A Regional Database Tracking Fire Footprint Each Year within the South Atlantic Region: Current Database Description and Future Directions

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Introduction

Despite improvements by land management agencies in tracking the spatial extent of fire, geolocations of prescribed fire at a regional scale are often only obtainable as individual points with no indication of the extent of the fires. Furthermore, land management agencies differ in the types of data and names of data fields used for data collected, thereby making it more difficult to combine information efficiently into a single database to help draw conclusions about progress towards regional management goals. Integrated digitized polygons for the region, not just points and acreage by land managers, are critical for predicting ecological impacts over specific areas and understanding how each area interacts with other adjacent areas (that may or may not be under similar ownership). To address this gap in regional data, our team has:

- identified key regional and state land managers to contribute fire spatial footprint data,
- developed a standard set of minimum fields for polygonal data acquisition that can be adopted by all of the agencies when rolling up data to a regional scale (see SALCC fire geodatabase for set of minimum fields), and
- created a geodatabase that will be freely available on USGS ScienceBase and Data Basin for viewing and download and use by anyone who needs it.
- Ensure that there is a plan for efficiently updating the geodatabase on a yearly basis.

The geodatabase developed under the current project now allows the South Atlantic Landscape Conservation Cooperative (SALCC) and other partners (such as America's Longleaf and

NFWF) to access data on fire in the region by year (for 2016, 2017, and 2018) and use it to better understand the impact of their work in the region and progress towards shared goals.

Need

Results from the 2015 National Prescribed Fire Use Survey Report show that, in 2014, 69% of all forested acres managed with prescribed fire were in the Southeast. Further, six of the eight states that burned more than 250,000 acres for forestry objectives were in the historic range of longleaf pine. These numbers give a big picture view of burning in the Southeast, but there is a lack of more specific data on burning in longleaf pine, shortleaf pine, and other forest types. With more fine-grained data on the number of acres burned, forest type, and location, the fire management community can better determine: 1) how many more acres need to be burned to reach ecosystem management and fuel reduction goals; 2) where to concentrate prescribed burning, education, and capacity building efforts; and 3) what the air quality and smoke impacts are from prescribed fire, among other things. Developing fire activity and air emissions tracking systems will be essential to inform strategic activities and resource allocation decisions, and to measure progress towards our goals.

From 2014 - 2017, the Department of the Interior Wildland Fire Resilient Landscapes program provided almost $3 million dollars to support prescribed fire in the South Atlantic region. A major focus of that program was about ecological impacts of fire beyond just acres burned. The South Atlantic region received those funds partly because of the ability to report back on ecological impacts. One major limitation in predicting ecological impacts, however, was the lack of a cross organizational geodatabase of the footprints of prescribed fires. The creation of the database described in this paper was jointly funded by the DOI wildland fire program and contributions to the South Atlantic LCC from U.S. Fish and Wildlife Service Science Applications.

Several agencies and groups, such as the Southeast Partnership for Planning and Sustainability (SERPPAS) and America's Longleaf Restoration Initiative, have all identified a similar need for better data tracking of prescribed fires to address the goals above. Ultimately, our database will help to develop a better understanding of how much burning is needed to reach restoration goals based on current acreages of community types, condition classes, and prescribed burning areas and the how close we are to meeting those goals. SERPPAS currently has a priority goal to "use a spatial analysis to identify and prioritize areas for prescribed fire treatments considering the missions and objectives of SERPPAS…" The geodatabase could also help to identify opportunities to provide additional funding and capacity support in those areas, as needed.

Agencies Providing Data to the Current Geodatabase (Updated as of August 2018)

The following agencies and land managers have contributed their data to the regional geodatabase for the years 2016, 2017, and 2018. We plan on continuing to add new contributors as we find new data to bring in. Data contributors include:
Camp Blanding Joint Training Center
Florida State Parks
Florida Fish and Wildlife Conservation Commission
Georgia Department of Natural Resources
Mecklenburg County Natural Resources (NC)
National Park Service
North Carolina State Parks

North Carolina Wildlife Resource Commission
Tall Timbers Research Station
The Nature Conservancy, North Carolina
US Fish & Wildlife Service
US Forest Service
United States Air Force (DoD)
United States Army (DoD)

Connection to Other Regional Projects

Several tracking and mapping efforts that will contribute toward this goal and its activities are already underway/under development, and all of the efforts have the potential to cover important parts of the Southeast geography. These and other tracking and mapping efforts depend on good data; therefore it is important to encourage states to collect and submit prescribed fire data to these efforts. This will help to determine how much burning is needed, and how much burning is being done. In the Southeast, the South Atlantic LCC geodatabase can work with the Peninsula Florida LCC's upcoming fire modeling effort to create coverage for all of Florida plus the South Atlantic LCC footprint in Alabama, Georgia, South Carolina, North Carolina, and Virginia. In addition, there may be utility in coordinating with the "Southern Integrated Prescribed Fire Information System for Air Quality and Health Impacts", run out of NC State University.

Methods for Updating the Database

The current geodatabase is a static product that will be posted to Data Basin so that data from 2016-2018 can be accessed. However, we recognize the need for this spatial database to be updated on a yearly basis so that the information can be used each year by key partners. Below are some recommendations/next steps for a methodology to update the database in the future.

1. Identify a stakeholder that can maintain and update the geodatabase with new information as it is made available and repost to ScienceBase and Data Basin on a monthly basis. This task includes converting raw data from contributors to final data format using the crosswalk to standard fields provided by each data provider (or crosswalking manually if no crosswalk exists). Steps should also include data exchange with Landfire program to ensure that they have all of the same data we have received and vice versa once their yearly data is finalized. Estimate of 70-140 hours/year plus some expenses associated with computer/software, depending upon the level of data submitted.
2. Identify a stakeholder that can lead yearly call for data, including maintenance of contacts database, updating contacts database yearly to make sure the correct contact for each organization is in the database, initial email call for data, secondary email call for data, follow up by phone to key data providers, and outreach to potential new data providers. Estimate of 70-140 hours/year depending upon the level of engagement of new data providers we wish to have.
3. Identify a stakeholder to publicize the database each year when it is updated so that those who need it know that it exists and where to find it. Estimate of 40 hours/year plus conference expenses for one conference presentation (Longleaf Alliance and/or America's Longleaf board meeting).

Suggestions for Next Steps and Potential Obstacles to Success

Our biggest obstacle to success is the lack of comprehensive polygonal burn records/data for all burns conducted each year within our area of interest. Agencies have made great strides in the last five years, so most large federal agencies now collect this data and have it available. However, there is still a need to encourage mid-sized and smaller landowners to collect this data for the benefit of all.

So far, money has only been allocated to develop these systems but not to maintain them. We need to make sure that this system is adequately funded so that the data can remain relevant and so that users trust the currency and quality of the data. If maintained, we feel that these databases can help assess ecological condition and ecological benefit of prescribed fire on the landscape and can help us look more closely at the long-term response of fire on our landscape. Ideally, the database would be maintained by a single entity who could update it in real time as new data became available and repost it to Data Basin and/or other sites where users could most easily access the information.

The following are suggested next steps:

1. Identify the best long-term home for this database. An active partnership focused on fire in the Southeast would be well positioned to decide how best to maintain and improve this database over time. The SERPPAS Prescribed Fire Working Group and Natureserve seem particularly well suited to collaborate on this but other options like America's Longleaf Restoration Initiative could also be considered if there was staff capacity to maintain the database within the organization.
2. Ensure funding for updating and maintenance. Discussions on funding are ongoing with multiple organizations.
3. Ensure database is complementary to other efforts and that users aren't required to submit the same data to multiple efforts. While this project worked to ensure integration with other ongoing work, new efforts will continue to emerge over time. Ensuring integration with current efforts and connections with new ones will be important over time.
4. Make it as easy as possible to contribute data. Potential future directions to explore include: a user-friendly interface, better integration with existing systems, or overcoming other barriers to tracking and sharing fire footprint data.
5. Explore the best way to integrate fire footprint data from this database and remotely sensed predictions of fire extent. While remotely sensed data is still not as accurate as fire footprint data at a fine scale, it is better at filling in data gaps where direct fire footprint data are not currently available.
6. Develop derivative products from the database that predict ecological impacts of fire. These products could be useful for reporting fire impacts, prioritizing fire locations, quantifying ecological condition, and communicating the importance of prescribed fire. These derivative products could also provide an incentive for organizations to include their data in the database.

Resources

SERRPAS Prescribed Burning Tracking Presentation
2015 National Prescribed Fire Use Survey Report

Florida Forest Service Prescribed Fire Tracker
SERRPAS Fire Fact Sheet