County of Lassen
Department of Planning and Building Services

• Planning   • Building   • Environmental Health   • Code Enforcement   • Surveyor   • Surface Mining

March 15, 2024

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TO: Lassen County Board of Supervisors
            Agenda Date: March 26, 2024

FROM: Maurice L. Anderson, Director

SUBJECT: Review the Lassen County Geographic Information System (GIS) Strategic Plan
            developed by the County's consultant, Geographic Technologies Group.

ACTION REQUESTED:

1. Receive report; and
2. Provide direction.

The Executive Summary of the Geographic Information System (GIS) Strategic Plan prepared by
the County's consultant, Geographic Technologies Group, is attached.

The complete GIS Strategic Plan is available on the Planning and Building Services
Department's portion of the County website, under the "News" tab, at the following URL:

https://www.lassencounty.org/government/news/planning-and-building-services

LASSEN COUNTY
CALIFORNIA
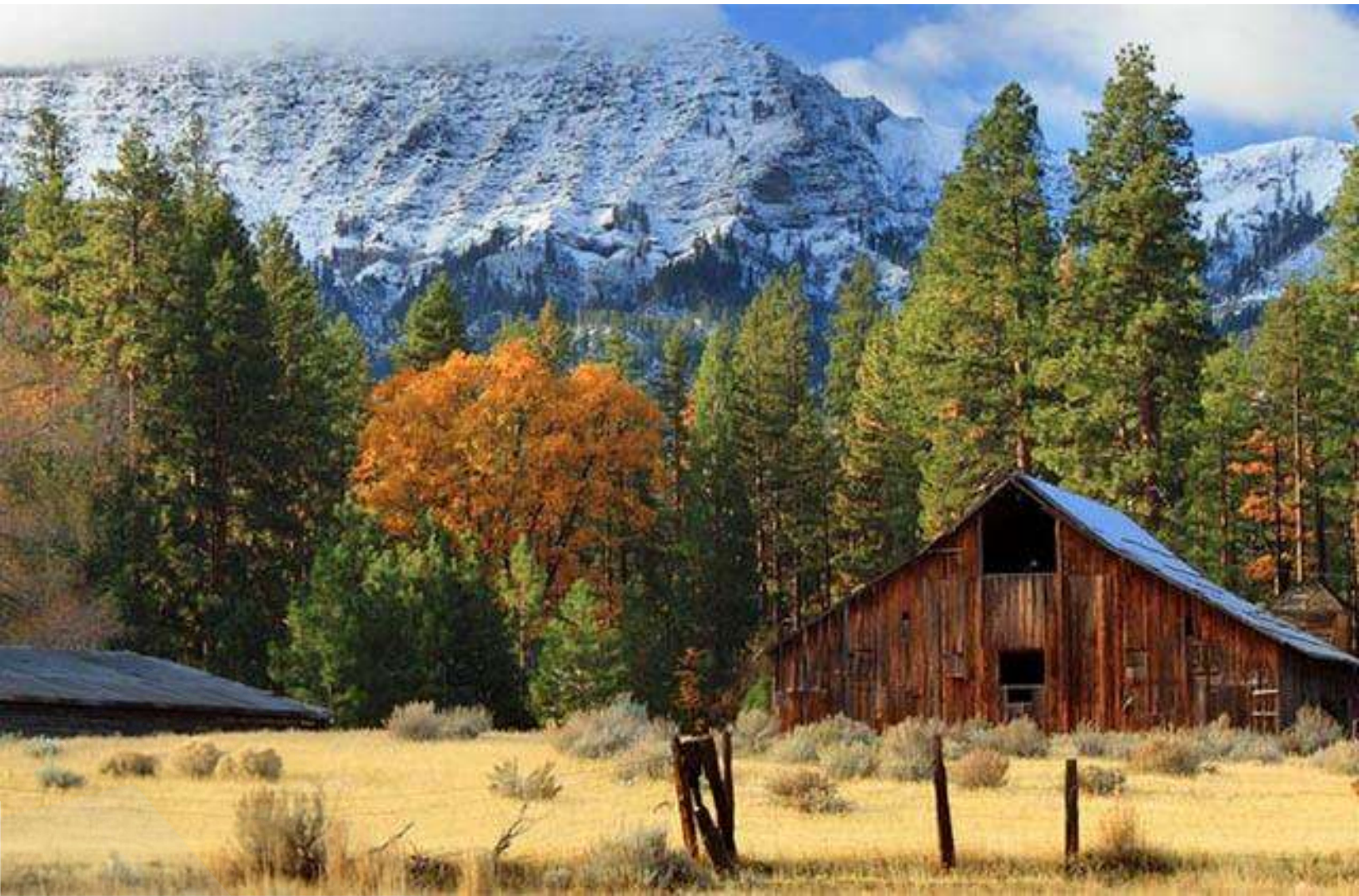
GIS STRATEGIC PLAN
2024

GEOGRAPHIC
TECHNOLOGIESGROUP

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GIS Needs Assessment Report

Lassen County | CA

GIS Strategic Plan

March 2024

**GEOGRAPHIC
TECHNOLOGIESGROUP®**
Beyond Location Intelligence

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Project Overview

Introduction

Lassen County, California, has engaged Geographic Technologies Group, Inc.® (GTG) to prepare a Geographic Information System (GIS) Strategy to develop a **strategic, enterprise, scalable, and sustainable phased GIS strategic implementation and business roadmap for geospatial technology and location intelligence**. The following strategy is designed around Geographic Technologies Group's (GTG) extensive experience in GIS strategic planning experience and our desire to produce the optimal roadmap for Lassen County GIS.

Methodology

GTG's strategic planning methodology outlines a strategy for an enterprise, sustainable, scalable, and enduring GIS. GTG organizes the strategic planning process into **3 distinct phases**:

- ◆ Phase I: Needs Assessment
- ◆ Phase II: Alternative System Design
- ◆ Phase III: GIS Strategic Implementation Plan

The three phase, seven step process includes new and innovative ways to collect stakeholder data, interview key stakeholders, evaluate GIS needs and priorities, benchmark the organization's existing GIS activities, identify Best Business Practices (BBP), hold GIS technology seminars, monitor improvements and successes, identify gaps and opportunities, and present the findings to stakeholders and elected officials.

The Six Pillars of GIS Sustainability

GTG used its philosophy known as the Six GIS Pillars of GIS Sustainability to determine the current status of the Lassen County's GIS program and to prepare the recommendations in subsequent reports. The following sections discuss the organization's existing GIS environment as it relates to Six Pillars of GIS Sustainability. These pillars are the major topic areas that must be planned for and work well to have an effective GIS program. Any pillar that is weak poses a risk to the stability of the entire GIS program.

The following is a detailed explanation of the Six Pillars of GIS Sustainability including the key measurable components of each pillar.

1. **GIS Governance –** An organization's governance of GIS is a critical indicator of its long-term success with GIS, which is why GIS Governance is the foremost pillar of GIS sustainability. Generally, governance refers to how an organization manages its GIS initiative. Indicators of good GIS governance include the existence of a GIS strategic plan, a GIS-specific vision statement, GIS goals and objectives, a formalized GIS hierarchy and clear GIS responsibilities, a GIS steering committee and end-user groups, GIS-specific job classifications and job descriptions that include GIS, coordinated GIS project management, GIS policies and mandates, a GIS budget, a GIS work plan, and key performance indicators for tracking these GIS metrics in governance and the other five pillars.

2. **GIS Digital Data and Databases –** This is arguably the most important pillar of GIS sustainability, as it is widely understood that poor data quality yields uninformed decision-making. Performing a digital data assessment, maintaining a master data list, documenting metadata, ensuring the accuracy of critical enterprise-wide data layers, providing department-specific data layers, following specific data creation procedures, and setting data standards, using mobile collection tools, and assigning data stewards/custodians are all steps to ensuring that an organization is keeping this pillar in good health.

3. **Procedures, Workflow, Integration, and Interoperability** – While procedures and workflows make any GIS program run more efficiently, the most critical element of this pillar is the integration and interoperability component, which analyzes the level to which GIS is integrated with other business systems. In local government, integration and interoperability with GIS is critical so that information from other business systems, such as Parcels and Property Assessment, Asset Management, Work Order, Computerized Maintenance Management, Enterprise Resource Planning, Document Management, and Public Safety solutions are all accessible from within a GIS interface.

4. **GIS Software Solutions** – As the name implies, this pillar examines the GIS tools that have been made available to end-users by an organization as well as the platform on which they run. This includes analyzing GIS licensing, levels of GIS customization, how accessible the software products are, internal and public-facing GIS solutions, story maps, mobile GIS applications, portals, dashboards, analysis tools, and any software extensions or add-ons in use.

5. **IT Infrastructure and System Architecture Design** – The Information Technology (IT) and GIS Infrastructure that an organization maintains are another key piece to enduring GIS success. It is important that all of the behind-the-scenes components accounted for and planned for. This includes developing and maintaining a strategic plan within IT for technology advancements, creating a GIS architectural design, providing adequate data storage, instituting hardware replacement timelines, providing GIS training to IT personnel, ensuring 24/7 availability of GIS, taking GIS back-ups, providing adequate data storage, setting hardware standards, and implementing development and staging zones for GIS software.

6. **GIS Training, Education, and Knowledge Transfer** – This final pillar of GIS sustainability embodies the 'sustainability' aspect of GIS implementation. One of the greatest threats to long-term GIS success is the loss of funding due to a lack of understanding of the benefits of technology. Another threat is the loss of institutional knowledge upon the departure of key staff. Therefore, it is very important for organizations to make a concerted effort to analyze the Return on Investment of GIS technology and promote successes with GIS to organizational leaders. For GIS to become intertwined with all the organization's activity, it is crucial to provide develop formal training plans, educate staff on GIS use, create succession plans for various staffing levels, and implement knowledge transfer techniques such as workshops, seminars, conferences, lunch-and-learns.

GIS Needs Assessment

Introduction

The primary goal of the GIS Strategic Plan is to improve the sustainability, endurance, and enterprise of an organization's GIS solution. The first phase is an objective review of the organization's current GIS capabilities and resources. This phase is an opportunity to gather information about the GIS needs, and future opportunities of all stakeholders.

The three steps of the Needs Assessment are:

1. Assess Existing Conditions with Stakeholder Questionnaires
2. Kick-off Meeting and Technology Workshop
3. Departmental Interviews
   a. SWOT Analysis
   b. Benchmarking Analysis

GTG's GIS strategic planning process includes stakeholder engagement and public consultation. Several techniques were used to gather information from County stakeholders, external entities, and the public. Using these methods, GTG has assessed how GIS is currently used by Lassen County and each department and analyzed the existing conditions regarding GIS.

This GIS Needs Assessment Report evaluates and summarizes the information gathered through questionnaires, benchmarking, and stakeholder interviews. This section details critical implementation issues, departmental needs, potential applications, necessary data, required resources, and identified workflows.

Questionnaire Findings

Introduction

The GIS Strategic Planning process began with a comprehensive GIS assessment of the organization's current GIS capabilities and resources through stakeholder consultation and community engagement. The first step in the GIS Strategic Plan process was to gather information from all County stakeholders, external entities, and the public. One of the first tasks was to administer three custom online questionnaires to stakeholders in all of the organizational divisions of Lassen County, external agencies, and the public. The questionnaires were tailored to the specific needs of each group related to existing GIS resources, activities, and workflow. The results of the questionnaire is the foundation of the formula for success of the GIS Strategic Plan.

The online GIS questionnaires solicited information about the Six Pillars of GIS Sustainability:

1. GIS Governance and Management
2. GIS Data and Databases
3. GIS Procedures, Workflows, and Integration
4. GIS Software
5. GIS Infrastructure
6. GIS Training, Education, and Knowledge Transfer

See the separate GIS Questionnaire Results report for the complete survey results.

Online GIS Questionnaire #1 – Internal Staff

Online GIS Questionnaire #1 was administered to all County GIS departments (see list below). Because GIS is not widely used in Lassen County yet, the internal questionnaire was tailored toward those with little to no familiarity with GIS. Having the survey geared toward new users of the technology provides insightful results and assists in shaping the next phases of the planning process to meet the needs of the County.

County Departments:

- Planning and Building Services
- Administration
- Agriculture Commissioner
- Assessor

- Auditor/Treasurer/Tax Collector
- Child Support Services
- Health and Social Services
- Environmental Health
- Community Social Services
- Information Services
- Office of Emergency Services
- Sheriff's Office
- Public Works
- University of California Cooperative Extension

A link to the internal survey was provided to the Lassen County project coordinator who sent the notice via email to each department director with an explanation of the project, an introduction to GIS, and a link to the survey to distribute to the staff of their choice.

The online questionnaire was administered to staff from May 11, 2023, through June 2, 2023. There were 28 responses from 13 departments/divisions, which is a good number of responses for an organization of this size.

Specific questions or tasks staff would like to address using GIS/mapping include:

- Land use, land resources management and condition, livestock, and wildlife distribution.
- Managing/compliance with mine reclamation.
- More accurate lot lines and distances to landmarks. Reliable flood plain information.
- Would like a tutorial so I can help get information to the customers, thus also helping alleviate some of the load on the planners.
- Our department would benefit from streamlining our different programs using a GIS-based application to increase productivity and proficiency.
- Record management for active permits. Facilitate accessing information for records requests. Public facing maps for inspections reports and other public information.
- Quality, reliable parcel boundary information, with good imagery data. Easy access to zoning information for the public and staff that incorporates the resources we already have online.
- Visual representation of public opinion polls and mapping of tobacco observation surveys.
- Time and distance mapping of all clients.

Summary slides are shown below. The full results can be found in the GIS Questionnaire Results report.

Lassen County Staff
Online Questionnaire Results

Which GIS/Mapping applications do you currently use?

Application	Count
Snow Load Zone Lookup (Web Map)	6
Online Parcel Search (ParcelQuest)	14
Fairgrounds Map (PDF)	0
Horse Stalls Map (PDF)	0
Lassen County Map (PDF)	15
Redistricting Maps (PDF)	3
Board of Supervisor District Map (PDF)	5
Planning and Building Services...	7
Esri ArcGIS Desktop	7
ArcGIS Online Portal	8
Google Maps/Earth	21
None, N/A, Unknown	4

What are some of the challenges you face in your work?

Challenge	Count
Analytics or Pattern Detection	12
Asset Management	6
Collaboration	12
Community Engagement	14
Compliance	9
Customer Service	12
Data Management	13
Data-Driven Decision Making	16
Information Retrieval	17
Quality Assurance	9
Service Delivery	7
Task Management	9
Visualization of Data	18
Workflow Procedures	9
Workforce Planning	7
N/A, Unknown	1
Other	2

Online GIS Questionnaire #2 – External Entities

The second GIS Questionnaire was administered to selected external entities (see list below). The questionnaire was tailored to the specific needs of the external entities and guided by the Six Pillars of GIS Sustainability. The external entities questionnaire were more detailed since the audience was an experienced GIS professional within each agency.

External Entities:

- **City of Susanville**
- **City of Shasta Lake**
- **Modoc County Planning & Building Services**
- **Shasta County**
- Plumas County
- **Sierra County Assessor's Office**
- **USDA Forest Service, Lassen National Forest**
- **Modoc National Forest**
- Plumas National Forest
- **Bureau of Land Management**
- **USDA Natural Resource Conservation Service**
- **Lassen Municipal Utility District**
- **Susanville Sanitary District**
- Fire Warden
- Pacific Gas and Electric
- Surprise Valley Electrification Cooperative
- Plumas Sierra Rural Electric Cooperative
- Sierra Army Depot
- Susanville Indian Rancheria
- Susan River Fire and Janesville Fire Protection Districts
- **CALFIRE**

*The **highlighted** entities above responded to the survey.*

GTG emailed contacts for each agency with an explanation of the project and a link to the survey. The external entities questionnaire was open from June 14, 2023 through July 12, 2023. There were 12 responses from 12 organizations. Unfortunately, responses were not received from each organization; however, several levels of government are represented, i.e., utility districts, federal agencies, state agencies, counties, and cities. Overall, the agencies all have ambitious GIS plans, but the organizations need to be made more aware of GIS and its potential.

Summary charts are shown below. The full results can be found in the GIS Questionnaire Results report.

External Entities
Online Questionnaire Results

GIS Department

12 TOTAL RESPONSES

Support Services 20%
Information Technology 20%
Assessor 10%
Public Works 20%
Ecosystem 20%
PreFire 10%

GIS Awareness

8

Average on a Scale of 0-10
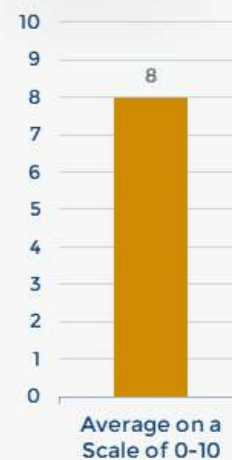
GIS Governance

Percentage of agencies that have these governance components:

- Vision, Goals, and Objectives
- Chief Data Officer
- GIS Steering/Executive Committee
- GIS Strategic Plan
- GIS User Groups
- Regional Partners

External Entities
Online Questionnaire Results

Which GIS/Mapping applications do you currently use?

Application	Value
ArcGIS Enterprise	4
ArcGIS Hub	2
Portal for ArcGIS	5
ArcGIS GeoEvent Server	0
ArcGIS Velocity	0
ArcGIS Field Maps	6
None, N/A, Unknown	4

What are the primary viewing and analytic tools provided to users?

Tool	Value
Easy-to-use Self-Service Web Mapping Applications	3
Mobile Phone Mapping Applications	3
Dashboards, Charts, and Statistics	1
Narrative Story Maps	0

What are the primary viewing and analytic tools provided to users?

Method	Value
Blog/newsletter/website	1
Email	3
Meetings or events	3
Sharing screens/Teams Chat	2
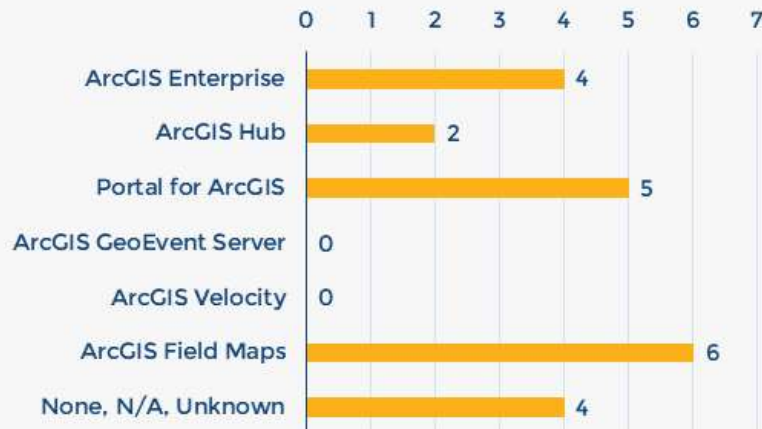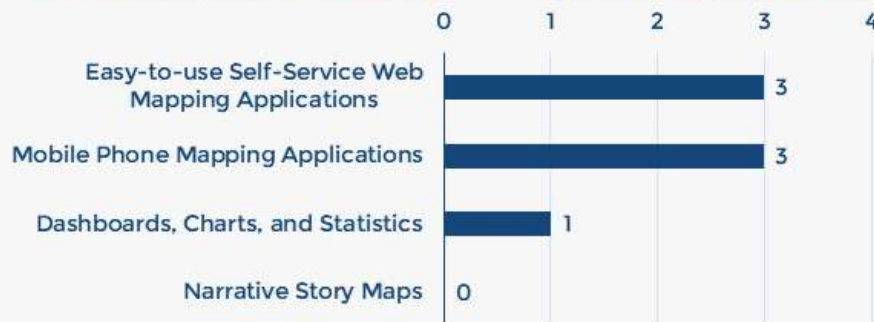
Online GIS Questionnaire #3 - Public Consultation

The public consultation GIS questionnaire was administered via the County's website. The questionnaire was tailored to the geospatial, GIS, and location intelligence needs of the public. Though this 5-question survey was guided by the Six Pillars of GIS Sustainability, it was designed to be simple and straightforward.

An announcement was placed on the County website main page and on the Planning and Building Services News and Current Events page which contained a link to the survey, as well as a flyer explaining the project.

The public questionnaire was open from June 28, 2023 through July 19, 2023. There were 9 responses mostly from constituents identifying as general public, and also from a local business, citizen scientist, state government Public Safety GIS administrator, and former planning commissioner.
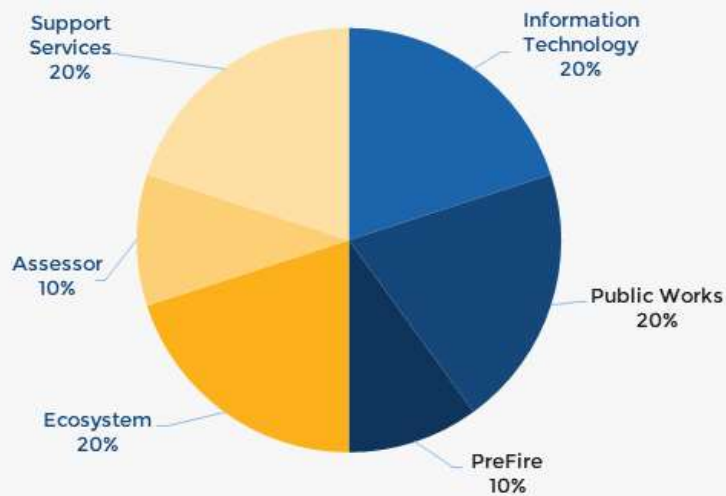
Summary charts are shown below. The full results can be found in the GIS Questionnaire Results report.

Public Consultation
Online Questionnaire Results

Constituent Representation

9 TOTAL RESPONSES
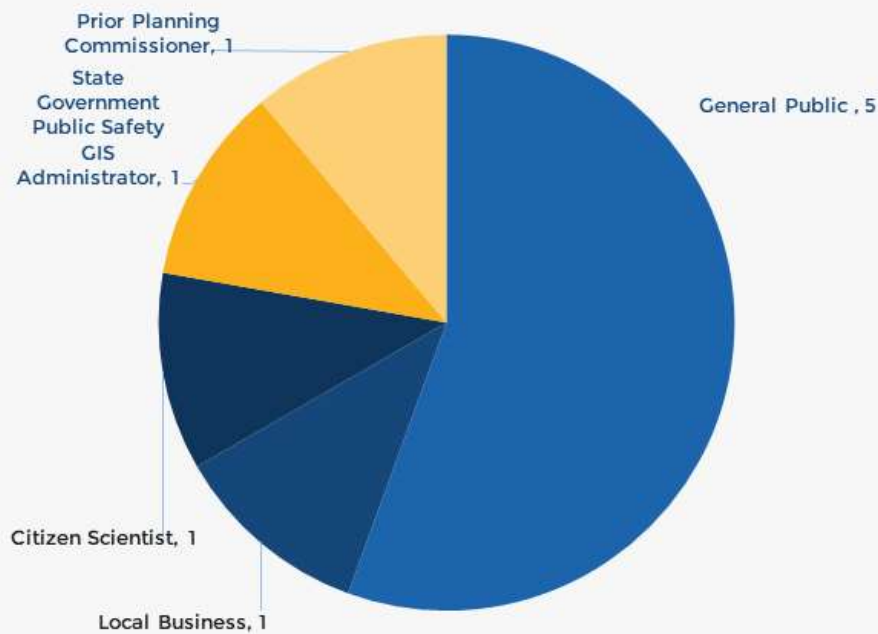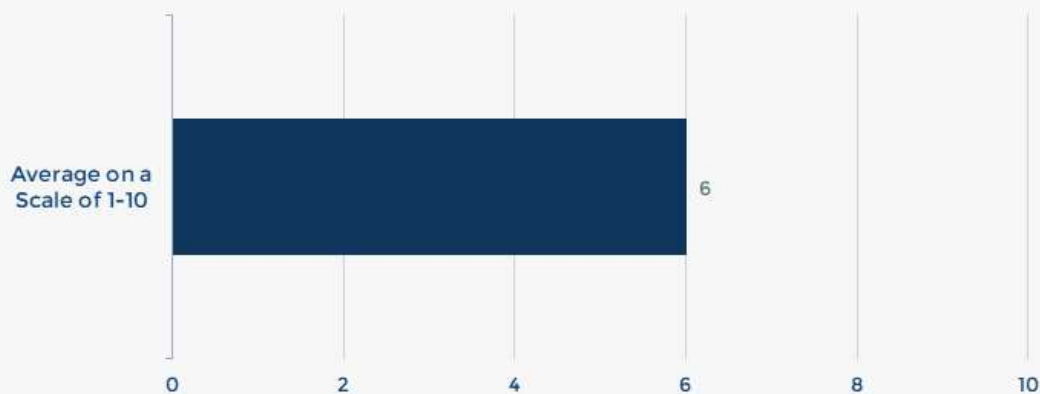
Prior Planning Commissioner, 1
State Government
Public Safety
GIS Administrator, 1
General Public, 5
Citizen Scientist, 1
Local Business, 1

GIS Knowledge Level

Average on a Scale of 1-10 — 6

0   2   4   6   8   10

Public Consultation
Online Questionnaire Results

Which GIS/Mapping applications do you currently use?

Application	Value
Snow Load Zone Lookup (Web Map)	4
Online Parcel Search (ParcelQuest)	5
Fairgrounds Map (PDF)	2
Horse Stalls Map (PDF)	0
Lassen County Map (PDF)	3
Redistricting Maps (PDF)	1
Board of Supervisor District Map (PDF)	2
Planning and Building Services Resources	0
None, N/A, Unknown	2

What types of GIS, spatial technology, and location intelligence tools and solutions should be available to the public?

Tool	Value
Easy-to-use Self-Service Web Mapping Applications	8
Mobile Phone Mapping Applications	3
Crowdsourcing Applications (tools to solicit feedback from the community)	5
Dashboards, Charts, and Statistics	6
Narrative Story Maps	2
Open Data Hub, data downloads	1

Benchmarking Analysis

Introduction

A detailed examination of the existing GIS conditions of an organization is mission-critical. The Benchmarking Analysis (BA) is a subjective evaluation of the existing GIS conditions of the organization. It is a checklist of metrics that conventional wisdom and Industry knowledge identify as essential to the success of any enterprise GIS. The benchmarking framework can serve as the basis for ongoing performance measurement, reporting, and management of the organization's GIS program.

An initial assessment was conducted through an interview process whereby a grade was given for each individual item. These results were then refined during the planning process based on departmental and organizational feedback. This assessment resulted in an accurate and objective comprehensive picture of the organization's strengths, weaknesses, gaps, opportunities, and metrics.

Methodology

The 'Six Pillars of GIS Sustainability' serve as the categories for the benchmark components. Each of the Six Pillars has a sequence of questions graded on a percentage scale – 0% being Adoption Stage and needing significant improvement, and 100% being at the Smart and Sustainable Stage at a 'best business practice' performance level. The goal for a successful GIS program is above 60%. Each component is weighted equally, although the importance of any given component varies with organizations.

Key Performance Indicators

The BA is based on a series of 105 Key Performance Indicators (KPIs). The KPIs have been scored based on key staff and stakeholder interviews, questionnaires, and supporting documentation. These KPIs should be used as a systematic way of monitoring progress over time. The following sections describe each KPI metric, the current situation, and GIS needs relating to the KPI. These metrics should be reviewed annually to evaluate progress and refine objectives.

Gap Analysis

A Gap Analysis identifies facets of an enterprise GIS that need further development or fall short of the desired end state. **Any item scoring 60% or below is considered a gap and can be considered an area of opportunity for improvement.** *See the separate GIS Benchmarking Scores table for a list of the gaps.*

GIS Benchmarking Summary

In August 2023, GTG interviewed the Deputy Director of Planning and Building Services, Natural Resources Coordinator, and Information Services Supervisor to determine benchmark scores of 105 benchmarking metrics. These metrics were used to assess the condition of the existing GIS program. This section offers insight into how GIS is implemented, administered, and operated within the organization and provides a state of existing conditions.

The GIS Benchmarking Overall Summary Scores are listed below. This chart represents the average of all the scores for each of the Six Pillars of GIS Sustainability.

Benchmarking and Gap Analysis

Summary

Governance

38%

Data and Databases

27%

Procedures, Workflow, and Integration

28%

GIS Software

28%

IT Infrastructure

66%

Training, Education, and Knowledge Transfer

11%

See the separate GIS Benchmarking Scores table for a description of each benchmark, metric, score, and current situation, grouped by the Six Pillars.

Pillar: #1 — The Six Pillars of GIS Sustainability

GIS GOVERNANCE · GIS DIGITAL DATA AND DATABASES · GIS TRAINING, EDUCATION, AND KNOWLEDGE TRANSFER · PROCEDURES, WORKFLOW, AND INTEGRATION · INFRASTRUCTURE · GIS SOFTWARE

Decentralized, Centralized, Hybrid, and Hybrid & Regionalization Governance Models.
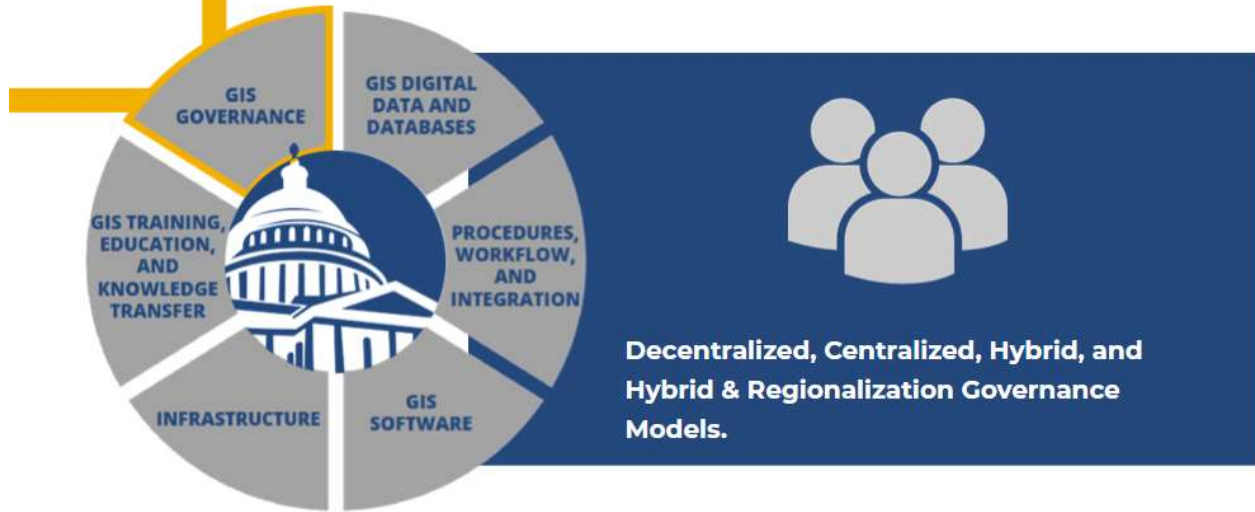
Governance

GIS Governance refers to the processes and actions required to manage the planning, design, implementation, and ongoing maintenance of GIS technology. Governance and management are required throughout all components of GIS in local government. GIS governance is the management of an integrated solution that serves an entire organization by offering levels of geospatial functionality, uniform standards, good management, reliable digital data and databases, workflow procedures, training, education, and knowledge transfer, and a backbone for technology architecture and infrastructure.

At Lassen County, the average Governance score was 38%. This strategic plan, the vision, goals, and objectives previously prepared, and the existing budget model are favorable factors for GIS governance. However, some areas need significant improvement. The Benchmarking Bar Chart below shows each GIS Governance metric's score.

Governance

38%

GIS Maturity Category	0	20	40	60	80	100
A GIS Strategic Plan					90	
Annual Update to the Strategic Plan						
A GIS Vision, Goals, and Objectives			40			
Key Performance Indicators			50			
A Formalized Governance Model		30				
GIS Job Classifications				70		
Coordinated GIS Enterprise Management				60		
GIS Steering Committee	20					
GIS Sponsors or Champions					80	
GIS Technical Committee						
GIS Functional Groups	20					
GIS User Group						
Regional GIS Framework Model			50			
GIS Policy and Mandates						
User Sensitivity and Feedback			40			
Quality of Service and Customer Satisfaction			40			
GIS Culture of Collaboration				70		
GIS Authority and Clear Lines of Responsibility			40			
A GIS Budget or Funding Model						100
Grants and Funding Initiatives	20					
An Annual Detailed GIS Work Plan						
GIS Blog or Newsletter						
Alignment with Org. Vision, Goals, and Objectives				60		
Service Level Agreement (SLA)						
New Emerging GIS Technologies				60		
Community Consultation and Engagement Strategy			40			

GIS MATURITY STAGE

ADOPTION 0-20%	ENHANCED 20-40%	OPERATIONAL 40-60%	STRATEGIC 60-80%	ENTERPRISE 80-90%	SMART & SUSTAINABLE 90-100%

Pillar: #2

GIS GOVERNANCE

GIS DIGITAL DATA AND DATABASES

GIS TRAINING, EDUCATION, AND KNOWLEDGE TRANSFER

PROCEDURES, WORKFLOW, AND INTEGRATION

INFRASTRUCTURE

GIS SOFTWARE

Design, build, collect, and maintain reliable and sustainable GIS digital data layers.
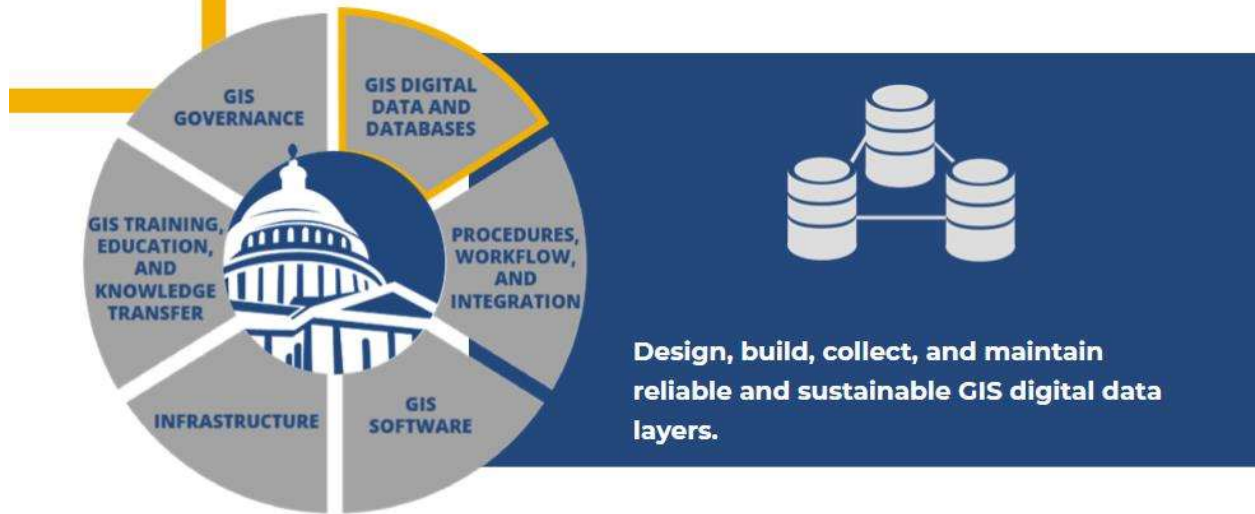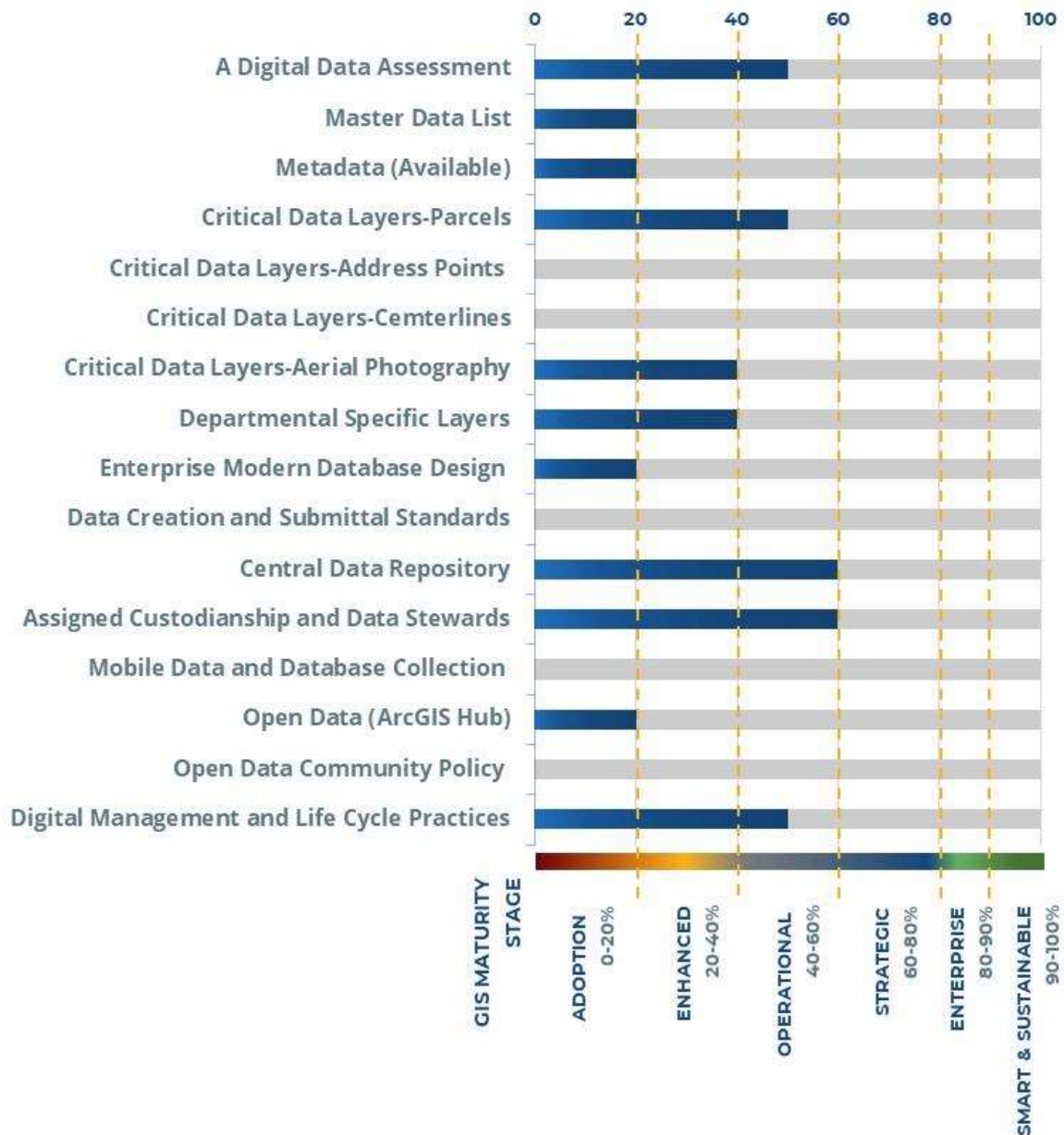
Data and Databases

Data is the most critical and most expensive component of a GIS program. Organizations invest significant funds in creating and maintaining data (spatial and non-spatial). One of the most powerful aspects of GIS is that it has the potential to become the primary tool for viewing data within an organization. Visualizing the data spatially empowers staff to analyze and manage data in new ways. Most data maintained by a local government has a geographic component (e.g., address, roll number). GIS should be used to 'geo-enable' the wealth of data that resides in the various IT systems maintained by the organization.

After completing a full benchmarking analysis, the average Data and Databases score was 27%. Although there is a central server for GIS data and assigned data stewards for existing data, most areas related to data and databases need significant improvement. The Benchmarking Bar Chart below shows the score for each individual Digital Data and Database metric.

Data and Databases

27%

GIS MATURITY STAGE					
ADOPTION 0-20%	ENHANCED 20-40%	OPERATIONAL 40-60%	STRATEGIC 60-80%	ENTERPRISE 80-90%	SMART & SUSTAINABLE 90-100%

Pillar:

#3
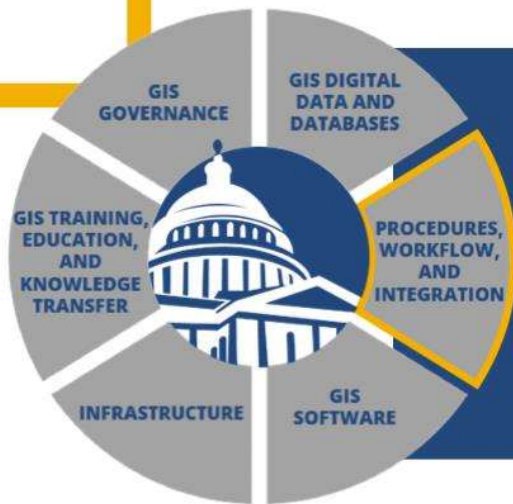
Integrate GIS functionality with existing systems, business processes, and workflow.

Procedures, Workflow, and Integration

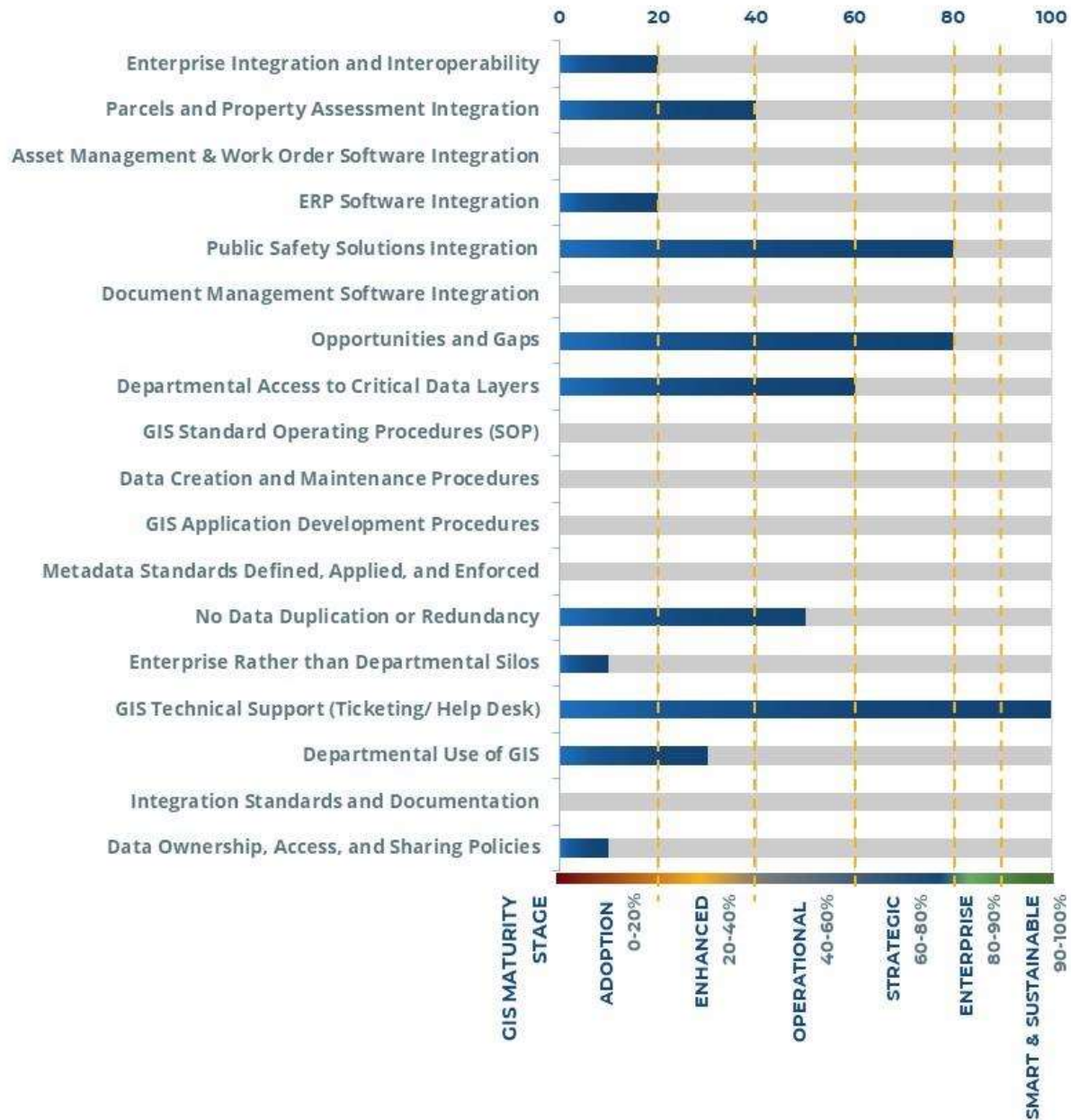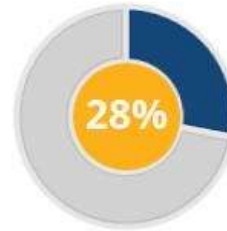One of the key components of any successful GIS is how well it integrates with other systems and improves the organization's overall workflow. GIS is a primary integrative tool that should serve as an organization's gateway for all its data. Combining the information from multiple systems into GIS applications allows data and information to be easily accessible in a single location via an intuitive, visual format. This pillar is a critical element of GIS success for cities and is inherently tied to good governance and quality GIS data.

After completing a full Benchmarking Analysis, the average score for Procedures, Workflow, and Integration was 28%. There is some integration in place, but there are opportunities for more integration and interoperability between GIS and business systems. Also, there is a lack of formal documentation of standards and processes. The Benchmarking Bar Chart below shows the score for each individual Procedure, Workflow, and Integration metric.

Procedures, Workflow, and Integration

28%

GIS MATURITY STAGE						
ADOPTION 0-20%	ENHANCED 20-40%	OPERATIONAL 40-60%	STRATEGIC 60-80%	ENTERPRISE 80-90%	SMART & SUSTAINABLE 90-100%	

Pillar: #4
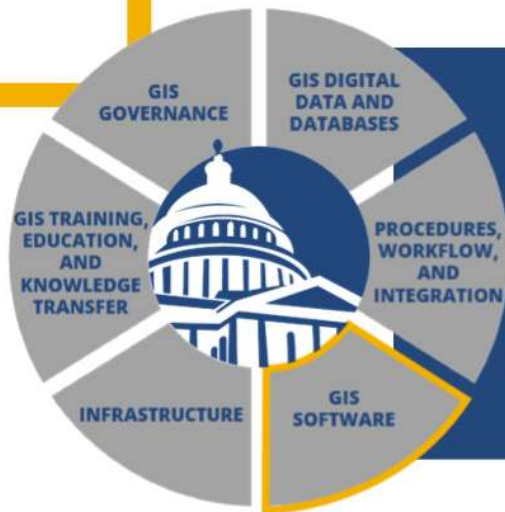
Make GIS software accessible throughout the organization and to the public.

GIS Software

The GIS software ecosystem is the manifestation of investment in GIS. The focus of GIS software development has shifted from desktop software to browser-based applications for data collection and viewing with analytical tools. Many local government organizations are concentrating their efforts towards this model to provide solutions that staff t can use to get their job done more efficiently.

After completing a full Benchmarking Analysis, the average score for GIS Software was 28%. While the County has Esri licenses, the licensing model could be expanded to allow more users and application options. The Benchmarking Bar Chart below shows the score for each individual GIS Software metric.

GIS Software

28%

GIS MATURITY STAGE						
	ADOPTION 0-20%	ENHANCED 20-40%	OPERATIONAL 40-60%	STRATEGIC 60-80%	ENTERPRISE 80-90%	SMART & SUSTAINABLE 90-100%

Optimal GIS Licensing — 30
Level of GIS COTS Versus Custom Code (Code Debt) — 100
Widget Development — 0
Access to Software — 90
Internal Business Solutions — 40
Public Facing Solutions — 20
Online/Cloud Initiative — 40
Story Maps — 0
Crowdsourcing Applications — 0
Board of Supervisors GIS — 30
Modeling Extensions — 0
Mobile GIS Solutions — 30
Global Positioning System (GPS) Technology — 30
Desktop GIS Customization (Add-ins) — 100
GIS Lifecycle Management, Review, and Planning — 0
ArcGIS Hub — 0
Predictive Analysis Tools (Insights, Business Analyst) — 0
Level of Automation — 0

Pillar:
#5

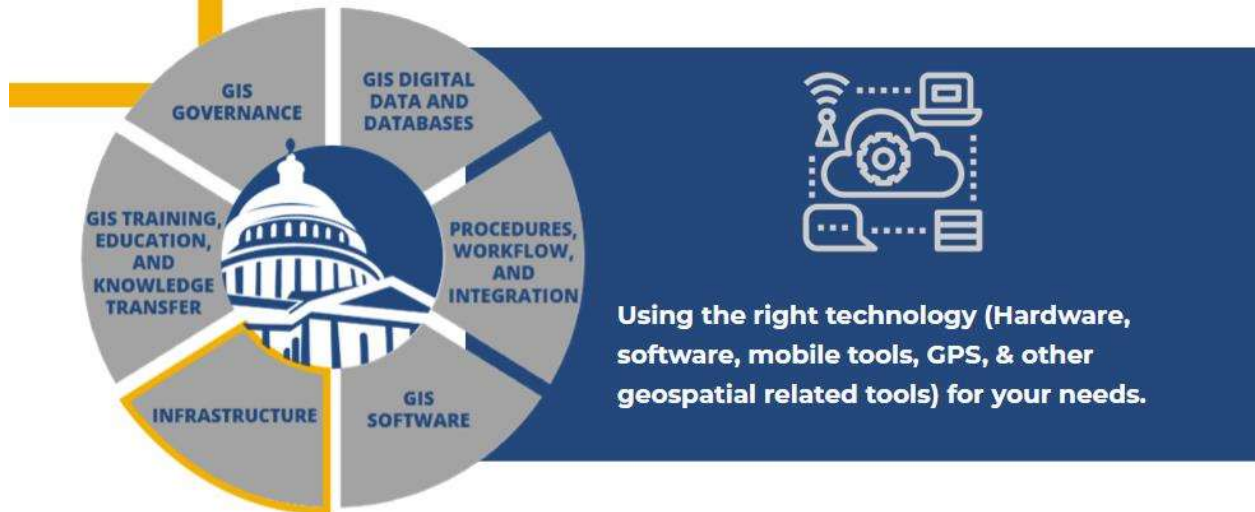Using the right technology (Hardware, software, mobile tools, GPS, & other geospatial related tools) for your needs.
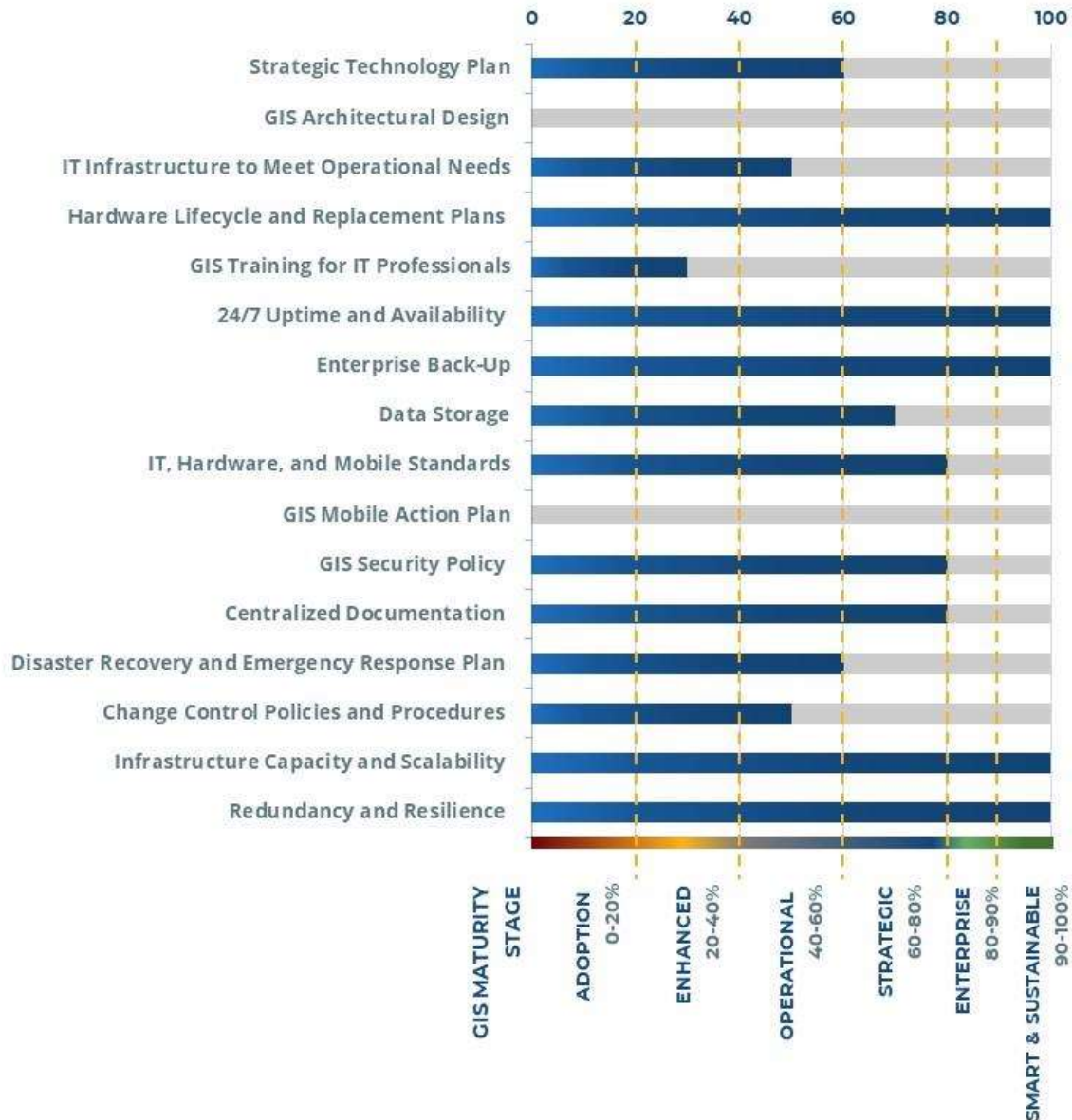
IT Infrastructure

Information Technology (IT) infrastructure refers to a dynamic web of processes, networks, hardware, and software resources that support the activities of an integrated IT department. The last two letters of GIS represent Information Systems. This indicates the technology's reliance on traditional information technology components (databases, networks, servers, data storage, etc.). These benchmarks measure how well the organization is ensuring that the IT infrastructure of the organization meets the business needs.
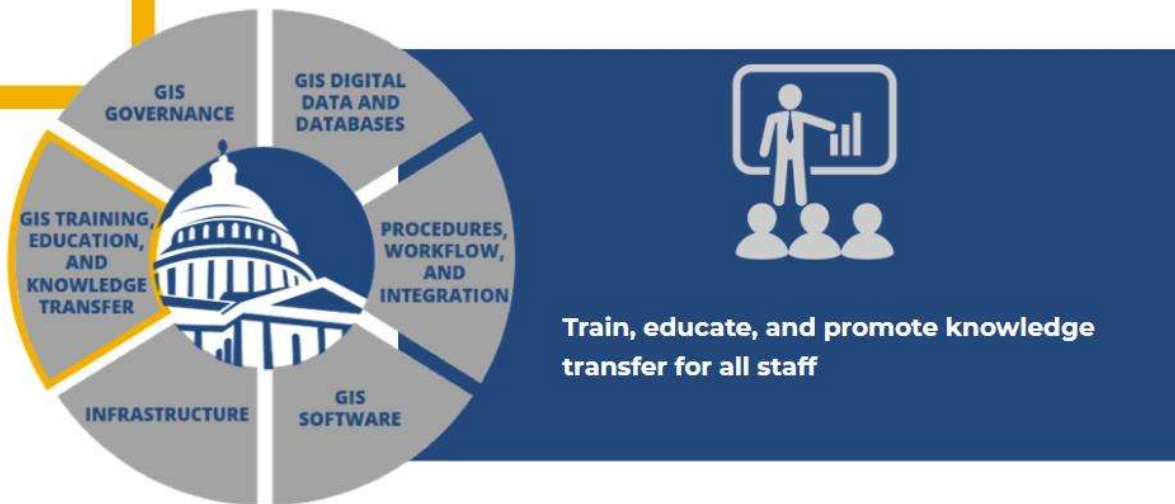
After completing a full Benchmarking Analysis, the average score for Infrastructure was 66%. Overall, the Information Services Department (ISD) has ensured that the infrastructure meets the business needs related to GIS. The Benchmarking Bar Chart below shows the score for each individual IT Infrastructure metric.

IT Infrastructure

66%

Chart: IT Infrastructure benchmarking (scale 0 to 100)

Category	Value
Strategic Technology Plan	~60
GIS Architectural Design	0
IT Infrastructure to Meet Operational Needs	~50
Hardware Lifecycle and Replacement Plans	~100
GIS Training for IT Professionals	~30
24/7 Uptime and Availability	~100
Enterprise Back-Up	~100
Data Storage	~70
IT, Hardware, and Mobile Standards	~80
GIS Mobile Action Plan	0
GIS Security Policy	~80
Centralized Documentation	~80
Disaster Recovery and Emergency Response Plan	~60
Change Control Policies and Procedures	~50
Infrastructure Capacity and Scalability	~100
Redundancy and Resilience	~100

GIS MATURITY STAGE:
- ADOPTION 0-20%
- ENHANCED 20-40%
- OPERATIONAL 40-60%
- STRATEGIC 60-80%
- ENTERPRISE 80-90%
- SMART & SUSTAINABLE 90-100%

Training, Education, and Knowledge Transfer

Training, education, and knowledge transfer are among the most important components to a successful enterprise-wide GIS effort; however, it is the one pillar of GIS success most often overlooked or underdeveloped. As a result, many excellent GIS implementations languish because the power of GIS is not understood. Some organizations mistakenly believe that software training is enough. However, education and understanding of what GIS can do for the end-user are equally (if not more) important.

After a full Benchmarking Analysis was completed, the average score for Training, Education, and Knowledge Transfer was only 11%. Because usage has been historically low and there are few applications, there has not been a need for significant training of departmental staff on GIS software so far. However, as applications are deployed, a formal training plan and knowledge transfer will be necessary. The Benchmarking Bar Chart below shows the score for each individual GIS Training, Education, and Knowledge Transfer metric.

Training, Education, and Knowledge Transfer

11%
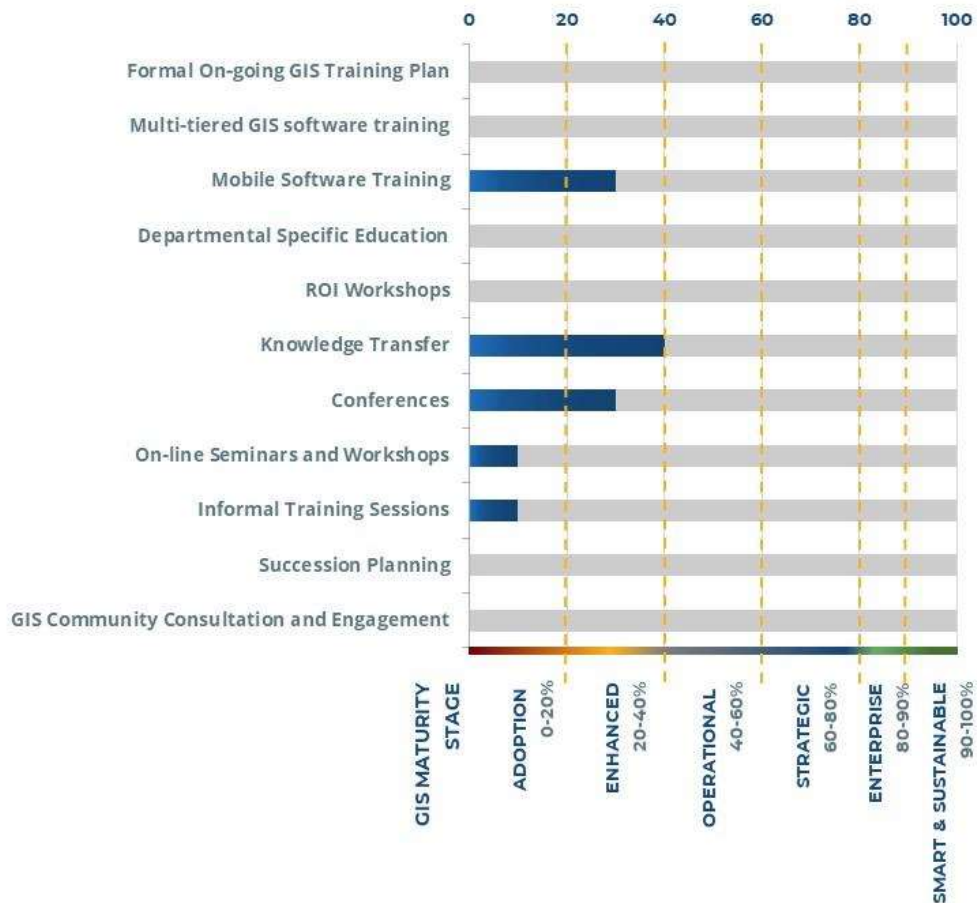
SWOT Analysis and Findings

Based on findings from the online survey, department interviews, and discussions held with key stakeholders, GTG compiled a list of Strengths, Weaknesses, Opportunities, and Threats (SWOT) related to GIS implementation at Lassen County.

The SWOT philosophy is defined as:

- Strengths – Internal elements that may **contribute** to the successful implementation of a sustainable GIS.
    - Advantages the organization has.
    - What the organization does better than comparable agencies.
    - Unique resources the organization has access to.
- Weaknesses – Internal elements that may **limit** the establishment of sustainable GIS.
    - Potential improvements.
    - Risk avoidance.
    - Factors preventing achieving goals.
- Opportunities – Internal and external elements that can be **leveraged** to ensure the success of an organization's GIS.
    - Opportunities the organization can identify.
    - Interesting trends.
    - Changes in the profile or culture of the community.
- Threats – Internal and external obstacles that may **hinder** the success of GIS.
    - Obstacles the organization is facing.
    - What comparable agencies are doing better than the organization.
    - Technological threats to the organization's environment.

The following sections highlight the strengths, weaknesses, opportunities, and threats at Lassen County.

Strengths

Strengths are internal elements that may **contribute** to the successful implementation of a sustainable and resilient GIS include advantages, successes, accomplishments, and unique resources.

Governance

◆ Support from the executive leadership.
◆ Team of GIS-knowledgeable staff in Planning and Building Services.
◆ There is a vacant GIS Coordinator position which, if filled, would be the lead person over the GIS program.
◆ This strategic planning project shows that the organization is interested in leveraging data and geospatial technology better.
◆ Senior-level leaders understand the importance of a GIS roadmap.
◆ Staff know the Planning and Building Services Department is the central point of contact for GIS needs.

Data and Databases

◆ There is demand and organizational support for data management.
◆ Department staff are responsible for the entry of their data.
◆ There is a high volume of data and information.
◆ Some critical data layers exist.
◆ Plenty of available data storage.

Procedures, Workflow, and Integration

◆ There is interest in integrating business systems with GIS and using geospatial data for decision-making.
◆ IT can facilitate GIS integration efforts.

Software Solutions

◆ The County has Esri licenses and a relationship with the local Esri representative.
◆ An ArcGIS Online organizational account is in place for data acquisition and editing.
◆ Several dashboards have been created for visualization of complex data.
◆ Survey123 has been used to collect data in the field.

IT Infrastructure and System Architecture Design

◆ IT staff are knowledgeable in GIS architecture.
◆ IT and GIS infrastructure is sufficient and scalable with good connectivity.
◆ Enterprise back-ups are in place.
◆ 24/7 GIS availability.

Training, Education, and Knowledge Transfer

◆ GIS knowledgeable staff provide one-on-one training for other staff.
◆ Informal training on Survey 123 was conducted for a mobile data collection project.
◆ Conference attendance is supported and budgeted.

Weaknesses

Weaknesses are internal elements that may **limit** the establishment of sustainable GIS include political and funding changes, unrealized potential, and untapped resources.

Governance

◆ There have been several efforts to start a GIS program in the past, but they have not been resulted in wide-spread use throughout the County.
◆ There is a lack of data and GIS expertise and understanding in some departments.
◆ GIS work has been reactionary, not planned.
◆ GIS work is mainly spent responding to requests to make maps rather than developing applications to empower staff.

Data and Databases

◆ The County faces the challenge of GIS underutilization within the organization and the existence of silos of data and databases.
◆ Many departments rely on Excel and separate databases to track and report operational data; however, the processes are largely manual and leave room for error.
◆ Not all staff are aware that the information they collect can be considered data and used for analysis.
◆ Not all staff know how documents, data, maps, and systems can work together for their job.

Procedures, Workflow, and Integration

◆ County business systems, such as MegaByte and SmartGov, are not integrated to share data between systems.
◆ There is a lack of standards and business process documentation.

Software Solutions

◆ GIS use is limited to several ArcGIS and ArcGIS Online (AGOL) users in a few departments.
◆ Few web applications have been developed.
◆ Applications have been developed by contractors/consultants, sometimes as part of a larger project.

Training, Education, and Knowledge Transfer

◆ Few staff understand the GIS system, and there is little documentation to ensure continuity.

Opportunities

Opportunities are internal and external elements that can be **leveraged** to ensure the success of an organization's GIS include emerging trends, service improvements, employee training, and education.

Governance

◆ Fill the GIS Coordinator position.
◆ Greater awareness of how data management and GIS can help the County visualize information and make decisions.
◆ Dissolve silos, share successes, and showcase the return on investment (ROI) to show what departments are doing.
◆ GIS user meetings about the benefits of GIS.

Data and Databases

◆ Raise collaboration to eliminate duplication of data.
◆ Leverage data gathered from the public and solicit a greater volume of feedback from the public.
◆ Enable departments to contribute to data updates.
◆ Enable geodatabase versioning on individual layers once uploaded and editing is started.

Procedures, Workflow, and Integration

◆ Increase system integration to leverage the wealth of data across departments.
◆ Prepare data standards and data creation Standard Operating Procedures SOPs.
◆ Merge regional and demographic data with GIS layers.

Software Solutions

◆ Greater organization-wide adoption and departmental access across systems for efficient data access.
◆ Deploy additional tools for staff to make creating their own maps easier.
◆ Gain a better understanding of customers from a demographic perspective to better align services to the customer base.
◆ Expand analytical solutions/applications.

IT Infrastructure and System Architecture Design

◆ Update IT infrastructure to keep pace with GIS expansion.

Training, Education, and Knowledge Transfer

- Increase data and GIS technology knowledge through formal training, seminars, and conferences.
- County-wide education on what GIS can do would allow staff to understand all the information they have.

Threats

Internal and external obstacles that may **impede** the success of GIS. Threats are any challenges, barriers, and pitfalls that must be mitigated to move forward and progress toward GIS expansion and growth.

Governance

- From a time and resource perspective, having one person dedicated to GIS may not provide the capability to deliver on the vision from this GIS Strategic Plan.
- A reactive state impedes growth.
- No annual detailed work plan for the GIS initiative.
- Lack of an alignment study with County Board goals could lead to a lack of support and funding.

Data and Databases

- Data silos and duplication.
- Data timeliness – not having up-to-date essential data when needed.
- Inaccurate and incomplete data may lead to erroneous decision-making.
- Lack of understanding of the data maintained by departments may lead to a lack of use and insight.

Procedures, Workflow, and Integration

- Changing technology may disrupt integrations.

Software Solutions

- Third-party or cloud systems not staying current with the latest GIS technology/versions can limit upgrades.
- Limited to what the contractors/consultants can provide.

IT Infrastructure and System Architecture Design

◆ IT infrastructure limiting GIS expansion.
◆ Lack of understanding of the Esri GIS ecosystem and geodatabase requirements.

Training, Education, and Knowledge Transfer

◆ Lack of promotion of GIS successes can lead to a lack of understanding and support.
◆ The lack of a user group and other educational methods leads to an underuse of data and software.
◆ Lack of GIS staff succession planning creates risk due to staff turnover.

GIS Needs Assessment

This section details critical enterprise-wide implementation issues, departmental needs, potential applications, necessary data, required resources, and identified workflows. The Enterprise Needs section identifies items that are required for the system as a whole to satisfy basic needs common to all departments. The Department Needs section contains the particular needs identified for each stakeholder department, division, or group.

Enterprise Needs

Background and Existing County GIS Infrastructure and Data

GIS efforts at Lassen County began more than 10 years ago. Esri licenses were purchased but were out of maintenance and support by 2015. Since that time, the Planning and Building Services Department and the Information Services Department (ISD) have updated and expanded the licenses and created a central database on-premise as well as a cloud environment.

The County operates a dedicated virtual server containing its GIS data and License Manager which is used across various County agencies. The database is running SQL Express, which is several iterations behind. The County operates a total of nine perpetual licenses for which maintenance is renewed each August. Seven of those licenses are ArcMap Desktop Basic and two are Desktop Standard. The County also has nine named user accounts on its ArcGIS Online (AGOL) account. The Lassen County Planning and Building Services Department and ISD maintain the relationship with Esri customer service and technical support.

GIS Governance

The responsibility for GIS has been part of the Planning and Building Services Department for the past eight years. The Deputy Director and Senior Planner manage the GIS software and function as data custodians and stewards, creating and updating data. In addition, Planning staff make maps and graphics for projects to go to the Planning Commission and Board of Supervisors.

GIS should be a County-wide initiative but is best positioned in Planning & Building Services until ISD is capable and dedicated, and GIS use is expanded to other departments.

A GIS Coordinator position was approved in 2018 but has not been filled due to a lack of qualified candidates willing to accept the location and salary range. If filled, this would be the lead person over the GIS program. The position is under the direction of the Planning and Building Services Director and is defined as follows:

◆ Plans, coordinates, oversees, and participates in the development, implementation, integration, operation, and maintenance of the County's GIS and permit system.
◆ Designs and implements information systems for provision of access to GIS data.
◆ Develops and implements specialized GIS applications.
◆ Oversees the design and development of all databases associated with the GIS base map.
◆ Responsible for management, development, and update of the County Assessor Parcel Layer.

The organizational chart below shows the core GIS related positions.

Figure 1: Existing GIS Organizational Chart

The County supports a semi-centralized GIS governance model, where the GIS services are centralized within one group with usage spread among departmental users, as shown in the chart below.

Figure 2: Existing GIS Governance Model

Current GIS Users

However, GIS governance has not been formalized within the organization; therefore, GIS has not been fully incorporated into the organization's workflows. While most departments have one or more users, the number of intermediate (analytical) and advanced users is low across departments. The graphic below depicts the County's existing users.

Figure 3: Current GIS User Counts

The 30 users are spread across several county departments, mostly using the ParcelQuest web interface. The table below lists the County's existing user count by department and tier.

Department	Tier 1: Advanced	Tier 2: Analytical	Tier 3: Viewer
Administration			2
Agriculture Commissioner			1
Assessor			8
Auditor/Treasurer/Tax Collector			4
Child Support Services			
Clerk		1	
Information Services	1		
Office of Emergency Services		1	

Department	Tier 1: Advanced	Tier 2: Analytical	Tier 3: Viewer
Planning and Building Services		5	
– Environmental Health Division			3
Public Works		2	
Sheriff's Office			1
University of California Cooperative Extension		1	
TOTAL	**1**	**10**	**19**

GIS Governance Needs

The following items were identified in interviews with Planning and Building Services Department and Information Services Department staff as being vital to setting up the governance model for an enterprise, enduring, and sustainable GIS:

- A Governance Model formalized with a charter or policy and approval from the GIS Sponsors and Steering Committee.
- Annual update to this GIS Strategic Plan.
- Formalize the GIS Vision, Goals, and Objectives and align them with the County's vision.
- Update the Key Performance Measures or Indicators (KPI) benchmarked in the plan.
- Coordinated GIS enterprise management to consider GIS with every technology project and business system acquisition.
- A GIS Steering Committee comprised of department directors or deputy directors.
- A GIS Technical Committee formed from department user liaisons to discuss technical aspects of GIS that affect the departments.
- GIS Functional Group for Asset Management.
- GIS User Group meetings.
- Build on relationships with external agencies to foster a Regional GIS Framework Model.
- GIS Policies and Mandates to ensure system and data maintenance, and proper use of data and map products.
- User sensitivity and feedback methods to gather user needs.
- Methods to measure quality of service and customer satisfaction.
- Promote the Planning and Building Services Department as the GIS authority with clear lines of responsibility.

◆ A GIS budget or funding model and an initiative to research grants and funding alternatives to sustain and expand the program.
◆ An annual detailed GIS Work Plan to support the County's focus areas.
◆ Community consultation and engagement strategy, such as a GIS Blog or Newsletter, to disseminate accomplishments and introduce recent technology.
◆ Alignment of GIS projects with organization's vision, goals, and objectives.
◆ Service Level Agreements (SLA) between departments and Intergovernmental Agreements with external agencies.
◆ Research new and emerging GIS Technologies.

Data and Databases

Compared to similar municipal government organizations, Lassen County needs to improve on the creation and maintenance of accurate and reliable digital GIS data. Several critical data layers exist but need improvement, while other critical layers do not exist.

Concurrent with this project, updates to the Parcel and Zoning layers are underway.

If you don't update it daily, you don't know if it's accurate. You need to have control to make sure it's accurate."
– Deputy County Administrative Officer

Existing Data

The County uses SQL Express as the central database, installed on a 2012 R2 MS Virtual Server. There is also GIS Data on a file share. In addition, several layers have been created on the County's ArcGIS Online (AGOL) organization.

The table below lists the known GIS data layers, the location where the data is stored or the type of source, and the responsible department.

Existing GIS Layers		
Layer Name	**Type - Location**	**Department**
Parcels	Geodatabase	Planning and Building Services
Address Search	ArcGIS Online	
Roads	Geodatabase	Public Works

Existing GIS Layers		
Zoning	Geodatabase	Planning and Building Services
FEMA Floodplain	Geodatabase	Planning and Building Services
Fire Hazard Severity Zones	Georeferenced Scanned Map	Planning and Building Services
Property Setbacks	Georeferenced Scanned Map	Planning and Building Services
General and Area Plans	Georeferenced Scanned Map	Planning and Building Services
General Plan Land Use Designation	Geodatabase	Planning and Building Services
Aerial Photography - NAIP	Imagery – File Share	Planning and Building Services
Vegetation Data	Shapefile or Personal Geodatabase	UC Cooperative Extension
Fence Boundaries	Shapefile or Personal Geodatabase	UC Cooperative Extension

ParcelQuest and Parcel Updates

The County contracts with the vendor ParcelQuest to update parcel maps with lot line adjustments. The Assessor's Office sends the changes to ParcelQuest, who updates the maps and provides a website to view them. The parcel update workflow is outlined below:
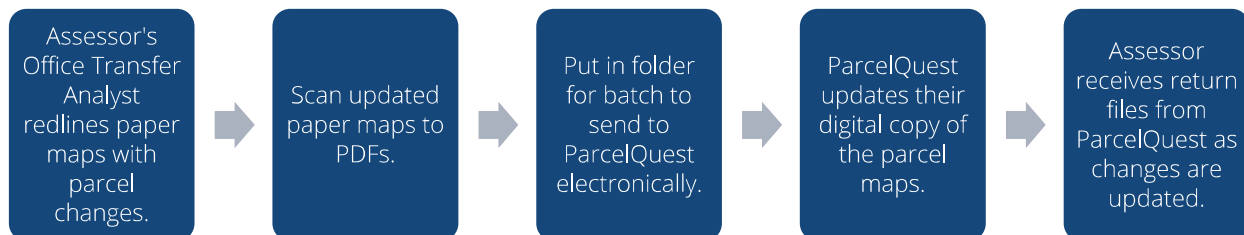
Assessor's Office Transfer Analyst redlines paper maps with parcel changes. → Scan updated paper maps to PDFs. → Put in folder for batch to send to ParcelQuest electronically. → ParcelQuest updates their digital copy of the parcel maps. → Assessor receives return files from ParcelQuest as changes are updated.

Figure 4: ParcelQuest Workflow

The project plan for Parcel updates is to update the County's Parcel layer with all updates from the past seven years, which is when the Drafter left the Assessor's Office. This is the point where ParcelQuest was contracted and put the layer into a geodatabase. The goal is to build back up to when the Assessor's Office stopped making edits. There have been approximately 15 lot line adjustments each year and approximately four parcel maps updated each year. The project will update the geodatabase, working from current Assessor's maps and/or recorded maps (Parcel Maps, Subdivision Maps, Records of Survey, etc.), to reflect the most up-to-date Assessor's parcel information and to work with the County to correct the accuracy of the parcel line data. However, there are challenges with parcel boundaries not aligning with aerial imagery. This will be an ongoing effort to correct the lot lines.

Data and Database Needs

The County must build and maintain consistent, reliable, and dynamic geographic data that can be effectively used by all departments within the County and shared within the region. The following items identified are necessary to provide the highest quality geospatial data and for County staff to make data-informed decisions.

- A Digital Data Assessment to analyze the data and identify any inaccurate data, non-standard spatial projections, and incomplete data or attributes.
- Master Data List developed, documented, and distributed.
- Metadata applied to enterprise datasets to understand the source, quality, and geometry of the data.
- An up-to-date Parcels data layer.
- An Address Points data layer.
- A Street Centerlines data layer.
- Updated, high-quality Aerial Photography.
- Departmental specific layers as identified in the Department Needs sections.
- An enterprise, modern database design for the central geodatabase.
- Data Creation and Submittal Standards developed and documented.
- A central data repository for the collection of geospatial data and files.
- Assigned custodianship and data stewards.
- Mobile data and database collection expansion.
- Open Data portal, such as an ArcGIS Hub.
- Open Data Community Policy developed and approved.
- Digital Data Management and Life Cycle Practices developed and documented.

See the Departmental Needs Assessment below for data and database needs expressed by department staff during the interviews.

Procedures, Workflow, and Integration

Lassen County has made a significant investment in time and money in the creation of data that resides in existing business systems. A primary need for all departments is the geo-enablement of this data. The existing business systems that could be integrated with GIS are listed below:

Asset Management	• None currently - GIS integration should be considered if an AM system is purchased.
Document Management	• Tyler Tech Eagle Recorder / Eagle Web
Elections Management	• DFM Associates
Pavement Management System	• Street Saver
Permit Tracking	• SmartGov
Property/Tax	• ParcelQuest • MegaByte
Public Safety	• Intrado and Cal OES
Mobile	• Garmin GPS • Spot Device

Existing corporate business systems in place at Lassen County.

Existing Integration

The County would like to integrate the parcel layer with the MegaByte property tax system. Currently, the County contracts with ParcelQuest to update a parcel map and display it in a web app for the staff and the public to view parcels and property data; however, full details are available only at a cost to the public. Also, the County has successfully integrated GIS with the County's Public Safety software solution.

A goal for the GIS team should be rapidly geo-enabling data soon after it is entered into a system. Many modern systems automatically geocode data as it is entered. However, geo-enablement may need to be automated through a backend software package or scripts.

Existing Procedures and Workflows

Overall, Lassen County's GIS is not bound by a strategic set of standards and policies. The processes and standards are well known by some staff but have not yet been documented. The County needs an approved set of standards and policies to ensure system and data maintenance, and proper use of data and map products.

Procedures, Workflow, and Integration Needs

The following items are vital to setting up procedures and workflows for an efficient, productive GIS:

- Enterprise GIS Integration and Interoperability with business systems:
  - Asset Management & Work Order Software
  - Property Assessment Software
  - Permit Tracking System
  - Public Safety Solutions
  - Document Management Software
- Standards, Policies, and Procedures are needed, at a minimum:
  - GIS Standard Operating Procedures (SOP)
  - Data Creation and Maintenance Procedures
  - GIS Application Development Procedures
  - Metadata Standards Defined, Applied and Enforced
  - Integration Standards and Documentation
  - Data Ownership, Access, and Sharing Policies
- Reduction of data duplication or redundancy.
- Enterprise-wide datasets, rather than departmental silos.
- Increased Departmental Use of GIS.

See the Departmental Needs Assessment below for procedures, workflow, and integration needs expressed by department staff during the interviews.

GIS Software

GIS software refers to the network of programs and applications housed on mainframes, servers and the cloud that are deployed to analyze, present, and draw conclusions from geospatial data. The end-user interfaces with GIS technology via this software.

Existing GIS Software

The County uses the Esri platform for its primary GIS software. The current subscription includes the following licenses:

- ◆ ArcGIS Desktop Standard 10.1-10.4 – Concurrent – 2 licenses
- ◆ ArcGIS Desktop Basic 10.1-10.4 – Concurrent – 7 licenses
- ◆ ArcGIS Enterprise Workgroup Standard (Up to Two Cores) – 1 license
- ◆ ArcGIS GIS Server Workgroup Standard Additional Cores – 2 licenses

The application used most often is ArcGIS Desktop/ArcMap. An ArcGIS License Server Administrator is installed on an on-premise server, but ISD is considering moving this function to the Esri cloud. ArcGIS Enterprise has not yet been deployed.

In addition, an ArcGIS Online (AGOL) organization, named Lassen County Planning & Building Services, is active with eight members, user type Creator with User and Data Editor roles, from the following departments:

1. Planning & Building Services
2. Clerk
3. Information Services

The account has a total of 700 credits, currently used for data storage. The usage as of July 5, 2023 is shown below:
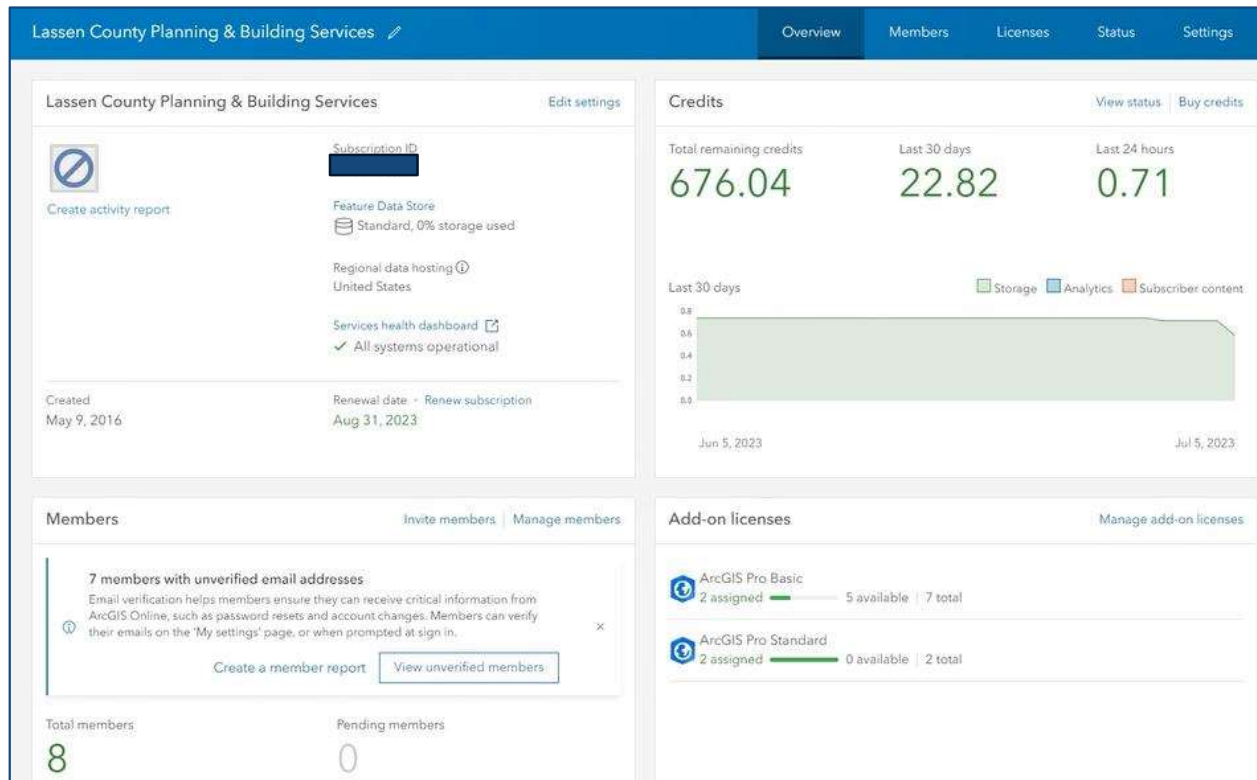
Figure 5: Lassen County AGOL Subscription Overview (as of July 5, 2023)

In addition, the Public Works Department uses AutoCAD 2018/2021 Civil3D and Revit for road and design work. AutoCAD users are a mix of in-house and contractor. There is one engineer on staff to do all bridge and small road projects.

Also, Google Maps/Earth is also used by several departmental staff.

ParcelQuest

The Parcel Quest application is used as a general GIS viewer by County staff in the Assessor's Office, Agricultural Commissioner's Office, Public Works, Auditor/Controller, and Treasurer /Tax Collector Office to look up parcels and property assessment information, and to view aerial photography and other map layers. A ParcelQuest Lite version is available to the public, with limited information free of charge, and full details at a cost.
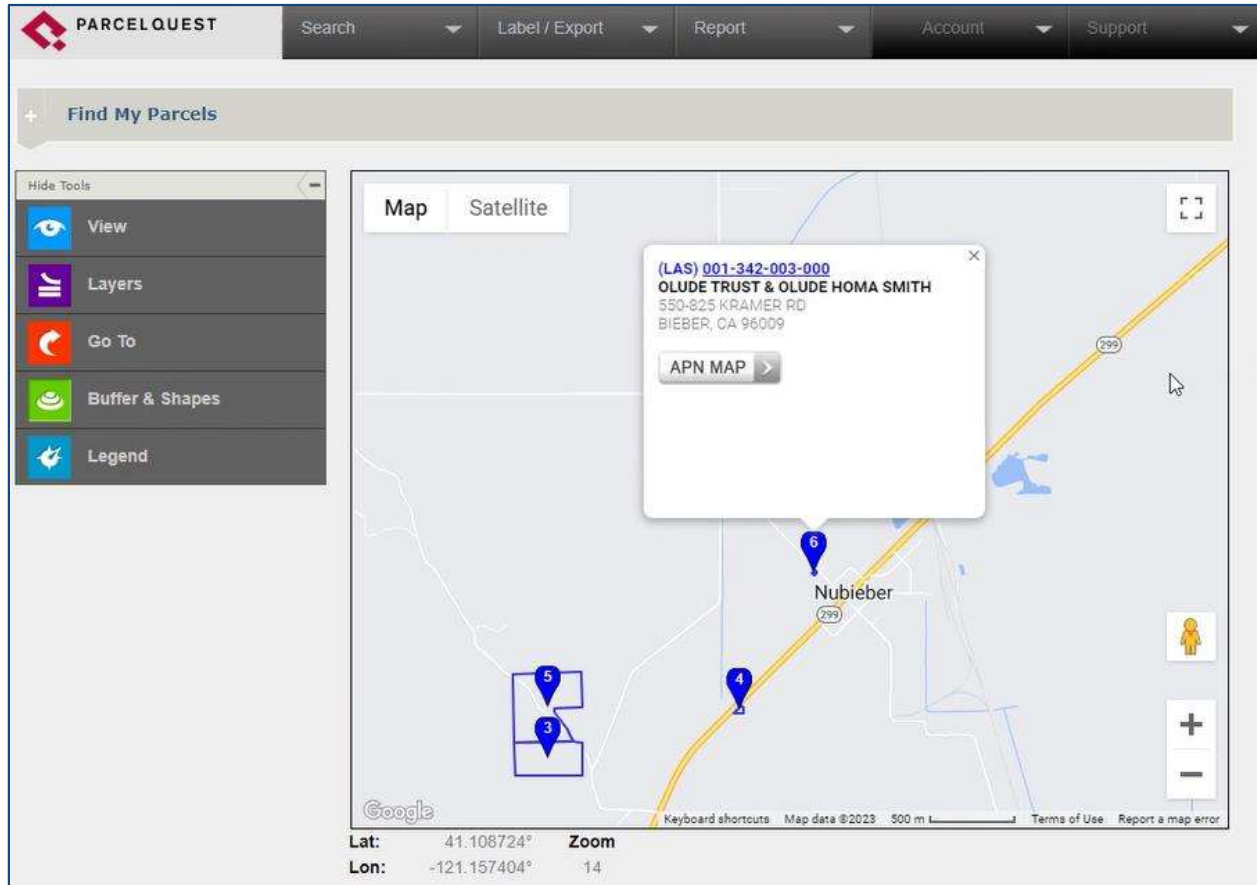
Figure 6: ParcelQuest Map View

GIS Software Needs

The following enterprise-wide GIS software related items were identified that would expand the uses of GIS throughout the County:

- ◆ Optimal GIS Licensing
- ◆ Widget Development
- ◆ Internal Business Solutions
- ◆ More self-serve Public Facing Solutions to enhance access for staff and residents to find information themselves.
- ◆ Expand the Online/Cloud Initiative to include web applications and enable mobile data collection.
- ◆ Story Maps
- ◆ Crowdsourcing Applications
- ◆ Board of Supervisors GIS – High-level information about what's happening in a District showing, for example, open permits, # of complaints, weather, snowplow locations, and other relevant items.

- Modeling Extensions
- Mobile GIS Solutions and Global Positioning System (GPS) Technology
- GIS Lifecycle Management, Review, and Planning
- ArcGIS Hub
- Predictive Analysis Tools (Insights, Business Analyst)
- Increased Level of Automation

See the Departmental Needs Assessment below for software and application needs expressed by department staff during the interviews.

IT Infrastructure for GIS

Infrastructure refers to the network of structures, both physical and systemic, that support an organization's activity. The Information Services Department (ISD) is an internal services division within the Department of Administration. ISD supports the GIS ecosystem of servers, networking, and security.

See the Information Services Department section below for more details.

IT Infrastructure Needs

The following is a list of key GIS infrastructure action items important to an enterprise, sustainable, and enduring GIS solution in local government.

- Strategic Technology Plan
- GIS Architectural Design review and network/server diagram of the existing environment(s)
- IT Infrastructure scalability to meet operational needs
- GIS Training for IT Professionals to support the geodatabase and understand how the security platform is set up for GIS to secure sensitive information.
- GIS Mobile Action Plan
- Disaster Recovery and Emergency Response Plan
- Change Control Policies and Procedures

GIS Training, Education, and Knowledge Transfer

Technology keeps moving forward and the County cannot afford for staff to fall behind. Departmental users have had to rely on the Planning and Building Services team to fulfill GIS requests because they lacked the skills, knowledge, tools, and access to do the work themselves. County staff would use GIS more and in more diverse ways if they had access to applications and the training to use them.

It is imperative to increase the awareness of GIS benefits across the organization. Staff are not completely aware of GIS and the benefits it can provide for their department and their work. GIS sponsors need to project a global understanding of GIS and the power of using data to make decisions. The GIS team also needs to communicate better with users about the sources and the accuracy of the data.

In addition, to ensure the sustainability of the program, a Succession Planning and a Continuity of Operations plan should be developed with cross-training to create a depth of knowledge that will help reduce knowledge gaps if someone leaves the organization or takes extended leave.

GIS Training, Education, and Knowledge Transfer Needs

The following items identified by department staff are needed to provide a solid understanding and skills for users:

- Formal, on-going, multi-tiered GIS Training Plan with mobile and departmental specific education.
- Return on Investment (ROI) Workshops for supervisors, directors, and managers to highlight the value and benefits that GIS offers.
- Knowledge transfer to share specific information among individuals.
- Conference attendance on a local, regional, provincial, and national level.
- Online seminars and workshops attendance on topics related to new technology or uses as GIS expands.
- Informal training sessions for users to share accomplishments and ideas.
- Succession planning for continuity of operations.
- GIS community consultation and engagement.

Department Needs

Introduction

GTG conducted remote video interviews with Lassen stakeholders and users, including all current data and GIS technology users. As a result, GTG has documented each stakeholder's role within the organization and has identified opportunities for data and GIS technology.

This section reviews each department interviewed and provides a brief overview of their responsibilities, current uses of data, GIS, and related technology, and the needs identified by staff.

The following departments participated in the interviews:

#	DEPARTMENT / STAKEHOLDER
1	Administration
2	Agriculture Commissioner
3	Assessor
4	Auditor–Controller, Treasurer, Tax Collector
5	Child Support Services
6	Clerk
7	Community Social Services
8	Environmental Health
9	Health and Social Services
10	Information Services
11	Office of Emergency Services
12	Planning and Building Services
13	Public Works
14	Sheriff's Office
15	University of California Cooperative Extension

Administration Department
Department Overview

The Administration Department is responsible for the annual preparation and presentation of the County Preliminary and Final Budgets to the Board of Supervisors. The Department provides administrative assistance to the Board of Supervisors. The Department also develops and implements the County's Purchasing Program and Policy by providing training, guidance, and support to County Departments in their purchasing needs. In addition, the Department oversees the County's Information Services Department in conjunction with the Information Services Supervisor to include budget development, hardware, software and equipment maintenance standards, and development of policies for computer and internet use.

Current Use of GIS

The Administration Department is a regular user of GIS data and maps. Administration uses the California Water Board's GeoTracker, which maintains records for sites that require cleanup, to assist in enforcing site cleanup initiatives for projects that impact ground and surface water quality. The department also regularly relies on USDA Forest Service data regarding public lands and roads to determine the legality of public access. California state census data is also regularly used by the Administration team. This is available throughout the state of California and contains information related to disadvantaged populations. In the past, this Department was a regular user of ParcelQuest, but due to licensing limitations, they no longer have access to this software.

The Administration team uses KML datasets within Google Earth Pro, as a workaround for not having experience with ArcGIS software. An example is a data layer outlining mixed use vehicles on forest roads. The downside of this workflow is that once the data is on Google Earth, it is no longer updated, and it will need to be edited externally and reuploaded to Google Earth to remain accurate.

Key Business Systems

The Administration Department uses the following business systems/software:

- ◆ Microsoft Word – Agendas, Note Taking, and Organizing
- ◆ Granicus – Digital Civic Engagement, Agendas

GIS Needs

Data and Databases

The Administration Department has the following data and database needs:

◆ Airport runways
◆ County buildings and grounds
◆ County parcels – including Owner Information
◆ Documents - title, bids for Capital Improvement Projects (CIP) – attached to GIS layer. All documents are currently paper-based. There is no records manager and each department is responsible for its records and documents management.
◆ Easements
◆ Incidents by claim location
◆ Lease locations
◆ Locations of County-owned devices
◆ Right-of-way polygons
◆ Stormwater assets (on County roads)
◆ Street centerlines

GIS Procedures, Workflow, and Integration

The Administration Department has the following GIS procedures, workflow, and integration needs:

◆ Attach title documents to parcels.
◆ Attach CIP documents to parcels.
◆ GIS integration with Granicus for public engagement.
◆ Enable the Department for field data collection.

Software Solutions

The Administration Department has the following software needs:

◆ Departmental GIS Viewer containing GIS data tailored to the Administration Department.

Agricultural Commissioner's Office
Department Overview

The Agricultural Commissioner's Office promotes Lassen County agricultural production by protecting it from injurious pests and diseases, to ensure the safety and wholesomeness of food and other products for the consumer, and to build consumer and business confidence in the marketplace through the maintenance of equity. This office certifies and tests all scales and measuring devices for the benefit of consumers. The Agricultural Commissioner's Office oversees insect monitoring and trapping, noxious weed abatement, pesticide control and inspection to meet safety standards, permitting for restricted pesticide usage, spraying invasive weeds along highways, the industrial hemp program, and facilitates the nursery program, including inspecting plants and materials from out of state. This office has three full-time staff members and four seasonal employees to assist with weed abatement.

Current Use of GIS

The Agricultural Commissioner's Office staff occasionally uses ParcelQuest to look up parcel numbers and owner names for properties of interest. This team has also attempted to use ArcGIS software in the past to create data but have not been able to, due to insufficient licensing.

The Agricultural Commissioner's Office staff has used ArcGIS on iPads through the CalTrap program to enable insect trappers to track their work. The CalTrap Trapper App is a map-based Pest Detection data management application that the County references to ensure that California trapping requirements and USDA reporting requirements are being met. However, broadband dead zones have made this application difficult to use while in the field. This group currently relies heavily on paper maps. These include official Bureau of Land Management (BLM) maps of weed abatement properties, and weed sheets, which are printed or hand-drawn paper maps of areas that have been sprayed for weeds.

Key Business Systems

The Agricultural Commissioner's Office uses the following business systems/software:

- Excel – Inspections
- Excel - Weights and measures devices
- CalAgPermits - Permitting Program (Includes embedded map)
- CalPEATS - Pesticide Inspections
- CalTrap – Pest Detection

GIS Needs

Data and Databases

The Agricultural Commissioner's Office has the following data and database needs:

◆ Field locations
◆ Maps of what/where people are growing to sell at farmers markets
◆ Organic Program Farm properties
◆ Industrial Hemp Farm properties
◆ Nursery Program properties
◆ Weed Abatement properties with spraying details
◆ Weights and Measures Device Locations
◆ CalAgPermits/CalPEATS Permit Locations
◆ CalTrap Locations
◆ Vegetation Treatment Data

GIS Procedures, Workflow, and Integration

The Agricultural Commissioner's Office has the following GIS procedures, workflow, and integration needs:

◆ Integration with CalAgPermits to visualize permits.
◆ Integration with CalPEATS to visualize inspection locations.
◆ Integration with CalTrap to visualize trapping locations.
◆ Enable field staff to collect/verify data with ArcGIS Field Maps.

Software Solutions

The Agricultural Commissioner's Office has the following software needs:

◆ Invasive Species Abatement Dashboard
◆ Weed Abatement Treatment Tracking
◆ USDA National Agricultural Statistics Service (NASS) Crop Map
◆ Agriculture Program Story Map, Web App, Dashboard- with CalAg, CalPEATS, CalTrap layers
◆ Water Resources Stream Gauge and Irrigation Diversion web app to monitor real-time data
◆ and underground such as fences and irrigation infrastructure in online Viewer
◆ ArcGIS Field Maps to do condition assessments and inspections
◆ Invasive Species Management database, web app, dashboard
◆ Vegetation Stewardship Story Map
◆ Crop Report Story Map

Assessor's Office
Department Overview

The Assessor's Office is responsible for assessing all taxable properties in the county and maintaining the repository for parcel maps, which includes roughly 25,000 parcels. The Office is responsible for lot line splits and mergers, which includes creating new parcel numbers, changing lot lines, and updating the parcel maps. The Assessor's office is regulated by the State of California Board of Equalization, and the Office must deliver the Assessment Roll to the state annually.

The Assessor's staff must maintain a current mapping and ownership database for the benefit of the general public, business community and government. Staff also administer exemptions that have been established by law to benefit homeowners, senior citizens, charitable organizations, churches, and disabled citizens, as well as implementing all the mandates of Proposition 13.

Current Use of GIS

The Assessor's Office directly maintained the County's parcel data until 2016, when the department lost its cadastral drafter. Since this time, the Assessor's Office has worked with ParcelQuest to maintain the County's parcel data within the ParcelQuest environment. ParcelQuest meets many of the County's needs; however, because ParcelQuest uses Google imagery, there have been challenges with parcel boundaries not aligning with aerial imagery.

The parcel update process is as follows: First, departmental staff compile redline information and scan the existing paper maps. These scanned documents are stored in a file folder, zipped, and sent to ParcelQuest for review. Using their own APN maps, ParcelQuest then updates their digital system and creates APN Maps in a PDF format. These PDF maps are then returned to the County's Assessor's Office and are dispersed internally.

The Assessor's Office team desires to internalize parcel maintenance once again. The Department has identified all updates that have been made in the last 7 years since ParcelQuest began maintaining the County's parcel, and these adjustments have been made to the County's internal copy of the parcel data. There have been approximately 15 lot line adjustments each year and approximately four parcel maps each year.

The Assessor's Office uses aerial imagery directly to visualize areas of interest prior to going into the field. ParcelQuest is available on mobile devices, and the departmental staff

occasionally use this mobile functionality for data visualization. Appraisal staff print out parcel maps prior to going into the field and make physical notes for where structures are discovered or lost. Departmental staff would like this process to be transitioned to an online solution.

Key Business Systems

The Assessor's Office uses the following business systems/software:

- ◆ ParcelQuest – Parcel Maintenance and Visualization
- ◆ MegaByte – Property Tax System
- ◆ Microsoft Excel – Track issued permits

GIS Needs

Data and Databases

The Assessor's Office has the following data and database needs:

- ◆ Spatially accurate parcel lot lines and aerial photos
- ◆ Permit Locations – to add value to parcels and property statements associated with parcels (personal business, aircraft, etc.)
- ◆ Locally-flown aerials – Coordinate with surrounding municipalities

GIS Procedures, Workflow, and Integration

The Assessor's Office has the following GIS procedures, workflow, and integration needs:

- ◆ Integrate MegaByte with GIS - Link parcels to property tax documents
- ◆ Parcel Mapping Workflow/Business Process Analysis

Software Solutions

The Assessor's Office has the following software needs:

- ◆ Assessor Parcel web app – internal and public
- ◆ Mobile app for Appraisers

Auditor and Treasurer/Tax Collector

Department Overview

The County Auditor is an independent, elected office for providing various accounting and property tax administration services to Lassen County and other governmental agencies within the County. The position is the County's ex-officio Controller pursuant to state law and is often referred to as the Auditor-Controller. The Auditor-Controller is the chief accounting officer of the County responsible for budget control, disbursements and receipts, and financial reporting. In addition, this office is responsible for audits of certain agencies within the county. The accounting/auditing authority and responsibilities of the Auditor-Controller are generally defined in the California Government Code.

The Lassen County Treasurer/Tax Collector manages the investments of the County to ensure maximum interest income and adequate cash flow. The office also collects property tax revenue for County government, school districts, and various special districts. As is outlined on the County's website, the Treasurer/Tax Collector is responsible for the collection and accountability of all secured, unsecured and supplemental property tax, and transient occupancy taxes; responsible for maintaining and reconciling all counts of collections, payment plans on prior delinquent taxes, redemption of tax delinquent property, and public action sales of tax-defaulted property; responsible for the processing of mobile home tax clearances, certificates of liens, summary judgment, subdivision/parcel maps, publications and bankruptcies; responsible for the receipt, recordation, and accounting of all monies paid to the County as well as payment and reconciliation of all checks issues; and maintains a portfolio of investments consisting of idle County funds in accordance with the law in order to safeguard the funds and maximize the rate of return apportioned to the County general fund and other agencies that use the County Treasurer as a depository.

Current Use of GIS

The department is a heavy user of ParcelQuest for viewing aerial photography, looking up properties for tax sale, and for researching structures on properties. ParcelQuest enables the department to verify a property's assessed value. The department's primary uses for GIS at this time are searching for tax sale information related to a parcel and identifying illegal marijuana grows via aerial imagery.

Key Business Systems

The department uses the following business systems/software:

◆ MegaByte **-** Assessor/Auditor Tax System
◆ [ParcelQuest](#)

GIS Needs

Data and Databases

The Auditor and Treasurer/Tax Collector Department has the following data and database needs:

◆ Marijuana Grows – with reports/photos attached
◆ Special Districts
◆ Tax Rate Areas
◆ Updated aerial imagery

GIS Procedures, Workflow, and Integration

The Auditor and Treasurer/Tax Collector Department has the following GIS procedures, workflow, and integration needs:

◆ Integrate MegaByte with GIS to link tax documents to parcels.

Software Solutions

The Auditor and Treasurer/Tax Collector Department has the following software needs:

◆ Road Map Application with updated aerial imagery, parcels, and a directions function.

Child Support Services
Department Overview

The County's Child Support Services team offers a professional, approachable, non-judgmental "middle ground" for parents/customers to get informed and ultimately transform a challenging situation into a path forward. This team is committed to helping parents navigate services available, ensuring children are provided for and promoting peace of mind through information and action. This department receives state and federal funding,

and both state and federal bodies oversee the operations of Child Support Services. This department reduces disparities between parents and facilitates the passing of funds from one party to another.

Current Use of GIS

The Child Support Services team is currently not a heavy user of GIS technology. However, this group does maintain data in a paper format that they would like to see visualized in a map.

Key Business Systems

Child Support Services uses the following business systems/software:

- Child Support Enforcement (CSE) - Reporting on individuals
- TurboCourt - Web App to Open Cases
- Microsoft Teams - Virtual Interview Platform
- Docusign – Electronic signatures
- California State Disbursement Unit (SDU) - Virtual Payment Platform

GIS Needs

Data and Databases

Child Support Services has the following data and database needs:

- Geo-enable demographic data
  - Households with minor children
  - Income
  - Single-parent households
  - Average rent
- Demographic heat maps
- Parcels with address and owner information
- Target area buffers
- Case locations
- Cases by zip code

GIS Procedures, Workflow, and Integration

Child Support Services has the following GIS procedures, workflow, and integration needs:

◆ Scan service documents and link to parcels.

Software Solutions

Child Support Services has the following software needs:

◆ Community Engagement Story Map
◆ Survey123 Application to conduct remote surveys
◆ Performance Management ArcGIS Solution – Gauge performance of services
◆ Dashboard visualizing cases per case worker
◆ Departmental Viewer containing case locations, demographic data, and other departmental layers.

Clerk's Office
Department Overview

The Clerk's Office provides certified copies of birth, death, and marriage certificates. This office also offers marriage licenses, business name statements, and notary public information. The Clerk's Office is also responsible for assisting with redistricting based on population. There are currently six full-time positions within the Clerk's Office.

Current Use of GIS

The Clerk's Office has a staff member with experience using GIS software. This employee conducts most of the GIS work within this Department and is excited to be involved in additional GIS projects in the future. GIS work completed includes using ArcMap to create and maintain boundary data and using ArcGIS Online to create a redistricting map in 2020. This was a joint project conducted by the Clerk's Office and the County's IT team.

Key Business Systems

The Clerk's Office uses the following business systems/software:

◆ DFM EIMS - Elections Management Software
◆ EagleWeb Document Management - Online Backend to Recording System
◆ Eagle Recorder - Recording Module for the Clerk's Side

GIS Needs

Data and Databases

The Clerk's Office has the following data and database needs:

- Special Districts
- Supervisorial Districts
- School Districts
- Fire Districts
- Polling Locations
- Parcels
- Roads
- Township/Range Grid
- Census Data in GIS Format

GIS Procedures, Workflow, and Integration

The Clerk's Office has the following GIS procedures, workflow, and integration needs:

- EagleWeb and Eagle Recorder Integration with GIS – Link records to GIS Locations by owner name
- Link scanned map book pages to GIS data.
- Provide access to authoritative parcel data to streamline boundary layer maintenance.
- County to offer training on GIS data editing and map making to build user confidence.

Software Solutions

The Clerk's Office has the following software needs:

- Internal departmental GIS Viewer including department-specific data layers
- Public-facing GIS Viewer including County district layers – to answer questions from the public
- Elections Story Map including polling locations

Health and Social Services

Department Overview

The Lassen County Health and Social Services (HSS) Agency promotes physical and emotional health to the people of Lassen County through quality, accessible services and resources. Departments within HSS include Administration, Behavioral Health, Community Social

Services, Grants and Loans, Public Guardian, and Public Health. HSS departments offer numerous programs and services to meet the health and social services needs of the communities we serve. HSS currently has 165 staff members.

Community Social Services staff members were interviewed alongside HSS staff members. This department is located within the Lassen County Health and Social Services (HSS) Agency and has 70 full-time staff members. Community Social Services provides evacuation shelter response with assistance from partner organizations, provides temporary financial assistance and support programs for low-income families with children, offers employment services under a social care program to work to help recipients become self-sufficient, and aids with housing, food, utilities, clothing, and medical care to eligible families.

Current Use of GIS

The Health and Social Services Agency Director has worked with the state of California in the past to map locations of food deserts, infant formula availability, and other considerations for the Women, Infants, and Children (WIC) program. The Director is now assisting with locating disease outbreaks and hot spots and overlaying this information with access to healthcare for disease prevention.

The Agency overall is not a heavy user of GIS technology currently; however, there is much interest in expanding its use in the future. The Agency will be undergoing a community health assessment soon, which will provide an opportunity for GIS analysis.

Key Business Systems

The Health and Social Services Agency uses the following business systems/software:

- ZoneHaven - Emergency response
- Microsoft Excel – Data management
- HMIS coordinated entry system - Homeless populations tracking

GIS Needs

Data and Databases

The Health and Social Services Agency has the following data and database needs:

- Rural homeless encampment locations
- ZIP code polygons

- Bed-bound patient locations – For evacuation
- Patients on oxygen locations – In Excel currently
- Adults with disabilities locations – Local adult protective services team maintains data in Excel
- Emergency Shelter locations
- Decontamination Hazmat Team locations
- Fire Houses
- Wellness Centers in Rural Areas – Used for sheltering
- Utility Infrastructure

GIS Procedures, Workflow, and Integration

The Health and Social Services Agency has the following GIS procedures, workflow, and integration needs:

- GIS integration with HMIS for internal use of data.

Software Solutions

The Health and Social Services Agency has the following software needs:

- Emergency Preparedness Story Map - highlight areas of concern and resources
- Internal GIS Viewers containing departmental data:
    - Emergency Services web app
    - Social Services web app
- Cluster Mapping Application - For trend analysis
- Dashboard highlighting Agency statistics
- Emergency Shelter Routing Application

Information Services
Department Overview

The Information Systems Division (ISD) is Lassen County's Internal Services Division within the Department of Administration. ISD provides infrastructure and software for County staff and has made 300 physical workstations, 100 mobile devices, 35 wireless access points, and roughly 150 cell phones available to County staff. ISD also supports County staff on technical issues, ensures connectivity for all County-owned hardware, provides system integration, and manages vendor interaction on behalf of the County. ISD supports 18 departments and 20 divisions in the County. Technical capabilities have increased significantly in recent years, and this innovation is expected to continue into the future.

Current Use of GIS

The Information Systems Division is the administrator of GIS software, licensing, and associated hardware in the County. This oversight includes servers, Esri licensing, and ArcGIS Online accounts.

Lassen County has an on-premises ArcGIS License Server Administrator that will likely be moved to a cloud-based environment soon. The current Esri licensing is outlined below:

- 7 ArcGIS Pro Desktop Basic 10.1-10.4 concurrent licenses
- 2 ArcGIS Pro Desktop Standard 10.1-10.4 concurrent licenses

County users can check out these licenses for remote access. Esri has recommended that the County moves to an Enterprise Agreement (Cloud only for small government - population is under 20K), and the County is considering this transition.

The Information Systems Division also oversees the County's ArcGIS Online accounts. The existing accounts are outlined below:

- Nancy McAllister
- Chris Martin
- Matt May
- Sarah Howe
- Micheal Prettyman

This group also oversees the County's SQL Server (2014) and production environment, including database and server image backups. Seven weeks of backups are consistently maintained. Images are backed up weekly, and database backups are taken twice a day.

Key Business Systems

The Information Systems Division uses the following business systems/software:

- Zoho Desk – Ticketing system
- Oversees all departmental software.

GIS Needs

GIS Procedures, Workflow, and Integration

The Information Systems Division has the following GIS procedures, workflow, and integration needs:

- ◆ Update policy on data security.
- ◆ Formalize data ownership.
- ◆ Fill GIS Coordinator/Manager position.
- ◆ Oversee GIS integrations with departmental systems.

Office of Emergency Services
Department Overview

As outlined on the County's website, the Office of Emergency Services provides informational, logistical, and management functions services in any emergency situations associated with natural disasters, technological (man-made) emergencies, and war emergency operations in the Lassen Operational Area. The Office is responsible for the policies, responsibilities and procedures required to protect the health and safety of the populace, public and private property, and the environment from the effects of natural and human caused technological emergencies and disasters. The Office is also the Administrative Agency for the Lassen Operational Area, and as such receives and reviews all hazardous materials business plans from the community and complies with the statutory requirements and community right-to-know laws.

The Emergency Services Chief is an employee of CalFire, who is contracted by Lassen County. Prior to formalizing this position, Emergency Services was within the Sheriff's Department.

Current Use of GIS

The Emergency Services Chief has experience with GIS and has access to ArcGIS Pro licensing through CalFire. Through CalFire, the Chief also has access to multiple data layers including topological maps and parcel data; however, he has not had much time to experiment with the existing GIS data. The Emergency Services Chief also has access to Zonehaven software and can adjust the evacuation routes, zones, and shelter locations maintained in this software.

Key Business Systems

The Office of Emergency Services uses the following business systems/software:

◆ [Zonehaven](#) - Maintain evacuation and shelter data – Federal alert and warning system

GIS Needs

Data and Databases

The Office of Emergency Services has the following data and database needs:

◆ Flood inundation data
◆ Direct access to Evacuation Routes, Evacuation Zones, and Shelter Locations – most of this data is available in Zonehaven
◆ Updated County parcel data
◆ Updated road centerline data
◆ Sewer, gas, water, and electric Assets – Joint initiative between County, Cities, and power companies

GIS Procedures, Workflow, and Integration

The Office of Emergency Services has the following GIS procedures, workflow, and integration needs:

◆ Zonehaven integration with GIS to get direct access to all data in Zonehaven.

Software Solutions

The Office of Emergency Services has the following software needs:

◆ Flood Inundation Online Maps
◆ Pre-Plan Projects Application
◆ Central Operational Dashboard for Emergency Situations

Planning and Building Services
Department Overview

The Planning and Building Services Department is a multi-disciplinary department providing a range of planning and development services to citizens, appointed boards, and commissions. This Department ensures that all development is consistent with State Law,

Building Codes, the General Plan, Zoning Ordinance, and Development Code. The Planning and Building Services team works to protect life and property, while improving quality of life and the environment. The Department is comprised of the following Divisions and functions:

- Planning Division
- Building Division
- Surveyor Division
- Code Enforcement Division
- Surface Mining and Reclamation Williamson Act (Land Conservation Act)
- Natural Resources
- Environmental Health

Current Use of GIS

The Planning and Building Services Department staff regularly use GIS software and data in their day-to-day duties. This team uses zoning data, ParcelQuest parcels, FEMA flood zones, fire hazard severity zones, groundwater basins, town boundaries, general plan land use data, georeferenced plans, and area plans for information retrieval, decision-making, and reporting needs. This data is visualized in ArcMap and ArcGIS Online. Most of these layers are maintained by other organizations.

The Planning Department is one of the predominant users of GIS software in the County today. The Department regularly uses ArcMap to make maps and graphics for Planning Commission projects and Board of Supervisor meetings. The Department also works closely with the County Assessor to maintain the County parcel GIS data.

The Planning and Building Services Department has two online mapping applications in place today: the Lassen County Zoning Map and the Snow Load Map. These applications were created for the County by a contractor in 2012, and departmental staff are interested in updating these applications.

Key Business Systems

The Planning and Building Services Department uses the following business systems/software:

- SmartGov - Permit tracking system
- ParcelQuest – Public notification disbursement
- Excel - Building permit archives (1970-1990)

◆ Excel - Operators inspections fees, acreage, mine status (open/closed/idle), and reclamation bond/deposits
◆ Eagle Web - Document management
◆ Intrado – Addressing

GIS Needs

Data and Databases

The Planning and Building Services Department has the following data and database needs:

◆ Agricultural preserves (Williamson Act) - Web Soil Survey - with contract number
◆ Building permit linked to parcels - archive in Excel
◆ Mining Operators linked to parcels – currently in Excel
◆ Use Permits - geo-enable from Smart Gov
◆ Big Valley Basin data
◆ Natural diversity database
◆ Soil type data
◆ Permitted boundaries
◆ Zoning Ordinances – including ability to locate the ordinance document from map
◆ Update Zoning layer – last updated in 2012
◆ Updated address points
◆ Updated street centerlines

GIS Procedures, Workflow, and Integration

The Planning and Building Services Department has the following GIS procedures, workflow, and integration needs:

◆ SmartGov integration – linking parcels to permits via APN
◆ MegaByte integration – linking parcels to Assessor information
◆ Eagle Web integration – linking parcels to recorded deeds, legal parcel status, and zoning ordinances

Software Solutions

The Planning and Building Services Department has the following software needs:

◆ Update Snow Load Application
◆ Parcel Viewer with zoning, permit history, entitlement, code cases, etc. - Ongoing project
◆ Planning and Building Dashboard
◆ Field Maps and Survey123 for field work

Environmental Health Division Overview

The mission of the Environmental Health Division is to protect and promote public health and environmental quality through the application of scientific principles, education, and the enforcement of applicable laws and regulations. Environmental Health carries out necessary programs designed to control or prevent disease, improve the overall environment, and enhance the general welfare and health of the community. This group oversees permitting, inspection, and enforcement to ensure compliance with state and regional standards. This group is a Certified Unified Program Agency (CUPA), which is a local agency certified by CalEPA to implement and enforce state hazardous waste and hazardous materials regulatory management programs.

The following programs are overseen by the Environmental Health Division:

- Body Art
- Food Safety
- Hazardous Material Management
- Liquid Waste Management
- Medical Waste
- Recreational Waters - Pools
- Septic Systems/On Site Sewage Disposal
- Solid Waste
- Underground Storage Tanks
- Water Supply Protection
- Water Wells
- Water Systems

Environmental Health was recently moved to be part of Planning and Building Services. Previously, this Division was within the Health and Social Services Department. There are currently three full-time staff members within the Environmental Health team.

Current Use of GIS

The Environmental Health Division uses ParcelQuest daily to lookup parcels and associated information. ParcelQuest works well overall for this team; however, they are required to contact Planning if additional information is needed for a specific parcel, such as if a parcel falls within a flood zone.

The Environmental Health Division is required to maintain records in the state reporting system. This enables staff members to look up historical information on the California Water

Board's GeoTracker website. All records for historical sites are maintained here including water wells, underground tank sites, and cleanup sites. The California Department of Water Resources maintains the <u>Well Completion Report Map Application</u>. The Environmental Health team is a regular user of this application to track well compliance/locations within the County.

The Department regularly uses Google Earth to visualize properties associated with permits. SPOT Devices have also been made available to Departmental staff members. These devices are used to ensure staff safety in the field, by enabling staff members to send their GPS location to leadership and emergency services if an emergency arises.

Key Business Systems

The Environmental Health Division uses the following business systems/software:

- <u>ParcelQuest</u> - Parcel lookup
- <u>GeoTracker</u> - Historical site details
- Excel - Permit and inspection management
- <u>SmartGov</u> - Building permit and inspection management

GIS Needs

Data and Databases

The Environmental Health Division has the following data and database needs:

- California Environmental Reporting System site addresses
- Hazardous Materials/Liquid Waste locations
- Groundwater recharge areas
- Well locations
- Water assets
- Permit locations
- Inspections
- Updated parcels with owner information
- Flood zones

GIS Procedures, Workflow, and Integration

The Environmental Health Division has the following GIS procedures, workflow, and integration needs:

- Link permits to parcels
- Link inspection documents to parcels
- Integrate SPOT devices with GIS software to highlight staff locations on an online map
- Building permit and inspection integration between SmartGov and GIS

Software Solutions

The Environmental Health Division has the following software needs:

- Implement Field Maps and Survey123 for field inspections.
- Implement ArcGIS Workforce for delegating field work.
- Story Map for the public on what the Division does.
- Internal Departmental GIS Viewer containing Department-specific GIS layers.

Public Works
Department Overview

Lassen County's Public Works Department is responsible for administration, operation and maintenance of County-owned assets and facilities. The Department is divided into the following functional groups:

- Roads
- Airports
- Animal Control
- Buildings and Grounds
- Cemeteries/Parks
- Transportation

Today, the Public Works Department has 75 staff members, spread throughout these functional groups.

Current Use of GIS

The Lassen County Public Works Department is currently a regular user of GIS. Several Public Works staff members use ParcelQuest to research parcel boundaries, APNs, and owner names. The Department uses the County's online zoning application that was created in 2012 by a contractor to verify zoning designations, search APNs, and view aerial imagery. Google Earth is also used to reference aerial imagery for areas of interest, and AutoCAD is relied on heavily for 3D drafting.

The Public Works Department references parcel data often to identify right of ways and to determine how properties are laid out. The animal control team references zoning data for permitting for kennel licenses. The Public Works Engineer takes elevation surveys using a Trimble GPS unit and develops contours/topological data as it is needed for road design projects.

Public Works staff who go into the field always have geo-enabled cellular devices. The County's trails specialist uses a Bad Elf GPS unit that synchronizes with a cellphone via Bluetooth on an as-needed basis. This GPS unit has been used to collect trail and road signage data for projects associated with the Bureau of Land Management (BLM) and the United States Forest Service (USFS).

Key Business Systems

The Public Works Department uses the following business systems/software:

- StreetSaver - Pavement management system
- CemSites - Record keeping for cemeteries
- CAMS - Accounting system and project/building management
- AutoCAD 2018/2021 (Civil3D, Revit, etc.) - road and design
- Google Earth – Imagery visualization

GIS Needs

Data and Databases

The Public Works Department has the following data and database needs:

- Utility assets
- Roads closed for winter
- Bus routes
- Road layer integrated with pavement condition - using Street Saver
- Updated street centerlines – Include Road types and snowplow status
- Pavement conditions
- Trail centerlines – Needs to be converted from current format
- Road signage – Needs to be converted from current format

GIS Procedures, Workflow, and Integration

The Public Works Department has the following GIS procedures, workflow, and integration needs:

- ◆ CAMS CIP integration with GIS
- ◆ StreetSaver integration with GIS
- ◆
- ◆ Formalize data maintenance procedures for departmental GIS data

Software Solutions

The Public Works Department has the following software needs:

- ◆ Street Status Application – Note roads that are open/closed throughout winter
- ◆ Bus System Application – Including real-time tracking to locate closest bus
- ◆ Susanville Ranch Park Map – Recreate existing static map
- ◆ CAMS Financial Overview Dashboard
- ◆ CAMS Work Order Dashboard
- ◆ CAMS CIP Story Map
- ◆ Update Snow Plowing Map

Sheriff's Office
Department Overview

The Lassen County Sheriff's Office is responsible for a wide range of public safety services; including the prevention, detection, and investigation of crimes in the unincorporated areas of the County, operating a 24-hour Adult Detention Facility, managing a 911 dispatch center, providing search and rescue services, providing boating safety services on navigable waters, providing court security services, serving all State mandated writs, warrants, and other notices issued by the Court, and serving as the Coroner of Lassen County.

The Lassen County Sheriff's Office provides general law enforcement services throughout 4,800 square miles within the County limits. Lassen County has a 911 dispatch center that works closely with the dispatch center within Susanville. The Sheriff's Office transfers fire and medical calls to Susanville.

The Sheriff's Office has 100 employees, including 35 patrol personnel and 35 correction officers. At this time, there are 8 911 dispatcher positions within the Sheriff's Department. Each patrol officer has an assigned vehicle, including a mixture of SUVs and 4-wheel drive

trucks. The Sheriff's Department also has a Polaris razor, a Honda pioneer, snowmobiles, snow cats, an off-road jeep, 4 boats, and a number of other off-road vehicles.

Current Use of GIS

Deputies often rely on Google Maps on County-issued cellphones. Some vehicles have GPS units which are used instead of cellphones. Every deputy is issued a paper map book that can be used if it is needed. Direct GIS work has been limited within the Sheriff's Office in recent years; however, the office plans on adding a Crime Analyst position soon. This addition would enable the Sheriff's Office to look further into the analytical benefits of GIS software.

RIMS maps (with Esri basemaps) have been made available through Sunridge Systems RIMS. Citizen RIMS is the associated public access application that enables the public to upload incidents, crimes, and arrests. The Sheriff's Office uses this information regularly to visualize hot spots and to determine crime statistics. Dispatch is handled through the provision of GPS coordinates and addresses (if available). The County is partnering with the University of California Chico to further build onto the capabilities of the RIMS maps.

Key Business Systems

The Sheriff's Office uses the following business systems/software:

- VESTA - E911 calls
- Sunridge Systems RIMS - CAD and RMS
    - Citizen RIMS - public access to upload incidents/crimes/arrests
- Visual Labs - body cam on phone
- App Tech - Radio
- Genasys - Emergency Alerting
- Vantage Points - Incident Location Mapping
- Intrado - ANI/ALI Maintenance

GIS Needs

Data and Databases

The Sheriff's Office has the following data and database needs:

- NG911-compliant Address Point data – Existing address data is outdated

◆ RIPA Stop data
◆ NIBRS Crime data
◆ Resident Beats, Zones, and HQ Location – Have been mapped but use could increase

GIS Procedures, Workflow, and Integration

The Sheriff's Office has the following GIS procedures, workflow, and integration needs:

◆ Link map book pages to parcels
◆ GIS integration with Sunridge Systems RIMS
◆ GIS integration with Visual Labs to link videos to incidents

Software Solutions

The Sheriff's Office has the following software needs:

◆ Public Safety ArcGIS Hub

    ◆ Police Reporting Dashboard
    ◆ Racial & Identity Profiling Act (RIPA) Reporting Dashboard
    ◆ Policy Transparency Story Map
    ◆ Departmental GIS Viewer Including Beats, Zones, Incidents, and Other Departmental GIS Layers

University of California Cooperative Extension
Department Overview

The University of California Cooperative Extension (UCCE) Office in Lassen County is located in uptown Susanville. The UCCE County Director and Farm Advisor's specialty is Natural Resources and Livestock, and he is a certified Rangeland Manager. The Farm Advisor consults directly with farmers and ranchers and carries out research on local issues. This position is funded by the Bureau of Land Management (BLM). The UCCE County Director and Farm Advisor's jurisdiction includes 1.5 million acres within the Buffalo Hills and Skedaddle Mountains. The UCCE office also assists farmers and ranchers to improve efficiency with irrigation, pest control, and invasive plant control. Stream maintenance and restoration is also one of the UCCE office's responsibilities.

The UCCE Office also includes the Sage Grouse Working Group policy coordinator. The Sage Grouse Working Group promotes grazing management practices, assists with managing

landscape, and preserves and protects threatened species (sage grouse) in the area. This working group is hosted by the UC Cooperative extension.

The UCCE office consists of 5 staff members. The UCCE office does not often work with County Departments; however, occasionally, requests will come from the County's Planning and Building Services Department. The UCCE team is looking to partner more closely with County staff in the future.

Current Use of GIS

This group regularly uses ArcCatalog and ArcMap, which are licensed through the University of California and renewed annually. The major use of ArcMap is to make maps for field use to enable this team to investigate areas of interest. BLM provides many datasets that are regularly used by the UCCE within ArcMap. The UCCE team has shown interest in transitioning from ArcMap to ArcGIS Pro. ArcGIS Pro training would likely be warranted to ensure a smooth transition.

The UCCE field crew regularly goes into the field and collects boundary points using Avenza software. These points are then used to digitize fence boundaries back in the office. This team also actively maintains a photo point layer that enables the capture of photos of features in the field. Project site location data is also often collected and maintained internally.

This team is actively conducting Juniper removal in areas with sage brush system encroachment. This removal work is planned through reviewing National Agricultural Imagery Program (NAIP) imagery to research how Juniper has been encroaching and target Juniper for removal.

The UCCE team has access to many GIS data layers from disparate sources. They regularly use Lassen County's parcel layer. The UCCE does not use ParcelQuest, but this group is a regular user of onX GPS Map Apps to view parcel boundaries. They also have many USGS (United States Geological Survey) and BLM layers stored locally, to ensure speed of internal data use. Other USGS layers are accessed through ArcGIS Online. Additionally, this team regularly accesses other BLM data layers via the BLM network. This group is also a regular user of NAIP imagery from the Natural Resources Conservation Service (NRCS) and BLM and Esri basemaps.

Key Business Systems

The UCCE uses the following business systems/software:

◆ onX **–** Parcel Visualization
◆ Google Earth **-** KMZ Use for Virtual Fencing Project
◆ Avenza **-** Field PDF Use **-** Create Points and Photos
◆ SPOT Device **-** GPS Locator **–** Subscription Paused

GIS Needs

Data and Databases

The UCCE has the following data and database needs:

◆ Geo-enable Vegetation Access Databases
◆ Integrate photo points with GIS
◆ Project locations
◆ Archaeological sites
◆ Existing infrastructure
◆ Springs
◆ Plant/animal locations
◆ Fence lines
◆ Document pre/post conditions
◆ Parcels for Modoc and Plumas Counties
◆ Updated Lassen County parcels

GIS Procedures, Workflow, and Integration

The UCCE has the following GIS procedures, workflow, and integration needs:

◆ ArcGIS Pro training **-** transition from ArcMap
◆ Photo Point process upgrade to integrate with GIS
◆ Integrate Avenza with GIS

Software Solutions

The UCCE has the following software needs:

◆ Educational Story Maps for landowners **-** affiliated with Intermountain West Joint Venture

Conceptual System Design Report

Lassen County | CA

GIS Strategic Plan

INITIAL DELIVERY December 2023

REVISIONS February 23, 2024

GEOGRAPHIC
TECHNOLOGIES GROUP®
Beyond Location Intelligence

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Conceptual System Design

Introduction

The Conceptual System Design is based on Lassen County's Geographic Information System (GIS) needs, priorities, and constraints gathered during the GIS Needs Assessment phase of the GIS Strategic Plan project. This alternative system-level design addresses the County's geospatial requirements in terms of performance, effectiveness, sustainability, and economics.

The design covers the Six Pillars of GIS Sustainability:

1. GIS Governance Recommendations
2. GIS Data and Database Recommendations
3. GIS Workflow, Procedures, Integration, and Interoperability Recommendations
4. GIS Software Recommendations
5. IT Infrastructure Recommendations
6. GIS Training, Education, and Knowledge Transfer Recommendations
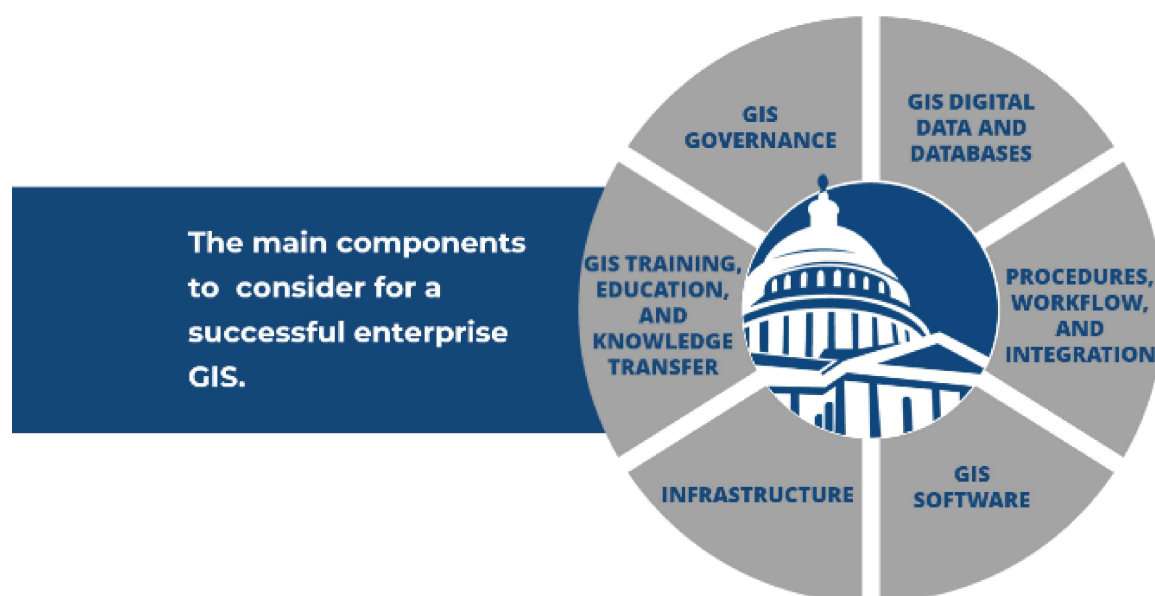
GIS Vision, Goals, and Objectives

Introduction

It is important to articulate the overall vision of GIS for Lassen County to help define the purpose of the GIS program and give it its identity. In essence, a vision statement describes the program's future state and should include major high-level goals and aspirations. The vision and goals will give the GIS team and stakeholders a common purpose and direction.

The larger vision of the organization must be broken down into concrete goals and measurable objectives for GIS technology. The vision, goals, and objectives developed for GIS in this plan should be formalized and published. In addition, these goals should be reviewed each year to ensure alignment with Lassen County's strategic goals.

Proposed GIS Vision

The vision for Lassen County GIS is to implement and manage an industry-standard, enterprise, scalable, sustainable, and innovative Geographic Information System (GIS) solution that promotes effective and innovative use of geospatial technology and location intelligence to improve the efficiency of County operations.

GIS Goals and Objectives

Below are six overarching GIS goals that the County should strive to accomplish. An annual work plan should document specific steps to achieve these goals. This GIS Strategic Plan will help prioritize and augment these broader objectives for the future.

Goal 1: Maintain an Effective GIS Governance Model.

Objectives

1. Institute the GIS Strategic Plan for effective management of GIS and update it annually.
2. Evaluate Key Performance Indicators (KPIs) annually.
3. Adopt a Hybrid Governance Model by empowering departments to train staff in GIS and increase data stewardship.
4. Add GIS-specific job classifications to attract and compensate qualified professionals.
5. Strengthen regionalization with continued participation in regional geospatial groups.

6. Build relationships and communicate with executive decision-makers, GIS experts, and users for a smooth implementation process and effective use of the GIS.

7. Research new and emerging GIS technologies and deploy state-of-the-art GIS technology.

Goal 2: Build and Maintain Accurate and Reliable GIS Data.

Objectives

1. Conduct a comprehensive data assessment to evaluate the accuracy, completeness, and overall health of the existing GIS data layers.

2. Aggregate the GIS data collection in a central data repository for easy maintenance and access.

3. Develop a Master Data List (MDL) to inventory data sets in the central data repository.

4. Enter Metadata for all GIS data layers detailing how, when, and where data was created and other properties.

5. Provide users with accurate, up-to-date, critical data layers, including Parcel, Address Point, Street Centerline, and Aerial Photography.

6. Create new digital GIS data layers as identified in the Needs Assessment and assign custodianship and data stewards for each dataset.

7. Build an enterprise database designed using standard models.

Goal 3: Develop and Enhance GIS Procedures, Workflow, Integration, and Interoperability.

Objectives

1. Integrate GIS functionality with existing and future enterprise software business systems and workflows to incorporate GIS maps and data and to geo-enable and display business systems' data.

2. Use state-of-the-art technologies to ensure seamless technology integration.

3. Establish effective enterprise-wide access to geospatial data.

4. Develop, document, and apply GIS policies, mandates, standards, and procedures for the enterprise GIS program.

5. Employ data management best practices to reduce data duplication and redundancy.

Goal 4: Promote Effective, Efficient, and Innovative Use of GIS Software.

Objectives

1. Optimize licensing to fully leverage the Esri platform and explore advanced tools for geospatial analysis and visualization.

2. Make GIS data and applications accessible to County staff, external partners, and the public for visualization, editing, and analysis.
3. Guide the implementation of targeted web-based applications that facilitate GIS access by employees, residents, external partners, and the public.
4. Use GIS as a tool to provide timely and accurate data to decision-makers.
5. Utilize GIS Lifecycle Management processes to manage GIS software upgrades, maintenance, and replacement.

Goal 5: Maintain Enterprise IT Infrastructure to Support GIS.
Objectives

1. Develop a GPS and GIS Mobile Action Plan to standardize and increase remote GIS accessibility.
2. Implement IT infrastructure for an enterprise GIS initiative that will sustain growth and change with improved redundancy and resilience.
3. Ensure optimum internal and mobile network connectivity and system architecture to handle widespread office, fieldwork, and public needs.

Goal 6: Increase GIS Skillsets and Knowledge.
Objectives

1. Develop a formal GIS Training Plan to provide multi-tiered department-specific GIS training and education opportunities to new and current staff at all user levels and empower them to use GIS capabilities fully.
2. Conduct GIS Return on Investment (ROI) Workshops to showcase the value and benefits GIS offers the County.
3. Implement Knowledge Transfer methods for sharing ideas, discussions, and information about GIS and emerging technologies.
4. Promote education through conferences, online seminars, and workshop participation.
5. Establish a GIS user group network within the organization to help facilitate GIS user community consultation and engagement and encourage departments to discuss new ideas for GIS use.
6. Plan for GIS sustainability with cross-training of key responsibilities and develop a Succession Plan.

GIS Governance

Introduction

GIS Governance refers to all the processes and actions required to manage the planning, design, implementation, and ongoing maintenance of GIS technology. Governance is integrated throughout all components of the GIS program. GIS governance is the management of an integrated solution that serves the entire organization by offering geospatial functionality, uniform standards, good management, reliable digital data and databases, workflow procedures, training education and knowledge transfer, and a backbone for architecture and infrastructure.

GIS governance is a social and political process. The aggregated experiences of local government organizations prove that achieving an operational GIS does not guarantee its use. Correct implementation of an appropriate governance model can give rise to positive benefits in an organization. Conversely, choosing a poorly suited governance model that does not follow the implementation principles can have negative consequences. The ultimate success of an enterprise-wide GIS will depend on the ability to govern and manage GIS in an evolving multi-departmental environment.

GIS technology brings an entirely new set of management challenges to the County. These changes may disrupt the processes an organization relies on for effective and democratic decision-making, consensus building, organization-wide resource planning, project and process management, project prioritization, data maintenance, and accountability. How the organization handles the complex strategic, technical, tactical, logistical, and political components accompanying such powerful technology will determine its success.

Outcomes of Good GIS Governance	Outcomes of Misguided GIS Governance
Supports effective, strategic decision-making.	Assumption-based decision-making.
Corporate-wide resource planning.	Empire building.
Seeing GIS information as a public resource.	Misinformed public.
Project and process management.	Data and process duplication.
Prioritized resource control.	Variations in priorities.
Clear lines of roles, responsibility, and accountability.	Constant internal competition over funding projects and resources.
Easy geospatial data exchange.	Information hoarding or missing information.
Timely response to internal and citizen GIS requests and questions.	Inability to locate critical or timely information.
End-user participation.	Poor training and education.
Stakeholder consensus building.	Insensitivity to users' needs.
Organizational sustainability.	Insufficient prevention and response.
Trained and certified GIS professionals.	Poor training and education
Accurate information, map data, and statistical reports.	Poorly maintained, misplaced, and outdated information.
Working as a team.	Everyone going their own way.

GIS Governance Models

Four primary organizational structures, centralized, decentralized, and hybrid models, have been used to implement GIS within organizations throughout North America:
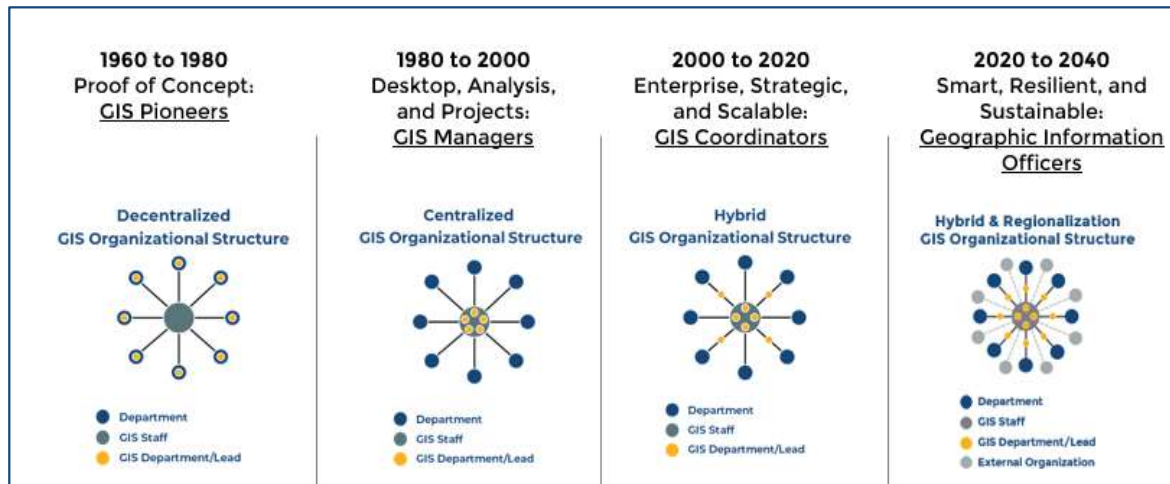
Figure 1: GIS Governance Models

Each of these models is described below.

Decentralized Governance Model

A decentralized organizational structure divides GIS responsibility throughout various departments. Decentralized models may still have a GIS section/division, operating independently or under the jurisdiction of another department. This approach divides system and data maintenance between the GIS section/division and departmental end-users. During their course of daily business, users update an enterprise database (e.g., using ArcGIS to edit data). All users share responsibility for maintaining the GIS, and users within each department maintain specific data according to their thematic disciplines and specialties.
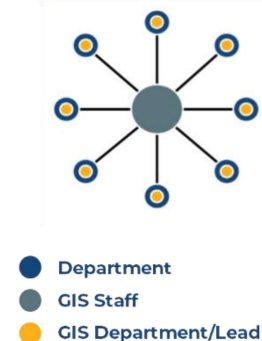
This type of organizational structure enables the GIS section/division to focus on hardware and software maintenance, data exchange and distribution, application/data design and development, user training and support, community extension, and technology innovation instead of devoting time to the creation and maintenance of data. In this model, no person

or group is governing or ultimately responsible for GIS, which may result in several GIS technologies and processes.

Pros: The benefit of a decentralized model is a defined structure where stakeholders pool their resources and work together to build a GIS. The model is flexible and ensures that stakeholder needs are addressed.

Cons: The risk is that it can become difficult to coordinate and negotiate. It requires strong communication and leadership to hold the system together. In addition, redundant solutions, processes, data capture, staffing, funding, and initiatives often occur in this model.

Centralized Governance Model

A centralized organizational structure maintains a central department or division responsible for all GIS services. In this type of structure, GIS often has its own dedicated department or is a division of an Information Technology (IT) or a heavy GIS-use department. The GIS department/division employs a group of management, analysts, technicians, and programmers tasked with hardware, software, application development, planning, and training. Data is created and maintained by this group or outsourced to contractors. All other participants are characterized as end-users with the capability to view, query, and analyze spatial data. However, with the advent of a new set of easy-to-use data collection tools and applications, end-users – in some cases – will be contributing to data creation and data maintenance.

Centralized
GIS Organizational Structure

● Department
● GIS Staff
● GIS Department/Lead
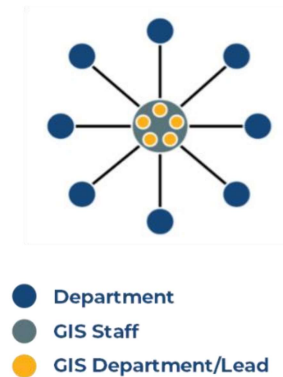
Business units or departments use the data for day-to-day operations or detailed analysis. Feedback is channeled through the chain of command to the lead GIS staff person(s). In some cases, oversight comes from a steering committee and end-user groups. Bureaucracy and duplication of effort are minimized since there is a central command and control and a single budget source. GIS functions are split into teams responsible for each function and requests for services.

Pros: The major strength of the centralized model is a well-structured and defined universal GIS system that is highly efficient and effective for the entire enterprise. The weakness of this model is that it can become too rigid or inflexible for stakeholders.

Cons: Many local government organizations shy away from the centralized model since it has a comparatively higher start-up cost than the other models. Additionally, this model does not engage the subject matter experts within the department, thus limiting the collective knowledge base and buy-in.

Hybrid Governance Model

Many local governments employ a hybrid of centralized support and decentralized use for their GIS programs. A significant benefit of the Hybrid Governance Model is its flexibility. Stakeholders actively participate in the design and project planning stages and work together while dividing and sharing the GIS functions. A central GIS body is responsible for the overall professional direction, career development, GIS system architecture, applications, license pools, and delegation of project work. Intra-departmental stakeholder teams are responsible for data capture, data edits, quality control, and cartographic output. Stakeholder resources are pooled, and team members from different departments are cross-trained.

Hybrid GIS Organizational Structure

- Department
- GIS Staff
- GIS Department/Lead

The hybrid model reduces redundancy because a central command structure comprises a lead GIS staff person, such as a Geographic Information Officer (GIO), GIS Coordinator, or GIS Manager, and key GIS technical staff. Strong leadership, communication, and GIS knowledge are required to succeed in a hybrid GIS governance model.

Pros: Flexibility and expertise are ensured since the stakeholder teams work within the departmental structure on specific end-user functions. If funding or leadership is lacking in a single department, then the other departments can compensate. Smaller departments are involved since they have an equal share in the decision-making process, and intra-departmental teams support them.

Cons: If there is no clear direction and agreement among participants concerning roles and responsibilities, there is a risk that the hybrid model of governance may devolve into the decentralized model, and redundant processes will emerge.

Hybrid & Regionalization Governance Model

A Regionalized Governance Model (RGM) is based on shared services. In this context, shared services can be defined as two or more local government authorities that plan, employ staff, undertake management, business and/or regulatory activities, deliver and/or maintain infrastructure, or provide services to their communities in a joint manner. Such collaborative activities can be conducted in a variety of ways, ranging from simple written agreements (such as an exchange of letters) through loosely structured consortiums to more formal entities, such as a Joint Powers Authority, up to jointly owned companies with independent boards. A regionalized model can often be an extension to a local government's centralized or decentralized governance. It essentially incorporates other municipalities into a shared services model.
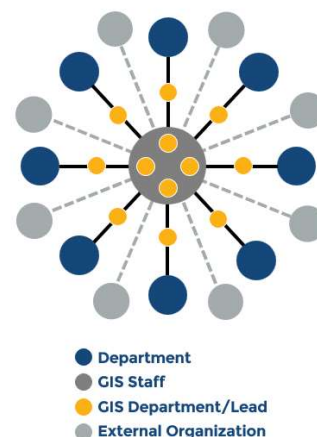
Pros: This model attempts to capture the strengths of unified and distributed models. Each member agency is equally accountable to the regional body. GIS functions are managed using a responsibility matrix of the intra-departmental stakeholder teams.

Cons: It can be challenging to secure adequate funding and participation from all members. The legal and administrative necessities of formal entities may be demanding.

Summary of Governance Models

- 🔶 **Centralized Governance Models:**
  - 🔷 Except for data viewing and analysis, all GIS tasks are handled by a central GIS department or division. All GIS staff are located within the central GIS department or division.

- 🔶 **Decentralized Governance Models:**
  - 🔷 GIS data updating and maintenance responsibilities are assigned to individual GIS-participating departments. Departments have their own GIS staff members.

- 🔶 **Hybrid Governance Models:**
  - 🔷 GIS tasks may be handled centrally or at the department level, depending on the needs and available GIS staff at individual departments.

♦ **Hybrid & Regionalization Governance Model:**
   ◆ Attempts to capture the strengths of unified and distributed models.
   ◆ GIS functions are managed using a responsibility matrix.
   ◆ Intradepartmental stakeholder teams.
   ◆ Funding and leadership are shared.
   ◆ Equal accountability.

In reality, the nuances of a governance model differ amongst every agency, and there are similarities and differences for each model. No one model is perfect in all circumstances.

Existing GIS Governance

The responsibility for GIS is currently under the Planning and Building Services (PBS) Department. However, the GIS Coordinator position is vacant. If filled, this would lead the GIS program and be responsible for managing, developing, and updating the County Assessor Parcel Layer. The organizational chart below shows the current core GIS-related positions.

Figure 2: Existing GIS Organizational Chart

The Planning and Building Services Department supports GIS users throughout the County; however, there is no strong field of GIS expertise within the department. Most users access GIS through the web apps provided. The diagram below shows the existing governance model and counts of current users across the departments. (Note that only departments with current GIS users are shown.)
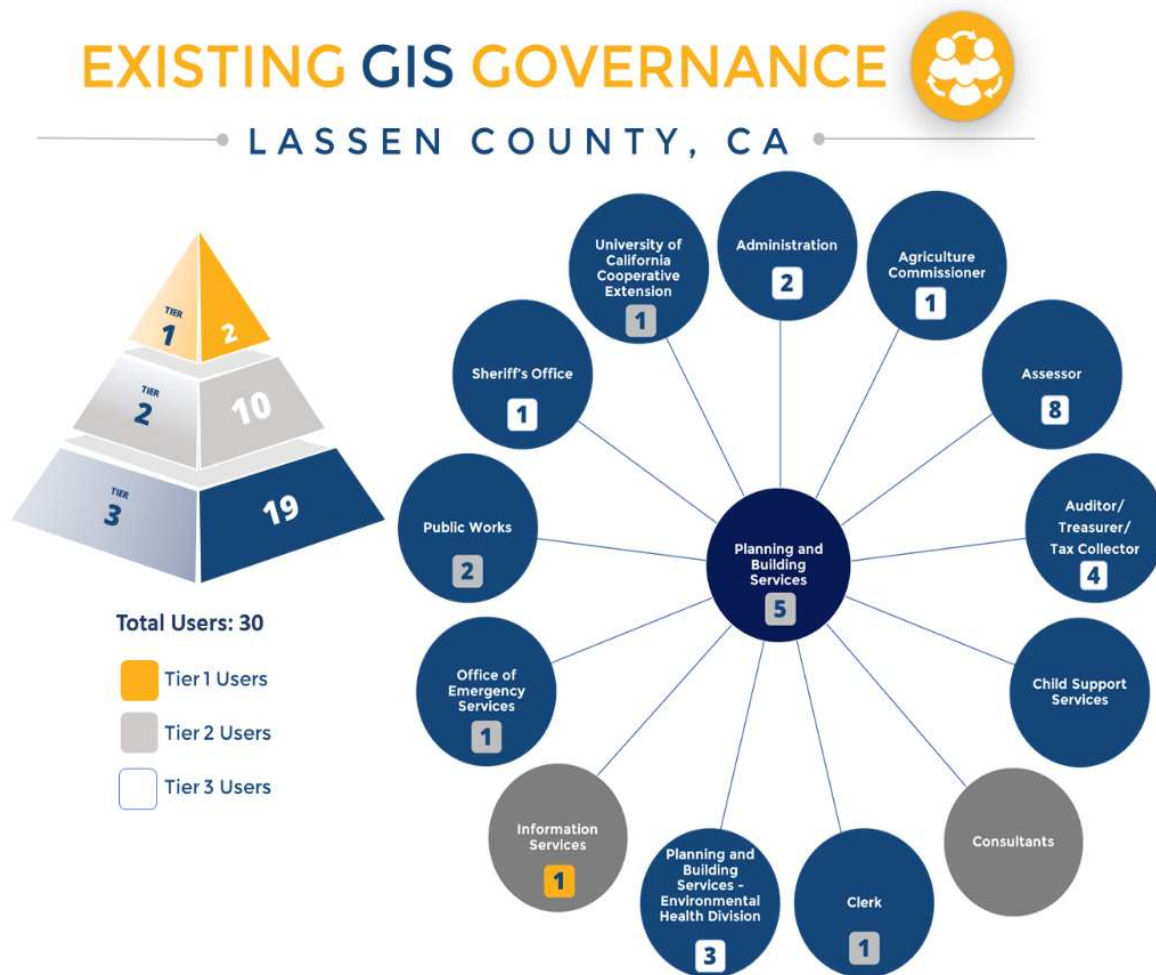
Figure 3: Existing GIS Governance Model and User Counts

Future GIS Governance

The following items are smart governance practices that lead to GIS success, which Lassen County should consider adopting.

Organizational Structure

Among counties across North America, a vast majority of enterprise-wide GIS implementations have a lead GIS staff person, such as a Geographic Information Officer (GIO) or GIS Manager. Compared to similar organizations, the GIS staffing structure and job descriptions of Lassen County should include a central GIS leader and several supporting team members of various competencies, such as system administration, database management, application and web development, and cartography.

The existing GIS Coordinator position must be filled to provide direction, guidance, oversight, and collaboration with County leaders and department directors. To achieve the recommendations for growth in this plan, the future governance model calls for a shift of GIS responsibility to the Information Services Department and several new GIS positions in two phases, as shown in the charts below.
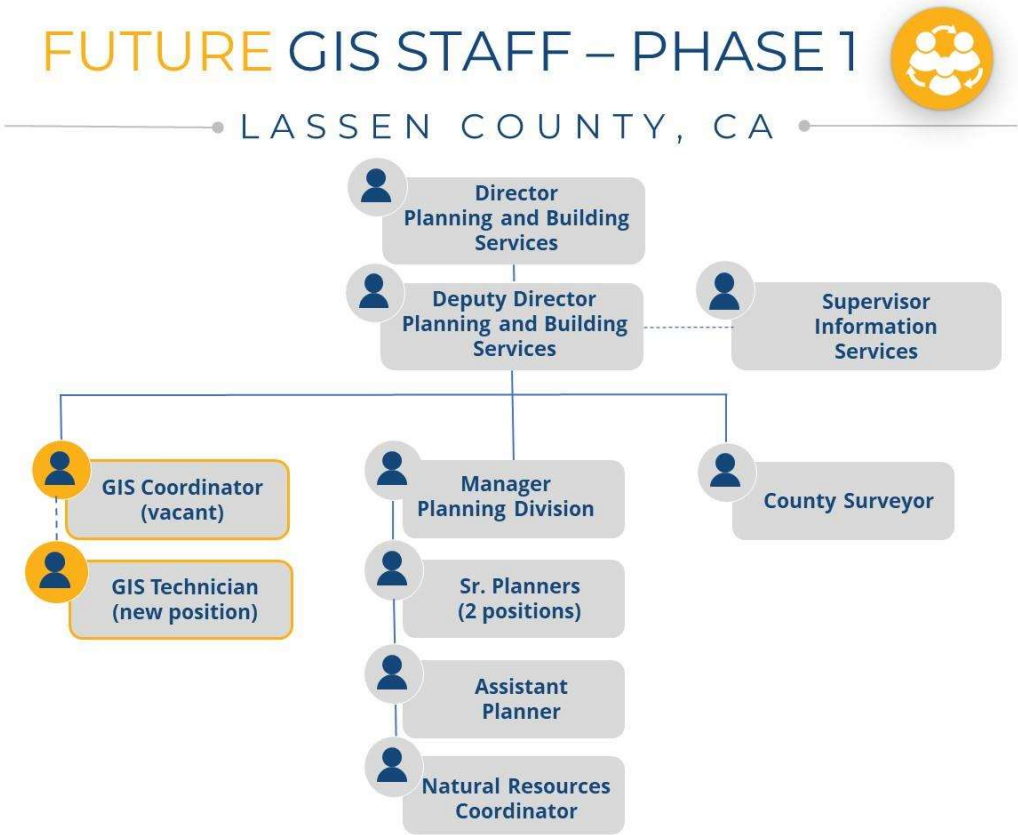
Figure 4: Recommended Future Governance Model – Phase 1

Phase 1 calls for the GIS Coordinator position to be filled and a new GIS Technician position to be created *(see Job Classifications section below.)* These positions would remain in the Planning and Building Services Department; although they would primarily support Planning and Building Services, they would also serve GIS needs in all departments.
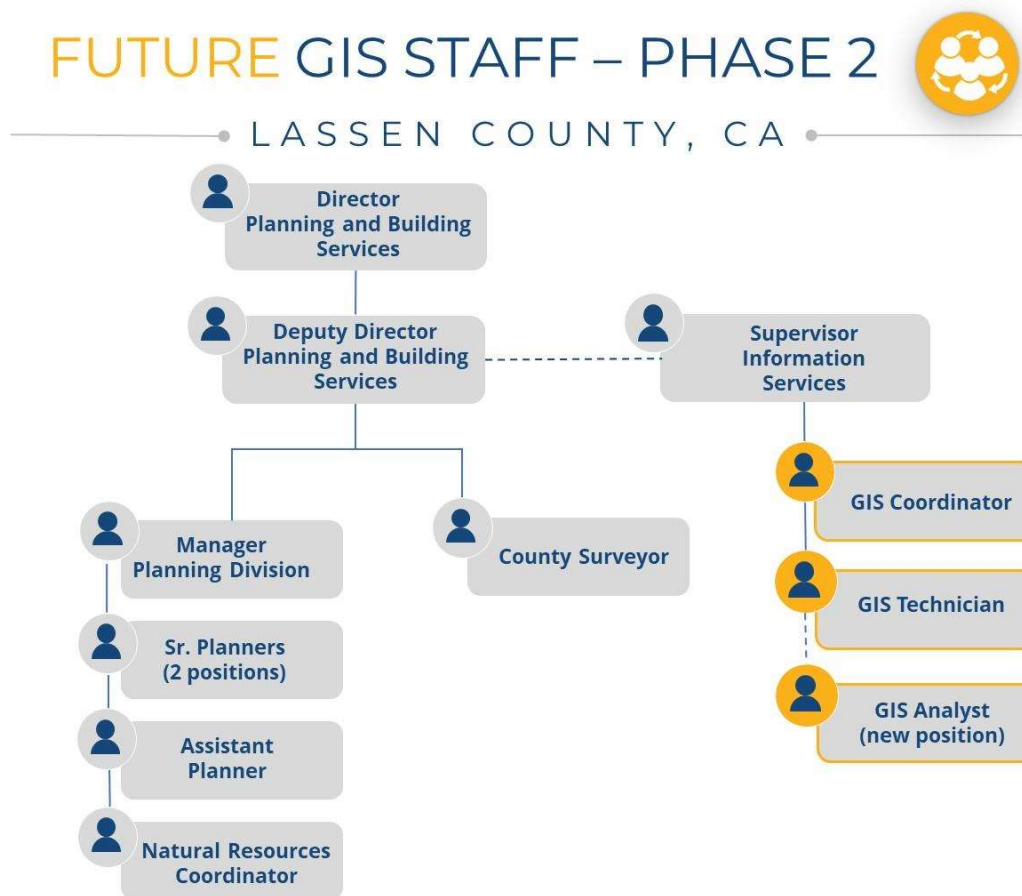
Figure 5: Recommended Future Governance Model – Phase 2

Phase 2 involves transferring the core GIS staff to the Information Services Department for equal support of all departments and stronger affiliation with ISD staff. This shift is necessary as GIS use is expanded to multiple departments, and advanced software and databases are developed and deployed. In addition, a new GIS Analyst position would be added for GIS application development and complex analysis *(see Job Classifications section below.)*

In both phases, the GIS Coordinator will collaborate with the Information Services Department (ISD) staff as the GIS administrator.

Job Classifications

The County currently has only one GIS job classification, GIS Coordinator. New job classifications would be required for the robust program envisioned for the future. The recommended job classifications are described below.

- **GIS Coordinator –** Serves as a GIS systems administrator, supporting day-to-day operations and leading projects to enhance and develop their capabilities. The individual is responsible for the development, implementation, integration, operation, and maintenance of the geographic information system and any integrated custom and commercial off-the-shelf components.

  - Plans, coordinates, oversees, and participates in the development, implementation, integration, operation, and maintenance of the County's geographic information system (GIS) and permit system.
  - Designs and implements information systems for the provision of access to GIS data.
  - Develops and implements specialized GIS applications.
  - Oversees the design and development of all databases associated with the GIS base map.
  - Performs a variety of technical tasks relative to assigned area of responsibility.
  - Responsible for management, development, and update of the County Assessor Parcel Layer.

- **GIS Technician –** Under the direction of the GIS Coordinator. Entry-level position involves database entry and the generation of maps from this data.

  - Coordinates GIS data conversion and cartographic production activities and prepares maps, drawings, spreadsheets, data files, and other documentation.
  - Performs drafting as required, digitizes maps and geographic feature data into various layers with the GIS, and performs quality control checks.
  - Manage incoming data and maps from various sources for input into the GIS database.

- **GIS Analyst –** Reports to the GIS Coordinator. Responsible for performing professional-level digital GIS mapping duties under the direction of the GIS Coordinator. The GIS Analyst classification is considered a professional with a working knowledge of all GIS functions. The GIS Analyst works on moderately complex projects where analysis of situations or data requires an evaluation of variables using specialized technical concepts.

  - Responsible for GIS mapping services and activities using available technology, including but not limited to Geographic Information System (GIS), Computer

Aided Drafting (CAD), and Global Positioning Systems (GPS) for the development, deployment, and publication of county information.

◆ Ensure that data quality and information are reliable and consistently maintained.
◆ Serve as a technical resource providing technical support.
◆ Perform GIS analysis, develop, implement, and maintain a complex GIS.

GIS Governance Recommendations

The following recommendations are based on smart GIS business practices in local government and the key factors for implementing an enterprise and scalable solution that will sustain the County into the future:

1. The County should create a Hybrid GIS Governance Model by instituting a clear and understandable strategy for effectively managing GIS and the best use of enterprise GIS resources.

    a. Add a GIS Technician under the GIS Coordinator in Phase 1.
    b. Add a GIS Analyst under the GIS Coordinator in Phase 2.
    c. Shift the GIS responsibilities to the IS Department in Phase 2.

2. The County should develop clear lines of GIS authority and accountability.
3. The County should evaluate Key Performance Indicators (KPIs) annually.
4. There is an opportunity for the County to improve Enterprise GIS Management to ensure a more coordinated and collaborative GIS experience for all stakeholders.
5. The County should establish a GIS Steering Committee and meet regularly for a smooth implementation process to allow direct interfacing between executive decision-makers and GIS experts.
6. The County should also establish a GIS Technical Committee to oversee the technical challenges of deploying an enterprise GIS.
7. A GIS User Group of stakeholders should also be established to share information and compare experiences with GIS technology for the benefit of all members.
8. The County should create relevant GIS Policies.
9. The County should research establishing a Regional GIS Policy by developing inter-governmental agreements for facilitating data sharing and cooperation among municipalities, regions, adjacent counties, and private interests.

10. The County should take the opportunity to measure the quality of GIS Service by gathering feedback throughout the organization at least once a year.
11. The County has an opportunity to explore GIS grants and funding initiatives.
12. The County should develop an Annual GIS Work Plan.
13. The GIS Coordinator should explore executing Service Level Agreements (SLA) with each user department to set service expectations.
14. The County should explore creating a GIS Blog or Newsletter to share accomplishments and opportunities with the user community.

GIS Data and Databases

Introduction

Successful enterprise data management results from a well-executed, multi-faceted plan. These facets include a scale-appropriate relational database management system (RDMS), data management standards, assigned data stewards, and assigned user roles. Maintaining the accuracy and reliability of enterprise data requires suitable software, knowledgeable staff, a formal data management program, and training for staff in data security and management. Laying out a plan improves an organization's data security and reliability and makes the organization more efficient and productive.

Lassen County requires a data management plan to build and maintain a secure database structure accessible to all departments, maximize efficiency, and minimize data collection and management costs. These needs can be met through a secure RDMS, implementation of well-designed database schemas, ongoing oversight from a data management team, and staff training in data management best practices.

This section assesses the County's existing geospatial data position and its relation to IT systems and proposes a strategy for improvement.

Data Management

Today's digital enterprise data management and life cycle practices have never been more important. The trend in the geospatial world is a shift towards a centralized geospatial hub of data, decisions, engagement, analysis, visualization, and dissemination.

This evolving data management strategy relies on the following smart data practices:

Data Governance

Data is potentially one of the most important assets of a local government. Millions of dollars are spent on IT systems whose usefulness is contingent on accurate and complete data. Fixed assets are typically tangible, i.e., seeing a building, park, or truck is easy. When a fixed asset is in disrepair, it is readily discernable, e.g., a broken park bench that needs to be fixed. However, data is also a managed asset that has value to the organization, even though it is intangible.

In many cases, the quality of the data entered into an IT system is not discernable, and decision-makers cannot find the data they need for analysis in a suitable form or timeframe. Also, IT systems are often seen as independent of each other, and data may be duplicated in multiple systems. It is best practice for a single 'source of truth' or 'database of record' to exist for shared data elements.

The use of GIS within organizations has changed how many organizations operate. With GIS, organizations can now visualize data within IT systems based on their geographic location. As the databases within business systems are geo-enabled, they begin to be used more meaningfully. Key data elements, such as asset locations, property boundaries, and utilities, should originate in GIS.

Key data elements should originate in GIS.

Central Data Repository

A central data repository is an organization's aggregated collection of GIS data, gathered from all information resources. This collective data represents the combined needs, responsibilities, and considerations of departments throughout an organization. Pooling data in this manner allows for ease of maintenance, monitoring, and metadata entry.

Master Data List

A common gap faced by most agencies is a viable and effective way to communicate and educate the organization about the existing data resources. Almost all local governments struggle with an effective data awareness dissemination method. A GIS Master Data List is a listing of up-to-date information about all the geographic and related datasets that are available for reference or utilization within the overall enterprise GIS ecosystem. Master Data Lists are usually extracted from a larger body of information, such as the enterprise spatial database. A typical MDL might contain the following information:

- Entity Name
- Entity Description
- Entity Type – Point, Line, Polygon, Composite
- Entity Status – In Progress, Complete, Planned
- Data Custodians
- Data Source
- Date Last Updated
- Update Frequency – Monthly, Daily, Quarterly, As-needed, Static

Lassen County should also consider a consumer-friendly GIS data document that is succinct and readily accessible to all users. This version of the MDL should be graphically pleasing and presented in such a way that a complete novice can understand what data is available. In addition, users need access to a digital version of an MDL and a hard copy if needed. The MDL can assist users in selecting the data they want to consume in their departmental applications.

Ensuring that users are aware of all available resources in the enterprise GIS will expand the usage of the system.

Metadata

In the simplest of terms, metadata is information about data. Like a library catalog record, metadata documents an enterprise GIS dataset's who, what, when, where, how, and why. Among other things, metadata provides descriptive information for maps, geographic data, imagery, and other location-based data resources. GIS metadata describes critical information about spatial data's purpose, location, content, and lineage.

Geographic metadata can provide answers to questions such as:

- Who developed the data?
- When was the data collected/created/updated?
- How was the data processed into its current state?
- How are the data attributes defined?
- In what formats are the data available?
- How does one obtain the data?
- Are there any constraints on the use of the data?

Metadata is needed to understand the quality and geometry of the data. The information in the metadata provides context for the data and supports the effective application of the data. Metadata is an important resource for system users who need guidance on the proper use of a dataset to support analysis or render decisions based on the contents and context of a dataset. Geospatial software systems and analysts increasingly rely on metadata to locate, assess, display, and manage geospatial data. Metadata helps users determine suitability for use and may limit data liability. Metadata is fundamental to the overall quality and usability of the dataset. Without data documentation, GIS data layers can quickly become functionally ineffective.

The recommended standard is the International Standards Organization (ISO) 19115, US Federal Geographic Data Committee (FGDC) "Content Standard for Digital Geospatial Metadata". Esri's ArcGIS software is well-equipped to create and maintain metadata. At a minimum, the GIS team should complete all metadata using the ArcGIS Item Description Metadata style. This style has a single information page, including a Title, Tags, Summary, Description, Credits, and Use Limitations. However, if more detailed information is desired, another metadata style can be adopted. Other styles carry the information listed previously, as well as sections covering data maintenance or field information listed on different pages of the metadata document. The GIS team should review the metadata styles available to determine the best fit for the organization's needs. After establishing a metadata standard, all feature classes should have their metadata loaded, updated, and verified using the built-in geoprocessing tools provided by Esri. Metadata reference resources include:

- [FGDC Metadata Quick Guide](#)
- [FGDC Metadata website](#)
- [ISO 19115:2003 Geographic Information Metadata](#)
- [Esri Help on Best Practices for Editing Metadata](#)

Regular, standardized entry of metadata will ensure the quality, value, and suitability of the County's GIS data repository is documented and preserved.

It is strongly recommended that Lassen County develop a metadata policy and enter metadata for all GIS core datasets. The recommended policy should include metadata procedures utilizing ArcGIS tools. In addition, the metadata policy implemented should align with GIS best management practices and established IT policies.

Data Custodianship and Stewardship

In Data Governance groups, responsibilities for data management are increasingly divided between the business process owners and information technology departments. Data Steward and Data Custodian are two functional designations commonly used for these roles.

Data Custodians are responsible for the technical environment, storage, security, database structure, and implementation of business rules.

Data Custodianship at Lassen County falls under the Information Services Department and should be formalized with agreement from each data steward group.

Data Stewards are responsible for the data content and following the business rules for the datasets.

Data steward groups at the County maintain identified datasets based on their proximity to the business processes that initiate the data. These department-specific data layers are mapped representations of data that correlate to the goals and objectives of a department(s). Although, some layers may be utilized by staff across the organization. Any department-specific layers that are created must be assigned a Data Steward.

Data Maintenance

For departments to take ownership and stewardship of their business data, the best practice is to have data maintained by subject matter experts (SMEs) within the department. To reach the optimal model for sustained growth and expansion of the GIS investment, formal GIS stewardship and responsibility must be assigned for each layer and accepted by user departments through Service Level Agreements.

The Lassen County GIS team is responsible for maintaining (creating and updating) the geodatabase layers. Most departments send data update requests to the GIS team to maintain GIS data for the county-wide datasets.

Data Management and Life Cycle Practices

The life cycle of data from creation to removal should be monitored and managed. Data that is no longer relevant should be taken out of circulation. Only pertinent, up-to-date data should be made available to users through apps to maintain user confidence in the digital data.

Each dataset should be assigned a retention policy in the master data list and metadata. In addition, the relevance of each data set should be evaluated periodically but at least annually.
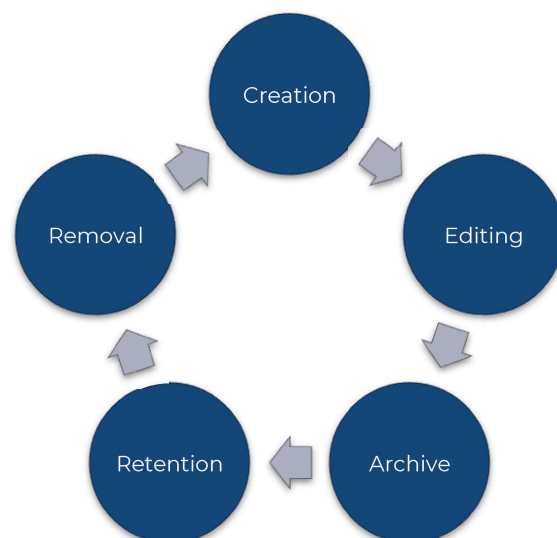
Figure 6: Data Management Life Cycle

Data Improvement Life Cycle

A properly executed data improvement life cycle will result in databases becoming more accurate over time. GIS can help improve business system databases, but the converse is also true. As records from business systems are converted to GIS layers, unmatched records may reveal erroneous or missing attribute data or locations. In either case, if a clean-up process is in place, the business system and the GIS dataset errors are reduced by attrition, and accuracy is improved for both.

The process of geo-enabling tabular data in business systems results in more pervasive use and analysis of the geocoded data, which often reveals data issues. The geocoding process, whereby addresses or other information are used to place a feature on a digital map, reveals those records that do not have an accurate geocode attribute, i.e., address, parcel, or ID (depending on the system). Those records that do not have a good geocode can be cleaned up to ensure that all the data in the business system can be geo-located, meaning it has an accurate, common field between the GIS layer and IT database. Issues with data completeness are uncovered as more people begin to use the data for meaningful purposes.
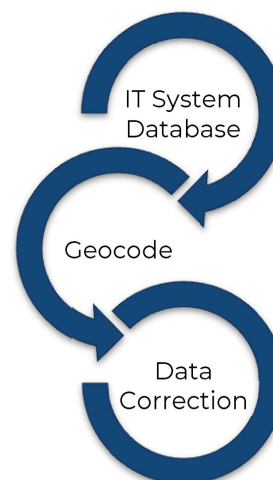
Figure 7: Data Geo-enablement Life Cycle

The GIS team must become involved in this data improvement life cycle. As data is regularly extracted and imported from business systems into GIS and vice versa, erroneous data can be culled or cleaned. The most prominent examples of this are Asset Management, Work Order, and Public Safety systems. The organization needs to understand and appreciate this symbiotic data improvement life cycle. The more this is understood, the more likely the GIS team will be included in technology acquisition decisions.

Also, the GIS team must be involved when new systems that house data are acquired to advise on best practices and review technological decisions.

Data Architecture

An enterprise GIS allows organizations to support data creation, management, and sharing among its internal departments, residents, and the public, should they choose. Database

design is the organization of data according to a database model. The designer determines what data must be stored and how the data elements interrelate. With this information, they can begin to fit the data to the database model. A database management system manages the data accordingly.

Data Security

Data security protects digital data and databases from unauthorized use and destructive forces, such as cyberattacks or data breaches. Data security can be configured at every level of the GIS system—hardware, applications, ArcGIS Enterprise, Portal, ArcGIS Server, SQL Server, and the central geodatabase.

From a technical standpoint, Active Directory, ArcGIS Enterprise Levels and Roles, or other role-based security, and ArcGIS Enterprise Groups can control access to data per user, user type, or data item or service. (For more details, ArcGIS Security best practices can be found on Esri's documentation for **ArcGIS Server**.)

Data owners and stewards should determine parameters for what should be accessible to different levels of users. Then, role-based security can be set up to manage access to the data.

Open Data Community Policy

Open Data describes an increasingly prevalent policy whereby citizens, stakeholders, and non-stakeholders have access to a curated selection of an organization's GIS-based data and data layers. The worldwide consensus is that open data is a great way for residents, business owners, and visitors to get critical information and see the results of a GIS initiative. Thus, a more transparent, open government is the end goal of an Open Data policy.

If Lassen County deploys an open data portal with public access to interactive maps, Story Maps, and downloadable data, an Open Data Community Policy will be necessary. It is recommended that ISD conduct a Data Security Assessment and Study to determine the current and future state of internal and external GIS systems and data access control.

To become more open and transparent, it is recommended that the GIS Steering Committee appoint an ad-hoc GIS Information Security group to review the applicable ISD and County policies to determine if some data can be classified as safe and secure for disclosure to business partners, government partners, residents, and the general public. Each dataset can

then be assigned the proper security classification, documented in metadata and the master data list for user reference.

Data Acquisition

Smart, real-time, and innovative ways of capturing vast amounts of digital data are part of our local government landscape today. This is supported by many classic and traditional data capture practices and principles, such as digitization from paper maps, conversion from computer-aided-drafting files, digitized on-screen, remotely sensed, collected with GPS, geocoded, and derived from other layers and databases. As the needs assessment has shown, there are many needs for new and improved data. Data acquisition sources can be categorized into the following four types:

- ◆ **Augment layer** – an existing layer that needs to be updated, improved, or expanded to include more detail.
- ◆ **Derivative layer** – a layer derived from the results of analytics, geoprocessing, and/or a combination of other layers and databases.
- ◆ **Geocode** – a layer created by geocoding records from an existing database.
- ◆ **New layer** – non-existent layers that will need to be created from any of the various creation techniques (GPS, digitizing, remote sensing).

Mobile Data and Database Collection

Multiple Lassen County departments require staff to go to the field to collect data, perform maintenance, and visit customers or clients. Data collection, remote connectivity, and GIS field operations have been reported as spotty in remote areas not covered by cell or Wi-Fi service. This and other technical issues with connectivity limit the organization's ability to access and collect data while in the field.

A security and vetting process is needed to expand mobile data collection to create and edit data in the field. Maintaining a set of secure public endpoints or providing modern tooling for offline data collection and synchronization could streamline field data collection considerably for Lassen County.

Data Quality and Assessment

The accuracy, validity, reliability, timeliness, relevance, and completeness of data is becoming much more applicable today. As new technology and new tools to collect real-time data

become more prevalent, ensuring the quality of geospatial data will be a critical component of data management. Any local government organization must constantly assess the content and quality of data.

The quality of spatial data can be measured by three components: spatial accuracy, attribution, and metadata, explained below:

- **Spatial accuracy –** The number of geometry and location errors found within a dataset. Qualities that can impact spatial accuracy include misalignment of data, missing data, poor feature management during edits, and not using complex geometry (i.e., true curves).
- **Attribution quality –** The completeness and accuracy of the data's attributes. A low number of null or blank values, consistent case or formats, no redundant fields, and the use of domains and subtypes indicate good attribute management and a high likelihood of completeness. However, either a visual review or cross-reference with other data sources is required to determine attribution accuracy.
- **Metadata –** The number of datasets with standard and current metadata populated.

Together, assessing these three components can provide a baseline for data health and highlight areas of improvement.

Excellent data quality builds confidence in the GIS system. To maintain data quality, the GIS team should run a series of checks using data validation tools, as well as validation rules, visual inspection, and attribute analysis on the existing geodata. It is recommended that these methods and tools be used to improve data quality initially and then configured to maintain data integrity moving forward. Ongoing data review procedures should be implemented and adhered to on a scheduled basis.

Excellent data quality builds confidence in the GIS system.

Data quality management tools can be used to assess the quality of GIS data to identify and correct issues. These tools enable specialized data validation for GIS administrators and editors to maintain and verify specific data quality efficiently, per industry standards and uses.

Lassen County has several GIS data layers; however, until recently, there have not been efforts to date to evaluate the data accuracy or completeness. It is recommended that

ongoing data review procedures be implemented and adhered to on a scheduled basis. The GIS team should perform a comprehensive GIS Data Assessment to analyze the data and identify any inaccurate records, non-standard spatial projections, and incomplete data or attributes.

Validation Rules and Tools

A concerted effort goes into building a successful GIS database that accurately represents the real world and is user-friendly for visualization and analysis. In the Esri geodatabase, several database design strategies can assist with maintaining a healthy enterprise GIS through the use of various validation rules. These rules include attribute rules, subtypes, domains, topologies, and network datasets. Attribute rules, subtypes, and domains are tools that constrain field values while building topologies and network datasets constrain how different types of geometries and feature types can interact with one another based on attribution. Most of these rules can be used individually or in conjunction with one another to improve your data's validity and integrity.

- ◆ **Subtypes** are used to categorize subsets of items in a feature class or table that share the same attributes. Using subtypes allows the data owner to set default values on fields for each category, assign coded or ranged domains to fields, set different connectivity rules within topologies and networks, and create custom rules and checks by category. They also improve the database's performance as fewer feature classes and tables are required to represent a variety of features.
- ◆ **Domains** are rules that only allow a specified set of values for a field. These can either be a range of numeric values (ranged domains) or a list of values (coded domains). They can be used in conjunction with subtypes to limit acceptable values by feature subtype. Domains are set at the database level and can be shared across all data within a database, eliminating redundancy in values (e.g., a road-type domain can be used in a street centerline and parcel dataset).
- ◆ **Topology** defines how different feature types (points, lines, or polygons) can interact with one another. Also, it prioritizes the importance of spatial relationships between features within a topology through a set of rules. A topology is a useful tool for identifying invalid spatial relationships. The topological rules can be set at the subtype level as well.
- ◆ **Network Datasets** use network attributes and rules to validate a network's topology. Networks leverage a topology to validate connections and spatial relationships to model flow through the network.

◆ **Attribute Rules** are used to auto-populate fields, perform quality assurance on existing features, and deny invalid edits. Attribute rules can also be applied based on subtype and can be used with domains to provide standardized values from a picklist.

◆ **Editor Tracking** provides a setting on feature classes and tables that allows users to automatically record information about any inserts and updates that are made. It maintains a record of the editor who created or modified the data and a timestamp of when the edit occurred.

These Esri data structures, along with domain and attribute-based rules, should be employed for quality assurance in avoiding errors in GIS datasets.

Existing Geospatial Data

Planning and Building Services maintains several GIS layers and geo-referenced maps for their operations and the general use of county-wide users. In addition, the UC Cooperative Extension maintains several datasets in shapefile and personal database formats. The current data holdings are listed in the diagram below.

County-wide	· Parcels · Roads · Zoning · FEMA Floodplain · Snow Plowing Map · Aerial Photography - NAIP
Planning & Building Services	· Addresses · Fire Hazard Severity Zones · Property Setbacks · General and Area Plans · General Plan Land Use Designation
UC Cooperative Extention	· Vegetation Data · Fence Boundaries
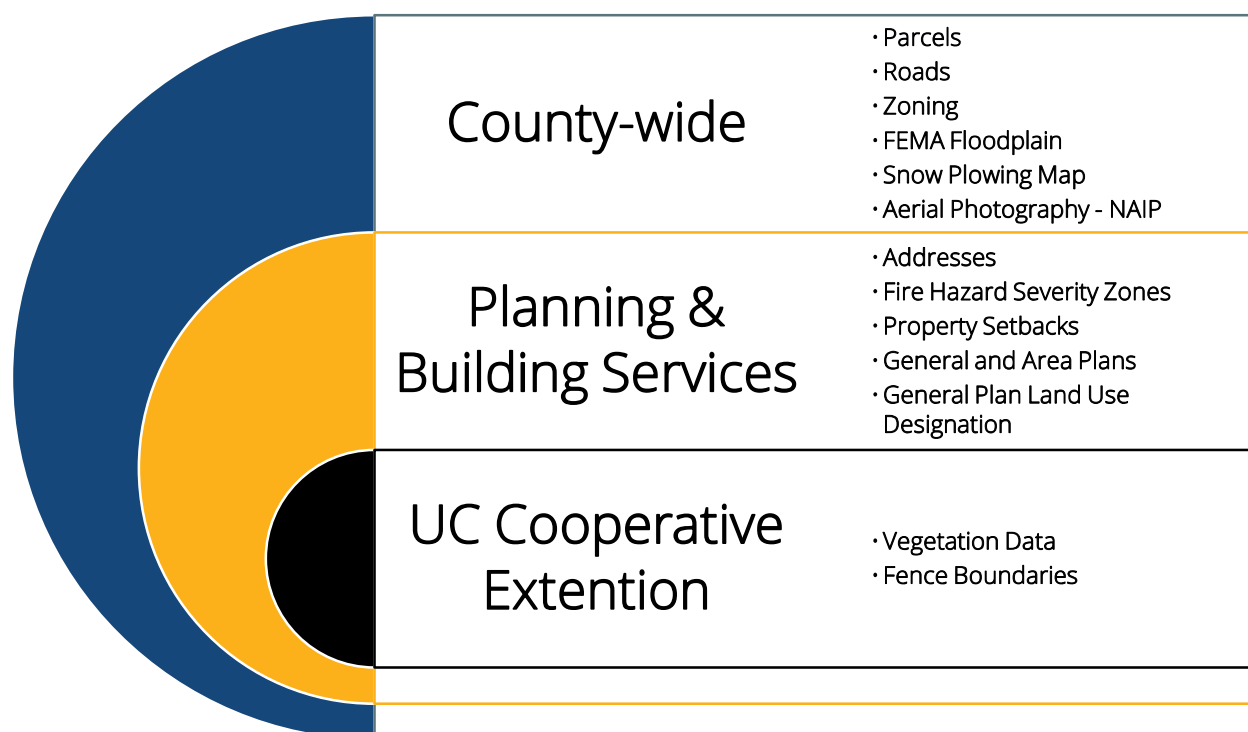
Critical Data Layers

Core data layers refer to the geospatial layers that are crucial to the GIS initiative and are mandatory for the successful use of GIS at a local government. These critical base layers are consistent throughout the United States. Without these core layers, the GIS program cannot operate at full capacity and impact most, if not all, of the departments.

At Lassen County, the critical Parcels, Addresses, Street Centerlines, and Aerial Photos layers are not maintained regularly or do not exist. The current status is listed below for each critical layer.

- **Parcels:** A project is underway to update the Parcel layer maintained by the Planning & Building Services Department. This layer is currently stored in a file geodatabase.

  - In addition, ParcelQuest and the Assessor have an agreement where ParcelQuest prepares Assessor parcel maps for the Assessor. ParcelQuest updates their own parcel layer, which the Assessor can access online. A subscription is required for other County departments to access the ParcelQuest parcel layer. At present, only the Planning and Building Services Department has an annual subscription ($20,000) to ParcelQuest.

- **Addresses:** The County is in the process of developing an addressing layer in GIS.

  - GTG has been contracted to provide an Addressing Tool so the County Surveyor can add addresses directly into GIS instead of on paper maps and in Intrado MSAG (for emergency services), as has been done to date. To create the layer, the existing GIS address layer in ArcGIS Online (AGOL) called 'Address Search' has been augmented based on the Parcel Situs Address data.

- **Street Centerlines:** There is no centerline data at the County today. The County has a roads layer from the Public Works Department in a geodatabase created around 2005. However, it must be updated and reviewed for accuracy as it is not comprehensive nor in the NENA NG911 centerline format.

  - GTG has been contracted to update the County roads layer. Updates will include differentiating between maintained versus non-maintained county roads and asphalt versus gravel/dirt roads and may include other pertinent attributes.

- **Zoning:** A project is underway to update the Zoning and General Plan layers maintained by the Planning & Building Services Department. This layer is currently stored in a file geodatabase.

◆ **Aerial Photography:** Aerial Photography – NAIP is available but not widely used. Users rely primarily on satellite imagery from Google.

Existing Data Management

◆ **Data Governance** – GIS data is stored on the County's file server and in ArcGIS Online. There is a network drive that is used to store authoritative data layers. Some departments also store data locally.
◆ **Master Data List** – There is no existing Master Data List of the County's geospatial data.
◆ **Metadata** – There is some metadata stored on the County's file server. However, the data does not include any information about data sources.
◆ **Data Quality and Assessment** – A digital data assessment was undertaken, and County staff determined that a number of data layers need to be updated, completed, or corrected.

GIS Data Strategy

Lassen County's core and critical GIS data layers should be stored in a central geodata repository. Internal and external layers may be stored on ArcGIS Online (AGOL) cloud geodatabases, including open data, public-facing layers, and field data layers. Further, the County could take advantage of consuming external services from state and federal sources, such as NOAA and USDA, and other regional agencies, as well as Esri's Living Atlas, as a no-cost option for data access. The database model should be determined and designed prior to adding datasets to the AGOL database.

For AGOL data governance and credit monitoring, it is recommended that a single data owner account be established to publish data. The AGOL Administrator can create groups for each department and share data specifically for the groups or for the entire organization.

There is also a need for more robust governance to ensure these datasets are maintained appropriately. For example, geospatial data stored on file shares, especially structured data, should be centralized into the central geodata repository to ensure the safety, stability, and authority of the information. Data stored on local file shares, local machines, or other non-centralized locations poses a significant risk in terms of data security but also impacts the ability for groups to collaborate and conduct informed analyses with all available data.

It is recommended that the County continue to build on the central GIS data repository and leverage AGOL as its enterprise geodatabase, until an ArcGIS Enterprise geodatabase is installed.

Parcel Layer

The County would like to move away from the ParcelQuest agreement. To achieve this, there must be processes and procedures in place to ensure the County maintained parcel layer is up-to-date, accurate, and reliable. To be accepted as the official property map, the Parcel layer maintained by the Planning & Building Services Department must be ratified by the Assessor as an authoritative data source, following the completion of the current project to update the layer. Also, Parcel Viewer web applications for staff and the public would need to be developed and deployed to replace the ParcelQuest web applications (*see GIS Software Strategy section for more details*).

Zoning Layer

Following the updates to the layer, the Zoning layer should be maintained by the PBS Department using standard operating procedures and processes. Also, the layer must be ratified by the PBS Department as an authoritative data source for the official Zoning map. At that point, an Ordinance amending the Lassen County Code could be adopted to replace the Zoning Index Maps with the Zoning ArcGIS layer from the County Geographical Information System (GIS).

GIS Data and Database Recommendations

The following recommendations are based on enterprise data management practices for local government and the gaps found in the County's existing GIS conditions:

1. The Parcel layer should be maintained by the PBS Department using standard operating procedures and processes.

    a. The layer must be ratified as an authoritative data source for the official property map, following the completion of the current project to update the layer.

2. The Zoning layer should be maintained by the PBS Department using standard operating procedures and processes.

    a. The layer must be ratified as an authoritative data source for the official zoning districts, following the completion of the current project to update the layer.

3. A central data repository should be created and enforced to house all the County's geospatial data and databases and reduce departmental silos.
4. The County should develop a Master Data List to document core GIS data sets in the central data repository.
5. The County should create Metadata for core GIS data sets in the central data repository, detailing how, when, and where data was created and the scale, accuracy, resolution, and other properties.
6. New digital GIS data layers should be created as identified in the Needs Assessment.
7. The County should consider implementing an industry standard database design for its central geodatabase, where applicable.
8. The County is recommended to develop Data Creation and Submittal Standards to ensure data quality and process sustainability.
9. The County should assign, enable, and document GIS Data layer Custodians and Stewards to empower and encourage departments to add GIS positions or roles to their staff to increase their GIS participation and data stewardship.
10. It is recommended that the County develop a Mobile Data Collection Program to establish standardized methods and procedures for application and mobile device acquisition, development, and deployment that involve departmental stakeholders.
11. The County should explore deploying an ArcGIS Hub Open Data Portal to meet the needs of the County to share data with the public and external partners.
12. It is recommended that the County examine and improve its Digital Data Management and Life Cycle Practices to evaluate each dataset's relevance and assign a retention policy to each dataset.

GIS Procedures, Workflow, Integration, and Interoperability

Introduction

GIS should be seen as a window into an organization's data. It can become a primary visualization and analytical portal for all departments through a combination of data, software, procedures, and workflows. Many organizations have invested time and resources in creating and maintaining a wealth of data in their existing business systems but are not leveraging this data to its fullest potential. Most business systems in the County likely have some geospatial component among the records.

Integration and interoperability will be defining factors in the future of local government. Integration means geo-enabling data in other systems and making it available within a GIS application. Interoperability means the ability of the GIS to work seamlessly with other systems within and across organizational boundaries, including local, provincial, and federal data sources. Integration and interoperability may be influenced by the political, organizational, logistical, tactical, human, and technical components of local government.

GIS Standard Operating Procedures

A full set of GIS Standard Operating Procedures (SOPs) documents the organization's GIS program policies, procedures, processes, methodologies, and system administration and architecture. SOPs allow the organization to be sustainable and resilient to change. These standards are the guiding principles that bring stability and confidence to the program. SOPs must be created and enforced to govern all GIS current procedures and processes, and new SOPs must be documented as developments occur. Creating SOPs should be a step in each project, enhancement, and implementation.

As the Lassen County GIS expands, the following enterprise-wide procedures should be documented:

- ◆ **Data Creation and Maintenance Procedures –** Standardizing guidelines by which an organization's data are collected, entered, and updated, including in-office and field

data collection. Standards should include data quality standards and geographic requirements (projection, scales, accuracy, etc.).

◆ **GIS Application Development Procedures** – Detailing how GIS technologies will be selected, designed, tested, deployed, and taught to meet user needs.

◆ **Metadata Standards and Template** – To ensure data is accurately described and well understood.

◆ **Integration Processes and Procedures** – Integration-specific documentation for each system GIS is integrated with, outlining the automated, ongoing data mining processes, methods, and schedules.

◆ **ArcGIS Online Standards, Procedures, Constraints, and Uses** – GIS content standards defining the stylistic elements and branding (symbology, color pallet, etc.).

◆ **Data Ownership, Access, and Sharing Policies** – Policy defining departmental stewardship and governance of GIS data and maintenance responsibilities and the relationship between department GIS data owners, editors, and the GIS team.

◆ **External Data Submittal Standards and Policy** – Ensure GIS and CAD data submitted from contractors is spatially accurate with all attributes appropriately entered.

The GIS team should review policies and process documentation annually to ensure that all needed documents exist and are current.

Existing Integration and Interoperability

ParcelQuest provides a Parcel viewer web app for the Assessor and PBS Department to view the ParcelQuest parcel layer, property data, and Tax Maps. A limited version of the app, ParcelQuest Lite, is also available to other County staff and the public; however, full details are only available at a cost.
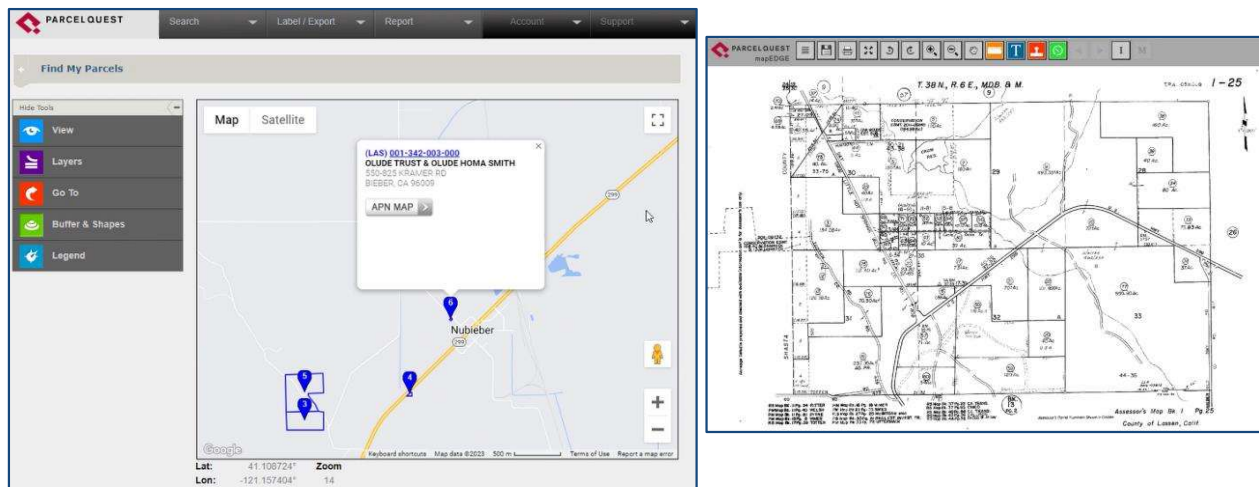
Figure 8: ParcelQuest App and Tax Map

Integration and Interoperability Opportunities

Business system integration is the process of integrating disconnected systems into the corporate initiative. In a geospatial context, enterprise integration encompasses how information moves from business systems to the central GIS data repository and how the new and more extensive system scope will alter stakeholder relationships and responsibilities.

Integration with non-spatial data in county-wide business systems is a critical component of an enterprise GIS. GIS technology can be leveraged further through integration with other business systems.

As the County's GIS matures, integration with all county databases should be a goal. Also, as legacy systems are replaced, a key focus should be ensuring that the replacement systems can be integrated with Esri GIS software. It should also be noted that typically, integration requires

Figure 9: Potential relationship between existing systems and GIS

custom development through Application Programming Interfaces (APIs) and cannot be done with commercial off-the-shelf (COTS) tools.

Enterprise integration and interoperability may take one of these forms:

- ◆ **Direct connect –** Connection to GIS via map services.
- ◆ **Bi-directional access –** Viewing/modifying GIS maps and attributes within business systems and accessing/editing data from business systems within GIS.
- ◆ **Transfer –** Pushing data from GIS to feed business systems.
- ◆ **Geo-enable –** Geocoding records from business systems that have a locational component.
- ◆ **Attachment –** Linking documents to features in GIS.
- ◆ **Hyperlink –** Jumping from one system to another through a link on a feature or record.

It is recommended that the County integrate the following business systems with each other and with GIS databases:

Business System	Provider Solution	Department(s)	Potential Integration
Asset Management	None have been implemented yet.	Public Works	Direct connect to GIS Bi-directional access with GIS
Document Management	Tyler Tech Eagle Recorder / Eagle Web	County Clerk	Open Attachments from GIS
Elections Management	DFM Associates	County Clerk	Transfer data from GIS
Pavement Management System	Street Saver	Public Works	Transfer data from GIS
Permit Tracking	SmartGov	Planning and Building Services	Integrate SmartGov and Megabyte Bi-directional access with GIS: • Capture GIS data for submitted applications. • Resolve the issue with the embedded GIS map. • Auto-assign by area. • Auto-populate fields from GIS.
Property/Tax	MegaByte	Assessor	Build a GIS app to view Parcels and Assessor data. Integrate the Parcel map layer with MegaByte.
Public Safety	Intrado MSAG Sunridge Systems RIMS	Emergency Services	Transfer data from GIS Direct connect to GIS

The County should evaluate opportunities for integration of GIS with existing and future business systems to increase efficiency and leverage organizational data.

Procedures, Workflow, Integration, and Interoperability Recommendations

The following steps should be taken to improve documentation of procedures and integration of business systems:

1. The County should ensure the integration of GIS with any Asset Management and Work Order software procured.
2. The County should explore integrating GIS with existing enterprise business systems:

    a. Property Assessment System – MegaByte
    b. Permit Tracking System – Smart GOV
    c. Public Safety Solutions – Sunridge Systems RIMS
    d. Document Management Software – Tyler Tech Eagle Recorder / Eagle Web

3. It is recommended that the County provide solutions that promote greater departmental access and use of GIS Software for editing, analysis, and visualization.
4. GIS Standards and Procedures should be developed for the following processes and workflows:

    - GIS Standard Operating Procedures (SOPs)
    - Data Creation and Maintenance Procedures
    - GIS Application Development Procedures
    - Metadata Standards Defined, Applied and Enforced
    - Integration Standards and Documentation
    - ArcGIS Online Standards, Procedures, Constraints, and Uses
    - Data Ownership, Access, and Sharing Policies
    - External Data Submittal Requirements

GIS Software

Introduction

GIS software consists of applications that display geographic data and help make maps. It allows users to visualize, query, analyze, and interpret location-based data to understand relationships, patterns, and trends. While GIS can be used simply for mapping and cartography, its true power lies in the capability to perform spatial data analysis to derive information, see patterns and trends, and draw conclusions from multiple data sources. The latest generation of GIS software solutions has simplified the process of making and sharing maps on a platform that anyone can use.

GIS software is the way that end-users interface with and utilize GIS data and technology. Simply put, the software is the window into the data. It is key to GIS success; therefore, selecting and deploying the appropriate software for the intended user is critical.

This section focuses on recommendations for GIS software applications for enterprise, desktop, web, and field solutions.

Existing GIS Software

The primary GIS software at the County is the Esri suite of products. As detailed in the Needs Assessments, the County's current license model includes the following licenses under Esri software maintenance at a total cost of $8,900, through August 31, 2024:

- ArcGIS Desktop Standard 10.1-10.4 – Concurrent – 2 licenses
- ArcGIS Desktop Basic 10.1-10.4 – Concurrent – 7 licenses
- ArcGIS Enterprise Workgroup Standard (Up to Two Cores) – 1 license
- ArcGIS GIS Server Workgroup Standard Additional Cores – 2 licenses
- ArcGIS Online (AGOL) organization with 700 credits and eight members

Lassen County's yearly maintenance for Desktop Standard licenses is currently (1) primary at $1,500 and (1) Secondary at $1,200 (2023 price, increasing to $1,750/$1,400 next maintenance cycle). Desktop Basic Licenses are (1) Primary at $700 and (6) Secondary at $500 per license (2023 price, increasing to $810/$580 next maintenance cycle)

ArcGIS Enterprise Workgroup and GIS Server Workgroup will be deprecated soon and will not be supported past ArcGIS Server 10.8. Also, ArcGIS Enterprise Workgroup Geodatabases are not compatible with Enterprise Geodatabases.

The ArcGIS Desktop concurrent licenses available through the License Administrator are for ArcGIS Desktop Basic and Standard. Seven ArcGIS users are in Planning & Building Services, Clerk, Information Services, and University of California Cooperative Extension.

In addition, the following GIS applications have been deployed:

Type	Name	Platform	Notes
County Staff Access			
Web App	ParcelQuest	ParcelQuest	Parcel Maps, Assessor data, Aerial Photos, and other layers.
Free App	Avenza Maps	PDF	GeoPDFs for offline field use
Web App	Redistricting 2020	AGOL	Election District visual aid but not detailed enough.
Public Access			
Web App	ParcelQuest Lite	ParcelQuest	Parcel Maps, Assessor data, Aerial Photos, and other layers.
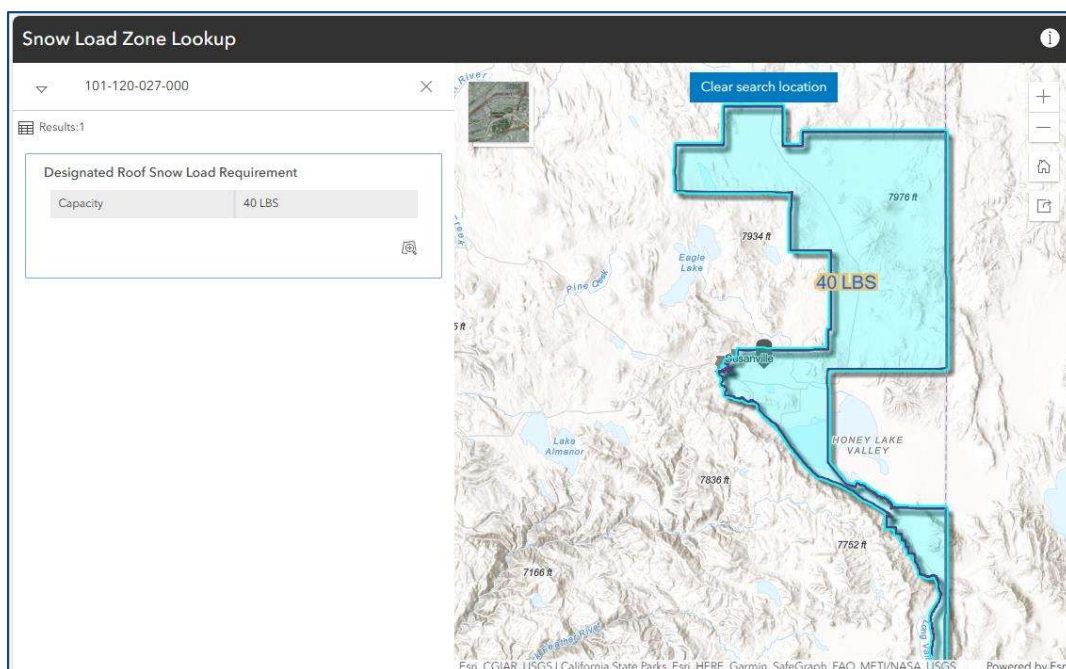
Figure 10: Lassen County Snow Load Zone Lookup App

Web App	Lassen County Zoning map	AGOL	Created by consultant Vestra in 2012.
Web App	Snow Load Map	AGOL	Digitized the paper map - created by consultant Vestra in 2022.

ParcelQuest

The Assessors ParcelQuest agreement provides access to the ParcelQuest web application to view parcel maps, property data, and Tax Maps. Also, the Planning and Building Services Department has a 1-Year subscription with ParcelQuest for 10 accounts (Aviator + Mobile) at an annual renewal cost of $20,000. According to its website, ParcelQuest is the sole provider of the most current California property data available online for all 58 counties, updated daily from the county assessors.

The ParcelQuest application is available to Assessor and PBS staff through an account login. Also, a ParcelQuest Lite web application is available to other County staff and the public with limited parcel data and map, with full details available at a cost. Both are used as general GIS viewers to look up parcels and property assessment information, and to view aerial photography and other map layers.
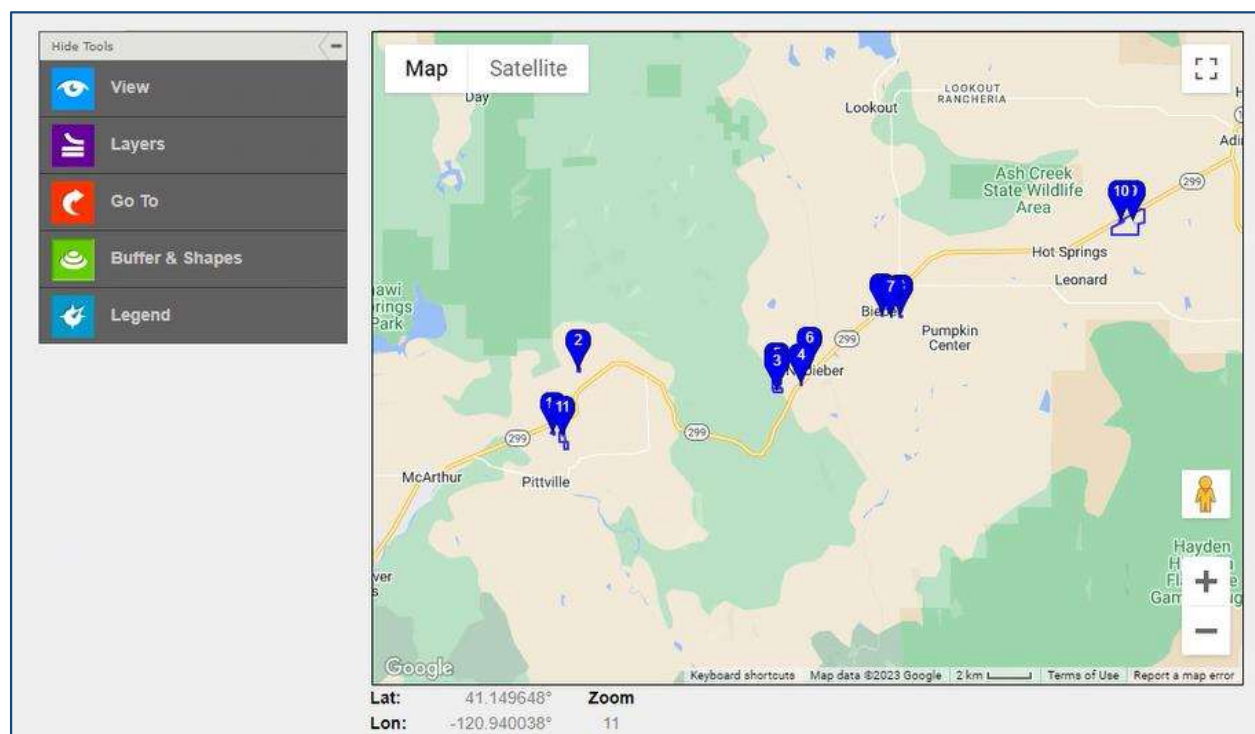
Figure 11: ParcelQuest Lite Parcel Search Map

GIS Software Strategy

Esri has offered the County an Enterprise Agreement (EA) under the Small Municipal and County Government EA (SGEA) Program. This program consists of a pre-packaged suite of software products, including ArcGIS Desktop and Extensions, ArcGIS Enterprise and Extensions, ArcGIS Image Server, and e-Learning. (*See _Government Enterprise Agreement | GIS Enterprise Licensing_ for a complete list of software offerings.*)

The limited-time offer includes 'ramp-up' pricing to ease the burden of the increased costs:

- Esri offered to move down a tier for the 1st year to Program Level One (for populations of 0 to 25,000)* for a cost of $16,100.
- The cost would increase to $22,700 in the 2nd year.
- In the 3rd year, the cost would be the full Program Level One price of $29,300.
- Subsequent renewals would be based on the Year 3 pricing.

By total county population (32,082), Lassen County would be in Program Level Two (for populations between 25,001 and 50,000).

Under the current license model, the seven ArcGIS Desktop Basic licenses would need to be upgraded to ArcGIS Desktop Standard licenses to accommodate recommended staff uses. The cost for Desktop license upgrade is $3,850/license, a total for 7 licenses of $26,950. Maintenance on these upgraded licenses would be $1,450 (2024 price) for each license, a total of $10,150/year.

Also, as mentioned above, the ArcGIS Enterprise Workgroup and GIS Server Workgroup products included in the current license model will be deprecated soon. The cost of Enterprise Standard level deployment is $23,000+ (if Workgroup is not converted to Enterprise and Enterprise deployed at some later date)., with a maintenance cost of $5,900. If Workgroup is converted to Enterprise, maintenance will be adjusted to the current rate of $5,900 starting March 1st, 2025 (Currently at $2,500/yr) ArcGIS Desktop and Enterprise Standard would be included in the SGEA.

If the County were to choose to go to ArcGIS Online as the migration path from Enterprise Workgroup, the prices for named users and GIS Professional Licenses (AGOL Desktop Equivalent) can be found on Esri's product web page. For reference, the SGEA contains 50 Creator-level licenses on both Enterprise and ArcGIS Online for use and 10,000 Credits for consumption.

By comparison, over the three-year term of the current license model, the cost would be $130,000 for maintenance, upgrades, and additional purchases, versus $68,100 with the SGEA, a difference of $61,900. Although the cost of the SGEA is an increase over the existing license renewal, the current licenses are not adequate for growth. With the SGEA, the County would gain access to uncapped licenses on a wider selection of products, along with increased AGOL credits and other benefits. With the necessary license upgrades and software purchases and the associated maintenance costs, the SGEA offers better options financially and operationally.

The SGEA annual total cost is compared to the current license maintenance model costs, upgrades, and purchases below.

Esri Proposed Pricing				
	Year 1	**Year 2**	**Year 3**	**3-Year Total**
Current/Upgrade License Maintenance*	$8,900	$15,850	$19,250	**$44,000**
License Upgrade/Purchase	$27,000 (ArcGIS Desktop upgrade)	$23,000 (ArcGIS Enterprise purchase)	$36,000 (ArcGIS Standard Professional Subscription)	**$86,000**
Current/Upgrade License Total	**$35,900**	**$38,850**	**$55,250**	**$130,000**
SGEA Annual Cost	**$16,100**	**$22,700**	**$29,300**	**$68,100**
Difference (Amount County would pay above the proposed SGEA cost.)	$19,800	$16,150	$25,950	**$61,900**

*Current/upgrade license maintenance costs are based on increases due to upgraded and purchased products..

Given the current state of GIS at Lassen County and the recommended growth plan, the additional software products, and licensing available in the SGEA, as quoted by Esri, are the best option for the County.

Regarding ArcGIS Online, it is recommended that the County deploy AGOL further to house core and critical GIS datasets and serve internal web applications. Also, the existing AGOL organization can be further leveraged to store open data, and public-facing and field collection layers and applications.

Additionally, AGOL can be used as a central repository for GIS data; however, this consumes Credits. *(See Credits by capability for each storage type.)* As GIS layers are added, credits may need to be purchased at a low cost (approximately $110 for 1000 credits). With the current and predicted 2–3-year growth, the County will not likely have high credit use or cost.

For AGOL administration, it is recommended that a single Data Owner account be established to publish data for governance and credit monitoring. This Administrator can create groups for each department and share content specifically for the groups, including data and apps; however, some data will be shared across the organization. It is further recommended that a GIS Coordinator and/or consultant assist with building the AGOL platform.

There is a benefit to keeping the ArcGIS License Server Administrator installed on an on-premise server to manage concurrent licenses. Although licenses can be managed through ArcGIS Online, each license is tied to one user and requires an administrator to manually change to another user. As the use of GIS expands, the County should assess whether ArcGIS Enterprise is warranted, either on-premise or in the cloud.

This growth plan will serve the County's needs for the next three years as the program expands. However, until the GIS Coordinator position is filled, the County will not have adequate staff resources to expand GIS further to departments and the public without significant support from consultants. When the position is filled, the County will have dedicated staff to guide implementation and administer the GIS system but may still require some outsourced assistance.

ParcelQuest Replacement

During the remaining term of the ParcelQuest agreement (through July 2024), a robust GIS web application should be built with all layers and imagery needed for parcel reference along with integration with MegaByte and SmartGov for parcel assessment and permit data, respectively. This would require regular data updates from MegaByte into SmartGov, which should be automated to streamline data transfer.

In addition, the Parcel layer maintained by the Planning & Building Services Department must be ratified by the Assessor as an authoritative data source, following the completion of the current project to update the layer. There also must be processes and procedures in place to ensure the County maintained parcel layer is up-to-date, accurate, and reliable.

GIS Software Recommendations

The following is a list of recommendations for expanding GIS software:

1. Esri Growth Plan:

   a. The County should accept the Esri offer of the Small Government Enterprise Agreement as quoted, to optimize Esri software licensing with upgraded desktop licenses, ArcGIS Enterprise, and additional AGOL members and credits, and other benefits.
   b. ArcGIS Enterprise deployment should be evaluated in Year 3 or 4.

2. The County should expand its ArcGIS Online Organization to a county-wide focus to provide easy access to web apps and data to all staff and the public.
3. The County should build web applications for internal staff and the public as identified in the Needs Assessment, including a Parcel GIS Viewer to replace ParcelQuest.
4. The County should consider creating Story Maps as identified in the Needs Assessment.
5. There is an opportunity for the County to create Crowdsourcing Solutions to engage the public using surveys that include a map to get feedback from the community on issues and services.
6. The County should consider utilizing real-time GIS in Board and Committee Meetings to visualize better information about the various issues related to the organization.
7. The County should assess the value and use cases of the following Esri GIS Modeling Extensions included with the ArcGIS Desktop licenses:

   c. ArcGIS Data Reviewer - Assesses and ensures data quality through custom, configured checks.
   d. ArcGIS Spatial Analyst - Advanced spatial modeling and analysis such as terrains, finding suitable locations and routes, discovering spatial patterns, and performing hydrologic and statistical analysis.

8. The County should implement mobile GIS and GPS solutions for office-to-field, field-to-office workflows to increase the use and participation of GIS by departments.
9. An ArcGIS Hub Map Portal solution should be considered if ArcGIS Enterprise is deployed.
10. The level of automation should be improved for efficient integration and interoperability.

IT Infrastructure

Introduction

The Information Technology architecture and associated infrastructure for GIS should reflect the corporate priorities of the Planning and Building Services Department, the Information Services Department (ISD), and the GIS community within the organization. Designing, implementing, and maintaining a sustainable, efficient, and modern GIS to support the County must be technically sound and resonate with the ideals and goals of the organization.

Existing IT Infrastructure

ISD maintains an enterprise GIS platform designed and deployed to leverage the resources of on-premise and cloud-hosted services to manage and deliver geospatial services. In addition, this centralized GIS design enables the management and distribution of GIS resources exposed as consumable services across the County's network.

The on-premise GIS architecture includes one production Microsoft virtual server running Windows 2012 R2 server license and SQL Express. In addition, a new virtual server was built in 2022, running SQL Server 2014. ArcGIS License Server Administrator 10.4.1 is installed on-premise for the ArcGIS Desktop concurrent licenses. The servers and databases are backed up regularly.

This centralized approach provides the County with the administrative benefit of a consolidated infrastructure while providing a uniform and distributed means of interacting with data, methods, and information. In addition to simplifying the administration of a system, centralized services allow for scalable, efficient, and distributed consumption of those resources. This model ensures that the organization's GIS is future-ready, integration-ready, and value-driven.

However, the servers and SQL Server databases must be upgraded to the latest version in order for an ArcGIS Enterprise geodatabase to ensure proper functionality, improve efficiencies, and follow compatibility recommendations. SQL Server should be upgraded to version 2016 at a minimum. Also, when all users transition to ArcGIS Pro, the need for the ArcGIS License Administrator will be voided, as Add-on licensing is administered through the ArcGIS Online organization.

Together, when implemented, the technological and associated infrastructural footprint, the GIS governance model, and the GIS community within the organization will have established a modern, scalable, efficient, and cost-effective GIS implementation for the County.

IT Infrastructure Recommendations

The following is a list of key GIS infrastructure recommendations to build an enterprise, sustainable, and enduring GIS ecosystem:

1. SQL Server should be upgraded to version 2016 at a minimum.
2. ISD should develop a Strategic Technology Plan to describe the County's current and future relationship with technology and how GIS technology will further the goals of the organization. The components of this plan will serve as the foundation for the GIS technology platform.
3. ISD should work with the GIS Coordinator to develop a GIS Architectural Design plan to understand and visualize the complex interrelationships between the GIS technology components, both on-premise and cloud.
4. ISD should work with the GIS Coordinator to develop a GIS Mobile Action Plan of the County's tactics to increase GIS accessibility on tablets, smartphones, and other mobile devices.
5. It is recommended that ISD develop Data Storage strategies, a Disaster Recovery and Emergency Response Plan, and Change Control Policies and Procedures to support the growth of the GIS initiative.

GIS Training, Education, and Knowledge Transfer

Introduction

GIS is a rapidly evolving technology, and organizational needs are ever-changing. An ongoing, multi-level training program encourages the effective utilization of GIS technology throughout the organization. As the County seeks to expand the use and reach of GIS, users in all departments will need to develop and maintain a strong, foundational knowledge of GIS. This plan should include the following three distinct components vital to ensuring GIS success:

- ◆ **GIS Training** – Teaching a particular skill or a new type of behavior. Training tends to be more formal and often includes computer technology.
- ◆ **GIS Education** – Systematic instruction that usually occurs in an academic setting. Education is less formal than GIS training and requires only the student's presence.
- ◆ **GIS Knowledge Transfer** – Transferring knowledge from one part of the organization to another, usually in a very relaxed atmosphere.

Lassen County needs a formal training, education, and knowledge transfer plan to outline skill development appropriate to current and future technical and business needs. An ongoing GIS training plan consists of the following:

- ◆ An approved outline of steps and schedules
- ◆ Costs for continuous training of the GIS and department staff
- ◆ Recommendations for classes, seminars, conferences, and workshops

Users require training targeted to the user tier, whether advanced, intermediate, or viewer. Educational sessions should also focus on the specific tasks users need to perform. In addition, the GIS Coordinator should organize all the training.

GIS Training Plan

The County should take advantage of training opportunities to increase the knowledge base and expand staff capabilities. Additionally, as Esri releases new tools, solutions, and

applications, it will be critical for staff to stay abreast of the latest updates and releases. These efforts will ensure staff understand GIS technological advancements and provide the necessary skills to adopt emerging technologies.

Some departmental users have a good understanding of the solutions they use; however, GIS technology changes continuously, and so do the courses offered. Therefore, an annual GIS Training Plan should be developed to broaden users' GIS skills. Creating individual training plans for the GIS Coordinator and Planning & Building Services staff and a general list of training opportunities for the user base are essential. However, specific classes depend on the employee's needs, budget, and time. Furthermore, each person has different skills, so courses must be tailored to the individual while considering existing skills and knowledge gaps. Users' existing knowledge and critical gaps in knowledge must also be considered.

Training and education options that should be offered as part of the GIS Training Plan include:

- A recommended list of formal training classes, seminars, and tutorials.
- Esri ecosystem training, including ArcGIS Pro.
- Training on all web apps/tools deployed.
- Video training sessions for employees.
- Hands-on training on basic functions.
- Annual refresher course on desktop tools.
- Visionary sessions for new and emerging technology.

The following sections list recommended training options for the County. These include training for internal applications and processes, Esri-based solutions, and specialized training.

GIS Software Application Training

Any department user who will be updating the data will need to have the requisite instructions on the process flow and editing tools. In addition, training should be included in the implementation plan for any new GIS software application deployment. The GIS Coordinator should be capable of providing these training sessions to the end users for whom they are built, either internal County staff or external for the public. However, the capability of the GIS Coordinator to provide training may be limited without additional staff or contractor bandwidth. Developing training videos that can be easily shared with internal

staff may be more efficient. If videos are produced, knowledgeable staff members should be assigned to record and update them.

Recommended internal and external user training sessions include:

- Public Web Portal

  - **Type:** Video or Presentation
  - **Frequency:** As new features are deployed
  - **Audience:** Public users

- Addressing Tool

  - **Type:** Knowledge Transfer – One-on-one or small group
  - **Frequency:** As new features are deployed
  - **Audience:** County Surveyor

- ArcGIS Online

  - **Type:** Classroom Training or Video
  - **Frequency:** As new apps or features are deployed
  - **Audience:** County staff users

- ArcGIS Pro

  - **Type:** Classroom Training or Video
  - **Frequency:** As new apps or features are deployed
  - **Audience:** Advanced County staff users responsible for data maintenance or analysis.

- Field Maps

  - **Type:** Knowledge Transfer – One-on-one or small group
  - **Frequency:** As new apps or features are deployed
  - **Audience:** County staff users responsible for field data collection or maintenance.

- ArcGIS Hub and Open Data Portal (if implemented)

  - **Type:** Video or Presentation
  - **Frequency:** Annual and during onboarding
  - **Audience:** County staff users

- Other Applications – This plan has recommended implementing numerous solutions. Each one of these applications is a candidate for its training. This could be in the form of a short how-to video or in-class activity. Training methods need to be considered for each application as they are released. Potential videos or training classes include:

- Creating and maintaining a Story Map
- Getting the most from your GIS browser
- Maintaining and using your GIS dashboard
- Visionary sessions for new and emerging technology

Esri Applications and Tools Training

Esri offers GIS classes in training centers and numerous low-cost and free, self-paced courses available online that can be leveraged by novice to advanced GIS users. Esri courses are changed yearly or bi-yearly, depending on new releases and updates. Esri Academy e-Learning courses cover various topics and skill levels, so the latest Esri training courses should be re-evaluated regularly.

The types of training offered by Esri fall into the following categories:

- **ArcGIS Labs –** Self-paced learning options emphasizing hands-on practice through step-by-step exercises.
- **Document –** A collection of whitepapers, articles, blogs, and PDFs that discuss various GIS and ArcGIS topics.
- **Instructor Led –** Online classes by industry expert instructors that students attend from their desks, delivering engaging class experiences that prepare students to apply what they have learned immediately.
- **MOOCs –** Massive, open, online courses to help expand horizons and advance careers.
- **Training Seminar –** Live and recorded video presentations with software demonstrations by Esri subject matter experts.
- **Video –** Training and educational videos from Esri and industry experts.
- **Web Courses –** Interactive self-paced courses with activities and hands-on exercises.

A Learning Plan is a collection of learning options to master a focused ArcGIS topic at the student's pace. The plans are created by curriculum experts at Esri and by the GIS community.

See the [Esri Academy](#) catalog for available training courses.

Communication and Knowledge Transfer

Lassen County can communicate its GIS message internally and externally through various methods. A strategy for sharing GIS expertise and documenting knowledge will ensure the GIS program is sustainable. Some techniques, such as email, brochures, newsletters, and the

internal employee website, are always available and easily accessible. Other methods require significant effort and cost to create and distribute. These include published articles, annual reports, presentations at GIS conferences, and developing or updating strategic plans. The County should review the various communication methods available and decide which suits its needs best. The following is a list of suggested communication methods, their frequency, and costs:

Communication Methods

Communication Method	Frequency	Details	Cost
GIS Steering Committee	Quarterly meetings (at a minimum)	Serves to keep decision-makers informed and guide GIS implementation and priorities.	$0 (internal staff time only)
Annual User Satisfaction Survey and Report	January of each year	Users should be given an anonymous survey to provide candid feedback on how well GIS is meeting their needs. Data should be compiled in a report and shared with the County.	$0 (internal staff time only)
Presentations to the Board of Supervisors	Annually	High-level presentation detailing how GIS is improving county services.	$0 (internal staff time only)
Blogs, Email, and Social Media	As pertinent	GIS staff should establish several conduits for disseminating relevant information via various digital mediums.	$0 (internal staff time only)
Newspapers and Television	As pertinent, but at least once a year	As exciting projects are completed, the story should be shared with media outlets. The media seek interesting stories and may work with the County to publicize GIS successes.	$0 (internal staff time only)
Brochures, Newsletters, and Marketing	Throughout the year	GIS staff should try to market successes and promote services through brochures, newsletters, the official County website, and other marketing methods.	$5,000 annually
ROI Workshops	Quarterly, at a minimum	Specific workshops to showcase the value and return on investment that GIS has brought to the County. These can be conducted by internal staff. However, a budget should exist to bring in outside speakers for key topics.	Varies

Communication Method	Frequency	Details	Cost
Conferences, Seminars, and Workshops	Annual / As Available	The Esri User Conference, California GIS Conference, and other GIS conferences, professional organizations, and regional user group participation are essential to professional GIS education. Regional workshops and online seminars are also beneficial.	$5000 (for conference registration and travel expenses)
Visionary Sessions	As needed, at least once a year.	Internal sessions to introduce new and emerging tools the County may consider adding to the GIS product offerings.	$0 (internal staff time only)

User Engagement

Face-to-face, personalized meetings with departments are essential and an excellent way to engage customers and guarantee buy-in, whether in person or remotely. The result is customer engagement and a committed GIS advocate. A key to GIS success is this type of engagement and buy-in. Customers that are being heard and engaged are critical to success. Therefore, a plan should be implemented to meet with every department at appropriate intervals. This task will need to be divided logically amongst team members. Also, expectations will need to be managed. Visibility into project management and an associated SOP will help with this process.

Engagement Item	Frequency	Details	Cost
Department Liaison or Business Unit Meetings	Monthly or quarterly	The GIS Coordinator should meet with key decision-makers each month to apprise them of how GIS is progressing to meet their needs and educate them on how their department can use the technology.	$0 (internal staff time only)

Engagement Item	Frequency	Details	Cost
GIS Users Group Meetings	Monthly or quarterly	Serves to keep users apprised of GIS technology changes, services, and direction. Forming a user group and making user group meetings a priority will also increase awareness, understanding, and support. The GIS-knowledgeable staff in each department should participate in the GIS Users Group meetings and attend user engagement events.	$0 (internal staff time only)
Lunch and Learn Sessions	Monthly	Short, informal lunch-and-learn sessions, where staff can hear a guest speaker and discuss GIS opportunities or concerns in a social setting. Topics should focus on a single item applicable to most users, such as a case study.	$0 (internal staff time only)
GIS Day Event	Annual - Held worldwide on the 2nd Wednesday in November.	Opportunity to share GIS successes with the organization and the public. The GIS Coordinator and users should participate and promote each year.	Nominal – for booth and various displays

Succession Planning

One critical part of communication and knowledge transfer that is frequently overlooked is succession planning. Succession planning refers to the organization's strategy for ensuring staff knowledge is not lost upon staff turnover. When key personnel retire or leave the organization, the information they accumulated during their time with the organization leaves with them. Numerous examples exist where organizations lose vital staff members, and the GIS program suffers. In extreme cases, the loss of a key person might mean the discontinuance of a program.

Lassen County needs a Succession Plan so that when individuals leave the organization, the GIS training and institutional knowledge they acquired are passed to other individuals. This preparation ensures there will not be a lag in organizational capacity when a staff member leaves or a turnover occurs.

It is vital to have a succession plan that focuses on program sustainability. The plan should include technical components, such as standards and documentation, as well as personnel considerations. In addition, succession planning provides for efforts to cross-train GIS staff and a disciplined approach to documenting processes and procedures.

Key components for succession planning include:

- Identifying staff for Continuity of Operations (COO)
- Standard Operating Procedures and process documentation
- Cross-training Plan
- Self-evaluation as to knowledge siloes

A GIS Succession Plan should also explain the GIS Coordinator's duties and responsibilities, COO staff succession, and a documentation list so that operations can continue without interruption.

GIS Training, Education, and Knowledge Transfer Recommendations

The following recommendations will provide a solid understanding and skills for users:

1. The County should develop a formal GIS Training Plan to provide all new and current staff with GIS training and education opportunities. The training plan should include multi-tiered GIS training for all levels of users.
2. Department-specific GIS training should be scheduled to increase organizational GIS skillsets and knowledge base.
3. GIS staff should conduct Mobile GIS Training on topics like GPS, Automatic Vehicle Location (AVL), and field data collection solutions.
4. There is an opportunity to hold GIS ROI Workshops to showcase the value and Return on Investment GIS offers the County.
5. Education and Knowledge Transfer can be promoted through conference attendance, online seminar participation, and informal training sessions.
6. GIS Succession and Continuity of Operations Plans should be an essential initiative.
7. Community Consultation and Engagement should be implemented through methods for sharing ideas, discussions, and information about GIS and emerging technologies with County staff users.

Appendix

Appendix A: Small Municipal and County Government EA (SGEA) Program

The table below lists all products and quantities included in the packaged Small Municipal and County Government EA (SGEA) Program (*as of February 2024 on Government Enterprise Agreement | GIS Enterprise Licensing*).

Esri Small Government Enterprise Agreement Product List	
Product Line	**Level/Product**
Uncapped Quantities	
ArcGIS Desktop	Advanced Standard Basic
ArcGIS Desktop Extensions	ArcGIS 3D Analyst ArcGIS Spatial Analyst ArcGIS Geostatistical Analyst ArcGIS Publisher ArcGIS Network Analyst ArcGIS Workflow Manager ArcGIS Data Reviewer
ArcGIS Enterprise	Advanced Standard
ArcGIS Enterprise Extensions	ArcGIS 3D Analyst ArcGIS Geostatistical Analyst ArcGIS Network Analyst ArcGIS Spatial Analyst ArcGIS Workflow Manager ArcGIS Data Reviewer
ArcGIS Enterprise Additional Capability Servers	ArcGIS Image Server
ArcGIS Monitor	
ArcGIS Runtime & ArcGIS Runtime Analysis Extension	Standard

Esri Small Government Enterprise Agreement Product List	
Limited Quantities	
ArcGIS Developer Subscription	One (1) annual Professional subscription
ArcGIS CityEngine	Two (2) Single Use Licenses
ArcGIS Online Users	50 Viewers 50 Creators 50 ArcGIS Enterprise Creators 6 Advanced Editing ArcGIS Extensions 2 ArcGIS Insights in ArcGIS Enterprise 2 ArcGIS Insights in ArcGIS Online 5 ArcGIS Location Sharing - Enterprise 5 ArcGIS Location Sharing - Online
ArcGIS Online Service Credits	10,000
Other Benefits	
Esri User Conference Registrations	2 (Annually)
Tier 1 Help Desk Individuals	2 (Authorized to call Esri for support)
Instructor-led Training	5% discount on all Instructor-Led training classes and the Esri Training Pass.
Self-Paced e-Learning	Uncapped access included during the agreement term, as covered under standard maintenance

GIS Strategic Implementation Plan

Lassen County | CA

GIS Strategic Plan

March 2024

GEOGRAPHIC
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Beyond Location Intelligence

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Introduction

Phase III includes a high-level Return on Investment (ROI) analysis and a phased GIS Strategic GIS Implementation Plan for Lassen County to maximize the County's benefit of GIS technology utilization and identify a strategy for achieving or advancing the recommended key performance indicators (KPIs). This phase will also focus on aligning the GIS initiative with the goals of the County. Phase III includes the following:

- Return on Investment (ROI) Analysis
- GIS Phased Implementation Plan: Schedule of recommended tasks by phase and a budget for attaining those tasks.

Return on Investment Analysis

Introduction

Implementing a GIS initiative requires a substantial initial investment in staff, hardware, software, data, applications, interfaces, and communications. Any technology investment requires support from organizational leaders and the belief that the benefits will exceed the cost of implementation. Therefore, it is essential to illustrate the potential intangible and tangible benefits of implementing GIS technology.

One of the primary benefits of GIS implementation is increased efficiency and productivity in existing operations. GIS technology can transform existing business practices and reduce the resources required to perform daily tasks. GIS data can also reveal patterns and relationships in geographic data not readily discernable in databases, tables, and lists. GIS provides insight into a location (spatial component) and helps visualize the best options.

An accurate, quantifiable return-on-investment analysis for implementing GIS is difficult. Many of the benefits are intangible, such as faster information retrieval, positive public perception, and better decision-making. It is easier to quantify actual benefits after the GIS is in use. For example, a task that takes hours or days because of the need to gather information may be reduced to a few minutes, or staff time consumed by answering public inquiries might be reduced by hundreds of hours a year because of public-facing GIS applications. There are many possible ways GIS can benefit the County.

GTG conducted a high-level Return on Investment (ROI) analysis on the recommendations made in the Phase II Alternative System Design Report. This analysis presents a strategy for improving the County's business processes using geospatial technology while maximizing the benefit and value of GIS technology. The ROI below notes the operational, organizational, technical, tactical, community, and environmental benefits that may be gained from achieving the recommended tasks and projects. The GIS needs that would be met by each benefit are categorized by Enterprise or Department Needs, as determined by the GIS Needs Assessment (*The needs identified were detailed in Phase I: Comprehensive GIS Needs Assessment Report*).

Operational Benefits

◆ Improve Efficiency

   ◆ Enterprise Needs

      ◆ GIS Policies and Mandates to ensure system and data maintenance, and proper use of data and map products.
      ◆ Data Creation and Submittal Standards developed and documented.
      ◆ Informal training sessions for users to share accomplishments and ideas.
      ◆ Formalize data ownership.

   ◆ Department Needs

      ◆ Planning and Building Services – Mining Operators linked to parcels
      ◆ Planning and Building Services – Parcel Viewer with zoning, permit history, entitlement, code cases
      ◆ Planning and Building Services – Building permit linked to parcels
      ◆ Planning and Building Services / Environmental Health – Field Maps and Survey123 for field work/field inspections
      ◆ Environmental Health – Implement ArcGIS Workforce for delegating field work.
      ◆ Environmental Health – Internal Departmental GIS Viewer containing Department-specific GIS layers.
      ◆ Public Works – CAMS Work Order Dashboard
      ◆ Sheriff's Office – GIS integration with Sunridge Systems RIMS
      ◆ Sheriff's Office – GIS integration with Visual Labs to link videos to incidents

◆ Increase Productivity

   ◆ Enterprise Needs

      ◆ GIS Policies and Mandates to ensure system and data maintenance, and proper use of data and map products.
      ◆ Mobile data and database collection expansion.
      ◆ Expand the Online/Cloud Initiative to include web applications and enable mobile data collection.
      ◆ Formal, on-going, multi-tiered GIS Training Plan with mobile and departmental specific education.
      ◆ Informal training sessions for users to share accomplishments and ideas.

   ◆ Department Needs

      ◆ Assessor's Office – Assessor Parcel web app – internal and public
      ◆ Information Services – Fill GIS Coordinator/Manager position.

- ◆ Information Services – Oversee GIS integrations with departmental systems.
- ◆ Planning and Building Services – Parcel Viewer with zoning, permit history, entitlement, code cases, etc.
- ◆ Planning and Building Services – Building permit linked to parcels
- ◆ University of California Cooperative Extension – ArcGIS Pro training - transition from ArcMap

- ◆ Streamline Business Operations

  - ◆ Enterprise Needs

    - ◆ Coordinated GIS enterprise management to consider GIS with every technology project and business system acquisition.
    - ◆ Service Level Agreements (SLA) between departments and Intergovernmental Agreements with external agencies.
    - ◆ Standards, Policies, and Procedures are needed.
    - ◆ Expand the Online/Cloud Initiative to include web applications and enable mobile data collection.
    - ◆ Succession planning for continuity of operations.

  - ◆ Department Needs

    - ◆ Assessor's Office – Parcel Mapping Workflow/Business Process Analysis.
    - ◆ Environmental Health – Internal departmental GIS Viewer containing department-specific GIS layers.

- ◆ Modernize Spatial Thinking

  - ◆ Enterprise Needs

    - ◆ Formalize the GIS Vision, Goals, and Objectives and align them with the County's vision.
    - ◆ Promote the Planning and Building Services Department as the GIS authority with clear lines of responsibility.
    - ◆ Increased Departmental Use of GIS.
    - ◆ Formal, on-going, multi-tiered GIS Training Plan with mobile and departmental specific education.
    - ◆ Conference attendance on a local, regional, provincial, and national level.
    - ◆ Online seminars and workshops attendance on topics related to new technology or uses as GIS expands.

  - ◆ Department Needs

    - ◆ Assessor's Office – Parcel Mapping Workflow/Business Process Analysis
    - ◆ Child Support Services – Geo-enable demographic data
    - ◆ Clerk's Office – EagleWeb and Eagle Recorder Integration with GIS – Link records to GIS Locations by owner name

- ◆ Planning and Building Services – Eagle Web integration – linking parcels to recorded deeds, legal parcel status, and zoning ordinances
- ◆ Office of Emergency Services – Pre-Plan Projects Application
- ◆ Planning and Building Services – Update Snow Load Application
- ◆ Planning and Building Services – Mining Operators linked to parcels
- ◆ Sheriff's Office – GIS integration with Sunridge Systems RIMS
- ◆ Sheriff's Office – GIS integration with Visual Labs to link videos to incidents
- ◆ University of California Cooperative Extension – ArcGIS Pro training - transition from ArcMap

- ◆ Make Better Quality and More Effective Decisions

    - ◆ Enterprise Needs

        - ◆ Build on relationships with external agencies to foster a Regional GIS Framework Model.
        - ◆ An enterprise, modern database design for the central geodatabase.
        - ◆ Data Creation and Submittal Standards developed and documented.
        - ◆ Return on Investment (ROI) Workshops for supervisors, directors, and managers to highlight the value and benefits that GIS offers.

    - ◆ Department Needs

        - ◆ Child Support Services – Geo-enable demographic data
        - ◆ Child Support Services – Performance Management ArcGIS Solution – Gauge performance of services
        - ◆ Health and Social Services – GIS integration with HMIS for internal use of data.
        - ◆ Health and Social Services – Cluster Mapping Application - For trend analysis
        - ◆ Health and Social Services – Dashboard highlighting Agency statistics
        - ◆ Office of Emergency Services – Flood Inundation Online Maps
        - ◆ Office of Emergency Services – Direct access to Evacuation Routes, Evacuation Zones, and Shelter Locations – most of this data is available in Zonehaven
        - ◆ Office of Emergency Services – Pre-Plan Projects Application
        - ◆ Planning and Building Services – Update Snow Load Application
        - ◆ Public Works - Road layer integrated with pavement condition - using Street Saver

- ◆ Improve Cross-Departmental Operations

    - ◆ Enterprise Needs

        - ◆ A GIS Steering Committee comprised of department directors or deputy directors.

- A GIS Technical Committee formed from department user liaisons to discuss technical aspects of GIS that affect the departments.
- Service Level Agreements (SLA) between departments and Intergovernmental Agreements with external agencies.
- Enterprise-wide datasets, rather than departmental silos.
- Return on Investment (ROI) Workshops for supervisors, directors, and managers to highlight the value and benefits that GIS offers.
- Knowledge transfer to share specific information among individuals.

- Department Needs

  - Information Services – Oversee GIS integrations with departmental systems.
  - Public Works – CAMS CIP integration with GIS

- Improve Communication, Coordination, and Collaboration

  - Enterprise Needs

    - Coordinated GIS enterprise management to consider GIS with every technology project and business system acquisition.
    - GIS User Group meetings.
    - User sensitivity and feedback methods to gather user needs.
    - Knowledge transfer to share specific information among individuals.

  - Department Needs

    - Health and Social Services – GIS integration with HMIS for internal use of data.
    - Office of Emergency Services – Central Operational Dashboard for Emergency Situations

- Respond More Quickly to Citizen Requests

  - Enterprise Needs

    - Methods to measure quality of service and customer satisfaction.
    - Enterprise-wide datasets, rather than departmental silos.
    - More self-serve Public Facing Solutions to enhance access for staff and residents to find information themselves.

  - Department Needs

    - Administration - GIS integration with Granicus for public engagement.
    - Assessor's Office – Assessor Parcel web app – internal and public
    - Child Support Services – Dashboard visualizing cases per case worker
    - Child Support Services – Departmental Viewer containing case locations, demographic data, and other departmental layers.
    - Clerk's Office – Public-facing GIS Viewer including County district layers – to answer questions from the public

- ◆ Health and Social Services – GIS integration with HMIS for internal use of data.
- ◆ Office of Emergency Services / Social Services – Emergency Services web app, Social Services web app
- ◆ Office of Emergency Services – Central Operational Dashboard for Emergency Situations
- ◆ Planning and Building Services – Use Permits - geo-enable from Smart Gov
- ◆ Planning and Building Services – Planning and Building Dashboard
- ◆ Planning and Building Services – Parcel Viewer with zoning, permit history, entitlement, code cases, etc.
- ◆ Environmental Health – Building permit and inspection integration between SmartGov and GIS
- ◆ Public Works – CemSites integration with GIS
- ◆ Public Works – Bus System Application – Including real-time tracking to locate closest bus
- ◆ Public Works – CAMS Work Order Dashboard

- ◆ Effectively Manage Assets and Resources

  - ◆ Enterprise Needs

    - ◆ GIS Functional Group for Asset Management.
    - ◆ An enterprise, modern database design for the central geodatabase.
    - ◆ Strategic Technology Plan
    - ◆ GIS Architectural Design review and network/server diagram of the existing environment(s)
    - ◆ IT Infrastructure scalability to meet operational needs
    - ◆ GIS Mobile Action Plan
    - ◆ Disaster Recovery and Emergency Response Plan
    - ◆ Change Control Policies and Procedures

  - ◆ Department Needs

    - ◆ Agricultural Commissioner's Office – Agricultural infrastructure, above ground and underground such as fences and irrigation infrastructure in online Viewer
    - ◆ Information Services – Fill GIS Coordinator/Manager position.
    - ◆ Information Services – Update policy on data security.
    - ◆ Public Works - Road layer integrated with pavement condition - using Street Saver
    - ◆ Public Works – CemSites integration with GIS

Organizational Benefits

- Save Lives
  - Department Needs
    - Health and Social Services – Rural homeless encampment locations
    - Health and Social Services – Bed-bound patient locations – For evacuation
    - Health and Social Services – Patients on oxygen locations – In Excel currently
    - Health and Social Services – Adults with disabilities locations – Local adult protective services team maintains data in Excel
    - Health and Social Services – Emergency Shelter locations
    - Health and Social Services – Wellness Centers in Rural Areas – Used for sheltering
    - Health and Social Services – GIS integration with HMIS for internal use of data.
    - Office of Emergency Services – Flood Inundation Online Maps
    - Office of Emergency Services – Direct access to Evacuation Routes, Evacuation Zones, and Shelter Locations – most of this data is available in Zonehaven
    - Office of Emergency Services – Pre-Plan Projects Application
    - Office of Emergency Services – Central Operational Dashboard for Emergency Situations
    - Sheriff's Office – NG911-compliant Address Point data – Existing address data is outdated
- Save Time
  - Enterprise Needs
    - Research new and emerging GIS Technologies.
    - Master Data List developed, documented, and distributed.
    - An enterprise, modern database design for the central geodatabase.
    - Reduction of data duplication or redundancy.
    - Enterprise-wide datasets, rather than departmental silos.
  - Department Needs
    - Agricultural Commissioner's Office – ArcGIS Field Maps to do condition assessments and inspections
    - Assessor's Office – Integrate MegaByte with GIS - Link parcels to property tax documents
    - Assessor's Office – Mobile app for Appraisers
    - Clerk's Office – EagleWeb and Eagle Recorder Integration with GIS – Link records to GIS Locations by owner name

- Planning and Building Services – Eagle Web integration – linking parcels to recorded deeds, legal parcel status, and zoning ordinances
- Office of Emergency Services / Social Services – Emergency Services web app, Social Services web app
- Office of Emergency Services – Pre-Plan Projects Application
- Planning and Building Services / Environmental Health – Field Maps and Survey123 for field work/field inspections
- Environmental Health – Implement ArcGIS Workforce for delegating field work.

- Save Money

  - Enterprise Needs

    - Research new and emerging GIS Technologies.
    - Optimal GIS Licensing
    - Succession planning for continuity of operations.

  - Department Needs

    - Assessor's Office – Mobile app for Appraisers

- Comply with State and Federal Mandates

  - Department Needs

    - Agricultural Commissioner's Office – USDA National Agricultural Statistics Service (NASS) Crop Map
    - Agricultural Commissioner's Office – Invasive Species Management database, web app, dashboard
    - Planning and Building Services – Agricultural Preserves (Williamson Act) - Web Soil Survey

- Inform and Educate Stakeholders

  - Enterprise Needs

    - An annual detailed GIS Work Plan to support the County's focus areas.
    - Community consultation and engagement strategy, such as a GIS Blog or Newsletter, to disseminate accomplishments and introduce recent technology.
    - Return on Investment (ROI) Workshops for supervisors, directors, and managers to highlight the value and benefits that GIS offers.

  - Department Needs

    - Agricultural Commissioner's Office – Invasive Species Management database, web app, dashboard
    - Sheriff's Office - Public Safety ArcGIS Hub
    - University of California Cooperative Extension – Educational Story Maps for landowners - affiliated with Intermountain West Joint Venture

- ◆ Boost Capacity Building within the organization
    - ◆ Enterprise Needs
        - ◆ Alignment of GIS projects with organization's vision, goals, and objectives.
        - ◆ Optimal GIS Licensing
        - ◆ GIS Training for IT Professionals to support the geodatabase and understand how the security platform is set up for GIS to secure sensitive information.
    - ◆ Department Needs
        - ◆ Assessor's Office – Mobile app for Appraisers
        - ◆ University of California Cooperative Extension – ArcGIS Pro training - transition from ArcMap
- ◆ Provide Data to Regulators, Developers, and Other Parties
    - ◆ Enterprise Needs
        - ◆ Open Data portal, such as an ArcGIS Hub.
    - ◆ Department Needs
        - ◆ Administration - GIS integration with Granicus for public engagement.
        - ◆ Assessor's Office – Assessor Parcel web app – internal and public
        - ◆ Auditor and Treasurer/Tax Collector – Road Map Application with updated aerial imagery, parcels, and a directions function.
        - ◆ Public Works – Street Status Application – Note roads that are open/closed throughout winter
        - ◆ Sheriff's Office - Public Safety ArcGIS Hub
- ◆ Present Data and Information in New and Effective Ways
    - ◆ Enterprise Needs
        - ◆ An annual detailed GIS Work Plan to support the County's focus areas.
        - ◆ Story Maps
        - ◆ Crowdsourcing Applications
        - ◆ Board of Supervisors GIS – High-level information about what's happening in a District showing, for example, open permits, # of complaints, weather, snowplow locations, and other relevant items.
    - ◆ Department Needs
        - ◆ Administration - GIS integration with Granicus for public engagement.
        - ◆ Agricultural Commissioner's Office – Agriculture Program Story Map, Web App, Dashboard- with CalAg, CalPEATS, CalTrap layers
        - ◆ Agricultural Commissioner's Office – Vegetation Stewardship Story Map
        - ◆ Assessor's Office – Integrate MegaByte with GIS – Link parcels to property tax documents

- ◆ Auditor and Treasurer/Tax Collector – Road Map Application with updated aerial imagery, parcels, and a directions function.
- ◆ Child Support Services – Geo-enable demographic data
- ◆ Child Support Services – Performance Management ArcGIS Solution – Gauge performance of services
- ◆ Child Support Services – Dashboard visualizing cases per case worker
- ◆ Child Support Services – Departmental Viewer containing case locations, demographic data, and other departmental layers.
- ◆ Health and Social Services – Cluster Mapping Application – For trend analysis
- ◆ Health and Social Services – Dashboard highlighting Agency statistics
- ◆ Office of Emergency Services / Social Services – Emergency Services web app, Social Services web app
- ◆ Office of Emergency Services – Pre-Plan Projects Application
- ◆ Office of Emergency Services – Central Operational Dashboard for Emergency Situations
- ◆ Planning and Building Services – Planning and Building Dashboard
- ◆ Environmental Health – Building permit and inspection integration between SmartGov and GIS
- ◆ Public Works – Street Status Application – Note roads that are open/closed throughout winter
- ◆ Public Works – Susanville Ranch Park Map – Recreate existing static map
- ◆ Sheriff's Office - Public Safety ArcGIS Hub

- ◆ Track People, Vehicles, Resources, Events, and Assets

  - ◆ Department Needs

    - ◆ Health and Social Services – Rural homeless encampment locations
    - ◆ Health and Social Services – Bed-bound patient locations – For evacuation
    - ◆ Health and Social Services – Patients on oxygen locations – In Excel currently
    - ◆ Health and Social Services – Adults with disabilities locations – Local adult protective services team maintains data in Excel
    - ◆ Health and Social Services – Emergency Shelter locations
    - ◆ Health and Social Services – Wellness Centers in Rural Areas – Used for sheltering
    - ◆ Environmental Health – Integrate SPOT devices with GIS software to highlight staff locations on an online map
    - ◆ Public Works – Bus System Application – Including real-time tracking to locate the closest bus

- ◆ Maintain, Monitor, and Model Organizational Assets

  - ◆ Enterprise Needs

- Up-to-date Parcels, Address Points, and Street Centerlines data layers, and high-quality Aerial Photography – as well as departmental specific layers as identified in the Department Needs sections.
  - Department Needs
    - Agricultural Commissioner's Office – Agricultural infrastructure, above ground and underground such as fences and irrigation infrastructure in online Viewer
- Secure Grant and Funding Opportunities
  - Enterprise Needs
    - A GIS budget or funding model and an initiative to research grants and funding alternatives to sustain and expand the program.

Technical & Tactical Benefits

- Improve Data Accuracy
  - Enterprise Needs
    - A Digital Data Assessment to analyze the data and identify any inaccurate data, non-standard spatial projections, and incomplete data or attributes.
    - Metadata applied to enterprise datasets to understand the source, quality, and geometry of the data.
- Automate Workflows
  - Enterprise Needs
    - Mobile data and database collection expansion.
    - Increased Level of Automation
- Improve Information Processing
  - Enterprise Needs
    - Digital Data Management and Life Cycle Practices developed and documented.
    - Enterprise GIS Integration and Interoperability with business systems.
  - Department Needs
    - Agricultural Commissioner's Office – Integration with CalAgPermits to visualize permits.
    - Agricultural Commissioner's Office – Integration with CalPEATS to visualize inspection locations.
    - Agricultural Commissioner's Office – Integration with CalTrap to visualize trapping locations.

- Assessor's Office – Integrate MegaByte with GIS - Link parcels to property tax documents
- University of California Cooperative Extension – Integrate Avenza with GIS
- University of California Cooperative Extension – Photo Point process upgrade to integrate with GIS

- Enhance Data Analytics
  - Enterprise Needs
    - Predictive Analysis Tools (Insights, Business Analyst)
  - Department Needs
    - Health and Social Services – Cluster Mapping Application - For trend analysis
    - Health and Social Services – Dashboard highlighting Agency statistics

- Visualize Planning Scenarios
  - Department Needs
    - Office of Emergency Services – Flood Inundation Online Maps
    - Office of Emergency Services – Direct access to Evacuation Routes, Evacuation Zones, and Shelter Locations – most of this data is available in Zonehaven
    - Office of Emergency Services – Pre-Plan Projects Application
    - Office of Emergency Services – Central Operational Dashboard for Emergency Situations

- Computerize Manual Procedures, Processes, and Protocols
  - Enterprise Needs
    - Mobile data and database collection expansion.
  - Department Needs
    - Administration – Documents - title, bids for Capital Improvement Projects (CIP) – attached to GIS layer. All documents are currently paper-based. There is no records manager and each department is responsible for its records and documents management.
    - Child Support Services – Survey123 Application to conduct remote surveys
    - Office of Emergency Services – Pre-Plan Projects Application
    - Planning and Building Services / Environmental Health – Field Maps and Survey123 for field work/field inspections
    - Environmental Health – Implement ArcGIS Workforce for delegating field work.

- Identify, Analyze, Predict, and Quantify Impacts to the Community

◆ Enterprise Needs

  ◆ Board of Supervisors GIS – High-level information about what's happening in a District showing, for example, open permits, # of complaints, weather, snowplow locations, and other relevant items.

◆ Department Needs –

  ◆ Health and Social Services – Cluster Mapping Application - For trend analysis
  ◆ Health and Social Services – Dashboard highlighting Agency statistics
  ◆ Office of Emergency Services – Flood Inundation Online Maps
  ◆ Office of Emergency Services – Direct access to Evacuation Routes, Evacuation Zones, and Shelter Locations – most of this data is available in Zonehaven
  ◆ Planning and Building Services – Planning and Building Dashboard

◆ Monitor Real-Time Critical Events

  ◆ Department Needs

    ◆ Agricultural Commissioner's Office – Water Resources Stream Gauge and Irrigation Diversion web app to monitor real-time data
    ◆ Office of Emergency Services – Central Operational Dashboard for Emergency Situations
    ◆ Public Works – Bus System Application – Including real-time tracking to locate closest bus

Community & Environmental Benefits

◆ Prioritize Environmental Stewardship

  ◆ Department Needs

    ◆ Planning and Building Services – Natural diversity database
    ◆ Environmental Health - Hazardous Materials/Liquid Waste locations
    ◆ University of California Cooperative Extension – Archaeological sites
    ◆ University of California Cooperative Extension – Geo-enable Vegetation Access Databases

◆ Protect the Community

  ◆ Department Needs

    ◆ Health and Social Services – Rural homeless encampment locations
    ◆ Health and Social Services – Bed-bound patient locations – For evacuation
    ◆ Health and Social Services – Patients on oxygen locations – In Excel currently

- ◆ Health and Social Services – Adults with disabilities locations – Local adult protective services team maintains data in Excel
- ◆ Health and Social Services – Emergency Shelter locations
- ◆ Health and Social Services – Wellness Centers in Rural Areas – Used for sheltering
- ◆ Health and Social Services – Cluster Mapping Application - For trend analysis
- ◆ Health and Social Services – Dashboard highlighting Agency statistics
- ◆ Office of Emergency Services – Flood Inundation Online Maps
- ◆ Office of Emergency Services – Direct access to Evacuation Routes, Evacuation Zones, and Shelter Locations – most of this data is available in Zonehaven
- ◆ Office of Emergency Services – Pre-Plan Projects Application
- ◆ Office of Emergency Services – Central Operational Dashboard for Emergency Situations

- ◆ Promote Open and Transparent Government

  - ◆ Enterprise Needs

    - ◆ Community consultation and engagement strategy, such as a GIS Blog or Newsletter, to disseminate accomplishments and introduce recent technology.
    - ◆ Open Data Community Policy developed and approved.
    - ◆ Open Data portal, such as an ArcGIS Hub.

- ◆ Improve Access to Government Information

  - ◆ Enterprise Needs

    - ◆ Build on relationships with external agencies to foster a Regional GIS Framework Model.
    - ◆ Open Data Community Policy developed and approved.
    - ◆ Open Data portal, such as an ArcGIS Hub.

  - ◆ Department Needs

    - ◆ Agricultural Commissioner's Office – Agriculture Program Story Map, Web App, Dashboard- with CalAg, CalPEATS, CalTrap layers
    - ◆ Assessor's Office – Integrate MegaByte with GIS - Link parcels to property tax documents
    - ◆ Auditor and Treasurer/Tax Collector – Road Map Application with updated aerial imagery, parcels, and a directions function.

- ◆ Empower and Engage Residents

  - ◆ Enterprise Needs

    - ◆ More self-serve Public Facing Solutions to enhance access for staff and residents to find information themselves.

◆ Department Needs

- ◆ Child Support Services – Community Engagement Story Map
- ◆ Clerk's Office – Elections Story Map including polling locations
- ◆ Health and Social Services – Emergency Preparedness Story Map - highlight areas of concern and resources
- ◆ Environmental Health – Story Map for the public on what the Division does.
- ◆ Public Works – CAMS CIP Story Map

◆ Monitor Climate, Conservation, and Environmental Change

◆ Department Needs

- ◆ Planning and Building Services – Natural diversity database
- ◆ Environmental Health - Hazardous Materials/Liquid Waste locations

GIS Implementation Plan

Introduction

This phased GIS Strategic Implementation Plan compiles the information developed during the Needs Assessment and provides a recommended strategy moving forward for Lassen County's GIS Program. The Phased Implementation Plan includes a detailed summary of the tasks recommended for the County and a matrix of priority actions with schedule timelines and cost estimates. **It is essential to understand that this implementation plan encapsulates ALL GIS recommendations for the County; however, it is not an all-or-nothing implementation.** Suggested priorities for these tasks are in the budget table below. The County may proceed with the tasks outlined below or adjust the schedule based on priority and a realistic timeframe and budget. The County should review and revise the priorities as necessary to determine what can be accomplished within its resources and budget.

Six Pillars of GIS Sustainability

As with the previous phases of the project, the components of the GIS Strategic Implementation Plan are categorized by the Six Pillars of GIS Sustainability.
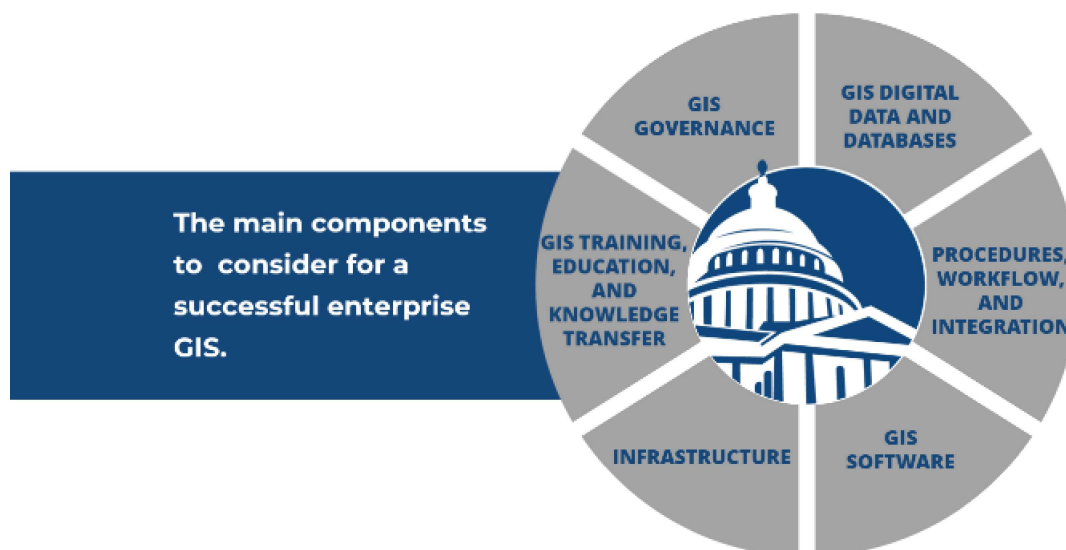
Phased Implementation Plan

This section presents a detailed summary of the recommended actions to be accomplished by the GIS staff in a phased plan for governance, data, software, workflows, processes, procedures, and training for GIS growth and modernization. *The needs identified were detailed in Phase I: Comprehensive GIS Needs Assessment Report.*

Phase 1: Key Performance Indicators (KPI)
GIS Governance
Formalize the GIS Governance Model.
Establish a GIS Steering Committee of department managers.
Improve coordinated Enterprise GIS Management.
Develop GIS Policies and Mandates.
Hold GIS User Group meetings and events.
Evaluate Key Performance Indicators (KPI) annually.
Data and Databases
Conduct a Digital Data Assessment of all GIS Data layers.
Geo-enable data for display in GIS as identified in the Needs Assessment.
Create or update departmental GIS layers as identified in the Needs Assessment.
Create Street Centerlines layer.
Create a Master Data List and complete Metadata for core GIS data layers.
Procedures, Workflow, and Integration
Document GIS Standard Operating Procedures (SOPs) and other workflows identified in the Needs Assessment.
GIS Software
Move to the Esri Small Government Enterprise Agreement upon renewal of current license agreement or sooner.
Prioritize and deploy 5 Web Applications as identified in the Needs Assessment.
Prioritize and build 3 Dashboards as identified in the Needs Assessment.
IT Infrastructure
Develop a Strategic Technology Plan and IT Disaster Recovery and Emergency Response Plan including GIS.
Develop a GIS Architectural Design diagram.

GIS Training, Education and Knowledge Transfer
Develop a formal, multi-tiered GIS Training Plan, including Mobile GIS training.
Schedule departmental-specific GIS training, especially for new staff members.
Conduct Mobile GIS Training.
Promote Education and Knowledge Transfer through blogs, newsletters, videos, seminars, and lunch-and-learns.

Phase 2: Key Performance Indicators (KPI)

GIS Governance
Add a GIS Technician under the GIS Coordinator.
Develop GIS Policies and Mandates.
Consider a GIS Technical Committee as GIS use expands.
Hold GIS User Group meetings and events.
Evaluate Key Performance Indicators (KPI) annually.
Develop an annual GIS Work Plan aligned with the County's Vision, Goals, and Objectives.
Explore GIS grants and funding initiatives.
Define how GIS can support the County's mission, vision statements, and priority focus areas.

Data and Databases
Geo-enable data for display in GIS as identified in the Needs Assessment.
Create or update departmental GIS layers as identified in the Needs Assessment.
Create Street Centerlines layer.
Acquire or access updated Aerial Photography.
Modernize the enterprise database design.
Develop Data Creation and Submittal Standards.

Procedures, Workflow, and Integration
Prioritize and begin integrating GIS with business systems as identified in the Needs Assessment.

GIS Software
Evaluate whether ArcGIS Enterprise is warranted due to GIS growth.
Prioritize and deploy 5 Web Applications as identified in the Needs Assessment.

Prioritize and build 2 Dashboards as identified in the Needs Assessment.
Prioritize and implement 2 Mobile GIS and GPS solutions as identified in the Needs Assessment.

IT Infrastructure

Develop a GIS Mobile Action Plan.

GIS Training, Education and Knowledge Transfer

Develop a formal, multi-tiered GIS Training Plan, including Mobile GIS training.
Schedule departmental-specific GIS training, especially for new staff members.
Attend instructor-led training classes from Esri or another vendor.
Hold GIS ROI Workshops.
Develop GIS Succession and Continuity of Operations Plans.
Promote Education and Knowledge Transfer through blogs, newsletters, videos, seminars, and lunch-and-learns.

Phase 3: Key Performance Indicators (KPI)

GIS Governance

Shift the GIS responsibilities to the IS Department.
Consider a GIS Technical Committee as GIS use expands.
Hold GIS User Group meetings and events.
Evaluate Key Performance Indicators (KPI) annually.
Develop an annual GIS Work Plan aligned with the County's Vision, Goals, and Objectives.
Establish a Regional GIS Policy and execute Data Sharing Agreements with External Agencies.
Explore GIS grants and funding initiatives.
Execute GIS Service Level Agreements (SLA) with each user department.
Promote Community Consultation and Engagement.

Data and Databases

Geo-enable data for display in GIS as identified in the Needs Assessment.
Create or update departmental GIS layers as identified in the Needs Assessment.
Configure Open Data on ArcGIS Hub and develop an Open Data Community Policy.
Examine and improve Digital Data Management and Life Cycle Practices.

Procedures, Workflow, and Integration

Document GIS Standard Operating Procedures (SOPs) and other workflows identified in the Needs Assessment.
Prioritize and begin integrating GIS with business systems as identified in the Needs Assessment.
GIS Software
If not deployed in Phase 2, deploy ArcGIS Enterprise.
Prioritize and deploy 5 Web Applications as identified in the Needs Assessment.
Prioritize and build 2 Dashboards as identified in the Needs Assessment.
Prioritize and implement 2 Mobile GIS and GPS solutions as identified in the Needs Assessment.
Prioritize and build 3 Story Maps as identified in the Needs Assessment.
IT Infrastructure
Develop a Data Storage Strategy.
Develop IT Change Control Policies and Procedures.
GIS Training, Education and Knowledge Transfer
Develop a formal, multi-tiered GIS Training Plan, including Mobile GIS training.
Schedule departmental-specific GIS training, especially for new staff members.
Attend instructor-led training classes from Esri or another vendor.
Hold GIS ROI Workshops.
Develop GIS Succession and Continuity of Operations Plans.
Promote Education and Knowledge Transfer through blogs, newsletters, videos, seminars, and lunch-and-learns.

Phase 4: Key Performance Indicators (KPI)
GIS Governance
Add a GIS Analyst under the GIS Coordinator.
Hold GIS User Group meetings and events.
Evaluate Key Performance Indicators (KPI) annually.
Develop an annual GIS Work Plan aligned with the County's Vision, Goals, and Objectives.
Explore GIS grants and funding initiatives.
Define how GIS can support the County's mission, vision statements, and priority focus areas.

Promote Community Consultation and Engagement.
Explore publishing a GIS blog or newsletter to share accomplishments and opportunities with the user community.
Data and Databases
Create or update departmental GIS layers as identified in the Needs Assessment.
Acquire or access updated Aerial Photography.
Procedures, Workflow, and Integration
Prioritize and begin integrating GIS with business systems as identified in the Needs Assessment.
GIS Software
Deploy ArcGIS Hub.
Prioritize and deploy 5 Web Applications as identified in the Needs Assessment.
Prioritize and build 2 Dashboards as identified in the Needs Assessment.
Prioritize and implement 2 Mobile GIS and GPS solutions as identified in the Needs Assessment.
Prioritize and build 3 Story Maps as identified in the Needs Assessment.
IT Infrastructure
Embrace 'smart' technology to modernize GIS.
GIS Training, Education and Knowledge Transfer
Develop a formal, multi-tiered GIS Training Plan, including Mobile GIS training.
Schedule departmental-specific GIS training, especially for new staff members.
Attend instructor-led training classes from Esri or another vendor.
Promote Education and Knowledge Transfer through blogs, newsletters, videos, seminars, and lunch-and-learns.

Phase 5: Key Performance Indicators (KPI)

GIS Governance
Hold GIS User Group meetings and events.
Evaluate Key Performance Indicators (KPI) annually.
Develop an annual GIS Work Plan aligned with the County's Vision, Goals, and Objectives.
Explore GIS grants and funding initiatives.

Promote Community Consultation and Engagement.
Explore publishing a GIS blog or newsletter to share accomplishments and opportunities with the user community.
Data and Databases
Create or update departmental GIS layers as identified in the Needs Assessment.
Procedures, Workflow, and Integration
Prioritize and integrate GIS with business systems as identified in the Needs Assessment.
GIS Software
Prioritize and deploy 3 Web Applications as identified in the Needs Assessment.
Prioritize and build 2 Dashboards as identified in the Needs Assessment.
Prioritize and build 3 Story Maps as identified in the Needs Assessment.
IT Infrastructure
Embrace 'smart' technology to modernize GIS.
GIS Training, Education and Knowledge Transfer
Develop a formal, multi-tiered GIS Training Plan, including Mobile GIS training.
Schedule departmental-specific GIS training, especially for new staff members.
Attend instructor-led training classes from Esri or another vendor.
Promote Education and Knowledge Transfer through blogs, newsletters, videos, seminars, and lunch-and-learns.

Project Schedule and Cost Estimate

The GIS maintenance, operational, and enhancement implementation tasks and costs are summarized by phase in the tables below, along with an estimate of the Esri software maintenance fees. Note that the costs do not include the salaries for new positions.

All cost estimates in the tables below assume that the work is to be done by a GIS consultant and reflect estimates of the labor cost for completing each task. These estimates are based on the typical level of effort for each task and GTG's current understanding of the required scopes. Actual costs should be determined from a requirement-gathering process to determine a detailed scope of work for each task. Tasks with no cost indicate work that

County staff will likely perform. It is also assumed that the in-house staff, augmented with GIS consultants, will maintain the resulting products into the future.

Also, these estimated budget totals for GIS consulting are not all or nothing. If the County is faced with a constrained budget for consulting services, the implementation tasks may be prioritized and redistributed across phases. Further, specifications for each task must be detailed in order for a consultant to determine the scope of work and the exact cost.

Priority Grade

Broad priority categories have been assigned to each task to help the County distinguish higher priority items that should be accomplished during each phase, as budget and time allow. It is recommended that all priority categories are implemented within a phase rather than focusing on one or two categories across all phases. The four categories are defined as:

CATEGORY	DESCRIPTION
FOUNDATIONAL	High-priority objectives required to support GIS objectives.
CRITICAL	Mission-critical items that multiple departments need to improve operations or sustain the GIS program.
IMPORTANT	Important items that may benefit processes and procedures.
SUPPORTIVE	Tasks that serve to support the enterprise-wide GIS effort.

Summary Budget by Phase

Lassen County, CA		GIS IMPLEMENTATION PLAN				
		Phase One	Phase Two	Phase Three	Phase Four	Phase Five
GIS STRATEGIC PLAN PHASED IMPLEMENTATION COST:		$155,500	$193,000	$159,500	$138,500	$83,500

Note that the costs do not include Esri license maintenance fees or new position salaries.

Summary Budget by Phase and Priority

Phase One	Total Cost:	$155,500				
Priority Grade	**GIS Governance**	**Data and Databases**	**Procedures, Workflow, and Integration**	**GIS Software**	**IT Infrastructure**	**GIS Training, Education and Knowledge Transfer**
FOUNDATIONAL	$2,500	$45,000	$10,000	$0	$0	$1,000
CRITICAL	$0	$50,000	$0	$44,500	$0	$0
IMPORTANT	$0	$2,500	$0	$0	$0	$0
SUPPORTIVE	$0	$0	$0	$0	$0	$0
Total	$2,500	$97,500	$10,000	$44,500	$0	$1,000

Phase Two	Total Cost:	$193,000				
Priority Grade	**GIS Governance**	**Data and Databases**	**Procedures, Workflow, and Integration**	**GIS Software**	**IT Infrastructure**	**GIS Training, Education and Knowledge Transfer**
FOUNDATIONAL	$2,500	$35,000	$40,000	$0	$0	$2,500
CRITICAL	$0	$50,000	$0	$48,000	$0	$0
IMPORTANT	$0	$5,000	$0	$0	$0	$0
SUPPORTIVE	$0	$0	$0	$0	$10,000	$0
Total	$2,500	$90,000	$40,000	$48,000	$10,000	$2,500

Phase Three	Total Cost:	$159,500				
Priority Grade	**GIS Governance**	**Data and Databases**	**Procedures, Workflow, and Integration**	**GIS Software**	**IT Infrastructure**	**GIS Training, Education and Knowledge Transfer**
FOUNDATIONAL	$0	$15,000	$30,000	$15,000	$0	$2,500
CRITICAL	$0	$25,000	$0	$66,000	$0	$0
IMPORTANT	$0	$2,500	$0	$0	$0	$0
SUPPORTIVE	$0	$3,500	$0	$0	$0	$0
Total	$0	$46,000	$30,000	$81,000	$0	$2,500

Phase Four	Total Cost:	$138,500				
Priority Grade	**GIS Governance**	**Data and Databases**	**Procedures, Workflow, and Integration**	**GIS Software**	**IT Infrastructure**	**GIS Training, Education and Knowledge Transfer**
FOUNDATIONAL	$0	$20,000	$15,000	$15,000	$0	$2,500
CRITICAL	$0	$15,000	$0	$66,000	$0	$0
IMPORTANT	$0	$0	$0	$0	$5,000	$0
SUPPORTIVE	$0	$0	$0	$0	$0	$0
Total	$0	$35,000	$15,000	$81,000	$5,000	$2,500

Phase Five	Total Cost:	$83,500				
Priority Grade	**GIS Governance**	**Data and Databases**	**Procedures, Workflow, and Integration**	**GIS Software**	**IT Infrastructure**	**GIS Training, Education and Knowledge Transfer**
FOUNDATIONAL	$0	$10,000	$10,000	$0	$0	$2,500
CRITICAL	$0	$10,000	$0	$46,000	$0	$0
IMPORTANT	$0	$0	$0	$0	$5,000	$0
SUPPORTIVE	$0	$0	$0	$0	$0	$0
Total	$0	$20,000	$10,000	$46,000	$5,000	$2,500

GIS Implementation Schedule and Budget

GIS IMPLEMENTATION PLAN

Lassen County, CA — GIS Governance

Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Formalize the GIS Governance Model.	FOUNDATIONAL	$0					
Add a GIS Technician under the GIS Coordinator. (Cost is salary only, not including benefits.)				$65,000			
Shift the GIS responsibilities to the IS Department.							
Add a GIS Analyst under the GIS Coordinator. (Cost is salary only, not including benefits.)						$70,000	
Establish a GIS Steering Committee of department managers.	FOUNDATIONAL	$0					
Improve coordinated Enterprise GIS Management.	FOUNDATIONAL	$0					
Develop GIS Policies and Mandates.	FOUNDATIONAL	$5,000	$2,500	$2,500			
Consider a GIS Technical Committee as GIS use expands.	FOUNDATIONAL	$0					
Hold GIS User Group meetings and events.	FOUNDATIONAL	$0					
Evaluate Key Performance Indicators (KPI) annually.	CRITICAL	$0					
Develop an annual GIS Work Plan aligned with the County's Vision, Goals, and Objectives.	IMPORTANT	$0					
Establish a Regional GIS Policy and execute Data Sharing Agreements with External Agencies.	IMPORTANT	$0					
Explore GIS grants and funding initiatives.	IMPORTANT	$0					
Define how GIS can support the County's mission, vision statements, and priority focus areas.	SUPPORTIVE	$0					
Execute GIS Service Level Agreements (SLA) with each user department.	SUPPORTIVE	$0					
Promote Community Consultation and Engagement.	SUPPORTIVE	$0					
Explore publishing a GIS blog or newsletter to share accomplishments and opportunities with the user community.	SUPPORTIVE	$0					
Total Cost for Governance		**$5,000**	**$2,500**	**$2,500**	**$0**	**$0**	**$0**

Data and Databases

Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Conduct a Digital Data Assessment of all GIS Data layers.	FOUNDATIONAL	$15,000	$15,000				
Geo-enable data for display in GIS as identified in the Needs Assessment.	FOUNDATIONAL	$30,000	$15,000	$10,000	$5,000		
Create or update departmental GIS layers as identified in the Needs Assessment.	CRITICAL	$150,000	$50,000	$50,000	$25,000	$15,000	$10,000
Create Street Centerlines layer.	FOUNDATIONAL	$20,000	$15,000	$5,000			
Acquire or access updated Aerial Photography.	FOUNDATIONAL	$20,000		$10,000		$10,000	
Maintain the Parcel and Zoning Layers	FOUNDATIONAL	$40,000		$10,000	$10,000	$10,000	$10,000
Develop Data Creation and Submittal Standards.	IMPORTANT	$5,000		$5,000			
Configure Open Data on ArcGIS Hub and develop an Open Data Community Policy.	IMPORTANT	$2,500			$2,500		
Create a Master Data List and complete Metadata for core GIS data layers.	IMPORTANT	$2,500	$2,500				
Examine and improve Digital Data Management and Life Cycle Practices.	SUPPORTIVE	$3,500			$3,500		
Total Cost for Data and Databases		**$288,500**	**$97,500**	**$90,000**	**$46,000**	**$35,000**	**$20,000**

Work to be performed by Lassen County staff.

$ Costs for work to be done by a consulting firm or contractor.

Procedures, Workflow, and Integration							
Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Document GIS Standard Operating Procedures (SOPs) and other workflows identified in the Needs Assessment.	FOUNDATIONAL	$15,000	$10,000		$5,000		
Prioritize and integrate GIS with business systems as identified in the Needs Assessment.	FOUNDATIONAL	$90,000		$40,000	$25,000	$15,000	$10,000
Total Cost for Procedures, Workflow, and Integration		**$105,000**	**$10,000**	**$40,000**	**$30,000**	**$15,000**	**$10,000**

GIS Software							
Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Deploy ArcGIS Enterprise.	FOUNDATIONAL	$15,000			$15,000		
Deploy ArcGIS Hub.	FOUNDATIONAL	$15,000				$15,000	
Prioritize and deploy 23 Web Applications as identified in the Needs Assessment.	CRITICAL	$115,000	$25,000	$25,000	$25,000	$25,000	$15,000
Prioritize and build 11 Dashboards as identified in the Needs Assessment.	CRITICAL	$71,500	$19,500	$13,000	$13,000	$13,000	$13,000
Prioritize and implement 6 Mobile GIS and GPS solutions as identified in the Needs Assessment.	CRITICAL	$30,000		$10,000	$10,000	$10,000	
Prioritize and build 9 Story Maps as identified in the Needs Assessment.	CRITICAL	$54,000			$18,000	$18,000	$18,000
Total Cost for GIS Software		**$300,500**	**$44,500**	**$48,000**	**$81,000**	**$81,000**	**$46,000**

IT Infrastructure							
Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Develop a Strategic Technology Plan and IT Disaster Recovery and Emergency Response Plan including GIS.	SUPPORTIVE	$0					
Develop a GIS Architectural Design diagram.	SUPPORTIVE	$0					
Develop a GIS Mobile Action Plan.	SUPPORTIVE	$10,000		$10,000			
Develop a Data Storage Strategy.	SUPPORTIVE	$0					
Develop IT Change Control Policies and Procedures.	SUPPORTIVE	$0					
Embrace 'smart' technology to modernize GIS.	IMPORTANT	$10,000				$5,000	$5,000
Total Cost for IT Infrastructure		**$20,000**	**$0**	**$10,000**	**$0**	**$5,000**	**$5,000**

GIS Training, Education and Knowledge Transfer							
Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Develop a formal, multi-tiered GIS Training Plan, including Mobile GIS training.	FOUNDATIONAL	$0					
Schedule departmental-specific GIS training, especially for new staff members.	FOUNDATIONAL	$0					
Conduct Mobile GIS Training.	FOUNDATIONAL	$1,000	$1,000				
Attend instructor-led training classes from Esri or another vendor.	FOUNDATIONAL	$10,000		$2,500	$2,500	$2,500	$2,500
Hold GIS ROI Workshops.	SUPPORTIVE	$0					
Develop GIS Succession and Continuity of Operations Plans.	CRITICAL	$0					
Promote Education and Knowledge Transfer.	SUPPORTIVE	$0					
Total Cost for GIS Training, Education, and Knowledge Transfer		**$11,000**	**$1,000**	**$2,500**	**$2,500**	**$2,500**	**$2,500**
TOTAL GIS STRATEGIC PLAN IMPLEMENTATION COST (Not including Esri license maintenance fees or new position salaries)		**$730,000**	**$155,500**	**$193,000**	**$159,500**	**$138,500**	**$83,500**

GIS Benchmarking Scores

Lassen County | CA

GIS Strategic Plan

August 8, 2023

GIS Benchmarking Scores

METRIC #	PILLAR	METRIC/KPI	METRIC DESCRIPTION	PERCENTAGE	CURRENT SITUATION	CATEGORY (See explanation in Lists worksheet.)
1	Governance	A GIS Strategic Plan	A sound GIS Strategic Plan provides the game plan for a County's development of a successful relationship with geospatial technology and corporate data sets. This plan should be the roadmap for GIS activities and goals at the County.	90%	The County has contracted GTG to develop an organization-wide GIS Strategic Plan.	Foundational
2	Governance	Annual Update to the Strategic Plan	The GIS Strategic Plan should be updated or reviewed annually because the County's roles, vision, and functions constantly evolve.	0%	Given the lack of a GIS Strategic Plan at the County, there has not been a Strategic Plan update undertaken.	Important
3	Governance	A GIS Vision, Goals, and Objectives	The vision, goals, and objectives of GIS technology must be formalized, align with the City's vision, and have measurable objectives.	40%	The creation of a GIS vision, goals, and objectives was a driving factor for undertaking the development of a GIS Strategic Plan. The County currently has goals for GIS that were outlined in the Strategic Plan RFP.	Foundational
4	Governance	Key Performance Measures or Indicators (KPI)	Key performance measures or key performance indicators (KPIs) are metrics that gauge whether and how specific goals are met. These numeric representations of success or failure are crucial for identifying and tracking imperatives for success.	50%	The County has presented the foundation for KPIs in the RFP for this Strategic Plan. The Strategic Plan will build upon this foundation and create formal KPIs that can be tracked into the future.	Important
5	Governance	A Formalized Governance Model	The term governance model refers to the constellation of relationships between individuals and departments within an organization. A formal governance model identifies lines of responsibility and the hierarchy of decision-making power within an organization.	30%	There is no formal governance model in place at the County at this time. The planning team is leading the formalization effort with support from IT, but not all departments have bought into this governance model at this time. The County has more of an ad hoc approach to GIS governance at this time.	Foundational
6	Governance	GIS Job Classifications	The various positions within an organization should be classified according to the formalized governance model. These job classifications denote the skill set, financial worth, decision-making power, hierarchical standing, and overall responsibilities of a given position within the organization	70%	There is a GIS coordinator job class in place at that County today. However, this position is not currently filled. The County will likely need to add additional job classifications in the future. A GIS Analyst and GIS Technician job classification should be considered.	Supportive
7	Governance	Coordinated GIS Enterprise Management	Coordinated GIS Enterprise Management entails the art of managing, monitoring, and coordinating data and GIS use throughout the organization and making sure key stakeholders have visibility as to their disposition.	60%	There are some formal GIS Enterprise management practices in place at the County. As GIS use grows, management practices will need to be revisited and reevaluated. All GIS management procedures and roles should be documented.	Foundational
8	Governance	GIS Steering Committee	A GIS steering committee is a group that is composed of top-level organizational leaders. The steering committee serves an advisory role for the organization's GIS direction and determines the schedule, priority, and policy issues that are related to implementation.	20%	There is no GIS Steering Committee in place at the County today. There was a committee established for decisions on this project, but this is not a formal steering committee. This group will need to be comprised of individuals that will guide the GIS program in the future.	Foundational

#	Category	Term	Description	%	Status	Score
9	Governance	GIS Sponsors or Champions	The GIS sponsor team is composed of executive leadership or an executive leader. This person or persons are responsible for championing the GIS cause, resource acquirement, and budgeting related to the GIS implementation process.	80%	There are GIS Champions at the County today. These individuals comprised the temporary committee that has driven the decision to undertake this project.	Foundational
10	Governance	GIS Technical Committee	As the name implies, a GIS Technical Committee oversees all the technical challenges of deploying an enterprise GIS. It can set standards for ways that GIS data are gathered, managed, and shared throughout an organization.	0%	There is not a GIS Technical Committee in place at the County today.	Foundational
11	Governance	GIS Functional Groups	GIS functional groups are specialized teams within an organization responsible for discussing and overseeing key focus areas, such as public safety, land management, utilities, or customer service.	20%	There are no formal functional groups in place today. These groups will be identified through the Strategic Plan process and should be formalized.	Foundational
12	Governance	GIS User Group	A GIS user group is a cohort of stakeholders who share information and compare experiences with GIS technology for the benefit of all members. A GIS user group is typically managed by a GIS Coordinator and meets frequently at set intervals.	0%	There is no GIS User Group in place at the County today.	Foundational
13	Governance	Regional GIS Framework Model	Regionalization is a formal or informal agreement between parties or entities to cooperate. Concerning geospatial technologies, regionalization may include the sharing of data, resources, applications, training, and education between disparate groups of GIS users in the region seeking to pool their resources and achieve similar goals.	50%	The County has begun formalizing a regional GIS framework model. The County has been working with other agencies, including BLM, USDA, CalFire in recent years. However, there is a desire at the County to more formally interface with regional agencies	Supportive
14	Governance	GIS Policies and Mandates	Policies refer to procedural codes of conduct that are ratified and enforced by organizational authorities. These policies are internally imposed and guide everything from data and resource sharing within the GIS initiative to financial concerns for the City at large. SOPs are critical for the sustainability of the GIS effort and must be created to ensure that GIS success can be propagated.	0%	There are no formal GIS policies or mandates in place at the County today.	Foundational
15	Governance	User Sensitivity and Feedback	User sensitivity refers to the capabilities of a particular GIS technology to fluidly respond to a user's request for information.	40%	There is one primary GIS user at the County today. This individual produces maps as they are needed and assists with any minor GIS requests that arise. This is a reactive process at this time.	Important
16	Governance	Measure of Quality of Service and Customer Satisfaction	A measure of the quality of service refers to the understanding and soliciting the opinions of users as to how GIS and GIS staff are meeting their needs.	40%	There are informal processes in place to track customer satisfaction today regarding GIS assistance. Ideally, this would be formalized through a ticketing system.	Important
17	Governance	A GIS Culture of Collaboration	A culture of collaboration refers to an attitude expressed by stakeholders in their relationships to one another, as they pertain to enterprise GIS. It is an unquantifiable web of positive interpersonal interactions that facilitates creative problem-solving and resource sharing amongst individuals and departments to achieve commonly held goals.	70%	It is apparent that County Departments work well together. As GIS use increases at the County, this trend should be expected to continue.	Foundational

#	Category	Item	Description	Score %	Comment	Rating
18	Governance	GIS Authority and Clear Lines of Responsibility	A line of responsibility describes the vertical chain of liability and authority in an organization. In common-sense terms, a line of responsibility formally lays out who is responsible for what and to whom.	40%	The GIS Coordinator would have reported to the planning department, but this position remains unfilled. Thus, the lines of responsibility are largely still up in the air. This should be formalized.	Foundational
19	Governance	A GIS Budget or Funding Model	A funding model is a methodical and institutionalized approach to building a reliable revenue base to support an organization's core programs and services.	100%	There is a GIS budget in place for licensing and for the GIS Strategic Plan. This is primarily part of the Planning budget today, but other departments assist as needed. Eventually, licenses and licensing costs might be split out among other departments as well.	Important
20	Governance	Grants and Funding Initiatives	A funding initiative allows a government organization to diversify the funding for its GIS initiative. Grants are sums of money that are distributed by governmental entities for specific project-related purposes.	20%	The Sheriff's office has undertaken funding initiatives in the past, but there is no concerted organization- wide effort today. Grant writing is a decentralized process managed individually by departments at the County.	Important
21	Governance	An Annual Detailed GIS Work Plan	A work plan proposes the schedule and budgeting for a specific project. It not only offers a step-by-step description of the ways that a plan will be enacted but also projects a timeline and explains how funding will be deployed within the plan's framework.	0%	There is no GIS Work Plan at the County today. This is a major goal of the Strategic Plan.	Important
22	Governance	GIS Blog or Newsletter	A GIS blog or digital newsletter can increase communications around a GIS initiative. It provides transparency and accountability by keeping stakeholders and community members in the loop through easily accessible media.	0%	There is no GIS blog or newsletter managed by County staff at this time.	Supportive
23	Governance	Alignment of GIS with Organization's Vision, Goals, and Objectives	The enterprise GIS needs to be aligned with the organization's vision, goals, and objectives. This is necessary from the ground up. These goals would then be broken down into objectives to be measured by performance indicators.	60%	The GIS core user team has tried to align GIS Goals with organizational objectives. This has not been formalized.	Important
24	Governance	Service Level Agreements (SLA)	In terms of GIS, SLAs are formal, binding agreements that outline what stakeholders can expect from an enterprise GIS and what each department can expect in terms of service.	0%	The County has SLAs for other responsibilities in IT, but not for GIS.	Supportive
25	Governance	New & Emerging GIS Technologies	Information Technology and GIS should be prepared to adopt new and emerging software, such as ArcGIS Online, Portal for ArcGIS, ArcGIS Pro, Drone2Map, 3D mapping, and other technologies.	60%	County GIS users are aware of GIS capabilities. This has led to the prioritization of this project and sending staff members to GIS conferences. The current gap is getting owners of projects in departments to agree with the development of new solutions.	Supportive
26	Governance	Community Consultation and Engagement Strategy	A Community consultation and engagement strategy refers to the process of building relationships with external partners, such as members of the general public, informed citizens, local businesses, non-profit groups, adjacent jurisdictions, regional government agencies, and any other interest groups, to work with the organization to solicit comments, feedback, and input about the GIS program.	40%	The County has had public outreach for other GIS efforts. There was also a public GIS questionnaire for this project.	Supportive

#	Category	Metric	Description	Score	Notes	Priority
1	Data and Databases	A Digital Data Assessment	A digital data assessment examines the completion and breadth of an organization's existing data layers. It evaluates the accuracy, completeness, and overall health of the existing digital data layers within an organization.	50%	A digital data assessment was undertaken, and County staff determined that a number of data layers need work.	Foundational
2	Data and Databases	Master Data List	The Master Data List (MDL) enumerates all the data sets that an organization needs for enterprise GIS implementation. The various datasets should be detailed by type and source and assessed in terms of their quantities, accessibility, and formats.	20%	There is no Master Data List at the County today. The data is held separately on the County's file server. There is no authoritative spreadsheet list, and the data does not include any information about data sources.	Foundational
3	Data and Databases	Metadata	Metadata describes the collective characteristics of data. In short, metadata is data about data. Metadata details how, when, and where data was created or collected and documents the scale, accuracy, resolution, and other properties.	20%	There is some metadata stored on the County's file server. This should be cleaned up and stored in a central location.	Important
4	Data and Databases	Critical Data Layers: Parcels	A parcel is a legally defined area of land. A legal description of plots of land for tax purposes usually accompanies a GIS parcel layer. This metric highlights the existence and quality of the County's Parcel data.	50%	County staff identified that the parcel data needs to be updated. This work is being undertaken as part of this project.	Critical
5	Data and Databases	Critical Data Layers: Address Points	An address point is a location marked by its position relative to a physical structure. Ideally, there is a one-to-one match between address points and every physical address in every community. This metric highlights the existence and quality of the County's Address Point data.	0%	There is no address point data at the County today.	Critical
6	Data and Databases	Critical Data Layers: Centerlines	Street centerlines serve as a method of mapping via address. Address ranges are maintained on the centerlines, allowing addresses to be mapped to their approximate location using linear geometry and interpolation. This metric highlights the existence and quality of the County's Centerline data.	0%	There is no centerline data at the County today.	Critical
7	Data and Databases	Critical Data Layers: Aerial Photography	Aerial photography (or airborne imagery) is the capture of photographs from an aircraft. Platforms for aerial photography include satellites, fixed-wing aircraft, helicopters, or unmanned aerial systems (UAS or 'drones'). This metric highlights the existence and quality of the County's aerial photography.	40%	The County relies primarily on satellite imagery from Google today. Public Safety has some drone footage, and the Planning team has a limited contract for aerial photography support. These resources supplement the Google imagery.	Critical
8	Data and Databases	Departmental Specific Layers	Data custodian groups maintain identified datasets based on their proximity to the business process that originate the data. Some of the data layers are utilized across the organization. Department-specific layers are mapped representations of data that correlate to the goals and objectives of a department(s).	40%	Planning, the County Clerk, and Behavioral Health have department specific data layers. Public Works and the County Assessor have a number of department-specific data needs.	Foundational
9	Data and Databases	Enterprise, Modern Database Design	Enterprise database design refers to the way that a data repository is crafted to meet objectives and further the goals of the organization. Enterprise	20%	There is a desire to retire the existing database, because it is seen as outdated. County staff mentioned wanting to transition to a cloud	Foundational

#	Category	Item	Description	Score	Comments	Priority
			database design usually includes focusing on the data, the use of data models, such as Esri's Local Government Information Model (LGIM), and integration strategies.		database.	
10	Data and Databases	Data Creation and Submittal Standards	Data creation procedures are the standardizing guidelines by which an organization's data is collected, cataloged, and turned into information products. This is an important set of procedures, as it protects against redundancy and unnecessary work, both of which reduce overall cost-effectiveness.	0%	There are no formal GIS data creation and submittal standards in place at the County today.	Foundational
11	Data and Databases	Central Data Repository	A central data repository is an organization's aggregated collection of GIS data, gathered from all information resources. Pooling data in this manner allows for ease of maintenance, monitoring, and collection of metadata.	60%	There is a network drive that is used to store authoritative data layers. Some departments also keep data locally.	Supportive
12	Data and Databases	Assigned Custodianship and Data Stewards	Data stewards are responsible for the administration and upkeep of specific digital data layers. They are custodians in that they monitor the accuracy as well as the security of departmental data.	60%	There were data stewards initially set for authoritative GIS data layers. However, these stewards have not been updated/maintained since the drafter in the Planning Department left the County.	Important
13	Data and Databases	Mobile Data and Database Collection	Mobile data and database collection refers to the capture of data in the field by inspectors, caseworkers, public works crews, etc.	0%	There is no mobile GIS data collection occurring at the County today.	Important
14	Data and Databases	Open Data (ArcGIS Hub)	With a hub, data can be organized and easily accessible from an easy-to-use web page, along with access to download any dataset to be shared as 'Open Data'.	20%	There is not an Open Data Hub in place at the County today. A County contractor has made an interactive snow load map available to the public. Also several of PDF maps have been made, such as area plans, general plans, and safety elements.	Important
15	Data and Databases	Open Data Community Policy	Open data describe an increasingly prevalent policy that allows citizens, stakeholders, and non-stakeholders access to an organization's GIS-based data and data layers. The worldwide consensus is that open data is a great way for residents and visitors to the area to get critical information and see the results of a GIS initiative.	0%	There is no Open Data Community Policy in place at the County today.	Supportive
16	Data and Databases	Digital Data Management and Life Cycle Practices	The life cycle of data from new to updated to aging should be monitored and managed. Data that is no longer relevant should be taken out of circulation and archived. It is important that only pertinent and up-to-date data be made available to maintain user confidence in digital data management.	50%	These practices have not been formalized at the County level, but there are formal department practices in the IT and Planning Departments.	Supportive
1	Procedures, Workflow, Integration, & Interoperability	Enterprise GIS Integration and Interoperability	Enterprise integration describes the process whereby existing IT business system data are integrated into the GIS, such as asset management, tax assessment, work order, or financial systems. This could include accessing and viewing data from business systems within GIS, accessing and viewing GIS within interoperable IT systems, or pushing data from GIS to feed these IT systems. Interoperability means	20%	The Planning Department uses ArcMap and ArcGIS Online, but other software has not been integrated at this time.	Critical

#	Category	Item	Description	%	Commentary	Score
			the ability of the GIS to work with other systems within and across organizational boundaries			
2	Procedures, Workflow, Integration, & Interoperability	Parcels and Property Assessment	Tax or property assessment systems integration provides valuable insight into parcel data such as ownership, legal description, and zoning.	40%	The County is working to update the authoritative parcel layer in GIS.	Critical
3	Procedures, Workflow, Integration, & Interoperability	Asset Management & Work Order Software	Asset management and Work order solutions manage, schedule, process, and maintain data about fixed assets, work orders, work performed, and results. Most work order and asset management solutions embrace GIS-centric solutions.	0%	The County currently does not have software for asset management. If the County begins to look for Asset Management software providers, it will be important to consider compatibility with GIS.	Critical
4	Procedures, Workflow, Integration, & Interoperability	ERP Software (Permits, Code Enforcement, & Inspections)	Enterprise Resource Planning (ERP) solutions are integrative software applications that automate various functions related to planning, permitting, finance, and administration.	20%	The County uses SmartGov software for permit tracking. Staff members look at aerial imagery for code enforcement or use GIS to create graphics for hearings. SmartGov has GIS capability, but there is no integration with GIS at this time.	Critical
5	Procedures, Workflow, Integration, & Interoperability	Public Safety Solutions	Public safety solutions are the software application(s) used in Computer- Aided Dispatch, Record Management System (RMS), Crime Analysis, and other database and analysis tools.	80%	The County has Sun Ridge Systems RIMS software which includes GIS functionality. Intrado software is used for addressing, which feeds into the public safety system for 911 dispatch. The Zonehaven evacuation program is also being utilized today by the Sheriff's Department. There is room for additional staff training and integration with these software products.	Critical
6	Procedures, Workflow, Integration, & Interoperability	Document Management Software	Enterprise Content Management or Document Management software integration connects the organization's drawings, plans, photos, CAD files, and documents to GIS features.	0%	The County has Eagle Web software, which is a content management platform. The County Clerk has access to a document management solution, but there is no Countywide document management system. This system is not integrated with GIS. There is an integration between SmartGov and MegaByte (property tax system) information. The County team is currently attempting to use MegaByte to feed the system that planning uses, so this information does not have to be stored in multiple locations.	Critical
7	Procedures, Workflow, Integration, & Interoperability	Identified Opportunities and Gaps	Gaps in the enterprise and integrated GIS solutions need to be identified and documented on a regular basis. They could include public safety data, permitting data, work order data, or crowdsourcing information. Opportunities are those databases that can effectively be incorporated into the enterprise GIS initiative.	80%	GIS opportunities and gaps are being identified in this strategic plan.	Supportive
8	Procedures, Workflow, Integration, & Interoperability	Departmental Access to Critical Data Layers	Critical departmental data layers are those that are crucial to the GIS enterprise. Departmental access refers to the ease with which various organizational departments may access these layers. Departmental accessibility is a critical component of success.	60%	The County has floating ArcGIS licenses that staff members can use. Departments that want access to these licenses, can have it. However, GIS is not being fully utilized across all County departments. Additionally, the Planning Department and the Clerk's Office have access to ArcGIS Online.	Important
9	Procedures, Workflow, Integration, & Interoperability	GIS Standard Operating Procedures (SOP)	Standard operating procedures (SOPs) are the organization's formally adopted blueprint for actions to be taken in pursuit of the desired objective. They are step by step, formulaic, and repeatable.	0%	There are no GIS SOPs at the County today.	Supportive
10	Procedures, Workflow,	Data Creation and Maintenance	Data maintenance procedures are a subset of SOPs that designate how to monitor and keep current	0%	There are no formal data creation and maintenance procedures at the	Supportive

#	Category	Criterion	Description	Score	Notes	Rating
	Integration, & Interoperability	Procedures	the massive amounts of data collected in an enterprise GIS.		County today.	Supportive
11	Procedures, Workflow, Integration, & Interoperability	GIS Application Development Procedures	GIS application development procedures are critical to an effective enterprise-wide GIS, whether written in-house or configuration of an acquired product. Procedures should exist detailing how the organization manages software acquisition and/or custom software development.	0%	There are no formal GIS application development procedures at the County today.	Supportive
12	Procedures, Workflow, Integration, & Interoperability	Metadata Standards Defined, Applied and Enforced	It is critically important to define metadata standards. Metadata raises political as well as practical issues for enterprise GIS. Clear lines of accountability and quality control for the gathering, storage, and application of metadata should be ratified by an organization.	0%	There are no formal metadata standards at the County today.	Supportive
13	Procedures, Workflow, Integration & Interoperability	No Data Duplication or Redundancy	Data duplication refers to any instance where the same or similar data is being stored and maintained by separate individuals or departments.	50%	There are known data duplicates between the County's server and ArcGIS Online. For example, there is a zoning data layer on the County's server and a separate zoning data layer in ArcGIS Online.	Important
14	Procedures, Workflow, Integration, & Interoperability	Enterprise Rather than Departmental Silos	Departmental silos are databases exclusively maintained by a single department. They are full of information and, like actual silos, vertically orientated but spread out over the terrain of an organization.	10%	A lot of the County's data is in departmental siloes at this time.	Supportive
15	Procedures, Workflow, Integration, & Interoperability	GIS Technical Support (Ticketing/ Help Desk)	Like users of any technology system, GIS users often need help or encounter problems while navigating GIS technologies. The team responsible for an organization's GIS technical support will walk users through issues and provide readily available troubleshooting information.	100%	The County uses Zoho, a cloud-based ticketing software. GIS licensing requests are handled through this ticketing system.	Supportive
16	Procedures, Workflow, Integration, & Interoperability	Departmental Use of GIS	This refers to the actual utilization of GIS within all departments of a local government. In the context of geospatial technology, departmental use implies a decentralized implementation of GIS technologies.	30%	At this point, three or four County Departments use GIS. There is room for expansion throughout the rest of the organization.	Important
17	Procedures, Workflow, Integration, & Interoperability	Integration Standards and Documentation	This category evaluates how structured the organization's GIS integrations are and the extent to which they are known, documented, and managed.	0%	There are no formal GIS integration standards in place at the County today.	Supportive
18	Procedures, Workflow, Integration, & Interoperability	Data Ownership, Access, and Sharing Policies	This criterion is used to determine what type of controls exist for the organization's geodata. This metric also measures the extent to which the policies are actually applied and adhered to.	10%	Data ownership is known internally by the Planning team, but this information is not formally documented. Planning is the data steward for most authoritative data. These data ownership responsibilities should be shared with the appropriate user groups and formally documented.	Supportive
1	GIS Software Ecosystem	Optimal GIS Licensing	The objective of this metric is to measure how available and pervasive GIS software is throughout the organization and to create an optimum and cost- effective licensing strategy. A license agreement is a legal agreement entered into by the organization and a GIS software vendor that stipulates the limitations, liabilities, and appropriate applications of the vendor's	30%	The County has ArcGIS concurrent licenses and ArcGIS Online licenses. This licensing format has limited the County's GIS use. This Strategic Plan will include licensing recommendations. Renewal with Esri due in August, 2023 ($8,900 for 7 standard and 2 basic) - currently deprecated, under mature support. Esri will pro-rate whatever is spent on maintenance to new platform. Esri is trying to sell a smaller population program - Enterprise Agreement for $15,000 (for Counties under 25,000). However, the County is not ready to jump to enterprise level. The ISD Supervisor recommends to renew	Foundational

#	Category	Metric	Description	%	Notes	Priority
			technology.		maintenance at $8,900 and the split cost between 4 depts (Health and Social Services, Planning Department, Clerk, and Sheriff)	
2	GIS Software Ecosystem	Level of GIS COTS Versus Custom Code (Code Debt)	off-the-shelf (COTS) applications forcing GIS staff to develop custom products. This has changed in recent years as Esri, and its business partners have released hundreds of configurable solutions ready to implement. Occasionally, organizations still need to develop scripts for data transfer, conversion, or optimizing a process. This metric also evaluates how much	100%	County staff does not use custom code to fulfill GIS needs.	Supportive
3	GIS Software Ecosystem	Widget Development	Widget is a term for a small software program that augments the functionality of a larger software program. GIS widgets provide a way to customize applications following the specific needs and circumstances of an organization.	0%	No custom widgets have been developed by/for the County.	Supportive
4	GIS Software Ecosystem	Access to Software	The GIS market has been flooded with new software tools. Most organizations are not equipped to handle all of this software. The traditional local government GIS has been focused on data, hardware, and core software products. Usually, there is not enough staff focused on implementing and supporting the wealth of targeted applications.	90%	Most staff members that need access, do have access to GIS software. The Planning Department oversees cost sharing and access to GIS software.	Important
5	GIS Software Ecosystem	Internal Business Solutions	An internal business solution is a web-based GIS data viewer that is accessible to an organization's employees that allows them to view and conduct basic analytical tasks on GIS data rapidly. This browser is typically housed on-premises in the organization's private network, accessible only to an organization's staff.	40%	County staff have access to a ParcelQuest solution. The County receives two free ParcelQuest accounts for the tax collector and assessor. Additionally, the County pays for ten extra accounts for departmental users.	Important
6	GIS Software Ecosystem	Public Facing Solutions	The introduction of Esri's ArcGIS Online Apps has opened a completely new way of sharing data with the public in an intuitive format. This metric highlights the existence of public-facing solutions at the County.	20%	The County has a public-facing Snow Load Application. There is interest in sharing more data and applications with the public.	Important
7	GIS Software Ecosystem	Online/Cloud Initiative	An online initiative is a program established to plan, design, and deploy cloud-based GIS solutions. Esri's ArcGIS Online and ArcGIS Hub are leading solutions for local government and offer a cloud-based alternative.	40%	County staff has access to ArcGIS Online, but it is not being optimally used at this time.	Important
8	GIS Software Ecosystem	Story Maps	The introduction of Esri's Story Maps has opened a completely new way of sharing data with the public in an intuitive and graphics-rich format. Simple and effective web-based maps that tell a story of an event, history, or occasion within local government can have a powerful effect on the community.	0%	The County does not have any Story Maps.	Supportive

#	Category	Benchmark	Description	%	Notes	Priority
9	GIS Software Ecosystem	Crowdsourcing Applications	Crowdsourcing applications like Esri's Public Comment application and various 311 applications can allow users to provide information to the County in a much more dynamic fashion.	0%	The County does not have any crowdsourcing applications.	Important
10	GIS Software Ecosystem	County Commissioner GIS	County Commissioner Government GIS refers to the use of GIS technology by executives and council members to visualize information about the various issues related to the organization.	30%	GIS software has been used to create PDF maps for Council meetings. The Clerk's Office has provided PDF maps to highlight districts and enable redistricting.	Important
11	GIS Software Ecosystem	Modeling Extensions	The maturation of GIS has resulted in a wealth of specialized software products. Esri has traditionally called these extensions, as they are extensions to the core product but not a part of the core product set. These include Spatial Analyst, Network Analyst, 3D Analyst, and a host of others.	0%	The County has not used modeling extensions.	Foundational
12	GIS Software Ecosystem	Mobile GIS Solutions	Mobile software refers to GIS applications that are designed for mobile use on a tablet or a smartphone. The mobility of GIS is a critical component of any successful enterprise GIS.	30%	There are several Garmin handheld GPS devices that are available to County staff. The Planning and Environmental Health Departments each have two spot devices, which allow employees to share their location while in the field. These devices are not integrated with GIS at this time. The Welfare and Behavioral Health Departments use County cell phones with GPS tracking to know where staff members are located in the field.	Important
13	GIS Software Ecosystem	Global Positioning System (GPS) Technology	GIS is a technology that is integrative to most other local government technologies. Many local governments are using GPS-enabled devices to pinpoint vehicle, equipment, or asset location. GPS-enabled devices that may be cellular and/or Wi-Fi-connected include smartphones, tablets, sensors, and survey units. This allows an organization to optimize responses, such as public safety for emergencies or field crews for work orders.	30%	The County has Garmin handheld devices and 130 County-managed cell phones.	Important
14	GIS Software Ecosystem	Desktop GIS Customization (Add-ins)	This category is intended to identify the extent to which an organization has customized its Desktop GIS software via ArcObjects, VDI access, custom toolboxes, etc.	100%	County staff does not use any Desktop add-ins.	Important
15	GIS Software Ecosystem	GIS Lifecycle Management, Review, and Planning	This benchmark is used to evaluate how structured and consistent the organization's GIS upgrade, maintenance, and replacement schedule and process are.	0%	There has been no lifecycle planning for GIS data or applications at the County.	Supportive
16	GIS Software Ecosystem	ArcGIS Hub	With a hub, GIS maps and applications are organized and easily accessible from an easy-to-use web page, along with access to download any GIS data layers to be shared as 'Open Data'. ArcGIS Hub is a solution offered by Esri to house all of an organization's GIS efforts in one place.	0%	The County does not have an ArcGIS Hub.	Important
17	GIS Software Ecosystem	Predictive Analysis Tools (Insights, Business Analyst)	GIS allows patterns to be seen through the visualization of spatial data that are otherwise impossible to discern through tables or lists. For example, the past, current, and future capital projects and expenditures, the history and trend in infrastructure repairs, the patterns of park usage,	0%	County staff has not used predictive analysis tools.	Important

#	GIS Software Ecosystem	Level of Automation	Description	%	Notes	Score
18	GIS Software Ecosystem	Level of Automation	and the areas of economic growth. This criterion is intended to evaluate how, why, and where the organization is using automation within its GIS operations.	0%	There are no scripts being used for GIS initiatives.	Supportive
1	IT Infrastructure	Strategic Technology Plan	A strategic technology plan describes an organization's current and future relationship with technology and outlines how this technology will further the goals of the organization. The components of this plan serve as the bedrock for the technology undergirding the GIS platform.	60%	The County does have a Strategic Technology Plan, but the current plan is outdated and likely insufficient. However, there are staff members in place that can improve the plan.	Foundational
2	IT Infrastructure	GIS Architectural Design	GIS architectural design is the plan that addresses GIS software technology, capacity performance, and IT infrastructure, including hardware, network communications, software architecture, enterprise security, backup, platform performance, and data administration.	0%	There is not formal GIS Architectural Design documentation included within the technology plan.	Foundational
3	IT Infrastructure	IT Infrastructure to Meet Operational Needs	IT infrastructure refers to a dynamic web of processes, networks, hardware, and software resources that support the activities of an integrated IT department. For many organizations, IT infrastructure/performance does not meet operational needs and impedes effective GIS use and enterprise adoption.	50%	At this time, the IT infrastructure meets the County's GIS needs, but decisions will need to be made as the County begins using an Enterprise GIS license model in 2023.	Foundational
4	IT Infrastructure	Hardware Lifecycle and Replacement Plans	An IT replacement plan is a formal plan for updating hardware and software resources in the future. Budgetary concerns, goals, and long-term objectives are taken into account.	100%	There is a formal Hardware Lifecycle and Replacement Plan in place at the County.	Foundational
5	IT Infrastructure	GIS Training for IT Professionals	For IT professionals to assist an organization with crowdsourcing or tech support, they need proficiency in GIS technologies.	30%	A County staff member has been to an Esri conference, but there is no formal on-going training in place.	Supportive
6	IT Infrastructure	24/7 Uptime and Availability	The term 24/7 availability refers to the availability of IT infrastructure and GIS technology at all hours of the day, every day of the week.	100%	The County's GIS is available 24/7.	Foundational
7	IT Infrastructure	Enterprise Back-Up	Maintaining an enterprise database backup is integral to mitigating risk in emergency situations where information is lost or corrupted. Having an updated data backup can save an organization much time and money.	100%	The County maintains an Enterprise back-up.	Foundational
8	IT Infrastructure	Data Storage	GIS is data intensive and requires a voluminous amount of storage. This used to be a bigger concern for local governments. However, the cost of data storage has dropped dramatically, and the technology has improved so that server farms with a huge array of available disk space are available for most local governments	70%	For the most part, the County's data storage capabilities are sufficient. However, video storage has been an issue in the past.	Foundational
9	IT Infrastructure	IT, Hardware, and Mobile Standards	IT, hardware, and mobile standards refer to the formalized set of guidelines and requirements required by the organization to support an enterprise GIS. Some organizations have done an	80%	There are formal standards in place at the County, but there are some gaps in these standards.	Supportive

#	Category	Benchmark	Description	Score	Comment	Rating
10	IT Infrastructure	GIS Mobile Action Plan	intensive study as to the best tools based on various business cases, giving the users opportunities to test the various hardware and software for suitability. A mobile action plan is an outline of the tactics that a city will deploy to increase GIS accessibility on tablets and smartphones.	0%	There is no GIS Mobile Action Plan in place at the County today.	Foundational
11	IT Infrastructure	IT Security Policy	This criterion is used to describe the organization's formal Information Security (InfoSec) policies related to the use and operation of the organization's GIS. Data security means protecting digital data, such as those in a database, from unauthorized use and destructive forces, such as a cyberattack or a data breach.	80%	The County has an IT Security Policy in place. An additional focus on GIS could be beneficial.	Supportive
12	IT Infrastructure	Centralized Documentation	This benchmark is intended to evaluate the extent to which the associated plans, diagrams, solutions, SOPs, etc., are consolidated and logically organized into an accessible and centralized place.	80%	There is a lot of documentation stored centrally at the County today. However, some authoritative documentation is not stored centrally. The County should use SharePoint to provide documentation centrally to the user base.	Supportive
13	IT Infrastructure	Disaster Recovery and Emergency Response Plan	This category assesses the organization's documented plans and policies related to disaster recovery (DR) and emergency response (ER) for their GIS.	60%	There is a Disaster Recovery and Emergency Response Plan in place today, but the current plan does not address GIS continuity of operations.	Supportive
14	IT Infrastructure	Change Control Policies and Procedures	This metric evaluates the organization's general IT and GIS-specific change control policies and procedures. A mature organization will have a formal change control process.	50%	The Change Control Policies and Procedures are not formally documented today.	Supportive
15	IT Infrastructure	Infrastructure Capacity and Scalability	This benchmark evaluates the agility of an organization to respond to immediate needs.	100%	The County's infrastructure has adequate capacity and scalability.	Supportive
16	IT Infrastructure	Redundancy and Resilience	This criterion is intended to answer the three related questions: "Are there single points of failure?" "To what extent can the GIS handle/tolerate faults?" and "How responsive is the organization's GIS in addressing outages?"	100%	The County's infrastructure has adequate redundancy and resilience.	Supportive
1	Training, Education, and Knowledge Transfer	Formal On-going GIS Training Plan	A formal ongoing GIS training plan is a ratified outline of steps, schedules, and costs for continuing to train the County's employees. It is important to have a multi-year, multi-tiered training plan, considering that GIS is a rapidly evolving technology, and organizational needs are ever-changing.	0%	There is no formal on-going GIS training plan in place at the County today.	Foundational
2	Training, Education, and Knowledge Transfer	Multi-tiered GIS software training	The formal training plan must include multi-tiered GIS software training using a standardized process for training employees at all levels of understanding in the use of GIS technology.	0%	There is no multi-tiered GIS software training in place at the County today.	Foundational
3	Training, Education, and Knowledge Transfer	Mobile Software Training	Mobile software training is the process of teaching users how to engage with GIS technology on their mobile devices.	30%	There is training on how to use spot devices, but this is limited. This training should be formalized and extended to Esri field tools.	Foundational
4	Training, Education, and Knowledge Transfer	Departmental Specific Education	Departmental-specific education provides specialized training procedures according to a department's specific needs.	0%	There is no formal departmental specific education in place at the County today.	Foundational

#	Category	Item	Description	%	Comment	Score
5	Training, Education, and Knowledge Transfer	ROI Workshops	Return on Investment (ROI) workshops are specific workshops that are related to the value and ROI that GIS offers the County. Each department is an important component in the success of an enterprise GIS.	0%	ROI workshops are not used by the County today.	Supportive
6	Training, Education, and Knowledge Transfer	Knowledge Transfer	Knowledge transfer refers to the process of communicating the GIS know- how and knowledge among different entities in the organization. This serves to transfer specific knowledge among individuals, creating a depth of knowledge that will help reduce knowledge gaps if someone leaves the organization or is on extended leave.	40%	One-on-one training is provided as the need arises. This should be formalized.	Supportive
7	Training, Education, and Knowledge Transfer	Conferences	Conferences are gatherings of the GIS that provide a range of opportunities for furthering employee GIS education. Talks, lectures, lessons, and socialization with other industry professionals are ways to advance an understanding of geospatial technologies and keep abreast of new developments.	30%	One County staff member has been to an Esri conference. There are plans to send additional staff members in the future.	Supportive
8	Training, Education, and Knowledge Transfer	On-line Seminars and Workshops	Online seminars and workshops are online programs implemented by a variety of organizations that further GIS education among employees.	10%	Staff members have used YouTube as a resource as specific questions have arisen.	Supportive
9	Training, Education, and Knowledge Transfer	Informal Training Sessions	Informal training sessions refer to a free-and-easy meeting where employees can discuss concerns with GIS team members and users in a social setting.	10%	The County participates in the California Counties Information Systems Directors Association (CCISDA). This group could provide professionals to train staff members within GIS workgroups.	Supportive
10	Training, Education, and Knowledge Transfer	Succession Planning	Succession planning refers to an organization's strategy for filling essential positions with experienced employees. Several succession planning strategies can be applied, such as knowledge transfer, cross-training, and system documentation.	0%	There is no formal GIS succession planning going on at the County today.	Critical
11	Training, Education, and Knowledge Transfer	GIS Community Consultation and Engagement	This evaluation category is intended to define the extent to which a formal GIS community and/or user group exists within the organization and is used to educate and disseminate information about the GIS program.	0%	There is potential for the County to begin engaging with the local GIS community. A few examples are the Far North Regional GIS Council, a Reading area GIS group, and/or a working group with Modoc and Shasta Counties to coordinate on GIS needs.	Supportive

Categories are assigned to each GIS metric to help identify higher priority items that should be accomplished as budget and time allow. The four categories are defined as:

– Foundational – High priority objectives that must be met to support GIS objectives.
– Critical – Important items that are needed by multiple departments to improve their operations, or to help sustain the GIS program.
– Important – Items which may benefit one department's processes and procedures.
– Supportive – Tasks which serve to support the enterprise-wide GIS effort.

GIS Implementation Budget and Schedule

Lassen County | CA

GIS Strategic Plan

August 8, 2023

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GIS Implementation Budget and Schedule

GIS IMPLEMENTATION PLAN

Lassen County, CA

GIS Governance

Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Formalize the GIS Governance Model.	FOUNDATIONAL	$0					
Add a GIS Technician under the GIS Coordinator. (Cost is salary only, not including benefits.)				*$65,000*			
Shift the GIS responsibilities to the IS Department.							
Add a GIS Analyst under the GIS Coordinator. (Cost is salary only, not including benefits.)						*$70,000*	
Establish a GIS Steering Committee of department managers.	FOUNDATIONAL	$0					
Improve coordinated Enterprise GIS Management.	FOUNDATIONAL	$0					
Develop GIS Policies and Mandates.	FOUNDATIONAL	$5,000	$2,500	$2,500			
Consider a GIS Technical Committee as GIS use expands.	FOUNDATIONAL	$0					
Hold GIS User Group meetings and events.	FOUNDATIONAL	$0					
Evaluate Key Performance Indicators (KPI) annually.	CRITICAL	$0					
Develop an annual GIS Work Plan aligned with the County's Vision, Goals, and Objectives.	IMPORTANT	$0					
Establish a Regional GIS Policy and execute Data Sharing Agreements with External Agencies.	IMPORTANT	$0					
Explore GIS grants and funding initiatives.	IMPORTANT	$0					
Define how GIS can support the County's mission, vision statements, and priority focus areas.	SUPPORTIVE	$0					
Execute GIS Service Level Agreements (SLA) with each user department.	SUPPORTIVE	$0					
Promote Community Consultation and Engagement.	SUPPORTIVE	$0					
Explore publishing a GIS blog or newsletter to share accomplishments and opportunities with the user community.	SUPPORTIVE	$0					
Total Cost for Governance		**$5,000**	**$2,500**	**$2,500**	**$0**	**$0**	**$0**

Data and Databases

Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Conduct a Digital Data Assessment of all GIS Data layers.	FOUNDATIONAL	$15,000	$15,000				
Geo-enable data for display in GIS as identified in the Needs Assessment.	FOUNDATIONAL	$30,000	$15,000	$10,000	$5,000		
Create or update departmental GIS layers as identified in the Needs Assessment.	CRITICAL	$150,000	$50,000	$50,000	$25,000	$15,000	$10,000
Create Street Centerlines layer.	FOUNDATIONAL	$20,000	$15,000	$5,000			
Acquire or access updated Aerial Photography.	FOUNDATIONAL	$20,000		$10,000		$10,000	
Maintain the Parcel and Zoning Layers	FOUNDATIONAL	$40,000		$10,000	$10,000	$10,000	$10,000
Develop Data Creation and Submittal Standards.	IMPORTANT	$5,000		$5,000			
Configure Open Data on ArcGIS Hub and develop an Open Data Community Portal.	IMPORTANT	$2,500			$2,500		
Create a Master Data List and complete Metadata for core GIS data layers.	IMPORTANT	$2,500	$2,500				
Examine and improve Digital Data Management and Life Cycle Practices.	SUPPORTIVE	$3,500			$3,500		
Total Cost for Data and Databases		**$288,500**	**$97,500**	**$90,000**	**$46,000**	**$35,000**	**$20,000**

Procedures, Workflow, and Integration

Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Document GIS Standard Operating Procedures (SOPs) and other workflows identified in the Needs Assessment.	FOUNDATIONAL	$15,000	$10,000		$5,000		
Prioritize and integrate GIS with business systems as identified in the Needs Assessment.	FOUNDATIONAL	$90,000		$40,000	$25,000	$15,000	$10,000
Total Cost for Procedures, Workflow, and Integration		**$105,000**	**$10,000**	**$40,000**	**$30,000**	**$15,000**	**$10,000**

GIS Software

Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Deploy ArcGIS Enterprise.	FOUNDATIONAL	$15,000			$15,000		
Deploy ArcGIS Hub.	FOUNDATIONAL	$15,000				$15,000	
Prioritize and deploy 23 Web Applications as identified in the Needs Assessment.	CRITICAL	$115,000	$25,000	$25,000	$25,000	$25,000	$15,000
Prioritize and build 11 Dashboards as identified in the Needs Assessment.	CRITICAL	$71,500	$19,500	$13,000	$13,000	$13,000	$13,000
Prioritize and implement 6 Mobile GIS and GPS solutions as identified in the Needs Assessment.	CRITICAL	$30,000		$10,000	$10,000	$10,000	
Prioritize and build 9 Story Maps as identified in the Needs Assessment.	CRITICAL	$54,000			$18,000	$18,000	$18,000
Total Cost for GIS Software		**$300,500**	**$44,500**	**$48,000**	**$81,000**	**$81,000**	**$46,000**

IT Infrastructure

Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Develop a Strategic Technology Plan and IT Disaster Recovery and Emergency Response Plan including GIS.	SUPPORTIVE	$0					
Develop a GIS Architectural Design diagram.	SUPPORTIVE	$0					
Develop a GIS Mobile Action Plan.	SUPPORTIVE	$10,000		$10,000			
Develop a Data Storage Strategy.	SUPPORTIVE	$0					
Develop IT Change Control Policies and Procedures.	SUPPORTIVE	$0					
Embrace 'smart' technology to modernize GIS.	IMPORTANT	$10,000				$5,000	$5,000
Total Cost for IT Infrastructure		**$20,000**	**$0**	**$10,000**	**$0**	**$5,000**	**$5,000**

GIS Training, Education and Knowledge Transfer

Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Develop a formal, multi-tiered GIS Training Plan, including Mobile GIS training.	FOUNDATIONAL	$0					
Schedule departmental-specific GIS training, especially for new staff members.	FOUNDATIONAL	$0					
Conduct Mobile GIS Training.	FOUNDATIONAL	$1,000	$1,000				
Attend instructor-led training classes from Esri or another vendor.	FOUNDATIONAL	$10,000		$2,500	$2,500	$2,500	$2,500
Hold GIS ROI Workshops.	SUPPORTIVE	$0					
Develop GIS Succession and Continuity of Operations Plans.	CRITICAL	$0					
Promote Education and Knowledge Transfer.	SUPPORTIVE	$0					
Total Cost for GIS Training, Education, and Knowledge Transfer		**$11,000**	**$1,000**	**$2,500**	**$2,500**	**$2,500**	**$2,500**
TOTAL GIS STRATEGIC PLAN IMPLEMENTATION COST (Not including Esri license maintenance fees or new position salaries)		**$730,000**	**$155,500**	**$193,000**	**$159,500**	**$138,500**	**$83,500**

GIS IMPLEMENTATION PLAN

Lassen County, CA

GIS Software Maintenance Costs

Task	Priority Grade	Total Cost	Phase One	Phase Two	Phase Three	Phase Four	Phase Five
Esri Small Government Enterprise Agreement (SGEA).	FOUNDATIONAL	$145,452	$16,100	$22,700	$29,300	$35,160	$42,192

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