930-present). Some of the important catalogs/data have been put on our website to help out other researchers.

Interactive Probabilistic Seismic Hazards Map:
http://redirect.conservation.ca.gov/cgs/rghm/pshamap/pshamain.html

California Historical Earthquake Online Database:
http://redirect.conservation.ca.gov/cgs/rghm/quakes/historical/index.htm

Forest and Watershed Geology Program

The Forest and Watershed Geology Program (FWGP) conducts GIS analyses and prepares maps and online applications for a variety of issues related to landslides, erosion, sedimentation and other geologic hazards. These GIS products are typically created for other agencies that require the information for land use decision making.

FWGP publishes maps of current landslide inventories and analyzes the future landslide potential of watersheds across California. The Program prepares trail and road assessments as well as geologic and soil erosion hazard maps for a variety of government agencies to assist in land use planning activities, such as timber harvest plans or the design and maintenance of sustainable hiking and OHV trails. Customized maps are created for a variety of land resource issues such as beach sand replenishment, watershed restoration, and sand dune erosion and transport. FWG staff also design and implement customized online spatial data viewers and database applications for use over the Internet by clients in a variety of different locations. FWG staff work with a variety of data formats and geospatial software and have experience with image processing and classification techniques, including 3-D imagery analysis.

To learn more about the Forest and Watershed Geology Program or see examples of our map products, please go to http://www.conservation.ca.gov/CGS/fwgp/Pages/index.aspx.

Seismic Hazard Zoning

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 and the Seismic Hazards Mapping Act of 1990 mandate the California Department of Conservation, Geological Survey (CGS) to identify and map areas subject to surface fault rupture, strong ground shaking, liquefaction, landslides, or other ground failure and other seismic hazards caused by earthquakes. These maps are prepared to assist cities and counties in fulfilling their responsibilities for protecting the public health and safety from the effects of, and to avoid damage resulting from earthquakes. The Seismic Hazard Mapping Program (SHMP) uses GIS technology in a multi-vendor GIS application environment based on an Oracle relational database management system (RDBMS). We acquire a myriad of data for use in the scientific analysis used to create these zones.

The department has the capacity to input vector or raster data for use in our analyses, including everything from the simple USGS topo maps, state, county and municipal boundaries, roads, and scanned historical aerial imagery, to the latest in remote sensing technologies. Examples of cutting edge remote sensing applications include GeoSAR (Geographic Synthetic Aperture Radar), in which CGS and NASA's Jet Propulsion Laboratory helped to develop a commercial airborne radar system, with funding provided by the Defense Advanced Research Projects Agency (DARPA). The department recently worked with software developers and remote sensing providers to make statewide digital photogrammetric (stereo 3D) imagery available at low cost on a GIS platform for critical geologic interpretation. We have also worked with the Jet Propulsion Laboratory to develop slope hazard identification tools with thermal infrared sensors (MASTER) and studied the usefulness of airborne hyper-spectral imaging systems (AVIRIS) to improve geologic mapping.

The Seismic Hazards Mapping Program routinely uses various satellite imagery data, such as Landsat and Landsat TM, QuickBird, SPOT IMAGE, and ASTER (advanced spaceborne thermal emission and reflection radiometer) in preparing better geologic maps. These improved geologic maps are combined with digital terrain data from sources like the USGS digital elevation models (DEMs), Light Detection and Ranging (LiDAR) DEMs, Interferometric Synthetic Aperture Radar (IFSAR) DEMs with digital databases of subsurface information (geotechnical strength parameters and ground water conditions) and earthquake shaking estimates (Peak Ground Acceleration, (PGA), Magnitude, and Distance) to prepare regulatory zone maps.

In addition to the Seismic Hazard Zone maps and the accompanying Seismic Hazard Evaluation Reports, we have also begun provide Landslide Inventory maps, improved geologic contact information that may used in improving geologic mapping in CGS's Regional Geologic Mapping Unit, digital borelog information used by the geotechnical industry and academia. These data

are available via our website as PDF files or digital data via an interactive Web Mapping site at http://www.conservation.ca.gov/cgs/shzp/Pages/Index.aspx. We are planning to develop other ancillary products that are created in our analysis process, such as seismic hazard potential and susceptibility maps.

DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

The Division of Oil, Gas, and Geothermal Resources (DOGGR) maintains a GIS database of approximately 200K oil, gas and geothermal wells in California. Well locations have been captured by GPS, heads up digitizing of scanned maps, and a MapInfo tool that converts section corner calls to lat/long.

The database includes features such as Operator name, well number, latitude, longitude, and section/township/range. Using this database, wells are plotted on oil and gas field maps, then printed to PDF and placed on the DOGGR website for viewing and download:

http://www.conservation.ca.gov/dog/maps/Pages/index_map.aspx

DOGGR also maintains a GIS digital map library. Examples of these include:

Oil, Gas and Geothermal Map of California (S-1):

ftp://ftp.conservation.ca.gov/pub/oil/maps/Map_S-1.pdf

Energy Map of California(S-2):

ftp://ftp.conservation.ca.gov/pub/oil/maps/Map_S-2.pdf

In addition to maps, DOGGR provides oil, gas, and geothermal data to the public through our Data Catalog, located on the FTP site:

ftp://ftp.conservation.ca.gov/pub/oil/Data_Catalog/

This catalog contains the wells database for California along with several boundary data files (oil and gas fields, administrative, districts, etc.) and is posted at the California Environmental Information Catalog. Files are in MapInfo and ESRI shape format, as well as Microsoft Access and DBF formats.

DOGGR also provides GIS data of all types upon request.

DIVISION OF RECYCLING

The Division of Recycling (DOR) maintains a GIS as part of its implementation of the California Beverage Container & Litter Reduction Act. GIS is used to define and track the thousands of individual businesses which play a part in moving money and materials through the beverage retailers and recycling industries in California.

Most of the GIS activity at DOR revolves around identifying which recycling centers and beverage dealers are located within ~2500 convenience zones (areas around supermarkets where recyclers are encouraged to locate). GIS staff oversees the GPS of hundreds of sites yearly and is ever-vigilant to maintain accurate and timely data sets. Based on the analysis of GIS data, DOR allocates $35M in payments to recycling centers, identifies the nearest recycling center for tens of thousands of individual stores and ensures that convenient recycling opportunities exist for California's citizens.

GIS staff supply data, maps and analysis to the Legislature, city and county governments, private citizens and industry groups free of charge and places great emphasis on customer service.

DIVISION OF LAND RESOURCE PROTECTION

DOC's Division of Land Resource Protection (DLRP) provides data on the status of agricultural lands in California. The Farmland Mapping and Monitoring Program (FMMP) combines soils data with current land use information to create Important Farmland Maps. These maps are updated every two years and are used in the planning process to assess impacts of proposed developments on Prime Farmland. In addition to paper and statistical products, GIS data is posted on the internet in shape file format. Maps are now also being posted in PDF format.

The FMMP staff's GIS expertise includes image interpretation, database development, data acquisition and quality control, as well as cartography. Custom analysis based on FMMP data is occasionally conducted on a reimbursement basis.

Program home page: http://www.conservation.ca.gov/DLRP/fmmp/Pages/index.aspx

OFFICE OF MINE RECLAMATION

The Office of Mine Reclamation (OMR) GIS shop updates and maintains a GIS library of active, idle, reclaimed and abandoned mine locations. OMR also tracks remediation efforts at abandoned mines that the Abandoned Mine Lands Unit (AMLU) has participated in. In 1997 the State created the AMLU under OMR to inventory and remediate abandoned mines in California and since then the data collected has been stored in a spatial database.

The AMLU has also digitized all the Topographically Occurring Mine Symbols (TOMS) on the USGS 7.5 minute quadrangle maps for California and has posted this in an ArcGIS shapefile format on the OMR website. There is also a link to an ArcGIS shapefile of the Principle Areas of

Mine Pollution (PAMP) data set which the Division of Mines and Geology created in 1972 based upon mines with production that exceeded $100,000.

OMR regularly produces maps for coordinating agencies on multiple levels as well as for the Legislature.

TOMS: http://www.conservation.ca.gov/omr/abandoned_mine_lands/toms/Pages/index.aspx

PAMP: http://www.conservation.ca.gov/omr/abandoned_mine_lands/pamp/Pages/index.aspx

OFFICE OF TECHNOLOGY SERVICES

The Office of Technology Services (OTS) supports the GIS operations of the entire department. OTS evaluates GIS software, manages software licensing, and communicates with vendors. OTS currently stores data for the various Divisions. OTS is in the process of evaluating storage space requirements for GIS data and implementing a geodatabase. Both are necessary to meet the rising demand for online storage of GIS data.

California Department of Corrections and Rehabilitation

No profile available.

California Department of Fish and Game

Services and Products:

The GIS function with the Department of Fish and Game (DFG) is mostly centralized within the Biogeographic Data Branch, with additional GIS staff located in the Regions throughout the state. GIS staff provide for both internal and external customers. Internally, GIS support is provided to all Headquarters Branches in Sacramento, as well as to each Region throughout the state. This support is essential in assisting in many of the core functions of DFG. Externally, several products are provided to help other state and federal agencies, as well as private companies comply with state wildlife regulations. These products include GIS data, packaged applications, and web mapping applications.

GIS Data:

-California Natural Diversity Database (CNDDB)

-California Wildlife Habitat Relationships (CWHR)

-Various Vegetation mapping products

Packaged Applications:

-RareFind (Query tool for CNDDB)

-WHR (Query tool for CWHR)

Web Mapping Applications:

-BIOS (Biogeographic Information and Observation System): clearinghouse for browsing all types of biogeographic data from DFG and other sources.

-Fishing Guide: guide to fishing locations around the state

-DFG Properties viewer: guide to DFGs Lands and Facilities.

-CalFish: multi-agency collaborative for Fisheries related data.

Geospatial Expertise:

The geospatial expertise at DFG is wide-ranging from cartography to analysis to modeling to enterprise server and web technologies.

URLS:

http://www.dfg.ca.gov/biogeodata/gis/

http://www.dfg.ca.gov/biogeodata/gis/imaps.asp

http://www.dfg.ca.gov/biogeodata/cnddb/

http://www.dfg.ca.gov/biogeodata/cwhr/

http://www.dfg.ca.gov/biogeodata/vegcamp/

http://bios.dfg.ca.gov/

http://www.calfish.org/

California Department of Food and Agriculture

The California Department of Food and Agriculture (CDFA) use GIS in the following program areas.

1. Plant Health and Pest Prevention Services

The Division of Plant Health and Pest Prevention Services (PHPPS) mission is to provide pest prevention and management programs that protect California's agriculture, horticulture, natural resources, and urban environments from invasive plant pests. GIS plays a key part in tracking, containing and preventing invasive plant pests.

PHPPS is rolling out an internet (extranet) GIS mapping service for use with samples submitted to the Plant Pest Diagnostics Center for laboratory testing, through the Pest and Damage Record (PDR) and emergency/quarantine response. This application is made up of three components; 1) mapping of PDRs, warning/hold notices, rejections and nurseries, 2) joint edit session for quarantine boundary editing and 3) web services to make the CDFA layers available to others.

The URL to the extranet site is http://phpps.cdfa.ca.gov. Based on a user's affiliation, they may not see all pages as these are role based for access. The PDR section of this site is not a public site but is used by cooperators, such as County Agricultural Commissioners to send plant pest samples in for laboratory testing. Other federal (USDA) state and county agencies also use the PDR section and mapping services.

2. Pierce's Disease Control Program

Pierce's disease has been in California for a century or more. The establishment of the glassy-winged sharpshooter infestation in southern California in the late 1990's suddenly thrust the disease to the top of the list of threats to crops ranging from grapes to alfalfa to stone fruits. GIS is part of a multi-faceted program that has succeeded in keeping this pest and disease from gaining ground.

The Pierce's Disease Control Program (PDCP) uses GIS for managing the Glassy-winged Sharpshooter. The program has a GIS laboratory to maintain currency of the spatial datasets used by the PDCP staff biologists in analysis, relating to the distribution of the Glassy-winged Sharpshooter and Pierce's Disease. PDCP utilizes GIS tools to process the program information (crop, insect, plant, disease, nursery, etc.) into spatial formats, to create maps, and to provide updated datasets onto the PDCP Internet Map Server.

The map server URL is: http://www.cdfa.ca.gov/pdcp/map_index.html. Public users can view maps of area wide trapping and Glassy Winged Sharpshooter infestation/eradication. Interactive mapping is restricted to cooperating, local, State and federal programs.

3. Animal Health and Food Safety Services

The Division of Animal Health and Food Safety Services (AHFSS) provides services to protect public health, protect the health of California's livestock and poultry, provide safety of food at animal origin and protect California livestock owners against losses due to animal theft and straying.

As a first responder to animal disease outbreaks and dairy food contamination incidents, GIS is used to analyze information; develop and maintain spatial datasets and maps used by Veterinary Medical Officers and emergency response staff relating to naturally occurring outbreaks of several recent animal diseases which include Exotic Newcastle Disease and avian influenza in poultry, tuberculosis in cattle and West Nile virus in horses; conducting emergency preparedness exercises with local, regional and national stakeholders to evaluate readiness to a emerging disease or act of bioterrorism; and, program planning for disease and dairy management activities.

4. Information Technology Services

The Office of Information Technology Services is developing an enterprise GIS support system, using a centralized web-based Service Orientated Architecture (SOA) approach. The project is presently in the planning stage, to determine requirements to support both existing users and add new applications such as for emergency project support, inspection services, marketing services, and weights and measures.

A key aspect of the enterprise GIS architecture will be utilizing web services to integrate and support division based GIS activities headquartered in Sacramento, field offices through-out the State, along with industry and government cooperators which work closely with the Department's divisions and special programs.

California Department of Forestry and Fire Protection (CALFIRE)

The California Department of Forestry and Fire Protection's Fire and Resource Assessment Program (FRAP) provides a variety of products including the Forest and Range Assessment, a detailed report on California's forests and rangelands. FRAP provides extensive technical and public information for statewide fire threat, fire hazard, watersheds, socio-economic conditions, environmental indicators, and forest-related climate change. Much of this information involves GIS analysis, tables, maps, data and calculation tools that are available on this website. For more information about FRAP, please visit the About FRAP page (http://www.frap.fire.ca.gov/).

California Department of Justice

The California Department of Justice (CA DOJ) has developed the Threat Analysis, Reporting, and Geographic Evaluation Tool (TARGET). The goal of TARGET is to allow analysts to evaluate threats using geospacial data.

This project provides evaluation, analytical, and reporting capabilities to support a spatial data infrastructure. The capabilities include: geographic mapping, Hot Spot evaluation, chronological tracking, sharing data projects, importing/geocoding data from other sources and applications, attaching files to a project (data, spreadsheets, photos, video, voice and other file types), spatial queries and more.

Geospatial applications are also used for our Geographical Event Mapping System (GEMS). This application monitors law enforcement activities and increases officer safety by plotting event locations on county maps, and detecting possible conflicts between enforcement operations. This allows centers to map law enforcement events, and do analysis to see if a conflict exists.

The Department of Justice also developed the Megan's Law Website. This public website provides access to information regarding sex offenders throughout the State of California and displays the last known address of the offenders on a map. Sex offenders are also listed on the site by zip code, city, and county.

California Department of Parks and Recreation

CDPR recently formed an enterprise GIS unit (eGIS). The mission of the eGIS Program is to support the Parks mission by partnering with Parks Programs to acquire, analyze, and publish Parks maps and databases. The eGIS achieves its mission by assuring that Parks maps and databases are up-to-date and accurate and by working with Parks Information Technology teams to make those maps and databases available to Parks staff, cooperators, and the public through modern, web services. Standards, including industry standards for hardware and software, will be used to set the example for contractors and cooperators, which will in turn enable Parks staff to efficiently implement deliverables. With enterprise, system-wide access to standard data, Parks staff can spend more time solving problems and lose less time to data searches, procurement, and data conversions.

The eGIS Program will serve a number of purposes for Parks. A blend of centralized and decentralized computing will enable 1) Headquarters to aggregate statewide data (centralized), and 2) through high-speed networks, enable HQ support of Field staff (decentralized) in their data acquisition and processing workloads. The eGIS will also grow the present GIS repository for informing current and future State Park acquisition and development projects statewide. Further, the *common operating picture*, vital to internal coordination, is also the basis for effective emergency preparedness, mitigation, response, and recovery, particularly during disasters when large numbers of participants have immediate, simultaneous needs for many types of information.

Examples of how eGIS will support CDPR programs are highlighted in *italics* below for each of the five core Parks functions:

- **Recreation** – Providing opportunities for quality outdoor recreation
  A Park "Gap" analysis: using maps and databases to determine where there are populations underserved for parks and recreation, i.e. the 'what is where and why'. GIS methods enable quantitative, objective means of setting priorities for support.

- **Resource Protection** – Managing natural and cultural resources
  The resource "Gap" analysis consists of mapping species habitats and home ranges and comparing this map to that of land ownership and associated protections (or lack thereof, i.e. "gaps"). Similar approaches apply to protecting the more 'fixed' assets of cultural resources.

- **Education/Interpretation** – Interpreting park resources to the public and working with educators to serve students
  eGIS maps and Parks asset inventories will be served on the Internet, thereby augmenting custom, staff-provided interpretation products and services.

- **Public Safety** – Providing public protection, law enforcement and emergency medical services
  Unifying Parks Communications Center geoFiles (dispatch event locations and contacts) and integrating the result with databases from other functions such as Facilities and Resource Protection.

- **Facilities** – Acquiring, developing and maintaining lands and facilities
  Integrating all locational information about Park assets into a common geographic database. Cross-disciplinary applications built upon the same core information, basemap, or on "common ground" are bound to save costs by eliminating costly, after-the-fact "retro-fitting".

Park Units (headquarters and field) and their contractors are responsible for data acquisition, backup, analysis and interpretation, and reporting for their respective jurisdictions. Park Operations shall partner with Service Centers to provide tools and training for the transmittal of Park Unit information to the eGIS data repository. The GIO shall facilitate data flows to Central Records and Parks Archives. Administration Division and the Information Technology Office (ITO) shall share responsibilities with the Park Operations GIO and designees for eGIS architecture, networks, servers, operations, project management, and training.

- **Hardware** - The GIO, in consultation with experienced Parks staff, shall approve procurements of servers and personal computers, mass storage, field data collection devices, and other technologies that contribute content to the eGIS.

- **Software** - Parks will implement an Enterprise License Agreement (ELA) for its core GIS software suite. The ELA will provide unlimited, individual software licenses to all Parks employees (for personal computers), thereby eliminating costly, multiple procurements by individual Units.

- **Data Standards** - The GIO will facilitate the documentation of existing, successful standards and will propose new standards where needed. The needs assessment regarding standards will be conducted with the help of staff that are representative of major Parks functions and geographic regions.

URL for State Park Boundaries down load from CERES metadata catalog:

http://gis.ca.gov/meta.epl?oid=31156

California Department of Public Health

Center for Chronic Disease Prevention and Health Promotion (CDPH)

In the California Department of Public Health (CDPH), there are two programs within the Center for Chronic Disease Prevention and Health Promotion actively utilizing a web-based GIS platform in order to expand the reach of their program goals in the areas of Nutrition and Physical Activity and support for Californians suffering from Arthritis.

The Network for a Healthy California (***The Network***) assists local public entities to enhance their nutrition education programs and promote physical activity, and coordinates with local community projects that increase the likelihood that Food Stamp-eligible and similarly low-income consumers throughout the state will make healthy food and physical activity choices consistent with the USDA Dietary Guidelines for Americans. http://www.cnngis.org

The California Arthritis Partnership Program (CAPP) collaborates with community-based organizations to expand the reach of programs that improve the quality of life for people with arthritis. http://www.calarthritis.com/

Environmental Health Investigations Branch (EHIB) uses GIS to visualize and analyze spatial and temporal patterns of environmental hazards, diseases, and their risk factors. For example, EHIB's California Environmental Health Tracking Program has developed the following GIS tools: a geocoding service, a geographic feature editing service, a spatio-temporal linkage service, and a visualization/internet mapping service.

The Centralized Geocoding Tool enables users to geocode addresses both individually in real-time or in batches. The Traffic Spatial Linkage tool enables users to input coordinates (or addresses) and acquire various traffic-related measurements (such as an average daily vehicle traffic volume) within a selected buffer. The Dynamic Map Service Integration Tool allows for the real-time aggregation of map server outputs from multiple map servers, such as CEHTP's own data, USGS, Cal/EPA, and GoogleMaps. The Agricultural Pesticide Use Web Map Service is a custom web mapping service. Some of the output options include: multiple years of reporting; various measures of pesticide application intensity; multiple geographic units in which data is displayed; maps of individual chemicals or groups of chemicals; maps of individual application sites (crops) or groups of sites; and statewide or individual county maps. The pesticide layers are mashed up with Google Maps.

A demo of CEHTP tools is at the following web site: http://www.ehib.org/toollist.jsp

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At the California Cancer Registry (CCR) program (Cancer Surveillance and Research Branch), we use GIS to geocode addresses, produce maps, and conduct spatial analysis. In regard to geocoding, we send most of the "addresses at time of diagnosis" to a commercial contractor for processing. However, for special studies in need of quick turnaround times, we will geocode addresses using ArcView 9.1 and street files purchased from Tele Atlas. In regard to cartography, we often use ArcView 9.1 to generate maps of locations where a suspected cancer concern has been reported. These maps help the public and the epidemiologists visualize the landscape, including airports, major roads, highways, rivers, etc. In support of spatial analysis efforts, we have calculated proportional incidence ratios (PIRs) by Medical Service Study Area (MSSA) for advanced stage breast cancer and colorectal cancer. The results are brought into ArcView and choropleth maps are produced to indicate geographical areas that would benefit from more screening.

Outside researchers also use the geographical indicators in our CCR dataset to conduct spatially focused studies. For example, a researcher at the CDC used CCR colorectal data and SaTScan to identify geographic variations in late stage. (Cancer Causes Control (2006) 17:449-457) Others have used CCR data to relate distance to treatment facilities to outcome.

The WISEWOMAN program uses GIS to view the geographical characteristics of program participants, primarily with respect to the distance between participants' home addresses and the site providing WISEWOMAN services. This is of particular relevance in our population of primarily low income Hispanic women, since many rely on public transportation or walking rather than personal automobiles.

We plan to use GIS in the future by mapping the locations of healthy community resources (such as parks and farmers markets) near our WISEWOMAN sites. These maps will help WISEWOMAN staff to locate such resources to benefit the wellbeing of their clients.

The Cancer Detection Section (CDS) has used ArcGIS in the past year to create maps that help the Section monitor program services and direct program policy, such as county-level maps showing mammography providers and women eligible for program services. CDS also plans to map the results of analysis evaluating the effect of program services on various health outcomes by geographic region. Staff has accessed shape files and geocoded using the CDPH centralized service.

Tobacco Control Branch

- Creating statewide maps of tobacco use indicators by county, such as youth and adult smoking prevalence
- Creating statewide maps of tobacco-related policies or ordinances in local jurisdictions, such as smoke-free beaches and local tobacco retailer licensing
- Geocoding all the tobacco-retailers statewide and locally to estimate their density, for studies related to estimating the coverage of the retailer list, and examining their relationship to middle and high schools.

California Heart Disease & Stroke Prevention Program

Geographic access to acute ischemic stroke treatment in California

GIS tools and analytical methodology were used to map the prevalence of ischemic stroke patients and their proximity to hospitals with resources to treat acute stroke. Mapping was constrained by county boundaries. Overlay methodologies were used to estimate the true at-risk population within zip codes. Approximately 58% of stroke patients lived within 120 minutes of a certified stroke center and an additional 38% lived within 120 minutes of a hospital with resources to treat stroke. However, almost 4% of stroke patients did not have geographic access to a stroke-ready hospital.

Center for Infectious Disease (CDPH)

The Bioterrorism Epidemiology Section uses GIS to map disease outbreaks and have future plans to use GIS to assist in responding to emergencies. We have also created maps in presentations/reports to show regional variation in syndromic surveillance capabilities statewide.

The Vector-Borne Disease Section (VBDS) utilizes ArcGIS 9.2 to map surveillance findings for many vector-borne diseases including plague, Hantavirus, West Nile virus, and Lyme disease to name a few. The WNV program has implemented a Dynamic Continuous Area Space-Time (DYCAST) system/program that predicts high risk WNV areas for humans using the dead bird population as indicators (westnile.ca.gov). VBDS also coordinates the arbovirus surveillance system and map all chicken flocks, mosquito pools, and equine cases.

The Lyme Disease program uses ArcGIS to model high risk nymphal and adult tick habitat/areas. VBDS also geocodes all positive plague and Hantavirus locations throughout the state.

Sexually Transmitted Disease Branch

The STD Control Branch has utilized GIS to create county level maps of disease rates which are made available to the public in our annual reports and surveillance slide sets (on the Internet). In addition, we have generated county level rates by gender and race/ethnicity as well as census tract level rate maps, both of which have not been made available to the public, but rather have been shared with our local health jurisdiction partners.

The STD branch currently have ArcGIS 9.2, and for the census tract maps we used ZP4 for cleaning up and standardizing the address data then Tables Address Geocoder (TAG) (made available by the Environmental Health Investigations Branch) for geocoding the addresses.

Infant Botulism Program

We are using GIS to evaluate space-time clustering of Infant Botulism (IB) cases as well as for surveillance purposes (mapping cases nationwide as they occur by year). IB plans to do a SaTScan space-time analysis for SIDS (crib death) cases. Because of an IB cluster that correlated in time with the 1989 Loma Prieta temblor, we also evaluated incidence <100 km of the epicenter for all temblors >6.0 in California since 1982 (where birth population size was sufficient). 1982 is the first year for which live births are available by ZIP code, if anyone should need that info, and I already have a file set up for SaTScan for this purpose.

Center for Family Health

Within the Epidemiology, Assessment and Program Development Branch of the Maternal, Child and Adolescent Health Program, Center for Family Health, there are five staff using ArcGIS software and know its capabilities. Work we have done has included mapping low birth weight rates and prenatal care utilization rates by census tract. These maps also showed the location of births, which were offset for confidentiality purposes, schools, and hospitals. We have produced maps for program planning and funding, showing teen birth rates by census tract and Medical Service Study Area (MSSA). Census tract level maps included showing schools and the location of births, which were offset. In-hospital breastfeeding initiation data has also been mapped at the county level. These maps are often used in presentations and published reports.

MCAH also map many levels of data which have included showing teen birth rates by census tract, MSSA, and county and overlaying teen pregnancy prevention sites. MCAH have done maps showing domestic violence shelter agency locations, Adolescent Family Planning Program sites, Black Infant Health sites, and various other program data to aid in allocating funding where needed.

In addition, MCAH staff utilizes GIS mapping to enhance research projects on topics such as maternal obesity, gestational diabetes, and preconception health, which are showcased at various conferences.

Within the Office of Family Planning, Center for Family Health, the UCSF program support and evaluation team for Family PACT (Planning, Access, Care, and Treatment) employs staff members with skills in GIS and holds four ArcGIS licenses. Family PACT is California's fee-for-service family planning program serving over 1.6 million low-income residents annually. Within the context of Family PACT program monitoring and evaluation, GIS has been used for several years to enhance special studies, research methods, and evaluation strategies. The UCSF team has two staff members with intermediate-to-advanced skills with ArcGIS and several others with introductory knowledge. Special expertise includes using GIS with paid medical claims data. ESRI's ArcGIS integrative product called 'SAS Bridge' was established in 2008. Typical public end-products include maps based on Family PACT data within major reports like the Annual Program Report, State Evaluation report, and reports assessing the need for publicly funded family planning services throughout the state (Examples can be found on the programs website http://www.familypact.org/en/Research/reports.aspx). Internal ad hoc reports and special studies have also benefited from the utilization of GIS. As an example, Family PACT clinician addresses have been geocoded, and then spatially joined with OSHPD's Medical Service Study Areas (MSSAs) layer. The spatially joined variables from MSSAs, such as the Urban/Rural classification scheme, have been used for descriptive analysis. Much potential exists for further

geospatial analysis of Family PACT data. Challenges towards GIS integration have included lack of precedence/established applications of GIS within the context of publicly funded family planning services, limited availability of resources, limited collaboration and collaborative resources.

Center for Health Information and Strategic Planning (CDPH)

For the last two years, CDPH have been implementing a federated model of GIS within the department with the following goals/achievements:

1. Enterprise geocoding service for CDPH and its HHSA partners
2. Creation of a Geospatial Library for shared data resources
3. Simple base map service (ArcGIS Map Service) as a starting point for map creation within CDPH, available as a WEB-ADF-created app, and a service for importing into desktop client
4. Extending use of concurrent licensing structure within CDPH, with a single machine for license management
5. Creation of Remedy system for GIS usage, geocoding, and software maintenance/installation
6. Publishing of all tools on departmental Intranet, Extranet, and ulitmately the Internet environments

California Department of Toxic Substance Control

Desktop Products – DTSC has five ArcView, two ArcEditor, and seven ArcInfo concurrent licenses plus two ArcView single use licenses. These are shared among about 40 GIS users. A few individuals also use ArcExplorer, ArcGIS Explorer, and ArcReader. Extension licenses include one ArcPublisher, one Geostatistical Analyst, six Spatial Analyst, and six 3d Analysts.

Server Products - Network applications include ArcIMS and ArcSDE is used as the library for ArcIMS applications. We are licensed for ArcGIS Server, but have not yet installed it.

Services – A senior staff person functions as a GIS Coordinator, managing licenses, providing technical consultation making maps, managing a library, developing and maintaining the departmental GIS web page, and developing ArcIMS applications. Most online services are Intranet only:

- Map an Address and Proximal Sites (MAAPS) - User specifies an address or coordinates and a search radius and receives an interactive map of enterprise sites within the

radius. Contains links to other applications. For the multiple coordinate input option, users can save the session and return to it later, as well as export a text file of the coordinates in a format suitable for conversion to shapefile via ArcMap.

- Environmental Data Exchange (EDE): A bare bones version of MAAPS that displays enterprise data from all CalEPA boards, departments, and offices.
- Geocoding: Takes single address input and returns a geographic coordinate.
- Coordinate Conversion: Takes a coordinate as decidegree or DMS and converts to the other.
- Address Verification: Takes an address and city and returns a zip code.
- Census Information: Given an address or coordinate and a search radius, returns an interactive map of census block groups. Can export a text file of selected census information.
- Point and Click Coordinate Extraction: Click on a map to get a geographic coordinate for the point clicked.
- What's In My Community? A contractor provides an internet map of enterprise data accessed by city, county, or zip code. http://www.envirostor.dtsc.ca.gov/public/

Expertise - DTSC has experience using desktop products to characterize, communicate, and research environmental issues as they relate to toxics. We also have experience building ArcIMS applications using the Cold Fusion connector.

California Department of Transportation (Caltrans)

Caltrans GIS is focused on decision support. The central GIS division (Division of Transportation System Information) manages the Department's spatial information and provides dozens of services and applications for use in planning, engineering, and Caltrans business activities. The GIS technology infrastructure is managed by the Division of Information Technology.

The GIS program focuses on providing data integration to create information that is used to make more informed transportation decisions. GIS coordinators in Caltrans districts and functional programs develop and maintain geospatial data and applications specific to their business needs. The central GIS Division coordinates and acts as the clearinghouse for GIS

efforts across the Department. The Geospatial Data Management Committee (GDMC) was created to help coordinate, standardize and guide the development of geospatial information including GIS, surveys, CADD and Photogrammetry in Caltrans in order to increase access to information, reduce cost of data maintenance, and better support Caltrans decision-making processes.

The GIS program has implemented a number of web services to extend enterprise linear referencing and dynamic segmentation capabilities. They are currently available on the Caltrans intranet and are scheduled to be deployed on the internet in the summer of 2009. Below is a description of each service.

Validation Services

1) ValidatePostmile – this service accepts a Postmile, which is the core referencing unit of the Caltrans Linear Referencing System. Each location on the California State Highway System is assigned a unique postmile value. These values can never be reassigned to another location, once assigned. In order to provide for road realignments, route renumber, relinquishments and other changes to the Highway System, a number of codes are conflated to the postmile. These codes can be hard to decipher and are not intuitive to the average user. As a result, a high number of postmile values used throughout Caltrans do not actually exist on the Highway System as defined. In order to facility using Postmiles in the Linear Referencing System, the Validation Service will compare the input postmile with the current LRS. If no exact match is found, a list of likely replacement candidates is returned. The candidates are assigned a weight, based on the likelihood of their applicability.
2) ValidatePostmilePair – this is an extension to the ValidatePostmile service, which provides validation of a linear postmile segment – that is, a segment defined by a beginning and ending postmile. Both endpoints are validated individually, and then the combination is evaluated for validity.

Postmile Lookup Services

3) GetPostmileForPoint – this service accepts a Point location (e.g., a coordinate pair). These can be longitude/latitude or projected x/y values. The service finds the nearest point on the State Highway System, and then calculates the unique Postmile value for that point.

Georeferencing Services

4) GetCoordinateForPostmile – this service takes a Postmile as input and calculates its geographic location on the California State Highway System. The results are returned as a coordinate pair – either longitude/latitude or projected x - y values.
5) GetCoordinatesForPostmilePair – this service is an extension of the GetCoordinatesForPostmile service. It takes a pair of postmiles as input, and calculates the linear segment on the California State Highway System which connects the two

Postmiles. The results are returned as a list of coordinates, which can be used to create a line.

All of the above services rely on the Open Geospatial Consortiums definition of geometric objects in XML, known as GML. This standard format allows for consistent definition of geometric objects across different software packages, GIS and non-GIS alike.

Web sites:

http://www.dot.ca.gov/hq/tsip/ogis.php

http://www.dot.ca.gov/hq/tsip/gis/datalibrary/gisdatalibrary.html

California Department of Water Resources

GIS is widely used in the ***Division of Planning and Local Assistance, Resource Restoration and Project Support Branch*** for production of maps project planning and analyses of environmental patterns and issues. For project planning purposes GIS is used with a wide range of data types to accurately plan and design: digital topographic maps and aerial photographs are used to determine general project location, setting and area; soil and geology data are used to determine site physical suitability, transportation and population data are used to determine site suitability relative to infrastructure. GIS is used extensively in, and is essential to, environmental permitting of projects, for example in determining known and potential locations of endangered species, mapping vegetation for regulatory and management needs such as wetland delineation and habitat mapping, selecting appropriate sites for projects. GIS is also used in analyses of hydrological-related issues important to the department, such as determining fish migration pathways and assessing fish passage barriers, analysis of effects of removals of dams or diversions, modeling possible soil erosion problems on DWR lands. ArcGIS is also widely used for production of maps for regulatory documents, emergency management (e.g., flood maps), presentations and reports.

The Land and Water Use Section use GIS to help collect and analyze data that is used in support of the California Water Plan Update. The land use survey program is the largest GIS effort within the Branch, where staff uses imagery of various kinds (aerial natural color and false infrared imagery and satellite imagery) to map agricultural and urban land use by county. District staff performs the surveys in the field. Over 80 digital surveys have been developed and are available via the web to the public. Staff uses ArcGIS in the field with imagery, a custom digitizing program developed specifically for this program, and GPS for field data collection. Image classification and processing are used in the program to aid in identification of crops, and to identify and quantify irrigated urban landscapes. Within the Branch, GIS is used with both Census and Department of Finance data to develop demographic information by (population, housing units, etc.) for specific geographic boundaries (planning units). This information is used in the development of urban water use information, also in support of the CWPU.

The Delta Suisun Marsh Office uses GIS in support of Delta levee maintenance and improvement projects, for habitat mitigation and enhancement projects, and in flood emergency response. The GIS supports the Office at specific project sites, to keep track of Program activities for the Delta as a whole, and in Delta-wide analyses such as the Delta Risk Management Strategy. The engineering, environmental management, and economic assessment tools that exist within the Office GIS assist the Program in overall planning of levee program expenditures. Finally, the Office's GIS promotes spatial database development and maintenance activities for the Delta in general, as a service to agencies, stakeholders, and consulting firms that engage in Delta research, planning, and implementation projects.

Division of Environmental Services (DES) uses GIS to analyze environmental conditions at project sites for environmental regulatory uses, including: determining known occurrences of sensitive species and determining potential species of a site, wetland delineation, vegetation and habitat mapping, hydrologic analysis, archaeological surveys, hazardous waste record searches and conducting environmental site assessments for hazardous wastes, determining conditions on properties prior to acquisition. ArcGIS is also used extensively to produce maps for field use, reports, presentations, and regulatory filings. DES has also created and maintains a GIS database that contains large raster datasets used extensively throughout DWR, for example seamless topographic map coverage for most of the state.

The DWR's ***District office*** uses GIS to supplement work associated with Engineering, Land Use, Environmental Services, Groundwater Monitoring, Surface water, and Water Quality activities. GIS has been used to map historic river channels to establish a meander history of the Sacramento River and the Feather River. Engineers within Northern district process elevation data for creation of TINs and to inventory their survey monuments. For Groundwater applications the district maintains an inventory of wells as a mechanism for retrieval of well log completion reports. Another Groundwater GIS use is groundwater contouring based on annual groundwater measurements. Environmental Services applications include inventory special status species (aquatic and terrestrial), vegetation mapping and monitoring, bank mapping, and cataloging of historic and current aerial photography. For surface water applications GIS is used to inventory gage locations and to determine drainage basin volume. Water Quality uses it to spatially inventory their sampling locations and to perform point source pollution analysis. Other uses have included the GeoHMS and GeoRAS in the ArcGIS environment to perform hydrologic and hydraulic modeling to analyze the flooding potential of floodplains. Past projects include watershed boundary delineation, FEMA floodplain mapping, special investigations involving culverts, bridges, flood control structures, and environmental impacts from proposed and existing projects.

The Mapping & Photogrammetry Section of the ***Division of Engineering*** provides aerial photographic coverage of selected areas of interest to other intradepartmental functional units and other state agencies. Photogrammetric software is used to generate digital terrain models and topographic maps from stereo imagery, as well as georeferenced orthomosaics. GIS

desktop software is used to prepare exhibits where vector data is overlain on aerial photography for various studies and presentations.

The Bay-Delta Office (BDO) uses GIS tools for analysis and preparation of spatial data for modeling input and output and in the graphical user interfaces for the models. The models developed and supported by the BDO are DSM2, a 1-D model for simulating hydrodynamics, water quality, and particle tracking in a network of river or estuarine channels; CalSIM, a generalized water resources simulation/optimization model for evaluating operational alternatives of large, complex river basins; C2VSIM, a groundwater simulation model applied to the Central Valley; and REALM, the development of a high-performance multi-dimensional open model that fits the evolving requirements of the Bay-Delta community. GIS is also used for customized map production for internal use and graphical illustrations of spatial data for use in public reports and presentations by BDO staff.

The Division of Flood Management uses GIS for data management and display. The Flood Operations Center is developing a new series of maps that will be in a GIS library available during an emergency. These maps will be the base for improving the web maps currently stored on the California Data Exchange Center web-site. During a Flood Emergency, the Planning and Intelligence Section of the Standardized Emergency Management System (SEMS) have used GIS to collect, analyze, document the food emergency situation and disseminate the information.

The California Data Exchange Center has been developing a relational data management system that will feed into GIS systems with live updates and current conditions in real time. This data will lead to a new series of maps for the Division and the internet.

California Employment Development Department

The Labor Market Information Division uses GIS for analysis and mapping of labor market and related data. The Division began working with GIS in 1995. Today LMID has four research program specialist and research analyst positions working full time with GIS, and two research program specialist positions using GIS on an occasional basis.

Over the last thirteen years, GIS has made significant analytical contributions for Division tasks such as defining economic regions in the State, relating the locations of welfare recipients to job opportunities, maximizing federal funding allocations for employment and training, helping to equitably distribute State funds to local programs, assessing the potential economic impact of disasters, and providing non-confidential employment data by sub-county areas to decision makers and customers.

- http://www.labormarketinfo.edd.ca.gov

- Monthly Press Release Maps: http://www.calmis.ca.gov/file/lfmonth/lf_geomaps.pdf
- Local Workforce Investment Area Maps: http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/?PageID=185
- Commute Maps: http://www.labormarketinfo.edd.ca.gov/article.asp?PAGEID=&SUBID=&ARTICLEID=530
- Economic Impact of the 2007 Southern California Wildfires: http://www.labormarketinfo.edd.ca.gov/article.asp?ArticleId=716&SubId=&PageId=&Visited=true
- Labor Market Risks of a Magnitude 6.9 Earthquake in Alameda County: http://www.bls.gov/opub/mlr/2007/12/contents.htm
- Fire Maps 2003 Success Stories: http://www.fgdc.gov/library/success-stories/

One other office in EDD has a staff member using GIS part time. They map EDD office locations.

California Energy Commission

GIS/Cartography Unit

The California Energy Commission (CEC) uses GIS mapping and analysis in many of its energy policy and planning programs. The GIS Unit staff primarily provides support to the Systems Assessment & Facilities Siting Division in their process of licensing thermal power plants 50 megawatts or larger. The GIS unit also routinely works with all departments at the CEC, along with professionals in the GIS world including federal, state and county agencies, private companies and even directly with the general public. The CEC has the capability for both high-quality cartographic production and applied geographic analysis. Projects have included comprehensive research and development, conducting data analysis for critical energy studies, and product production for display purposes, along with digital web-based maps. Projects have included:

- Mapping for forecasting and future energy needs
- Researching emerging energy technologies and renewable energy
- Providing hard copy and web maps to the public for review and energy development purposes

The Unit specifically uses GIS software and an array of peripheral software to provide a wide range of services for the development and manipulation of data and maps. In addition equipment for plotting, scanning and printing is used. CEC maintains a wealth of digital layers such as energy facilities (power plants, transmission line, LNG, Natural Gas Lines, Climate Zones, Electric Service Area, etc.), environmental resources, municipal, transportation, demographic, and other socio-economic data that can be displayed on maps for analysis and review. In addition, the CEC has developed unique layers and databases of energy related topics such as:

- Electric Transmission Line and Substation statewide coverage
- Electric Utility Service Area Coverage
- Building and Forecasting Climate Zones
- Database of statewide operational power plants

The CEC web site is: http://www.energy.ca.gov/

Energy maps are posted: http://www.energy.ca.gov/maps/index.html

Areas of geospatial responsibilities and expertise include:

- Database management - Effective storage, management, data entry and editing, and design of large databases that are use for GIS mapping.
- Create maps, graphs, illustrations and documents.
- Conduct research to locate and obtain existing databases, digital maps and to find site locations by various methods.
- Gather, analyze, and integrate spatial data from staff and determine how best the information can be displayed using GIS and other software.
- Map data entry from table digitizing, raster scanning and conversion, from GPS, or by direct input of coordinate information.
- Data conversion and integration - Conversion of numerous standard vector, raster, CAD, and image formats together.
- Performing map projections and transformations, data manipulation and management, image display, and tabular data management
- Compile geographic data from a variety of sources including censuses, field observation, satellite imagery, aerial photographs, and existing digital maps.
- Analyze spatial data for geographic statistics to incorporate into documents and reports by using point, line, and polygon overly; raster data, and other geo-processing methods.
- Produce high-quality cartographic by efficient editing of both graphic and attribute data.

Enterprise Geospatial Architecture: The GIS Unit uses GIS software ArcMap 9.2 for the development and manipulation of maps. In addition an array of other software; Access, Photoshop, Illustrator, Excel, allows for a flexible mapping process. On the hardware side, CEC's GIS Unit has plotting, scanning and printing equipment. CEC maintains a wealth of digital layers such as natural resources, municipal, transportation, demographic, and other socio-economic data that can be displayed on maps.

The unit has two full time research analysis GIS specialist and two students.

CEC Partners

The CEC GIS unit has worked with many different groups to produced maps and other products. Within the Commission they have worked with every division on such projects as:

- Climate zone boundary development – Transportation Energy Division
- Renewable Energy maps and PIER Wind maps – Technology Systems Division
- Compliance Project maps and Statewide Transmission System maps – Systems Assessment & Facilities Siting Division

In addition to working with staff within the Commission they have:

- Produced and sold maps to the public
- Worked on joint mapping projects with the governor's office along with other state and federal agencies
- Produced customized requested maps for the utilities, consultants such as Aspen and H2Mhill, and for state agencies

California Highway Patrol

No profile available.

California Integrated Waste Management Board

The California Integrated Waste Management Board (CIWMB), part of the CalEPA family, is responsible for reducing the generation of, and improving the management of solid waste in California. The Board uses ESRI and Google GIS services to assist in tracking the locations of various facilities, stakeholders, partners and customers.

Current CIWMB GIS services include:

- Interactive mapping to portray data on jurisdictional boundaries, solid waste facility locations and specific material recycling centers as well as related geographic layers for roads, cities, and counties.
- Address searching and display to determine if a customer is within a development zone boundary.
- Address display based on latitude/longitude coordinates.
- Ad-hoc inquires to support Board program needs.

California Office of Environmental Health Hazard Assessment

CalEPA's OEHHA uses GIS for the following:

- GIS allows for analyses of the relationship between daily air pollutant measurements and daily outcome counts such as deaths or hospitalizations, as well as to assess effects of climate change. OEHHA has published studies examining elevated pollution and temperatures with mortality/hospitalization. They are finding acute effects (either same day, or lags up to a few days) from the elevated air pollutants and temperature when they have used county wide pollution and temperature measurements. OEHHA staff will compare these results to analysis that limit the outcomes of death/hospitalization to the people who reside near the pollution/temperature monitors. With GIS OEHHA geocodes subjects to determine their proximity to pollution and temperature monitors. OEHHA will compare results using different methods for geocoding to the county-wide approach.

- GIS helps with decisions about fish sampling plans and advisory boundaries, including determining proximity of sampling locations and interpretation of mercury concentrations in relation to geographic features such as watersheds. GIS provides user-friendly maps of OEHHA issued fish advisory locations that are posted on their web site, in presentations and fact sheets.

- GIS was used to develop exposure metrics based on residential proximity to traffic. In addition, staff developed land use regression models of traffic pollutant concentrations using GIS methods. GIS tools, including visual, analytical, and geostatistical methods, were used for this study. See http://www.oehha.ca.gov/eastbaykids/adults.htm

- OEHHA assess risk to the ecosystem at the landscape scale. This type of analysis depends heavily on spatial analysis. In addition to the performance of landscape scale assessments, OEHHA also has a major project to develop a set of impervious surface coefficients for the State. This project is currently being supported by a contract the US EPA has made on their behalf. GIS Impervious Surface Analysis is one of the new techniques being used in this project. This will aid in assessing the source of contaminants entering a habitat or watershed via direct sheet flow and storm water drains. See http://www.oehha.ca.gov/ecotox/isc031006.html

California Office of Statewide Health Planning and Development

Prior to 2001, OSHPD had very limited uses of geospatial technologies. The program for OSHPD's Enterprise Geographic Information System (E-GIS) was conceived in early 2001 in response to the OSHPD vision for:

- Promoting equitable healthcare accessibility for California,
- Improved health and human services planning and decision making,

- Collaboratively managing health and human services information, and
- Understanding interrelationships between healthcare and education, energy reliability, jobs, economy, housing affordability, public safety, transportation, and our environment.

Today within this agency, geospatial systems are being used in multiple departments. They are:

- **Data Management Office (DMO)** – Automates spatial analysis and geocoding for inclusion in various databases, to include the 80+ million patient record and facility data warehouse. Publishes web-based GIS resources such as the California Healthcare Atlas. The DMO also guides internal policy and decisions for usage of all geospatial resources within our agency.
- **Healthcare Outcomes Center (HOC)** – Performs spatial analysis and produces cartographic output within outcomes studies by research scientists.
- **Healthcare Information Resource Center (HIRC)** – Applies GIS for spatial analysis and cartography for a wide variety of healthcare data projects, from ad-hoc to more established, such as The Perspectives publication. Publishes "fair pricing policies" online, which uses Google Maps and our geocoding resources.
- **Facilities Development Division (FDD)** – GIS supports FDD's Administrative Order for facility earthquake damage assessment. Uses GIS primarily for earthquake hazard modeling for healthcare facilities using the FEMA product called HAZUS. Uses a browser-based tool for emergency operations management and facility triage, which consumes near real-time USGS web services.
- **Healthcare Workforce and Community Development Division (HWCDD)** – Uses GIS analysis and mapping to help ensure there are sufficient health professionals distributed within The State. Periodically reviews California's counties to assess provider-to-population ratios, poverty levels, and public health indicators for eligibility to receive federal assistance for health care. The Healthcare Workforce Policy Commission ratifies the recommendations, known as Medical Service Study Areas (MSSAs), which qualifies sites for Song-Brown Program funding and California State Loan Repayment Program (SLRP) placements. Also uses GIS resources to substantiate legislative proposals to inform policy decisions.
- **Rural Health Policy Council (RHPC)** – Performs spatial analysis and produces map products to help educate the public, understand the issues, and establish rural health policy for The State.

At the core of OSHPD's geospatial systems is a large *repository* of spatial base, or foundation, data. This "base data" is central to all geospatial requirements at OSHPD, and it is *managed centrally* for use across all of OSHPD. A significant portion of this base data is purchased from TeleAtlas. The 500+ seat license for which is also written to cover usage by Health and Human Services Agency, especially The California Department of Public Health.

The OSHPD Data Management Office maintains ESRI ArcGIS Desktop software for all users in a mixture of local workstation installations and Citrix applications. Most licenses are concurrent-use while a few are stand-alone.

OSHPD is developing robust *server-based* geocoding and spatial analysis capabilities for both single-use and batch processing. The platform is ESRI ArcGIS Server. The system will be used by desktop applications, web browser applications, and "back-end" system processes.

A central component of the geospatial resources OSHPD has developed is the *California Healthcare Atlas*, a public facing Internet application. While still a young product, we are rolling lessons learned into future generations of the product. The *concept* is to integrate rich healthcare datasets, maps, charts, news, and reports into a cohesive, intuitive, easily-understood platform and deliver it to the public via the Internet. Today, the Atlas integrates *seven* data systems. OSHPD expects that number and the effectiveness with which it does so to increase in the future.

California Resources Agency

California Environmental Resources Evaluation System (CERES)

Tremendous volumes of data and information about California's natural environment are generated daily by both public and private sector organizations. Cataloging and making these materials "discoverable" is the primary goal of the California Environmental Resources Evaluation System (CERES) program (http://www.ceres.ca.gov/). CERES accomplishes this via the standards based California Environmental Information Catalog (CEIC pronounced "seek"; http://gis.ca.gov/catalog/). The California GIS Council has endorsed CEIC as California's primary National Spatial Data Infrastructure node. CERES has also developed and operates Internet portals around a number of environmental themes like watersheds (http://cwp.resources.ca.gov/) and land use planning (http://ceres.ca.gov/planning/) to provide one-stop-shops for environmental data and information within these domains. Finally, CERES in partnership with NASA and the CalSpace program at UC Davis has developed and operates the California Spatial Information Library (CaSIL; http://gis.ca.gov/), a unique, no-cost web accessible collection of spatial data for California.

CERES offers the following services in support of environmental programs and projects:

WEB ACCESSIBLE DATA AND TECHNICAL DOCUMENT CATALOG – CERES can adapt the technology tools used for the CEIC to an organization's needs to organize and make discoverable a full range of technical documentation including GIS or spatial data (see http://gis.ca.gov/catalog/ for example). Client organizations can host this catalog or CERES can do this for them. The CERES catalog is fully compliant with the federal National Spatial Data Infrastructure (NSDI) standards.

The catalog embodies a thesaurus or controlled vocabulary that greatly enhances data and document cataloging and retrieval.

WEB ACCESSIBLE LIBRARY OF SPATIAL DATA – CERES can provide hosting of a collection of a client organization's GIS or spatial data holdings (see http://gis.ca.gov/ for an example). Library holdings are fully cataloged, viewable as web accessible maps and can be made discoverable through the CEIC referenced above.

WEB PORTAL – CERES can help organizations build a web portal around any environmental subject or discipline to help organize an organization's information and provide their customers, both internal and external, a one-stop shop for the organization's data and information. The portal can take advantage of all the capabilities of CERES' other service offerings. In addition, CERES can spatially enable the portal interface to provide a map-based approach to data discovery and retrieval (see http://cwp.resources.ca.gov/browser/index.epl for an example).

Coming Soon…

WEB ACCESSIBLE LIBRARY OF TECHNICAL DOCUMENTS – Starting in 2009, CERES will be able to help organizations build an on-line repository of technical documents. This includes the capture of catalog entries and the uploading or publishing of documents in their electronic forms to the repository from contributors both inside and outside of the client organization. The resulting library can be hosted by CERES or others and made accessible to customers in a controlled or unrestricted manner as needed.

SHARING AND INTEGRATION OF GEOSPATIAL DATA OVER THE WEB – Early in 2009 CERES will offer a better way for organizations to share and integrate their geospatial data over the Internet than the centrally hosted web applications in common use today. Making GIS data available as web services allows organizations to maintain control over how their data are presented. This involves the use of a web map services registry (Interagency Networked Services Integrating Geospatial Hosted Technologies (INSIGHT)) and a light weight map browser client. INSIGHT will be a registry of web services and associated standards for data exchange that organizations can use to create cross departmental information services. Web map services registered in INSIGHT will also be accessible to any number of GIS software applications capable of accessing these services over the Internet. These tools will enable organizations to avoid the problems associated with making copies of data that soon go out of date.

California State Lands Commission

The California State Lands Commission (CSLC) maintains GIS capability in its Land Management, Environmental Planning, and Mineral Resources Management Divisions. CSLC GIS users are professional geologists, environmental scientists and land surveyors possessing college-level GIS certification and other formal GIS training. Use of GIS at CSLC ranges from in-house evaluations and presentations, to collaboration with private entities and public agencies on GIS projects involving state school lands and sovereign lands.

Examples of CSLC GIS projects include a 2004 cooperative effort with State Parks to develop shared GIS databases for non-point source pollution problems on CSLC and State Parks lands, and a GIS/Records Preservation Pilot Project to evaluate scanning, database design, and legal issues related to preservation and certification of vital historical mapping.

California State Water Resources Control Board

State Water Resources Control Board (SWRCB) has 3.8 GIS staff including 1 RPS2 (GIS) and 2.8 RPS1 (GIS) dedicated to supporting enterprise GIS applications and performing complex GIS analysis and mapping for the State Board Divisions. Each of the nine Regional Water Quality Control Boards have staff who are desktop GIS users in non-GIS classifications.

- SWRCB maintains a GIS data library (SDE) shared between the SWRCB and Regional Boards as well as maintaining a shared pool of ArcGIS Desktop licenses.
- GIS staff provides GIS analytical and mapping services for projects related to the prioritization of Stormwater Permits, selection of random stratified sampling sites for water quality sampling, watershed assessments as well as making ad hoc maps for informational use.
- GIS staff assists in GIS application development and maintenance of several enterprise GIS systems including the use and deployment of ArcSDE and ArcGIS Server.

Electronic Water Rights Information Management System (eWRIMS) – eWRIMS is the principal application used by the Division of Water Rights to issue, manage, and protect vested water rights. This system utilizes a relational database and a web-based GIS application to administer water right programs and ensure effective management of water resources. The relational database and GIS system are linked in real time and enable Water Rights staff to create, edit and maintain spatial data via their web browser.
http://waterrightsmaps.waterboards.ca.gov/ewrims/

Geographic Environmental Information Management System (GEIMS)/Geotracker

GEIMS is a data warehouse that tracks regulatory data about underground fuel tanks, fuel pipelines, and public drinking water supplies. Geotracker is a proprietary web-based GIS interface to the GEIMS data warehouse for the display and analysis of potential threats to drinking water sources.
http://geotracker.waterboards.ca.gov

Geo-referenced Water Body System (GeoWBS) GIS and Database – This database is a catalogue of the maps and data showing the state's major water bodies and contains information about water body size, specific pollutants, sources of pollutants, and affected uses. It identifies the general condition of the uses supported by each water body. Regional Water Boards provide the information in this database.

Governor's Office of Emergency Services

The Governor's Office of Emergency Services (OES) uses GIS for analysis and mapping of known hazard areas in California. OES does not define the three main hazard areas for California; Earthquake, Flood and Fire. Instead we rely on the subject matter experts to define theses hazard areas; Cal-Fire to define the Fire Hazard Severity Zones, the FEMA National Flood Insurance Program (NFIP) to delineate the 100 Year Special Flood Hazard Areas, and the United States Geologic Society (USGS) and California Geologic Survey (CGS) to define the Earthquake Shaking Potential for California. OES works with local government, both at the county and city levels, to complete GIS analysis and create map products. This shows them where these hazards exist to help them understand their hazard vulnerabilities. Emergency managers can then write more effective comprehensive emergency plans pertinent to their jurisdiction.

OES is responsible for oversight of the Dam Inundation Program and Tsunami Inundation programs for California. By law, dam owners of large jurisdictional dams must hire an engineering firm to complete a hydrologic study to define the inundation area of their dam should the dam fail. These maps are submitted to OES, and go through an independent approval process. Once the map is approved, the GIS section makes the approved maps and the inundation boundary available in a GIS format and maps provided for public distribution. MIKE 21 is a professional engineering software package for the simulation of flows, waves, sediments and ecology in rivers, lakes, estuaries, bays, coastal areas and seas

Since 1997 the National Oceanic and Atmospheric Administration (NOAA), the FEMA and OES have undergone the process of developing tsunami evacuation planning maps for the State of California. OES is managing the process of the inundation projection generation and has developed a guidance document for use by all coastal counties and jurisdictions in the state. The guidance is intended to assist local governments in use of the inundation projections for evacuation planning, and in dissemination of tsunami watch and warning information within county operational areas as well as to the general public. Evacuation planning maps are produced by the OES GIS staff based on research data from USC. These products are distributed to counties (operational areas) and approved recipients. The entire California coast will be

mapped on an approved annual funding schedule from NOAA. Outreach, planning and collaboration by GIS, OES field coordinators and operational areas are ongoing. The maps are intended for local jurisdictional, coastal evacuation planning uses only.

OES also implements FEMA's Hazards United States (HAZUS) loss estimation modeling tool. HAZUS is a GIS software program that estimates potential losses from earthquakes and flood for buildings, infrastructure and populations. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing mitigation plans and policies, emergency preparedness, and response and recovery planning. This information can be used to provide rapid assessment of where damage and casualties are likely to have occurred immediately following a large earthquake or flood in order to more intelligently direct important emergency resources (fire trucks, heavy equipment, supplies or other). It is instrumental in providing the federal government with dollar loss estimates necessary to expedite assistance to the state and all areas affected.

Governor's Office of Homeland Security

Currently OHS does not have an internal GIS capability. The GIS Coordinator has been developing a strategy revolving around an ESRI ArcGIS Server/Data Appliance/Explorer Viewer and/or the Google Earth Enterprise Client. This internal solution may also evolve into a statewide common operating picture for use by numerous government partners at the local, regional, State, and federal levels. In the interim, some of the tools OHS has come to relied on include:

- iCAV - the official GIS viewer for U.S. DHS; went operational on September 30, 2007 and is used in the National Operations Center (NOC) https://icav.dhs.gov/ICAV/

- HSIP Gold - developed by the National Geospatial-Intelligence Agency (NGA) and provided to U.S. DHS for use in iCAV; only licensed for "federal partners" and for others at the state and local level if there is a declared emergency such as the wildfires in October 2007; it can be viewed through the iCAV browser by states and locals, but only "federal partners" can get the CD-ROM with data.

- iMapData - U.S. DHS previously paid for these accounts being used by states and locals until September 30, 2007 when iCAV went operational; Kathy McKeever successfully reestablished OHS accounts a few months after they had expired since they could not download needed data from iCAV, so iMapData is currently used for most CIKR data analysis at OHS such as Tier 1/2 data calls, UASI analysis, risk analysis, etc. (see http://www.imapdata.com/).

- HSIP Freedom - This data is currently under development by NGA, who has contracted the actual work to TechniGraphicS and was established to get around the restrictions of HSIP Gold for state and local partners; the contract may not cover all seventeen or eighteen CIKR sectors; currently focusing on Police stations, Fire stations, prisons, hospitals, and EMS/ambulance services; we've provided EOC, colleges & universities, state government facilities, and PSAP (9-1-1 call areas) boundaries. Our point of contact with TGS is Ms Cheryl Lemon (also see attachment).

Areas OHS has identified that could be supported, enhanced, or made more efficient through the use of geospatial tools include:

- Visualize CI/KR high value assets across the state
- Support CI/KR vulnerability assessments, consequence modeling, and threat estimation efforts.
- Make more sophisticated CI/KR protection and funding decisions, utilizing all-hazards, threats, criminal activity and responder resource info.
- Plot and link pre-incident indicators, criminal activity, and tips and leads.
- Support response and recovery planning efforts (GG08).
- Assist with interoperability communication decisions and track progress.
- Catalog responder resources, such as type, quantity and location.
- Calculate first responder response times, and identify gaps in coverage.
- Determine grant spending and balance by location.
- Calculate resource improvements, and measure security progress.
- Map funding by city/county as it relates to threats.
- Track outbreaks, vaccine stockpile locations, types and quantities.

California State Board of Equalization

Created in 1879 by a constitutional amendment, the BOE was initially charged with responsibility for ensuring that county property tax assessment practices were equal and uniform throughout the state. Currently the tax programs administered by the BOE are concentrated in four general areas: sales and use taxes, property taxes, special taxes and the tax appellate program. In 2006-07, BOE-administered taxes and fees produced $53.87 billion to provide essential services for the people of California. BOE administered programs provided more than 34 percent of the annual revenue for state government and $9 billion in essential funding for counties, cities, and special districts.

BOE-administered revenues support hundreds of state and local government programs and services, including schools and colleges, hospitals and health care services, criminal justice,

correctional, and social welfare programs, law enforcement, consumer services, natural resource management, and transportation and housing programs.

Tax Area Services Section (TASS) is charged with the responsibility of maintaining, recording and reporting to the various county auditors and assessors, all changes to jurisdictional boundaries of approximately 10,000 revenue districts that are required to file with the Board of Equalization. TASS makes the final determination of the physical location of all jurisdictional boundaries of the revenue districts based upon the documents filed by the various districts. TASS administers the tax rate area system and provides the tax rate chart segment of the Board Roll of State Assessed Property. The tax rate area system is the mechanism by which all property taxes and special assessments are distributed to the various special districts. In fiscal year 2006-07 the property taxes allocated to the districts totaled $43.16 billion. To complete this process TASS maintains maps in both digital GIS and paper formats for approximately 12 million parcels in the state of California

California Tahoe Conservancy

The California Tahoe Conservancy's mission is to preserve, protect, restore, enhance, and sustain the unique significant natural resources and recreational opportunities in the Lake Tahoe Basin. The GIS program supports the other Conservancy programs – Public Access & Recreation, Land Acquisition & Management, Wildlife Enhancement, Forest Habitat Enhancement, Stream Environment Zone & Watershed Restoration, and Soil Erosion Control – in mapping and analysis.

The Conservancy's GIS maps provide valuable visual insights for decision makers in regards to multi-agency project coordination in the Tahoe Basin, for financial support for the agency, and in presentations to its Board of Directors. GIS analyses assist in watershed and habitat management, land use models and recreation planning.