

RHODE ISLANDVIEW 2022 - 2023 ACTIVITIES

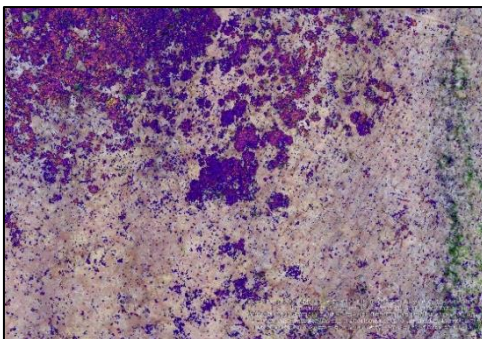
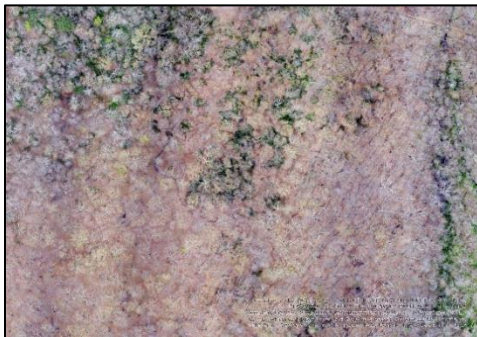
Rhode IslandView study explores the use drones and aerial LiDAR to map forest understory habitat for species of concern.

A number of species in Rhode Island, including the New England Cottontail and American Woodcock, rely on dense understory forest vegetation or early successional forest habitat. To develop strategies for supporting these species, wildlife management agencies need to know the locations and amounts of current suitable habitat. Although Rhode Island has statewide aerial LiDAR, it is unknown whether these data are capable of detecting shrub habitat under a forest overstory. It is also unknown if drone LiDAR can be used for effectively detecting shrub habitat. The goal of the study was to evaluate the capability of drone and aerial LiDAR to map habitat in forest understories.

Ground truth data was collected using a ground-based laser scanner and survey-grade GPS. These data were used to evaluate the utility of drone and aerial statewide LiDAR data for detecting and estimating shrub cover.



Station view from Trimble X7 scanner while collecting ground truthing data in April 2023.



Shrubs detected by drone (bottom) compared to leaf off aerial imagery (top)

Drone and statewide aerial LiDAR were collected during March/April 2022 when deciduous trees were leaf-off. Point densities for drone and statewide LiDAR were 500+ pts/m² and 8 pts/m², respectively.

Preliminary results found that the drone and statewide aerial LiDAR datasets are not effective in directly mapping overall shrub cover.

- Drone LiDAR detected only ~20% of the shrub cover.
- Statewide aerial LiDAR detected only 1% of shrub cover.

Both drone and aerial statewide LiDAR were more effective at detecting evergreen shrubs than leaf-off deciduous shrubs:

- Drone LiDAR detected 80% of evergreen shrubs but only 25% of leaf-off deciduous shrubs.
- Statewide LiDAR detected 40% of evergreen shrubs but only 8% of leaf-off deciduous shrubs.

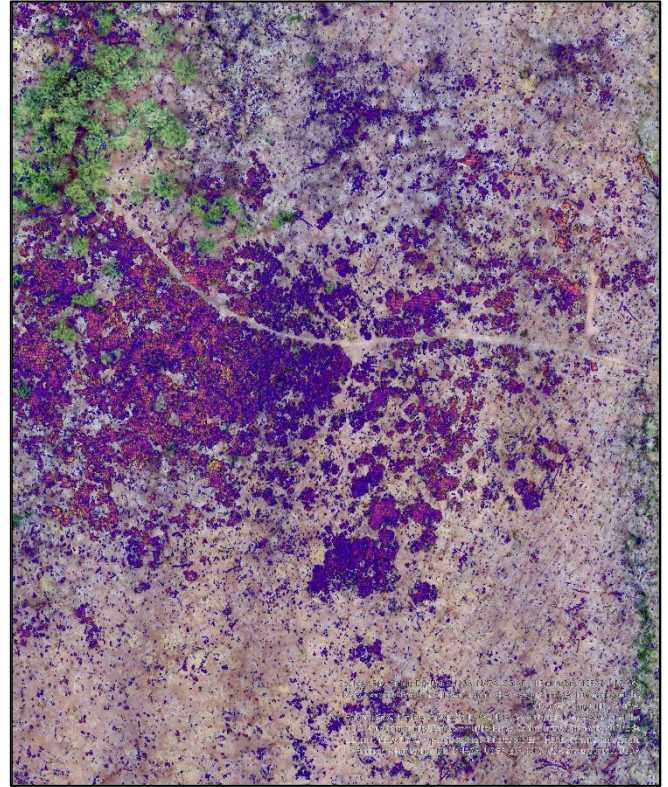
Further research will explore the use of leaf-on drone LiDAR and environmental variables (e.g. tree canopy density, soil type, etc.) to predict understory conditions in various forest stands.

BENEFITS TO RHODE ISLAND

Important implications for using LiDAR to map understory shrubs for wildlife.

Our results have important implications for monitoring wildlife habitat with drone and aerial LiDAR data. Aerial LiDAR data alone may not be sufficient for detecting certain shrub habitat characteristics under a forest canopy. Even drone LiDAR has low detection of deciduous shrubs when they are leaf-off. Additional research is needed to determine whether drone and aerial LiDAR can map forest and environmental conditions that are associated with various understory habitat conditions.

The Rhode IslandView activities supported one graduate student during the spring and summer of 2023. The student gained valuable experience in field data collection using land survey equipment and data processing using Esri and other software. The student developed skills in communicating technical remote sensing material to non-technical audiences through presentations at two professional conferences. He will continue the research begun in this project to develop a Masters thesis and bring the skills and knowledge gained to his professional community upon entering the workforce.



Understory shrubs detected by drone

RHODE ISLANDVIEW CONSORTIUM MEMBERSHIP

THE
UNIVERSITY
OF RHODE ISLAND

RIGIS



USDA United States
Department of
Agriculture
Natural Resources Conservation Service



Rhode IslandView Principal Investigator:

Dr. Y.Q. Wang

University of Rhode Island

401.874.4345

yqwang@uri.edu



<https://riview.uri.edu>