

Energetic Data Acquisition in Florida

UPDATES FROM AGENCIES ON LIDAR COLLECTIONS

The spring 2021 FL-ASPRS/UF Lidar Workshop was held remotely on 17 June 2021 and attended by 140 participants. While the majority were from the US (Florida, Georgia and California), other ASPRS registrant countries included Canada, Pakistan, and Brazil. The seven-hour workshop contained recorded technical and application-oriented presentations by state and federal agencies, academia, and private industry. Presenters were available to answer questions live. USGS's Dr. Warren Day, Earth MRI (EMRI) Science Coordinator and Research Geologist, presented the keynote session live and fielded questions about the EMRI program. The biannual

workshop was the Florida region's 10th in the series. The plan moving forward was to run a hybrid live/virtual Fall workshop in October 2021.

The workshops traditionally begin with representatives of the five Water Management Districts—Northwest Florida (NFWMD), South Florida (SFWMD), St. Johns River (SJRWMD), Suwannee River (SRWMD) and Southwest Florida (SWFWMD)—giving short presentations detailing either their recent lidar and/or imagery acquisitions or issues that they have encountered.

Additional state and/or federal agencies also have the opportunity to present. For the spring 2021 workshop, agency briefings were provided by: Florida

Department of Revenue (FDOR); Florida Department of Environmental Protection (FDEP); US Geological Survey (USGS); and Dewberry, briefing on the on the Florida State Lidar program.

In 2018 Florida Division of Emergency Management (FDEM), Florida Department of Transportation (FDOT) and the five Water Management Districts entered into a cooperative program with USGS to remap 34,000 square miles of the peninsula of Florida to the USGS QL1 specification. Then, following Hurricane Michael in 2019, USGS authorized remapping of the central panhandle of Florida. The acquisition and processing of the lidar data were discussed in the Dewberry briefing.

NFWFMD

Jesse Gray, a recent addition to the NFWFMD staff who manages all of the District's lidar acquisitions, described the previous lidar collections in NFWFMD. He noted the continuing challenge of obtaining lidar data in the Eglin Air Force Base airspace, indicating that the area was mapped by earlier acquisitions at the QL2 level. He concluded by illustrating the 2020 USGS QL1 post-Hurricane Michael lidar acquisition currently in progress (Figure 1).

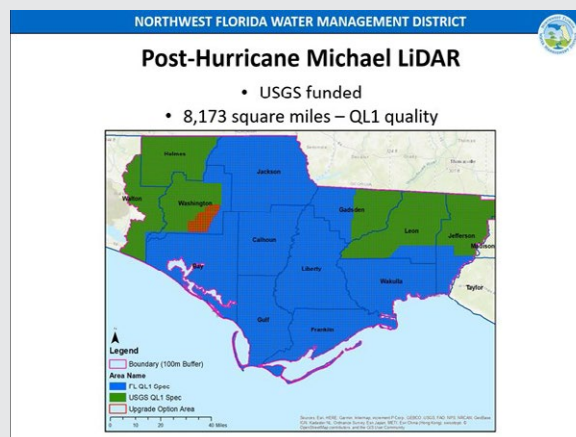


Figure 1: Lidar collections in the central-panhandle counties of Florida mapped following Hurricane Michael.

SJRWMD

Sandra Fox contributed a map showing the status of SJRWMD's review of the current USGS/FDEM Peninsular lidar (Figure 2). Most of the coastal counties in SJRWMD have been reviewed, while the inland counties are awaiting review.

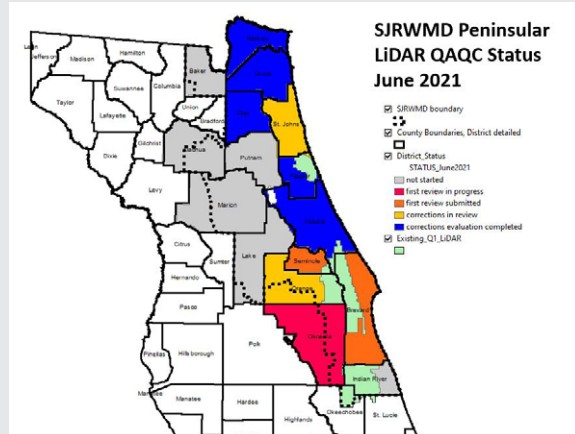


Figure 2: 2018/19 Peninsular Florida lidar surveys in review by SJRWMD.

SRWMD

Paul Buchanan, GIS Manager, reported on the lidar remapping for Gilchrist and Bradford counties and a topobathymetric (CZMIL) project in the Suwannee Sound area (Figure 3). He also presented SRWMD's 360° image mapping project of the Suwannee River and its primary tributaries, known as the Riverview Project (Figure 4).

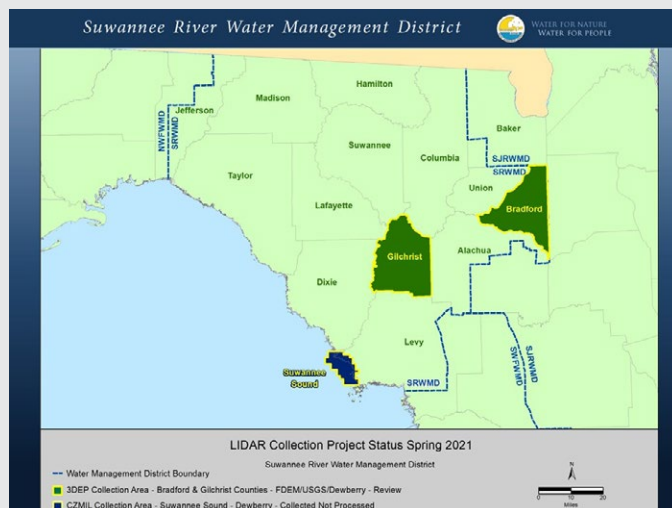


Figure 3: 2018/19 Peninsular Florida lidar surveys in review by the SRWMD.



Figure 4: Areas of the Suwannee River imaged by 360° photogrammetry in spring 2021.

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SWFWMD

Nicole Hewitt cited a discussion with James Van Rens in the Spring 2021 issue of *LIDAR Magazine*¹ regarding the future of artificial intelligence (AI) in lidar processing. Nicole presented several “challenges for classification,” including building misclassifications as well as bridge and seawall misclassifications, which could potentially be resolved through AI coupled with high-resolution orthophotography and/or oblique imagery (Figure 5).

¹ Walker, S., 2021. The next decade with lidar: *LIDAR Magazine* interviews James Van Rens, SVP, RIEGL USA, *LIDAR Magazine*, 11(1): 12-16, Spring 2021.

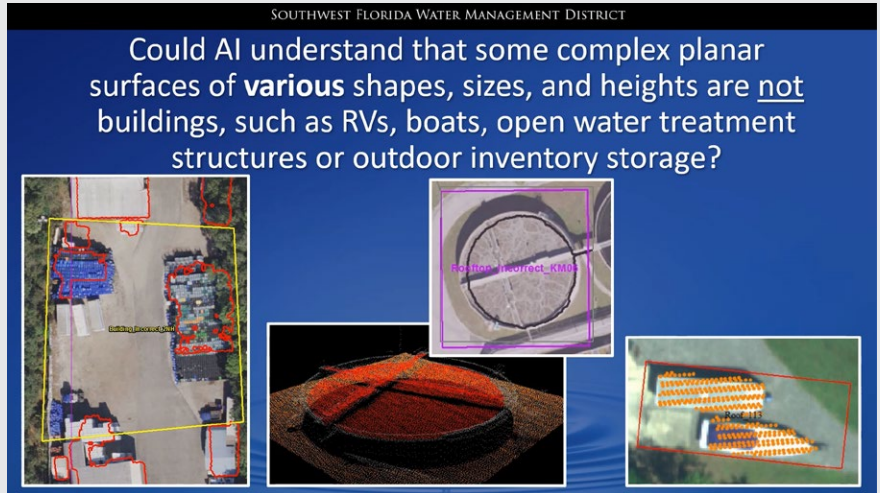


Figure 5: Lidar classification challenges raised by SWFWMD.

FDOR

Charles Russell contributed a map showing the orthoimagery acquisition scheduled for fall 2021/winter 2022 and the links to the FDOR website for the Florida orthoimagery standards and tile index (Figure 6).

HOME	CHILD SUPPORT	PROPERTY TAX	GENERAL TAX	CONTACT																		
Local/County Officials	aerial photography	OVERSIGHT																				
Quick Links Accessibility Contact Us Data Portal Frequently Asked Questions Open Government and Public Records Requests Property Tax Forms Property Tax Oversight Rules Public Meetings Tangible Personal Property Truth in Millage (TRIM) Value Adjustment Board (VAB)		Aerial Photography The Department coordinates the capture and distribution of ortho imagery of approximately one-third of the state each year according to section 195.022, F.S. <table border="1"> <thead> <tr> <th>Document</th> <th>Description</th> <th>Format</th> </tr> </thead> <tbody> <tr> <td>Aerial Photography Three Year Flight Schedule</td> <td>2020-2023 aerial photography schedule</td> <td>PDF (337 KB)</td> </tr> <tr> <td>Aerial Photography Contract</td> <td>These specifications fulfill the Department of Revenue's aid and assistance responsibilities under section 195.022, Florida Statutes</td> <td>PDF (1.8 MB)</td> </tr> <tr> <td>Florida County Digital Orthoimagery Program Standards</td> <td>PDF Document</td> <td>PDF (537 KB)</td> </tr> <tr> <td>2020 Florida County Digital Orthoimagery Standards Overview Presentation 3/2020</td> <td>PPT Document</td> <td>PDF (10 MB)</td> </tr> <tr> <td>County Aerial Photography Grid Index</td> <td>County Imagery Index</td> <td>ZIP (3.8 MB)</td> </tr> </tbody> </table>			Document	Description	Format	Aerial Photography Three Year Flight Schedule	2020-2023 aerial photography schedule	PDF (337 KB)	Aerial Photography Contract	These specifications fulfill the Department of Revenue's aid and assistance responsibilities under section 195.022, Florida Statutes	PDF (1.8 MB)	Florida County Digital Orthoimagery Program Standards	PDF Document	PDF (537 KB)	2020 Florida County Digital Orthoimagery Standards Overview Presentation 3/2020	PPT Document	PDF (10 MB)	County Aerial Photography Grid Index	County Imagery Index	ZIP (3.8 MB)
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Resources Find a County Official Find a Clerk of Court Florida Administrative Code																						

Figure 6: FDOR website access to Statewide Photography Grid Indexes.



Coastal Mapping Initiative (CMI)

- The Florida Legislature designated \$100 million in CARE Act funds to DEP for Florida coastal mapping (topobathymetric lidar)
**Still under review*
- The Office of Resilience and Coastal Protection will administer the project with the State Geographic Information Office
- When the funds have been approved and released to DEP, a more detailed announcement will follow
- CMI is a **separate** effort from the FCMaP (Florida Coastal Mapping Program) which is expected to move under the University of South Florida – Florida Institute of Oceanography’s management



Figure 7: FGIO summary of the upcoming CMI.

FDEP

Parker Hinson represented FDEP and the Florida Geographic Information Office (FGIO). He discussed two major FDEP/FGIO updates, including the newly announced Coastal Mapping Initiative (CMI) (Figure 7), as well as additions to the FGIO Hub (floridagio.gov) (Figure 8). CMI will assist State efforts in mapping Florida’s coast using topobathymetric lidar, and updates to the FGIO Hub include new partners, content, and lidar projects and resources such as the Florida Peninsular LiDAR County Delivery Dashboard.



FloridaGIO Hub - <https://www.floridagio.gov/>

FGIO Initiatives
Explore Statewide and Federal Initiatives

Florida GIS Community
Explore Florida's GIS Community, Events, and Professional Affiliations

FGIO Resources
Explore Statewide GIS Resources

Florida Geospatial Open Data Portal
Explore Florida's Geospatial Open Data Portal

- New Partners and New Content
- Top 20 Foundational Datasets (national efforts)
- LiDAR Resources



Figure 8: FGIO announcement of the new FGIO Hub.

USGS

Alexandra “Xan” Fredericks provided an update on behalf of the National Geospatial Program about the 3D Elevation Program (3DEP) and the FY2021 Broad Agency Announcement. She displayed several new features and datasets available on the USGS/The National Map (Figure 9) and illustrated how to use the webmaps for planning and coordination of topographic and topobathymetric efforts in Florida, as well as the Florida Coastal Mapping Program Hub (Figure 10).

+ U.S. Federal Mapping Coordination

The screenshot shows a web-based mapping interface. On the left is a map of Florida with various colored overlays. On the right is a 'Data Layers' panel with a list of datasets including '3DEP 2019 Elevation (10m)', '3DEP 2019 Bathymetry (10m)', and '3DEP 2019 Hydrography (10m)'. The interface includes search, zoom, and layer management tools. Logos for USGS and The National Map are visible at the bottom.

Figure 9: USGS link to seasketch.org showing U.S. Federal Mapping Coordination.

The screenshot shows the homepage of the Florida Coastal Mapping Program (FCMaP) Hub. It features a large map of Florida with the text 'Florida Coastal Mapping Program' overlaid. Below the map is a descriptive paragraph: 'The Florida Coastal Mapping Program (FCMaP) is an initiative between Federal and Florida State agencies and institutions to coordinate and facilitate the collection and accessibility of Florida coastal seafloor data in order to fill priority areas and gaps. FCMaP is affiliated with the Florida Institute of Oceanography (FIO) whose activities are guided by the FCMaP Science and Technical Advisory Council (STAC)'. Logos for USGS, FGIO, and USF are visible at the bottom.

Figure 10: Link showing the Florida Coastal Mapping Program StoryMap.

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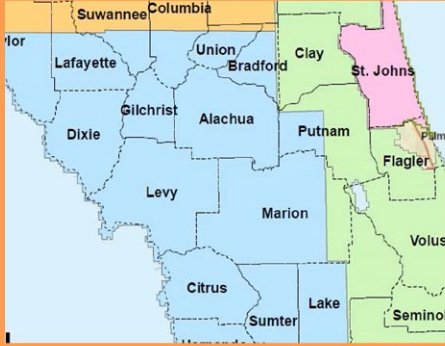
Florida Statewide Lidar

Elise MacPherson presented the Florida Statewide Lidar Mapping Project on behalf of Dewberry. She started with an overview of the Florida Peninsular Lidar Project, then discussed the challenges and issues encountered (Figure 11). She outlined problems with calibration, classification, and breaklining, along with the complexities of having multiple data collectors, compilers, and multiple levels of external review. Since October 2020, 29 (out of 34) counties' QL1 lidar data has been delivered. Moreover, lidar collections of the northern counties, which were delayed owing to flooding and calibration issues, have been conflated and are in final stages of completion by dedicated staff.

With more counties nearing completion, edge-matching has been a continuing challenge. Marion County, which borders on seven other counties, has been particularly problematical, but, thanks to past experience, these issues are being resolved.

She concluded with a description of the review process, the project status map (Figure 12) and an updated project completion schedule.

Some New Project Challenges



- Seamless edge-matching between counties
- Marion County creating a specific challenge do to it bordering 7 counties!!!
- Team of experienced individuals to edge match
- Great lesson learned: Important to look ahead at future matching.

Figure 11: Recent challenges to the Peninsular Florida lidar mapping program.

Where do we stand NOW?

- 13 – Counties/Areas Completed and Accepted by USGS (blue)
- 15 – Other Counties Delivered and either in the review stage by USGS and the Water Management Districts, or Dewberry is correcting calls placed on the data. These counties could be accepted within the next 2 – 4 months (green)
- 16 – Counties completely edited and breaklines completed. Now in the final stages of conflation and creating final products for delivery. These counties will be reviewed within the next 6 – 8 months (yellow)
- 1 County still in breakline production – Polk County (red)



Figure 12: Status of the Peninsular Florida lidar mapping program.

FL Hurricane Michael QL1 Overview:

- Some delay on western portion of AOI
- Acquired all but Apalachicola River Basin by 2/27/2020
 - area began to flood, decision made to demobilize
 - plan to re-mobilize 3/28/2020 - COVID caused restrictions for between state travel & leaves were beginning to bud
 - New plan for remainder of AOI:
 - aircraft & sensor (LMS-1560) housed in Ormond Beach, FL; no move-acquire from Ormond Beach;
 - increase overlap to 50%
- Completed 4/2-4/22

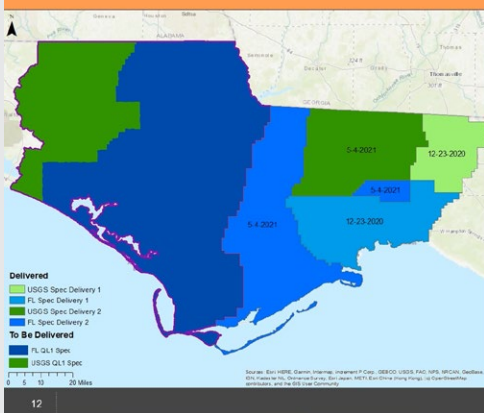


Emily Klipp completed Dewberry's presentation by discussing the status of the Florida Hurricane Michael Project (Figure 13). She summarized the damage resulting from the hurricane and the rationale for the USGS Supplemental project. The QL1 lidar collection was accomplished by the end of February 2020, but flooding along the Apalachicola River, combined with covid-19 restrictions in early 2020, delayed acquisition in the area until late April 2021.

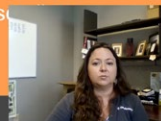
Emily ended with an update map of the Hurricane Michael Supplemental Project (Figure 14).

Figure 13: Summary and plan for the Florida Hurricane Michael QL1 Supplemental project.

Current Progress



- Lot 6 – Delivered 12/23/2020
 - USGS Spec (415 sqmi)
 - FL Spec (797 sqmi)
- Lot 7 – Delivered 5/4/2021
 - USGS Spec (858 sqmi)
 - FL Spec (1390 sqmi)
- Lot 8 – Due Date 9/20/2021
 - USGS Spec (1209 sqmi)
 - FL Spec (3594 sqmi)



Alvan "AI" Karlin, PhD, CMS-L, GISP is a senior geospatial scientist at Dewberry, formerly from the Southwest Water Management District (SWFWMD), where he managed all the remote sensing and lidar projects in mapping and GIS. With Dewberry, he serves as a consultant on Florida-related lidar and imagery projects, as well as general GIS-related projects. He has a PhD in computational theoretical genetics from Miami University in Ohio. He is a past president of the Florida Region of ASPRS, an ASPRS Certified Mapping Scientist – Lidar, and a GIS Certification Institute Professional.

Figure 14: Status of the Florida Hurricane Michael Supplemental project.