OVERVIEW OF THE 12TH SOUTHERN FORESTRY AND NATURAL RESOURCE MANAGEMENT GIS CONFERENCE

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ABSTRACT. This is a brief summary of the background and contents of the research papers included in the 2020 Special Section on the 2019 Southern Forestry GIS Conference. Other papers from the conference, still undergoing peer review, may appear in the future issues of the Mathematical and Computational Forestry & Natural-Resource Sciences journal.

Keywords: GIS; Remote Sensing; GPS; UAV; 3D Modeling; LiDAR, Satellite Imagery; Urban Forestry.

1 BACKGROUND

In December 2019, the 12th Southern Forestry and Natural Resource Management GIS Conference was held in Athens, Georgia (USA), at the University of Georgia Center for Continuing Education. The conference was attended by over 130 participants from across the United States. Thirty-nine presentations were provided, ranging from historical perspectives on the use of GIS in forestry to future developments in technology that should be of value to land managers. Presentations on unmanned aerial vehicles and three-dimensional modeling of data from LiDAR and other devices predominated the meeting, however a healthy diversity of presentations on invasive species, GPS, economics, and GIS work process flows were also provided during the conference. Several of these presentations were further refined into research papers and submitted to the journal for consideration for publication. Two of the submitted papers successfully completed peer review and are now provided in this issue of Mathematical and Computational Forestry & Natural-Resource Sciences, Volume 12, Issue 2. Overviews of peer-reviewed research papers resulting from other former Southern Forestry and Natural Resource Management GIS Conferences can be found in Bettinger and Merry (2014, 2016ab, 2017), Bettinger and Hubbard (2010), and Cieszewski (2018).

2 CONTENTS OF THE SPECIAL SECTION

The first of the papers included here advocates that raster image resolution should be carefully considered if it is used to assess land cover change and best management practice conformance. In an interesting analysis by Gay et al. (2020), large pixels (30 m spatial resolution) were disaggregated into a smaller subset of pixels (1 m spatial resolution). For practical purposes, the relative size of the pixels in a raster grid would ideally be consistent with the minimum dimensions of landscape features one wishes to identify. A simulation was conducted to determine the approximate threshold when changes to the land cover assignment of the smaller subset of pixels would be consistent with changes in the land cover assignment of the larger, original pixel. The finer scale of analysis, using the smaller pixels, seemed to be more appropriate for monitoring the change in fine-scale landscape features, such as riparian zone size and encroachment into it by nearby agricultural activities. The importance of this conclusion lies in the fact that many broad-scale land cover analyses utilize medium-size remotely sensed imagery (e.g., 30 m and other similar spatial resolutions), and therefore the tool (i.e., raster imagery of a given resolution) applied to a problem, such as monitoring certain changes in the landscape should be considered carefully.

In the second paper, Crosby et al. (2020) photo-interpreted randomly placed sample points in ten small Louisiana cities to estimate the amount of tree cover and to further extend these estimates to ecosystem services these resources provide. Seven land classes (water, forest, grass, roads, buildings, bare ground, and other impervious surfaces) were defined, and after interpretation of the sample points via fine-scale aerial imagery, removals of carbon dioxide, nitrogen dioxide, ozone, sulfur dioxide and other contaminants by the forest canopy

were estimated. The carbon sequestered by the forest canopy and the social cost (estimates of health effects on society) were also estimated. While the per-capita value of some of the ecosystem services provided by tree cover were relatively low, carbon sequestration and associated values were modest and perhaps of concern to urban planners. The dynamics between human population levels and services provided by tree cover can disguise the fact that in heavily populated areas with lower tree cover, a concerted effort to maintain or improve tree cover area may be necessary. In an environment that periodically endures severe wind events (i.e., hurricanes), cities along the Gulf Coast of the United States may be hampered by periodic losses of tree cover to natural disasters, further emphasizing a need to comprehensively plan the future of urban forests.

References

Bettinger, P., & Merry, K. 2014. A Brief Overview of the 9th Southern Forestry and Natural Resources GIS Conference. Mathematical and Computational Forestry & Natural-Resource Sciences (MCFNS), 6(2), 62-64 (3). Retrieved from http://mcfns.net-/index.php/Journal/article/view/6_62

Bettinger, P., & Merry, K. 2016a. An overview of the 10th Southern Forestry and Natural Resource Management GIS Conference. Mathematical and Computational Forestry & Natural-Resource Sciences (MCFNS), 8(1), 1-3(3). Retrieved from http://mcfns-.net.index.php/Journal/article/view/MSFNS.8.1

Bettinger, P., & Merry, K. 2016b. A brief overview of the second Special Section of papers from the 10th Southern Forestry and Natural Resource Management GIS Conference. Mathematical and Computational Forestry & Natural-Resource Sciences (MCFNS), 8(2), 16-17 (2). Retrieved from http://mcfns.net-/index.php/Journal/article/view/8.3

Bettinger, P., & Merry, K. 2017. Overview of the third Special Section of papers from the 10th Southern Forestry and Natural Resource Management GIS Conference. Mathematical and Computational Forestry & Natural-Resource Sciences (MCFNS), 9(2), 1-2(2). Retrieved from http://mcfns.net/index.php/Journal-/article/view/9.5

Bettinger, P., & Hubbard, W. 2010. The 2009 Southern Forestry and Natural Resources GIS Conference. Mathematical and Computational Forestry & Natural-Resource Sciences (MCFNS), 2(2), Pages: 135-137 (3). Retrieved from http://mcfns.net/index-.php/Journal/article/view/MCFNS.2-135

Cieszewski, C. 2018. Overview of the 2017 11th Southern Forestry and Natural Resources GIS Conference. Mathematical and Computational Forestry & Natural-Resource Sciences (MCFNS), 10(1), 13-14(2). Retrieved from http://mcfns.net/index.php/Journal-/article/view/10.4

Crosby, M.K., T.E. McConnell, and J.J. Holderieath. 2020. Forest canopy benefits in small urban areas of Louisiana. Mathematical and Computational Forestry & Natural-Resource Sciences. 12(2): 18-31. Retrieved from http://mcfns.net/index.php/Journal-/article/view/12.7

Gay, D.C., M.K. Crosby, J.J. Holderieath, and T.E. McConnell. 2020. A simulation approach to using Landsat 8 imagery to determine a threshold for detecting changes along a streamside management zone: A case study in Louisiana. Mathematical and Computational Forestry & Natural-Resource Sciences. 12(2): 12–17. Retrieved from http://mcfns.net/index.php/Journal-/article/view/12.8