

9. TECHNOLOGY TO UNDERSTAND THE COUNTY

INTRODUCTION

Technology is critical to comprehending the complexities of Fairfax County's environment with its mix of land uses and population of over 1.1 million residents. Among the most important tools to assist county staff and the public in this pursuit is a Geographic Information System (GIS), which models and maps the built and natural environment. GIS facilitates planning and consensus building for environmental issues both macro and micro and is inclusive in the way it can provide public information broadly through public applications with easy-to-use tools. Geographic Information Systems and related information technologies are the focus of this chapter of the Annual Report on the Environment (ARE).

Reflecting its high-tech economy, Fairfax County was an early adopter of GIS and today is one of the nation's leading counties in applying GIS to its business processes. The substantial returns on this investment are documented in the county's Information Technology plan and numerous interactive mapping applications are offered to the public. One such general purpose application is the JADE viewer which provides public access to a variety of GIS data and some public purpose GIS tools.

Enterprise GIS is managed by Geographic Information Systems and Mapping Services Division, of Fairfax County's Department of Information Technology. It is tasked with developing, maintaining, coordinating, and distributing GIS/mapping data and technology to Fairfax County government agencies and residents. Supported by this core of expertise, county agencies have been successfully integrating GIS into their business practices. Many of the county's earliest GIS applications naturally dealt with land use and transportation, where the advantages of GIS are so powerful and obvious. However, GIS also has great application to other environmental areas, including water resources, ecology, wildlife and all forms of monitoring and studying pollution and environmental health hazards. Today, GIS is being used across the enterprise by essentially all technicians and professionals who work on environmental matters. GIS is now a mission critical asset for environmental management.

CURRENT CONCERNS

The Fairfax County GIS, like any, requires not just a platform but people, data, and access. To fully support environmental management all these elements of the system require training and investment. Some concerns with regards to GIS custodianship are detailed below.

Investment in Data

Environmental change whether degradation, restorative, or land use-based changes are monitored and seen through the temporal dimension. Therefore, key datasets need to be kept as current as

possible to enable monitoring, detection, and change impact quantification. In the past few year's strides were made in this direction with planning and some direct investment. The county needs to continue to invest in its key GIS datasets or the usefulness of the GIS investment will be impeded, especially in the environmental lines of business. These datasets include, orthographic and oblique photography, planimetric data (roads, streams, buildings, etc), LiDAR data, and Land Cover. Planimetric data in particular needs to be updated semi annually in order to be provide full benefit to operations.

GIS Support, Licensing and Platform

Table 9-1 indicates GIS usage continues to experience a high rate of growth. [TABLE 9-1 NEAR HERE] While such high growth may present operational problems, it also presents opportunities both directly from efficiencies and indirectly from better public and private decisions. The County should ensure GIS resource availability so that ongoing work in environmental management can continue. New capabilities are emerging that will benefit these efforts as well. GIS Staff, infrastructure and software licensing are the key to further progress.

The county would benefit if it continued to grow GIS staff resources through the addition of positions to allow for the exploitation of the full GIS capacities to support public efforts at environmental management. Agency staff is key, but many smaller agencies rely on the GIS Division for direct project support for their business areas and cannot procure staff themselves. Today staff available to help in these areas are strained. The county should consider ramping labor resources available for customer services in central services to meet the rising demands. Recommendation 9TECH-2021.2 is an ongoing recommendation and addresses staff shortages.

GIS usage continues to grow and more areas in environmental management will adopt additional uses. It is important that the county maintain the appropriate architecture so as to allow for the capabilities that will benefit this area. Additional licensing needs will emerge as more mobile and location tracking GIS is deployed and new tools that have not been procured yet will emerge that provide additional efficiency or capability the county will need to take advantage of.

Public Access to GIS

While difficult to quantify directly, public utilization of the GIS and its data have significant benefits for private affairs and when parties are dealing with the government for business. OpenData and a variety of GIS based web applications have been the primary avenues to obtain this data and the county should continue to build out it's suite of applications and data availability. Access to information can eliminate controversy, save resources (e.g., by lowering the number of land use applications submitted that would be denied), and build consensus. The county should continue to move GIS into business areas that could benefit and to include making subsequent datasets and applications with this new data available to the public who would interact with these areas.

RECOMMENDATIONS

The Scorecard for this ARE contains the following recommendations pertaining to this chapter. Please see the Scorecard for details.

Success was achieved in completing two recommendations in 2022:

- Recommendation: 9TECH-2021.1 - Fund recapture of LiDAR data in 2022 to provide ongoing data for metrics on tree cover and stream erosion as well as other benefits.
- Recommendation: 9TECH 2022.1 – Examine planimetric data update cycle and determine a method to maintain the base map information

One prior-year recommendation continued making progress:



- Recommendation: 9TECH 2021.2- Prepare a plan for fully staffing GIS support positions in FY 2024 and beyond, with particular attention to Spatial Analyst IV positions.

Two other recommendations are new this year as follow-ups to the two successfully completed recommendations noted above:

- Recommendation: 9TECH-2023.1 Continue investments in aerial photography, LiDAR, multispectral imagery on a business-driven cycle.
- Recommendation: 9TECH 2023.2 Establish a yearly update cycle for planimetric data.

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SCORECARD ELEMENTS

	GIS Three Recommendations in 2022	Summary of Action Taken by Agency or Department	Status / EQAC Comments
1	Recommendation: 9TECH-2021.1 Fund recapture of LiDAR data in 2022 to provide ongoing data for metrics on tree cover and stream erosion as well as other benefits.	Staff's response indicated that this recommendation has been addressed. LiDAR was flown in December 2022 and will be received in 2023.	Completed / Recommended since 2021. Successful completion led to a follow-up recommendation 9TECH 2023.1. 
2	Recommendation: 9TECH-2021.2 Prepare a plan for fully staffing GIS support positions in FY 2024 and beyond, with particular attention to Spatial Analyst IV positions.	Agencies and DIT are adjusting resources as situation allows. SA IV position and SA III position established for LDS. DIT created 1 SA IV position in 2022 to address high end data needs in remote sensing.	Making progress. Recommended since 2021. As a next step in staff planning, increase customer service capacity in the GIS Division to ensure adequate resources for maintenance, administration, and continued innovation with GIS. An additional Spatial Analyst III in the Agency Geospatial Services branch will allow for expanded support to new business areas such as the Office of Environmental and Energy Coordination. This will permit additional time for the remote sensing specialist to continue advanced and cutting-edge work in the area of environmental management more broadly. 
	Recommendation: 9TECH-2022.1 Examine planimetric data update cycle and	The GIS Division has worked over the past year to identify more cost-effective methods to employ than have been used in	Completed/Recommended since 2021/





GIS Three Recommendations in 2022	Summary of Action Taken by Agency or Department	Status / EQAC Comments
determine a method to maintain the base map information	the past. An agency needs survey was conducted. A vendor was engaged to determine estimates for a yearly update cycle using newer techniques and current business requirements. Funding is being pursued now to begin in 2023 or 2024.	Successful completion led to a follow-up recommendation 9TECH 2023.2. 
Recommendation: 9TECH-2023.1 Continue investments in aerial photography, LiDAR, multispectral imagery on a business-driven cycle.	New for 2023	Ensure proper funding for critical data collections on cycle for maximum benefit. LiDAR – 4-5 years Aerial Photography – annually Multispectral imagery – 2 years 
Recommendation: 9TECH 2023.2 Establish a yearly update cycle for planimetric data.	New for 2023. This recommendation is the follow up to 9TECH-2022.1 and superseded it.	  This recommendation is a direct follow-up to the successful completion of Recommendation 9TECH-2022.1

Table 9-1. Sessions of GEM (internal) and JADE (public) in FY 2021 and FY 2022. GEM use increased by 32% and JADE 13%.

	Sessions FY 2021	Sessions FY 2022	% Change
GEM (internal)	195733	258030	32%
JADE (public)	133154	283259	13%

Alternate text: Table 9-1 showing sessions of GEM (internal) and JADE (public) in FY 2021 and FY 2022. GEM use increased by 32% and JADE 13%.

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