Reference SON: *2017-ER-17 Evaluation and Optimization of Unmanned Aircraft Systems to Sense, Identify, and Map in Aquatic Systems [1]*

Lead PI(s): *Sean Griffin, Kristofer Lasko & Michael Campbell*

Project Development Team (PDT): *Molly Reif (ERDC)*

Proponent(s)/District Collaborators: *Victor Wilhelm (SAJ, CoP), Eric Summa, Jon Morton, Jon Lane (SAJ)*

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Using Unmanned Aircraft System Imagery to Map Aquatic and Terrestrial Vegetation[1]

Research Need
Mapping the precise spatial distributions of complex vegetation communities is a critical element in the planning, implementation, and monitoring of both small and large ecosystem management and restoration projects.

Project Purpose & Objectives
The objectives of this study are to develop and test multistage ecosystem monitoring methods that incorporate:

- Remotely sensed optical imagery, from both spaceborne and airborne sensors, with varying spatial and temporal resolutions
- Limited ground reference data collection
- Development of new ArcMap and ENVI image processing toolkits.

This will be achieved by identifying study sites within ongoing ecosystem restoration projects. Supporting imagery will include high-resolution multispectral data from commercial satellites and unmanned aircraft systems (UAS), verified with limited ground reference data. An image processing and geospatial analysis workflow will be developed and packaged into a user-friendly ArcMap toolkit, leveraging current and ongoing mapping research.

Value of Research and Development (Payoff)
Developing or improving vegetation mapping workflows using geospatial data-driven techniques will help managers better understand vegetation distribution and more effectively manage and restore habitats. In addition, custom image processing workflows using familiar ArcMap and ENVI software will streamline data processing, enabling rapid generation of information and mapping products.

Products
Technical Reports (TRs)

Lasko, K. and Griffin, S. (2021). Monitoring Ecological Restoration with Imagery Tools (MERIT): Python-based Decision Support Tools Integrated into ArcGIS for Satellite and UAS Image Processing, Analysis, and Classification (ERDC/GRL TR-21-3), Technical Report. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Technical Notes (TNs)

Griffin, S.P. and Lasko, K.D. (2020). Using unmanned aircraft system (UAS) and satellite imagery to map aquatic and terrestrial vegetation (ERDC/GRL TN 20-4), Technical Note. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Other

Automated Training Data Generation from Spectral Indexes for Mapping Surface Water Extent with Sentinel-2 Satellite Imagery at 10 m and 20 m Resolutions (https://www.mdpi.com/2072-4292/13/22/4531)

ArcGIS Tools, installer files, read me documents (https://emrrp.el.erdc.dren.mil/models/merit/2022-02-24-MERIT_Share.zip)