Getting Fire Science on the Ground

The Southern Fire Exchange and the JFSP Fire Science Exchange Network

David Godwin, Ph.D., Coordinator
School of Forest Resources and Conservation
University of Florida

The Gap

Natural Resource & Wildland Fire Management Community

Photo by Christian Joudrey on Unsplash

Traditional Model

Natural Resource & Wildland Fire Management Community

"We argue that communication of results through published literature alone is insufficient to gain widespread field application."

Adams et al. 2017 IJWF "Bridging the divide…"

Photo by Christian Joudrey on Unsplash

JOINT FIRE SCIENCE PROGRAM

JOINT FIRE SCIENCE PROGRAM

Bridging the Gap

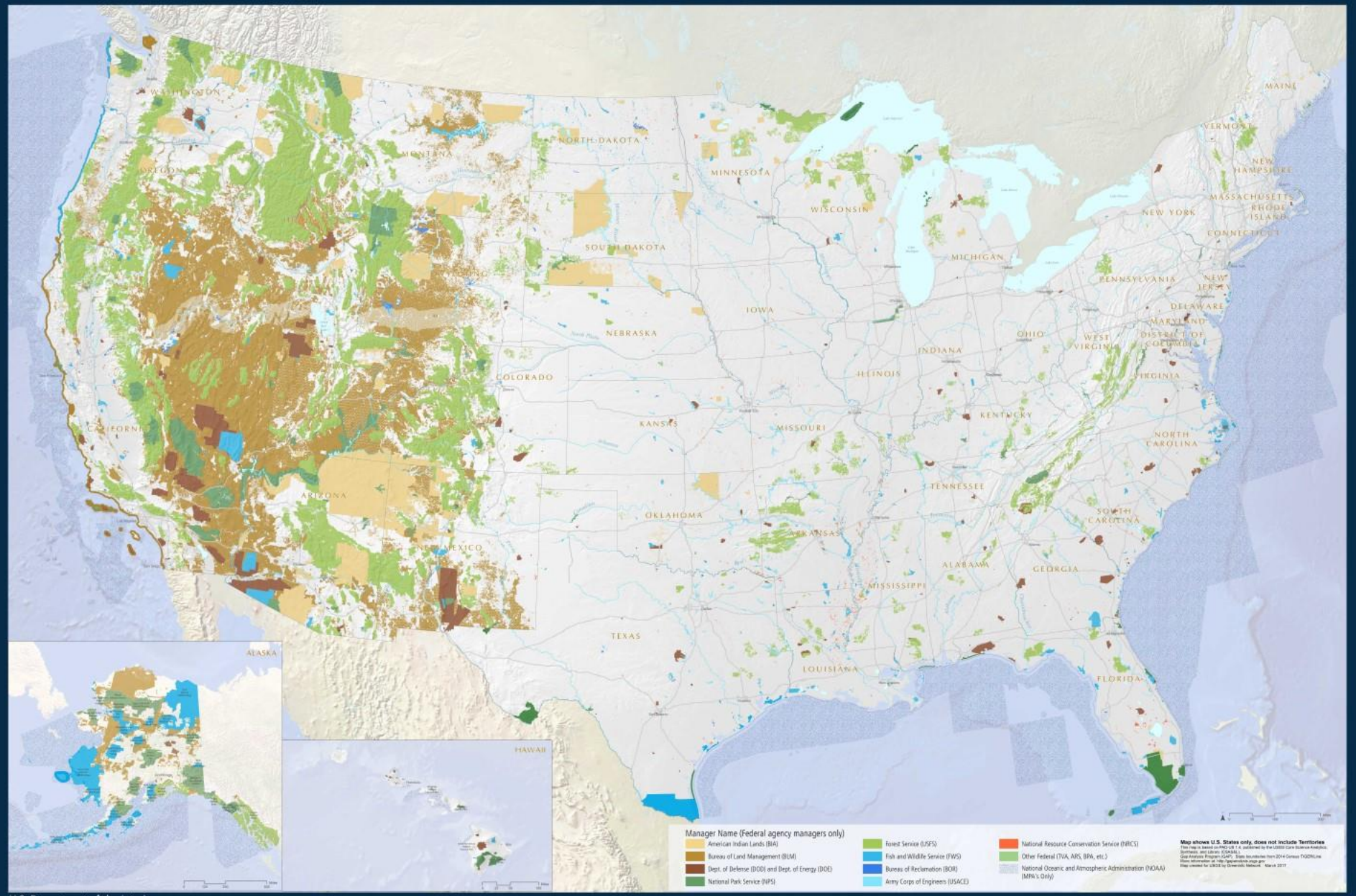
Natural Resource & Wildland Fire Management Community

Science Community

Photo by Patrick Tomasso on Unsplash

USGS
science for a changing world

Protected Areas Database of the U.S. (PAD-US) - Federally Managed Lands



U.S. Department of the Interior
U.S. Geological Survey

NORTHWEST FIRE SCIENCE CONSORTIUM

NORTHERN ROCKIES FIRE SCIENCE NETWORK

GREAT PLAINS FIRE SCIENCE EXCHANGE

Tallgrass Prairie and Oak Savanna Fire Science Consortium

OAK WOODLANDS & FORESTS FIRE CONSORTIUM

Lake States Fire Science Consortium

Great Basin Fire Science Exchange

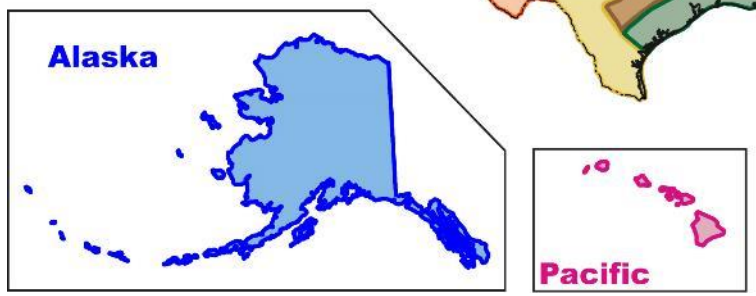
SOUTHERN ROCKIES FIRE SCIENCE NETWORK

NORTH ATLANTIC FIRE SCIENCE EXCHANGE

CALIFORNIA FIRE SCIENCE CONSORTIUM

Consortium of Appalachian Fire Managers & Scientists

SOUTHWEST FIRE SCIENCE CONSORTIUM



PFX Pacific Fire Exchange

SOUTHERN Fire Exchange

ALASKA FIRE SCIENCE CONSORTIUM

JOINT FIRE SCIENCE PROGRAM

Key Objectives of the Fire Science Exchange Network

1. Share information and build relationships.

2. List and describe existing research and synthesis information.

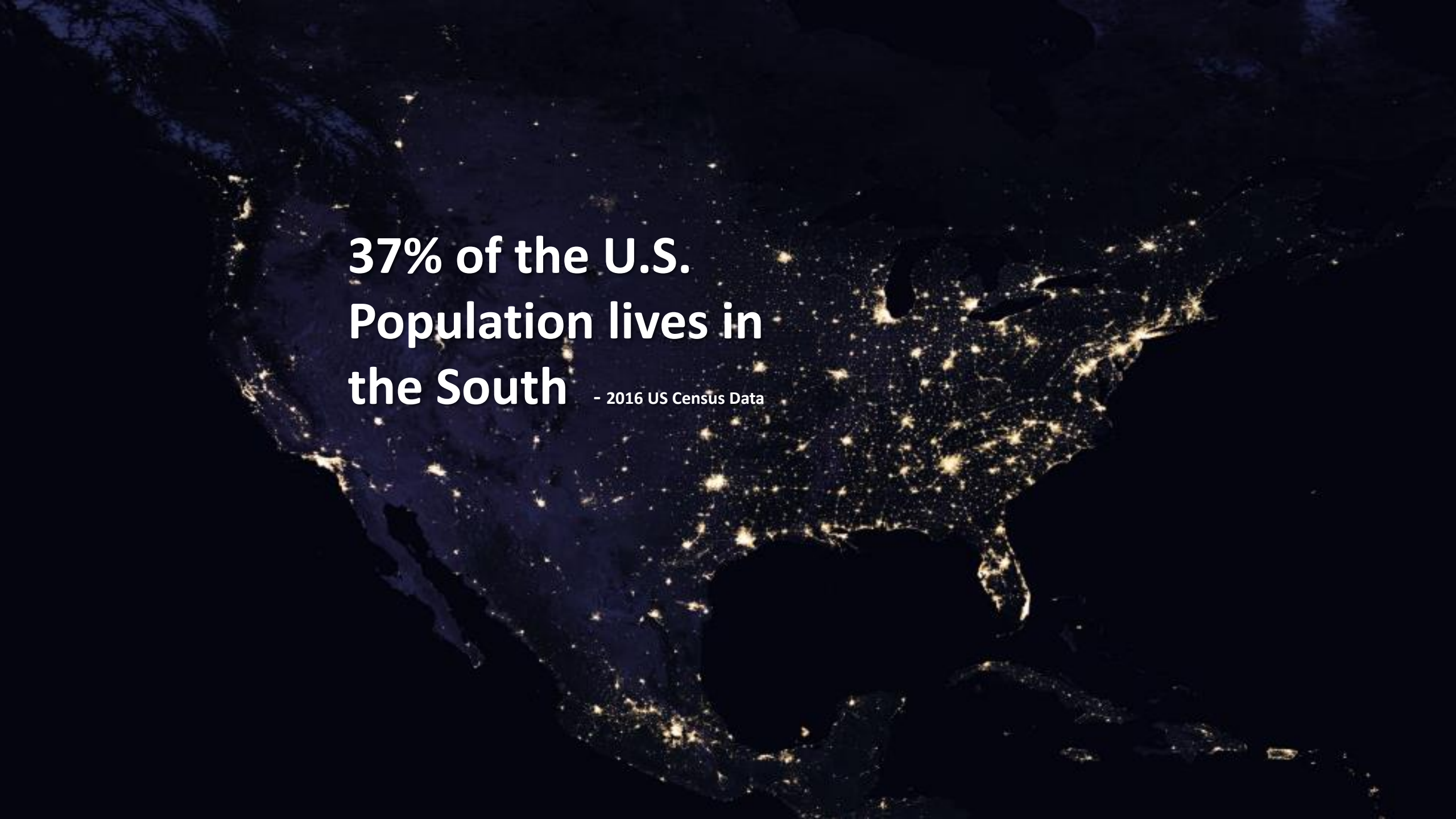
3. Identify and develop methods to assess the quality and applicability of research.

4. Demonstrate research on the ground.

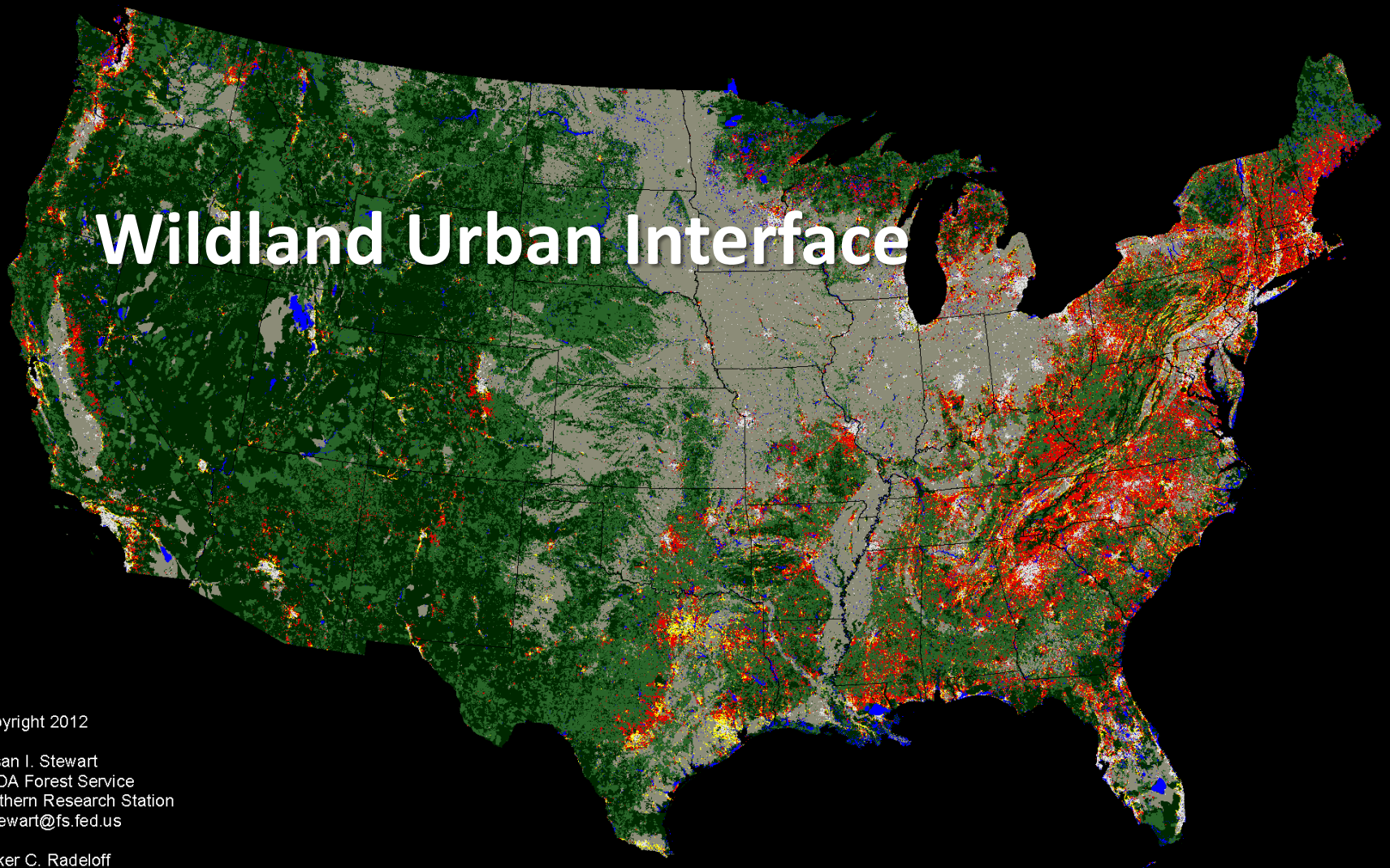
5. Support adaptive management.

6. Identify new research, synthesis, and validation needs.


SOUTHERN
Fire Exchange


37% of the U.S. Population lives in the South
- 2016 US Census Data

2010 Wildland Urban Interface



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WUI 2010 based on the 2010 Census,
2006 National Land Cover Database (NLCD),
and the Protected Areas Database version 1.1

WUI
- Interface
- Intermix

Non-WUI Vegetated
- No Housing
- Very Low Density Housing

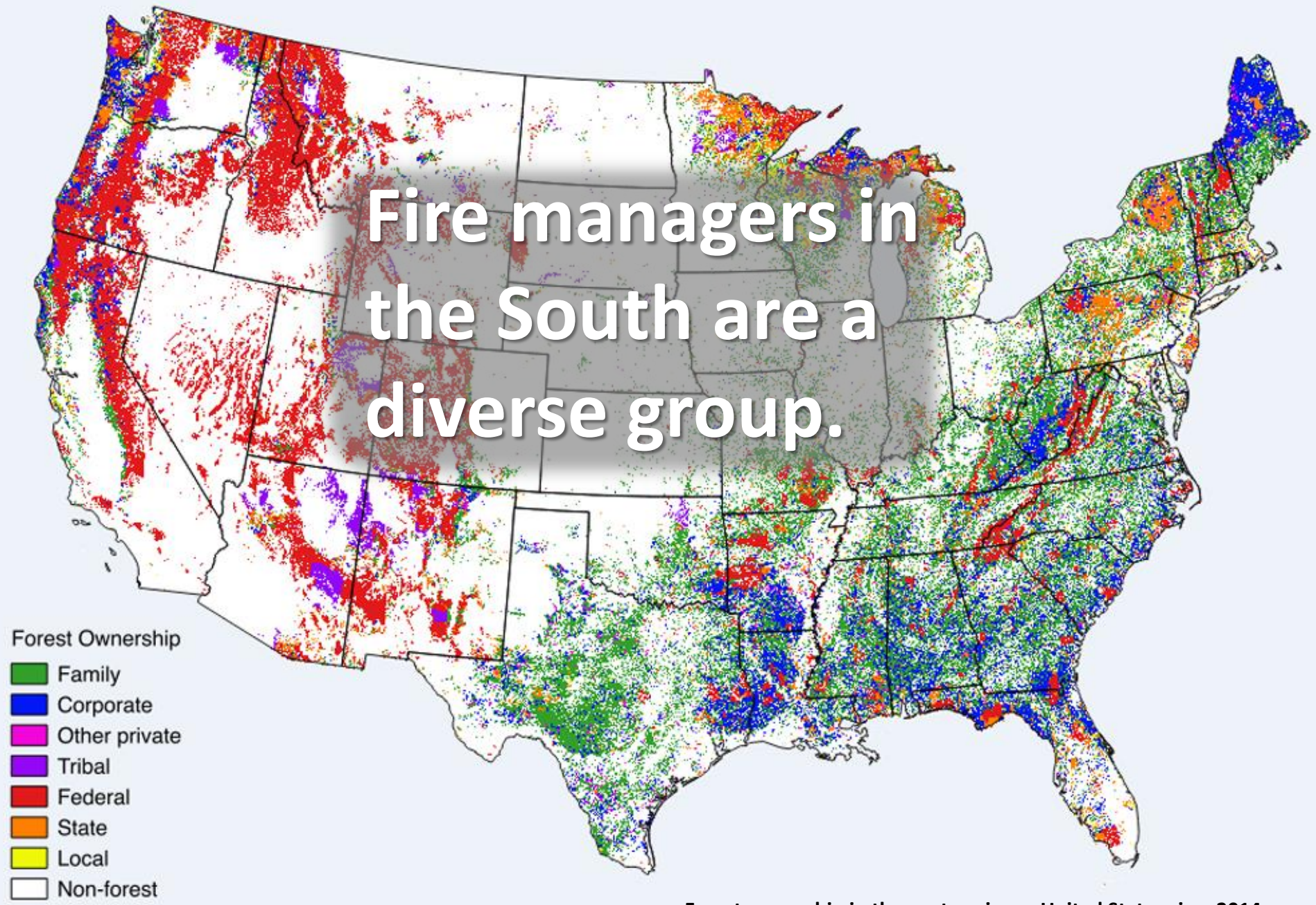
Non-Vegetated or Agriculture
- Medium and High Density Housing
- Low and Very Low Housing Density
- Water

States with the largest WUI area

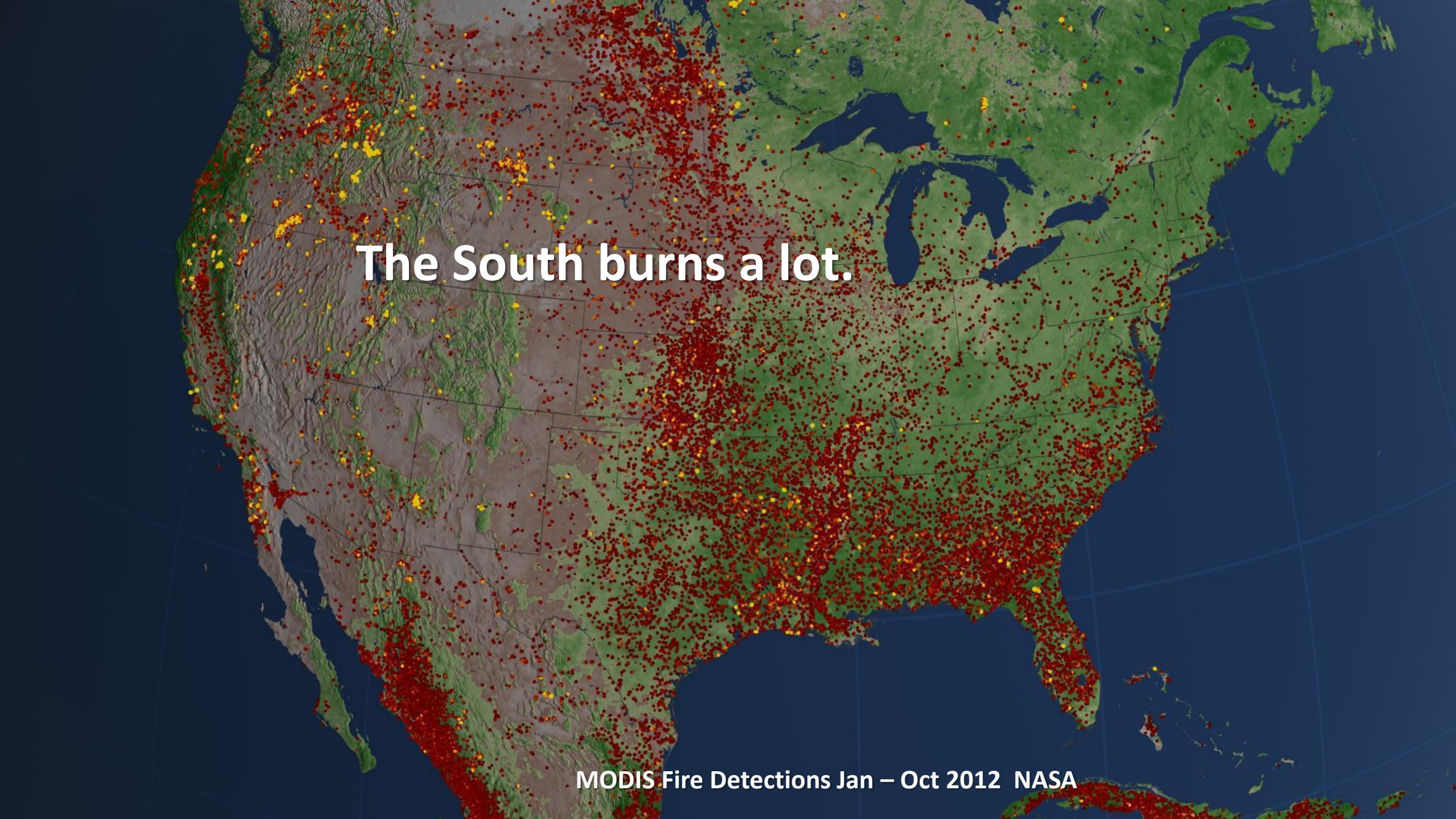
- North Carolina (54,000 km^2)
- Texas (47,000 km^2)
- Georgia (42,000 km^2)
- Pennsylvania (41,000 km^2)

https://doi.org/10.2737/NRS-RMAP-8

Fire managers in the South are a diverse group.

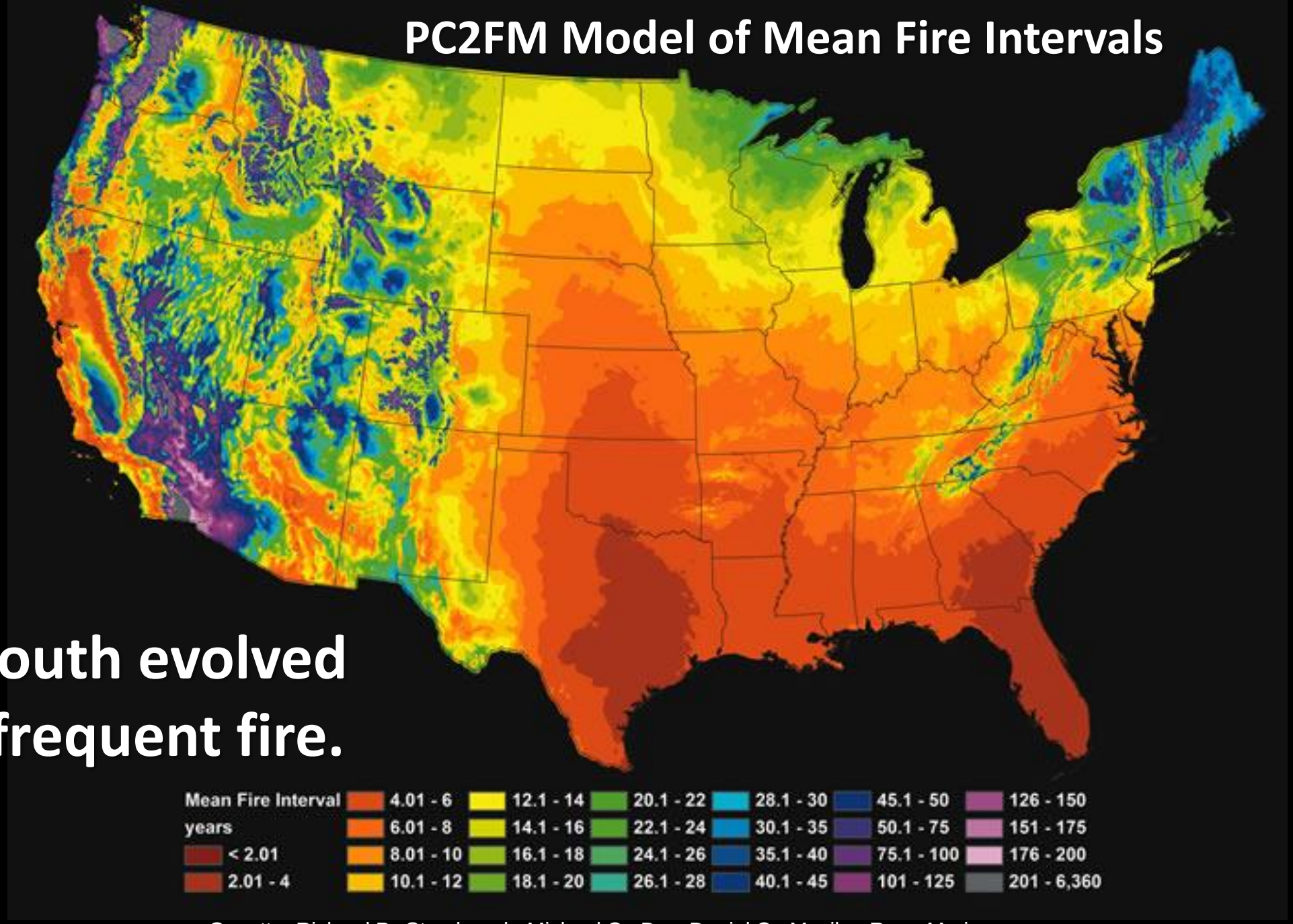


Forest ownership in the conterminous United States circa 2014
Source: Hewes, J.H.; Butler, B.J.; Liknes, G.C. 2017. USFS Data Archive



MODIS Fire Detections Jan – Oct 2012 NASA

PC2FM Model of Mean Fire Intervals



The South evolved with frequent fire.

Guyette, Richard P.; Stambaugh, Michael C.; Dey, Daniel C.; Muzika, Rose-Marie. 2012. Predicting fire frequency with chemistry and climate. Ecosystems 15(2):322-335.

The South uses fire.

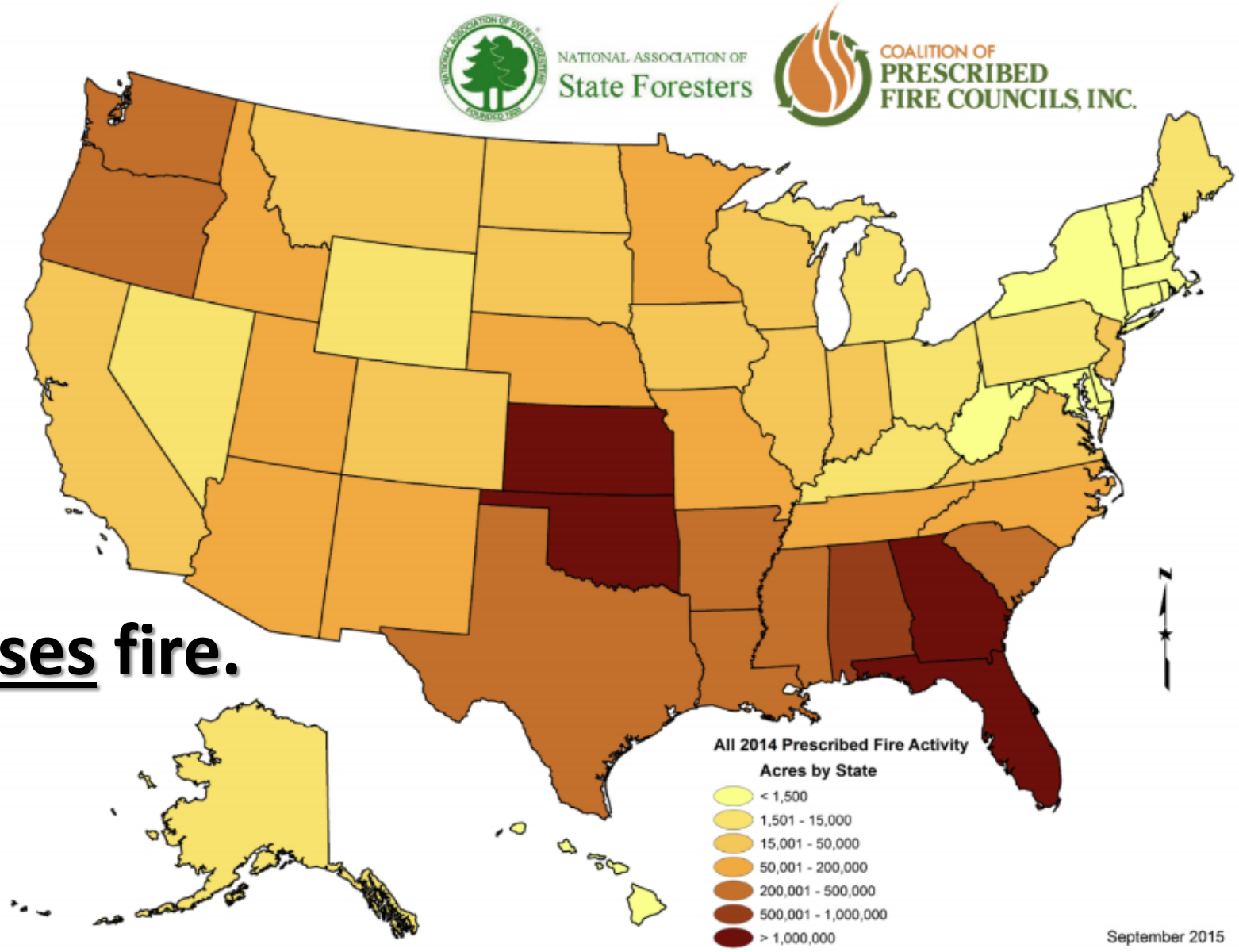
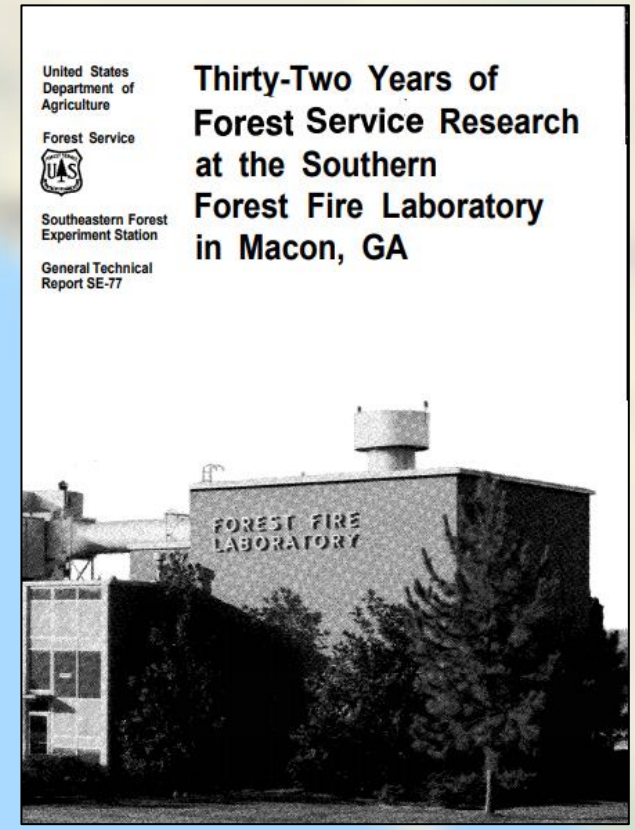


Figure 9. Acres of all prescribed fire use by state. Coarse acreage classes were created using a histogram that determined the most significant breaking points in acres reported.

2015 National Prescribed Fire Use Survey

The South creates fire science.



NatureServe

Clemson University 1889

NC STATE UNIVERSITY

VT

University of Georgia 1785

SRS Savannah River Site

Prescribed Fire Science Consortium

State Mississippi State University

Georgia Tech

The University of Alabama

The Joseph W. Jones Ecological Research Center at Ichauway

SRS Southern Research Station

Texas A&M University

LSU Louisiana State University

Tall Timbers

UF IFAS University of Florida

USGS science for a changing world

USDA Agricultural Research Service

Archbold Biological Station

University of Central Florida

NASA

Florida State University 1851

Florida State University

Photo: Rose Rodriguez, Tall Timbers

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Bridging the Gap

Natural Resource & Wildland Fire Management Community

Science Community

Photo by Patrick Tomasso on Unsplash

Essential Partnerships for Fire Science

SOUTHERN
Fire Exchange

UF | IFAS
UNIVERSITY of FLORIDA

NC STATE
UNIVERSITY

JOINT
FIRE SCIENCE
PROGRAM

The Nature Conservancy
Protecting nature. Preserving life.™
nature.org

SFE Core Focal Areas

- **Smoke and Air Quality**: Smoke management and effects, including smoke and fog forecasting, air quality impacts, weather interactions with smoke;

- **Prescribed Burning**: Improvements in incorporating science into burn prescriptions, implementation, and evaluation; application of weather forecasting tools and fire behavior models; quantification of fuel loads and consumption; manipulating fire regimes; and fire interactions with herbicides and fuel treatments;

- **Fire Ecology**: Ecological effects of fire on individual species or communities of plants and animals, soil, water, and wetlands across temporal and spatial scales;

- **Wildfire Mitigation & Suppression**: Research-based information related to suppression and fuels management impacts, safety guidelines and equipment, tactical decision making, resource-use fire, risk assessment and reduction, and WUI fire mitigation.

SFE Science Delivery Programing

User Accessed

- Fact Sheets
- Newsletters
- Website
- Videos
- Email / Social Media

Direct Delivery

- Webinars
- Meeting Presentations
- Fire Ecology Database

Personal Interactions

- Workshops
- Field Tours
- Classes
- Events
- Conferences

- User Effort Investment and Engagement +

Newsletters

SOUTHERN Fire Exchange
Uniting Fire Science and Natural Resource Management

FIRE LINES
A Joint Newsletter of the Southern Fire Exchange and the Southeastern Section of the Association for Fire Ecology

January - February 2016
Volume 6 - Issue 1

IN THIS ISSUE

Do Liability and Regulatory Standards Influence the Amount of Prescribed Burning in the South?

This is an interesting question given the diversity of standards in legislation and regulations related to certified prescribed burn managers (CPBM) across the region. Two states (Florida and Georgia) use "gross negligence" as the liability standard for loss of control of prescribed fires and civil damages and injuries. "Simple negligence" is the standard in the other southern states. In most states, statutory requirements for liability protection under either standard include a burn permit but are more variable with respect to the presence of a CPBM at the burn, written prescriptions, adequate personnel and firebreaks, and burn ban exemptions. A fascinating new study reported in *Ecological Applications* (Wonkka, Rogers, and Kreuter, 2015) asked the question at the top of this article, using Florida, Alabama, Georgia, South Carolina and North Carolina records for prescribed burns on private lands from 2008 to 2013. By pairing 66 adjacent counties across state lines, the authors were able to evaluate the effects of different liability and regulatory standards on two variables: 1) percentage of privately owned forest, range, and pasture land burned each year and 2) the annual number of prescribed fires on those lands.

In the two states with gross negligence liability, the annual percentage of private acres burned was significantly higher than in adjacent counties with simple negligence standards. These results suggest that the extra liability protection under the gross negligence standard provides an extra incentive for landowners to utilize prescribed burning for land management and resource protection. On average, the additional 3.5% of acres burned in those states is approximately 7,100 acres/county. The number of prescribed burns was also higher in "gross negligence" counties than in "simple negligence" standard counties across state lines. Interestingly, the authors did not find that other requirements (such as having a CPBM on site or written burn prescriptions) in addition to burn permits had any effect on the two main variables. Rather than discouraging landowners from burning, the additional requirements may serve to encourage them through the training and safety awareness that come with those requirements. This study provides new information that could be helpful as states and counties evaluate policies relevant to prescribed burning.

Wonkka, C.L., W.E. Rogers, and U.P. Kreuter. (2015). Legal barriers to effective ecosystem management: exploring linkages between liability, regulations, and prescribed fire. *Ecological Applications* 25(8): 2382–2393.

SFE Webinar: El Nino, La Nina and the 1998 Florida Wildfires

Wednesday, February 17, 2016
1:00 - 2:00 PM, Eastern

The current 2015-2016 El Niño event has many Florida fire managers thinking of their experiences from 1998. During the epic 1998 Florida wildfire season, more than 500,000 acres burned resulting in damage and suppression costs of $390 million. Interestingly, the 1998 fires occurred during a La Niña event that followed the last strong El Niño. During this webinar, Scott Goodrick with the U.S. Forest Service Southern Research Station will discuss what managers need to know about the impacts of ENSO events on the 1998 fires and Florida wildfire seasons in general. Following the webinar there will be time for audience questions and answers. One hour of Category 1 Society of American Foresters Continuing Education credit is anticipated.

Click here to register for this webinar!

CONTACT INFORMATION

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Kevin Robertson (Co-PI)
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Exchange Staff
Chet Buell (IT Specialist)
David Godwin (Program Coordinator)
Carol Kimball (TTRS Librarian)
Annie Okarani (Outreach Specialist)

Learn more about our Partners and the JFSP Fire Science Exchange Network.

Visit the SFE Resource Center www.southernfireexchange.org

Stay Connected with SFE

SOUTHERN Fire Exchange
Uniting Fire Science and Natural Resource Management

INES
A Joint Newsletter of the Southern Fire Exchange and the Southeastern Section of the Association for Fire Ecology

May - June 2016
Volume 6 - Issue 3

A View into the Field: Recap of Recent Learning Events

This spring, the SFE has been working with several partners to host or present at great field events where managers, landowners, and researchers have come together to discuss fire science.

Fire, Fuels, and Longleaf Pine Management

This workshop and field tour took place in the Kisatchie National Forest and the Palustris Experimental Forest, Louisiana. The day included discussions of strategies for minimizing negative fire impacts on longleaf pine seedlings, opportunities for converting existing loblolly pine stands to longleaf, and new research on the impacts of containerized planting methods on pine root morphology. Presenters discussed research that has demonstrated that the timing and season of prescribed fire early in the life of a newly established longleaf pine stand can be critical for achieving competition control while minimizing fire-induced near-term reductions on tree height and volume. Based on several studies, research forester Dave Haywood recommends burning in May, rather than in March or July, in young longleaf pine plantations. The US Forest Service covered this event in a recent issue of *Compass Live*. To see more photos from the day, click here.

...g Sandhill Ecosystems

...r-Swisher Biological Station (OSBS) near Melrose, Florida, participants learned about ...rch designed to improve the results of returning prescribed fire to long-unburned sandhill ... One highlight from the workshop was work by Dr. Morgan Varner (US Forest Service) ... Kreye (Virginia Tech) on the effects and underlying mechanisms behind duff-fire ...rtality. Their research has shown that duff smoldering around the bases of pines can ... after the surrounding vegetation has cooled, leading to prolonged upper-horizon soil ...sequent fine root mortality and tree death. Click here to read a feature story on this ...ty of Florida, IFAS Research News. To see more photos, click here.

...oodlands and Forests Fire Consortium

...o share fire science about a pine-bluestem restoration project. Partici... and learned about the science and management surrounding the ... Forest shortleaf pine-bluestem ecosystem restoration pro... ...gh the use of frequent prescribed fire and selective timber harvesting ...ired red cockaded woodpeckers, increased understory plant diversi... ...game and non-game wildlife species, and maintained a sustainable ...ets. Click here for a related research brief from the Oak Wood-

Cont'd on page 3

Fact Sheets

SOUTHERN Fire Exchange
Uniting Fire Science and Natural Resource Management

SFE Fact Sheet 2017-1

What the Research Says:
Prescribed Fire and Wildfire Risk Reduction

Alan Long and Annie Ozmart

A variety of research studies have found similar conclusions: Prescribed fire reduces wildfire risk, intensity, and size in southern pine flatwoods ecosystems, but for a relatively short time.

Most fire and natural resource managers across the Southeast agree that prescribed fire reduces wildfire risk. After all, fuels reduction is an objective that is often included in burn plans, and many managers and landowners have seen firsthand how wildfires respond in unburned versus frequently burned areas. But beyond observational and anecdotal information, what scientific findings do we have that prescribed fire reduces wildfire risk? And how long do these effects last? These questions have been asked for at least 50 years in the South and a number of research studies have addressed them from various angles. This fact sheet summarizes the conclusions of five studies conducted in pine flatwoods ecosystems.

One of the earliest studies that assessed prescribed fire effects on wildfire risk was reported by Davis and Cooper (1963). The authors tracked 380 wildfires over 4 years on almost 1 million acres in South Georgia and North Florida and classified the years since the last burn for each wildfire. Results of this study showed that the areas classified as having a 0–2 year rough had a wildfire occurrence rate of 0.73 wildfires per 10,000 acres, while the 3–5 year rough had a rate of 1.19 wildfires per 10,000 acres. In addition, the acres burned annually increased with the time since fire, with annual burn percentages ranging from 0.03% to 0.14% in the 0–5 year rough and 7.2% in the more than 5 year rough.

Conclusion: Fuel accumulations of fewer than 3 years resulted in less wildfires, fewer acres burned, and lower fire intensities than fuel accumulations greater than 3 years.

From 1998 to 2000, wildfires occurred across northern Florida, with several of those fires burning up to or across areas that had been treated with prescribed fire or other fuel treatments. This provided an opportunity for researchers to evaluate the effects of fuels treatments on wildfire characteristics. For example, Brose and Wade (2002) measured fuel loads in Northeast Florida on sites where fuels had been treated through herbicide application, prescribed fire, or thinning. Fuel loads were measured 1, 2, 3, or 4 years after treatment, and the treatments were compared with unburned rough. The fuel load measurements were then used, in combination with weather conditions recorded during the 1998 wildfires, to

Researchers have been studying how prescribed fire influences wildfire in pine flatwoods ecosystems for more than 50 years. Photo: David Godwin

evaluate fire behavior in the BEHAVE fire modeling system. Using flame length and rate of spread results as indicators to predict difficulty of wildfire control, the study found that "fire behavior in the 1-year-old prescribed burn and thinned stands would be mild, allowing for easy control" while the opposite is true for untreated stands and for 1-year-old herbicide stands.

Conclusion: Based on model predictions, prescribed fire reduces wildfire hazard for approximately 1 to 2 years, until shrubs recover.

In another study, Outcalt and Wade (2004) evaluated pine mortality after the 1998 and 2000 Florida wildfires on three different properties in Northeast Florida that represented a range of prescribed burning regimes. Results from stands in the Osceola National Forest showed that pine mortality was lowest after wildfires in stands burned in the previous 1.5 years, as compared to older roughs. In addition, the results showed that pine mortality was higher at Tiger Bay State Forest, where prescribed burning had been used less frequently, and was highest at Lake Butler forest where prescribed fire was not used.

Conclusion: Wildfire intensity and severity were lower on sites one to two years after prescribed fire than on sites with longer fire return intervals.

SOUTHERN Fire Exchange
Uniting Fire Science and Natural Resource Management

SFE Fact Sheet 2014-3

Offline Maps for Wildland Fire and Natural Resource Management: Custom GPS Enabled Maps on a Mobile Device

David Godwin

INTRODUCTION

Improvements in smartphone and tablet device hardware and software have made it relatively easy for wildland fire and natural resource professionals to use digital maps in the field. Digital map uses include a variety of resource management tasks: custom prescribed fire maps, boundary line and timber cruising, damage surveys, wildlife inventories, and more. Unfortunately, since many of the most common mobile device mapping applications (apps) require constant data connectivity to stream maps, such applications often have little utility for wildland fire and natural resource management operations due to remote operating locations. This fact sheet provides instructions for exporting GPS enabled custom self-contained maps into a GeoPDF format that can later be georeferenced in the field using a mobile app without requiring cellular or data connections (3G/4G or wifi).

Software required for these instructions:

- **ESRI ArcMap 10.01 (desktop GIS application)**
  http://www.esri.com/software/arcgis
- **Avenza PDF Maps (free mobile mapping app)**
  http://www.avenza.com/pdf-maps
- **DropBox (free mobile file storage/sharing app)**
  http://www.dropbox.com

Figure 1. Avenza PDF Maps is a free mobile application for the Apple iOS and Google Android mobile device operating systems that enables users to plot their position on a preloaded custom map in the field without needing a data connection.

INSTRUCTIONS

Note: The screen captures included in this fact sheet were taken on a Windows 7 machine and an Apple iOS 7 mobile device. Changes in software and operating systems may require modifications of these directions.

Step 1: Build a custom map in ESRI ArcGIS. Assemble the layers and zoom to the desired area that should be visible within the custom map.

Step 2: Within ArcGIS, go to the File menu and select *Export Map*. Under *File Type* select *PDF*. Within the *Options* pane, select the *Advanced* tab. Under the *Layers and Attributes* dropdown menu select

Webinars

SFE webinars have been used as training for:

- Everglades Nat. Park Wildland Fire
- Florida Forest Service
- University and Community Colleges
- Georgia Interagency RxFire Burn Teams
- State RxFire Certification Courses


Field Workshops
[Managers]
[Scientists]


Collaborative
Research Events
PRESCRIBED
FIRE
SCIENCE
CONSORTIUM
[Scientists]
[Managers]

New Science Applied to Management

New Management Problem Identified

Research Questions Developed

New Science Generated

Science Disseminated

PRESCRIBED FIRE SCIENCE CONSORTIUM

SOUTHERN Fire Exchange

Adaptive Fire Science Generation and Management

"To safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire."

– *Cohesive Strategy Vision*

SOUTHERN Fire Exchange

Connect with us!

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TALL TIMBERS Research Station & Land Conservancy

NC STATE UNIVERSITY

Youth Events