SE FireMap Phase 2 – Enhanced Burned Area Products and Decision Support Tools

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Introduction

This proposal is in response to recommendations contained in the final scoping report and approved by the Technical Oversight Team (TOT), Natural Resource Conservation Service – USDA (NRCS), and the U.S. Endowment for Forestry and Communities (Endowment). Given the findings presented during SE FireMap Phase I, the TOT suggested that this is a unique opportunity to partner with the U.S. Geological Survey (USGS) on improving the Landsat Burned Area (BA) product and build upon research Tall Timbers already has underway. As a next step, NRCS and the Endowment have requested Tall Timbers Research Station and Land Conservancy (TTR) and USGS submit a joint Development Proposal. TTR and USGS will work collaboratively to address the objectives outlined in this proposal to support SE FireMap and align it with future national mapping and conservation efforts.

To maintain focus on SE FireMap product improvements in the USGS/TTR proposal, NRCS and the Endowment made the decision to request a separate joint proposal to accommodate an "Enhanced Needs Assessment" leading to development of queries that will be integrated into a decision support tool that integrates the SE FireMap version 2.0 with the NRCS-funded Longleaf Element Occurrence Geodatabase (LEO GDB). This proposal will be incorporated into the following joint proposal submitted by TTR and USGS. This further work on the needs assessment will focus on gathering feedback from key partners in the conservation community to build appropriate functionality into a web mapping tool via remote and possibly in-person workshops. Desired recommendations will include determining which data products should be included (in addition to SE FireMap and beyond the LEO GDB) in the web mapping tool and developing appropriate query, display, and reporting functionality.

Background

The goal of SE FireMap[1] is to accurately track and understand wildland fire patterns across the Southeastern U.S. and fill critical information needs identified by conservation partners and funded by the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Working Lands for Wildlife program under an agreement with the U.S. Endowment for Forestry and Communities. Remote sensing is essential to the SE FireMap to track both prescribed fire and wildfire activity on public and private lands and serve as a critical information source in decision support tools to maximize the effectiveness of conservation practices. The SE FireMap effort spans the extent of longleaf pine occurrence in the Southeast (Figure 1).

Fire occurrence on public and private lands in the Southeast is currently tracked by approximate location through various permitting systems or burn unit mapping that is done by disjunct federal, state, and limited private land ownerships. In the case of permitting, these systems do not record perimeter data or include assessments regarding which burns are actually completed. Relying solely on these disparate systems results in documented data gaps when estimating the size, location and effectiveness of managed fires on a regional scale.

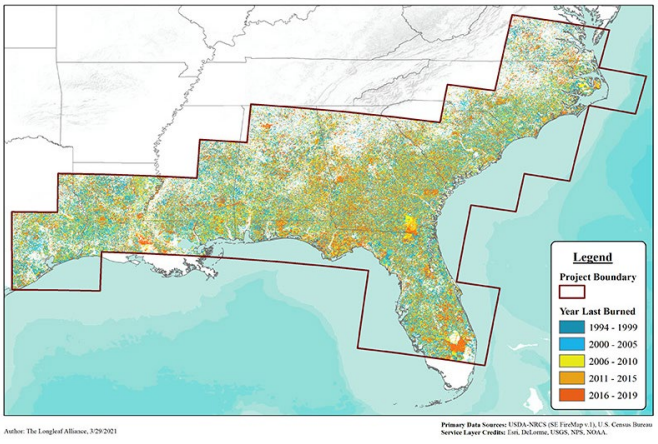

Figure 1. Extent of the SE FireMap project.

Resource managers across the Southeast have long recognized the importance of tracking and monitoring the use of prescribed fire for decision making. Many species in the Southeast are dependent on fire for maintenance of appropriate habitat conditions. For these species, managing an appropriate fire return interval is critical. For example, differentiating areas that have an appropriate fire return interval from areas without an appropriate fire return interval would allow managers to focus resources on areas most in need of management actions, as well as serve as a means to measure and quantify the success of conservation and restoration efforts. Thus, mapping and providing qualitative attributes based on fire regime characteristics, such as fire return interval, would inform the targeted acquisition of conservation lands, enable prioritization of conservation cost-share expenditures, increase the effectiveness of land and fire management, and allow for tracking the success and failure of conservation efforts.

For these reasons, the Phase I scoping portion of the SE FireMap effort evaluated a number of remotely sensed burned area products. That effort specifically recommended to continue 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 – 2021), 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). Our recent publication (Teske et. al. 2021) showed how fire history metrics could be generated from the Landsat BA

[1] https://www.landscapepartnership.org/key-issues/wildland-fire/fire-mapping/regional-fire-mapping/se-firemap

products and demonstrated their value for fire and conservation management decision making. Furthermore, with the release of the SE FireMap 1.0 beta viewer and datasets in April of 2021, TTR demonstrated the potential to fill critical information gaps to track the current and historic fire regime characteristics on both public and private lands in the Southeast.

Cost-effective and efficient management of conservation lands requires up-to-date detailed resource maps. Additional work is required to move SE FireMap from the Phase I prototype into the Phase II operational decision-support system to provide up-to-date information to resource managers. Discussions among the SE FireMap Team members yielded a number of objectives to address to support Phase II of the SE FireMap implementation. This proposal presents objectives and plans to (A) continue generation of products incorporated in SE FireMap Phase I and (B) new work to support and improve 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. Specific objectives that TTR and USGS will pursue in collaboration with NRCS, the Endowment and the TOT are listed below and described in more detail in the following sections. Our objectives 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 with SE FireMap team.

1. Soliciting input from decision-support tool users

Tall Timbers leads with collaboration with NRCS represented by Ferguson-Lynch, TOT, and USGS

Alignment of the decision-support tool with the questions and scenarios of highest interest to tool users is critical. Furthermore, demonstrating how SE FireMap, and its underlying data can be incorporated into technical analysis and decision-making can provide resource managers insight into how to incorporate these datasets and tools into existing workflows. To this end, TTR proposes to conduct workshops in GA, FL, AL, NC, and SC to demonstrate the current SE FireMap and solicit input from tool users on priority data, modeling needs, and analyses of interest (i.e., standard queries). The workshops will also be used to demonstrate how the fire history metrics can be combined with other relevant datasets such as the Southeast Longleaf Ecosystem Occurrences (LEO) Geodatabase to produce model-based decision

support tools to identify priority landscapes and areas of shared priorities with partner organizations. Workshops would focus on the following outcomes:

1. Treatment optimization and prioritization
2. Identifying high quality conservation lands
3. Rankings of projects and proposals
4. Developing metrics of success for cost share programs
5. Standardized methods to rank site potential

The ability to incorporate the datasets present in the SE FireMap into prioritization modeling, decision support tools and focused reporting can streamline existing workflows and bring new insight into management practices. Input from workshops as well as previous scoping efforts will inform the queries, tools and reports that will be incorporated into the end user interface.

2. Implementing decision support tools and build end user interface

Tall Timbers leads in partnership with Ferguson-Lynch for smooth translation/transmission to LP Portal; input from NRCS, TOT, USGS

The web user interface can be viewed as somewhat separate from the products that it is consuming. The web user interface should remain essentially constant over time regardless of the remotely sensed fire datasets and traditional fire polygon records it may incorporate. It is expected that data inputs will change and improve as new technology becomes available, but the database/end user application design should be designed in a manner to accommodate those changes. TTR will develop a web mapping application using ESRI Enterprise standards, and approved by Ferguson-Lynch, to host the current and future versions of the SE FireMap on the Landscape Partnership portal (https://www.landscapepartnership.org/). All applications will be created on a fully accessible development server and all code will be shared with NRCS or their designated agent for production hosting. In addition to hosting the BA products, the web mapping application will also need to host supporting datasets to guide decision support tools and model-based prioritization tools (Hiers et. al., 2003). These supporting datasets will ultimately be determined by information gathered at workshops and at NRCS direction. In addition to the FHM, we would recommend the following be included:

1. National Land Cover Database (NLCD) 2019 or NOAA C-CAP
2. Range-wide habitat suitability maps for at-risk species in the longleaf system (Crawford et al. 2020)
3. The Southeast Longleaf Occurrences (LEO) Geodatabase
4. Combined wildfire datasets for the United States and certain territories, 1878-2019 (Welty & Jeffries, 2020)
5. The Southeast Burn Permit Database, Priority Areas (Tall Timbers Geospatial 2021, in development)
6. Connectivity (LCPA, TNC's Resilient and Connected landscapes, etc.)
7. Urban Growth Analyses (SLEUTH)
8. Climate resilience (TNC)

The ability to incorporate the datasets present in the SE FireMap into prioritization modeling, decision support tools and focused reporting can streamline existing workflows and bring new insight into management practices. Input from workshops as well as previous scoping efforts will inform the queries, tools and reports that will be incorporated into the end user interface.

3. Training and documentation for the decision support-tool

Tall Timbers leads with training development; Ferguson-Lynch facilitates hosting of training session(s), records sessions and develops format for online training modules; input from NRCS, TOT, and USGS

TTR will provide complete documentation, code for web mapping application and metadata for all new products produced. TTR will conduct a final wrap up workshop with both in-person and virtual options to present final end user interface and decision support tools. A recording of the webinar presentations will be made available on the Landscape Partnership portal.

USGS will assist TTR with developing outreach material in the form of product documentation and presentations for this workshop and the workshops to solicit input, and other forms of engagement to SE FireMap users. These materials and outreach are essential for SE FireMap users to understand how the underlying data in the SE FireMap were produced, the uncertainties in the data, and how those uncertainties might propagate into reports and analyses.

4. Continuing production of the Landsat burned area products

USGS leads in coordination with Tall Timbers, NRCS, and TOT

The Landsat BA products were recommended as foundational data to support the SE FireMap as they are the finest resolution burned area product with the longest history (1984-2021) operationally produced across the U.S. (Hawbaker et. al., 2020). Production of the Landsat BA products remains a priority for the USGS Land Change Science and National Land Imaging Programs. The Phase 1 scoping for SE FireMap and Teske et. al., (2021) demonstrated conservation and fire management applications of the TTR fire history metrics derived from the USGS Landsat BA products. Developing and integrating prototype code to create the fire history metrics as part of the Landsat BA annual products was supported in FY 2021 by USGS's Community for Data Integration. USGS will support continued production of the Landsat BA products and fire history metrics to support SE FireMap Phase II.

USGS will produce products for calendar years 2022, 2023, 2024, and 2025 to support SE FireMap Phase II. These products will include mosaics of annual burn probability, burn classification count, burn date, and filtered burn classification rasters, as well as polygons of burned areas attributed with summary statistics of burn probability, burn classification count, burn date, and land cover classes. The TTR fire history metrics will include raster layers for fire frequency, years since last burn, shortest burn-free interval, longest burn-free interval, and season of burn (spring, summer, fall, winter). History metrics will be updated to include the most recent calendar year after the annual burned area products are produced.

5. Reducing latency for Landsat burned area products and fire history metrics

USGS leads in coordination with Tall Timbers, NRCS, and TOT

In the past, the timeframe over which the Landsat BA products were produced was based on funding levels, availability of personnel, and the maturity of image delivery systems and code to acquire imagery. This hampered efforts to integrate those products into decision support tools and highlighted the need to establish a data production schedule to provide timely updates to SE FireMap Phase II. Additionally, past production has been completed on internal USGS computing infrastructure which can be difficult for external partners to access. USGS will work to reduce delivery times for the Landsat BA products and fire history metrics at the end of each calendar year. USGS will also work to reduce delivery times by testing production on Amazon's AWS cloud. Given latencies related to image acquisition, georeferencing, surface reflectance calculations, ARD formatting and delivery, and scene-level Landsat BA product generation, we expect that the technician would be able to generate annual products within 3 months after the end of the calendar year. For example, 2022 annual products will be provided by the end of March 2023. Generating the annual composites and mosaics in the cloud will create efficiencies in data processing and sharing, allowing USGS and TTR to focus more on collaborative research application development, and outreach with stakeholders.

6. Incorporating harmonized Landsat Sentinel-2 data into BA product generation

USGS leads in collaboration with Tall Timbers, NRCS, and TOT

NASA recently announced the availability of the Harmonized Landsat and Sentinel-2 (HLS) version 2 products[2]. These products rely on a single processing pipeline to generate standardized surface reflectance and brightness data and provide near global observation at 30 m spatial resolution every 2 to 3 days from 2013 through present, but with image frequency depending on when individual sensors were launched (2013 for Landsat 8, 2015 for Sentinel 2a, and 2017 for Sentinel 2b; Claverie et. al., 2018). Cloud cover and rapid vegetation recovery make burned area detection challenging using Landsat data alone because of the 16-day revisit interval when 1 Landsat sensor is operational and 8-day revisit interval when 2 sensors are operational (e.g., Landsat 8 and 9 in early 2022). We anticipate omission errors due to cloud cover and rapid vegetation recovery will be reduced using the denser HLS time series resulting in more complete burned area mapping in the Southeast. Initial analyses of wetland fires in the Southeast demonstrated this potential in Vanderhoof et. al. (2021) showed that Sentinel 2 mapped more burned area and had lower omission errors than Landsat 8 (29% vs. 45%). Furthermore, USGS has provided initial funding to Geosciences and Environmental Change Science Center to explore expanding the Landsat BA algorithm to the HLS data for North America. Matching funds from NRCS to support this new effort would demonstrate a need for the improved products and help solidify USGSs long-term commitment to it. Because this effort is designed to operate at a continental scale, generating fire history metrics from the HLS burned area products should be possible in the near future, although the improvements offered by the HLS data over the Landsat data will be limited to 2015 and later. We anticipate products will not be available until spring of FY24 because of code changes required to incorporate the HLS data and generate products in the cloud environment, as well as HLS data availability (HLS products prior to 2021 are lacking).

[2] https://lpdaac.usgs.gov/news/release-of-harmonized-landsat-and-sentinel-2-hls-version-20/

7. Advancing remote sensing data and methods to improve fire and burned area products

USGS leads in collaboration with Tall Timbers, NRCS, and TOT

The extent to which the HLS time series data can be fully utilized to map burned areas in the Southeast with the greatest accuracy remains uncertain. With support from NRCS, co-PIs Hawbaker and Vanderhoof from USGS and Noble from TTR would collaborate to expand on the North American HLS effort and initial discoveries from Vanderhoof et. al., (2021), to evaluate a range of image processing techniques to extract features (predictors) condensing spatial and temporal information from the HLS data for use in machine learning models to identify burned areas.

Scientists and analysts at TTR are in a unique position to contribute to this research on advanced remote sensing data and methods and provide feedback on regional products. TTR resources include extensive knowledge of the southeastern U.S. region fire ecology, a 5,000 ha land base where we can conduct prescribed fire experiments, access to thousands of hectares of private and public land for conducting ground-based measurements, an extensive field plot network, and decades of experience in remote sensing of fire and ecosystems.

This collaboration would pay particular attention to the challenges to mapping burned areas in the Southeast and the unique needs of SE FireMap users. Focusing on the SE FireMap extent, we would use a series of experiments testing different algorithm changes including: (1) varying the duration over which lagged predictors are calculated from 3 years to 3 days, (2) incorporating spatial segmentation of images prior to classification, and (3) augmenting Landsat and HLS burned area detections with active fire detections from coarse-resolution sensors (e.g., GOESS, MODIS, and VIIRS). In these experiments, the algorithms would be parameterized with training data and evaluated using independent reference data collected at locations across the Southeast. To document improvement, the omission and commission error rates of the experimental BA products would be evaluated and compared to existing BA products. We will update burned area products and derived fire history metrics and incorporate them into SE FireMap Phase II as improved methods are incorporated into our data processing pipeline.

8. Predicting uncertainties in the burned area products

Work performed by postdoc located at Tall Timbers jointly supervised by USGS and Tall Timbers

SE FireMap users need additional information characterizing uncertainties in the burned area products. This information would allow users to better understand when and where they can have confidence in the Landsat and HLS BA products. For the Landsat BA products, there are two sources of information users can examine to assess uncertainties: (1) the pixel-level burn probability (BP) surfaces (Hawbaker et. al., 2017; 2020) and (2) the validation error metrics summaries nationally, regionally, by land cover class, and by fire size (Vanderhoof et. al., 2017a, Vanderhoof et. al., 2017b, Hawbaker et. al., 2020). The first (BP products) are based entirely on the information contained in the Landsat images and the second (validation metrics) are not spatially explicit.

We propose new research to explore developing spatially explicit uncertainty maps, based on information external to algorithm development. These maps could help users better understand potential sources of misclassification and how they propagate from the burned area products to the fire history metrics. Using our training and validation data, we will identify classification errors, determining

which pixels were correctly classified (as burned or not burned), or were errors (commission or omission). This determination is limited to dates and locations where reference data exist. However, what we propose here is to model and predict the errors at other dates and locations using ancillary data not incorporated in the burned area algorithm (e.g., day of year, land cover, or distance to clouds and cloud shadows) as predictors.

The predicted results would include a probability estimate for two of the classification outcomes: incorrect burn (commission error) and incorrect not burn (omission error). The commission and omission probability estimates could be further translated into a categorical layer representing high (e.g., ≤ 5% commission), moderate (e.g., > 5% and ≤ 10% commission), and low confidence (e.g., > 10% commission) in the burn classifications. Users could then filter the burn classifications to include or remove burned pixels depending on confidence levels. The models of omission and commission errors can inform to future algorithm improvements, in addition to providing uncertainty information to users in Se FireMap Phase II. For example, high predictor importance for individual land cover classes may indicate where additional training data should be collected to reduce error.

9. Assessing regional patterns and impacts of burning

Work performed by postdoc located at Tall Timbers jointly supervised by USGS and Tall Timbers

In addition to collaborating on remote sensing approaches to improve burned area detection and uncertainty analysis to support SE FireMap, we plan analyze spatial and temporal patterns in fire occurrence at landscape scales within the SE FireMap to interpret potential cultural, geophysical, and historical context drivers of change and their ecological impacts. Broadly, we are interested in two areas of inquiry: 1) What are the regional geographic patterns of change in prescribed fire use, and how do they relate to dominant land use and landowner type, state jurisdictions, and distribution of NRCS cost-share assistance for burning. 2) What are the predicted changes in multiple ecosystem services (e.g., biodiversity, wildfire resilience, soil stabilization) associated with trends in burning and changes in land use, including conversion between agriculture and frequently burned longleaf pine, based on existing empirical data? We request funding to support a post-doc stationed at Tall Timbers and supervised by the PIs to further explore and develop these lines of inquiry with input from NRCS. These studies will add value to SE FireMap Phase II by providing examples of how SE FireMap supports research elucidating the cultural and ecological significance of prescribed fire and assessing the value of NRCS programs that assist landowners with fire management and ecological restoration.

10. Coordinating with the SE FireMap team

Effective integration of remotely sensed burned area products and fire history metrics into SE FireMap will require constant interaction between USGS, NRCS, TTR, Ferguson-Lynch and the TOT. Co-PIs from TTR and USGS will participate in regular meetings and conference calls to support the SE FireMap project. This interaction is needed to coordinate production of data products and routine ingestion into SE FireMap. This interaction is also critical to incorporate feedback and suggestions from the entire SE FireMap team and ensure the decision support tools developed are meeting the goals of SE FireMap and the needs of SE FireMap users. Finally, our team interactions will provide a forum to discuss and make plans to incorporating the latest scientific advances in remote sensing, image processing, and machine

learning for utilizing remote sensing to map burned areas and generate additional fire-relevant data products, as well as identifying opportunities to expand the SE FireMap concept in the future.

Deliverables

The main goal of this agreement is to produce the foundational burned area information data to support SE FireMap. As outlined in objectives 1 and 2, USGS will produce and deliver the Landsat BA products and derived fire history metrics by Mar. 31st each year using Landsat data from the prior year (e.g., 2022 Landsat BA products will be produced in 2023). We plan to do the same with the HLS data, but there is some uncertainty in data availability. The HLS version 2.0 data release was announced on Aug. 24, 2021[3] but processing of historical data is incomplete. Recent exploration of the HLS archive indicated that 2021 data are being processed now but the timeline for producing historical data is unclear. This creates some uncertainty for objectives that depend on the HLS products; however, those objectives could be completed with the Landsat BA products and history metrics if needed to stay on schedule.

Although our goal is to produce the foundational burned area information data to support SE FireMap, we envision a number of scientific publications produced from this effort including: Mapping burned areas with HLS data across North America (journal article); Spatially-explicit representation of uncertainty in remotely sensed burned area products (journal article); Advanced remote sensing methods for burned area mapping (1 – 3 journal articles); and Landscape scale assessments of burning and impacts (1 – 3 journal articles). TT and USGS will also co-produce a 2-page Science to Solutions for NRCS-WLFW, a brief overview of the science behind the SE FireMap in layperson's terminology with the target audiences being agency leadership, Congress and the public.

In addition to the core burned area products produced by USGS, the technology transfer of a science-based product to natural resource managers, landowners and fire practitioners, by way of web enabled decision support tools will provide insight, automation, and efficiencies into the management process.

Tall Timbers, in partnership with USGS will conduct at least 5 workshops to assess the needs of natural resource managers and decision makers in order to produce a set of decision support tools that will be available in a web enabled application. Individual workshops will introduce the process of using different GIS layers to address a variety of management objectives for specific locations throughout the region. The end results of the workshops will be a suite of DSTs that will support broader regional objectives and will be included in the final end user interface. All DSTs and associated training material will be hosted on the Landscape Partnership portal, as referenced previously.

[3] https://lpdaac.usgs.gov/news/release-of-harmonized-landsat-and-sentinel-2-hls-version-20/

Deliverables

Deliverable	Delivery date
2-page Science to Solutions for NRCS-WLFW	Mar. 31, 2023
DST workshop (1 of 5)	May 30, 2023
DST workshop (2 of 5)	Jun. 30, 2023
DST workshop (3 of 5)	Sep. 30, 2023
DST workshop (4 of 5)	Dec. 31, 2023
DST workshop (5 of 5)	Mar. 31, 2023
Implement DST interface (SE FireMap Phase II)	Mar. 31, 2025
DST documentation and training materials	Mar. 31, 2026
2022 Landsat Burned Area products and 1984 – 2022 fire history metrics	Mar. 31, 2023
2023 Landsat Burned Area products and 1984 – 2023 fire history metrics	Mar. 31, 2024
2024 Landsat Burned Area products and 1984 – 2024 fire history metrics	Mar. 31, 2025
2025 Landsat Burned Area products and 1984 – 2025 fire history metrics	Mar. 31, 2026
2023 HLS Burned Area products and 2013 – 2023 fire history metrics	Mar. 31, 2024
2024 HLS Burned Area products and 2013 – 2024 fire history metrics	Mar. 31, 2025
2025 HLS Burned Area products and 2013 – 2025 fire history metrics	Mar. 31, 2026
2022 SE FireMap (Phase I) data updates incorporated	Apr. 30, 2023
2023 SE FireMap (Phase II) data updates incorporated	Apr. 30, 2024
2024 SE FireMap (Phase II) data updates incorporated	Apr. 30, 2025
2025 SE FireMap (Phase II) data updates incorporated	Apr. 30, 2026
Mapping burned areas with HLS data across North America (journal article)	Mar. 31, 2024
Spatially explicit representation of uncertainty in remotely sensed burned area products (journal article)	Jun. 30, 2026
Advanced remote sensing methods for burned area mapping (1st journal article)	July 31, 2024
Advanced remote sensing methods for burned area mapping (2nd journal article)	Mar. 31, 2025
Advanced remote sensing methods for burned area mapping (3rd journal article)	Mar. 31, 2026
Landscape scale assessments of burning and impacts (1st journal article)	Jun. 30, 2024
Landscape scale assessments of burning and impacts (2nd journal article)	Jun. 30, 2025

Timeline

This timeline assumes an Oct. 1, 2022 start date for TTR and USGS but will need to be adjusted based on the actual start date. W: winter, Sp: spring, Su: summer, F: fall. P: Burned area products and fire history metrics delivered by end of March each year. J: Journal article submission. H: search and hire postdocs.

		2023				2024				2025				2026		
Objective	**F**	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**	**F**	**W**	**Sp**	**Su**
1. Soliciting input from decision-support tool users (workshops)																
2. Implement decision support tools/end user interface																
3. Decision support tools documentation and training																
4. Continued production of Landsat BA data			P				P				P				P	
5. Reducing Landsat product latency																
6. Incorporating HLS data							J		P				P			
7. Advanced remote sensing data and methods									J			J				J
8. Predicting uncertainties									H						**J**	
9. Assessing regional patterns and impacts	H						J				J					
10. Coordination with SE FireMap team																