SE FIREMAP

An improved system for mapping fires across the Southeastern U.S.

BACKGROUND:

More effective spatial tracking of wildland fire and understanding fire patterns across both public and private lands in the Southeast are critical needs identified by a consortium of conservation partners, including members of the Southeast Regional Partnership for Planning and Sustainability (SERPPAS) and America's Longleaf Restoration Initiative (ALRI). In 2020, the USDA Natural Resources Conservation Service (NRCS) provided funds through an agreement with the U.S. Endowment for Forestry and Communities (Endowment) to support a new "SE FireMap" product. The accuracy of the SE FireMap will promote better decision-making to prioritize funding for staff, projects, training, equipment, and allow fire partners to work smarter. Fire is key to healthy native landscapes in the Southeast to keep "working lands" working, restore the longleaf pine ecosystem, support the Department of Defense's military and training missions, conserve listed and at-risk species, manage for wildfire risk, and minimize the need to conserve species through regulation. The importance of improving and expanding prescribed burn management cannot be overstated - it is imperative that we have a reliable method to select priority geographies to manage natural resources and wildfire risk.

Key Objectives:

➢ Develop a cohesive system using remote sensing to track both prescribed fires and wildfires across the Southeast, providing significantly improved resolution over other regional and national systems currently in use;

➢ Identify priority databases already in use by partners to test mapping accuracy and help train the SE FireMap toward reducing error rates;

➢ Provide comprehensive coverage of both public and private lands;

➢ Seek to achieve a mapping scale that balances the desire to support site-specific management decisions with the ability to ensure accuracy;

➢ Coordinate continuously with fire mapping experts within the U.S. to facilitate future expansion of this project to include other regions, especially the Western U.S.;

➢ Deliver the SE FireMap online for public use as a decision support tool "dashboard" with standard query options, as well as spatial data and pdf map downloads, to promote the efficiency and effectiveness of fire management toward conservation, economic and public safety goals.

PROCESS:

The Endowment and NRCS are leading a regional consortium of partners to conduct the work and partnered with The Longleaf Alliance (TLA) to coordinate the project and a technical oversight team (TOT) of subject matter experts nominated by ALRI and SERPPAS partners. The TOT consists of ten members who are guiding the project through all phases of development. This project has been separated into a "Scoping Phase" and "Development Phase" with a target completion date in 2026.

Phase I: Scoping

To ensure product quality, a Request for Proposals (RFP) was released in 2019 for a national assessment of existing spatial information, models, remote sensing, other tools and approaches relevant to developing an improved fire mapping system. Tall Timbers Research, Inc. (TTR) received this award and completed the scoping effort in 2021. In the scoping effort, TTR evaluated a number of remotely sensed burned area products and specifically recommended to use of the USGS Landsat Burned Area (BA) products in the Phase II SE FireMap implementation as those products have the longest running record (1984 – 2020), finest spatial resolution (30 m), and have been thoroughly described, evaluated, and validated in a number of studies (Hawbaker et. al., 2017; Vanderhoof et. al., 2017a, Vanderhoof et. al., 2017b; Hawbaker et. al., 2020; and Vanderhoof et. al., 2021). Another recent publication (Teske et. al. 2021) demonstrated how fire history metrics could be generated from the Landsat BA products and their value for fire and conservation management decision making. The Landsat BA products and fire history metrics were integrated in the SE FireMap 1.0 beta viewer and released on the Landscape Partnership Portal in April of 2021 (https://landscapepartnership.org/key-issues/wildland-fire/fire-mapping/regional-fire-mapping/se-firemap). The beta viewer demonstrated the potential to fill critical information gaps, tracking the current and historic fire regime characteristics on both public and private lands in the Southeast.

Phase II: Development

Based on the findings presented by TTR during SE FireMap Phase I, the NRCS, Endowment, and TOT made several recommendations to transition SE FireMap from the Phase I prototype into the Phase II operational decision-support system to provide up-to-date information to resource managers. These recommendations included: A) continue generation of products incorporated in SE FireMap Phase I and (B) new work to support and improve products for use in SE FireMap Phase II, as well as (C) additional research to demonstrate the value of SE FireMap and its products for land management and conservation planning. NRCS and the Endowment have partnered with TTR and USGS for Phase II Development. TTR and USGS will work collaboratively to address the objectives outlined in the development phase to support SE FireMap and align it with future national mapping and conservation efforts.

Objectives for Phase II Development include:

(1) Soliciting input from decision-support tool users,
(2) Implementing decision-support tools and build end user interface,
(3) Training and documentation for the decision-support-tool,
(4) Continuing production of the Landsat BA products and fire history metrics,
(5) Reducing latency for the Landsat BA annual products and fire history metrics,
(6) Incorporating harmonized Landsat Sentinel-2 data into BA product generation,
(7) Advancing remote sensing data and methods to improve fire detection and burned area products,
(8) Predicting uncertainties in the burned area products,
(9) Assessing regional patterns and impacts of burning, and
(10) Coordinating all with SE FireMap technical oversight team.

References

Hawbaker, T.J., Vanderhoof, M.K., Beal, Y.-J., Takacs, J.D., Schmidt, G.L., Falgout, J.T., Williams, B., Fairaux, N.M., Caldwell, M.K., Picotte, J.J., Howard, S.M., Stitt, S., Dwyer, J.L., 2017. Mapping burned areas using dense time-series of Landsat data. Remote Sensing of Environment 198, 504–522. https://doi.org/10.1016/j.rse.2017.06.027

Hawbaker, T.J., Vanderhoof, M.K., Schmidt, G.L., Beal, Y.-J., Picotte, J.J., Takacs, J.D., Falgout, J.T., Dwyer, J.L., 2020. The Landsat Burned Area algorithm and products for the conterminous United States. Remote Sensing of Environment 244, 111801. https://doi.org/10.1016/j.rse.2020.111801

Teske, C., Vanderhoof, M.K., Hawbaker, T.J., Noble, J., Hiers, J.K., 2021. Using the Landsat Burned Area Products to Derive Fire History Relevant for Fire Management and Conservation in the State of Florida, Southeastern USA. Fire 4, 26. https://doi.org/10.3390/fire4020026

Vanderhoof, M.K., Brunner, N., Beal, Y.-J.G., Hawbaker, T.J., 2017a. Evaluation of the U.S. Geological Survey Landsat Burned Area Essential Climate Variable across the Conterminous U.S. Using Commercial High-Resolution Imagery. Remote Sensing 9, 743. https://doi.org/10.3390/rs9070743

Vanderhoof, M.K., Fairaux, N., Beal, Y.-J.G., Hawbaker, T.J., 2017b. Validation of the USGS Landsat Burned Area Essential Climate Variable (BAECV) across the conterminous United States. Remote Sensing of Environment 198, 393–406. https://doi.org/10.1016/j.rse.2017.06.025

Vanderhoof, M.K.; Hawbaker, T.J.; Teske, C.; Ku, A.; Noble, J.; Picotte, J. 2021. Mapping Wetland Burned Area from Sentinel-2 across the Southeastern United States and Its Contributions Relative to Landsat-8 (2016–2019). Fire, 4, 52. https://doi.org/10.3390/fire4030052

For additional information about this project, go to
https://www.landscapepartnership.org/key-issues/wildland-fire and quickly REGISTER.

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