

2019 CFLRP Ecological Indicator Progress Report

OVERVIEW

Introduction

In 2011, the National Forest Foundation convened CFLRP participants to develop a set of national indicators. The resulting five indicators are economic impacts, fire risk and costs, collaboration, leveraged funds, and ecological condition. Data to support these five indicators comes from a number of sources, including the Treatment for Restoration Economic Analysis Toolkit, collaboration surveys conducted by NFF, and the Annual Reports.

Projects first reported on ecological indicators in 2014. Since then, the CFLRP staff in the US Forest Service Washington Office have worked with colleagues and partners to review and update the template to make improvements while maintaining a consistent protocol to 2014. The intent of the 2019 CFLRP Ecological Indicator Progress Report is to better understand your progress in advancing ecological outcomes. It is not intended to capture everything about your monitoring activities.

To aid you in filling out this report, we recommend that you read the new [2019 Guidance Document](#). We also recommend that you reference your past [Annual Reports](#) and your [2014 Ecological Indicator Progress Reports](#). For additional help, please email CFLRP@fs.fed.us.

We appreciate the time and energy you dedicate to completing this progress report. This information is critical for understanding the ecological outcomes of your work, telling the national story, supporting communication and transparency, and sharing successful approaches and practices across the nation.

Thank you!

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2019 CFLRP Ecological Indicator Progress Report

Project Name:

State:

FIRE REGIME

Narrative - Note: All boxes in this template will scroll, so you have as much space as you need.

1. Did you make any changes to your desired condition(s) for fire regime as compared to the 2014 Ecological Indicator Report?

Please briefly describe:

Yes No

2. Did you make any changes to your monitoring methodologys for fire regime as compared to the 2014 Ecological Indicator Report? Please briefly describe:

Yes No

3. Did you use any new or updated baseline data for evaluating your fire regime progress for the purposes of this report?

Please briefly describe:

Yes No

4. Did your projects experience any unanticipated developments that positively or negatively affected expected progress towards your desired conditions for fire regime? (e.g. wildfire in the project area, litigation outcome, change in collaborative participation, etc.)

5. What were the most difficult barriers or challenges you experienced in progressing towards your desired conditions for fire regime? If you adapted to address these challenges please provide a brief description of how.

6. Did you include the effects of treatments on areas adjacent to the active treatment area? Yes No

If yes, please briefly describe your methodology for including these adjacent acres, and describe any work conducted across land ownership in support of desired conditions for fire regime.

Desired Conditions

In this report, the term "**desired conditions**" refers to landscape and resource conditions (as defined collaboratively by stakeholders and land managers) that you are seeking to achieve and maintain for your CFLRP landscape over the next 10+ years. Desired conditions are outcome-driven not output-driven, and should link to your project's CFLRP proposal while being measurable. (Note: The term "desired condition" is used somewhat differently in the Forest Service's Land Management Planning Process. In that context, it is not time bound, and often represents long-term social, economic and ecological goals, while the term "objective" is used to represent specific, measurable and time-bound benchmarks to be achieved while working toward desired conditions in a forest plan area.) In this report, the term "**landscape**" refers to the landscape identified in your CFLRP project proposal or in subsequently-approved proposal edits. See cover page for links to guidance.

7. Project-scale Desired Conditions Target for Fire Regime:

% change (relative to the desired condition) occurs across % of the project areas by

% change (relative to the desired condition) occurs across % of the project areas by

Please include 1-5 *quantifiable* desired condition statements upon which the above target is based:

Example: Treatments in the project area result in a 23% reduction in potential flame length.

Example: 75% of all prescribed burn projects meet prescription objectives as quantified in burn plan.

8. Landscape-scale Desired Conditions Target for Fire Regime:

% change (relative to the desired condition) occurs across % of the landscape area by

% change (relative to the desired condition) occurs across % of the landscape area by

Please include 1-5 *quantifiable* desired condition statements upon which the above target is based:

Examples: Modeled ecological departure indicates that forest vegetation is restored to Vegetation Condition Class 1 with low fire hazard across 51% (105,183 acres) of the CFLR landscape; Fuel models indicate reduced likelihood of supporting a stand replacing fire across 8.5% of the CFLR landscape (73,000 acres); Fire-adapted landscapes transition from shrub-dominant understory fuel model to a grass/forb dominant understory fuel model across 50% of the CFLR landscape.

9. Please select the broader goals that are central to your desired condition(s) for fire regime for the **Project-scale (P) and **Landscape-scale (L)** :**

P L

- Reduced risk/likelihood of uncharacteristic wildfires (high severity, widespread, high mortality, active crown fire/crown fire initiation)
- Re-establish natural fire regimes and move landscape to historical range of variability and/or natural range of variability
- Restore/maintain fire dependent and tolerant species
- Restore/maintain native species
- Restore/maintain heterogeneity (species, size classes)
- Increase use of prescribed fires
- Other. Please describe:

10. Please select the key outcomes you are hoping to achieve on the landscape through attainment of the broader goals you selected above:

- Increase options/opportunities for managers to control/manage wildfires
- Protect communities and high valued resources/reduce risk of loss
- Protection of water quality/supply
- Public and firefighter safety
- Reduced fire suppression costs and avoided costs
- Other. Please describe:

11. Given these goals, please state the evaluation metric(s) you are using to monitor progress towards your desired conditions for fire regime for this report. Note: This evaluation metric is something you are measuring or counting to monitor fire regime change. It has a unit of measurement attached to it.

Examples of fire regime evaluation metrics: basal area in square feet per acre (for tree density), quadratic mean diameter in inches (for tree sizes), litter and duff depths in centimeters (for fire hazard), percent canopy cover (for openness), fuels treatment effectiveness, tons of fuel loads removed (for fire hazard), avoided costs

Data and Methodology

12. Select the type(s) of monitoring you used to assess Project-scale (P) and Landscape-scale (L) progress towards fire regime desired conditions for this report. Select all that apply:

P L

- Baseline Data Collection** (i.e. was data collected prior to treatment to be used for later comparison?)
- Accomplishment Reporting** (i.e. was progress tracked using acres and miles reported?)
- Implementation Monitoring** (i.e. were the treatments implemented as prescribed?)
- Effectiveness Monitoring** (i.e. were treatments effective at meeting the stated objectives?)
- Effectiveness Monitoring Pilot Study** (i.e. was a trial run conducted to assess considerations of crafting an effectiveness monitoring plan?)
- Ecological Impacts Monitoring** (i.e. were there any unforeseen ecological consequences that could compromise treatment success?)
- Other.** Please describe:

13. Select the methodologies used to assess Project-scale (P) and Landscape-scale (L) progress towards fire regime desired conditions for this report. Select all that apply and provide a brief description for each:

P L

Field-based sampling/plots:

Remote sensing:

LiDAR Aerial photography NAIP Landsat Other:

Treatments implemented (e.g. acres or miles accomplished):

Modeling (include type and indicators used):

Measuring a reduction in the fire risk index:

Observation/expert opinion:

Fuels treatment effectiveness:

GIS analysis:

Other:

14. Where is the data that is being used for monitoring Project-scale (P) and Landscape-scale (L) progress toward fire regime desired conditions being stored? Select the databases categories that apply and provide a description of the specific datasets being used. Include links if available:

P L

FSVeg:

Forest Inventory and Analysis (FIA):

Fuels Treatment Effectiveness Report Database:

GNN:

VMap:

Feat-Firemon Integrated Database:

FACTS (please select performance measure):

FP-FUELS-NON-WUI FP-FUELS-WUI FOR-VEG-EST FOR-VEG-IMP OTHER:

Local database:

Inspection reports/contract record:

Other:

Project-scale scoring

From the beginning, CFLRP intended to shift towards desired conditions at the landscape-scale. As the disturbances and processes of interest occur at a landscape-scale, we need a landscape-scale assessment. It's a challenge to look at the impacts at that scale, given the scale itself as well as time delays (e.g. it takes more time to shift outcomes at landscape-scale than project-scale). While landscape-scale is the focus, project-scale assessments allow projects to bring in their monitoring data and look at treatment outcomes.

Each management action funded through CFLRP will have its own project-level objectives that are designed to contribute to achieving desired conditions at larger scales. Project-scale scoring should reflect how well the results of an individual management activity met the objectives for that project. Individual projects may not meet every desired condition of the CFLRP project. Project-scale scoring is conducted by the multi-party monitoring group following completed management activities.

An individual activity might not need to lead to a fully restored acre, but if it sets the landscape up for the next treatment it may still get a good rating. For example if a successful thinning doesn't restore a fire regime, but it sets up landscape for subsequent burns that might, it could still receive a "Green" rating. There may be many reasons for not scoring a "Green," including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a "Yellow" or "Red" does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to [Guidance Document](#) for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across 75% or more of our CFLRP project areas.
- **Yellow** = Expected progress is being made towards desired conditions across 26% - 74% of our CFLRP project areas.
- **Red** = Expected progress is being made towards desired conditions across 25% or less of our CFLRP project areas.

Ecological Indicator	Green, Yellow, or Red score and % of the CFLRP project areas resulting in measurable progress as defined above	Are you achieving your CFLRP objectives? <u>Yes</u> or <u>No</u> ? If "no", briefly describe why in the box below and use the narrative section as needed.
Fire Regime		

Please briefly describe how you calculated your score.

Scoring for National Reporting

Landscape-scale scoring

Few (if any) CFLRP-funded Landscapes propose to meet every proposed desired condition on every acre or achieve landscape-scale objectives through the mechanical treatment of every acre within their landscape boundary. Rather, multiple projects with multiple objectives (fire risk reduction, wildlife habitat improvement, stream restoration, etc.) should facilitate meeting these broader objectives. Scoring at the landscape-scale reflects the degree to which individual Landscapes are moving towards Desired Conditions at broader spatial extent. Landscape-scale scoring is conducted by the multi-party monitoring group at each Landscape.

“Expected progress” will be defined using 10-year benchmarks for FY 2010 projects and 8-year benchmarks for FY 2012 projects for each desired condition based on a percentage of the lifetime outcome specified for the landscape in each proposal. There may be many reasons for not scoring a “Green,” including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a “Yellow” or “Red” does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to [Guidance Document](#) for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across _____ % of our CFLRP landscape area.
- **Yellow** = Expected progress is being made towards desired conditions across _____ % of our CFLRP landscape area.
- **Red** = Expected progress is being made towards desired conditions across _____ % of our CFLRP landscape area.

Ecological Indicator	<u>Green, Yellow, or Red score and % of the landscape across which progress is being made towards desired conditions</u>	<u>Are you achieving your CFLRP objectives? <u>Yes</u> or <u>No</u>? If "no", briefly describe why in the box below and use the narrative section as needed.</u>
Fire Regime		

Please briefly describe how you decided on the percentage thresholds used above for the scoring categories and how you calculated your score.

2019 CFLRP Ecological Indicator Progress Report

Project Name:

State:

WATERSHED CONDITION

Narrative - Note: All boxes in this template will scroll, so you have as much space as you need.

If watershed condition is not part of your CFLRP proposal and landscape restoration strategy, please let us know by checking this box.

1. Did you make any changes to your desired condition(s) for watershed condition as compared to the 2014 Ecological Indicator Report? Please briefly describe: Yes No

2. Did you make any changes to your monitoring methodologies for watershed condition as compared to the 2014 Ecological Indicator Report? Please briefly describe: Yes No

3. Did you use any new or updated baseline data for evaluating your watershed condition progress for the purposes of this report? Please briefly describe: Yes No

4. Did your projects experience any unanticipated developments that positively or negatively affected expected progress towards your desired conditions for watershed condition? (e.g. wildfire in the project area, litigation outcome, change in collaborative participation, etc.)

5. What were the most difficult barriers or challenges you experienced in progressing towards your desired conditions for watershed condition? If you adapted to address these challenges please provide a brief description of how.

6. Are you using the Priority Watershed(s) identified through the Watershed Condition Framework to focus CFLRP watershed restoration work and monitoring for this report? Yes No Our CFLRP does not have Priority Watersheds

If no, please briefly describe why you are not using the Priority Watersheds:

If yes, is there a Watershed Restoration Action Plan (WRAP) developed for the Priority Watershed(s)? Yes No

7. Our Priority Watershed(s) of focus for this report cover % of the CFLRP landscape

8. Please select up to three conditions in each category for why it was chosen as a Priority (these are available in the WCATT entry):

Category 1: Resource Values

Wilderness
Wild and Scenic River
Experimental Watershed
Municipal Watershed
Outstanding Resource Water
Species protection area
Class 1 Air Shed
Other:

Category 2: Concerns and Threats

Water Quality
Water Quantity
Riparian Structure and Function
Species Habitat
Wildfire Risk
Invasive Species
Other:

Category 3: Opportunities

Improve Condition
Maintain Condition
Potential Partnership
Non-NFS Land Collaboration
Larger Scale Restoration
Leverage FS funds
Socio-economic
Other:

Desired Conditions

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9. Project-scale Desired Conditions Target for Watershed Condition:

% change (relative to the desired condition) occurs across % of the project areas by

% change (relative to the desired condition) occurs across % of the project areas by

Please include 1-5 quantifiable desired condition statements upon which the above target is based:

Examples: Over 50% of roads that will be used for activities in project areas have received or are planned for BMPs; Over 170 acres of riparian area are improved and floodplain reconnected, 2 miles of stream are restored, and dam removal results in 13 miles of fish passage.

10. Landscape-scale Desired Conditions Target for Watershed Condition:

% change (relative to the desired condition) occurs across % of the landscape area by

% change (relative to the desired condition) occurs across % of the landscape area by

Please include 1-5 quantifiable desired condition statements upon which the above target is based:

Examples: 50% of the essential projects identified in the watershed WRAP are implemented; Watershed Condition Classification indicates that 14 of the 17 subwatersheds (82% of the CFLRP Landscape Area) are in Condition Class 1 (Properly Functioning); The Watershed Condition Classification for the fire regime and wildfire indicators are improved for 17% of the landscape (30% of the expected treatment area).

11. Please select the indicator(s) below related to watershed condition that you are trying to affect to achieve your quantifiable desired condition(s):

- Water quality
- Water quantity
- Aquatic habitat (fragmentation, woody debris, channel shape and function)
- Aquatic biota (life-form presence, native species, exotic/invasive species)
- Improve riparian/wetland vegetation condition
- Roads and trails (road density, road maintenance, proximity to water, mass wasting)
- Soils (erosion, productivity, contamination)
- Fire regime and wildfire (fire condition class, wildfire effects)
- Forest cover
- Rangeland vegetation
- Terrestrial invasive species (extent and rate of spread)
- Forest health (insects and disease, ozone)
- Other. Please describe:

12. Please select the actions you are implementing to work towards your desired condition(s):

- | | | |
|--------------------------------------|------------------------------------|-------------------------|
| Road decommissioning | Mechanical thinning | Other. Please describe: |
| Road maintenance and/or improvement | Prescribed fire/controlled burn | |
| Trail maintenance and/or improvement | Culvert replacement | |
| | Reintroduction of native species | |
| | Removal of exotic/invasive species | |

13. Please state the evaluation metric(s) you are using to monitor progress towards your desired conditions for watershed condition.

Note: This evaluation metric is something you are measuring or counting to monitor watershed condition. It has a unit of measurement attached to it.

Examples of evaluation metrics: Fine sediment volume (mL), fine sediment weight (g), basal area in square feet per acre (for tree density), number of woody debris pieces in a specific size class per stream mile (for fish habitat), stream flow rate (liters/sec), miles of road decommissioned (miles), fish population (number of fish per sweep).

Data and Methodology

14. Select the methodologies used to assess Project-scale (P) and Landscape-scale (L) progress towards watershed condition desired conditions in this report. Select all that apply and provide a brief description for each:

P L

National BMP monitoring (protect water quality):

Streambed coring:

Float method (water flow):

Current meter (water flow):

Fish occupancy/use surveys:

Ground-based photo points or photo plots:

Aerial surveys, aerial photography, or remote sensing:

GIS analysis:

Treatments implemented (e.g. acres or miles accomplished) used as proxy for monitoring outcomes:

Modelling used as proxy for monitoring outcomes:

Other:

15. Where is the the data that is being used for monitoring Project-scale (P) and Landscape-scale (L) progress toward watershed condition being stored? Select the database categories that apply and provide a description of the specific datasets being used.

Include links if available:

P L

GIS database:

County database:

State database:

Tribal database:

Citizen Science database:

Watershed Classification and Assessment Tracking Tool (WCATT):

USFS database of record (e.g. FACTS, WIT, WorkPlan, etc.): *please select performance measure from the table below*

Other:

Performance Measure Shorthand	Description	Database	P	L
RD-HC-MAIN	Miles of high clearance system roads receiving maintenance	ROADS		
RD-PC-IMP	Miles of road reconstruction and capital improvement	ROADS		
RD-PC-MAIN	Miles of system roads receiving maintenance	ROADS		
RG-VEG-IMP	Acres of rangeland vegetation improved	FACTS		
S&W-RSRC-IMP	Acres of water or soil resources protected, maintained or improved to achieve desired watershed conditions	WIT		
SP-NATIVE-FED-AC	Number of priority acres treated annually for native pests on Federal lands	FAD		
STRM-CROS-MITG-STD	Number of stream crossings constructed or reconstructed to provide for aquatic organism passage	WIT		
TL-IMP-STD	Miles of system trail improved	TRAILS		
TL-MAINT-STD	Miles of system trail maintained	TRAILS		
TMBR-SALES-TRT-AC	Acres of forestlands treated using timber sales	FACTS		
TMBR-TRT	Acres of forestlands treated to achieve healthier conditions	FACTS		
WTRSHD-CLS-IMP-NUM	# of watersheds moved to an improved condition class or sustained in properly functioning condition (Class 1)	WCATT		

16. Please describe why the datasets or performance measures you selected in Question 15 above are appropriate for assessing progress towards your watershed desired conditions.

Project-scale scoring

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Each management action funded through CFLRP will have its own project-level objectives that are designed to contribute to achieving desired conditions at larger scales. Project-scale scoring should reflect how well the results of an individual management activity met the objectives for that project. Individual projects may not meet every desired condition of the CFLRP project. Project-scale scoring is conducted by the multi-party monitoring group following completed management activities.

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If you need to summarize scores across different desired condition targets, please refer to [Guidance Document](#) for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across 75% or more of our CFLRP project areas.
- **Yellow** = Expected progress is being made towards desired conditions across 26% - 74% of our CFLRP project areas.
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Ecological Indicator	Green, Yellow, or Red score and % of the CFLRP project areas resulting in measurable progress as defined above	Are you achieving your CFLRP objectives? <u>Yes</u> or <u>No</u> ? If "no", briefly describe why in the box below and use the narrative section as needed.
Watershed Condition		

Please briefly describe how you calculated your score.

Scoring for National Reporting

Landscape-scale scoring

Few (if any) CFLRP-funded Landscapes propose to meet every proposed desired condition on every acre or achieve landscape-scale objectives through the mechanical treatment of every acre within their landscape boundary. Rather, multiple projects with multiple objectives (fire risk reduction, wildlife habitat improvement, stream restoration, etc.) should facilitate meeting these broader objectives. Scoring at the landscape-scale reflects the degree to which individual Landscapes are moving towards Desired Conditions at broader spatial extent. Landscape-scale scoring is conducted by the multi-party monitoring group at each Landscape.

“Expected progress” will be defined using 10-year benchmarks for FY 2010 projects and 8-year benchmarks for FY 2012 projects for each desired condition based on a percentage of the lifetime outcome specified for the landscape in each proposal. There may be many reasons for not scoring a “Green,” including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a “Yellow” or “Red” does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to [Guidance Document](#) for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across _____ % of our CFLRP landscape area.
- **Yellow** = Expected progress is being made towards desired conditions across _____ % of our CFLRP landscape area.
- **Red** = Expected progress is being made towards desired conditions across _____ % of our CFLRP landscape area.

Ecological Indicator	Green, Yellow, or Red score and % of the landscape across which progress is being made towards desired conditions	Are you achieving your CFLRP objectives? <u>Yes</u> or <u>No</u> ? If "no", briefly describe why in the box below and use the narrative section as needed.
Watershed Condition		

Please briefly describe how you decided on the percentage thresholds used above for the scoring categories and how you calculated your score.

2019 CFLRP Ecological Indicator Progress Report

Project Name: _____

State: _____

FISH & WILDLIFE HABITAT

Narrative - *Note: All boxes in this template will scroll, so you have as much space as you need.*

If wildlife habitat is not part of your CFLRP proposal and landscape restoration strategy, please let us know by checking this box.

If fish habitat is not part of your CFLRP proposal and landscape restoration strategy, please let us know by checking this box.

1. Did you make any changes to your desired condition(s) for fish & wildlife habitat as compared to the 2014 Ecological Indicator Report? Please briefly describe: Yes No

2. Did you make any changes to your monitoring methodologies for fish & wildlife habitat as compared to the 2014 Ecological Indicator Report? Please briefly describe: Yes No

3. Did you use any new or updated baseline data for evaluating your fish & wildlife habitat progress for the purposes of this report? Please briefly describe: Yes No

4. Did your projects experience any unanticipated developments that positively or negatively affected expected progress towards your desired conditions for fish and wildlife habitat? (e.g. wildfire in the project area, litigation outcome, change in collaborative participation, etc.)

5. What were the most difficult barriers or challenges you experienced in progressing towards your desired conditions for fish and wildlife habitat? If you adapted to address these challenges please provide a brief description of how.

6. Did you include the effects of treatments on areas adjacent to the active treatment area? Yes No

If yes, please briefly describe your methodology for including these adjacent acres, and describe any work conducted across land ownership in support of fish & wildlife habitat.

Desired Conditions

In this report, the term "**desired conditions**" refers to landscape and resource conditions (as defined collaboratively by stakeholders and land managers) that you are seeking to achieve and maintain for your CFLRP landscape over the next 10+ years. Desired conditions are outcome-driven not output-driven, and should link to your project's CFLRP proposal while being measurable. (Note: The term "desired condition" is used somewhat differently in the Forest Service's Land Management Planning Process. In that context, it is not time bound, and often represents long-term social, economic and ecological goals, while the term "objective" is used to represent specific, measurable and time-bound benchmarks to be achieved while working toward desired conditions in a forest plan area.) In this report, the term "**landscape**" refers to the landscape identified in your CFLRP project proposal or in subsequently-approved proposal edits. See cover page for links to guidance.

7. Project-scale Desired Conditions Target for Fish & Wildlife Habitat:

% change (relative to the desired condition) occurs across % of the project areas by

% change (relative to the desired condition) occurs across % of the project areas by

(OPTIONAL. Use if separate, additional target is needed for aquatic habitat)

Please include 1-5 quantifiable desired condition statements upon which the above target is based:

Example: 50 miles of inaccessible salmon spawning habitat is made accessible by removing one dam.

Example: Stands have a basal area of 50-80 square feet/acre, which is ideal for red-cockaded woodpecker.

Example: Stands between 5,000-8,000 ft elevation are dominated by ponderosa pine, with 5-10 trees per group, and openings 0.25- 1 acre.

8. Landscape-scale Desired Conditions Target for Fish & Wildlife Habitat:

% change (relative to the desired condition) occurs across % of the landscape area by

% change (relative to the desired condition) occurs across % of the landscape area by

(OPTIONAL. Use if separate, additional target is needed for aquatic habitat)

Please include 1-5 quantifiable desired condition statements upon which the above target is based:

Example: Slash pine is replaced by longleaf pine ecosystem across 5,000 acres of our CFLRP landscape.

Example: Coniferous forests across the CFLRP landscape have an average canopy cover at or above 50%.

Example: All identified inventoried aquatic organism passages at road/stream crossings that were found to be a barrier (10) are accessible for identified aquatic species at all life stages.

Habitat

9. Please select the categories of the broader goals related to fish & wildlife habitat that you are trying to achieve through your quantifiable desired condition(s):

Open forest habitat (e.g. wider tree spacing, less mid-story vegetation)

Grass/forb/shrub abundance and/or diversity (e.g. native or desired)

Wildlife security (e.g. reduced disturbance and/or mortality to fish or wildlife)

Rare or sensitive ecosystem protection and/or restoration (e.g. longleaf, bluestem, riparian, meadow, aspen or wetland habitat)

Horizontal Complexity (e.g. "mosaic"/diversity of habitat types, patch sizes, and/or patterns)

Vertical complexity (e.g. number of canopy layers)

Forest structures (e.g. snags, downed wood, den trees)

Mast-producing plant abundance and/or diversity (e.g. acorns, nuts, fruits, or berries eaten by wildlife)

Sustainable flow of habitat age-classes through time (e.g. planning the proportion of early-, mid-, and late-seral stands)

Habitat connectivity/availability (e.g. increased access to or availability of desired habitat)

Aquatic habitat connectivity (e.g. culverts are passable to all aquatic organisms, no dams, stream diversions)

Aquatic habitat complexity (e.g. downed wood, pools, riffles, etc)

Aquatic sedimentation levels (e.g. suspended sediment or fine sediment in spawning gravels)

Other. Please describe:

10. Please state the evaluation metric(s) you are using to monitor progress towards your desired conditions for fish & wildlife habitat for this report. Note: This evaluation metric is something you are measuring or counting to monitor habitat change. It has a unit of measurement attached to it.

Examples of habitat evaluation metrics: basal area in square feet per acre (for tree density), number of trees per acre (for tree density), quadratic mean diameter in inches (for tree sizes), litter and duff depths in centimeters (for fire hazard), percent canopy cover (for openness), percent ground cover (for forage), seedling survival per acre per year (for reforestation), number of woody debris pieces in a specific size class per stream mile (for fish habitat), grass dry weight clippings used to calculate grass pounds per acre (for forage abundance)

Populations

11. Please select the categories of broader goals related to fish & wildlife populations that you are trying to achieve through your quantifiable desired condition(s). Then list the specific species of interest related to each category you select.

Maintain abundance/density:

Increase abundance/density:

Decrease abundance/density:

Maintain native species diversity:

Increase native species diversity:

Translocation/reintroduction:

Optimal sustained yield of game species:

Ecosystem function/food webs:

Spatial extent of population:

Other. Please describe:

12. If relevant for your CFLRP project, please state the evaluation metric(s) you are using to monitor progress towards your desired conditions for fish & wildlife populations. Note: This evaluation metric is something you are measuring or counting to monitor population change. It has a unit of measurement attached to it.

Examples of population evaluation metrics: number of wildlife encounter events per unit area via point counts or remote cameras (for wildlife usage), number of pellet groups along transects used to calculate animal density per unit area (for mammal usage), presence/absence of a plant community-associated wildlife species in the project area, presence of aquatic species as indicated by eDNA

Please check this box if you are not evaluating fish & wildlife populations.

Data and Methodology

13. Select the type(s) of monitoring you used to assess Project-scale (P) and Landscape-scale (L) progress towards fish & wildlife habitat desired conditions for this report. Select all that apply.

P L

Baseline Data Collection (i.e. was data collected prior to treatment to be used for later comparison?)

Accomplishment Reporting (i.e. was progress tracked using acres and miles reported?)

Implementation Monitoring (i.e. were the treatments implemented as prescribed?)

Effectiveness Monitoring Pilot Study (i.e. was a trial run conducted to assess considerations of crafting an effectiveness monitoring plan?)

Effectiveness Monitoring (i.e. were treatments effective at meeting the stated objectives?)

Ecological Impacts Monitoring (i.e. were there any unforeseen ecological consequences that could compromise treatment success?)

Other. Please describe:

14. Select the methodologies used to assess Project-scale (P) and Landscape-scale (L) progress towards fish & wildlife habitat desired conditions for this report. Select all that apply and provide a brief description for each:

P L

Common Stand Exams (USFS procedures):

Understory vegetation plots or transects:

Fish or Wildlife occupancy/use surveys:

Stream surveys:

Remote motion-capture cameras:

Ground-based photo points or photo plots:

Aerial surveys, aerial photography, or remote sensing:

Treatments implemented (e.g. acres or miles accomplished):

Modeling (include type and whether ground-truthed):

GIS analysis:

Other:

15. Where is the the data that is being used for monitoring Project-scale (P) and Landscape-scale (L) progress toward fish & wildlife habitat desired conditions being stored? Select the database categories that apply and provide a description of the specific datasets being used. Include links if available:

P L

GIS database:

County database:

State database:

Tribal database:

Citizen Science database:

FSVeg:

NRIS:

Other USFS database of record: *please select performance measure from the table below*

Other:

16. Please describe why the datasets or performance measures you selected in Question 15 above are appropriate for assessing progress towards your fish & wildlife habitat desired condition(s).

Project-scale scoring

From the beginning, CFLRP intended to shift towards desired conditions at the landscape-scale. As the disturbances and processes of interest occur at a landscape-scale, we need a landscape-scale assessment. It's a challenge to look at the impacts at that scale, given the scale itself as well as time delays (e.g. it takes more time to shift outcomes at landscape-scale than project-scale). While landscape-scale is the focus, project-scale assessments allow projects to bring in their monitoring data and look at treatment outcomes.

Each management action funded through CFLRP will have its own project-level objectives that are designed to contribute to achieving desired conditions at larger scales. Project-scale scoring should reflect how well the results of an individual management activity met the objectives for that project. Individual projects may not meet every desired condition of the CFLRP project. Project-scale scoring is conducted by the multi-party monitoring group following completed management activities.

An individual activity might not need to lead to a fully restored acre, but if it sets the landscape up for the next treatment it may still get a good rating. For example if a successful thinning doesn't restore a fire regime, but it sets up landscape for subsequent burns that might, it could still receive a "Green" rating. There may be many reasons for not scoring a "Green," including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a "Yellow" or "Red" does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to [Guidance Document](#) for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across 75% or more of our CFLRP project areas.
- **Yellow** = Expected progress is being made towards desired conditions across 26% - 74% of our CFLRP project areas.
- **Red** = Expected progress is being made towards desired conditions across 25% or less of our CFLRP project areas.

Ecological Indicator	Green, Yellow, or Red score and % of the CFLRP project areas resulting in measurable progress as defined above	Are you achieving your CFLRP objectives? <u>Yes</u> or <u>No</u> ? If "no", briefly describe why in the box below and use the narrative section as needed.
Fish and Wildlife Habitat		

Please briefly describe how you calculated your score.

Scoring for National Reporting

Landscape-scale scoring

Few (if any) CFLRP-funded Landscapes propose to meet every proposed desired condition on every acre or achieve landscape-scale objectives through the mechanical treatment of every acre within their landscape boundary. Rather, multiple projects with multiple objectives (fire risk reduction, wildlife habitat improvement, stream restoration, etc.) should facilitate meeting these broader objectives. Scoring at the landscape-scale reflects the degree to which individual Landscapes are moving towards Desired Conditions at broader spatial extent. Landscape-scale scoring is conducted by the multi-party monitoring group at each Landscape.

“Expected progress” will be defined using 10-year benchmarks for FY 2010 projects and 8-year benchmarks for FY 2012 projects for each desired condition based on a percentage of the lifetime outcome specified for the landscape in each proposal. There may be many reasons for not scoring a “Green,” including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a “Yellow” or “Red” does not necessarily mean that work was not accomplished.

If you need to summarize scores across different desired condition targets, please refer to [Guidance Document](#) for additional instruction.

- **Green** = Expected progress is being made towards desired conditions across _____ % of our CFLRP landscape area.
- **Yellow** = Expected progress is being made towards desired conditions across _____ % of our CFLRP landscape area.
- **Red** = Expected progress is being made towards desired conditions across _____ % of our CFLRP landscape area.

Ecological Indicator	<u>Green, Yellow, or Red score and % of the landscape across which progress is being made towards desired conditions</u>	<u>Are you achieving your CFLRP objectives? Yes or No? If "no", briefly describe why in the box below and use the narrative section as needed.</u>
Fish and Wildlife Habitat		

Please briefly describe how you decided on the percentage thresholds used above for the scoring categories and how you calculated your score.

2019 CFLRP Ecological Indicator Progress Report

Project Name:

State:

INVASIVE SPECIES

Narrative - Note: All boxes in this template will scroll, so you have as much space as you need

If invasive species is not part of your CFLRP proposal and landscape restoration strategy, please let us know by checking this box.

1. Did you make any changes to your desired condition(s) for invasive species as compared to the 2014 Ecological Indicator Report? Please briefly describe:

Yes No

2. Did you make any changes to your monitoring methodologies for invasive species as compared to the 2014 Ecological Indicator Report? Please briefly describe:

Yes No

3. Did you use any new or updated baseline data for evaluating your invasive species progress for the purposes of this report? Please briefly describe:

Yes No

4. Did your projects experience any unanticipated developments that positively or negatively affected expected progress towards your desired conditions for invasive species? (e.g. wildfire in the project area, litigation outcome, change in collaborative participation, etc.)

5. What were the most difficult barriers or challenges you experienced in progressing towards your desired conditions for invasive species? If you adapted to address these challenges please provide a brief description of how.

Desired Conditions

In this report, the term "**desired conditions**" refers to landscape and resource conditions (as defined collaboratively by stakeholders and land managers) that you are seeking to achieve and maintain for your CFLRP landscape over the next 10+ years. Desired conditions are outcome-driven not output-driven, and should link to your project's CFLRP proposal while being measurable. (Note: The term "desired condition" is used somewhat differently in the Forest Service's Land Management Planning Process. In that context, it is not time bound, and often represents long-term social, economic and ecological goals, while the term "objective" is used to represent specific, measurable and time-bound benchmarks to be achieved while working toward desired conditions in a forest plan area.) In this report, the term "**landscape**" refers to the landscape identified in your CFRLP project proposal or in subsequently-approved proposal edits. See cover page for links to guidance.

6. Project-scale Desired Conditions Target for Invasive Species

% change (relative to the desired condition) occurs across % of the project areas by

% change (relative to the desired condition) occurs across % of the project areas by

Please include 1-5 quantifiable desired condition statements upon which the above target is based:

Example: Cogongrass is reduced to less than 25% cover.

Example: Using the prevention protocols on all projects, no new invasive species infestations are established.

7. Landscape-scale Desired Conditions Target for Invasive Species:

% change (relative to the desired condition) occurs across % of the landscape area by

% change (relative to the desired condition) occurs across % of the landscape area by

Please include 1-5 quantifiable desired condition statements upon which the above target is based:

Example: The increase in coverage of Leafy Spurge and Rush Skeletonweed is prevented on 500 acres of sensitive botanical habitat within our CFLRP landscape.

Example: All known populations of Yellow Star Thistle are contained along 100 miles of FS roads and trails within our CFLRP landscape.

Example: The presence of feral swine is surveyed and mapped on 500 acres within our CFLRP landscape.

8. Please select the categories of the broader goals related to invasive species that you are trying to achieve through your quantifiable desired condition(s):

Inventory and Mapping

Risk Assessment

Prevention

Maintenance at current levels

Containment below thresholds

Reduction

Eradication

Increased resilience. Recognizing *invasive species are not constrained to disturbed areas*, please describe your definition of resilience in an invasive species context:

Other. Please describe:

9. For each invasive species you have addressed within your CFRLP landscape, please list the action(s)¹ you have taken to work towards your invasive species desired conditions, the acres and/or miles you have accomplished, and the efficacy of each action:

(All of the following data is reported in FACTS.)

Target Invasive Species

Action Taken

Land Ownership

Acres

Efficacy (%)

¹ Actions taken to address an invasive species might include inventory & mapping, hand removal, mechanical removal, release of a biological control agent (an organism that kills the target species), ground-based herbicide application, aerial herbicide application, tarping, grazing, preventative weed wash stations, trapping invasive animals, etc.

10. Please briefly describe the specific negative impacts each of your target invasive species causes that you are trying to avoid.
These impacts can be environmental, economic, cultural, or human/animal health-related.

Data and Methodology

11. Select the methodologies used to assess Project-scale (P) and Landscape-scale (L) progress towards invasive species desired conditions for this report. Select all that apply and provide a brief description of each:

P L

- Aerial surveys/inventories/mapping:
- Ground surveys/inventories/mapping:
- Environmental sampling (wood, soil, water, infected tissue, etc.):
- Observations of individuals:
- Observations of damage:
- Observation of tracks, scat, nests, etc.:
- Trap samples:
- eDNA:
- Other:

12. Where is the the data that is being used for monitoring Project-scale (P) and Landscape-scale (L) progress toward invasive species desired conditions being stored? Select the databases categories that apply and provide a description of the specific datasets being used. Include links if available:

P L

- GIS database:
- County database:
- State database:
- Tribal database:
- Citizen Science database:
- Forest Inventory and Analysis (FIA) database:
- USFS database of record (FACTS - *select performance measures*):
 - INVPLT-NXWD-FED-AC Highest priority acres treated for noxious weeds and invasive pests
 - INVSPE-TERR-FED-AC Highest priority acres treated for invasive terrestrial & aquatic species
- Other:

Project-scale scoring

From the beginning, CFLRP intended to shift towards desired conditions at the landscape-scale. As the disturbances and processes of interest occur at a landscape-scale, we need a landscape-scale assessment. It's a challenge to look at the impacts at that scale, given the scale itself as well as time delays (e.g. it takes more time to shift outcomes at landscape-scale than project-scale). While landscape-scale is the focus, project-scale assessments allow projects to bring in their monitoring data and look at treatment outcomes.

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Ecological Indicator	Green, Yellow, or Red score and % of the CFLRP project areas resulting in measurable progress as defined above	Are you achieving your CFLRP objectives? <u>Yes</u> or <u>No</u> ? If "no", briefly describe why in the box below and use the narrative section as needed.
Invasive Species		

Please briefly describe how you calculated your score.

Scoring for National Reporting

Landscape-scale scoring

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“Expected progress” will be defined using 10-year benchmarks for FY 2010 projects and 8-year benchmarks for FY 2012 projects for each desired condition based on a percentage of the lifetime outcome specified for the landscape in each proposal. There may be many reasons for not scoring a “Green,” including ecological and sociological considerations beyond the scope of the CFLRP project as well as recognition of unanticipated barriers or challenges. Note that scoring a “Yellow” or “Red” does not necessarily mean that work was not accomplished.

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- **Red** = Expected progress is being made towards desired conditions across _____ % of our CFLRP landscape area.

Ecological Indicator	<u>Green, Yellow, or Red score and % of the landscape across which progress is being made towards desired conditions</u>	<u>Are you achieving your CFLRP objectives? Yes or No? If "no", briefly describe why in the box below and use the narrative section as needed.</u>
Invasive Species		

Please briefly describe how you decided on the percentage thresholds used above for the scoring categories and how you calculated your score.

Monitoring References and Resources

1. Briefly describe any key lessons learned about integration across these 4 ecological sub-indicators.

For example, if you planned fuels reduction treatments (Fire Regime) strategically around a Priority Watershed (Watershed Condition).

2. Briefly describe the roles of the parties involved in setting the desired conditions, and collecting, assessing, and sharing the data used in this report:

3. Please acknowledge the people who assisted with completing this 2019 CFLRP Ecological Indicator Report:

4. Please provide links to your past CFLRP monitoring reports developed by the USFS, partners, etc.:

Examples: [Uncompahgre CFLRP Monitoring of Forest Spatial Patterns](#); [Four Forest Restoration Initiative Bird Survey Report 2015](#)

5. Please provide links to your CFLRP monitoring plans and any approved revisions (or include as an attachment):

Examples: [Colorado Front Range Multi-Party Monitoring Plan](#); [Dinkey Landscape Ecological Monitoring Plan](#)

6. Please provide links to technical reports or other literature utilized in determining and assessing the desired conditions used in this report:

Examples: [Historical Forest Attributes of the Western Blue Mountains of Oregon](#); [Restoring Ponderosa Pine Forests of the Colorado Front Range](#)

**Ouachita National Forest Collaborative Forest Landscape
Restoration Project (CFLRP) in Arkansas and Oklahoma
Plant Community Monitoring Report – 1st Re-measure**



**Gabriel De Jong
Douglas Zollner**

The Nature Conservancy

February 2018

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Executive Summary

The Collaborative Forest Landscape Restoration Project (CFLRP) in the Ouachita National Forest was designed to improve forest health within the shortleaf pine-bluestem plant community (Management Area 22). The Nature Conservancy and Forest Service personnel established 100 macroplots in this management area (50 plots in Arkansas and 50 in Oklahoma) to monitor the progress of this plant community towards the desired ecological conditions within the project's boundaries (300,000+ acres). We collected baseline data during the summers of 2012 and 2013 and then re-measured them three years later, in 2015 and 2016 respectively. Macroplots were randomly placed across the landscape in four general topographic positions: ridgetops, north slopes, south slopes, and riparian. We analyzed the data by topographic position, coertype (shortleaf pine vs. loblolly pine plantation) and management activity (no management, burned-only, burned and thinned, and thinned-only).

We found that while the forest structure (tree density and basal area) had not changed on a landscape scale since baseline data were collected, it had changed for some coertypes and topographic positions. Woodlands (tree basal area 35-70 ft²/acre) increased by 1%, now representing 19% of the landscape, which was much lower than the desired 80%+. Large overstory shortleaf pines (greater than 24" dbh) remained scarce in the landscape. Overstory basal area remained higher than desired, but was significantly lower on ridgetops and pine plantations compared to baseline, which moved those habitats closer to the desired ecological condition. Midstory stem density and basal area also declined in the ridgetop community and were near the desired conditions, but overall the midstory remained more dense than desired. Five percent of the landscape remained in early seral stage, which met the forest objective.

Ground layer diversity and cover had increased on a landscape scale. Total species richness and average ground layer and herbaceous layer species richness per macroplot increased in all topographic positions and coertypes. Average Floristic Quality Index (FQI) per macroplot also increased between monitoring events. By the first re-measure, ridgetops and pine plantations had met the desired condition for ground layer and herbaceous layer species richness per macroplot. Non-native species frequency increased between years, with most of this change occurring in the pine plantation coertype.

Macroplots that had been burned or were burned and thinned over the previous eight years met many of the desired ecological conditions, while untreated or thinned-only macroplots did not. Ground and herbaceous layer species richness, total ground layer cover and floristic quality (as measured by FQI), were greater in burned plots compared to unburned plots. The composition and structure of the midstory tree layer was in or near the desired condition in burned plots. The effect of thinning alone, without fire, was a dense midstory composed of less-desirable species. Overstory structure was closer to the desired condition in burned plots than in unburned plots. Thinned-only plots met the desired conditions for overstory structure and were nearing the desired overstory species composition. However, given the increased midstory growth in those areas, it is unlikely that the overstory structure will remain in the desired condition without further management (e.g., burning). Invasive species were more likely to be present in plots that had been burned or burned and thinned than in untreated or thinned-only plots. Greater focus on invasive species control in areas under active fire management is therefore warranted. Overall, these results clearly demonstrate that fire, either alone or in conjunction with thinning can help managers reach the desired ecological conditions in the pine-bluestem community, if non-native species are controlled. While the desired conditions have been met in areas managed with fire, the larger, landscape-scale desired conditions have not yet resulted, presumably because prescribed fire has not been implemented at effective frequencies and spatial scales.

Background

In this monitoring report, we present ecological conditions from the first repeat of data collection for the shortleaf pine-bluestem plant community (Management Area 22) within the Ouachita National Forest Collaborative Landscape Restoration Project (CFLRP) in Arkansas and Oklahoma. It is important to understand that according to the Revised Land and Resource Management Plan for the Ouachita National Forest (heretofore Forest Plan), management areas are "areas within a national forest having common desired conditions, suitable uses, management objectives, and design criteria. Taken together, these attributes constitute the "prescription" for the management area." (USDA 2005). Thus, while forest communities in this report are both shortleaf forest and loblolly plantation, both are in Management Area 22, and have the same

prescription and desired future condition. The CFLRP objectives-based monitoring for Forest Health has three objectives relating to desired ecological condition:

1. The existing ecological system is restored and/or maintained within the project site and the regeneration of overstory trees is within desired condition.
2. The density and diversity of native overstory, midstory, and understory woody and herbaceous species is restored and/or maintained within the desired range of variation.
3. Non-native species are not a dominant component of the ecological system and are reduced and maintained below problem levels.

In this report, we present results from the first re-measure (2015-2016) and compare these to baseline conditions and the desired future conditions. Baseline conditions were previously summarized in a report and submitted to the Forest Service in 2015. Data collection for the 2020 report will begin in the summer of 2018 and continue during the summer of 2019. Although the monitoring effort is being led by The Nature Conservancy, in keeping with the collaborative framework of the CFLRP, many Forest Service staff and student interns participated in the field work and collection of a vast amount of data. It could not have been completed without the participation of the Collaborative.

Methods

Macroplot selection and design

We used ArcMap to randomly generate 150 points within the project boundary on the Ouachita National Forest in Arkansas and Oklahoma, with the intention of establishing 100 plots. The monitoring points were stratified by topographic position (ridgetop, south slope, north slope, and riparian) (fig. 1). For ease of access, points were selected based on accessibility and to capture the desired topographic positions. Plots that showed soil disturbance (food plots, ponds, etc.) were eliminated. Each of these point locations served as the center-point of the sampling units, the macroplots. Each macroplot consisted of a 10 m fixed radius tree plot, two nested shrub plots and four ground layer plots within it (Appendix A). The center-points of macroplots were permanently marked with metal fence posts and their locations were recorded using a

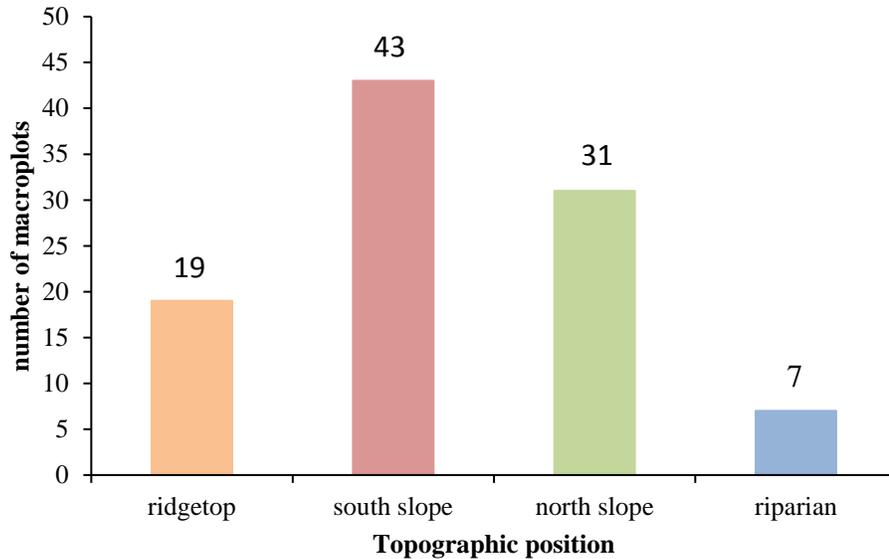


Figure 1. Number of macroplots within each topographic position.

global positioning system (GPS). The corners of ground layer plots and the center-points of shrub plots were marked with rebar five meters from the macroplot center at 60-degree intervals (e.g. herb plot at 0°, shrub 60°, and so on). The rebar was bent in an L-shape for safety and to prevent the puncture of tires on logging equipment.

Data collection

Within each macroplot, species at all forest levels (overstory and midstory trees, shrubs, and ground layer) were recorded. Trees were defined as woody stems greater than one meter tall with a diameter-at-breast-height (dbh) greater than or equal to two centimeters. Trees at the edge of the circular macroplot were counted "in" if 50% of their bole, measured at breast height, was within the 10 m radius. Shrubs included all woody stems greater than one meter tall with a dbh of less than 2 cm and were recorded in two 3.6 m radius, circular plots (nested within the 10 m radius tree plot). Ground layer species were recorded in four nested 1 m² quadrats and included all herbaceous species (forbs, graminoids and non-woody vines) and only woody stems less than one meter tall. Each ground layer species was assigned a cover class value (Appendix B). In addition, a total cover class value was assigned to each nested ground layer plot and each shrub plot.

Two photos were taken at each macroplot, one of the entire macroplot from the 0° ground layer plot facing 180° (south), and one photo taken of the entire ground layer plot at 0°.

Floristic Quality Assessment

In 2016, Coefficients of Conservatism (CC-values) were developed for plant species of the shortleaf pine-bluestem community of the Ouachita Mountains. The CC-values were the result of a collaborative effort between trained botanists and ecologists from the U.S. Forest Service, The Nature Conservancy of Arkansas, and the Arkansas Natural Heritage Commission, all of whom were familiar with the Arkansas flora.

CC-values have been used in a floristic ranking system, to assess the floristic quality of natural areas. Species within a geographical area are assigned a rank (0-10) that reflects their level of conservatism relative to other species in the region (a "1" being native and highly tolerant of unnatural conditions and disturbances, "10" being the least tolerant of unnatural disturbances and requiring natural habitat of high ecological integrity). A ranking of "0" was given to all non-native species. Average CC-value and Floristic Quality Assessment (FQA) provide another measure, beyond species richness, of plant community integrity, and have been used in ecological restoration projects across the U.S. to track changes in floristic quality over time.

Determination of treatment type

We acquired maps (shapefiles) from the Ouachita National Forest of completed activities within the CFLRP. The map contained activities completed between 2007 and 2016. We recorded the number and types of activities over this time period, for each macroplot, by overlaying plot point locations on activity polygons in ArcGIS 10.2. Using these map layers, we created four categories for treatment type, including 1) untreated plots, 2) burned-only plots (burned once or twice, no mechanical thinning), 3) burned and thinned plots (burned once or twice and thinned), and 4) thinned-only plots. Thinning activities included wildlife stand improvement (WSI), timber stand improvement (TSI), salvage cuts, and seed tree cutting.

Determination of Desired Ecological Conditions (DECs)

The desired ecological (future) conditions metrics originated from the Forest Plan (numerical metrics and written desired condition), Landfire ecosystem modelling (most landscape percentages), the CFLRP description document and observations made at reference restoration sites within the Interior Highlands. These metrics reflect important characteristics of woodlands and forests undergoing management and restoration. Data can be analyzed in many ways depending on the questions asked. The metrics used in this report reflect the common questions asked by personnel planning and implementing forest management.

Summary Tables

We used SAS STAT 9.4 (SAS Institute Inc., Cary, NC, USA) to generate all summary tables. The data were summarized separately for each monitoring effort (2012-2013 and 2015-2016). This report compares baseline with 2015-2016 monitoring data. For each monitoring effort, we generated summary tables for 1) all data, 2) each topographic position (ridgetop, north slope, south slope, riparian, and non-riparian only), 3) each covertype (shortleaf pine overstory and loblolly pine plantation), and 4) treatment type (untreated, burned-only, burned + thinned, and thinned-only). The data were also analyzed by four vegetation strata: 1) overstory trees (dbh ≥ 20.5 cm), 2) midstory trees ($2 \text{ cm} \leq \text{dbh} < 20.5 \text{ cm}$), 3) shrub layer (woody stems: dbh < 2 cm, height ≥ 1 m), and 4) ground layer (all vascular herbaceous plants, woody plants < 1 m tall). Vegetation data were compiled into three main types of tables. The tables appearing first in each section of the results contain the following diversity measures: total number of species (the grand total and values for each vegetation stratum), average number of herbaceous species per macroplot (graminoids, forbs, ferns and non-woody vines only), average number of species per macroplot for each vegetation stratum, non-native species frequency (percentage of nested plots occupied by at least one non-native species), average C-value per macroplot (including non-native species), and average floristic quality index (FQI) per macroplot. The FQI of a macroplot was given by

$$FQI = \bar{x}C \times \sqrt{S_n},$$

where $\bar{x}C$ was the average C-value per macroplot and S_n was the total number of native species per macroplot. The following measures for cover and density were included in these tables: basal areas (BA) (ft^2/acre) for live midstory and overstory trees (first combined for a total and then

separated by stratum), average cover class of ground layer and shrub layer species per nested plot, and stem densities (stems/acre) for all tree layers, and stem densities of snags by tree layer. For a complete table displaying this information across all years, by topographic position, covertype and treatment type see Appendix C.

The second table type, which was included in the overall, covertype and treatment type sections of the results, presents current ecological conditions and compares them to the desired ecological conditions. Information in these tables includes the percentage of the landscape in pine woodland condition (considering overstory trees only or all trees, separately), average number of herbaceous species per plot, average ground layer cover class, midstory stems/acre (live trees), midstory regeneration stems/acre (8"+ dbh, oak and pine species only), average cover class for shrub layer, midstory BA/acre, percentage of midstory shortleaf pine based on BA, percentage of midstory loblolly pine based on BA, overstory BA/acre, percentage of overstory shortleaf pine (based on BA), percentage of overstory loblolly pine (based on BA), percentage of overstory trees larger than 24 inches dbh, and the frequency of non-native species (percentage of nested plots that contained at least one non-native species).

The third table type is presented in Appendices D - F and includes full lists of species for each stratum sorted by importance value [Importance Value = (relative frequency + relative cover + relative density)/3]. Values for frequency (fraction of macroplots where given species was present), relative frequency, stem density, total BA, total BA per acre, relative BA, and relative density were also included in these tables for each woody species. Summary tables for ground layer species were sorted by importance value (IV), given by

$$IV = \bar{x}(RC + RF),$$

where RC was the relative cover per species and RF was the relative frequency per species. Total cover per species (the sum of cover class values across all nested ground layer plots), frequency per species (frequency across all nested ground layer plots), relative cover per species, and relative frequency per species were also presented in these tables. Non-native species were presented in bold in these tables. Summary tables for shrub layer species were sorted by IV, given by

$$IV = \bar{x}(RF + RD),$$

where RF was the relative frequency and RD was the relative density per species. Summary

tables for tree layer species were sorted by IV , given by

$$IV = \bar{x}(RF + RD + RBA),$$

where RF was the relative frequency, RD was the relative density, and RBA was the relative BA per species.

Species nomenclature follows the Atlas of the Vascular Plants of Arkansas (2013).

Statistical analyses

We used SAS STAT 9.4 to conduct all statistical analyses. Our analyses looked at the effects of treatment types, by the 1st re-measure, on key vegetation characteristics, including overstory BA, midstory BA, shrub stem density per macroplot, ground layer species richness per macroplot, and herbaceous layer species richness per macroplot. No analyses were conducted to test for significant changes in these metrics between re-measures (baseline vs. first re-measure). Riparian plots were dropped a-priori from all analyses, to focus on those areas in the landscape where fire management and thinning are most often carried out and are most effective in. This reduced our sample size from $N = 100$ to $N = 93$.

We used analysis of variance in PROC GLIMMIX to test for differences in overstory and midstory BA, both square root transformed, between treatment types (4 levels: untreated, burned-only, burned and thinned, thinned-only). To test for significant differences in shrub stem density, ground layer species richness per plot, and herbaceous layer species richness per plot, we used PROC GLIMMIX, specifying treatment type as the independent variable (4 levels, same as above) and using the appropriate distributions for count data. We first ran the models using the Poisson distribution, but found that there was significant overdispersion using this method. We then ran the models with the negative binomial distribution (with log link function), which resulted in a better fit to our data (Pearson Chi-square/DF was close to 1), for all dependent variables. If the main effects were statistically significant ($\alpha = 0.05$), we used the Tukey-Kramer test (for unbalanced sample sizes) do individual post-hoc tests, looking for significant differences between the treatments at the $\alpha = 0.05$ level.

Results

All plots combined

A total of 278 species were observed across all macroplots (N = 100), with 257 species in the ground layer and 61 species in the tree and shrub layers (Table 1). There was an average of 20 species per macroplot in the ground layer (12 were herbaceous species). The average total ground layer cover per plot was 4.1 (50% – 75%) (see fig. 2 for distribution). The average C-value and average FQI per macroplot were 4.7 and 20.6, respectively (see fig. 3 for distribution). The most important species in the ground layer were poison ivy (*Toxicodendron radicans*), muscadine (*Vitis rotundifolia*), shortleaf pine (*Pinus echinata*), nut-rush (*Scleria oligantha*), and longleaf wood-oats (*Chasmanthium sessiliflorum*). Of the top-ten most important species in the ground layer,

four species were

graminoids, one

was a forb, four

were woody

vines, and one

was a tree

seedling. Eight

non-native

species were

observed in the

ground layer

plots, including

sericea lespedeza

(*Lespedeza*

cuneata), Japanese bush-clover (*Kummerowia striata*), Korean bush-clover (*K. stipulacea*),

mimosa (*Albizia julibrissin*), Johnson grass (*Sorghum halapense*), Japanese honeysuckle

(*Lonicera japonica*), hop clover (*Triflium campestre*), and common vetch (*Vicia sativa*). A total

of 25 macroplots (33 nested plots) contained at least one of these non-native species. The average cover class for non-native species, when present in a plot, was 2.1 (5% – 25%).

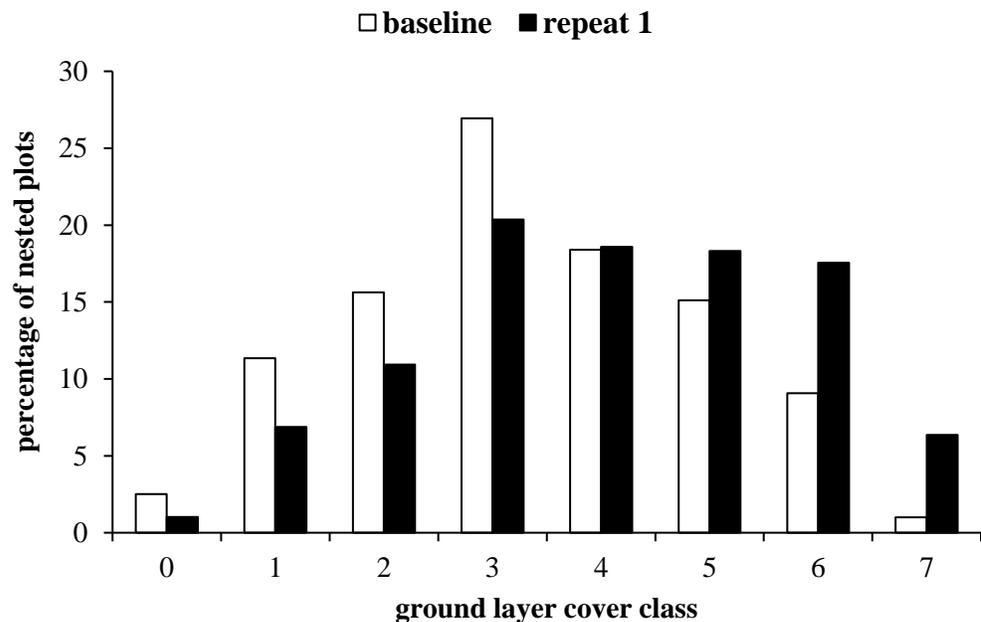


Figure 2. Distributions of total cover class values for ground layer plots, between years.

Table 1. Comparison of vegetation data between years, <i>all plots</i>, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.		
<i>Year</i>	baseline	1st re-measure
<i>Diversity</i>		
Total number of species (spp.)	247	278
Total number of ground layer spp.	228	257
Total number of woody spp.	53	61
Avg. number of herbaceous spp./plot	9	12
Avg. number of ground layer spp./plot	15	20
Avg. number of midstory tree spp./plot	6	6
Avg. number of overstory tree spp./plot	2	2
Avg. number of shrub layer spp./plot	4	5
Non-native species frequency (% of plots)	5%	8%
Average C-value/plot (std. dev.)	4.9 (0.6)	4.7 (0.7)
Average FQI/plot (std. dev.)	18.5 (5.4)	20.6 (5.8)
<i>Cover</i>		
Total live basal area/acre (ft ² /acre)	107	104
Total midstory live basal area/acre	24	23
Total overstory live basal area/acre	83	81
Avg. cover class of shrub layer spp.	1.2 (25-50%)	1.3 (25-50%)
Avg. cover class of ground layer spp.	3.3 (25-50%)	4.1 (50-75%)
<i>Density</i>		
Total live tree stems/acre	474	466
Total live midstory tree stems/acre	363	366
Total live overstory tree stems/acre	111	100
Total midstory snag stems/acre	81	51
Total overstory snag stems/acre	7	7
Total shrub layer stems/acre	733	1190

The shrub layer averaged 1190 stems/acre and contained five species per macroplot. The dominant shrub layer species were post oak (*Quercus stellata*), black hickory (*Carya texana*), mockernut hickory (*C. tomentosa*), red maple (*Acer rubrum*), and winged elm (*Ulmus alata*). The average cover class in the shrub layer, per nested shrub plot, was 1.3 (25% – 50%) (fig. 5).

On average, there were six midstory tree species (2 cm – 8" dbh) per macroplot. The midstory was dominated by shortleaf pine, which comprised 39% of the live BA. Other common

species included snags, post oak, mockernut hickory, white oak (*Quercus alba*), and winged elm. Live stem density was 366 stems/acre and snag density was 51 stems/acre. Average midstory BA per macroplot was 23 square feet per acre.

The overstory tree layer (dbh \geq 8") had an average stem density of 100 stems/acre and BA of 81 square feet per acre. The dominant overstory species were shortleaf pine and loblolly pine (*Pinus taeda*), which together comprised 88% of the live BA. Snags, post oak, and white oak were also important components of the overstory.

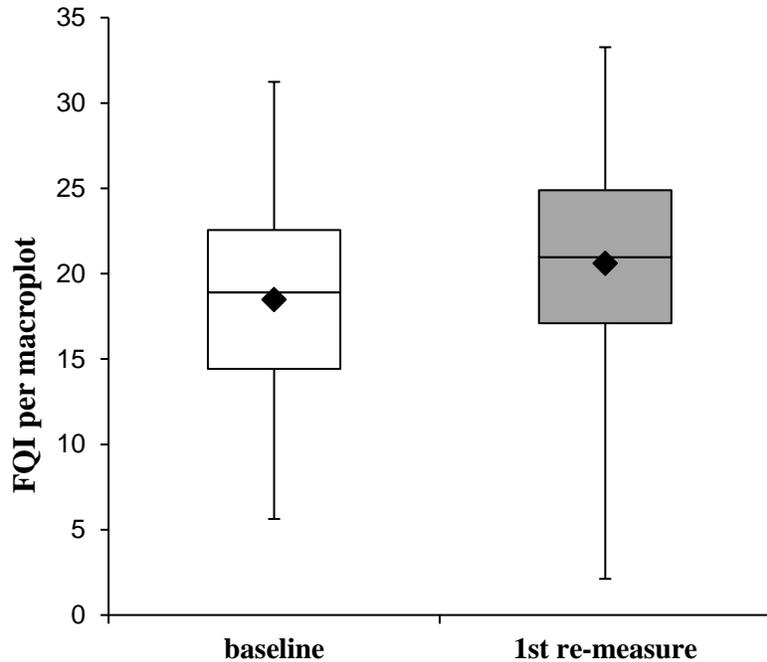


Figure 3. Distributions of FQI per macroplot between years (n = 100). Lower bar = minimum, lower box boundary = 1st quartile, middle horizontal line = median, upper box boundary = 3rd quartile, upper bar = maximum, and diamond = mean.

Summary of changes between years and progress towards desired conditions

Overall, the percent of the landscape in the desired pine woodland condition based on total BA per macroplot was 19%, which was lower than desired and represented little change since baseline (Table 2). The percent of the landscape in the desired pine woodland condition based on overstory BA per macroplot was 46%, representing little change since baseline.

Total ground layer species richness increased by 29 species (13%) and woody species richness increased by 8 species (15%) between years (fig. 4). The average number of herbaceous species per macroplot increased by three species to 12 per macroplot, which was a desired change. The average number of ground layer species per macroplot increased by five species between years and had met the desired condition of 20 or more species per macroplot. The average total cover in the ground layer increased between years, moving closer to the desired

Table 2. Comparison of baseline, current and desired conditions for the Arkansas and Oklahoma CFLRA project, all macroplots.			
	Baseline	1st repeat	Desired
Percent of landscape pine woodland (BA 30-70), all trees	18%	19%	80% +
Percent of landscape pine woodland (BA 30-70), overstory only	43%	46%	80% +
Average herbaceous species/plot	9	12	15+
Average ground layer cover class	3.3 (25-50%)	4.1(50-75%)	5+ (75-99%)
Midstory stems/acre (live trees)	363	366	less than 150
Midstory regeneration* stems/acre	158 (43% shortleaf)	173 (41% shortleaf)	50-100 per acre (75% shortleaf)
Average shrub layer cover class	1.2 (25-50%)	1.3 (25-50%)	less than 2.0 (50-75%)
BA/acre midstory trees	24	23	10 ft ² /acre or less
Percent of the midstory shortleaf pine (based on BA)	37%	39%	70% or greater pine BA
Percent of the midstory loblolly pine (based on BA)	12%	5%	0% of BA
BA/acre overstory trees	83	81	30-70
Percent of the overstory shortleaf pine (based on BA)	48%	48%	70% or greater BA
Percent of the overstory loblolly pine (based on BA)	38%	40%	0% of BA
Overstory trees (> 24" dbh)	0%	0%	10%
Non-native species frequency (nested plots)	5%	8%	0%

* regeneration is oak species and shortleaf pine only

condition (fig. 2). While average C-value did not increase between re-measures, average FQI per macroplot increased between years, which was a desired change (fig. 3).

Shrub stem density increased by 62% between measurement years, but shrub layer cover appeared to increase only slightly (fig. 5) and remained in the desired condition. Non-native species occupied 8% of nested ground layer plots in 2015-2016, which was higher than baseline and an undesired change.

Live midstory and overstory stem density and BA changed little between years and remained higher than desired (fig. 6). Midstory regeneration (shortleaf pine and oak species only) increased slightly between years to 173 stems/acre and remained higher than desired. The

proportion of the midstory regeneration made up of shortleaf pine was 41%, which was close to baseline levels and lower than desired. The proportion of the midstory basal area that was shortleaf pine remained lower than desired, at 39%. The percent of the overstory made up of shortleaf pine did not change since baseline and remained lower than desired, at 48%. The percent of the overstory composed of loblolly pine remained at similar levels to baseline and was higher than desired, at 40%.

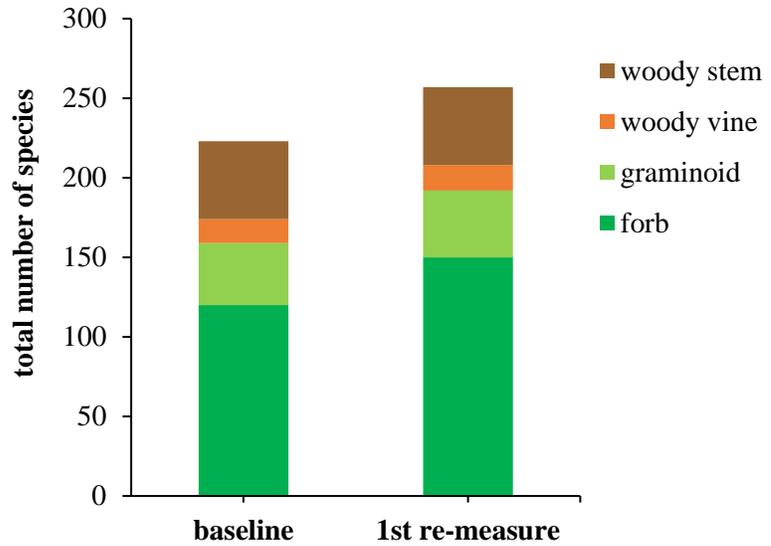


Figure 4. Total number of ground layer species of each growthform, between monitoring efforts.

Topographic position

Ridgetop

A total of 164 species were observed in 19 macroplots in the ridgetop community, with 154 species in the ground layer and 34 species in the tree and shrubs layers (Table 3). There was an average of 22 species per macroplot in the ground layer (15 were herbaceous) and an average total cover class of 4.6 (50% – 75%). The

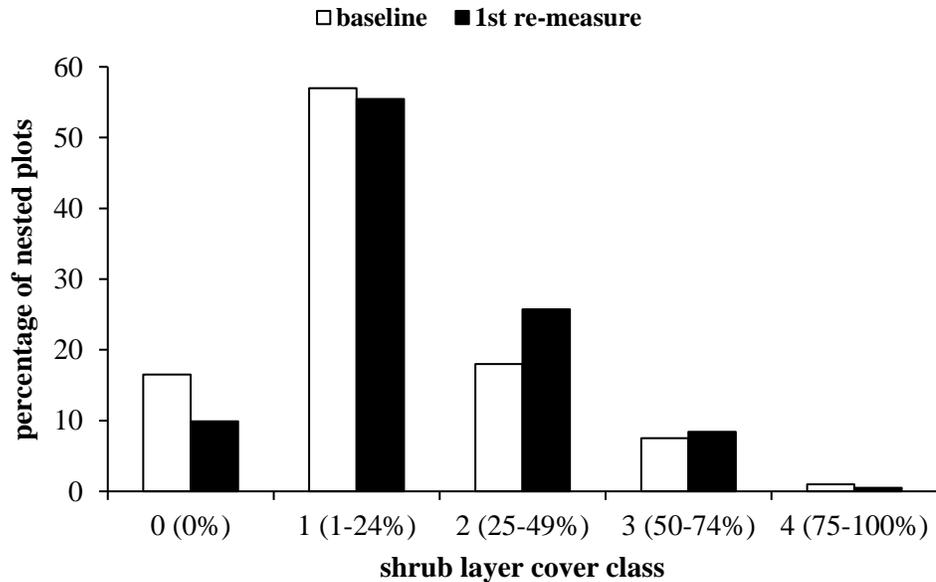


Figure 5. Distributions of total cover class values for shrub layer plots, between years.

average C-value and average FQI per macroplot were 4.2 and 19.9, respectively. Dominant species in the ground layer included poison ivy, muscadine, open-flower rosette grass (*Dichanthelium laxiflorum*), long-leaf wood-oats (*Chasmanthium sessiliflorum*), and

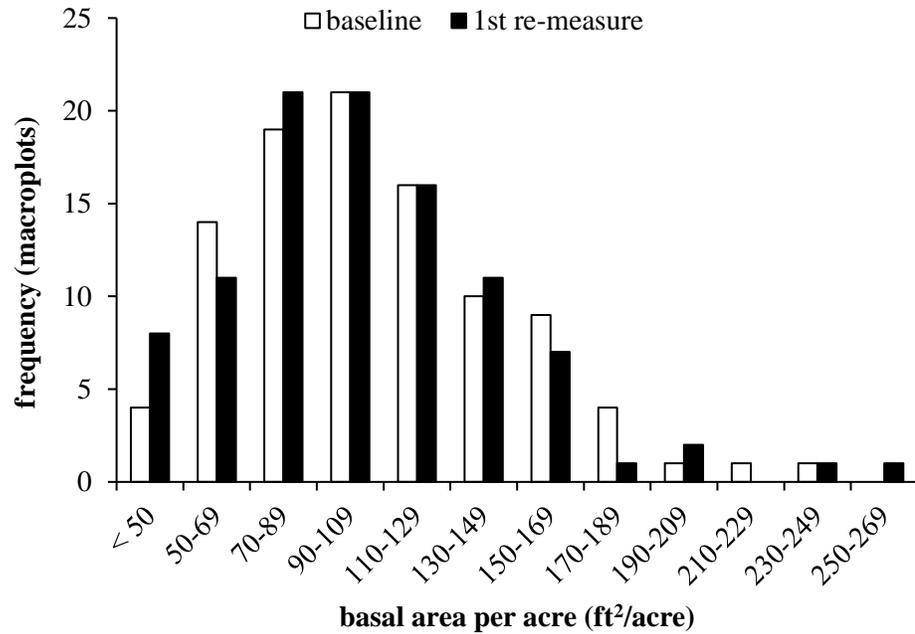


Figure 6. Distribution of total BA per macroplot, between years.

forked rosette grass (*Dichanthelium dichotomum*). Of the top ten most important species in the ground layer, three were graminoids, two were forbs, four were woody vines, and one was a shrub. Three non-native species were present in the ridgetop community, including sericea lespedeza, Japanese bush-clover, and hop clover. A total of 7 macroplots (9 nested plots) contained at least one of these non-native species.

The shrub layer had an average of 863 stems/acre and 5 species per macroplot. The dominant shrub layer species were mockernut hickory, post oak, and American beautyberry (*Callicarpa americana*). Winged elm and farkleberry (*Vaccinium arboreum*) were also common. The average cover class of nested shrub plots was 1.2 (25% – 50%).

On average, there were four midstory tree species per macroplot. The midstory was dominated by shortleaf pine, snags, and post oak. Red oak (*Quercus rubra*) and mockernut hickory were also common. Live stem density was 284 stems/acre and snag stem density was 46 stems/acre. The average BA of live midstory trees was 11 square feet per acre.

The overstory tree layer averaged 91 live stems/acre and had an average BA of 77 square feet per acre. On average, there was one overstory tree species per macroplot. The dominant overstory trees were loblolly pine and shortleaf pine, comprising 95% of the live overstory BA.

Table 3. Comparison of vegetation data between years, <i>ridgetop</i> community, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.		
<i>Year</i>	baseline	1st re-measure
<i>Diversity</i>		
Total number of species (spp.)	133	164
Total number of ground layer spp.	121	154
Total number of woody spp.	32	34
Avg. number of herbaceous spp./plot	11	15
Avg. number of ground layer spp./plot	17	22
Avg. number of midstory tree spp./plot	6	4
Avg. number of overstory tree spp./plot	2	1
Avg. number of shrub layer spp./plot	4	5
Non-native species frequency (% of plots)	12%	12%
Average C-value/plot (std. dev.)	4.7 (0.6)	4.2 (1.0)
Average FQI/plot (std. dev.)	18.6 (5.9)	19.9 (7.2)
<i>Cover</i>		
Total live basal area/acre (ft ² /acre)	113	89
Total midstory live basal area/acre	23	11
Total overstory live basal area/acre	90	77
Avg. cover class of shrub layer spp.	1.3 (25-50%)	1.2 (25-50%)
Avg. cover class of ground layer spp.	3.0 (25-50%)	4.6 (50-75%)
<i>Density</i>		
Total live tree stems/acre	455	375
Total live midstory tree stems/acre	331	284
Total live overstory tree stems/acre	124	91
Total midstory snag stems/acre	80	46
Total overstory snag stems/acre	6	4
Total shrub layer stems/acre	789	863

North slope

A total of 178 species were observed in 43 macroplots in the north slope community, with 162 species in the ground layer and 44 species in the tree and shrubs layers (Table 4). There was an average of 19 species per macroplot in the ground layer (11 were herbaceous) and an average total cover class of 3.9 (25% – 50%). The average C-value and average FQI per macroplot were 4.2 and 19.7, respectively. Dominant species in the ground layer included poison ivy, muscadine, nut-rush, long-leaf wood-oats, and shortleaf pine. Of the top ten most important species in the ground layer, four were graminoids, four were

Table 4. Comparison of vegetation data between years, <i>north slope community</i>, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.		
<i>Year</i>	baseline	1st re-measure
<i>Diversity</i>		
Total number of species (spp.)	163	178
Total number of ground layer spp.	146	162
Total number of woody spp.	40	44
Avg. number of herbaceous spp./plot	8	11
Avg. number of ground layer spp./plot	14	19
Avg. number of midstory tree spp./plot	7	7
Avg. number of overstory tree spp./plot	2	2
Avg. number of shrub layer spp./plot	3	5
Non-native species frequency (% of plots)	2%	4%
Average C-value/plot (std. dev.)	4.7 (0.6)	4.7 (0.6)
Average FQI/plot (std. dev.)	17.0 (5.3)	19.7 (5.7)
<i>Cover</i>		
Total live basal area/acre (ft ² /acre)	110	116
Total midstory live basal area/acre	24	26
Total overstory live basal area/acre	86	90
Avg. cover class of shrub layer spp.	1.2 (25-50%)	1.3 (25-50%)
Avg. cover class of ground layer spp.	3.0 (25-50%)	3.9 (25-50%)
<i>Density</i>		
Total live tree stems/acre	552	575
Total live midstory tree stems/acre	435	460
Total live overstory tree stems/acre	116	115
Total midstory snag stems/acre	36	56
Total overstory snag stems/acre	6	10
Total shrub layer stems/acre	611	1198

woody vines, and two were woody stems. Three non-native species were present in the north slope community, including sericea lespedeza, Korean bush-clover, and Japanese bush-clover. A total of 4 macroplots (7 nested plots) contained at least one of these non-native species.

The shrub layer had an average of 1198 stems/acre and five species per macroplot. The dominant shrub layer species were post oak, black hickory, red maple, white oak and winged elm. The average cover class of nested shrub plots was 1.3 (25% – 50%).

On average, there were seven midstory tree species per macroplot. The midstory was dominated by shortleaf pine and snags. White oak, post oak, and mockernut hickory were also

common. Live stem density was 460 stems/acre and snag stem density was 56 stems/acre. The average BA of live midstory trees was 26 square feet per acre.

The overstory tree layer averaged 115 live stems/acre and had an average BA of 90 square feet per acre. On average, there were two overstory tree species per macroplot. The dominant overstory trees were loblolly pine and shortleaf pine, comprising 89% of the live overstory BA. Snags, post oak, and white oak were also important species, making up 13% of the total overstory BA.

South slope

A total of 196 species were observed in 31 macroplots in the south slope community with 178 species in the ground layer and 50 species in the tree and shrubs layers (Table 5). There was an average of 20 species per macroplot in the ground layer (12 were herbaceous) and an average total cover class of 3.9 (25% – 50%). The average C-value and average FQI per macroplot were 5.0 and 21.5, respectively. Dominant species in the ground layer included shortleaf pine, muscadine, nut-rush, little bluestem (*Schizachyrium scoparium*) and Virginia creeper (*Parthenocissus quinquefolia*). Of the top ten most important species in the ground layer, five were graminoids, one was a forb, three were woody vines, and one was a woody stem. Four non-native species were present in the south slope community, including Japanese bush-clover, Korean bush-clover, Johnson grass, and sericea lespedeza. A total of 12 macroplots (15 nested plots) contained at least one of these non-native species.

The shrub layer had an average of 1174 stems/acre and five species per macroplot. The dominant shrub layer species were black hickory, red maple, mockernut hickory, post oak and winged elm. The average cover class of nested shrub plots was 1.3 (25% – 50%).

On average, there were five midstory tree species per macroplot. The midstory was dominated by shortleaf pine, but post oak, snags, and mockernut hickory were also common. Live stem density was 329 stems/acre and snag stem density was 48 stems/acre. The average BA of live midstory trees was 26 square feet per acre.

The overstory tree layer averaged 99 live stems/acre and had an average BA of 79 square feet per acre. On average, there were two overstory tree species per macroplot. The dominant overstory trees were shortleaf pine and loblolly pine, comprising 84% of the live overstory BA.

Table 5. Comparison of vegetation data between years, <i>south slope community</i>, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.		
<i>Year</i>	baseline	1st re-measure
<i>Diversity</i>		
Total number of species (spp.)	178	196
Total number of ground layer spp.	165	178
Total number of woody spp.	40	50
Avg. number of herbaceous spp./plot	10	12
Avg. number of ground layer spp./plot	16	20
Avg. number of midstory tree spp./plot	6	5
Avg. number of overstory tree spp./plot	2	2
Avg. number of shrub layer spp./plot	4	5
Non-native species frequency (% of plots)	3%	11%
Average C-value/plot (std. dev.)	5.2 (0.5)	5.0 (0.6)
Average FQI/plot (std. dev.)	19.7 (4.7)	21.5 (5.3)
<i>Cover</i>		
Total live basal area/acre (ft ² /acre)	104	105
Total midstory live basal area/acre	24	26
Total overstory live basal area/acre	81	79
Avg. cover class of shrub layer spp.	1.2 (25-50%)	1.3(25-50%)
Avg. cover class of ground layer spp.	3.0 (25-50%)	3.9 (25-50%)
<i>Density</i>		
Total live tree stems/acre	420	428
Total live midstory tree stems/acre	311	329
Total live overstory tree stems/acre	109	99
Total midstory snag stems/acre	93	48
Total overstory snag stems/acre	10	7
Total shrub layer stems/acre	758	1174

Post oak and snags and were also important components of the overstory, making up 14% of the total overstory BA.

Riparian

A total of 104 species were observed in 7 macroplots in the riparian community, with 83 species in the ground layer and 39 species in the tree and shrubs layers (Table 6). There was an average of 21 species per macroplot in the ground layer (12 were herbaceous) and an average

Table 6. Comparison of vegetation data between years, <i>riparian community</i>, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.		
<i>Year</i>	baseline	1st re-measure
<i>Diversity</i>		
Total number of species (spp.)	84	104
Total number of ground layer spp.	65	83
Total number of woody spp.	32	39
Avg. number of herbaceous spp./plot	7	12
Avg. number of ground layer spp./plot	15	21
Avg. number of midstory tree spp./plot	7	7
Avg. number of overstory tree spp./plot	2	2
Avg. number of shrub layer spp./plot	5	7
Non-native species frequency (% of plots)	0%	7%
Average C-value/plot (std. dev.)	4.5 (1.0)	4.7 (0.7)
Average FQI/plot (std. dev.)	17.1 (7.6)	21.0 (5.9)
<i>Cover</i>		
Total live basal area/acre (ft ² /acre)	92	87
Total midstory live basal area/acre	26	19
Total overstory live basal area/acre	66	68
Avg. cover class of shrub layer spp.	1.2 (25-50%)	1.7 (25-50%)
Avg. cover class of ground layer spp.	3.0 (25-50%)	4.3 (50-75%)
<i>Density</i>		
Total live tree stems/acre	538	466
Total live midstory tree stems/acre	471	399
Total live overstory tree stems/acre	66	67
Total midstory snag stems/acre	28	67
Total overstory snag stems/acre	0	4
Total shrub layer stems/acre	971	2144

total cover class of 4.3 (50% – 75%). The average C-value and average FQI per macroplot were 4.7 and 21.0, respectively. Dominant species in the ground layer included saw-tooth greenbrier (*Smilax bona-nox*), poison ivy, shortleaf pine, slender wood-oats (*Chasmanthium laxum*), and nut-rush. Of the top ten most important species in the ground layer, four were graminoids, three were forbs, two were woody vines, and one was a woody stem. Two non-native species were present in the riparian community, including mimosa and Japanese honeysuckle. A total of 2 macroplots (2 nested plots) contained at least one of these non-native species.

The shrub layer had an average of 2144 stems/acre and seven species per macroplot. The dominant shrub layer species were red maple, black hickory, winged sumac (*Rhus copallinum*),

hop-hornbeam (*Ostrya virginiana*), and sweetgum (*Liquidambar styraciflua*). The average cover class of nested shrub plots was 1.7 (25% – 50%).

On average, there were seven midstory tree species per macroplot. The midstory was dominated by post oak, hop-hornbeam, snags and mockernut hickory. Live stem density was 399 stems/acre and snag stem density was 67 stems/acre. The average BA of live midstory trees was 19 square feet per acre.

The overstory tree layer averaged 67 live stems/acre and had an average BA of 68 square feet per acre. On average, there were two overstory tree species per macroplot. The dominant overstory trees species was shortleaf pine, comprising 83% of the live overstory BA. Post oak, snags, and mockernut hickory were also important components of the overstory.

Non-riparian

A total of 268 species were observed in 93 macroplots in the non-riparian community, with 248 species in the ground layer and 60 species in the tree and shrubs layers (Table 7). There was an average of 20 species per macroplot in the ground layer (12 were herbaceous) and an average total cover class of 4.0 (50% – 75%). The average C-value and average FQI per macroplot were 4.8 and 20.6, respectively. Dominant species in the ground layer included poison ivy, muscadine, shortleaf pine, longleaf wood-oats, and nut-rush. Of the top ten most important species in the ground layer, four were graminoids, one was a forb, four were woody vines, and one was a woody stem. non-native species were present in the non-riparian community, including sericea lespedeza, Korean bush-clover, Japanese bush-clover, Johnson grass, and hop clover. A total of 23 macroplots (31 nested plots) contained at least one of these non-native species.

The shrub layer had an average of 1118 stems/acre and five species per macroplot. The dominant shrub layer species were post oak, black hickory, mockernut hickory, red maple, and winged elm. The average cover class of nested shrub plots was 1.3 (25% – 50%).

On average, there were six midstory tree species per macroplot. The midstory was dominated by shortleaf pine. Snags, post oak and mockernut hickory were also common. Live stem density was 364 stems/acre and snag stem density was 50 stems/acre. The average BA of live midstory trees was 23 square feet per acre.

Table 7. Comparison of vegetation data between years, <i>non-riparian community</i>, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.		
<i>Year</i>	baseline	1st re-measure
<i>Diversity</i>		
Total number of species (spp.)	240	268
Total number of ground layer spp.	221	248
Total number of woody spp.	49	60
Avg. number of herbaceous spp./plot	10	12
Avg. number of ground layer spp./plot	15	20
Avg. number of midstory tree spp./plot	6	6
Avg. number of overstory tree spp./plot	2	2
Avg. number of shrub layer spp./plot	4	5
Non-native species frequency (% of plots)	5%	5%
Average C-value/plot (std. dev.)	4.9 (0.6)	4.8 (0.8)
Average FQI/plot (std. dev.)	18.6 (5.2)	20.6 (5.8)
<i>Cover</i>		
Total live basal area/acre (ft ² /acre)	108	105
Total midstory live basal area/acre	24	23
Total overstory live basal area/acre	84	82
Avg. cover class of shrub layer spp.	1.2 (25-50%)	1.3 (25-50%)
Avg. cover class of ground layer spp.	3.0 (25-50%)	4.0 (50-75%)
<i>Density</i>		
Total live tree stems/acre	469	466
Total live midstory tree stems/acre	354	364
Total live overstory tree stems/acre	114	103
Total midstory snag stems/acre	83	50
Total overstory snag stems/acre	8	7
Total shrub layer stems/acre	715	1118

The overstory tree layer averaged 103 live stems/acre and had an average BA of 82 square feet per acre. On average, there were two overstory tree species per macroplot. The dominant overstory trees species were shortleaf pine and loblolly pine, comprising 88% of the live overstory BA. Snags, post oak, and white oak were also important components of the overstory.

Summary of changes between years, topographic position

Total ground layer species richness increased in all topographic positions between measurements. The average number of ground layer species and herbaceous species only, per

macroplot, both increased significantly between years in all topographic positions. The average total ground layer cover increased between years in all topographic positions. The average C-value of ground layer species remained at similar levels (slight increases or decreases depending on topographic position) between years, while average FQI per macroplot increased in all topographic positions. Significant changes in species importance included a decrease in one fire-sensitive species, poison ivy, in all topographic positions. Meanwhile, several fire-sensitive species, including muscadine, sawtooth greenbrier, and Virginia creeper increased in importance in all topographic positions and were ranked in the top-ten most important species. Shortleaf pine seedlings were an important component of the ground layer in all topographic positions, except ridgetops, which was a significant increase in importance between years. Little bluestem, a fire dependent species and a good indicator of quality, open woodland habitat, decreased in importance in most topographic positions, but often remained in the top-ten most important species. One graminoid, open-flower rosette grass, increased in importance in all topographic positions except the riparian community. Long-leaf wood-oats, which was one of the dominant graminoids across all topographic positions at baseline, decreased in importance in all non-riparian areas and increased in importance in riparian areas.

Shrub layer stem density increased in all topographic positions, but the largest increases occurred on north slopes, south slopes and in riparian areas. Despite these large increases in stem densities, total shrub cover did not increase significantly between years in any of the topographic positions. Although relatively small in magnitude, all topographic positions had more species per plot in the shrub layer by the first re-measure. There were many shifts in species importance, which varied by topographic position. On ridgetops, mockernut hickory, American beautyberry, farkleberry, and black hickory increased in importance, while red maple and flowering dogwood (*Cornus florida*) declined. On north-facing slopes, post oak, black hickory, winged elm, red oak and winged sumac increased in importance, while mockernut hickory, shortleaf pine, American beautyberry and hop hornbeam declined. On south-facing slopes, black hickory, red maple, black cherry (*Prunus serotina*), and black oak (*Quercus velutina*) increased in importance, while mockernut hickory, post oak and winged sumac declined. In riparian areas, red maple black hickory, winged sumac, sweetgum, post oak, white ash (*Fraxinus americana*), and American beautyberry increased in importance between years, while hop hornbeam, red oak, and mockernut hickory experienced declines.

Live midstory stem density declined between years on ridgetops and in riparian areas, by 14% and 15%, respectively. In these two communities, live midstory BA also declined by 52% and 27%, respectively. On north slopes and south slopes there were small increases in midstory stem density and BA. On ridgetops, shortleaf pine, snags, post oak, red oak, white oak, black hickory, and Mexican plumb (*Prunus mexicana*) increased in importance between years, while mockernut hickory, red maple, and hop hornbeam declined. On north slopes, snags and white oak increased in importance, while post oak, mockernut hickory, black hickory, and red maple declined. On south slopes, shortleaf pine, post oak, snags, mockernut hickory, white oak and black cherry increased in importance. Loblolly pine was the only common species that experienced a decline in importance value between years on south slopes. In riparian areas, hop hornbeam, snags, shortleaf pine, white oak and black hickory increased in importance, while post oak, winged elm, red maple, and flowering dogwood decreased in importance.

Ridgetops experienced the greatest changes in overstory structure between years, with a 21% decrease in BA and 27% decrease in stem density. By the first re-measure, the overstory structure of north slopes and south slopes remained similar to baseline conditions. There was a 5% decline in overstory BA in the riparian community, despite there being little change in stem density. On ridgetops, shortleaf pine and southern red oak (*Quercus falcata*) increased in importance between years. Northern red oak, which was not previously in the overstory tree layer, grew into the overstory between years. Several tree species that tend to be more fire-sensitive were no longer present in the overstory, including winged elm, mockernut hickory, sweetgum, and eastern red cedar. The result was an overstory composed only of pine and oak species. On north-facing slopes, loblolly pine, snags, black hickory, and black gum increased in importance, the latter species having grown into the overstory since baseline. Shortleaf pine, white oak, mockernut hickory, and red oak declined in importance on north slopes. On south-facing slopes, post oak and snags increased in importance, while white oak declined. Riparian areas remained dominated by shortleaf pine in the overstory. Post oak, snags, and mockernut hickory all increased in importance in this community, while white oak and water oak (*Quercus nigra*) declined.

Covertypes

Two covertypes, shortleaf pine-bluestem and pine plantation, were used to categorize macroplots, based on their dominant overstory trees species. The shortleaf pine-bluestem plots were dominated by shortleaf pine and pine plantations were dominated by loblolly pine. A total of 70 macroplots were categorized as shortleaf pine-bluestem and 30 macroplots were categorized as pine plantation. Two macroplots in the shortleaf pine-bluestem coertype had very little to no overstory ($BA < 30\text{ft}^2/\text{acre}$ per macroplot), but were retained in the analysis of this coertype.

Shortleaf pine-bluestem

A total of 239 species were observed in 70 macroplots in the shortleaf pine-bluestem community, with 217 species in the ground layer and 58 species in the tree and shrubs layers (Table 8). There was an average of 19 species per macroplot in the ground layer (11 were herbaceous) and an average total cover class of 4.0 (50% – 75%). The average C-value and average FQI per macroplot were 4.9 and 20.8, respectively. Common species in the ground layer included shortleaf pine, poison ivy, muscadine, sawtooth greenbrier, Virginia creeper, and nut-rush. Of the top ten most important species in the ground layer, four were graminoids, one was a forb, four were woody vines, and one was a tree seedling. Six non-native species were present in the shortleaf pine-bluestem community, including sericea lespedeza, Korean bush-clover, Japanese bush-clover, mimosa, Japanese honeysuckle, and common vetch. A total of 11 macroplots (15 nested plots) contained at least one of these non-native species.

The shrub layer had an average of 1426 stems/acre and 6 species per macroplot. The dominant shrub layer species were red maple, black hickory, post oak, winged elm and northern red oak. The average cover class of nested shrub plots was 1.5 (25% – 50%).

On average, there were seven midstory tree species per macroplot. The midstory was dominated by shortleaf pine, comprising 39% of the total BA. Post oak, snags, mockernut hickory, and white oak were also important components of the midstory. Live stem density was 451 stems/acre and snag stem density was 61 stems/acre. The average BA of live midstory trees was 28 square feet per acre.

Table 8. Comparison of vegetation data between years, <i>shortleaf pine-bluestem</i> coevtype, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.		
<i>Year</i>	baseline	1st re-measure
<i>Diversity</i>		
Total number of species (spp.)	209	239
Total number of ground layer spp.	189	217
Total number of woody spp.	52	58
Avg. number of herbaceous spp./plot	8	11
Avg. number of ground layer spp./plot	14	19
Avg. number of midstory tree spp./plot	7	7
Avg. number of overstory tree spp./plot	2	2
Avg. number of shrub layer spp./plot	4	6
Non-native species frequency (% of plots)	4%	5%
Average C-value/plot (std. dev.)	4.9 (0.7)	4.9 (0.6)
Average FQI/plot (std. dev.)	17.7 (5.4)	20.8 (5.2)
<i>Cover</i>		
Total live basal area/acre (ft ² /acre)	102	105
Total midstory live basal area/acre	28	28
Total overstory live basal area/acre	73	77
Avg. cover class of shrub layer spp.	1.2 (25-50%)	1.5 (25-50%)
Avg. cover class of ground layer spp.	3.4 (25-50%)	4.0 (50-75%)
<i>Density</i>		
Total live tree stems/acre	533	547
Total live midstory tree stems/acre	438	451
Total live overstory tree stems/acre	96	96
Total midstory snag stems/acre	86	61
Total overstory snag stems/acre	4	6
Total shrub layer stems/acre	816	1426

The overstory tree layer averaged 96 live stems/acre and had an average BA of 77 square feet per acre. On average, there was two overstory tree species per macroplot. The dominant overstory tree was shortleaf pine, comprising 72% of the live overstory BA. Other important species included post oak, snags, and loblolly pine.

Summary of changes between years and progress toward desired conditions

Overall, the percent of the landscape in the desired pine woodland condition based on total BA per macroplot was 14%, which was lower than desired and represented an undesired decline since baseline (Table 9). The percent of the landscape in the desired pine woodland

Table 9. Comparison of baseline, current and desired conditions for the Arkansas and Oklahoma CFLRA project, <i>shortleaf pine-bluestem</i> (n = 70).			
	Baseline	1st repeat	Desired
Percent of landscape pine woodland (BA 30-70), all trees	24%	14%	80% +
Percent of landscape pine woodland (BA 30-70), overstory only	56%	49%	80% +
Average herbaceous species/plot	8	12	15+
Average ground layer cover class	3.4 (25-50%)	4.0 (50-75%)	5+ (75-99%)
Midstory stems/acre (live trees)	438	451	less than 150
Midstory regeneration* stems/acre	205 (46% shortleaf)	221 (45% shortleaf)	50-100 per acre (75% shortleaf)
Average shrub layer cover class	1.2 (25-50%)	(25-50%)	less than 2.0 (50-75%)
BA/acre midstory trees	28	28	10 ft ² /acre or less
Percent of the midstory shortleaf pine (based on BA)	44%	44%	70% or greater pine BA
Percent of the midstory loblolly pine (based on BA)	1%	1%	0% of BA
BA/acre overstory trees	73	77	30-70
Percent of the overstory shortleaf pine (based on BA)	78%	72%	70% or greater BA
Percent of the overstory loblolly pine (based on BA)	2%	11%	0% of BA
Overstory trees (> 24" dbh)	0%	0%	10%
Non-native species frequency (nested plots)	4%	5%	0%

* regeneration is oak species and shortleaf pine only

condition based on overstory BA per macroplot was 49%, which was lower than desired and represented an undesired decline since baseline.

Total ground layer species richness increased by 28 species (15%) and woody species richness increased by six species (12%) between years. The average number of herbaceous species per macroplot increased by three species to 11 per macroplot, which was a desired change. The average number of ground layer species per macroplot increased by five species between years and was near the desired condition of 20 or more species per macroplot. Species that increased in importance between years included shortleaf pine, Virginia creeper, open-flower rosette grass, and butterfly-pea (*Clitoria mariana*), while nut rush and little bluestem

decreased in importance. The average total cover in the ground layer increased between years, moving closer to the desired condition. While average C-value did not increase between years, average FQI per macroplot did increase, which was a desired change. Non-native species occupied 5% of nested ground layer plots by the first re-measure and was slightly higher than baseline.

Shrub stem density increased by 75% between measurement years, but shrub layer increased slightly and remained in the desired condition. Black hickory increased in importance in the shrub layer, while post oak, winged sumac, and hop hornbeam decreased in importance between years.

There were slight increases in live midstory and overstory stem density between years. Midstory BA remained the same as baseline, and was higher than desired. Midstory regeneration (shortleaf pine and oak species only) increased slightly between years to 221 stems/acre and remained much higher than desired. The proportion of the midstory regeneration made up of shortleaf pine was 45%, which was lower than desired and represented little change since baseline. The proportion of the midstory basal area that was shortleaf pine remained lower than desired, at 44%. Post oak, snags, and black hickory increased in importance between years, while red maple declined slightly in importance.

Overstory BA increased by 5% between years and was slightly higher than desired. The proportion of the overstory made up of shortleaf pine decreased since baseline, but remained in the desired condition, at 72%. The percent of the overstory composed of loblolly pine increased since baseline, to 11%, representing an undesired change. Snags, post oak and loblolly pine increased in importance in the overstory, while shortleaf pine and white oak declined between years. There were no large overstory trees (dbh > 24") observed in the shortleaf pine-bluestem coertype by the first re-measure.

Pine plantation

A total of 167 species were observed in 30 macroplots in the pine plantation community, with 160 species in the ground layer and 28 species in the tree and shrubs layers (Table 10). There was an average of 22 species per macroplot in the ground layer (16 were herbaceous) and an average total cover class of 4.3 (50% – 75%). The average C-value and average FQI per macroplot were 4.5 and 20.1, respectively. Common species in the ground layer included poison

Table 10. Comparison of vegetation data between years, <i>pine plantation covertype</i>, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.		
<i>Year</i>	baseline	1st re-measure
<i>Diversity</i>		
Total number of species (spp.)	159	167
Total number of ground layer spp.	147	160
Total number of woody spp.	30	28
Avg. number of herbaceous spp./plot	13	16
Avg. number of ground layer spp./plot	19	22
Avg. number of midstory tree spp./plot	4	4
Avg. number of overstory tree spp./plot	2	1
Avg. number of shrub layer spp./plot	3	3
Non-native species frequency (% of plots)	8%	15%
Average C-value/plot (std. dev.)	4.8 (0.6)	4.5 (0.9)
Average FQI/plot (std. dev.)	20.2 (5.1)	20.1 (7.1)
<i>Cover</i>		
Total live basal area/acre (ft ² /acre)	119	101
Total midstory live basal area/acre	13	9
Total overstory live basal area/acre	106	91
Avg. cover class of shrub layer spp.	1.2 (25-50%)	1.0 (25-50%)
Avg. cover class of ground layer spp.	3.1 (25-50%)	4.3 (50-75%)
<i>Density</i>		
Total live tree stems/acre	335	277
Total live midstory tree stems/acre	188	168
Total live overstory tree stems/acre	147	109
Total midstory snag stems/acre	72	29
Total overstory snag stems/acre	15	10
Total shrub layer stems/acre	540	641

ivy, open-flower rosette grass, long-leaf wood-oats, forked rosette grass, and nut-rush. Of the top ten most important species in the ground layer, four were graminoids, three were forbs, and three were woody vines. Five non-native species were present in the pine plantation community, Korean bush-clover, sericea lespedeza, Japanese bush-clover, Johnson grass, and hop clover. A total of 14 macroplots (18 nested plots) contained at least one of these non-native species.

The shrub layer had an average of 641 stems/acre and three species per macroplot. The dominant shrub layer species was mockernut hickory, comprising 25% of the shrub layer stem density. American beautyberry, post oak, black oak, winged sumac, and black hickory were also common. The average cover class of nested shrub plots was 1.0 (25% – 50%).

On average, there were four midstory tree species per macroplot. The midstory was dominated by mockernut hickory, snags, loblolly pine, and white oak. Live stem density was 168 stems/acre and snag stem density was 29 stems/acre. The average BA of live midstory trees was nine square feet per acre.

The overstory tree layer averaged 109 live stems/acre and had an average BA of 91 square feet per acre. On average, there was one overstory tree species per macroplot. The dominant overstory tree was loblolly pine, comprising 96% of the live overstory BA. Snags were also common in the overstory tree layer.

Summary of changes between years and progress towards desired conditions

Overall, the percent of the landscape in the desired pine woodland condition based on total BA per macroplot was 30%, which represented a significant increase since baseline and a desired change, but what still lower than desired (Table 11). The percent of the landscape in the desired pine woodland condition based on overstory BA per macroplot was 40%, which was lower than desired, but represented a desired increase since baseline.

Total ground layer species richness increased by 13 species (9%) and woody species richness decreased by two species between years. The average number of herbaceous species per macroplot was in the desired condition, following an increase by three species per plot between years to 16. The average number of ground layer species per macroplot increased by three species between years and was in the desired condition at 22 species per plot. Open-flower rosette grass and bracken fern (*Pteridium aquilinum*) increased in importance between years, while long-leaf wood-oats, nut rush, butterfly-pea, and sawtooth greenbrier decreased in importance. The average total cover in the ground layer increased between years, moving closer to the desired condition. Average C-value and average FQI per macroplot remained at similar levels to baseline. Non-native species occupied 15% of nested ground layer plots by the first re-measure, which was a significant increase between years and an undesired change.

Shrub stem density increased by 19% between measurement years, but shrub layer cover appeared to decrease slightly and remained in the desired condition. Mockernut hickory, American beautyberry, and post oak decreased in importance, but still ranked in the top ten most

Table 11. Comparison of baseline, current and desired conditions for the Arkansas and Oklahoma CFLRA project, <i>pine plantation</i> (n = 30).			
	Baseline	1st repeat	Desired
Percent of landscape pine woodland (BA 30-70), all trees	3%	30%	80% +
Percent of landscape pine woodland (BA 30-70), overstory only	13%	40%	80% +
Average herbaceous species/plot	13	16	15+
Average ground layer cover class	3.1 (25-50%)	4.3 (50-75%)	5+ (75-99%)
Midstory stems/acre (live trees)	188	168	less than 150
Midstory regeneration* stems/acre	95 (6% shortleaf)	62 (12% shortleaf)	50-100 per acre (75% shortleaf)
Average shrub layer cover class	1.2 (25-50%)	1.0 (25-50%)	less than 2.0 (< 50%)
BA/acre midstory trees	13	9	10 ft ² /acre or less
Percent of the midstory shortleaf pine (based on BA)	3%	6%	70% or greater pine BA
Percent of the midstory loblolly pine (based on BA)	66%	29%	0% of BA
BA/acre overstory trees	106	91	30-70
Percent of the overstory shortleaf pine (based on BA)	0%	2%	70% or greater BA
Percent of the overstory loblolly pine (based on BA)	96%	96%	0% of BA
Overstory trees (> 24" dbh)	0%	0%	10%
Non-native species frequency (nested plots)	8%	15%	0%

* regeneration is oak species and shortleaf pine only

important species. Black hickory and black oak increased in importance and where in the top ten most important species, after growing into the shrub layer between years. Winged elm and farkleberry also increased in importance between years.

Midstory BA and stem density both declined between years, which was a desired change. Midstory BA was in the desired condition at nine square feet per acre and midstory stem density was slightly higher than desired at 168 stems/acre. Midstory regeneration (shortleaf pine and oak species only) declined between years and was in the desired condition. The proportion of the midstory regeneration made up of shortleaf pine was 12%, which represented an increase from the previous measurement, but was still much lower than desired. The proportion of the midstory

BA attributed to shortleaf pine remained lower than desired, at 6%. The proportion of the midstory BA attributed to loblolly pine declined significantly between years, but remained higher than desired. Shortleaf pine decreased significantly in importance between years, while mockernut hickory, white oak, black oak, flowering dogwood, shortleaf pine, and black cherry (*Prunus serotina*) increased in importance.

Overstory BA declined by 14% between years, which was a desired change. However, the overstory remained more dense than desired. The proportion of the overstory made up of shortleaf pine increased slightly since baseline, but remained much lower than desired at two percent. The percent of the overstory composed of loblolly pine was unchanged since baseline and remained much higher than desired at 96%. Post oak and shortleaf pine increased in importance and black gum and black oak grew into the overstory between years. There were no large overstory trees (dbh > 24") observed in the pine plantation covertype by the first re-measure.

Treatments

Untreated plots

A total of 199 species were observed in 42 untreated macroplots, with 180 species in the ground layer and 54 species in the tree and shrubs layers (Table 12). There was an average of 17 species per macroplot in the ground layer (10 were herbaceous) and an average total cover class of 3.5 (25% – 50%). The average C-value and average FQI per macroplot were 4.7 and 18.7, respectively. Common species in the ground layer included muscadine, Virginia creeper, poison ivy, sawtooth greenbrier, and shortleaf pine. Of the top ten most important species in the ground layer, four were graminoids, four were woody vines, and two were trees or shrubs. Four non-native species were present in untreated plots, including Korean bush-clover, Japanese bush-clover, hop clover, and common vetch. A total of six macroplots (six nested plots) contained at least one of these non-native species.

The shrub layer had an average of 967 stems/acre and five species per macroplot. The dominant shrub layer species were winged elm, red oak, post oak and mockernut hickory. The average cover class of nested shrub plots was 1.4 (25% – 50%).

On average, there were seven midstory tree species per macroplot. The midstory was dominated by shortleaf pine and snags. Post oak, mockernut hickory, and white oak were also

Table 12. Comparison of vegetation data between years, <i>untreated and thinned-only treatments</i>, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.		
<i>Treatment</i>	untreated (42 plots)	thinned-only (10 plots)
<i>Diversity</i>		
Total number of species (spp.)	199	86
Total number of ground layer spp.	180	77
Total number of woody spp.	54	22
Avg. number of herbaceous spp./plot	10	10
Avg. number of ground layer spp./plot	17	16
Avg. number of midstory tree spp./plot	7	6
Avg. number of overstory tree spp./plot	2	2
Avg. number of shrub layer spp./plot	5	4
Non-native species frequency (% of plots)	4%	3%
Average C-value/plot (std. dev.)	4.7 (0.7)	4.6 (1.2)
Average FQI/plot (std. dev.)	18.7 (5.0)	18.5 (6.7)
<i>Cover</i>		
Total live basal area/acre (ft ² /acre)	116	99
Total midstory live basal area/acre	30	33
Total overstory live basal area/acre	86	66
Avg. cover class of shrub layer spp.	1.4 (25-50%)	1.1 (25-50%)
Avg. cover class of ground layer spp.	3.5 (25-50%)	3.4 (25-50%)
<i>Density</i>		
Total live tree stems/acre	622	543
Total live midstory tree stems/acre	508	437
Total live overstory tree stems/acre	114	107
Total midstory snag stems/acre	60	68
Total overstory snag stems/acre	8	8
Total shrub layer stems/acre	967	606

common. Live stem density was 508 stems/acre and snag stem density was 60 stems/acre. The average BA of live midstory trees was 30 square feet per acre.

The overstory tree layer averaged 116 live stems/acre and had an average BA of 86 square feet per acre. On average, there were two overstory tree species per macroplot. The dominant overstory tree species were shortleaf pine and loblolly pine, which comprised 83 percent of the live overstory BA. Snags and post oak were also common in the overstory tree layer.

Burned-only plots

A total of 182 species were observed in 32 burned-only macroplots, with 166 species in the ground layer and 43 species in the tree and shrubs layers (Table 13). There was an average of 24 species per macroplot in the ground layer (16 were herbaceous) and an average total cover class of 4.7 (50% – 75%). The average C-value and average FQI per macroplot were 4.9 and 23.5, respectively. Common species in the ground layer included poison ivy, shortleaf pine, forked rosette grass, open-flower rosette grass, and hairy woodland sunflower. Of the top ten most important species in the ground layer, five were graminoids, two were forbs, two were woody vines, and one was a tree seedling. Four non-native species were present in burned-only plots, including sericea lespedeza, Japanese bush-clover, Korean bush-clover and mimosa. A total of 13 macroplots (18 nested plots) contained at least one of these non-native species.

The shrub layer had an average of 1305 stems/acre and five species per macroplot. The dominant shrub layer species were black hickory, post oak, mockernut hickory and red maple. The average cover class of nested shrub plots was 1.2 (25% – 50%).

On average, there were five midstory tree species per macroplot. The midstory was dominated by shortleaf pine, which comprised 41% of the live BA. Snags, post oak, and mockernut hickory were also common in the midstory. Live stem density was 230 stems/acre and snag stem density was 39 stems/acre. The average BA of live midstory trees was 15 square feet per acre.

The overstory tree layer averaged 96 live stems/acre and had an average BA of 88 square feet per acre. On average, there were two overstory tree species per macroplot. The dominant overstory tree species were loblolly pine and shortleaf pine, which comprised 91 percent of the live overstory BA. Snags and post oak were also common in the overstory tree layer.

Burned + thinned plots

A total of 118 species were observed in nine burned and thinned macroplots, with 108 species in the ground layer and 24 species in the tree and shrubs layers (Table 13). There was an average of 24 species per macroplot in the ground layer (16 were herbaceous) and an average total cover class of 5.0 (75% – 95%). There were, on average, 16 herbaceous species per macroplot. The average C-value and average FQI per macroplot were 4.3 and 21.1, respectively. Common species in the ground layer included poison ivy, open-flower rosette grass, hairy

Table 13. Comparison of vegetation data between years, <i>burned-only and burned + thinned treatments</i>, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.		
<i>Treatment</i>	burned-only (32 plots)	burned + thinned (9 plots)
<i>Diversity</i>		
Total number of species (spp.)	182	118
Total number of ground layer spp.	166	108
Total number of woody spp.	43	24
Avg. number of herbaceous spp./plot	16	16
Avg. number of ground layer spp./plot	24	24
Avg. number of midstory tree spp./plot	5	3
Avg. number of overstory tree spp./plot	2	1
Avg. number of shrub layer spp./plot	5	6
Non-native species frequency (% of plots)	13%	19%
Average C-value/plot (std. dev.)	4.9 (0.5)	4.3 (1.0)
Average FQI/plot (std. dev.)	23.5 (5.1)	21.1 (7.4)
<i>Cover</i>		
Total live basal area/acre (ft ² /acre)	103	69
Total midstory live basal area/acre	15	6
Total overstory live basal area/acre	88	63
Avg. cover class of shrub layer spp.	1.2 (25-50%)	1.5 (25-50%)
Avg. cover class of ground layer spp.	4.7 (50-75%)	5.0 (75-95%)
<i>Density</i>		
Total live tree stems/acre	327	149
Total live midstory tree stems/acre	230	81
Total live overstory tree stems/acre	96	68
Total midstory snag stems/acre	39	23
Total overstory snag stems/acre	8	1
Total shrub layer stems/acre	1305	1623

woodland sunflower, forked rosette grass, and shortleaf pine. Of the top ten most important species in the ground layer, four were graminoids, two were forbs, two were woody vines, and two were tree seedlings. Five non-native species were present in burned and thinned plots, including sericea lespedeza, Japanese bush-clover, Korean bush-clover, Johnson grass, and Japanese honeysuckle. A total of eight macroplots (eight nested plots) contained at least one of these non-native species.

The shrub layer had an average of 1623 stems/acre and six species per macroplot. The dominant shrub layer species were black hickory and post oak. Red maple, black oak, winged

elm, and mockernut hickory were also common. The average cover class of nested shrub plots was 1.5 (25% – 50%).

On average, there were three midstory tree species per macroplot. The midstory was dominated by shortleaf pine, snags and post oak. Red oak and white oak were also common in the midstory. Live stem density was 81 stems/acre and snag stem density was 23 stems/acre. The average BA of live midstory trees was six square feet per acre.

The overstory tree layer averaged 68 live stems/acre and had an average BA of 63 square feet per acre. On average, there was one overstory tree species per macroplot. The dominant overstory tree species was shortleaf pine, which comprised 77 percent of the live overstory BA. Loblolly pine and snags were the only other species in the overstory.

Thinned-only plots

A total of 86 species were observed in ten thinned-only macroplots, with 77 species in the ground layer and 22 species in the tree and shrubs layers (Table 12). There was an average of 16 species per macroplot in the ground layer (10 were herbaceous) and an average total cover class of 3.4 (25% – 50%). The average C-value and average FQI per macroplot were 4.6 and 18.5, respectively. Common species in the ground layer included poison ivy, long-leaf wood-oats, muscadine, red maple, and sawtooth greenbrier. Of the top ten most important species in the ground layer, three were graminoids, one was a forb, four were woody vines, and two were tree seedlings. One non-native species, Korean bush-clover, was found in one nested plot.

The shrub layer had an average of 606 stems/acre and four species per macroplot. The dominant shrub layer species were red maple, black gum, and winged elm. Black hickory and farkleberry were also common. The average cover class of nested shrub plots was 1.1 (25% – 50%).

On average, there were six midstory tree species per macroplot. The midstory was dominated by shortleaf pine, snags and post oak. Winged elm, red oak, and black hickory were also common in the midstory. Live stem density was 437 stems/acre and snag stem density was 68 stems/acre. The average BA of live midstory trees was 33 square feet per acre.

The overstory tree layer averaged 107 live stems/acre and had an average BA of 66 square feet per acre. On average, there were two overstory tree species per macroplot. The

dominant overstory tree species were shortleaf pine and loblolly pine, which together comprised 96 percent of the live overstory BA. Snags were also common in the overstory.

Effects of prescribed fire and thinning treatments and progress towards the desired condition

Significant differences in plant community characteristics were observed between treatments. Macroplots that were burned-only had significantly higher species richness in the ground layer than untreated plots (GLM, $df = 89$, $F = 6.07$, $p = 0.0008$) (fig. 7). Differences between burned and thinned plots and untreated plots approached statistical significance ($p = 0.0828$) and differences between burned-only plots and thinned-only plots were nearly statistically significant ($p = 0.0555$). The number of herbaceous species per macroplot was significantly higher in burned-only plots, compared to thinned-only and untreated plots (GLM, $df = 89$, $F = 6.40$, $p = 0.0006$). Only the burned-only and burned and thinned treatments had actual numbers (true means) and predicted numbers of species per plot (based on statistical models) in the desired ecological condition (Table 14 and Table 15, fig. 7). The average FQI per macroplot

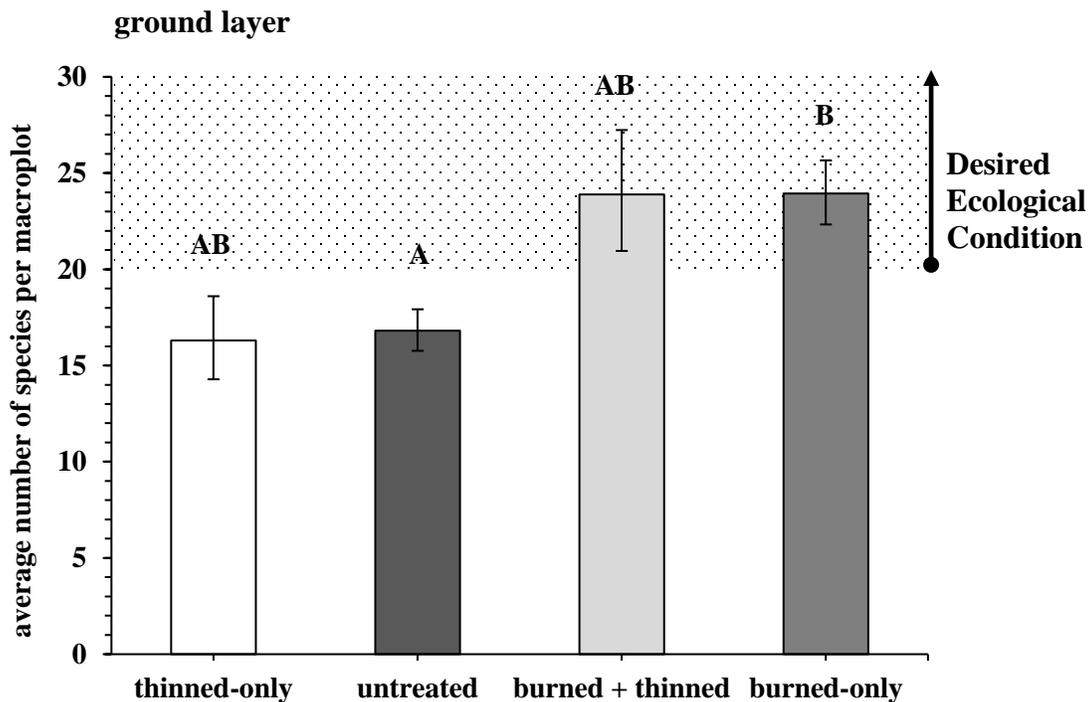


Figure 7. Differences in ground layer species richness per macroplot between treatment types were statistically significant (GLM, $df = 89$, $F=6.07$, $p = 0.0008$). Thick bars are LS means from the model. Bars that share the same letter were not significantly different at $\alpha = 0.05$ (Tukey-Kramer). Error bars are standard errors.

Table 14. Comparison of baseline, current and desired conditions for the Arkansas and Oklahoma CFLRA project, <i>untreated and thinned-only treatments.</i>			
	untreated	thinned-only	Desired
Percent of landscape pine woodland (BA 30-70), all trees	12%	30%	80% +
Percent of landscape pine woodland (BA 30-70), overstory only	45%	70%	80% +
Average herbaceous species/plot	10	10	15+
Average ground layer cover class	3.5 (25-50%)	3.4 (25-50%)	5+ (75-99%)
Midstory stems/acre (live trees)	508	437	less than 150
Midstory regeneration* stems/acre	211 (33% shortleaf)	276 (50% shortleaf)	50-100 per acre (75% shortleaf)
Average shrub layer cover class	1.4 (25-50%)	1.2 (25-50%)	less than 2.0 (< 50%)
BA/acre midstory trees	30	33	10 ft ² /acre or less
Percent of the midstory shortleaf pine (based on BA)	34%	66%	70% or greater pine BA
Percent of the midstory loblolly pine (based on BA)	3%	0%	0% of BA
BA/acre overstory trees	86	66	30-70
Percent of the overstory shortleaf pine (based on BA)	45%	60%	70% or greater BA
Percent of the overstory loblolly pine (based on BA)	37%	36%	0% of BA
Overstory trees (> 24" dbh)	0%	0%	10%
Non-native species frequency (nested plots)	4%	3%	0%

* regeneration is oak species and shortleaf pine only

was higher in both burned treatment types, compared to untreated and thinned-only plots. Average total cover class in the ground layer was higher in the burned-only and burned and thinned treatments than in other treatments and only the burned and thinned plots were in the desired ecological condition for this characteristic. Overall, most of the plots in the burned treatments had higher total cover, with cover classes mostly in the 4-7 range (fig. 8). Burned-only and burned and thinned plots had more of the desired graminoids and forbs in the top-ten most important species in the ground layer, with seven and six species, respectively, compared to only 4 graminoids or forbs in the untreated and thinned-only plots, separately. One undesired

Table 15. Comparison of baseline, current and desired conditions for the Arkansas and Oklahoma CFLRA project, <i>burned-only</i> and <i>burned + thinned</i> treatments.			
	burned-only	burned + thinned	Desired
Percent of landscape pine woodland (BA 30-70), all trees	16%	44%	80% +
Percent of landscape pine woodland (BA 30-70), overstory only	34%	56%	80% +
Average herbaceous species/plot	16	16	15+
Average ground layer cover class	4.7 (50-75%)	5.2 (75-95%)	5+ (75-99%)
Midstory stems/acre (live trees)	230	81	less than 150
Midstory regeneration* stems/acre	130 (57% shortleaf)	72 (40% shortleaf)	50-100 per acre (75% shortleaf)
Average shrub layer cover class	1.2 (25-50%)	1.5 (25-50%)	less than 2.0 (< 50%)
BA/acre midstory trees	15	6	10 ft ² /acre or less
Percent of the midstory shortleaf pine (based on BA)	41%	76%	70% or greater pine BA
Percent of the midstory loblolly pine (based on BA)	13%	0%	0% of BA
BA/acre overstory trees	88	63	30-70
Percent of the overstory shortleaf pine (based on BA)	38%	77%	70% or greater BA
Percent of the overstory loblolly pine (based on BA)	53%	23%	0% of BA
Overstory trees (> 24" dbh)	0%	0%	10%
Non-native species frequency (nested plots)	12%	19%	0%

* regeneration is oak species and shortleaf pine only

outcome of management with prescribed fire was higher frequencies of non-native species in the ground layer compared to thinned-only and untreated plots.

Shrub stem density was significantly higher in burned plots (both treatments combined) compared to untreated and thinned-only plots combined (GLM, df = 91, F = 4.08, p = 0.0464). Despite the higher stem counts in burned plots, total shrub cover remained in the desired condition and differed little from unburned plots. Plots that had been thinned but not burned were dominated by less desirable species, like red maple, black gum, and winged elm. Sweetgum was also present in thinned-only plots and was one of the top-ten most important species. Oak species

tended to be less important in thinned-only plots, with only one species, post oak, being present in the top ten most important species. Burned plots had many more oak species present in the shrub layer and

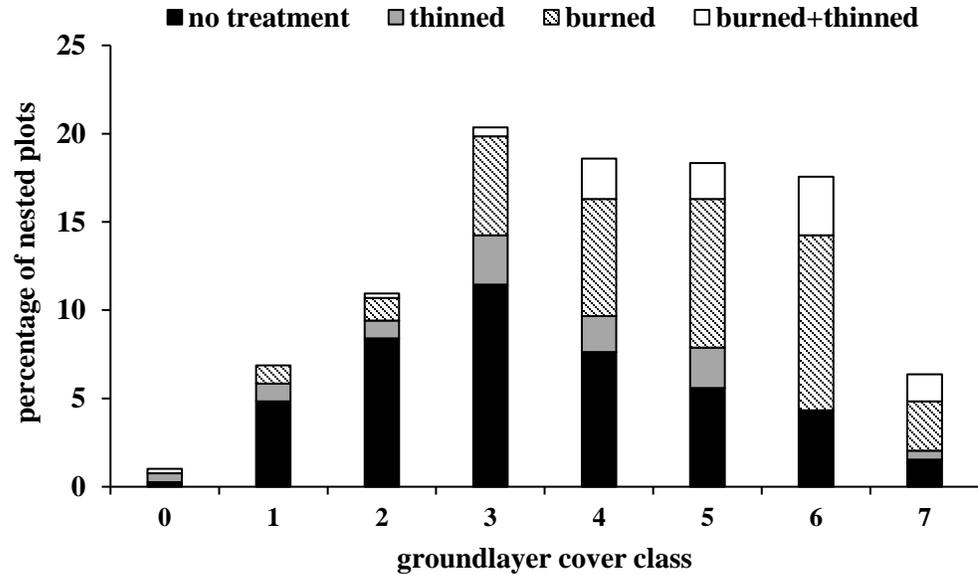


Figure 8. Distribution of ground layer total cover class values (percent of nested plots, n = 393), categorized by treatment type.

contained more shortleaf pine. Shortleaf pine was much less important in untreated plots. Winged elm was the most important species in the shrub layer in untreated plots, but was not among the top ten most important species in both burned treatments.

Midstory BA was significantly lower in burned and thinned plots than in untreated plots (ANOVA, df = 89, F = 5.00, p = 0.003) (fig. 9). The difference between untreated plots and burned-only plots approached statistical significance (p = 0.0503), as did that between burned and thinned plots and thinned-only plots (p = 0.0701). The structure of the midstory tree layer was in the desired condition for BA and stem density in the burned and thinned plots and slightly higher than desired in the burned-only plots. Untreated plots and thinned-only plots had much higher midstory BA and stem densities than desired. Midstory regeneration (oak species and shortleaf pine only) in burned and thinned plots met the desired condition of 50-100 stems/acre, but had less shortleaf regeneration than desired. Burned-only plots had higher than desired amounts of regeneration, but had amounts of shortleaf pine regeneration that were closest to the desired condition. Shortleaf pine was much more dominant in the midstory in treated plots compared to untreated plots. Oak species also tended to be more important in treated plots versus untreated plots. Only the burned and thinned plots had the desired levels of shortleaf pine BA in the midstory layer. Loblolly pine was still present at higher-than-desired levels in untreated plots, while in treated plots it was either absent or much less important.

The overstory structure was closer to or in the desired condition in treated plots compared to untreated plots. Differences in overstory BA between treatments did not reach statistical significance when analyzed with all four levels of treatment or with two levels (treated and untreated) (ANOVA, $df = 91$, $F = 1.13$, $p = 0.29$).

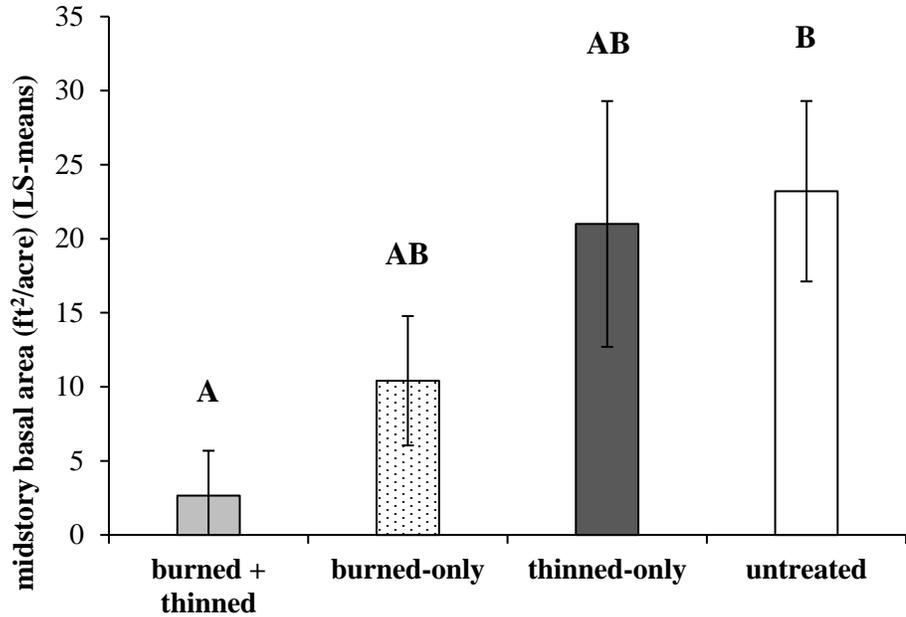
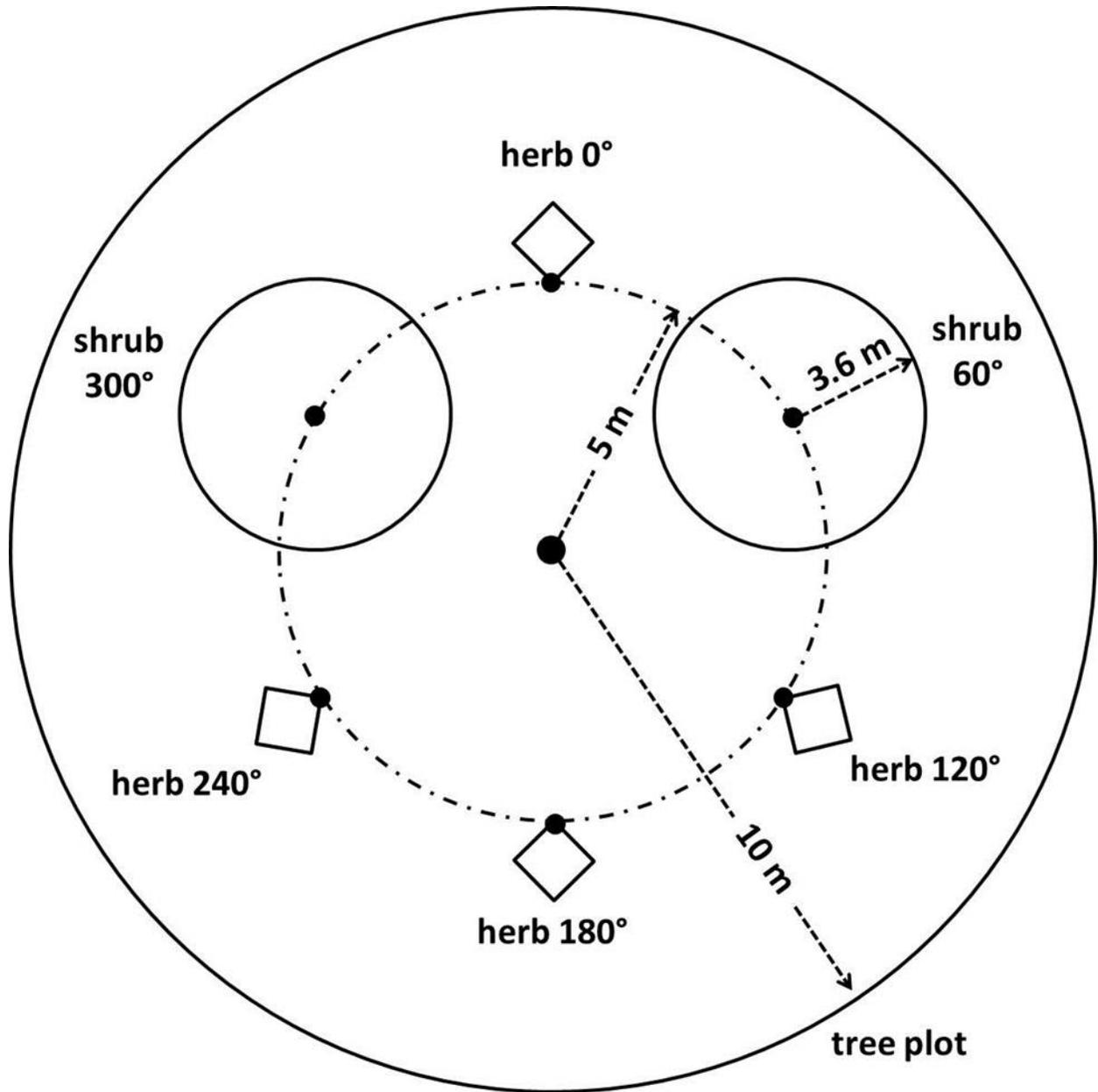


Figure 9. Differences in midstory basal area (ft²/acre) between treatments were significant (ANOVA, $df = 89$, $F = 5.00$, $p = 0.003$). Thick bars are back-transformed LS-means and errors bars are standard errors. Thick bars with the same letter were not significantly different at $\alpha = 0.05$, using the Tukey-Kramer multiple comparison test for unbalanced sample sizes.

Overstory BA in the burned and thinned and thinned-only plots met the desired condition. Only the burned and thinned plots had the desired levels of shortleaf pine BA, compared to BA levels for all other species combined. All plots had more loblolly pine than desired and no plots had trees of the desired larger size class ($dbh > 24''$).

APPENDIX A. Macroplot layout and design.



APPENDIX B. Cover class values for shrub plots and ground layer plots.

Cover class definitions for shrub layer plots.

Class	Percent cover
0	no shrubs
1	1-25%
2	26-50%
3	51-75%
4	76-100%

Cover class definitions for ground layer species and nested plots.

Class	Percent cover
0	none
1	0-1%
2	1-5%
3	6-25%
4	26-50%
5	51-75%
6	75-95%
7	96-100%

Table C1. Comparison of vegetation data between years and by *covertypes* for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.

Covertypes	All plots		Shortleaf pine (70 plots)		Pine plantation (30 plots)		
	<i>Year</i>	<i>baseline</i>	<i>repeat 1</i>	<i>baseline</i>	<i>repeat 1</i>	<i>baseline</i>	<i>repeat 1</i>
<i>Diversity</i>							
Total number of species (spp.)		247	278	209	239	159	167
Total number of ground layer spp.		228	257	189	217	147	160
Total number of woody spp.		53	61	52	58	30	28
Avg. number of herbaceous spp./plot		9	12	8	11	13	16
Avg. number of ground layer spp./plot		15	20	14	19	19	22
Avg. number of midstory tree spp./plot		6	6	7	7	4	4
Avg. number of overstory tree spp./plot		2	2	2	2	2	1
Avg. number of shrub layer spp./plot		4	5	4	6	3	3
Non-native species frequency (% of plots)		5%	8%	4%	5%	8%	15%
Average C-value/plot (std. dev.)		4.9 (0.6)	4.7 (0.7)	4.9 (0.7)	4.9 (0.6)	4.8 (0.6)	4.5 (0.9)
Average FQI/plot (std. dev.)		18.5 (5.4)	20.6 (5.8)	17.7 (5.4)	20.8 (5.2)	20.2 (5.1)	20.1 (7.1)
<i>Cover</i>							
Total live basal area/acre (ft ² /acre)		107	104	102	105	119	101
Total midstory live basal area/acre		24	23	28	28	13	9
Total overstory live basal area/acre		83	81	73	77	106	91
Avg. cover class of shrub layer spp.		1.2	1.3	1.2	1.5	1.2	1.0
Avg. cover class of ground layer spp.		3.3	4.1	3.4	4.0	3.1	4.3
<i>Density</i>							
Total live tree stems/acre		474	466	533	547	335	277
Total live midstory tree stems/acre		363	366	438	451	188	168
Total live overstory tree stems/acre		111	100	96	96	147	109
Total midstory snag stems/acre		81	51	86	61	72	29
Total overstory snag stems/acre		7	7	4	6	15	10
Total shrub layer stems/acre		733	1190	816	1426	540	641

Table C2. Comparison of vegetation data between years and by *topographic position* for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.

Topographic position	ridgetop (19 plots)		north slope (43 plots)		south slope (31 plots)		riparian (7 plots)		
	<i>Year</i>	<i>baseline</i>	<i>repeat 1</i>	<i>baseline</i>	<i>repeat 1</i>	<i>baseline</i>	<i>repeat 1</i>	<i>baseline</i>	<i>repeat 1</i>
<i>Diversity</i>									
Total number of species (spp.)		133	164	163	178	178	196	84	104
Total number of ground layer spp.		121	154	146	162	165	178	65	83
Total number of woody spp.		32	34	40	44	40	50	32	39
Avg. number of herbaceous spp./plot		11	15	8	11	10	12	7	12
Avg. number of ground layer spp./plot		17	22	14	19	16	20	15	21
Avg. number of midstory tree spp./plot		6	4	7	7	6	5	7	7
Avg. number of overstory tree spp./plot		2	1	2	2	2	2	2	2
Avg. number of shrub layer spp./plot		4	5	3	5	4	5	5	7
Non-native species frequency (% of plots)		12%	12%	2%	4%	3%	11%	0%	7%
Average C-value/plot (std. dev.)		4.7 (0.6)	4.2 (1.0)	4.7 (0.6)	4.7 (0.6)	5.2 (0.5)	5.0 (0.6)	4.5 (1.0)	4.7 (0.7)
Average FQI/plot (std. dev.)		18.6 (5.9)	19.9 (7.2)	17.0 (5.3)	19.7 (5.7)	19.7 (4.7)	21.5 (5.3)	17.1 (7.6)	21.0 (5.9)
<i>Cover</i>									
Total live basal area/acre (ft ² /acre)		113	89	110	116	104	105	92	87
Total midstory live basal area/acre		23	11	24	26	24	26	26	19
Total overstory live basal area/acre		90	77	86	90	81	79	66	68
Avg. cover class of shrub layer spp.		1.3	1.2	1.2	1.3	1.2	1.3	1.2	1.7
Avg. cover class of ground layer spp.		3.0	4.6	3.0	3.9	3.0	3.9	3.0	4.3
<i>Density</i>									
Total live tree stems/acre		455	375	552	575	420	428	538	466
Total live midstory tree stems/acre		331	284	435	460	311	329	471	399
Total live overstory tree stems/acre		124	91	116	115	109	99	66	67
Total midstory snag stems/acre		80	46	36	56	93	48	28	67
Total overstory snag stems/acre		6	4	6	10	10	7	0	4
Total shrub layer stems/acre		789	863	611	1198	758	1174	971	2144

Table C3. Comparison of vegetation data between years, *riparian vs. non-riparian communities*, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.

Covertypes	All plots		Riparian (7 plots)		Non-riparian (93 plots)		
	Year	baseline	repeat 1	baseline	repeat 1	baseline	repeat 1
<i>Diversity</i>							
Total number of species (spp.)		247	281	84	104	240	268
Total number of ground layer spp.		228	260	65	83	221	248
Total number of woody spp.		53	62	32	39	49	60
Avg. number of herbaceous spp./plot		9	12	7	12	10	12
Avg. number of ground layer spp./plot		15	20	15	21	15	20
Avg. number of midstory tree spp./plot		6	6	7	7	6	6
Avg. number of overstory tree spp./plot		2	2	2	2	2	2
Avg. number of shrub layer spp./plot		4	5	5	7	4	5
Non-native species frequency (% of plots)		5%	8%	0%	7%	5%	5%
Average C-value/plot (std. dev.)		4.9 (0.6)	4.7 (0.7)	4.5 (1.0)	4.7 (0.7)	4.9 (0.6)	4.8 (0.8)
Average FQI/plot (std. dev.)		18.5 (5.4)	20.6 (5.8)	17.1 (7.6)	21 (5.9)	18.6 (5.2)	20.6 (5.8)
<i>Cover</i>							
Total live basal area/acre (ft ² /acre)		107	104	92	87	108	105
Total midstory live basal area/acre		24	23	26	19	24	23
Total overstory live basal area/acre		83	81	66	68	84	82
Avg. cover class of shrub layer spp.		1.2	1.3	1.2	1.7	1.2	1.3
Avg. cover class of ground layer spp.		3.3	4.1	3.0	4.3	3.0	4.0
<i>Density</i>							
Total live tree stems/acre		474	466	538	466	469	466
Total live midstory tree stems/acre		363	366	471	399	354	364
Total live overstory tree stems/acre		111	100	66	67	114	103
Total midstory snag stems/acre		81	51	28	67	83	50
Total overstory snag stems/acre		7	7	0	4	8	7
Total shrub layer stems/acre		733	1190	971	2144	715	1118

Table C4. Comparison of vegetation data between treatments, excluding riparian areas, for the Arkansas and Oklahoma CFLRA project, Ouachita National Forest.

<i>Treatment</i>	untreated (43 plots)	burned only (32 plots)	burned + thinned (9 plots)	thinned only (10 plots)
<i>Diversity</i>				
Total number of species (spp.)	199	182	118	86
Total number of ground layer spp.	180	166	108	77
Total number of woody spp.	54	43	24	22
Avg. number of herbaceous spp./plot	10	16	16	10
Avg. number of ground layer spp./plot	17	24	24	16
Avg. number of midstory tree spp./plot	7	5	3	6
Avg. number of overstory tree spp./plot	2	2	1	2
Avg. number of shrub layer spp./plot	5	5	6	4
Non-native spp. frequency (% of nested plots)	4%	13%	19%	3%
Average C-value/plot (std. dev.)	4.7 (0.7)	4.9 (0.5)	4.3 (1.0)	4.6 (1.2)
Average FQI/plot (std. dev.)	18.7 (5.0)	23.5 (5.1)	21.1 (7.4)	18.5 (6.7)
<i>Cover</i>				
Total live basal area/acre (ft ² /acre)	116	103	69	99
Total midstory live basal area/acre	30	15	6	33
Total overstory live basal area/acre	86	88	63	66
Avg. cover class of shrub layer spp.	1.4 (25-50%)	1.2 (25-50%)	1.3 (25-50%)	1.1 (25-50%)
Avg. cover class of ground layer spp.	3.5 (25-50%)	4.7 (50-75%)	5.0 (75-95%)	3.4 (25-50%)
<i>Density</i>				
Total live tree stems/acre	622	327	149	543
Total live midstory tree stems/acre	508	230	81	437
Total live overstory tree stems/acre	114	96	68	107
Total midstory snag stems/acre	60	39	23	68
Total overstory snag stems/acre	8	8	1	8
Total shrub layer stems/acre	967	1305	1623	606

APPENDIX D. Species importance values by strata, *all plots*, for the Arkansas and Oklahoma CFLRA project, 2015-2016.

Table 1: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of *all* overstory species (8"+ dbh) for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	0.63	32.81	47.45	301.63	39.21	45.55	44.24	40.87
<i>Pinus taeda</i>	0.33	17.19	38.48	247.54	32.18	37.39	35.88	30.15
snag	0.30	15.63	7.15	36.70	4.77	5.54	6.67	9.28
<i>Quercus stellata</i>	0.24	12.50	5.46	32.74	4.26	4.94	5.09	7.51
<i>Quercus alba</i>	0.09	4.69	2.60	16.35	2.13	2.47	2.42	3.19
<i>Carya tomentosa</i>	0.08	4.17	2.08	8.93	1.16	1.35	1.94	2.48
<i>Quercus rubra</i>	0.04	2.08	1.04	4.85	0.63	0.73	0.97	1.26
<i>Quercus falcata</i>	0.03	1.56	0.39	1.98	0.26	0.30	0.36	0.74
<i>Nyssa sylvatica</i>	0.03	1.56	0.39	1.85	0.24	0.28	0.36	0.74
<i>Juniperus virginiana</i>	0.03	1.56	0.39	1.36	0.18	0.21	0.36	0.71
<i>Carya texana</i>	0.02	1.04	0.52	1.79	0.23	0.27	0.48	0.60
<i>Prunus serotina</i>	0.02	1.04	0.26	1.81	0.24	0.27	0.24	0.52
<i>Liquidambar styraciflua</i>	0.02	1.04	0.26	1.23	0.16	0.19	0.24	0.49
<i>Quercus velutina</i>	0.02	1.04	0.26	1.19	0.15	0.18	0.24	0.49
<i>Ulmus alata</i>	0.02	1.04	0.26	1.08	0.14	0.16	0.24	0.48
<i>Quercus nigra</i>	0.01	0.52	0.13	0.66	0.09	0.10	0.12	0.25
<i>Quercus marilandica</i>	0.01	0.52	0.13	0.43	0.06	0.06	0.12	0.24
Totals	1.92	100.00	107.25	662.13	86.08	100.00	100.00	100.00

Table 2: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of *all* midstory species (2 cm – 7.9" dbh) for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	0.56	9.06	71.24	68.72	8.93	35.03	17.07	20.39
snag	0.73	11.81	51.35	21.22	2.76	10.82	12.30	11.64
<i>Quercus stellata</i>	0.61	9.87	49.01	22.53	2.93	11.49	11.74	11.03
<i>Carya tomentosa</i>	0.52	8.41	34.71	14.56	1.89	7.42	8.32	8.05
<i>Quercus alba</i>	0.37	5.99	25.74	13.15	1.71	6.70	6.17	6.29
<i>Ulmus alata</i>	0.39	6.31	24.31	6.35	0.83	3.24	5.82	5.12
<i>Ostrya virginiana</i>	0.16	2.59	31.98	3.92	0.51	2.00	7.66	4.08
<i>Carya texana</i>	0.21	3.40	18.33	3.76	0.49	1.91	4.39	3.23
<i>Prunus serotina</i>	0.29	4.69	11.05	3.89	0.51	1.98	2.65	3.11
<i>Quercus rubra</i>	0.22	3.56	11.31	5.65	0.73	2.88	2.71	3.05
<i>Cornus florida</i>	0.29	4.69	13.13	2.46	0.32	1.26	3.15	3.03
<i>Pinus taeda</i>	0.11	1.78	5.46	8.16	1.06	4.16	1.31	2.42
<i>Nyssa sylvatica</i>	0.19	3.07	11.44	2.74	0.36	1.40	2.74	2.40
<i>Acer rubrum</i>	0.16	2.59	9.75	2.36	0.31	1.20	2.34	2.04
<i>Liquidambar styraciflua</i>	0.09	1.46	9.62	4.58	0.60	2.33	2.30	2.03
<i>Quercus marilandica</i>	0.22	3.56	7.15	1.39	0.18	0.71	1.71	1.99
<i>Quercus velutina</i>	0.19	3.07	5.98	2.35	0.31	1.20	1.43	1.90
<i>Juniperus virginiana</i>	0.16	2.59	4.68	1.93	0.25	0.98	1.12	1.56
<i>Quercus falcata</i>	0.10	1.62	2.47	1.03	0.13	0.52	0.59	0.91
<i>Vaccinium arboreum</i>	0.08	1.29	2.86	0.15	0.02	0.08	0.69	0.69
<i>Acer saccharum</i>	0.05	0.81	2.86	0.94	0.12	0.48	0.69	0.66
<i>Prunus mexicana</i>	0.05	0.81	2.34	0.60	0.08	0.31	0.56	0.56
<i>Viburnum rufidulum</i>	0.07	1.13	1.56	0.11	0.01	0.06	0.37	0.52
<i>Carya glabra</i>	0.03	0.49	1.56	1.37	0.18	0.70	0.37	0.52
<i>Amelanchier arborea</i>	0.06	0.97	1.43	0.17	0.02	0.09	0.34	0.47
<i>Fraxinus americana</i>	0.04	0.65	0.65	0.27	0.04	0.14	0.16	0.31
<i>Carpinus caroliniana</i>	0.03	0.49	1.56	0.15	0.02	0.08	0.37	0.31
<i>Fraxinus pennsylvanica</i>	0.03	0.49	0.39	0.26	0.03	0.13	0.09	0.24
<i>Quercus nigra</i>	0.01	0.16	0.65	0.75	0.10	0.38	0.16	0.23
<i>Ulmus americana</i>	0.02	0.32	0.52	0.41	0.05	0.21	0.12	0.22
<i>Morus rubra</i>	0.03	0.49	0.39	0.05	0.01	0.03	0.09	0.20

<i>Prunus americana</i>	0.02	0.32	0.52	0.05	0.01	0.03	0.12	0.16
<i>Rhus glabra</i>	0.01	0.16	0.39	0.01	0.00	0.01	0.09	0.09
<i>Frangula caroliniana</i>	0.01	0.16	0.13	0.04	0.01	0.02	0.03	0.07
<i>Prunus sp.</i>	0.01	0.16	0.13	0.01	0.00	0.01	0.03	0.07
<i>Ilex decidua</i>	0.01	0.16	0.13	0.01	0.00	0.00	0.03	0.07
<i>Ilex opaca</i>	0.01	0.16	0.13	0.01	0.00	0.00	0.03	0.07
<i>Celtis laevigata</i>	0.01	0.16	0.13	0.01	0.00	0.00	0.03	0.07
<i>Chionanthus virginicus</i>	0.01	0.16	0.13	0.01	0.00	0.00	0.03	0.07
<i>Crataegous sp.</i>	0.01	0.16	0.13	0.01	0.00	0.00	0.03	0.07
<i>Rhus copallinum</i>	0.01	0.16	0.13	0.00	0.00	0.00	0.03	0.06
Totals	6.18	100.00	417.43	196.15	25.50	100.00	100.00	100.00

Table 3: Frequency, relative frequency, stems/acre, relative density, and importance value of all shrub species for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Quercus stellata</i>	0.42	8.59	106.85	8.98	8.78
<i>Carya texana</i>	0.32	6.54	128.22	10.77	8.66
<i>Carya tomentosa</i>	0.39	7.98	90.94	7.64	7.81
<i>Acer rubrum</i>	0.23	4.70	129.71	10.90	7.80
<i>Ulmus alata</i>	0.33	6.75	66.10	5.55	6.15
<i>Quercus rubra</i>	0.28	5.73	55.66	4.68	5.20
<i>Rhus copallinum</i>	0.14	2.86	80.01	6.72	4.79
<i>Callicarpa americana</i>	0.17	3.48	65.60	5.51	4.49
<i>Quercus alba</i>	0.21	4.29	37.27	3.13	3.71
<i>Vaccinium arboreum</i>	0.22	4.50	29.32	2.46	3.48
<i>Prunus serotina</i>	0.20	4.09	26.34	2.21	3.15
<i>Ostrya virginiana</i>	0.15	3.07	33.79	2.84	2.95
<i>Quercus velutina</i>	0.16	3.27	27.83	2.34	2.81
<i>Pinus echinata</i>	0.08	1.64	45.72	3.84	2.74
<i>Quercus marilandica</i>	0.18	3.68	14.41	1.21	2.45
<i>Liquidambar styraciflua</i>	0.09	1.84	28.82	2.42	2.13
<i>Cornus florida</i>	0.14	2.86	15.41	1.29	2.08
<i>Nyssa sylvatica</i>	0.07	1.43	24.85	2.09	1.76
<i>Vitis rotundifolia</i>	0.06	1.23	19.88	1.67	1.45
<i>Fraxinus americana</i>	0.09	1.84	11.93	1.00	1.42
<i>Quercus falcata</i>	0.09	1.84	8.45	0.71	1.28
<i>Rubus argutus</i>	0.05	1.02	15.90	1.34	1.18
<i>Acer saccharum</i>	0.04	0.82	17.89	1.50	1.16
<i>Juniperus virginiana</i>	0.08	1.64	6.96	0.58	1.11
<i>Rhus glabra</i>	0.06	1.23	11.43	0.96	1.09
<i>Smilax bona-nox</i>	0.04	0.82	9.94	0.84	0.83
<i>Carya glabra</i>	0.04	0.82	8.45	0.71	0.76
<i>Carpinus caroliniana</i>	0.04	0.82	7.95	0.67	0.74
<i>Diospyros virginiana</i>	0.04	0.82	5.47	0.46	0.64
<i>Prunus sp.</i>	0.04	0.82	5.47	0.46	0.64
<i>Quercus nigra</i>	0.03	0.61	6.46	0.54	0.58
<i>Viburnum dentatum</i>	0.02	0.41	6.46	0.54	0.48
<i>Amelanchier arborea</i>	0.03	0.61	3.48	0.29	0.45
<i>Smilax rotundifolia</i>	0.03	0.61	2.98	0.25	0.43
<i>Viburnum rufidulum</i>	0.02	0.41	4.97	0.42	0.41
<i>Prunus americana</i>	0.03	0.61	1.99	0.17	0.39
<i>Robinia pseudoacacia</i>	0.01	0.20	5.96	0.50	0.35
<i>Vitis aestivalis</i>	0.02	0.41	3.48	0.29	0.35
<i>Cercis canadensis</i>	0.02	0.41	2.98	0.25	0.33
<i>Aralia spinosa</i>	0.02	0.41	2.48	0.21	0.31
<i>Frangula caroliniana</i>	0.02	0.41	1.99	0.17	0.29
<i>Hamamelis virginiana</i>	0.02	0.41	1.49	0.13	0.27
<i>Rhus aromatica</i>	0.02	0.41	0.99	0.08	0.25
<i>Sassafras albidum</i>	0.02	0.41	0.99	0.08	0.25

<i>Symphoricarpos orbiculatus</i>	0.01	0.20	0.99	0.08	0.14
<i>Ampelopsis arborea</i>	0.01	0.20	0.50	0.04	0.12
<i>Chionanthus virginicus</i>	0.01	0.20	0.50	0.04	0.12
<i>Crataegus crus-galli</i>	0.01	0.20	0.50	0.04	0.12
<i>Crataegus sp.</i>	0.01	0.20	0.50	0.04	0.12
<i>Ilex opaca</i>	0.01	0.20	0.50	0.04	0.12
<i>Magnolia acuminata</i>	0.01	0.20	0.50	0.04	0.12
<i>Morus rubra</i>	0.01	0.20	0.50	0.04	0.12
<i>Prunus mexicana</i>	0.01	0.20	0.50	0.04	0.12
<i>Quercus phellos</i>	0.01	0.20	0.50	0.04	0.12
<i>Ulmus americana</i>	0.01	0.20	0.50	0.04	0.12
<i>Vaccinium sp.</i>	0.01	0.20	0.50	0.04	0.12
<i>Vaccinium stamineum</i>	0.01	0.20	0.50	0.04	0.12
Totals	4.89	100.00	1,190.23	100.00	100.00

Table 4: Frequency, total cover, relative cover, relative frequency, and importance value of all ground layer species for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Toxicodendron radicans</i>	313.00	131.00	4.14	3.79	3.96
<i>Vitis rotundifolia</i>	270.00	93.00	3.57	2.69	3.13
<i>Pinus echinata</i>	180.00	124.00	2.38	3.58	2.98
<i>Scleria oligantha</i>	175.00	105.00	2.32	3.04	2.68
<i>Chasmanthium sessiliflorum</i>	221.00	83.00	2.92	2.40	2.66
<i>Smilax bona-nox</i>	180.00	94.00	2.38	2.72	2.55
<i>Dichantherium laxiflorum</i>	192.00	83.00	2.54	2.40	2.47
<i>Dichantherium dichotomum</i>	165.00	89.00	2.18	2.57	2.38
<i>Parthenocissus quinquefolia</i>	176.00	73.00	2.33	2.11	2.22
<i>Helianthus hirsutus</i>	145.00	69.00	1.92	1.99	1.96
<i>Schizachyrium scoparium</i>	155.00	58.00	2.05	1.68	1.86
<i>Clitoria mariana</i>	117.00	72.00	1.55	2.08	1.81
<i>Dichantherium linearifolium</i>	102.00	50.00	1.35	1.45	1.40
<i>Galactia volubilis</i>	81.00	59.00	1.07	1.71	1.39
<i>Dichantherium commutatum</i>	91.00	52.00	1.20	1.50	1.35
<i>Lespedeza procumbens</i>	95.00	49.00	1.26	1.42	1.34
<i>Quercus stellata</i>	105.00	41.00	1.39	1.19	1.29
<i>Vaccinium pallidum</i>	90.00	39.00	1.19	1.13	1.16
<i>Rubus argutus</i>	93.00	37.00	1.23	1.07	1.15
<i>Danthonia spicata</i>	82.00	37.00	1.09	1.07	1.08
<i>Acer rubrum</i>	56.00	45.00	0.74	1.30	1.02
<i>Dichantherium acuminatum</i>	63.00	40.00	0.83	1.16	1.00
<i>Vaccinium arboreum</i>	75.00	34.00	0.99	0.98	0.99
<i>Monarda russeliana</i>	57.00	38.00	0.75	1.10	0.93
<i>Antennaria plantaginifolia</i>	65.00	32.00	0.86	0.93	0.89
<i>Ulmus alata</i>	64.00	32.00	0.85	0.93	0.89
<i>Lespedeza repens</i>	60.00	32.00	0.79	0.93	0.86
<i>Dichantherium boscii</i>	61.00	29.00	0.81	0.84	0.82
<i>Rubus sp.</i>	69.00	24.00	0.91	0.69	0.80
<i>Rubus flagellaris</i>	62.00	27.00	0.82	0.78	0.80
<i>Solidago ulmifolia</i>	46.00	33.00	0.61	0.95	0.78
<i>Chamaecrista fasciculata</i>	42.00	33.00	0.56	0.95	0.75
<i>Ostrya virginiana</i>	49.00	29.00	0.65	0.84	0.74
<i>Symphyotrichum anomalum</i>	44.00	29.00	0.58	0.84	0.71
<i>Pteridium aquilinum</i>	63.00	17.00	0.83	0.49	0.66
<i>Desmodium laevigatum</i>	47.00	24.00	0.62	0.69	0.66
<i>Carya texana</i>	53.00	20.00	0.70	0.58	0.64
<i>Rhus copallinum</i>	50.00	20.00	0.66	0.58	0.62
<i>Smilax glauca</i>	35.00	24.00	0.46	0.69	0.58
<i>Oxalis dillenii</i>	28.00	25.00	0.37	0.72	0.55
<i>Erechtites hieraciifolius</i>	36.00	21.00	0.48	0.61	0.54
<i>Quercus alba</i>	37.00	20.00	0.49	0.58	0.53
<i>Symphyotrichum patens</i>	31.00	21.00	0.41	0.61	0.51
<i>Stylosanthes biflora</i>	30.00	21.00	0.40	0.61	0.50
<i>Lactuca canadensis</i>	32.00	20.00	0.42	0.58	0.50

<i>Carya tomentosa</i>	42.00	15.00	0.56	0.43	0.49
<i>Desmodium obtusum</i>	39.00	15.00	0.52	0.43	0.47
<i>Carex</i> sp.	30.00	18.00	0.40	0.52	0.46
<i>Rudbeckia hirta</i>	33.00	14.00	0.44	0.40	0.42
<i>Prunus serotina</i>	26.00	17.00	0.34	0.49	0.42
<i>Smilax rotundifolia</i>	34.00	13.00	0.45	0.38	0.41
<i>Amphicarpaea bracteata</i>	28.00	15.00	0.37	0.43	0.40
<i>Nyssa sylvatica</i>	27.00	15.00	0.36	0.43	0.40
<i>Liatris aspera</i>	26.00	14.00	0.34	0.40	0.37
<i>Solidago petiolaris</i>	26.00	14.00	0.34	0.40	0.37
<i>Quercus marilandica</i>	30.00	12.00	0.40	0.35	0.37
<i>Lespedeza cuneata</i>	31.00	11.00	0.41	0.32	0.36
<i>Solidago odora</i>	22.00	15.00	0.29	0.43	0.36
<i>Quercus rubra</i>	26.00	13.00	0.34	0.38	0.36
<i>Lespedeza virginica</i>	23.00	14.00	0.30	0.40	0.35
<i>Kummerowia striata</i>	27.00	12.00	0.36	0.35	0.35
<i>Viola sororia</i>	19.00	15.00	0.25	0.43	0.34
<i>Phlox pilosa</i>	18.00	15.00	0.24	0.43	0.34
<i>Vitis aestivalis</i>	25.00	11.00	0.33	0.32	0.32
<i>Coreopsis grandiflora</i>	21.00	12.00	0.28	0.35	0.31
<i>Carya texana</i>	23.00	11.00	0.30	0.32	0.31
<i>Hypericum hypericoides</i>	18.00	12.00	0.24	0.35	0.29
<i>Ceanothus americanus</i>	24.00	9.00	0.32	0.26	0.29
<i>Solidago nemoralis</i>	19.00	11.00	0.25	0.32	0.28
<i>Cornus florida</i>	19.00	10.00	0.25	0.29	0.27
<i>Desmodium viridiflorum</i>	20.00	9.00	0.26	0.26	0.26
<i>Chasmanthium laxum</i>	22.00	8.00	0.29	0.23	0.26
<i>Scutellaria elliptica</i>	17.00	10.00	0.22	0.29	0.26
<i>Callicarpa americana</i>	19.00	9.00	0.25	0.26	0.26
<i>Carex latebracteata</i>	19.00	9.00	0.25	0.26	0.26
<i>Andropogon gerardii</i>	21.00	8.00	0.28	0.23	0.25
<i>Sanicula canadensis</i>	16.00	10.00	0.21	0.29	0.25
<i>Pinus taeda</i>	12.00	11.00	0.16	0.32	0.24
<i>Scutellaria ovata</i>	12.00	11.00	0.16	0.32	0.24
<i>Ruellia pedunculata</i>	14.00	10.00	0.19	0.29	0.24
<i>Berchemia scandens</i>	16.00	9.00	0.21	0.26	0.24
<i>Kummerowia stipulacea</i>	16.00	9.00	0.21	0.26	0.24
<i>Acalypha gracilens</i>	11.00	11.00	0.15	0.32	0.23
<i>Hieracium gronovii</i>	13.00	10.00	0.17	0.29	0.23
<i>Coreopsis palmata</i>	17.00	8.00	0.22	0.23	0.23
<i>Viola palmata</i>	12.00	9.00	0.16	0.26	0.21
<i>Conyza canadensis</i>	14.00	8.00	0.19	0.23	0.21
<i>Quercus velutina</i>	16.00	7.00	0.21	0.20	0.21
<i>Symphoricarpos orbiculatus</i>	16.00	7.00	0.21	0.20	0.21
<i>Galium circaezans</i>	11.00	9.00	0.15	0.26	0.20
<i>Pseudognaphalium obtusifolium</i>	13.00	8.00	0.17	0.23	0.20
<i>Echinacea pallida</i>	15.00	7.00	0.20	0.20	0.20
<i>Chamaecrista nictitans</i>	10.00	9.00	0.13	0.26	0.20
<i>Carex rosea</i>	14.00	7.00	0.19	0.20	0.19

<i>Potentilla simplex</i>	14.00	7.00	0.19	0.20	0.19
<i>Carya alba</i>	11.00	8.00	0.15	0.23	0.19
<i>Carex complanata</i>	13.00	7.00	0.17	0.20	0.19
<i>Lespedeza violacea</i>	13.00	7.00	0.17	0.20	0.19
<i>Dichanthelium</i> sp.	15.00	5.00	0.20	0.14	0.17
<i>Lespedeza hirta</i>	11.00	6.00	0.15	0.17	0.16
<i>Fraxinus americana</i>	13.00	5.00	0.17	0.14	0.16
<i>Asplenium platyneuron</i>	8.00	7.00	0.11	0.20	0.15
<i>Viola sagittata</i>	8.00	7.00	0.11	0.20	0.15
<i>Elymus glabriflorus</i>	12.00	5.00	0.16	0.14	0.15
<i>Rubus trivialis</i>	12.00	5.00	0.16	0.14	0.15
<i>Ruellia strepens</i>	7.00	7.00	0.09	0.20	0.15
<i>Carex glaucoidea</i>	11.00	5.00	0.15	0.14	0.15
<i>Piptochaetium avenaceum</i>	11.00	5.00	0.15	0.14	0.15
<i>Dichanthelium polyanthes</i>	10.00	5.00	0.13	0.14	0.14
<i>Eupatorium serotinum</i>	10.00	5.00	0.13	0.14	0.14
<i>Monarda fistulosa</i>	10.00	5.00	0.13	0.14	0.14
<i>Viola pedata</i>	7.00	6.00	0.09	0.17	0.13
<i>Vaccinium stamineum</i>	11.00	4.00	0.15	0.12	0.13
<i>Croton willdenowii</i>	8.00	5.00	0.11	0.14	0.13
<i>Physalis heterophylla</i>	8.00	5.00	0.11	0.14	0.13
<i>Prunus mexicana</i>	8.00	5.00	0.11	0.14	0.13
<i>Liquidambar styraciflua</i>	9.00	4.00	0.12	0.12	0.12
<i>Tradescantia ohiensis</i>	9.00	4.00	0.12	0.12	0.12
<i>Solidago delicatula</i>	6.00	5.00	0.08	0.14	0.11
<i>Desmodium paniculatum</i>	8.00	4.00	0.11	0.12	0.11
<i>Dichanthelium malacophyllum</i>	8.00	4.00	0.11	0.12	0.11
<i>Aristolochia serpentaria</i>	5.00	5.00	0.07	0.14	0.11
<i>Liatris</i> sp.	5.00	5.00	0.07	0.14	0.11
<i>Quercus nigra</i>	7.00	4.00	0.09	0.12	0.10
<i>Symphyotrichum</i> sp.	7.00	4.00	0.09	0.12	0.10
<i>Galium obtusum</i>	6.00	4.00	0.08	0.12	0.10
<i>Rhynchosia latifolia</i>	8.00	3.00	0.11	0.09	0.10
<i>Rudbeckia grandiflora</i>	8.00	3.00	0.11	0.09	0.10
<i>Acalypha monococca</i>	5.00	4.00	0.07	0.12	0.09
<i>Conyza canadensis</i>	5.00	4.00	0.07	0.12	0.09
<i>Euphorbia corollata</i>	5.00	4.00	0.07	0.12	0.09
<i>Eupatorium serotinum</i>	5.00	4.00	0.07	0.12	0.09
<i>Pycnanthemum tenuifolium</i>	7.00	3.00	0.09	0.09	0.09
<i>Baptisia sphaerocarpa</i>	6.00	3.00	0.08	0.09	0.08
<i>Carex blanda</i>	6.00	3.00	0.08	0.09	0.08
<i>Ruellia humilis</i>	6.00	3.00	0.08	0.09	0.08
<i>Desmodium nudiflorum</i>	5.00	3.00	0.07	0.09	0.08
<i>Muhlenbergia sobolifera</i>	5.00	3.00	0.07	0.09	0.08
<i>Pityopsis graminifolia</i>	5.00	3.00	0.07	0.09	0.08
<i>Solidago rugosa</i>	5.00	3.00	0.07	0.09	0.08
<i>Symphyotrichum lanceolatum</i>	5.00	3.00	0.07	0.09	0.08
<i>Sorghastrum nutans</i>	7.00	2.00	0.09	0.06	0.08
<i>Acalypha virginica</i>	4.00	3.00	0.05	0.09	0.07

<i>Celtis occidentalis</i>	4.00	3.00	0.05	0.09	0.07
<i>Crataegus marshallii</i>	4.00	3.00	0.05	0.09	0.07
<i>Desmodium</i> sp.	4.00	3.00	0.05	0.09	0.07
<i>Maianthemum racemosum</i>	4.00	3.00	0.05	0.09	0.07
<i>Matelea baldwyniana</i>	4.00	3.00	0.05	0.09	0.07
<i>Packera obovata</i>	4.00	3.00	0.05	0.09	0.07
<i>Rosa carolina</i>	4.00	3.00	0.05	0.09	0.07
<i>Salvia lyrata</i>	4.00	3.00	0.05	0.09	0.07
<i>Strophostyles umbellata</i>	4.00	3.00	0.05	0.09	0.07
<i>Vicia caroliniana</i>	4.00	3.00	0.05	0.09	0.07
<i>Croton glandulosus</i>	3.00	3.00	0.04	0.09	0.06
<i>Dioscorea villosa</i>	3.00	3.00	0.04	0.09	0.06
<i>Physalis</i> sp.	3.00	3.00	0.04	0.09	0.06
<i>Viola</i> sp.	3.00	3.00	0.04	0.09	0.06
<i>Elymus virginicus</i>	5.00	2.00	0.07	0.06	0.06
<i>Solidago altissima</i>	5.00	2.00	0.07	0.06	0.06
<i>Vernonia baldwinii</i>	5.00	2.00	0.07	0.06	0.06
<i>Acer saccharum</i>	4.00	2.00	0.05	0.06	0.06
<i>Carex muehlenbergii</i>	4.00	2.00	0.05	0.06	0.06
<i>Cynoglossum virginianum</i>	4.00	2.00	0.05	0.06	0.06
<i>Hamamelis virginiana</i>	4.00	2.00	0.05	0.06	0.06
<i>Helianthus divaricatus</i>	4.00	2.00	0.05	0.06	0.06
<i>Liatris pycnostachya</i>	4.00	2.00	0.05	0.06	0.06
<i>Pycnanthemum albescens</i>	4.00	2.00	0.05	0.06	0.06
<i>Rhus aromatica</i>	4.00	2.00	0.05	0.06	0.06
<i>Sanicula canadensis</i>	4.00	2.00	0.05	0.06	0.06
<i>Scleria muehlenbergii</i>	4.00	2.00	0.05	0.06	0.06
<i>Crataegus uniflora</i>	3.00	2.00	0.04	0.06	0.05
<i>Cunila origanoides</i>	3.00	2.00	0.04	0.06	0.05
<i>Desmodium perplexum</i>	3.00	2.00	0.04	0.06	0.05
<i>Dichanthelium aciculare</i>	3.00	2.00	0.04	0.06	0.05
<i>Morus rubra</i>	3.00	2.00	0.04	0.06	0.05
<i>Solidago hispida</i>	3.00	2.00	0.04	0.06	0.05
<i>Trachelospermum difforme</i>	3.00	2.00	0.04	0.06	0.05
<i>Viburnum rufidulum</i>	3.00	2.00	0.04	0.06	0.05
<i>Chasmanthium latifolium</i>	2.00	2.00	0.03	0.06	0.04
<i>Croton monanthogynus</i>	2.00	2.00	0.03	0.06	0.04
<i>Elephantopus tomentosus</i>	2.00	2.00	0.03	0.06	0.04
<i>Houstonia longifolia</i>	2.00	2.00	0.03	0.06	0.04
<i>Lactuca floridana</i>	2.00	2.00	0.03	0.06	0.04
<i>Diospyros virginiana</i>	4.00	1.00	0.05	0.03	0.04
<i>Albizia julibrissin</i>	3.00	1.00	0.04	0.03	0.03
<i>Carex laxiculmis</i>	3.00	1.00	0.04	0.03	0.03
<i>Delphinium carolinianum</i>	3.00	1.00	0.04	0.03	0.03
<i>Sporobolus clandestinus</i>	3.00	1.00	0.04	0.03	0.03
<i>Symphotrichum dumosum</i>	3.00	1.00	0.04	0.03	0.03
<i>Verbesina alternifolia</i>	3.00	1.00	0.04	0.03	0.03
<i>Viburnum dentatum</i>	3.00	1.00	0.04	0.03	0.03
<i>Andropogon virginicus</i>	2.00	1.00	0.03	0.03	0.03

<i>Aralia spinosa</i>	2.00	1.00	0.03	0.03	0.03
<i>Arisaema dracontium</i>	2.00	1.00	0.03	0.03	0.03
<i>Aristolochia reticulata</i>	2.00	1.00	0.03	0.03	0.03
<i>Bromus pubescens</i>	2.00	1.00	0.03	0.03	0.03
<i>Carex blanda</i>	2.00	1.00	0.03	0.03	0.03
<i>Coreopsis tinctoria</i>	2.00	1.00	0.03	0.03	0.03
<i>Crotalaria sagittalis</i>	2.00	1.00	0.03	0.03	0.03
<i>Desmodium glabellum</i>	2.00	1.00	0.03	0.03	0.03
<i>Dichanthelium scoparium</i>	2.00	1.00	0.03	0.03	0.03
<i>Elephantopus carolinianus</i>	2.00	1.00	0.03	0.03	0.03
<i>Erigeron strigosus</i>	2.00	1.00	0.03	0.03	0.03
<i>Galium pilosum</i>	2.00	1.00	0.03	0.03	0.03
<i>Galium texense</i>	2.00	1.00	0.03	0.03	0.03
<i>Hypericum gentianoides</i>	2.00	1.00	0.03	0.03	0.03
<i>Lamium amplexicaule</i>	2.00	1.00	0.03	0.03	0.03
<i>Lathyrus venosus</i>	2.00	1.00	0.03	0.03	0.03
<i>Lespedeza frutescens</i>	2.00	1.00	0.03	0.03	0.03
<i>Lespedeza stuevei</i>	2.00	1.00	0.03	0.03	0.03
<i>Mimulus alatus</i>	2.00	1.00	0.03	0.03	0.03
<i>Physalis virginiana</i>	2.00	1.00	0.03	0.03	0.03
<i>Solanum carolinense</i>	2.00	1.00	0.03	0.03	0.03
<i>Sorghum halepense</i>	2.00	1.00	0.03	0.03	0.03
<i>Tephrosia virginiana</i>	2.00	1.00	0.03	0.03	0.03
<i>Tridens flavus</i>	2.00	1.00	0.03	0.03	0.03
unknown forb 1	2.00	1.00	0.03	0.03	0.03
<i>Verbena stricta</i>	2.00	1.00	0.03	0.03	0.03
<i>Vitis cinerea</i>	2.00	1.00	0.03	0.03	0.03
<i>Aristolochia tomentosa</i>	1.00	1.00	0.01	0.03	0.02
<i>Bidens aristosa</i>	1.00	1.00	0.01	0.03	0.02
<i>Botrychium dissectum</i>	1.00	1.00	0.01	0.03	0.02
<i>Celtis tenuifolia</i>	1.00	1.00	0.01	0.03	0.02
<i>Circaea canadensis</i>	1.00	1.00	0.01	0.03	0.02
<i>Cirsium carolinianum</i>	1.00	1.00	0.01	0.03	0.02
<i>Crataegous</i> sp.	1.00	1.00	0.01	0.03	0.02
<i>Cyperus</i> sp.	1.00	1.00	0.01	0.03	0.02
<i>Dalea candida</i>	1.00	1.00	0.01	0.03	0.02
<i>Desmodium rotundifolium</i>	1.00	1.00	0.01	0.03	0.02
<i>Dryopteris marginalis</i>	1.00	1.00	0.01	0.03	0.02
<i>Erigeron tenuis</i>	1.00	1.00	0.01	0.03	0.02
<i>Frangula caroliniana</i>	1.00	1.00	0.01	0.03	0.02
<i>Galium arkansanum</i>	1.00	1.00	0.01	0.03	0.02
<i>Heliotropium tenellum</i>	1.00	1.00	0.01	0.03	0.02
<i>Ilex decidua</i>	1.00	1.00	0.01	0.03	0.02
<i>Juncus tenuis</i>	1.00	1.00	0.01	0.03	0.02
<i>Lechea tenuifolia</i>	1.00	1.00	0.01	0.03	0.02
<i>Lonicera japonica</i>	1.00	1.00	0.01	0.03	0.02
<i>Lonicera sempervirens</i>	1.00	1.00	0.01	0.03	0.02
<i>Menispermum canadense</i>	1.00	1.00	0.01	0.03	0.02
<i>Passiflora lutea</i>	1.00	1.00	0.01	0.03	0.02

<i>Penstemon</i> sp.	1.00	1.00	0.01	0.03	0.02
<i>Polygala verticillata</i>	1.00	1.00	0.01	0.03	0.02
<i>Quercus</i> sp.	1.00	1.00	0.01	0.03	0.02
<i>Sambucus canadensis</i>	1.00	1.00	0.01	0.03	0.02
<i>Scleria</i> sp.	1.00	1.00	0.01	0.03	0.02
<i>Scutellaria parvula</i>	1.00	1.00	0.01	0.03	0.02
<i>Smilax</i> sp.	1.00	1.00	0.01	0.03	0.02
<i>Solidago flexicaulis</i>	1.00	1.00	0.01	0.03	0.02
<i>Trifolium campestre</i>	1.00	1.00	0.01	0.03	0.02
<i>Triodanis perfoliata</i>	1.00	1.00	0.01	0.03	0.02
unknown forb 2	1.00	1.00	0.01	0.03	0.02
unknown forb 3	1.00	1.00	0.01	0.03	0.02
unknown forb 5	1.00	1.00	0.01	0.03	0.02
unknown forb 7	1.00	1.00	0.01	0.03	0.02
<i>Verbesina helianthoides</i>	1.00	1.00	0.01	0.03	0.02
<i>Vicia sativa</i>	1.00	1.00	0.01	0.03	0.02
Total	5,963.00	3,065.00	78.91	88.61	83.76

Appendix E. Species importance values by strata and topographic position.

Table 5: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8"+ dbh), *ridgetop community*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus taeda</i>	3.53	35.71	45.84	66.37	45.41	57.18	48.20	47.03
<i>Pinus echinata</i>	3.16	32.14	41.05	43.42	29.71	37.40	43.17	37.57
snag	0.32	10.71	4.11	3.05	2.09	2.63	4.32	5.89
<i>Quercus falcata</i>	0.11	7.14	1.37	1.46	1.00	1.25	1.44	3.28
<i>Quercus stellata</i>	0.11	7.14	1.37	0.82	0.56	0.71	1.44	3.10
<i>Quercus velutina</i>	0.05	3.57	0.68	0.57	0.39	0.49	0.72	1.59
<i>Quercus rubra</i>	0.05	3.57	0.68	0.39	0.27	0.34	0.72	1.54
Totals	7.32	100.00	95.11	116.08	79.42	100.00	100.00	100.00

Table 6: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), ridgetop community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	5.37	9.47	69.79	8.82	6.03	42.64	21.16	24.43
snag	3.53	12.63	45.84	4.04	2.76	19.53	13.90	15.35
<i>Quercus stellata</i>	4.16	10.53	54.05	2.01	1.37	9.71	16.39	12.21
<i>Quercus rubra</i>	1.53	7.37	19.84	1.55	1.06	7.50	6.02	6.96
<i>Carya tomentosa</i>	1.11	10.53	14.37	0.52	0.36	2.53	4.36	5.81
<i>Ulmus alata</i>	2.26	4.21	29.42	0.53	0.36	2.56	8.92	5.23
<i>Quercus alba</i>	1.53	5.26	19.84	0.87	0.60	4.22	6.02	5.17
<i>Carya texana</i>	1.63	4.21	21.21	0.36	0.24	1.72	6.43	4.12
<i>Cornus florida</i>	0.68	5.26	8.89	0.36	0.24	1.73	2.70	3.23
<i>Quercus marilandica</i>	0.79	5.26	10.26	0.17	0.12	0.84	3.11	3.07
<i>Quercus velutina</i>	0.58	5.26	7.53	0.26	0.18	1.26	2.28	2.93
<i>Prunus serotina</i>	0.47	4.21	6.16	0.21	0.15	1.04	1.87	2.37
<i>Prunus mexicana</i>	0.47	2.11	6.16	0.09	0.06	0.41	1.87	1.46
<i>Juniperus virginiana</i>	0.16	2.11	2.05	0.29	0.20	1.41	0.62	1.38
<i>Acer rubrum</i>	0.21	2.11	2.74	0.24	0.17	1.18	0.83	1.37
<i>Quercus falcata</i>	0.32	2.11	4.11	0.10	0.07	0.50	1.24	1.28
<i>Fraxinus pennsylvanica</i>	0.05	1.05	0.68	0.19	0.13	0.92	0.21	0.73
<i>Rhus glabra</i>	0.16	1.05	2.05	0.01	0.01	0.05	0.62	0.57
<i>Nyssa sylvatica</i>	0.11	1.05	1.37	0.03	0.02	0.15	0.41	0.54
<i>Acer saccharum</i>	0.11	1.05	1.37	0.01	0.01	0.04	0.41	0.50
<i>Crataegous sp.</i>	0.05	1.05	0.68	0.01	0.00	0.03	0.21	0.43
<i>Vaccinium arboreum</i>	0.05	1.05	0.68	0.01	0.00	0.03	0.21	0.43
<i>Rhus copallinum</i>	0.05	1.05	0.68	0.00	0.00	0.02	0.21	0.43
Totals	25.37	100.00	329.79	20.68	14.15	100.00	100.00	100.00

Table 7: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, ridgetop community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Carya tomentosa</i>	0.63	14.29	138.63	16.06	15.17
<i>Quercus stellata</i>	0.53	11.90	86.31	10.00	10.95
<i>Callicarpa americana</i>	0.26	5.95	104.62	12.12	9.04
<i>Ulmus alata</i>	0.26	5.95	47.08	5.45	5.70
<i>Vaccinium arboreum</i>	0.26	5.95	47.08	5.45	5.70
<i>Carya texana</i>	0.16	3.57	60.16	6.97	5.27
<i>Quercus alba</i>	0.26	5.95	39.23	4.55	5.25
<i>Quercus rubra</i>	0.26	5.95	31.39	3.64	4.79
<i>Rhus copallinum</i>	0.16	3.57	44.47	5.15	4.36
<i>Acer rubrum</i>	0.21	4.76	28.77	3.33	4.05
<i>Pinus echinata</i>	0.05	1.19	36.62	4.24	2.72
<i>Quercus falcata</i>	0.16	3.57	15.69	1.82	2.69
<i>Rubus argutus</i>	0.05	1.19	34.00	3.94	2.56
<i>Cornus florida</i>	0.11	2.38	18.31	2.12	2.25
<i>Acer saccharum</i>	0.05	1.19	20.92	2.42	1.81
<i>Rhus glabra</i>	0.11	2.38	10.46	1.21	1.80
<i>Carya glabra</i>	0.05	1.19	18.31	2.12	1.66
<i>Quercus velutina</i>	0.11	2.38	7.85	0.91	1.65
<i>Vitis rotundifolia</i>	0.05	1.19	15.69	1.82	1.50
<i>Juniperus virginiana</i>	0.11	2.38	5.23	0.61	1.49
<i>Prunus serotina</i>	0.11	2.38	5.23	0.61	1.49
<i>Fraxinus americana</i>	0.05	1.19	13.08	1.52	1.35
<i>Aralia spinosa</i>	0.05	1.19	7.85	0.91	1.05
<i>Cercis canadensis</i>	0.05	1.19	7.85	0.91	1.05
<i>Diospyros virginiana</i>	0.05	1.19	5.23	0.61	0.90
<i>Ilex opaca</i>	0.05	1.19	2.62	0.30	0.75
<i>Magnolia acuminata</i>	0.05	1.19	2.62	0.30	0.75
<i>Nyssa sylvatica</i>	0.05	1.19	2.62	0.30	0.75
<i>Quercus marilandica</i>	0.05	1.19	2.62	0.30	0.75
<i>Smilax bona-nox</i>	0.05	1.19	2.62	0.30	0.75
Total	4.42	100.00	863.15	100.00	100.00

Table 8: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, ridgetop community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Toxicodendron radicans</i>	36.00	95.00	7.01	5.46	6.24
<i>Vitis rotundifolia</i>	25.00	69.00	5.09	3.79	4.44
<i>Dichantheium laxiflorum</i>	26.00	60.00	4.43	3.95	4.19
<i>Chasmanthium sessiliflorum</i>	21.00	46.00	3.39	3.19	3.29
<i>Dichantheium dichotomum</i>	22.00	40.00	2.95	3.34	3.15
<i>Smilax bona-nox</i>	21.00	37.00	2.73	3.19	2.96
<i>Helianthus hirsutus</i>	19.00	38.00	2.80	2.88	2.84
<i>Parthenocissus quinquefolia</i>	17.00	41.00	3.03	2.58	2.80
<i>Lespedeza procumbens</i>	15.00	34.00	2.51	2.28	2.39
<i>Rubus argutus</i>	13.00	33.00	2.44	1.97	2.20
<i>Scleria oligantha</i>	15.00	26.00	1.92	2.28	2.10
<i>Schizachyrium scoparium</i>	11.00	28.00	2.07	1.67	1.87
<i>Dichantheium linearifolium</i>	11.00	26.00	1.92	1.67	1.79
<i>Pteridium aquilinum</i>	9.00	30.00	2.21	1.37	1.79
<i>Clitoria mariana</i>	13.00	21.00	1.55	1.97	1.76
<i>Quercus stellata</i>	9.00	25.00	1.85	1.37	1.61
<i>Danthonia spicata</i>	9.00	22.00	1.62	1.37	1.49
<i>Erechtites hieraciifolius</i>	10.00	19.00	1.40	1.52	1.46
<i>Rhus copallinum</i>	8.00	21.00	1.55	1.21	1.38
<i>Pinus echinata</i>	11.00	14.00	1.03	1.67	1.35
<i>Dichantheium commutatum</i>	9.00	18.00	1.33	1.37	1.35
<i>Rubus</i> sp.	7.00	22.00	1.62	1.06	1.34
<i>Chamaecrista fasciculata</i>	11.00	12.00	0.89	1.67	1.28
<i>Oxalis dillenii</i>	10.00	12.00	0.89	1.52	1.20
<i>Desmodium laevigatum</i>	7.00	15.00	1.11	1.06	1.08
<i>Antennaria plantaginifolia</i>	7.00	14.00	1.03	1.06	1.05
<i>Galactia volubilis</i>	8.00	11.00	0.81	1.21	1.01
<i>Carex</i> sp.	7.00	12.00	0.89	1.06	0.97
<i>Solidago odora</i>	7.00	12.00	0.89	1.06	0.97
<i>Lespedeza cuneata</i>	6.00	14.00	1.03	0.91	0.97
<i>Rubus flagellaris</i>	5.00	15.00	1.11	0.76	0.93
<i>Symphyotrichum anomalum</i>	6.00	11.00	0.81	0.91	0.86
<i>Quercus alba</i>	5.00	13.00	0.96	0.76	0.86
<i>Dichantheium acuminatum</i>	6.00	10.00	0.74	0.91	0.82
<i>Solidago petiolaris</i>	5.00	12.00	0.89	0.76	0.82
<i>Hypericum hypericoides</i>	5.00	10.00	0.74	0.76	0.75
<i>Amphicarpaea bracteata</i>	5.00	9.00	0.66	0.76	0.71
<i>Pseudognaphalium obtusifolium</i>	5.00	9.00	0.66	0.76	0.71
<i>Solidago ulmifolia</i>	5.00	8.00	0.59	0.76	0.67
<i>Potentilla simplex</i>	4.00	10.00	0.74	0.61	0.67
<i>Phlox pilosa</i>	5.00	7.00	0.52	0.76	0.64
<i>Eupatorium serotinum</i>	4.00	9.00	0.66	0.61	0.64
<i>Liatris aspera</i>	4.00	9.00	0.66	0.61	0.64
<i>Lespedeza virginica</i>	4.00	8.00	0.59	0.61	0.60
<i>Monarda fistulosa</i>	4.00	8.00	0.59	0.61	0.60

<i>Vaccinium arboreum</i>	4.00	8.00	0.59	0.61	0.60
<i>Acer rubrum</i>	5.00	5.00	0.37	0.76	0.56
<i>Lactuca canadensis</i>	5.00	5.00	0.37	0.76	0.56
<i>Dichanthelium boscii</i>	4.00	7.00	0.52	0.61	0.56
<i>Desmodium obtusum</i>	3.00	9.00	0.66	0.46	0.56
<i>Stylosanthes biflora</i>	4.00	6.00	0.44	0.61	0.52
<i>Ulmus alata</i>	4.00	6.00	0.44	0.61	0.52
<i>Quercus velutina</i>	3.00	8.00	0.59	0.46	0.52
<i>Pinus taeda</i>	4.00	5.00	0.37	0.61	0.49
<i>Symphoricarpos orbiculatus</i>	3.00	7.00	0.52	0.46	0.49
<i>Callicarpa americana</i>	3.00	6.00	0.44	0.46	0.45
<i>Lespedeza repens</i>	3.00	6.00	0.44	0.46	0.45
<i>Coreopsis grandiflora</i>	3.00	5.00	0.37	0.46	0.41
<i>Hieracium gronovii</i>	3.00	5.00	0.37	0.46	0.41
<i>Muhlenbergia sobolifera</i>	3.00	5.00	0.37	0.46	0.41
<i>Sorghastrum nutans</i>	2.00	7.00	0.52	0.30	0.41
<i>Vitis aestivalis</i>	2.00	7.00	0.52	0.30	0.41
<i>Celtis occidentalis</i>	3.00	4.00	0.30	0.46	0.38
<i>Cornus florida</i>	3.00	4.00	0.30	0.46	0.38
<i>Carya tomentosa</i>	2.00	6.00	0.44	0.30	0.37
<i>Desmodium viridiflorum</i>	2.00	6.00	0.44	0.30	0.37
<i>Quercus marilandica</i>	2.00	6.00	0.44	0.30	0.37
<i>Physalis sp.</i>	3.00	3.00	0.22	0.46	0.34
<i>Ceanothus americanus</i>	2.00	5.00	0.37	0.30	0.34
<i>Dichanthelium polyanthes</i>	2.00	5.00	0.37	0.30	0.34
<i>Echinacea pallida</i>	2.00	5.00	0.37	0.30	0.34
<i>Kummerowia striata</i>	2.00	5.00	0.37	0.30	0.34
<i>Quercus rubra</i>	2.00	5.00	0.37	0.30	0.34
<i>Vaccinium pallidum</i>	2.00	5.00	0.37	0.30	0.34
<i>Desmodium paniculatum</i>	2.00	4.00	0.30	0.30	0.30
<i>Helianthus divaricatus</i>	2.00	4.00	0.30	0.30	0.30
<i>Pycnanthemum albescens</i>	2.00	4.00	0.30	0.30	0.30
<i>Quercus nigra</i>	2.00	4.00	0.30	0.30	0.30
<i>Tradescantia ohiensis</i>	2.00	4.00	0.30	0.30	0.30
<i>Berchemia scandens</i>	2.00	3.00	0.22	0.30	0.26
<i>Chamaecrista nictitans</i>	2.00	3.00	0.22	0.30	0.26
<i>Conyza canadensis</i>	2.00	3.00	0.22	0.30	0.26
<i>Galium obtusum</i>	2.00	3.00	0.22	0.30	0.26
<i>Lespedeza violacea</i>	2.00	3.00	0.22	0.30	0.26
<i>Monarda russeliana</i>	2.00	3.00	0.22	0.30	0.26
<i>Nyssa sylvatica</i>	2.00	3.00	0.22	0.30	0.26
<i>Physalis heterophylla</i>	2.00	3.00	0.22	0.30	0.26
<i>Rudbeckia hirta</i>	2.00	3.00	0.22	0.30	0.26
<i>Scutellaria elliptica</i>	2.00	3.00	0.22	0.30	0.26
<i>Smilax glauca</i>	2.00	3.00	0.22	0.30	0.26
<i>Acalypha gracilens</i>	2.00	2.00	0.15	0.30	0.23
<i>Conyza canadensis</i>	2.00	2.00	0.15	0.30	0.23
<i>Elephantopus tomentosus</i>	2.00	2.00	0.15	0.30	0.23
<i>Ostrya virginiana</i>	2.00	2.00	0.15	0.30	0.23
<i>Strophostyles umbellata</i>	2.00	2.00	0.15	0.30	0.23

<i>Viola pedata</i>	2.00	2.00	0.15	0.30	0.23
<i>Piptochaetium avenaceum</i>	1.00	4.00	0.30	0.15	0.22
<i>Baptisia sphaerocarpa</i>	1.00	3.00	0.22	0.15	0.19
<i>Carex laxiculmis</i>	1.00	3.00	0.22	0.15	0.19
<i>Carya texana</i>	1.00	3.00	0.22	0.15	0.19
<i>Carex glaucoidea</i>	1.00	3.00	0.22	0.15	0.19
<i>Desmodium nudiflorum</i>	1.00	3.00	0.22	0.15	0.19
<i>Elymus glabriflorus</i>	1.00	3.00	0.22	0.15	0.19
<i>Fraxinus americana</i>	1.00	3.00	0.22	0.15	0.19
<i>Prunus serotina</i>	1.00	3.00	0.22	0.15	0.19
<i>Rudbeckia grandiflora</i>	1.00	3.00	0.22	0.15	0.19
<i>Smilax rotundifolia</i>	1.00	3.00	0.22	0.15	0.19
<i>Solidago altissima</i>	1.00	3.00	0.22	0.15	0.19
<i>Solidago nemoralis</i>	1.00	3.00	0.22	0.15	0.19
<i>Vernonia baldwinii</i>	1.00	3.00	0.22	0.15	0.19
<i>Acalypha virginica</i>	1.00	2.00	0.15	0.15	0.15
<i>Andropogon virginicus</i>	1.00	2.00	0.15	0.15	0.15
<i>Aralia spinosa</i>	1.00	2.00	0.15	0.15	0.15
<i>Arisaema dracontium</i>	1.00	2.00	0.15	0.15	0.15
<i>Carex blanda</i>	1.00	2.00	0.15	0.15	0.15
<i>Carex muehlenbergii</i>	1.00	2.00	0.15	0.15	0.15
<i>Crataegus marshallii</i>	1.00	2.00	0.15	0.15	0.15
<i>Crotalaria sagittalis</i>	1.00	2.00	0.15	0.15	0.15
<i>Croton willdenowii</i>	1.00	2.00	0.15	0.15	0.15
<i>Carex complanata</i>	1.00	2.00	0.15	0.15	0.15
<i>Elymus virginicus</i>	1.00	2.00	0.15	0.15	0.15
<i>Erigeron strigosus</i>	1.00	2.00	0.15	0.15	0.15
<i>Lespedeza frutescens</i>	1.00	2.00	0.15	0.15	0.15
<i>Prunus mexicana</i>	1.00	2.00	0.15	0.15	0.15
<i>Sanicula canadensis</i>	1.00	2.00	0.15	0.15	0.15
<i>Solanum carolinense</i>	1.00	2.00	0.15	0.15	0.15
<i>Solidago rugosa</i>	1.00	2.00	0.15	0.15	0.15
<i>Symphyotrichum patens</i>	1.00	2.00	0.15	0.15	0.15
<i>Trachelospermum difforme</i>	1.00	2.00	0.15	0.15	0.15
unknown forb 1	1.00	2.00	0.15	0.15	0.15
<i>Vaccinium stamineum</i>	1.00	2.00	0.15	0.15	0.15
<i>Viola sororia</i>	1.00	2.00	0.15	0.15	0.15
<i>Acalypha monococca</i>	1.00	1.00	0.07	0.15	0.11
<i>Aristolochia serpentaria</i>	1.00	1.00	0.07	0.15	0.11
<i>Carya alba</i>	1.00	1.00	0.07	0.15	0.11
<i>Crataegous</i> sp.	1.00	1.00	0.07	0.15	0.11
<i>Croton glandulosus</i>	1.00	1.00	0.07	0.15	0.11
<i>Croton monanthogynus</i>	1.00	1.00	0.07	0.15	0.11
<i>Cyperus</i> sp.	1.00	1.00	0.07	0.15	0.11
<i>Erigeron tenuis</i>	1.00	1.00	0.07	0.15	0.11
<i>Eupatorium serotinum</i>	1.00	1.00	0.07	0.15	0.11
<i>Galium arkansanum</i>	1.00	1.00	0.07	0.15	0.11
<i>Juncus tenuis</i>	1.00	1.00	0.07	0.15	0.11
<i>Menispermum canadense</i>	1.00	1.00	0.07	0.15	0.11
<i>Morus rubra</i>	1.00	1.00	0.07	0.15	0.11

<i>Ruellia pedunculata</i>	1.00	1.00	0.07	0.15	0.11
<i>Sambucus canadensis</i>	1.00	1.00	0.07	0.15	0.11
<i>Scleria</i> sp.	1.00	1.00	0.07	0.15	0.11
<i>Scutellaria ovata</i>	1.00	1.00	0.07	0.15	0.11
<i>Solidago delicatula</i>	1.00	1.00	0.07	0.15	0.11
<i>Trifolium campestre</i>	1.00	1.00	0.07	0.15	0.11
<i>Viburnum rufidulum</i>	1.00	1.00	0.07	0.15	0.11
<i>Viola</i> sp.	1.00	1.00	0.07	0.15	0.11
<i>Viola sagittata</i>	1.00	1.00	0.07	0.15	0.11
Total	659.00	1,355.00	100.00	100.00	100.00

Table 9: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8"+ dbh), north slope community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus taeda</i>	4.16	19.35	54.10	101.44	42.54	43.75	43.14	35.42
<i>Pinus echinata</i>	3.52	27.42	45.71	89.05	37.34	38.41	36.45	34.09
snag	0.81	17.74	10.48	16.66	6.98	7.18	8.36	11.10
<i>Quercus stellata</i>	0.29	8.06	3.77	6.90	2.89	2.97	3.01	4.68
<i>Quercus alba</i>	0.29	4.84	3.77	7.98	3.35	3.44	3.01	3.76
<i>Carya tomentosa</i>	0.19	6.45	2.52	2.88	1.21	1.24	2.01	3.23
<i>Carya texana</i>	0.13	3.23	1.68	1.79	0.75	0.77	1.34	1.78
<i>Nyssa sylvatica</i>	0.06	3.23	0.84	0.99	0.41	0.43	0.67	1.44
<i>Prunus serotina</i>	0.03	1.61	0.42	1.39	0.58	0.60	0.33	0.85
<i>Quercus rubra</i>	0.03	1.61	0.42	0.74	0.31	0.32	0.33	0.75
<i>Liquidambar styraciflua</i>	0.03	1.61	0.42	0.62	0.26	0.27	0.33	0.74
<i>Quercus falcata</i>	0.03	1.61	0.42	0.53	0.22	0.23	0.33	0.73
<i>Ulmus alata</i>	0.03	1.61	0.42	0.49	0.20	0.21	0.33	0.72
<i>Juniperus virginiana</i>	0.03	1.61	0.42	0.43	0.18	0.18	0.33	0.71
Totals	9.65	100.00	125.39	231.86	97.23	100.00	100.00	100.00

Table 10: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), north slope community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	5.26	6.93	68.35	21.01	8.81	30.21	13.24	16.79
snag	4.29	10.82	55.77	7.45	3.13	10.72	10.80	10.78
<i>Quercus alba</i>	3.84	7.36	49.90	8.20	3.44	11.80	9.67	9.61
<i>Quercus stellata</i>	3.39	8.23	44.03	5.01	2.10	7.21	8.53	7.99
<i>Carya tomentosa</i>	2.90	7.36	37.74	5.11	2.14	7.35	7.31	7.34
<i>Ulmus alata</i>	2.23	8.23	28.94	1.90	0.80	2.73	5.61	5.52
<i>Carya texana</i>	2.39	3.90	31.03	3.01	1.26	4.33	6.01	4.75
<i>Ostrya virginiana</i>	3.48	2.60	45.29	1.75	0.74	2.52	8.77	4.63
<i>Nyssa sylvatica</i>	2.32	4.76	30.19	2.07	0.87	2.97	5.85	4.53
<i>Cornus florida</i>	1.39	5.63	18.03	1.06	0.45	1.53	3.49	3.55
<i>Acer rubrum</i>	1.45	3.46	18.87	1.25	0.52	1.79	3.66	2.97
<i>Prunus serotina</i>	0.90	4.76	11.74	0.99	0.42	1.43	2.27	2.82
<i>Quercus rubra</i>	0.90	3.46	11.74	1.82	0.76	2.61	2.27	2.78
<i>Pinus taeda</i>	0.42	3.03	5.45	2.86	1.20	4.11	1.06	2.73
<i>Liquidambar styraciflua</i>	1.23	0.87	15.94	2.17	0.91	3.12	3.09	2.36
<i>Quercus marilandica</i>	0.55	2.60	7.13	0.33	0.14	0.48	1.38	1.49
<i>Quercus velutina</i>	0.45	2.16	5.87	0.76	0.32	1.09	1.14	1.46
<i>Juniperus virginiana</i>	0.55	2.16	7.13	0.55	0.23	0.79	1.38	1.44
<i>Acer saccharum</i>	0.42	0.87	5.45	0.87	0.36	1.25	1.06	1.06
<i>Quercus falcata</i>	0.23	2.16	2.94	0.26	0.11	0.38	0.57	1.04
<i>Amelanchier arborea</i>	0.13	1.73	1.68	0.13	0.05	0.18	0.32	0.75
<i>Carya glabra</i>	0.19	0.43	2.52	0.52	0.22	0.75	0.49	0.56
<i>Carpinus caroliniana</i>	0.19	0.87	2.52	0.07	0.03	0.10	0.49	0.49
<i>Prunus americana</i>	0.13	0.87	1.68	0.05	0.02	0.07	0.32	0.42
<i>Prunus mexicana</i>	0.10	0.87	1.26	0.07	0.03	0.10	0.24	0.40
<i>Viburnum rufidulum</i>	0.10	0.87	1.26	0.03	0.01	0.04	0.24	0.38
<i>Ulmus americana</i>	0.10	0.43	1.26	0.09	0.04	0.13	0.24	0.27
<i>Fraxinus pennsylvanica</i>	0.03	0.43	0.42	0.06	0.03	0.09	0.08	0.20
<i>Fraxinus americana</i>	0.03	0.43	0.42	0.05	0.02	0.08	0.08	0.20
<i>Ilex opaca</i>	0.03	0.43	0.42	0.01	0.00	0.01	0.08	0.18
<i>Celtis laevigata</i>	0.03	0.43	0.42	0.01	0.00	0.01	0.08	0.17

<i>Morus rubra</i>	0.03	0.43	0.42	0.01	0.00	0.01	0.08	0.17
<i>Vaccinium arboreum</i>	0.03	0.43	0.42	0.00	0.00	0.00	0.08	0.17
Totals	39.71	100.00	516.23	69.55	29.17	100.00	100.00	100.00

Table 11: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, north slope community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Quercus stellata</i>	0.42	9.03	142.68	11.91	10.47
<i>Carya texana</i>	0.35	7.64	145.88	12.18	9.91
<i>Acer rubrum</i>	0.23	4.86	110.61	9.24	7.05
<i>Quercus alba</i>	0.35	7.64	73.74	6.16	6.90
<i>Ulmus alata</i>	0.35	7.64	70.54	5.89	6.76
<i>Quercus rubra</i>	0.26	5.56	72.14	6.02	5.79
<i>Carya tomentosa</i>	0.26	5.56	57.71	4.82	5.19
<i>Rhus copallinum</i>	0.16	3.47	73.74	6.16	4.82
<i>Pinus echinata</i>	0.10	2.08	83.36	6.96	4.52
<i>Callicarpa americana</i>	0.16	3.47	56.11	4.69	4.08
<i>Ostrya virginiana</i>	0.19	4.17	44.89	3.75	3.96
<i>Vaccinium arboreum</i>	0.26	5.56	16.03	1.34	3.45
<i>Prunus serotina</i>	0.19	4.17	17.63	1.47	2.82
<i>Quercus marilandica</i>	0.19	4.17	9.62	0.80	2.48
<i>Cornus florida</i>	0.16	3.47	17.63	1.47	2.47
<i>Nyssa sylvatica</i>	0.06	1.39	24.05	2.01	1.70
<i>Juniperus virginiana</i>	0.10	2.08	9.62	0.80	1.44
<i>Quercus falcata</i>	0.10	2.08	9.62	0.80	1.44
<i>Quercus velutina</i>	0.10	2.08	9.62	0.80	1.44
<i>Diospyros virginiana</i>	0.06	1.39	12.82	1.07	1.23
<i>Fraxinus americana</i>	0.06	1.39	11.22	0.94	1.16
<i>Robinia pseudoacacia</i>	0.03	0.69	19.24	1.61	1.15
<i>Viburnum dentatum</i>	0.03	0.69	19.24	1.61	1.15
<i>Carpinus caroliniana</i>	0.06	1.39	8.02	0.67	1.03
<i>Acer saccharum</i>	0.03	0.69	16.03	1.34	1.02
<i>Rubus argutus</i>	0.03	0.69	16.03	1.34	1.02
<i>Viburnum rufidulum</i>	0.03	0.69	12.82	1.07	0.88
<i>Vitis rotundifolia</i>	0.03	0.69	12.82	1.07	0.88
<i>Liquidambar styraciflua</i>	0.03	0.69	11.22	0.94	0.82
<i>Hamamelis virginiana</i>	0.03	0.69	3.21	0.27	0.48
<i>Amelanchier arborea</i>	0.03	0.69	1.60	0.13	0.41
<i>Crataegus crus-galli</i>	0.03	0.69	1.60	0.13	0.41
<i>Crataegous sp.</i>	0.03	0.69	1.60	0.13	0.41
<i>Prunus americana</i>	0.03	0.69	1.60	0.13	0.41
<i>Quercus phellos</i>	0.03	0.69	1.60	0.13	0.41
<i>Sassafras albidum</i>	0.03	0.69	1.60	0.13	0.41
Total	4.65	100.00	1,197.52	100.00	100.00

Table 12: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, north slope community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Toxicodendron radicans</i>	48.00	120.00	6.90	5.32	6.11
<i>Vitis rotundifolia</i>	32.00	91.00	5.23	3.55	4.39
<i>Scleria oligantha</i>	37.00	62.00	3.57	4.10	3.83
<i>Chasmanthium sessiliflorum</i>	29.00	75.00	4.31	3.22	3.76
<i>Pinus echinata</i>	34.00	48.00	2.76	3.77	3.26
<i>Smilax bona-nox</i>	27.00	51.00	2.93	2.99	2.96
<i>Dichantherium dichotomum</i>	25.00	50.00	2.88	2.77	2.82
<i>Parthenocissus quinquefolia</i>	22.00	50.00	2.88	2.44	2.66
<i>Dichantherium laxiflorum</i>	19.00	50.00	2.88	2.11	2.49
<i>Acer rubrum</i>	25.00	30.00	1.73	2.77	2.25
<i>Ostrya virginiana</i>	17.00	30.00	1.73	1.88	1.80
<i>Helianthus hirsutus</i>	15.00	32.00	1.84	1.66	1.75
<i>Clitoria mariana</i>	16.00	27.00	1.55	1.77	1.66
<i>Dichantherium linearifolium</i>	14.00	30.00	1.73	1.55	1.64
<i>Quercus stellata</i>	12.00	33.00	1.90	1.33	1.61
<i>Monarda russeliana</i>	16.00	22.00	1.27	1.77	1.52
<i>Dichantherium boscii</i>	12.00	28.00	1.61	1.33	1.47
<i>Danthonia spicata</i>	12.00	26.00	1.50	1.33	1.41
<i>Schizachyrium scoparium</i>	10.00	29.00	1.67	1.11	1.39
<i>Solidago ulmifolia</i>	14.00	20.00	1.15	1.55	1.35
<i>Smilax glauca</i>	14.00	18.00	1.04	1.55	1.29
<i>Symphyotrichum anomalum</i>	13.00	19.00	1.09	1.44	1.27
<i>Lespedeza repens</i>	10.00	23.00	1.32	1.11	1.22
<i>Ulmus alata</i>	11.00	20.00	1.15	1.22	1.18
<i>Dichantherium commutatum</i>	10.00	20.00	1.15	1.11	1.13
<i>Rubus argutus</i>	9.00	21.00	1.21	1.00	1.10
<i>Lespedeza procumbens</i>	10.00	19.00	1.09	1.11	1.10
<i>Vaccinium pallidum</i>	10.00	19.00	1.09	1.11	1.10
<i>Dichantherium acuminatum</i>	12.00	15.00	0.86	1.33	1.10
<i>Chamaecrista fasciculata</i>	11.00	15.00	0.86	1.22	1.04
<i>Lactuca canadensis</i>	9.00	18.00	1.04	1.00	1.02
<i>Amphicarpaea bracteata</i>	9.00	17.00	0.98	1.00	0.99
<i>Carya texana</i>	7.00	20.00	1.15	0.78	0.96
<i>Galactia volubilis</i>	11.00	12.00	0.69	1.22	0.95
<i>Rubus</i> sp.	6.00	21.00	1.21	0.67	0.94
<i>Antennaria plantaginifolia</i>	8.00	17.00	0.98	0.89	0.93
<i>Smilax rotundifolia</i>	7.00	18.00	1.04	0.78	0.91
<i>Carya texana</i>	8.00	16.00	0.92	0.89	0.90
<i>Desmodium laevigatum</i>	7.00	16.00	0.92	0.78	0.85
<i>Desmodium obtusum</i>	5.00	16.00	0.92	0.55	0.74
<i>Viola sororia</i>	8.00	10.00	0.58	0.89	0.73
<i>Dichantherium</i> sp.	5.00	15.00	0.86	0.55	0.71
<i>Lespedeza cuneata</i>	4.00	16.00	0.92	0.44	0.68
<i>Rubus trivialis</i>	5.00	12.00	0.69	0.55	0.62
<i>Oxalis dillenii</i>	7.00	8.00	0.46	0.78	0.62

<i>Coreopsis palmata</i>	5.00	11.00	0.63	0.55	0.59
<i>Rubus flagellaris</i>	5.00	11.00	0.63	0.55	0.59
<i>Vaccinium arboreum</i>	5.00	11.00	0.63	0.55	0.59
<i>Erechtites hieraciifolius</i>	5.00	10.00	0.58	0.55	0.56
<i>Quercus alba</i>	5.00	10.00	0.58	0.55	0.56
<i>Quercus rubra</i>	5.00	9.00	0.52	0.55	0.54
<i>Scutellaria ovata</i>	6.00	7.00	0.40	0.67	0.53
<i>Nyssa sylvatica</i>	4.00	10.00	0.58	0.44	0.51
<i>Berchemia scandens</i>	5.00	8.00	0.46	0.55	0.51
<i>Symphotrichum patens</i>	5.00	7.00	0.40	0.55	0.48
<i>Viola palmata</i>	5.00	7.00	0.40	0.55	0.48
<i>Asplenium platyneuron</i>	5.00	6.00	0.35	0.55	0.45
<i>Ruellia pedunculata</i>	5.00	6.00	0.35	0.55	0.45
<i>Cornus florida</i>	3.00	9.00	0.52	0.33	0.43
<i>Kummerowia stipulacea</i>	4.00	7.00	0.40	0.44	0.42
<i>Elymus glabriflorus</i>	3.00	8.00	0.46	0.33	0.40
<i>Carya tomentosa</i>	3.00	7.00	0.40	0.33	0.37
<i>Pycnanthemum tenuifolium</i>	3.00	7.00	0.40	0.33	0.37
<i>Galium circaezans</i>	4.00	5.00	0.29	0.44	0.37
<i>Solidago delicatula</i>	4.00	5.00	0.29	0.44	0.37
<i>Carex latebracteata</i>	3.00	6.00	0.35	0.33	0.34
<i>Ruellia humilis</i>	3.00	6.00	0.35	0.33	0.34
<i>Sanicula canadensis</i>	3.00	6.00	0.35	0.33	0.34
<i>Stylosanthes biflora</i>	3.00	6.00	0.35	0.33	0.34
<i>Acalypha gracilens</i>	4.00	4.00	0.23	0.44	0.34
<i>Chamaecrista nictitans</i>	4.00	4.00	0.23	0.44	0.34
<i>Callicarpa americana</i>	3.00	5.00	0.29	0.33	0.31
<i>Liatris aspera</i>	3.00	5.00	0.29	0.33	0.31
<i>Piptochaetium avenaceum</i>	3.00	4.00	0.23	0.33	0.28
<i>Potentilla simplex</i>	3.00	4.00	0.23	0.33	0.28
<i>Viola sagittata</i>	3.00	4.00	0.23	0.33	0.28
<i>Kummerowia striata</i>	2.00	5.00	0.29	0.22	0.25
<i>Liquidambar styraciflua</i>	2.00	5.00	0.29	0.22	0.25
<i>Tradescantia ohiensis</i>	2.00	5.00	0.29	0.22	0.25
<i>Aristolochia serpentaria</i>	3.00	3.00	0.17	0.33	0.25
<i>Carya alba</i>	3.00	3.00	0.17	0.33	0.25
<i>Hieracium gronovii</i>	3.00	3.00	0.17	0.33	0.25
<i>Phlox pilosa</i>	3.00	3.00	0.17	0.33	0.25
<i>Pinus taeda</i>	3.00	3.00	0.17	0.33	0.25
<i>Prunus serotina</i>	3.00	3.00	0.17	0.33	0.25
<i>Croton willdenowii</i>	2.00	4.00	0.23	0.22	0.23
<i>Desmodium paniculatum</i>	2.00	4.00	0.23	0.22	0.23
<i>Dichanthelium malacophyllum</i>	2.00	4.00	0.23	0.22	0.23
<i>Lespedeza hirta</i>	2.00	4.00	0.23	0.22	0.23
<i>Physalis heterophylla</i>	2.00	4.00	0.23	0.22	0.23
<i>Rhus copallinum</i>	2.00	4.00	0.23	0.22	0.23
<i>Scleria muehlenbergii</i>	2.00	4.00	0.23	0.22	0.23
<i>Solidago petiolaris</i>	2.00	4.00	0.23	0.22	0.23
<i>Symphoricarpos orbiculatus</i>	2.00	4.00	0.23	0.22	0.23
<i>Carex sp.</i>	2.00	3.00	0.17	0.22	0.20

<i>Cunila origanoides</i>	2.00	3.00	0.17	0.22	0.20
<i>Desmodium</i> sp.	2.00	3.00	0.17	0.22	0.20
<i>Desmodium viridiflorum</i>	2.00	3.00	0.17	0.22	0.20
<i>Eupatorium serotinum</i>	2.00	3.00	0.17	0.22	0.20
<i>Prunus mexicana</i>	2.00	3.00	0.17	0.22	0.20
<i>Quercus marilandica</i>	2.00	3.00	0.17	0.22	0.20
<i>Scutellaria elliptica</i>	2.00	3.00	0.17	0.22	0.20
<i>Solidago rugosa</i>	2.00	3.00	0.17	0.22	0.20
<i>Symphytichum</i> sp.	2.00	3.00	0.17	0.22	0.20
<i>Diospyros virginiana</i>	1.00	4.00	0.23	0.11	0.17
<i>Croton glandulosus</i>	2.00	2.00	0.12	0.22	0.17
<i>Desmodium nudiflorum</i>	2.00	2.00	0.12	0.22	0.17
<i>Dioscorea villosa</i>	2.00	2.00	0.12	0.22	0.17
<i>Lespedeza virginica</i>	2.00	2.00	0.12	0.22	0.17
<i>Maianthemum racemosum</i>	2.00	2.00	0.12	0.22	0.17
<i>Viola</i> sp.	2.00	2.00	0.12	0.22	0.17
<i>Acer saccharum</i>	1.00	3.00	0.17	0.11	0.14
<i>Ceanothus americanus</i>	1.00	3.00	0.17	0.11	0.14
<i>Elymus virginicus</i>	1.00	3.00	0.17	0.11	0.14
<i>Pteridium aquilinum</i>	1.00	3.00	0.17	0.11	0.14
<i>Viburnum dentatum</i>	1.00	3.00	0.17	0.11	0.14
<i>Acalypha monococca</i>	1.00	2.00	0.12	0.11	0.11
<i>Baptisia sphaerocarpa</i>	1.00	2.00	0.12	0.11	0.11
<i>Bromus pubescens</i>	1.00	2.00	0.12	0.11	0.11
<i>Carex rosea</i>	1.00	2.00	0.12	0.11	0.11
<i>Conyza canadensis</i>	1.00	2.00	0.12	0.11	0.11
<i>Cynoglossum virginianum</i>	1.00	2.00	0.12	0.11	0.11
<i>Desmodium perplexum</i>	1.00	2.00	0.12	0.11	0.11
<i>Fraxinus americana</i>	1.00	2.00	0.12	0.11	0.11
<i>Galium pilosum</i>	1.00	2.00	0.12	0.11	0.11
<i>Hamamelis virginiana</i>	1.00	2.00	0.12	0.11	0.11
<i>Hypericum hypericoides</i>	1.00	2.00	0.12	0.11	0.11
<i>Lamium amplexicaule</i>	1.00	2.00	0.12	0.11	0.11
<i>Monarda fistulosa</i>	1.00	2.00	0.12	0.11	0.11
<i>Morus rubra</i>	1.00	2.00	0.12	0.11	0.11
<i>Quercus nigra</i>	1.00	2.00	0.12	0.11	0.11
<i>Quercus velutina</i>	1.00	2.00	0.12	0.11	0.11
<i>Rudbeckia hirta</i>	1.00	2.00	0.12	0.11	0.11
<i>Sanicula canadensis</i>	1.00	2.00	0.12	0.11	0.11
<i>Solidago altissima</i>	1.00	2.00	0.12	0.11	0.11
<i>Strophostyles umbellata</i>	1.00	2.00	0.12	0.11	0.11
<i>Vaccinium stamineum</i>	1.00	2.00	0.12	0.11	0.11
<i>Vernonia baldwinii</i>	1.00	2.00	0.12	0.11	0.11
<i>Vitis cinerea</i>	1.00	2.00	0.12	0.11	0.11
<i>Acalypha virginica</i>	1.00	1.00	0.06	0.11	0.08
<i>Aristolochia tomentosa</i>	1.00	1.00	0.06	0.11	0.08
<i>Bidens aristosa</i>	1.00	1.00	0.06	0.11	0.08
<i>Botrychium dissectum</i>	1.00	1.00	0.06	0.11	0.08
<i>Conyza canadensis</i>	1.00	1.00	0.06	0.11	0.08
<i>Carex complanata</i>	1.00	1.00	0.06	0.11	0.08

<i>Desmodium rotundifolium</i>	1.00	1.00	0.06	0.11	0.08
<i>Dichantheium polyanthes</i>	1.00	1.00	0.06	0.11	0.08
<i>Echinacea pallida</i>	1.00	1.00	0.06	0.11	0.08
<i>Houstonia longifolia</i>	1.00	1.00	0.06	0.11	0.08
<i>Lespedeza violacea</i>	1.00	1.00	0.06	0.11	0.08
<i>Liatris</i> sp.	1.00	1.00	0.06	0.11	0.08
<i>Matelea baldwyniana</i>	1.00	1.00	0.06	0.11	0.08
<i>Packera obovata</i>	1.00	1.00	0.06	0.11	0.08
<i>Pseudognaphalium obtusifolium</i>	1.00	1.00	0.06	0.11	0.08
<i>Rosa carolina</i>	1.00	1.00	0.06	0.11	0.08
<i>Salvia lyrata</i>	1.00	1.00	0.06	0.11	0.08
<i>Solidago nemoralis</i>	1.00	1.00	0.06	0.11	0.08
<i>Solidago odora</i>	1.00	1.00	0.06	0.11	0.08
<i>Trachelospermum difforme</i>	1.00	1.00	0.06	0.11	0.08
unknown forb 3	1.00	1.00	0.06	0.11	0.08
unknown forb 5	1.00	1.00	0.06	0.11	0.08
<i>Vitis aestivalis</i>	1.00	1.00	0.06	0.11	0.08
Total	902.00	1,739.00	100.00	100.00	100.00

Table 13: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8" + dbh), south slope community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	3.91	34.09	50.79	138.67	41.92	50.24	48.14	44.16
<i>Pinus taeda</i>	2.33	12.50	30.23	79.73	24.11	28.89	28.65	23.35
<i>Quercus stellata</i>	0.65	17.05	8.47	21.97	6.64	7.96	8.02	11.01
snag	0.51	15.91	6.65	15.59	4.71	5.65	6.30	9.29
<i>Quercus alba</i>	0.26	6.82	3.33	8.37	2.53	3.03	3.15	4.33
<i>Carya tomentosa</i>	0.16	3.41	2.12	4.10	1.24	1.49	2.01	2.30
<i>Quercus rubra</i>	0.14	2.27	1.81	3.72	1.12	1.35	1.72	1.78
<i>Juniperus virginiana</i>	0.05	2.27	0.60	0.94	0.28	0.34	0.57	1.06
<i>Nyssa sylvatica</i>	0.02	1.14	0.30	0.87	0.26	0.31	0.29	0.58
<i>Liquidambar styraciflua</i>	0.02	1.14	0.30	0.62	0.19	0.22	0.29	0.55
<i>Ulmus alata</i>	0.02	1.14	0.30	0.59	0.18	0.22	0.29	0.55
<i>Prunus serotina</i>	0.02	1.14	0.30	0.43	0.13	0.16	0.29	0.53
<i>Quercus marilandica</i>	0.02	1.14	0.30	0.43	0.13	0.16	0.29	0.53
Totals	8.12	100.00	105.51	276.02	83.45	100.00	100.00	100.00

Table 14: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), south slope community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	6.30	11.11	81.93	38.33	11.59	40.53	21.73	24.46
<i>Quercus stellata</i>	3.56	11.51	46.26	12.25	3.70	12.95	12.27	12.24
snag	3.70	13.10	48.07	8.73	2.64	9.23	12.75	11.69
<i>Carya tomentosa</i>	3.33	8.73	43.23	7.76	2.35	8.20	11.47	9.47
<i>Ulmus alata</i>	1.42	5.56	18.44	3.27	0.99	3.46	4.89	4.64
<i>Quercus alba</i>	1.02	5.16	13.30	3.16	0.96	3.34	3.53	4.01
<i>Prunus serotina</i>	1.05	5.16	13.60	2.62	0.79	2.77	3.61	3.85
<i>Ostrya virginiana</i>	1.67	3.17	21.77	1.37	0.41	1.45	5.77	3.47
<i>Pinus taeda</i>	0.67	1.59	8.77	5.31	1.61	5.61	2.33	3.18
<i>Quercus rubra</i>	0.70	2.78	9.07	2.28	0.69	2.41	2.41	2.53
<i>Cornus florida</i>	0.77	3.97	9.98	0.89	0.27	0.94	2.65	2.52
<i>Liquidambar styraciflua</i>	0.77	1.98	9.98	2.32	0.70	2.45	2.65	2.36
<i>Quercus marilandica</i>	0.51	3.97	6.65	0.88	0.27	0.93	1.76	2.22
<i>Quercus velutina</i>	0.40	3.17	5.14	0.81	0.25	0.86	1.36	1.80
<i>Juniperus virginiana</i>	0.30	2.78	3.93	1.04	0.31	1.10	1.04	1.64
<i>Carya texana</i>	0.56	2.38	7.26	0.29	0.09	0.30	1.92	1.54
<i>Vaccinium arboreum</i>	0.47	2.38	6.05	0.14	0.04	0.15	1.60	1.38
<i>Nyssa sylvatica</i>	0.30	2.38	3.93	0.64	0.19	0.67	1.04	1.37
<i>Acer rubrum</i>	0.49	1.59	6.35	0.23	0.07	0.24	1.68	1.17
<i>Viburnum rufidulum</i>	0.21	1.98	2.72	0.08	0.02	0.09	0.72	0.93
<i>Carya glabra</i>	0.14	0.79	1.81	0.85	0.26	0.89	0.48	0.72
<i>Quercus falcata</i>	0.09	0.79	1.21	0.35	0.11	0.37	0.32	0.49
<i>Prunus mexicana</i>	0.14	0.40	1.81	0.45	0.14	0.47	0.48	0.45
<i>Fraxinus americana</i>	0.05	0.79	0.60	0.04	0.01	0.04	0.16	0.33
<i>Carpinus caroliniana</i>	0.14	0.40	1.81	0.08	0.02	0.08	0.48	0.32
<i>Ulmus americana</i>	0.02	0.40	0.30	0.32	0.10	0.34	0.08	0.27
<i>Acer saccharum</i>	0.09	0.40	1.21	0.05	0.01	0.05	0.32	0.26
<i>Amelanchier arborea</i>	0.07	0.40	0.91	0.02	0.01	0.02	0.24	0.22
<i>Morus rubra</i>	0.02	0.40	0.30	0.01	0.00	0.01	0.08	0.16
<i>Prunus sp.</i>	0.02	0.40	0.30	0.01	0.00	0.01	0.08	0.16
<i>Chionanthus virginicus</i>	0.02	0.40	0.30	0.01	0.00	0.01	0.08	0.16

Totals	29.00	100.00	377.00	94.57	28.59	100.00	100.00	100.00
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Table 15: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, south slope community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Carya texana</i>	0.35	7.14	124.82	10.63	8.89
<i>Acer rubrum</i>	0.23	4.76	152.56	12.99	8.88
<i>Carya tomentosa</i>	0.40	8.10	97.08	8.27	8.18
<i>Quercus stellata</i>	0.37	7.62	84.37	7.19	7.40
<i>Ulmus alata</i>	0.30	6.19	76.28	6.50	6.34
<i>Quercus rubra</i>	0.28	5.71	57.79	4.92	5.32
<i>Prunus serotina</i>	0.26	5.24	45.07	3.84	4.54
<i>Quercus velutina</i>	0.23	4.76	47.38	4.04	4.40
<i>Rhus copallinum</i>	0.12	2.38	61.25	5.22	3.80
<i>Quercus marilandica</i>	0.26	5.24	25.43	2.17	3.70
<i>Vaccinium arboreum</i>	0.21	4.29	35.83	3.05	3.67
<i>Callicarpa americana</i>	0.12	2.38	57.79	4.92	3.65
<i>Liquidambar styraciflua</i>	0.14	2.86	27.74	2.36	2.61
<i>Nyssa sylvatica</i>	0.07	1.43	38.14	3.25	2.34
<i>Ostrya virginiana</i>	0.14	2.86	20.80	1.77	2.31
<i>Pinus echinata</i>	0.07	1.43	27.74	2.36	1.90
<i>Cornus florida</i>	0.12	2.38	9.25	0.79	1.58
<i>Quercus alba</i>	0.09	1.90	13.87	1.18	1.54
<i>Vitis rotundifolia</i>	0.07	1.43	18.49	1.57	1.50
<i>Rhus glabra</i>	0.07	1.43	17.34	1.48	1.45
<i>Quercus nigra</i>	0.07	1.43	15.02	1.28	1.35
<i>Carya glabra</i>	0.07	1.43	11.56	0.98	1.21
<i>Quercus falcata</i>	0.07	1.43	5.78	0.49	0.96
<i>Smilax bona-nox</i>	0.05	0.95	10.40	0.89	0.92
<i>Rubus argutus</i>	0.05	0.95	9.25	0.79	0.87
<i>Fraxinus americana</i>	0.07	1.43	3.47	0.30	0.86
<i>Vitis aestivalis</i>	0.05	0.95	8.09	0.69	0.82
<i>Amelanchier arborea</i>	0.05	0.95	6.93	0.59	0.77
<i>Prunus sp.</i>	0.05	0.95	6.93	0.59	0.77
<i>Acer saccharum</i>	0.02	0.48	11.56	0.98	0.73
<i>Juniperus virginiana</i>	0.05	0.95	5.78	0.49	0.72
<i>Smilax rotundifolia</i>	0.05	0.95	5.78	0.49	0.72
<i>Carpinus caroliniana</i>	0.02	0.48	10.40	0.89	0.68
<i>Frangula caroliniana</i>	0.05	0.95	4.62	0.39	0.67
<i>Prunus americana</i>	0.05	0.95	3.47	0.30	0.62
<i>Aralia spinosa</i>	0.02	0.48	2.31	0.20	0.34
<i>Symphoricarpos orbiculatus</i>	0.02	0.48	2.31	0.20	0.34
<i>Viburnum rufidulum</i>	0.02	0.48	2.31	0.20	0.34
<i>Ampelopsis arborea</i>	0.02	0.48	1.16	0.10	0.29
<i>Diospyros virginiana</i>	0.02	0.48	1.16	0.10	0.29
<i>Hamamelis virginiana</i>	0.02	0.48	1.16	0.10	0.29
<i>Prunus mexicana</i>	0.02	0.48	1.16	0.10	0.29
<i>Rhus aromatica</i>	0.02	0.48	1.16	0.10	0.29
<i>Sassafras albidum</i>	0.02	0.48	1.16	0.10	0.29
<i>Vaccinium stamineum</i>	0.02	0.48	1.16	0.10	0.29

<i>Viburnum dentatum</i>	0.02	0.48	1.16	0.10	0.29
Total	4.88	100.00	1,174.22	100.00	100.00

Table 16: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, south slope community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Pinus echinata</i>	64.00	100.00	4.13	5.08	4.60
<i>Vitis rotundifolia</i>	32.00	100.00	4.13	2.54	3.33
<i>Scleria oligantha</i>	43.00	69.00	2.85	3.41	3.13
<i>Schizachyrium scoparium</i>	33.00	82.00	3.39	2.62	3.00
<i>Parthenocissus quinquefolia</i>	31.00	79.00	3.26	2.46	2.86
<i>Toxicodendron radicans</i>	34.00	70.00	2.89	2.70	2.79
<i>Dichantherium dichotomum</i>	36.00	65.00	2.69	2.85	2.77
<i>Chasmanthium sessiliflorum</i>	26.00	77.00	3.18	2.06	2.62
<i>Clitoria mariana</i>	35.00	58.00	2.40	2.78	2.59
<i>Dichantherium laxiflorum</i>	30.00	66.00	2.73	2.38	2.55
<i>Smilax bona-nox</i>	32.00	57.00	2.36	2.54	2.45
<i>Vaccinium pallidum</i>	26.00	64.00	2.64	2.06	2.35
<i>Helianthus hirsutus</i>	28.00	60.00	2.48	2.22	2.35
<i>Galactia volubilis</i>	32.00	48.00	1.98	2.54	2.26
<i>Vaccinium arboreum</i>	24.00	54.00	2.23	1.90	2.07
<i>Dichantherium commutatum</i>	27.00	44.00	1.82	2.14	1.98
<i>Dichantherium linearifolium</i>	24.00	44.00	1.82	1.90	1.86
<i>Lespedeza procumbens</i>	21.00	38.00	1.57	1.67	1.62
<i>Dichantherium acuminatum</i>	19.00	33.00	1.36	1.51	1.44
<i>Antennaria plantaginifolia</i>	17.00	34.00	1.40	1.35	1.38
<i>Danthonia spicata</i>	16.00	34.00	1.40	1.27	1.34
<i>Rubus argutus</i>	13.00	37.00	1.53	1.03	1.28
<i>Quercus stellata</i>	15.00	33.00	1.36	1.19	1.28
<i>Lespedeza repens</i>	17.00	29.00	1.20	1.35	1.27
<i>Ulmus alata</i>	14.00	34.00	1.40	1.11	1.26
<i>Rubus flagellaris</i>	13.00	29.00	1.20	1.03	1.11
<i>Rudbeckia hirta</i>	11.00	28.00	1.16	0.87	1.01
<i>Carya texana</i>	11.00	27.00	1.12	0.87	0.99
<i>Carya tomentosa</i>	9.00	28.00	1.16	0.71	0.94
<i>Prunus serotina</i>	13.00	20.00	0.83	1.03	0.93
<i>Acer rubrum</i>	14.00	18.00	0.74	1.11	0.93
<i>Pteridium aquilinum</i>	7.00	30.00	1.24	0.56	0.90
<i>Stylosanthes biflora</i>	13.00	17.00	0.70	1.03	0.87
<i>Rhus copallinum</i>	9.00	22.00	0.91	0.71	0.81
<i>Monarda russeliana</i>	12.00	16.00	0.66	0.95	0.81
<i>Solidago ulmifolia</i>	12.00	16.00	0.66	0.95	0.81
<i>Symphyotrichum patens</i>	11.00	16.00	0.66	0.87	0.77
<i>Andropogon gerardii</i>	8.00	21.00	0.87	0.63	0.75
<i>Quercus marilandica</i>	8.00	21.00	0.87	0.63	0.75
<i>Dichantherium boscii</i>	9.00	19.00	0.79	0.71	0.75
<i>Rubus</i> sp.	8.00	20.00	0.83	0.63	0.73
<i>Quercus alba</i>	10.00	14.00	0.58	0.79	0.69
<i>Kummerowia striata</i>	8.00	17.00	0.70	0.63	0.67
<i>Vitis aestivalis</i>	8.00	17.00	0.70	0.63	0.67
<i>Solidago nemoralis</i>	9.00	15.00	0.62	0.71	0.67

<i>Carex</i> sp.	8.00	14.00	0.58	0.63	0.61
<i>Lespedeza virginica</i>	8.00	13.00	0.54	0.63	0.59
<i>Desmodium obtusum</i>	7.00	14.00	0.58	0.56	0.57
<i>Ostrya virginiana</i>	7.00	14.00	0.58	0.56	0.57
<i>Chamaecrista fasciculata</i>	8.00	12.00	0.50	0.63	0.57
<i>Symphotrichum anomalum</i>	8.00	12.00	0.50	0.63	0.57
<i>Coreopsis grandiflora</i>	7.00	13.00	0.54	0.56	0.55
<i>Liatris aspera</i>	7.00	12.00	0.50	0.56	0.53
<i>Nyssa sylvatica</i>	7.00	12.00	0.50	0.56	0.53
<i>Carex latebracteata</i>	6.00	13.00	0.54	0.48	0.51
<i>Smilax glauca</i>	7.00	11.00	0.45	0.56	0.50
<i>Ceanothus americanus</i>	5.00	14.00	0.58	0.40	0.49
<i>Carex rosea</i>	6.00	12.00	0.50	0.48	0.49
<i>Desmodium laevigatum</i>	6.00	12.00	0.50	0.48	0.49
<i>Quercus rubra</i>	6.00	12.00	0.50	0.48	0.49
<i>Scutellaria elliptica</i>	6.00	11.00	0.45	0.48	0.47
<i>Solidago odora</i>	7.00	9.00	0.37	0.56	0.46
<i>Phlox pilosa</i>	7.00	8.00	0.33	0.56	0.44
<i>Lactuca canadensis</i>	6.00	9.00	0.37	0.48	0.42
<i>Solidago petiolaris</i>	6.00	8.00	0.33	0.48	0.40
<i>Kummerowia stipulacea</i>	5.00	9.00	0.37	0.40	0.38
<i>Erechtites hieraciifolius</i>	6.00	7.00	0.29	0.48	0.38
<i>Viola sororia</i>	6.00	7.00	0.29	0.48	0.38
<i>Desmodium viridiflorum</i>	4.00	10.00	0.41	0.32	0.37
<i>Smilax rotundifolia</i>	4.00	10.00	0.41	0.32	0.37
<i>Hypericum hypericoides</i>	6.00	6.00	0.25	0.48	0.36
<i>Ruellia strepens</i>	6.00	6.00	0.25	0.48	0.36
<i>Echinacea pallida</i>	4.00	9.00	0.37	0.32	0.34
<i>Lespedeza violacea</i>	4.00	9.00	0.37	0.32	0.34
<i>Sanicula canadensis</i>	5.00	7.00	0.29	0.40	0.34
<i>Conyza canadensis</i>	4.00	8.00	0.33	0.32	0.32
<i>Carex glaucoidea</i>	4.00	8.00	0.33	0.32	0.32
<i>Carya alba</i>	4.00	7.00	0.29	0.32	0.30
<i>Lespedeza hirta</i>	4.00	7.00	0.29	0.32	0.30
<i>Acalypha gracilens</i>	5.00	5.00	0.21	0.40	0.30
<i>Callicarpa americana</i>	3.00	8.00	0.33	0.24	0.28
<i>Rhynchosia latifolia</i>	3.00	8.00	0.33	0.24	0.28
<i>Cornus florida</i>	4.00	6.00	0.25	0.32	0.28
<i>Euphorbia corollata</i>	4.00	5.00	0.21	0.32	0.26
<i>Galium circaezans</i>	4.00	5.00	0.21	0.32	0.26
<i>Hieracium gronovii</i>	4.00	5.00	0.21	0.32	0.26
<i>Viola pedata</i>	4.00	5.00	0.21	0.32	0.26
<i>Carex complanata</i>	3.00	6.00	0.25	0.24	0.24
<i>Quercus velutina</i>	3.00	6.00	0.25	0.24	0.24
<i>Liatris</i> sp.	4.00	4.00	0.17	0.32	0.24
<i>Oxalis dillenii</i>	4.00	4.00	0.17	0.32	0.24
<i>Pinus taeda</i>	4.00	4.00	0.17	0.32	0.24
<i>Vaccinium stamineum</i>	2.00	7.00	0.29	0.16	0.22
<i>Pityopsis graminifolia</i>	3.00	5.00	0.21	0.24	0.22
<i>Symphotrichum lanceolatum</i>	3.00	5.00	0.21	0.24	0.22

<i>Vicia caroliniana</i>	3.00	4.00	0.17	0.24	0.20
<i>Rudbeckia grandiflora</i>	2.00	5.00	0.21	0.16	0.18
<i>Symphoricarpos orbiculatus</i>	2.00	5.00	0.21	0.16	0.18
<i>Chamaecrista nictitans</i>	3.00	3.00	0.12	0.24	0.18
<i>Scutellaria ovata</i>	3.00	3.00	0.12	0.24	0.18
<i>Viola sagittata</i>	3.00	3.00	0.12	0.24	0.18
<i>Carex blanda</i>	2.00	4.00	0.17	0.16	0.16
<i>Carya texana</i>	2.00	4.00	0.17	0.16	0.16
<i>Dichanthelium malacophyllum</i>	2.00	4.00	0.17	0.16	0.16
<i>Liatris pycnostachya</i>	2.00	4.00	0.17	0.16	0.16
<i>Ruellia pedunculata</i>	2.00	4.00	0.17	0.16	0.16
<i>Symphyotrichum</i> sp.	2.00	4.00	0.17	0.16	0.16
<i>Crataegus uniflora</i>	2.00	3.00	0.12	0.16	0.14
<i>Dichanthelium aciculare</i>	2.00	3.00	0.12	0.16	0.14
<i>Galium obtusum</i>	2.00	3.00	0.12	0.16	0.14
<i>Matelea baldwyniana</i>	2.00	3.00	0.12	0.16	0.14
<i>Prunus mexicana</i>	2.00	3.00	0.12	0.16	0.14
<i>Pseudognaphalium obtusifolium</i>	2.00	3.00	0.12	0.16	0.14
<i>Solidago hispida</i>	2.00	3.00	0.12	0.16	0.14
<i>Viola palmata</i>	2.00	3.00	0.12	0.16	0.14
<i>Acalypha monococca</i>	2.00	2.00	0.08	0.16	0.12
<i>Asplenium platyneuron</i>	2.00	2.00	0.08	0.16	0.12
<i>Chasmanthium latifolium</i>	2.00	2.00	0.08	0.16	0.12
<i>Croton willdenowii</i>	2.00	2.00	0.08	0.16	0.12
<i>Berchemia scandens</i>	1.00	3.00	0.12	0.08	0.10
<i>Piptochaetium avenaceum</i>	1.00	3.00	0.12	0.08	0.10
<i>Sporobolus clandestinus</i>	1.00	3.00	0.12	0.08	0.10
<i>Symphyotrichum dumosum</i>	1.00	3.00	0.12	0.08	0.10
<i>Amphicarpaea bracteata</i>	1.00	2.00	0.08	0.08	0.08
<i>Aristolochia reticulata</i>	1.00	2.00	0.08	0.08	0.08
<i>Carex muehlenbergii</i>	1.00	2.00	0.08	0.08	0.08
<i>Coreopsis tinctoria</i>	1.00	2.00	0.08	0.08	0.08
<i>Cynoglossum virginianum</i>	1.00	2.00	0.08	0.08	0.08
<i>Desmodium glabellum</i>	1.00	2.00	0.08	0.08	0.08
<i>Dichanthelium polyanthes</i>	1.00	2.00	0.08	0.08	0.08
<i>Dichanthelium scoparium</i>	1.00	2.00	0.08	0.08	0.08
<i>Fraxinus americana</i>	1.00	2.00	0.08	0.08	0.08
<i>Galium texense</i>	1.00	2.00	0.08	0.08	0.08
<i>Hamamelis virginiana</i>	1.00	2.00	0.08	0.08	0.08
<i>Hypericum gentianoides</i>	1.00	2.00	0.08	0.08	0.08
<i>Lathyrus venosus</i>	1.00	2.00	0.08	0.08	0.08
<i>Liquidambar styraciflua</i>	1.00	2.00	0.08	0.08	0.08
<i>Maianthemum racemosum</i>	1.00	2.00	0.08	0.08	0.08
<i>Mimulus alatus</i>	1.00	2.00	0.08	0.08	0.08
<i>Physalis virginiana</i>	1.00	2.00	0.08	0.08	0.08
<i>Sorghum halepense</i>	1.00	2.00	0.08	0.08	0.08
<i>Tephrosia virginiana</i>	1.00	2.00	0.08	0.08	0.08
<i>Tridens flavus</i>	1.00	2.00	0.08	0.08	0.08
<i>Viburnum rufidulum</i>	1.00	2.00	0.08	0.08	0.08
<i>Aristolochia serpentaria</i>	1.00	1.00	0.04	0.08	0.06

<i>Baptisia sphaerocarpa</i>	1.00	1.00	0.04	0.08	0.06
<i>Celtis tenuifolia</i>	1.00	1.00	0.04	0.08	0.06
<i>Circaea canadensis</i>	1.00	1.00	0.04	0.08	0.06
<i>Cirsium carolinianum</i>	1.00	1.00	0.04	0.08	0.06
<i>Conyza canadensis</i>	1.00	1.00	0.04	0.08	0.06
<i>Croton monanthogynus</i>	1.00	1.00	0.04	0.08	0.06
<i>Dalea candida</i>	1.00	1.00	0.04	0.08	0.06
<i>Desmodium sp.</i>	1.00	1.00	0.04	0.08	0.06
<i>Desmodium perplexum</i>	1.00	1.00	0.04	0.08	0.06
<i>Dioscorea villosa</i>	1.00	1.00	0.04	0.08	0.06
<i>Elymus glabriflorus</i>	1.00	1.00	0.04	0.08	0.06
<i>Eupatorium serotinum</i>	1.00	1.00	0.04	0.08	0.06
<i>Eupatorium serotinum</i>	1.00	1.00	0.04	0.08	0.06
<i>Frangula caroliniana</i>	1.00	1.00	0.04	0.08	0.06
<i>Heliotropium tenellum</i>	1.00	1.00	0.04	0.08	0.06
<i>Houstonia longifolia</i>	1.00	1.00	0.04	0.08	0.06
<i>Ilex decidua</i>	1.00	1.00	0.04	0.08	0.06
<i>Lactuca floridana</i>	1.00	1.00	0.04	0.08	0.06
<i>Lechea tenuifolia</i>	1.00	1.00	0.04	0.08	0.06
<i>Lespedeza cuneata</i>	1.00	1.00	0.04	0.08	0.06
<i>Passiflora lutea</i>	1.00	1.00	0.04	0.08	0.06
<i>Penstemon sp.</i>	1.00	1.00	0.04	0.08	0.06
<i>Physalis heterophylla</i>	1.00	1.00	0.04	0.08	0.06
<i>Polygala verticillata</i>	1.00	1.00	0.04	0.08	0.06
<i>Quercus sp.</i>	1.00	1.00	0.04	0.08	0.06
<i>Rhus aromatica</i>	1.00	1.00	0.04	0.08	0.06
<i>Rosa carolina</i>	1.00	1.00	0.04	0.08	0.06
<i>Scutellaria parvula</i>	1.00	1.00	0.04	0.08	0.06
<i>Solidago flexicaulis</i>	1.00	1.00	0.04	0.08	0.06
<i>Triodanis perfoliata</i>	1.00	1.00	0.04	0.08	0.06
unknown forb 2	1.00	1.00	0.04	0.08	0.06
unknown forb 7	1.00	1.00	0.04	0.08	0.06
<i>Vicia sativa</i>	1.00	1.00	0.04	0.08	0.06
Total	1,261.00	2,420.00	100.00	100.00	100.00

Table 17: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8" + dbh), riparian community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	4.00	50.00	52.00	30.48	56.61	79.87	73.68	67.85
<i>Quercus stellata</i>	0.43	14.29	5.57	3.05	5.66	7.99	7.89	10.06
snag	0.29	14.29	3.71	1.41	2.62	3.69	5.26	7.75
<i>Carya tomentosa</i>	0.43	7.14	5.57	1.94	3.61	5.09	7.89	6.71
<i>Quercus nigra</i>	0.14	7.14	1.86	0.66	1.23	1.74	2.63	3.84
<i>Quercus velutina</i>	0.14	7.14	1.86	0.62	1.14	1.61	2.63	3.80
Totals	5.43	100.00	70.57	38.16	70.88	100.00	100.00	100.00

Table 18: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), riparian community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Quercus stellata</i>	5.71	7.50	74.29	3.26	6.06	28.76	15.94	17.40
<i>Ostrya virginiana</i>	9.43	5.00	122.57	0.80	1.48	7.03	26.29	12.77
snag	5.14	7.50	66.86	1.01	1.87	8.85	14.34	10.23
<i>Carya tomentosa</i>	1.86	7.50	24.14	1.16	2.16	10.25	5.18	7.64
<i>Pinus echinata</i>	1.71	7.50	22.29	0.56	1.04	4.91	4.78	5.73
<i>Ulmus alata</i>	2.00	5.00	26.00	0.65	1.21	5.72	5.58	5.43
<i>Quercus alba</i>	0.86	5.00	11.14	0.91	1.69	8.01	2.39	5.13
<i>Acer rubrum</i>	0.71	5.00	9.29	0.64	1.19	5.65	1.99	4.22
<i>Quercus nigra</i>	0.71	2.50	9.29	0.75	1.40	6.64	1.99	3.71
<i>Carya texana</i>	1.71	5.00	22.29	0.10	0.19	0.90	4.78	3.56
<i>Quercus velutina</i>	0.57	2.50	7.43	0.52	0.96	4.57	1.59	2.89
<i>Cornus florida</i>	1.71	2.50	22.29	0.15	0.28	1.32	4.78	2.87
<i>Liquidambar styraciflua</i>	0.43	5.00	5.57	0.09	0.16	0.78	1.20	2.32
<i>Juniperus virginiana</i>	0.43	5.00	5.57	0.05	0.09	0.44	1.20	2.21
<i>Quercus falcata</i>	0.29	2.50	3.71	0.31	0.58	2.77	0.80	2.02
<i>Fraxinus americana</i>	0.29	2.50	3.71	0.18	0.33	1.58	0.80	1.63
<i>Amelanchier arborea</i>	0.57	2.50	7.43	0.02	0.04	0.20	1.59	1.43
<i>Prunus serotina</i>	0.43	2.50	5.57	0.07	0.12	0.58	1.20	1.43
<i>Acer saccharum</i>	0.43	2.50	5.57	0.02	0.04	0.18	1.20	1.29
<i>Frangula caroliniana</i>	0.14	2.50	1.86	0.04	0.08	0.36	0.40	1.09
<i>Morus rubra</i>	0.14	2.50	1.86	0.03	0.06	0.27	0.40	1.06
<i>Ilex decidua</i>	0.14	2.50	1.86	0.01	0.01	0.07	0.40	0.99
<i>Quercus marilandica</i>	0.14	2.50	1.86	0.01	0.01	0.07	0.40	0.99
<i>Fraxinus pennsylvanica</i>	0.14	2.50	1.86	0.01	0.01	0.05	0.40	0.98
<i>Nyssa sylvatica</i>	0.14	2.50	1.86	0.01	0.01	0.05	0.40	0.98
Totals	35.86	100.00	466.14	11.35	21.08	100.00	100.00	100.00

Table 19: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, riparian community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Acer rubrum</i>	0.29	3.92	347.88	16.23	10.07
<i>Carya texana</i>	0.43	5.88	255.58	11.92	8.90
<i>Rhus copallinum</i>	0.14	1.96	319.48	14.90	8.43
<i>Ostrya virginiana</i>	0.43	5.88	156.19	7.28	6.58
<i>Liquidambar styraciflua</i>	0.29	3.92	191.69	8.94	6.43
<i>Quercus stellata</i>	0.43	5.88	141.99	6.62	6.25
<i>Ulmus alata</i>	0.57	7.84	35.50	1.66	4.75
<i>Fraxinus americana</i>	0.43	5.88	63.90	2.98	4.43
<i>Quercus rubra</i>	0.43	5.88	35.50	1.66	3.77
<i>Carya tomentosa</i>	0.29	3.92	70.99	3.31	3.62
<i>Callicarpa americana</i>	0.29	3.92	49.70	2.32	3.12
<i>Cornus florida</i>	0.29	3.92	35.50	1.66	2.79
<i>Prunus sp.</i>	0.29	3.92	35.50	1.66	2.79
<i>Smilax bona-nox</i>	0.14	1.96	70.99	3.31	2.64
<i>Vitis rotundifolia</i>	0.14	1.96	70.99	3.31	2.64
<i>Acer saccharum</i>	0.14	1.96	56.80	2.65	2.30
<i>Quercus velutina</i>	0.14	1.96	42.60	1.99	1.97
<i>Rhus glabra</i>	0.14	1.96	28.40	1.32	1.64
<i>Cercis canadensis</i>	0.14	1.96	21.30	0.99	1.48
<i>Carpinus caroliniana</i>	0.14	1.96	14.20	0.66	1.31
<i>Pinus echinata</i>	0.14	1.96	14.20	0.66	1.31
<i>Quercus alba</i>	0.14	1.96	14.20	0.66	1.31
<i>Chionanthus virginicus</i>	0.14	1.96	7.10	0.33	1.15
<i>Juniperus virginiana</i>	0.14	1.96	7.10	0.33	1.15
<i>Morus rubra</i>	0.14	1.96	7.10	0.33	1.15
<i>Nyssa sylvatica</i>	0.14	1.96	7.10	0.33	1.15
<i>Prunus serotina</i>	0.14	1.96	7.10	0.33	1.15
<i>Rhus aromatica</i>	0.14	1.96	7.10	0.33	1.15
<i>Rubus argutus</i>	0.14	1.96	7.10	0.33	1.15
<i>Smilax rotundifolia</i>	0.14	1.96	7.10	0.33	1.15
<i>Ulmus americana</i>	0.14	1.96	7.10	0.33	1.15
<i>Vaccinium sp.</i>	0.14	1.96	7.10	0.33	1.15
Total	7.29	100.00	2,144.05	100.00	100.00

Table 20: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, riparian community, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Smilax bona-nox</i>	14.00	35.00	7.80	5.76	6.78
<i>Toxicodendron radicans</i>	13.00	28.00	6.24	5.35	5.79
<i>Pinus echinata</i>	15.00	18.00	4.01	6.17	5.09
<i>Chasmanthium laxum</i>	8.00	22.00	4.90	3.29	4.10
<i>Scleria oligantha</i>	10.00	18.00	4.01	4.12	4.06
<i>Chasmanthium sessiliflorum</i>	7.00	23.00	5.12	2.88	4.00
<i>Dichantherium laxiflorum</i>	8.00	16.00	3.56	3.29	3.43
<i>Monarda russeliana</i>	8.00	16.00	3.56	3.29	3.43
<i>Helianthus hirsutus</i>	7.00	15.00	3.34	2.88	3.11
<i>Clitoria mariana</i>	8.00	11.00	2.45	3.29	2.87
<i>Galactia volubilis</i>	8.00	10.00	2.23	3.29	2.76
<i>Schizachyrium scoparium</i>	4.00	16.00	3.56	1.65	2.60
<i>Quercus stellata</i>	5.00	14.00	3.12	2.06	2.59
<i>Dichantherium dichotomum</i>	6.00	10.00	2.23	2.47	2.35
<i>Dichantherium commutatum</i>	6.00	9.00	2.00	2.47	2.24
<i>Vitis rotundifolia</i>	4.00	10.00	2.23	1.65	1.94
<i>Dichantherium boscii</i>	4.00	7.00	1.56	1.65	1.60
<i>Rubus flagellaris</i>	4.00	7.00	1.56	1.65	1.60
<i>Symphyotrichum patens</i>	4.00	6.00	1.34	1.65	1.49
<i>Coreopsis palmata</i>	3.00	6.00	1.34	1.23	1.29
<i>Parthenocissus quinquefolia</i>	3.00	6.00	1.34	1.23	1.29
<i>Rubus</i> sp.	3.00	6.00	1.34	1.23	1.29
<i>Desmodium laevigatum</i>	4.00	4.00	0.89	1.65	1.27
<i>Oxalis dillenii</i>	4.00	4.00	0.89	1.65	1.27
<i>Dichantherium acuminatum</i>	3.00	5.00	1.11	1.23	1.17
<i>Fraxinus americana</i>	2.00	6.00	1.34	0.82	1.08
<i>Lespedeza procumbens</i>	3.00	4.00	0.89	1.23	1.06
<i>Ulmus alata</i>	3.00	4.00	0.89	1.23	1.06
<i>Chamaecrista fasciculata</i>	3.00	3.00	0.67	1.23	0.95
<i>Ostrya virginiana</i>	3.00	3.00	0.67	1.23	0.95
<i>Carex complanata</i>	2.00	4.00	0.89	0.82	0.86
<i>Coreopsis grandiflora</i>	2.00	3.00	0.67	0.82	0.75
<i>Packera obovata</i>	2.00	3.00	0.67	0.82	0.75
<i>Ruellia pedunculata</i>	2.00	3.00	0.67	0.82	0.75
<i>Salvia lyrata</i>	2.00	3.00	0.67	0.82	0.75
<i>Sanicula canadensis</i>	2.00	3.00	0.67	0.82	0.75
<i>Crataegus marshallii</i>	2.00	2.00	0.45	0.82	0.63
<i>Lespedeza repens</i>	2.00	2.00	0.45	0.82	0.63
<i>Nyssa sylvatica</i>	2.00	2.00	0.45	0.82	0.63
<i>Rubus argutus</i>	2.00	2.00	0.45	0.82	0.63
<i>Solidago ulmifolia</i>	2.00	2.00	0.45	0.82	0.63
<i>Symphyotrichum anomalum</i>	2.00	2.00	0.45	0.82	0.63
<i>Viola palmata</i>	2.00	2.00	0.45	0.82	0.63
<i>Acer rubrum</i>	1.00	3.00	0.67	0.41	0.54
<i>Albizia julibrissin</i>	1.00	3.00	0.67	0.41	0.54

<i>Carya texana</i>	1.00	3.00	0.67	0.41	0.54
<i>Carya texana</i>	1.00	3.00	0.67	0.41	0.54
<i>Delphinium carolinianum</i>	1.00	3.00	0.67	0.41	0.54
<i>Rhus aromatica</i>	1.00	3.00	0.67	0.41	0.54
<i>Rhus copallinum</i>	1.00	3.00	0.67	0.41	0.54
<i>Smilax glauca</i>	1.00	3.00	0.67	0.41	0.54
<i>Smilax rotundifolia</i>	1.00	3.00	0.67	0.41	0.54
<i>Verbesina alternifolia</i>	1.00	3.00	0.67	0.41	0.54
<i>Berchemia scandens</i>	1.00	2.00	0.45	0.41	0.43
<i>Carex blanda</i>	1.00	2.00	0.45	0.41	0.43
<i>Ceanothus americanus</i>	1.00	2.00	0.45	0.41	0.43
<i>Conyza canadensis</i>	1.00	2.00	0.45	0.41	0.43
<i>Dichanthelium linearifolium</i>	1.00	2.00	0.45	0.41	0.43
<i>Dichanthelium polyanthes</i>	1.00	2.00	0.45	0.41	0.43
<i>Elephantopus carolinianus</i>	1.00	2.00	0.45	0.41	0.43
<i>Lespedeza stuevei</i>	1.00	2.00	0.45	0.41	0.43
<i>Liquidambar styraciflua</i>	1.00	2.00	0.45	0.41	0.43
<i>Rosa carolina</i>	1.00	2.00	0.45	0.41	0.43
<i>Solidago petiolaris</i>	1.00	2.00	0.45	0.41	0.43
<i>Vaccinium arboreum</i>	1.00	2.00	0.45	0.41	0.43
<i>Vaccinium pallidum</i>	1.00	2.00	0.45	0.41	0.43
<i>Verbena stricta</i>	1.00	2.00	0.45	0.41	0.43
<i>Acalypha virginica</i>	1.00	1.00	0.22	0.41	0.32
<i>Acer saccharum</i>	1.00	1.00	0.22	0.41	0.32
<i>Carya tomentosa</i>	1.00	1.00	0.22	0.41	0.32
<i>Carex sp.</i>	1.00	1.00	0.22	0.41	0.32
<i>Desmodium viridiflorum</i>	1.00	1.00	0.22	0.41	0.32
<i>Dryopteris marginalis</i>	1.00	1.00	0.22	0.41	0.32
<i>Galium circaezans</i>	1.00	1.00	0.22	0.41	0.32
<i>Lactuca floridana</i>	1.00	1.00	0.22	0.41	0.32
<i>Lonicera japonica</i>	1.00	1.00	0.22	0.41	0.32
<i>Lonicera sempervirens</i>	1.00	1.00	0.22	0.41	0.32
<i>Quercus nigra</i>	1.00	1.00	0.22	0.41	0.32
<i>Ruellia strepens</i>	1.00	1.00	0.22	0.41	0.32
<i>Scutellaria ovata</i>	1.00	1.00	0.22	0.41	0.32
<i>Smilax sp.</i>	1.00	1.00	0.22	0.41	0.32
<i>Stylosanthes biflora</i>	1.00	1.00	0.22	0.41	0.32
<i>Verbesina helianthoides</i>	1.00	1.00	0.22	0.41	0.32
Total	243.00	449.00	100.00	100.00	100.00

Table 21: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8" + dbh), *non-riparian community*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	3.62	31.46	47.11	271.14	37.90	43.45	42.82	39.25
<i>Pinus taeda</i>	3.18	18.54	41.38	247.54	34.60	39.67	37.61	31.94
snag	0.57	15.73	7.41	35.30	4.93	5.66	6.73	9.37
<i>Quercus stellata</i>	0.42	12.36	5.45	29.69	4.15	4.76	4.96	7.36
<i>Quercus alba</i>	0.22	5.06	2.80	16.35	2.29	2.62	2.54	3.41
<i>Carya tomentosa</i>	0.14	3.93	1.82	6.99	0.98	1.12	1.65	2.23
<i>Quercus rubra</i>	0.09	2.25	1.12	4.85	0.68	0.78	1.02	1.35
<i>Quercus falcata</i>	0.03	1.69	0.42	1.98	0.28	0.32	0.38	0.79
<i>Nyssa sylvatica</i>	0.03	1.69	0.42	1.85	0.26	0.30	0.38	0.79
<i>Juniperus virginiana</i>	0.03	1.69	0.42	1.36	0.19	0.22	0.38	0.76
<i>Carya texana</i>	0.04	1.12	0.56	1.79	0.25	0.29	0.51	0.64
<i>Prunus serotina</i>	0.02	1.12	0.28	1.81	0.25	0.29	0.25	0.56
<i>Liquidambar styraciflua</i>	0.02	1.12	0.28	1.23	0.17	0.20	0.25	0.53
<i>Ulmus alata</i>	0.02	1.12	0.28	1.08	0.15	0.17	0.25	0.52
<i>Quercus velutina</i>	0.01	0.56	0.14	0.57	0.08	0.09	0.13	0.26
<i>Quercus marilandica</i>	0.01	0.56	0.14	0.43	0.06	0.07	0.13	0.25
Totals	8.46	100.00	110.01	623.97	87.22	100.00	100.00	100.00

Table 22: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), *non-riparian community*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	5.76	9.17	74.92	68.16	9.53	36.88	18.11	21.39
snag	3.86	12.11	50.18	20.22	2.83	10.94	12.13	11.73
<i>Quercus stellata</i>	3.62	10.03	47.11	19.27	2.69	10.43	11.39	10.62
<i>Carya tomentosa</i>	2.73	8.48	35.51	13.40	1.87	7.25	8.58	8.10
<i>Quercus alba</i>	2.06	6.06	26.84	12.24	1.71	6.62	6.49	6.39
<i>Ulmus alata</i>	1.86	6.40	24.18	5.70	0.80	3.09	5.84	5.11
<i>Ostrya virginiana</i>	1.94	2.42	25.16	3.13	0.44	1.69	6.08	3.40
<i>Quercus rubra</i>	0.94	3.81	12.16	5.65	0.79	3.06	2.94	3.27
<i>Prunus serotina</i>	0.88	4.84	11.46	3.82	0.53	2.07	2.77	3.23
<i>Carya texana</i>	1.39	3.29	18.03	3.65	0.51	1.98	4.36	3.21
<i>Cornus florida</i>	0.96	4.84	12.44	2.31	0.32	1.25	3.01	3.03
<i>Pinus taeda</i>	0.45	1.90	5.87	8.16	1.14	4.42	1.42	2.58
<i>Nyssa sylvatica</i>	0.94	3.11	12.16	2.73	0.38	1.48	2.94	2.51
<i>Quercus marilandica</i>	0.58	3.63	7.55	1.39	0.19	0.75	1.82	2.07
<i>Liquidambar styraciflua</i>	0.76	1.21	9.92	4.49	0.63	2.43	2.40	2.01
<i>Acer rubrum</i>	0.75	2.42	9.78	1.72	0.24	0.93	2.36	1.91
<i>Quercus velutina</i>	0.45	3.11	5.87	1.83	0.26	0.99	1.42	1.84
<i>Juniperus virginiana</i>	0.35	2.42	4.61	1.88	0.26	1.02	1.11	1.52
<i>Quercus falcata</i>	0.18	1.56	2.38	0.71	0.10	0.39	0.57	0.84
<i>Vaccinium arboreum</i>	0.24	1.38	3.08	0.15	0.02	0.08	0.74	0.74
<i>Acer saccharum</i>	0.20	0.69	2.66	0.92	0.13	0.50	0.64	0.61
<i>Prunus mexicana</i>	0.19	0.87	2.52	0.60	0.08	0.33	0.61	0.60
<i>Viburnum rufidulum</i>	0.13	1.21	1.68	0.11	0.02	0.06	0.41	0.56
<i>Carya glabra</i>	0.13	0.52	1.68	1.37	0.19	0.74	0.41	0.55
<i>Amelanchier arborea</i>	0.08	0.87	0.98	0.15	0.02	0.08	0.24	0.39
<i>Carpinus caroliniana</i>	0.13	0.52	1.68	0.15	0.02	0.08	0.41	0.34
<i>Ulmus americana</i>	0.04	0.35	0.56	0.41	0.06	0.22	0.14	0.23
<i>Fraxinus americana</i>	0.03	0.52	0.42	0.09	0.01	0.05	0.10	0.22
<i>Fraxinus pennsylvanica</i>	0.02	0.35	0.28	0.25	0.04	0.14	0.07	0.18
<i>Prunus americana</i>	0.04	0.35	0.56	0.05	0.01	0.03	0.14	0.17
<i>Morus rubra</i>	0.02	0.35	0.28	0.02	0.00	0.01	0.07	0.14

<i>Rhus glabra</i>	0.03	0.17	0.42	0.01	0.00	0.01	0.10	0.09
<i>Prunus</i> sp.	0.01	0.17	0.14	0.01	0.00	0.01	0.03	0.07
<i>Ilex opaca</i>	0.01	0.17	0.14	0.01	0.00	0.00	0.03	0.07
<i>Celtis laevigata</i>	0.01	0.17	0.14	0.01	0.00	0.00	0.03	0.07
<i>Chionanthus virginicus</i>	0.01	0.17	0.14	0.01	0.00	0.00	0.03	0.07
<i>Crataegous</i> sp.	0.01	0.17	0.14	0.01	0.00	0.00	0.03	0.07
<i>Rhus copallinum</i>	0.01	0.17	0.14	0.00	0.00	0.00	0.03	0.07
Totals	31.83	100.00	413.76	184.80	25.83	100.00	100.00	100.00

Table 23: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, *non-riparian community*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Quercus stellata</i>	0.42	8.90	104.20	9.32	9.11
<i>Carya texana</i>	0.31	6.62	118.63	10.61	8.61
<i>Carya tomentosa</i>	0.40	8.45	92.45	8.27	8.36
<i>Acer rubrum</i>	0.23	4.79	113.29	10.13	7.46
<i>Ulmus alata</i>	0.31	6.62	68.40	6.12	6.37
<i>Quercus rubra</i>	0.27	5.71	57.18	5.11	5.41
<i>Callicarpa americana</i>	0.16	3.42	66.80	5.97	4.70
<i>Rhus copallinum</i>	0.14	2.97	61.99	5.54	4.26
<i>Quercus alba</i>	0.22	4.57	39.01	3.49	4.03
<i>Vaccinium arboreum</i>	0.24	5.02	31.53	2.82	3.92
<i>Prunus serotina</i>	0.20	4.34	27.79	2.48	3.41
<i>Pinus echinata</i>	0.08	1.60	48.09	4.30	2.95
<i>Quercus velutina</i>	0.16	3.42	26.72	2.39	2.91
<i>Quercus marilandica</i>	0.19	4.11	15.50	1.39	2.75
<i>Ostrya virginiana</i>	0.13	2.74	24.58	2.20	2.47
<i>Cornus florida</i>	0.13	2.74	13.89	1.24	1.99
<i>Nyssa sylvatica</i>	0.06	1.37	26.18	2.34	1.86
<i>Liquidambar styraciflua</i>	0.08	1.60	16.57	1.48	1.54
<i>Quercus falcata</i>	0.10	2.05	9.08	0.81	1.43
<i>Vitis rotundifolia</i>	0.05	1.14	16.03	1.43	1.29
<i>Rubus argutus</i>	0.04	0.91	16.57	1.48	1.20
<i>Juniperus virginiana</i>	0.08	1.60	6.95	0.62	1.11
<i>Fraxinus americana</i>	0.06	1.37	8.02	0.72	1.04
<i>Rhus glabra</i>	0.05	1.14	10.15	0.91	1.02
<i>Acer saccharum</i>	0.03	0.68	14.96	1.34	1.01
<i>Carya glabra</i>	0.04	0.91	9.08	0.81	0.86
<i>Diospyros virginiana</i>	0.04	0.91	5.88	0.53	0.72
<i>Carpinus caroliniana</i>	0.03	0.68	7.48	0.67	0.68
<i>Quercus nigra</i>	0.03	0.68	6.95	0.62	0.65
<i>Smilax bona-nox</i>	0.03	0.68	5.34	0.48	0.58
<i>Viburnum dentatum</i>	0.02	0.46	6.95	0.62	0.54
<i>Amelanchier arborea</i>	0.03	0.68	3.74	0.33	0.51
<i>Viburnum rufidulum</i>	0.02	0.46	5.34	0.48	0.47
<i>Prunus americana</i>	0.03	0.68	2.14	0.19	0.44
<i>Robinia pseudoacacia</i>	0.01	0.23	6.41	0.57	0.40
<i>Vitis aestivalis</i>	0.02	0.46	3.74	0.33	0.40
<i>Prunus sp.</i>	0.02	0.46	3.21	0.29	0.37
<i>Aralia spinosa</i>	0.02	0.46	2.67	0.24	0.35
<i>Smilax rotundifolia</i>	0.02	0.46	2.67	0.24	0.35
<i>Frangula caroliniana</i>	0.02	0.46	2.14	0.19	0.32
<i>Hamamelis virginiana</i>	0.02	0.46	1.60	0.14	0.30
<i>Sassafras albidum</i>	0.02	0.46	1.07	0.10	0.28
<i>Cercis canadensis</i>	0.01	0.23	1.60	0.14	0.19
<i>Symphoricarpos orbiculatus</i>	0.01	0.23	1.07	0.10	0.16
<i>Ampelopsis arborea</i>	0.01	0.23	0.53	0.05	0.14

<i>Crataegus crus-galli</i>	0.01	0.23	0.53	0.05	0.14
<i>Crataegous</i> sp.	0.01	0.23	0.53	0.05	0.14
<i>Ilex opaca</i>	0.01	0.23	0.53	0.05	0.14
<i>Magnolia acuminata</i>	0.01	0.23	0.53	0.05	0.14
<i>Prunus mexicana</i>	0.01	0.23	0.53	0.05	0.14
<i>Quercus phellos</i>	0.01	0.23	0.53	0.05	0.14
<i>Rhus aromatica</i>	0.01	0.23	0.53	0.05	0.14
<i>Vaccinium stamineum</i>	0.01	0.23	0.53	0.05	0.14
Total	4.71	100.00	1,118.44	100.00	100.00

Table 24: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, *non-riparian community*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Toxicodendron radicans</i>	118.00	285.00	5.17	4.18	4.68
<i>Vitis rotundifolia</i>	89.00	260.00	4.72	3.15	3.93
<i>Pinus echinata</i>	109.00	162.00	2.94	3.86	3.40
<i>Chasmanthium sessiliflorum</i>	76.00	198.00	3.59	2.69	3.14
<i>Scleria oligantha</i>	95.00	157.00	2.85	3.37	3.11
<i>Dichanthelium laxiflorum</i>	75.00	176.00	3.19	2.66	2.92
<i>Dichanthelium dichotomum</i>	83.00	155.00	2.81	2.94	2.88
<i>Parthenocissus quinquefolia</i>	70.00	170.00	3.08	2.48	2.78
<i>Smilax bona-nox</i>	80.00	145.00	2.63	2.83	2.73
<i>Helianthus hirsutus</i>	62.00	130.00	2.36	2.20	2.28
<i>Schizachyrium scoparium</i>	54.00	139.00	2.52	1.91	2.22
<i>Clitoria mariana</i>	64.00	106.00	1.92	2.27	2.10
<i>Dichanthelium linearifolium</i>	49.00	100.00	1.81	1.74	1.77
<i>Lespedeza procumbens</i>	46.00	91.00	1.65	1.63	1.64
<i>Dichanthelium commutatum</i>	46.00	82.00	1.49	1.63	1.56
<i>Galactia volubilis</i>	51.00	71.00	1.29	1.81	1.55
<i>Vaccinium pallidum</i>	38.00	88.00	1.60	1.35	1.47
<i>Quercus stellata</i>	36.00	91.00	1.65	1.28	1.46
<i>Rubus argutus</i>	35.00	91.00	1.65	1.24	1.45
<i>Danthonia spicata</i>	37.00	82.00	1.49	1.31	1.40
<i>Acer rubrum</i>	44.00	53.00	0.96	1.56	1.26
<i>Vaccinium arboreum</i>	33.00	73.00	1.32	1.17	1.25
<i>Dichanthelium acuminatum</i>	37.00	58.00	1.05	1.31	1.18
<i>Antennaria plantaginifolia</i>	32.00	65.00	1.18	1.13	1.16
<i>Ulmus alata</i>	29.00	60.00	1.09	1.03	1.06
<i>Lespedeza repens</i>	30.00	58.00	1.05	1.06	1.06
<i>Solidago ulmifolia</i>	31.00	44.00	0.80	1.10	0.95
<i>Rubus sp.</i>	21.00	63.00	1.14	0.74	0.94
<i>Dichanthelium boscii</i>	25.00	54.00	0.98	0.89	0.93
<i>Rubus flagellaris</i>	23.00	55.00	1.00	0.82	0.91
<i>Monarda russeliana</i>	30.00	41.00	0.74	1.06	0.90
<i>Chamaecrista fasciculata</i>	30.00	39.00	0.71	1.06	0.89
<i>Ostrya virginiana</i>	26.00	46.00	0.83	0.92	0.88
<i>Pteridium aquilinum</i>	17.00	63.00	1.14	0.60	0.87
<i>Symphyotrichum anomalum</i>	27.00	42.00	0.76	0.96	0.86
<i>Carya texana</i>	19.00	50.00	0.91	0.67	0.79
<i>Rhus copallinum</i>	19.00	47.00	0.85	0.67	0.76
<i>Desmodium laevigatum</i>	20.00	43.00	0.78	0.71	0.74
<i>Erechtites hieraciifolius</i>	21.00	36.00	0.65	0.74	0.70
<i>Smilax glauca</i>	23.00	32.00	0.58	0.82	0.70
<i>Quercus alba</i>	20.00	37.00	0.67	0.71	0.69
<i>Lactuca canadensis</i>	20.00	32.00	0.58	0.71	0.64
<i>Carya tomentosa</i>	14.00	41.00	0.74	0.50	0.62

<i>Desmodium obtusum</i>	15.00	39.00	0.71	0.53	0.62
<i>Stylosanthes biflora</i>	20.00	29.00	0.53	0.71	0.62
<i>Oxalis dillenii</i>	21.00	24.00	0.44	0.74	0.59
<i>Carex</i> sp.	17.00	29.00	0.53	0.60	0.56
<i>Rudbeckia hirta</i>	14.00	33.00	0.60	0.50	0.55
<i>Prunus serotina</i>	17.00	26.00	0.47	0.60	0.54
<i>Symphyotrichum patens</i>	17.00	25.00	0.45	0.60	0.53
<i>Amphicarpaea bracteata</i>	15.00	28.00	0.51	0.53	0.52
<i>Smilax rotundifolia</i>	12.00	31.00	0.56	0.43	0.49
<i>Quercus marilandica</i>	12.00	30.00	0.54	0.43	0.48
<i>Liatris aspera</i>	14.00	26.00	0.47	0.50	0.48
<i>Lespedeza cuneata</i>	11.00	31.00	0.56	0.39	0.48
<i>Quercus rubra</i>	13.00	26.00	0.47	0.46	0.47
<i>Solidago odora</i>	15.00	22.00	0.40	0.53	0.47
<i>Kummerowia striata</i>	12.00	27.00	0.49	0.43	0.46
<i>Nyssa sylvatica</i>	13.00	25.00	0.45	0.46	0.46
<i>Lespedeza virginica</i>	14.00	23.00	0.42	0.50	0.46
<i>Solidago petiolaris</i>	13.00	24.00	0.44	0.46	0.45
<i>Viola sororia</i>	15.00	19.00	0.34	0.53	0.44
<i>Phlox pilosa</i>	15.00	18.00	0.33	0.53	0.43
<i>Vitis aestivalis</i>	11.00	25.00	0.45	0.39	0.42
<i>Hypericum hypericoides</i>	12.00	18.00	0.33	0.43	0.38
<i>Solidago nemoralis</i>	11.00	19.00	0.34	0.39	0.37
<i>Carya texana</i>	10.00	20.00	0.36	0.35	0.36
<i>Cornus florida</i>	10.00	19.00	0.34	0.35	0.35
<i>Ceanothus americanus</i>	8.00	22.00	0.40	0.28	0.34
<i>Coreopsis grandiflora</i>	10.00	18.00	0.33	0.35	0.34
<i>Andropogon gerardii</i>	8.00	21.00	0.38	0.28	0.33
<i>Callicarpa americana</i>	9.00	19.00	0.34	0.32	0.33
<i>Carex latebracteata</i>	9.00	19.00	0.34	0.32	0.33
<i>Scutellaria elliptica</i>	10.00	17.00	0.31	0.35	0.33
<i>Desmodium viridiflorum</i>	8.00	19.00	0.34	0.28	0.31
<i>Kummerowia stipulacea</i>	9.00	16.00	0.29	0.32	0.30
<i>Pinus taeda</i>	11.00	12.00	0.22	0.39	0.30
<i>Hieracium gronovii</i>	10.00	13.00	0.24	0.35	0.30
<i>Acalypha gracilens</i>	11.00	11.00	0.20	0.39	0.29
<i>Scutellaria ovata</i>	10.00	11.00	0.20	0.35	0.28
<i>Quercus velutina</i>	7.00	16.00	0.29	0.25	0.27
<i>Symphoricarpos orbiculatus</i>	7.00	16.00	0.29	0.25	0.27
<i>Berchemia scandens</i>	8.00	14.00	0.25	0.28	0.27
<i>Echinacea pallida</i>	7.00	15.00	0.27	0.25	0.26
<i>Pseudognaphalium obtusifolium</i>	8.00	13.00	0.24	0.28	0.26
<i>Sanicula canadensis</i>	8.00	13.00	0.24	0.28	0.26
<i>Carex rosea</i>	7.00	14.00	0.25	0.25	0.25
<i>Potentilla simplex</i>	7.00	14.00	0.25	0.25	0.25
<i>Chamaecrista nictitans</i>	9.00	10.00	0.18	0.32	0.25
<i>Lespedeza violacea</i>	7.00	13.00	0.24	0.25	0.24
<i>Carya alba</i>	8.00	11.00	0.20	0.28	0.24

<i>Ruellia pedunculata</i>	8.00	11.00	0.20	0.28	0.24
<i>Conyza canadensis</i>	7.00	12.00	0.22	0.25	0.23
<i>Galium circaezans</i>	8.00	10.00	0.18	0.28	0.23
<i>Dichanthelium</i> sp.	5.00	15.00	0.27	0.18	0.22
<i>Viola palmata</i>	7.00	10.00	0.18	0.25	0.21
<i>Lespedeza hirta</i>	6.00	11.00	0.20	0.21	0.21
<i>Elymus glabriflorus</i>	5.00	12.00	0.22	0.18	0.20
<i>Rubus trivialis</i>	5.00	12.00	0.22	0.18	0.20
<i>Asplenium platyneuron</i>	7.00	8.00	0.15	0.25	0.20
<i>Viola sagittata</i>	7.00	8.00	0.15	0.25	0.20
<i>Coreopsis palmata</i>	5.00	11.00	0.20	0.18	0.19
<i>Carex glaucoidea</i>	5.00	11.00	0.20	0.18	0.19
<i>Piptochaetium avenaceum</i>	5.00	11.00	0.20	0.18	0.19
<i>Eupatorium serotinum</i>	5.00	10.00	0.18	0.18	0.18
<i>Monarda fistulosa</i>	5.00	10.00	0.18	0.18	0.18
<i>Vaccinium stamineum</i>	4.00	11.00	0.20	0.14	0.17
<i>Carex complanata</i>	5.00	9.00	0.16	0.18	0.17
<i>Viola pedata</i>	6.00	7.00	0.13	0.21	0.17
<i>Croton willdenowii</i>	5.00	8.00	0.15	0.18	0.16
<i>Physalis heterophylla</i>	5.00	8.00	0.15	0.18	0.16
<i>Prunus mexicana</i>	5.00	8.00	0.15	0.18	0.16
<i>Ruellia strepens</i>	6.00	6.00	0.11	0.21	0.16
<i>Tradescantia ohiensis</i>	4.00	9.00	0.16	0.14	0.15
<i>Desmodium paniculatum</i>	4.00	8.00	0.15	0.14	0.14
<i>Dichanthelium malacophyllum</i>	4.00	8.00	0.15	0.14	0.14
<i>Dichanthelium polyanthes</i>	4.00	8.00	0.15	0.14	0.14
<i>Solidago delicatula</i>	5.00	6.00	0.11	0.18	0.14
<i>Symphyotrichum</i> sp.	4.00	7.00	0.13	0.14	0.13
<i>Aristolochia serpentaria</i>	5.00	5.00	0.09	0.18	0.13
<i>Liatris</i> sp.	5.00	5.00	0.09	0.18	0.13
<i>Rhynchosia latifolia</i>	3.00	8.00	0.15	0.11	0.13
<i>Rudbeckia grandiflora</i>	3.00	8.00	0.15	0.11	0.13
<i>Galium obtusum</i>	4.00	6.00	0.11	0.14	0.13
<i>Fraxinus americana</i>	3.00	7.00	0.13	0.11	0.12
<i>Liquidambar styraciflua</i>	3.00	7.00	0.13	0.11	0.12
<i>Pycnanthemum tenuifolium</i>	3.00	7.00	0.13	0.11	0.12
<i>Acalypha monococca</i>	4.00	5.00	0.09	0.14	0.12
<i>Conyza canadensis</i>	4.00	5.00	0.09	0.14	0.12
<i>Euphorbia corollata</i>	4.00	5.00	0.09	0.14	0.12
<i>Eupatorium serotinum</i>	4.00	5.00	0.09	0.14	0.12
<i>Baptisia sphaerocarpa</i>	3.00	6.00	0.11	0.11	0.11
<i>Carex blanda</i>	3.00	6.00	0.11	0.11	0.11
<i>Quercus nigra</i>	3.00	6.00	0.11	0.11	0.11
<i>Ruellia humilis</i>	3.00	6.00	0.11	0.11	0.11
<i>Sorghastrum nutans</i>	2.00	7.00	0.13	0.07	0.10
<i>Desmodium nudiflorum</i>	3.00	5.00	0.09	0.11	0.10
<i>Muhlenbergia sobolifera</i>	3.00	5.00	0.09	0.11	0.10
<i>Pityopsis graminifolia</i>	3.00	5.00	0.09	0.11	0.10

<i>Solidago rugosa</i>	3.00	5.00	0.09	0.11	0.10
<i>Symphyotrichum lanceolatum</i>	3.00	5.00	0.09	0.11	0.10
<i>Celtis occidentalis</i>	3.00	4.00	0.07	0.11	0.09
<i>Desmodium</i> sp.	3.00	4.00	0.07	0.11	0.09
<i>Maianthemum racemosum</i>	3.00	4.00	0.07	0.11	0.09
<i>Matelea baldwyniana</i>	3.00	4.00	0.07	0.11	0.09
<i>Strophostyles umbellata</i>	3.00	4.00	0.07	0.11	0.09
<i>Vicia caroliniana</i>	3.00	4.00	0.07	0.11	0.09
<i>Elymus virginicus</i>	2.00	5.00	0.09	0.07	0.08
<i>Solidago altissima</i>	2.00	5.00	0.09	0.07	0.08
<i>Vernonia baldwinii</i>	2.00	5.00	0.09	0.07	0.08
<i>Croton glandulosus</i>	3.00	3.00	0.05	0.11	0.08
<i>Dioscorea villosa</i>	3.00	3.00	0.05	0.11	0.08
<i>Physalis</i> sp.	3.00	3.00	0.05	0.11	0.08
<i>Viola</i> sp.	3.00	3.00	0.05	0.11	0.08
<i>Carex muehlenbergii</i>	2.00	4.00	0.07	0.07	0.07
<i>Cynoglossum virginianum</i>	2.00	4.00	0.07	0.07	0.07
<i>Hamamelis virginiana</i>	2.00	4.00	0.07	0.07	0.07
<i>Helianthus divaricatus</i>	2.00	4.00	0.07	0.07	0.07
<i>Liatris pycnostachya</i>	2.00	4.00	0.07	0.07	0.07
<i>Pycnanthemum albescens</i>	2.00	4.00	0.07	0.07	0.07
<i>Sanicula canadensis</i>	2.00	4.00	0.07	0.07	0.07
<i>Scleria muehlenbergii</i>	2.00	4.00	0.07	0.07	0.07
<i>Acalypha virginica</i>	2.00	3.00	0.05	0.07	0.06
<i>Crataegus uniflora</i>	2.00	3.00	0.05	0.07	0.06
<i>Cunila origanoides</i>	2.00	3.00	0.05	0.07	0.06
<i>Desmodium perplexum</i>	2.00	3.00	0.05	0.07	0.06
<i>Dichantherium aciculare</i>	2.00	3.00	0.05	0.07	0.06
<i>Morus rubra</i>	2.00	3.00	0.05	0.07	0.06
<i>Solidago hispida</i>	2.00	3.00	0.05	0.07	0.06
<i>Trachelospermum difforme</i>	2.00	3.00	0.05	0.07	0.06
<i>Viburnum rufidulum</i>	2.00	3.00	0.05	0.07	0.06
<i>Diospyros virginiana</i>	1.00	4.00	0.07	0.04	0.05
<i>Chasmanthium latifolium</i>	2.00	2.00	0.04	0.07	0.05
<i>Croton monanthogynus</i>	2.00	2.00	0.04	0.07	0.05
<i>Elephantopus tomentosus</i>	2.00	2.00	0.04	0.07	0.05
<i>Houstonia longifolia</i>	2.00	2.00	0.04	0.07	0.05
<i>Rosa carolina</i>	2.00	2.00	0.04	0.07	0.05
<i>Acer saccharum</i>	1.00	3.00	0.05	0.04	0.04
<i>Carex laxiculmis</i>	1.00	3.00	0.05	0.04	0.04
<i>Sporobolus clandestinus</i>	1.00	3.00	0.05	0.04	0.04
<i>Symphyotrichum dumosum</i>	1.00	3.00	0.05	0.04	0.04
<i>Viburnum dentatum</i>	1.00	3.00	0.05	0.04	0.04
<i>Andropogon virginicus</i>	1.00	2.00	0.04	0.04	0.04
<i>Aralia spinosa</i>	1.00	2.00	0.04	0.04	0.04
<i>Arisaema dracontium</i>	1.00	2.00	0.04	0.04	0.04
<i>Aristolochia reticulata</i>	1.00	2.00	0.04	0.04	0.04
<i>Bromus pubescens</i>	1.00	2.00	0.04	0.04	0.04

<i>Coreopsis tinctoria</i>	1.00	2.00	0.04	0.04	0.04
<i>Crataegus marshallii</i>	1.00	2.00	0.04	0.04	0.04
<i>Crotalaria sagittalis</i>	1.00	2.00	0.04	0.04	0.04
<i>Desmodium glabellum</i>	1.00	2.00	0.04	0.04	0.04
<i>Dichanthelium scoparium</i>	1.00	2.00	0.04	0.04	0.04
<i>Erigeron strigosus</i>	1.00	2.00	0.04	0.04	0.04
<i>Galium pilosum</i>	1.00	2.00	0.04	0.04	0.04
<i>Galium texense</i>	1.00	2.00	0.04	0.04	0.04
<i>Hypericum gentianoides</i>	1.00	2.00	0.04	0.04	0.04
<i>Lamium amplexicaule</i>	1.00	2.00	0.04	0.04	0.04
<i>Lathyrus venosus</i>	1.00	2.00	0.04	0.04	0.04
<i>Lespedeza frutescens</i>	1.00	2.00	0.04	0.04	0.04
<i>Mimulus alatus</i>	1.00	2.00	0.04	0.04	0.04
<i>Physalis virginiana</i>	1.00	2.00	0.04	0.04	0.04
<i>Solanum carolinense</i>	1.00	2.00	0.04	0.04	0.04
<i>Sorghum halepense</i>	1.00	2.00	0.04	0.04	0.04
<i>Tephrosia virginiana</i>	1.00	2.00	0.04	0.04	0.04
<i>Tridens flavus</i>	1.00	2.00	0.04	0.04	0.04
unknown forb 1	1.00	2.00	0.04	0.04	0.04
<i>Vitis cinerea</i>	1.00	2.00	0.04	0.04	0.04
<i>Aristolochia tomentosa</i>	1.00	1.00	0.02	0.04	0.03
<i>Bidens aristosa</i>	1.00	1.00	0.02	0.04	0.03
<i>Botrychium dissectum</i>	1.00	1.00	0.02	0.04	0.03
<i>Celtis tenuifolia</i>	1.00	1.00	0.02	0.04	0.03
<i>Circaea canadensis</i>	1.00	1.00	0.02	0.04	0.03
<i>Cirsium carolinianum</i>	1.00	1.00	0.02	0.04	0.03
<i>Crataegous</i> sp.	1.00	1.00	0.02	0.04	0.03
<i>Cyperus</i> sp.	1.00	1.00	0.02	0.04	0.03
<i>Dalea candida</i>	1.00	1.00	0.02	0.04	0.03
<i>Desmodium rotundifolium</i>	1.00	1.00	0.02	0.04	0.03
<i>Erigeron tenuis</i>	1.00	1.00	0.02	0.04	0.03
<i>Frangula caroliniana</i>	1.00	1.00	0.02	0.04	0.03
<i>Galium arkansanum</i>	1.00	1.00	0.02	0.04	0.03
<i>Heliotropium tenellum</i>	1.00	1.00	0.02	0.04	0.03
<i>Ilex decidua</i>	1.00	1.00	0.02	0.04	0.03
<i>Juncus tenuis</i>	1.00	1.00	0.02	0.04	0.03
<i>Lactuca floridana</i>	1.00	1.00	0.02	0.04	0.03
<i>Lechea tenuifolia</i>	1.00	1.00	0.02	0.04	0.03
<i>Menispermum canadense</i>	1.00	1.00	0.02	0.04	0.03
<i>Packera obovata</i>	1.00	1.00	0.02	0.04	0.03
<i>Passiflora lutea</i>	1.00	1.00	0.02	0.04	0.03
<i>Penstemon</i> sp.	1.00	1.00	0.02	0.04	0.03
<i>Polygala verticillata</i>	1.00	1.00	0.02	0.04	0.03
<i>Quercus</i> sp.	1.00	1.00	0.02	0.04	0.03
<i>Rhus aromatica</i>	1.00	1.00	0.02	0.04	0.03
<i>Salvia lyrata</i>	1.00	1.00	0.02	0.04	0.03
<i>Sambucus canadensis</i>	1.00	1.00	0.02	0.04	0.03
<i>Scleria</i> sp.	1.00	1.00	0.02	0.04	0.03

<i>Scutellaria parvula</i>	1.00	1.00	0.02	0.04	0.03
<i>Solidago flexicaulis</i>	1.00	1.00	0.02	0.04	0.03
<i>Trifolium campestre</i>	1.00	1.00	0.02	0.04	0.03
<i>Triodanis perfoliata</i>	1.00	1.00	0.02	0.04	0.03
unknown forb 2	1.00	1.00	0.02	0.04	0.03
unknown forb 3	1.00	1.00	0.02	0.04	0.03
unknown forb 5	1.00	1.00	0.02	0.04	0.03
unknown forb 7	1.00	1.00	0.02	0.04	0.03
<i>Vicia sativa</i>	1.00	1.00	0.02	0.04	0.03
Total	2,822.00	5,514.00	100.00	100.00	100.00

Appendix F. Species importance values by strata and coertype.

Table 25: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8" + dbh), *shortleaf pine coertype*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	5.16	41.22	67.04	297.68	55.28	68.15	65.64	58.33
<i>Quercus stellata</i>	0.56	14.19	7.24	30.74	5.71	7.04	7.09	9.44
snag	0.44	14.86	5.76	22.47	4.17	5.14	5.64	8.55
<i>Pinus taeda</i>	0.79	3.38	10.21	44.89	8.34	10.28	10.00	7.89
<i>Quercus alba</i>	0.29	6.08	3.71	16.35	3.04	3.74	3.64	4.49
<i>Carya tomentosa</i>	0.23	5.41	2.97	8.93	1.66	2.04	2.91	3.45
<i>Quercus rubra</i>	0.11	2.70	1.49	4.85	0.90	1.11	1.45	1.76
<i>Juniperus virginiana</i>	0.04	2.03	0.56	1.36	0.25	0.31	0.55	0.96
<i>Carya texana</i>	0.06	1.35	0.74	1.79	0.33	0.41	0.73	0.83
<i>Prunus serotina</i>	0.03	1.35	0.37	1.81	0.34	0.42	0.36	0.71
<i>Liquidambar styraciflua</i>	0.03	1.35	0.37	1.23	0.23	0.28	0.36	0.67
<i>Ulmus alata</i>	0.03	1.35	0.37	1.08	0.20	0.25	0.36	0.65
<i>Nyssa sylvatica</i>	0.03	1.35	0.37	0.99	0.18	0.23	0.36	0.65
<i>Quercus falcata</i>	0.03	1.35	0.37	0.92	0.17	0.21	0.36	0.64
<i>Quercus nigra</i>	0.01	0.68	0.19	0.66	0.12	0.15	0.18	0.34
<i>Quercus velutina</i>	0.01	0.68	0.19	0.62	0.11	0.14	0.18	0.33
<i>Quercus marilandica</i>	0.01	0.68	0.19	0.43	0.08	0.10	0.18	0.32
Totals	7.86	100.00	102.14	436.80	81.12	100.00	100.00	100.00

Table 26: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), *shortleaf pine* covertype, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	7.59	9.86	98.61	67.39	12.52	39.34	19.27	22.82
<i>Quercus stellata</i>	4.96	9.86	64.44	20.74	3.85	12.10	12.60	11.52
snag	4.67	11.07	60.73	17.93	3.33	10.47	11.87	11.13
<i>Carya tomentosa</i>	2.21	6.84	28.79	11.02	2.05	6.43	5.63	6.30
<i>Quercus alba</i>	1.99	5.84	25.81	10.27	1.91	5.99	5.05	5.62
<i>Ulmus alata</i>	2.24	6.04	29.16	5.11	0.95	2.98	5.70	4.91
<i>Ostrya virginiana</i>	3.50	3.02	45.50	3.92	0.73	2.29	8.89	4.73
<i>Carya texana</i>	2.01	4.23	26.19	3.76	0.70	2.19	5.12	3.85
<i>Quercus rubra</i>	1.20	3.82	15.60	5.55	1.03	3.24	3.05	3.37
<i>Prunus serotina</i>	1.09	4.83	14.11	3.27	0.61	1.91	2.76	3.17
<i>Cornus florida</i>	0.97	4.23	12.63	1.63	0.30	0.95	2.47	2.55
<i>Nyssa sylvatica</i>	1.17	3.02	15.23	2.31	0.43	1.35	2.98	2.45
<i>Liquidambar styraciflua</i>	1.06	1.81	13.74	4.58	0.85	2.67	2.69	2.39
<i>Acer rubrum</i>	0.97	3.02	12.63	2.23	0.41	1.30	2.47	2.26
<i>Quercus marilandica</i>	0.73	4.02	9.47	1.32	0.25	0.77	1.85	2.22
<i>Juniperus virginiana</i>	0.49	2.82	6.31	1.81	0.34	1.06	1.23	1.70
<i>Quercus velutina</i>	0.24	2.21	3.16	1.17	0.22	0.68	0.62	1.17
<i>Quercus falcata</i>	0.24	1.61	3.16	0.64	0.12	0.37	0.62	0.87
<i>Vaccinium arboreum</i>	0.31	1.61	4.09	0.15	0.03	0.09	0.80	0.83
<i>Acer saccharum</i>	0.31	1.01	4.09	0.94	0.17	0.55	0.80	0.78
<i>Viburnum rufidulum</i>	0.17	1.41	2.23	0.11	0.02	0.06	0.44	0.64
<i>Carya glabra</i>	0.17	0.60	2.23	1.37	0.25	0.80	0.44	0.61
<i>Pinus taeda</i>	0.11	0.40	1.49	1.84	0.34	1.08	0.29	0.59
<i>Amelanchier arborea</i>	0.16	1.21	2.04	0.17	0.03	0.10	0.40	0.57
<i>Carpinus caroliniana</i>	0.17	0.60	2.23	0.15	0.03	0.09	0.44	0.38
<i>Prunus mexicana</i>	0.14	0.60	1.86	0.09	0.02	0.05	0.36	0.34
<i>Fraxinus americana</i>	0.06	0.60	0.74	0.22	0.04	0.13	0.15	0.29
<i>Fraxinus pennsylvanica</i>	0.04	0.60	0.56	0.26	0.05	0.15	0.11	0.29
<i>Quercus nigra</i>	0.07	0.20	0.93	0.75	0.14	0.44	0.18	0.27
<i>Ulmus americana</i>	0.06	0.40	0.74	0.41	0.08	0.24	0.15	0.26
<i>Morus rubra</i>	0.04	0.60	0.56	0.05	0.01	0.03	0.11	0.25

<i>Prunus americana</i>	0.06	0.40	0.74	0.05	0.01	0.03	0.15	0.19
<i>Rhus glabra</i>	0.04	0.20	0.56	0.01	0.00	0.01	0.11	0.11
<i>Frangula caroliniana</i>	0.01	0.20	0.19	0.04	0.01	0.02	0.04	0.09
<i>Prunus sp.</i>	0.01	0.20	0.19	0.01	0.00	0.01	0.04	0.08
<i>Ilex decidua</i>	0.01	0.20	0.19	0.01	0.00	0.00	0.04	0.08
<i>Ilex opaca</i>	0.01	0.20	0.19	0.01	0.00	0.00	0.04	0.08
<i>Celtis laevigata</i>	0.01	0.20	0.19	0.01	0.00	0.00	0.04	0.08
<i>Chionanthus virginicus</i>	0.01	0.20	0.19	0.01	0.00	0.00	0.04	0.08
<i>Rhus copallinum</i>	0.01	0.20	0.19	0.00	0.00	0.00	0.04	0.08
Totals	39.36	100.00	511.64	171.32	31.82	100.00	100.00	100.00

Table 27: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, *shortleaf pine* coevtype, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Acer rubrum</i>	0.33	5.74	185.30	13.00	9.37
<i>Carya texana</i>	0.39	6.73	164.71	11.55	9.14
<i>Quercus stellata</i>	0.43	7.48	134.89	9.46	8.47
<i>Ulmus alata</i>	0.43	7.48	88.03	6.18	6.83
<i>Quercus rubra</i>	0.37	6.48	75.25	5.28	5.88
<i>Carya tomentosa</i>	0.30	5.24	61.06	4.28	4.76
<i>Rhus copallinum</i>	0.16	2.74	89.45	6.27	4.51
<i>Quercus alba</i>	0.24	4.24	42.60	2.99	3.61
<i>Ostrya virginiana</i>	0.20	3.49	45.44	3.19	3.34
<i>Pinus echinata</i>	0.11	2.00	65.32	4.58	3.29
<i>Prunus serotina</i>	0.26	4.49	29.11	2.04	3.27
<i>Vaccinium arboreum</i>	0.23	3.99	29.11	2.04	3.02
<i>Quercus marilandica</i>	0.24	4.24	19.88	1.39	2.82
<i>Callicarpa americana</i>	0.13	2.24	44.02	3.09	2.67
<i>Liquidambar styraciflua</i>	0.11	2.00	40.47	2.84	2.42
<i>Nyssa sylvatica</i>	0.10	1.75	35.50	2.49	2.12
<i>Quercus velutina</i>	0.14	2.49	23.43	1.64	2.07
<i>Cornus florida</i>	0.16	2.74	16.33	1.15	1.94
<i>Vitis rotundifolia</i>	0.09	1.50	28.40	1.99	1.74
<i>Rubus argutus</i>	0.07	1.25	22.72	1.59	1.42
<i>Acer saccharum</i>	0.06	1.00	25.56	1.79	1.40
<i>Fraxinus americana</i>	0.10	1.75	12.78	0.90	1.32
<i>Rhus glabra</i>	0.09	1.50	16.33	1.15	1.32
<i>Juniperus virginiana</i>	0.10	1.75	9.23	0.65	1.20
<i>Smilax bona-nox</i>	0.06	1.00	14.20	1.00	1.00
<i>Carya glabra</i>	0.06	1.00	12.07	0.85	0.92
<i>Carpinus caroliniana</i>	0.06	1.00	11.36	0.80	0.90
<i>Quercus falcata</i>	0.07	1.25	7.10	0.50	0.87
<i>Prunus sp.</i>	0.06	1.00	7.81	0.55	0.77
<i>Quercus nigra</i>	0.04	0.75	9.23	0.65	0.70
<i>Viburnum dentatum</i>	0.03	0.50	9.23	0.65	0.57
<i>Amelanchier arborea</i>	0.04	0.75	4.97	0.35	0.55
<i>Smilax rotundifolia</i>	0.04	0.75	4.26	0.30	0.52
<i>Viburnum rufidulum</i>	0.03	0.50	7.10	0.50	0.50
<i>Prunus americana</i>	0.04	0.75	2.84	0.20	0.47
<i>Vitis aestivalis</i>	0.03	0.50	4.97	0.35	0.42
<i>Cercis canadensis</i>	0.03	0.50	4.26	0.30	0.40
<i>Aralia spinosa</i>	0.03	0.50	3.55	0.25	0.37
<i>Frangula caroliniana</i>	0.03	0.50	2.84	0.20	0.35
<i>Diospyros virginiana</i>	0.03	0.50	2.13	0.15	0.32
<i>Hamamelis virginiana</i>	0.03	0.50	2.13	0.15	0.32
<i>Rhus aromatica</i>	0.03	0.50	1.42	0.10	0.30
<i>Symphoricarpos orbiculatus</i>	0.01	0.25	1.42	0.10	0.17
<i>Ampelopsis arborea</i>	0.01	0.25	0.71	0.05	0.15
<i>Chionanthus virginicus</i>	0.01	0.25	0.71	0.05	0.15

<i>Crataegus crus-galli</i>	0.01	0.25	0.71	0.05	0.15
<i>Crataegous sp.</i>	0.01	0.25	0.71	0.05	0.15
<i>Ilex opaca</i>	0.01	0.25	0.71	0.05	0.15
<i>Morus rubra</i>	0.01	0.25	0.71	0.05	0.15
<i>Prunus mexicana</i>	0.01	0.25	0.71	0.05	0.15
<i>Quercus phellos</i>	0.01	0.25	0.71	0.05	0.15
<i>Ulmus americana</i>	0.01	0.25	0.71	0.05	0.15
<i>Vaccinium sp.</i>	0.01	0.25	0.71	0.05	0.15
<i>Vaccinium stamineum</i>	0.01	0.25	0.71	0.05	0.15
Total	5.73	100.00	1,425.58	100.00	100.00

Table 28: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, *shortleaf pine* covertype, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Pinus echinata</i>	123.00	179.00	4.53	5.96	5.25
<i>Toxicodendron radicans</i>	79.00	187.00	4.73	3.83	4.28
<i>Vitis rotundifolia</i>	67.00	203.00	5.14	3.25	4.19
<i>Smilax bona-nox</i>	71.00	138.00	3.49	3.44	3.47
<i>Parthenocissus quinquefolia</i>	59.00	149.00	3.77	2.86	3.32
<i>Scleria oligantha</i>	73.00	116.00	2.94	3.54	3.24
<i>Chasmanthium sessiliflorum</i>	50.00	138.00	3.49	2.42	2.96
<i>Schizachyrium scoparium</i>	46.00	127.00	3.21	2.23	2.72
<i>Dichanthelium dichotomum</i>	53.00	103.00	2.61	2.57	2.59
<i>Helianthus hirsutus</i>	47.00	97.00	2.45	2.28	2.37
<i>Dichanthelium laxiflorum</i>	43.00	92.00	2.33	2.08	2.21
<i>Clitoria mariana</i>	46.00	68.00	1.72	2.23	1.98
<i>Quercus stellata</i>	31.00	80.00	2.02	1.50	1.76
<i>Dichanthelium linearifolium</i>	36.00	65.00	1.64	1.75	1.69
<i>Acer rubrum</i>	42.00	53.00	1.34	2.04	1.69
<i>Lespedeza procumbens</i>	34.00	63.00	1.59	1.65	1.62
<i>Danthonia spicata</i>	28.00	61.00	1.54	1.36	1.45
<i>Dichanthelium commutatum</i>	31.00	50.00	1.27	1.50	1.38
<i>Galactia volubilis</i>	34.00	44.00	1.11	1.65	1.38
<i>Antennaria plantaginifolia</i>	27.00	56.00	1.42	1.31	1.36
<i>Vaccinium pallidum</i>	24.00	59.00	1.49	1.16	1.33
<i>Ulmus alata</i>	25.00	50.00	1.27	1.21	1.24
<i>Ostrya virginiana</i>	27.00	45.00	1.14	1.31	1.22
<i>Rubus flagellaris</i>	22.00	54.00	1.37	1.07	1.22
<i>Vaccinium arboreum</i>	23.00	50.00	1.27	1.11	1.19
<i>Dichanthelium boschii</i>	23.00	48.00	1.21	1.11	1.16
<i>Symphyotrichum anomalum</i>	27.00	40.00	1.01	1.31	1.16
<i>Monarda russeliana</i>	27.00	39.00	0.99	1.31	1.15
<i>Rubus argutus</i>	20.00	52.00	1.32	0.97	1.14
<i>Lespedeza repens</i>	23.00	44.00	1.11	1.11	1.11
<i>Dichanthelium acuminatum</i>	24.00	37.00	0.94	1.16	1.05
<i>Solidago ulmifolia</i>	25.00	34.00	0.86	1.21	1.04
<i>Smilax glauca</i>	22.00	32.00	0.81	1.07	0.94
<i>Quercus alba</i>	17.00	31.00	0.78	0.82	0.80
<i>Carya texana</i>	14.00	33.00	0.84	0.68	0.76
<i>Stylosanthes biflora</i>	18.00	25.00	0.63	0.87	0.75
<i>Rubus</i> sp.	12.00	36.00	0.91	0.58	0.75
<i>Smilax rotundifolia</i>	13.00	34.00	0.86	0.63	0.75
<i>Symphyotrichum patens</i>	17.00	24.00	0.61	0.82	0.72
<i>Quercus rubra</i>	13.00	26.00	0.66	0.63	0.64
<i>Desmodium laevigatum</i>	15.00	22.00	0.56	0.73	0.64
<i>Amphicarpaea bracteata</i>	12.00	24.00	0.61	0.58	0.59
<i>Rhus copallinum</i>	11.00	24.00	0.61	0.53	0.57
<i>Carya texana</i>	11.00	23.00	0.58	0.53	0.56
<i>Solidago odora</i>	13.00	18.00	0.46	0.63	0.54

<i>Quercus marilandica</i>	10.00	23.00	0.58	0.48	0.53
<i>Viola sororia</i>	12.00	16.00	0.40	0.58	0.49
<i>Carya tomentosa</i>	9.00	21.00	0.53	0.44	0.48
<i>Ceanothus americanus</i>	8.00	22.00	0.56	0.39	0.47
<i>Chasmanthium laxum</i>	8.00	22.00	0.56	0.39	0.47
<i>Desmodium viridiflorum</i>	9.00	20.00	0.51	0.44	0.47
<i>Carex</i> sp.	10.00	18.00	0.46	0.48	0.47
<i>Prunus serotina</i>	11.00	16.00	0.40	0.53	0.47
<i>Scutellaria elliptica</i>	10.00	17.00	0.43	0.48	0.46
<i>Sanicula canadensis</i>	10.00	16.00	0.40	0.48	0.44
<i>Cornus florida</i>	9.00	17.00	0.43	0.44	0.43
<i>Lactuca canadensis</i>	9.00	17.00	0.43	0.44	0.43
<i>Berchemia scandens</i>	9.00	16.00	0.40	0.44	0.42
<i>Nyssa sylvatica</i>	9.00	16.00	0.40	0.44	0.42
<i>Coreopsis palmata</i>	8.00	17.00	0.43	0.39	0.41
<i>Chamaecrista fasciculata</i>	10.00	12.00	0.30	0.48	0.39
<i>Solidago nemoralis</i>	8.00	15.00	0.38	0.39	0.38
<i>Oxalis dillenii</i>	10.00	11.00	0.28	0.48	0.38
<i>Coreopsis grandiflora</i>	8.00	13.00	0.33	0.39	0.36
<i>Liatris aspera</i>	8.00	13.00	0.33	0.39	0.36
<i>Galium circaeazans</i>	9.00	11.00	0.28	0.44	0.36
<i>Carex latebracteata</i>	7.00	14.00	0.35	0.34	0.35
<i>Desmodium obtusum</i>	7.00	14.00	0.35	0.34	0.35
<i>Carya alba</i>	8.00	11.00	0.28	0.39	0.33
<i>Hieracium gronovii</i>	8.00	11.00	0.28	0.39	0.33
<i>Lespedeza cuneata</i>	6.00	14.00	0.35	0.29	0.32
<i>Vitis aestivalis</i>	6.00	14.00	0.35	0.29	0.32
<i>Hypericum hypericoides</i>	8.00	10.00	0.25	0.39	0.32
<i>Lespedeza virginica</i>	8.00	10.00	0.25	0.39	0.32
<i>Dichanthelium</i> sp.	5.00	15.00	0.38	0.24	0.31
<i>Rudbeckia hirta</i>	5.00	14.00	0.35	0.24	0.30
<i>Carex rosea</i>	6.00	12.00	0.30	0.29	0.30
<i>Viola palmata</i>	7.00	10.00	0.25	0.34	0.30
<i>Carex complanata</i>	6.00	11.00	0.28	0.29	0.28
<i>Kummerowia stipulacea</i>	6.00	11.00	0.28	0.29	0.28
<i>Rubus trivialis</i>	5.00	12.00	0.30	0.24	0.27
<i>Asplenium platyneuron</i>	7.00	8.00	0.20	0.34	0.27
<i>Callicarpa americana</i>	5.00	11.00	0.28	0.24	0.26
<i>Carex glaucoidea</i>	5.00	11.00	0.28	0.24	0.26
<i>Kummerowia striata</i>	5.00	11.00	0.28	0.24	0.26
<i>Andropogon gerardii</i>	4.00	12.00	0.30	0.19	0.25
<i>Solidago petiolaris</i>	5.00	9.00	0.23	0.24	0.24
<i>Fraxinus americana</i>	4.00	10.00	0.25	0.19	0.22
<i>Liquidambar styraciflua</i>	4.00	9.00	0.23	0.19	0.21
<i>Dichanthelium malacophyllum</i>	4.00	8.00	0.20	0.19	0.20
<i>Quercus velutina</i>	4.00	8.00	0.20	0.19	0.20
<i>Erechtites hieraciifolius</i>	5.00	6.00	0.15	0.24	0.20
<i>Scutellaria ovata</i>	5.00	6.00	0.15	0.24	0.20
<i>Solidago delicatula</i>	5.00	6.00	0.15	0.24	0.20
<i>Viola sagittata</i>	5.00	6.00	0.15	0.24	0.20

<i>Vaccinium stamineum</i>	3.00	9.00	0.23	0.15	0.19
<i>Quercus nigra</i>	4.00	7.00	0.18	0.19	0.19
<i>Aristolochia serpentaria</i>	5.00	5.00	0.13	0.24	0.18
<i>Prunus mexicana</i>	4.00	6.00	0.15	0.19	0.17
<i>Carex blanda</i>	3.00	6.00	0.15	0.15	0.15
<i>Lespedeza violacea</i>	3.00	6.00	0.15	0.15	0.15
<i>Ruellia humilis</i>	3.00	6.00	0.15	0.15	0.15
<i>Ruellia strepens</i>	4.00	4.00	0.10	0.19	0.15
<i>Sorghastrum nutans</i>	2.00	7.00	0.18	0.10	0.14
<i>Desmodium nudiflorum</i>	3.00	5.00	0.13	0.15	0.14
<i>Elymus glabriflorus</i>	3.00	5.00	0.13	0.15	0.14
<i>Potentilla simplex</i>	3.00	5.00	0.13	0.15	0.14
<i>Solidago rugosa</i>	3.00	5.00	0.13	0.15	0.14
<i>Desmodium sp.</i>	3.00	4.00	0.10	0.15	0.12
<i>Echinacea pallida</i>	3.00	4.00	0.10	0.15	0.12
<i>Euphorbia corollata</i>	3.00	4.00	0.10	0.15	0.12
<i>Lespedeza hirta</i>	3.00	4.00	0.10	0.15	0.12
<i>Maianthemum racemosum</i>	3.00	4.00	0.10	0.15	0.12
<i>Matelea baldwyniana</i>	3.00	4.00	0.10	0.15	0.12
<i>Packera obovata</i>	3.00	4.00	0.10	0.15	0.12
<i>Phlox pilosa</i>	3.00	4.00	0.10	0.15	0.12
<i>Piptochaetium avenaceum</i>	3.00	4.00	0.10	0.15	0.12
<i>Vicia caroliniana</i>	3.00	4.00	0.10	0.15	0.12
<i>Elymus virginicus</i>	2.00	5.00	0.13	0.10	0.11
<i>Rudbeckia grandiflora</i>	2.00	5.00	0.13	0.10	0.11
<i>Solidago altissima</i>	2.00	5.00	0.13	0.10	0.11
<i>Symphoricarpos orbiculatus</i>	2.00	5.00	0.13	0.10	0.11
<i>Croton glandulosus</i>	3.00	3.00	0.08	0.15	0.11
<i>Dioscorea villosa</i>	3.00	3.00	0.08	0.15	0.11
<i>Acer saccharum</i>	2.00	4.00	0.10	0.10	0.10
<i>Cynoglossum virginianum</i>	2.00	4.00	0.10	0.10	0.10
<i>Desmodium paniculatum</i>	2.00	4.00	0.10	0.10	0.10
<i>Dichantherium polyanthes</i>	2.00	4.00	0.10	0.10	0.10
<i>Hamamelis virginiana</i>	2.00	4.00	0.10	0.10	0.10
<i>Pityopsis graminifolia</i>	2.00	4.00	0.10	0.10	0.10
<i>Pycnanthemum tenuifolium</i>	2.00	4.00	0.10	0.10	0.10
<i>Rhus aromatica</i>	2.00	4.00	0.10	0.10	0.10
<i>Scleria muehlenbergii</i>	2.00	4.00	0.10	0.10	0.10
<i>Conyza canadensis</i>	2.00	3.00	0.08	0.10	0.09
<i>Cunila organoides</i>	2.00	3.00	0.08	0.10	0.09
<i>Desmodium perplexum</i>	2.00	3.00	0.08	0.10	0.09
<i>Galium obtusum</i>	2.00	3.00	0.08	0.10	0.09
<i>Morus rubra</i>	2.00	3.00	0.08	0.10	0.09
<i>Rosa carolina</i>	2.00	3.00	0.08	0.10	0.09
<i>Ruellia pedunculata</i>	2.00	3.00	0.08	0.10	0.09
<i>Salvia lyrata</i>	2.00	3.00	0.08	0.10	0.09
<i>Solidago hispida</i>	2.00	3.00	0.08	0.10	0.09
<i>Symphyotrichum lanceolatum</i>	2.00	3.00	0.08	0.10	0.09
<i>Trachelospermum difforme</i>	2.00	3.00	0.08	0.10	0.09
<i>Acalypha monococca</i>	2.00	2.00	0.05	0.10	0.07

<i>Crataegus marshallii</i>	2.00	2.00	0.05	0.10	0.07
<i>Elephantopus tomentosus</i>	2.00	2.00	0.05	0.10	0.07
<i>Houstonia longifolia</i>	2.00	2.00	0.05	0.10	0.07
<i>Lactuca floridana</i>	2.00	2.00	0.05	0.10	0.07
<i>Viola</i> sp.	2.00	2.00	0.05	0.10	0.07
<i>Albizia julibrissin</i>	1.00	3.00	0.08	0.05	0.06
<i>Carex laxiculmis</i>	1.00	3.00	0.08	0.05	0.06
<i>Delphinium carolinianum</i>	1.00	3.00	0.08	0.05	0.06
<i>Sporobolus clandestinus</i>	1.00	3.00	0.08	0.05	0.06
<i>Symphytotrichum dumosum</i>	1.00	3.00	0.08	0.05	0.06
<i>Verbesina alternifolia</i>	1.00	3.00	0.08	0.05	0.06
<i>Viburnum dentatum</i>	1.00	3.00	0.08	0.05	0.06
<i>Aralia spinosa</i>	1.00	2.00	0.05	0.05	0.05
<i>Arisaema dracontium</i>	1.00	2.00	0.05	0.05	0.05
<i>Baptisia sphaerocarpa</i>	1.00	2.00	0.05	0.05	0.05
<i>Carex blanda</i>	1.00	2.00	0.05	0.05	0.05
<i>Celtis occidentalis</i>	1.00	2.00	0.05	0.05	0.05
<i>Coreopsis tinctoria</i>	1.00	2.00	0.05	0.05	0.05
<i>Dichanthelium scoparium</i>	1.00	2.00	0.05	0.05	0.05
<i>Elephantopus carolinianus</i>	1.00	2.00	0.05	0.05	0.05
<i>Galium pilosum</i>	1.00	2.00	0.05	0.05	0.05
<i>Hypericum gentianoides</i>	1.00	2.00	0.05	0.05	0.05
<i>Lathyrus venosus</i>	1.00	2.00	0.05	0.05	0.05
<i>Lespedeza frutescens</i>	1.00	2.00	0.05	0.05	0.05
<i>Lespedeza stuevei</i>	1.00	2.00	0.05	0.05	0.05
<i>Mimulus alatus</i>	1.00	2.00	0.05	0.05	0.05
<i>Pseudognaphalium obtusifolium</i>	1.00	2.00	0.05	0.05	0.05
<i>Sanicula canadensis</i>	1.00	2.00	0.05	0.05	0.05
<i>Tephrosia virginiana</i>	1.00	2.00	0.05	0.05	0.05
<i>Tradescantia ohiensis</i>	1.00	2.00	0.05	0.05	0.05
unknown forb 1	1.00	2.00	0.05	0.05	0.05
<i>Vernonia baldwinii</i>	1.00	2.00	0.05	0.05	0.05
<i>Verbena stricta</i>	1.00	2.00	0.05	0.05	0.05
<i>Vitis cinerea</i>	1.00	2.00	0.05	0.05	0.05
<i>Acalypha gracilens</i>	1.00	1.00	0.03	0.05	0.04
<i>Acalypha virginica</i>	1.00	1.00	0.03	0.05	0.04
<i>Bidens aristosa</i>	1.00	1.00	0.03	0.05	0.04
<i>Botrychium dissectum</i>	1.00	1.00	0.03	0.05	0.04
<i>Celtis tenuifolia</i>	1.00	1.00	0.03	0.05	0.04
<i>Circaea canadensis</i>	1.00	1.00	0.03	0.05	0.04
<i>Cirsium carolinianum</i>	1.00	1.00	0.03	0.05	0.04
<i>Conyza canadensis</i>	1.00	1.00	0.03	0.05	0.04
<i>Crataegus uniflora</i>	1.00	1.00	0.03	0.05	0.04
<i>Croton willdenowii</i>	1.00	1.00	0.03	0.05	0.04
<i>Dalea candida</i>	1.00	1.00	0.03	0.05	0.04
<i>Desmodium rotundifolium</i>	1.00	1.00	0.03	0.05	0.04
<i>Dichanthelium aciculare</i>	1.00	1.00	0.03	0.05	0.04
<i>Dryopteris marginalis</i>	1.00	1.00	0.03	0.05	0.04
<i>Erigeron tenuis</i>	1.00	1.00	0.03	0.05	0.04
<i>Eupatorium serotinum</i>	1.00	1.00	0.03	0.05	0.04

<i>Frangula caroliniana</i>	1.00	1.00	0.03	0.05	0.04
<i>Galium arkansanum</i>	1.00	1.00	0.03	0.05	0.04
<i>Helianthus divaricatus</i>	1.00	1.00	0.03	0.05	0.04
<i>Heliotropium tenellum</i>	1.00	1.00	0.03	0.05	0.04
<i>Ilex decidua</i>	1.00	1.00	0.03	0.05	0.04
<i>Liatris</i> sp.	1.00	1.00	0.03	0.05	0.04
<i>Lonicera japonica</i>	1.00	1.00	0.03	0.05	0.04
<i>Lonicera sempervirens</i>	1.00	1.00	0.03	0.05	0.04
<i>Passiflora lutea</i>	1.00	1.00	0.03	0.05	0.04
<i>Polygala verticillata</i>	1.00	1.00	0.03	0.05	0.04
<i>Quercus</i> sp.	1.00	1.00	0.03	0.05	0.04
<i>Sambucus canadensis</i>	1.00	1.00	0.03	0.05	0.04
<i>Scutellaria parvula</i>	1.00	1.00	0.03	0.05	0.04
<i>Smilax</i> sp.	1.00	1.00	0.03	0.05	0.04
<i>Solidago flexicaulis</i>	1.00	1.00	0.03	0.05	0.04
<i>Symphotrichum</i> sp.	1.00	1.00	0.03	0.05	0.04
unknown forb 2	1.00	1.00	0.03	0.05	0.04
unknown forb 3	1.00	1.00	0.03	0.05	0.04
unknown forb 5	1.00	1.00	0.03	0.05	0.04
<i>Verbesina helianthoides</i>	1.00	1.00	0.03	0.05	0.04
<i>Vicia sativa</i>	1.00	1.00	0.03	0.05	0.04
<i>Viola pedata</i>	1.00	1.00	0.03	0.05	0.04
Total	2,063.00	3,952.00	100.00	100.00	100.00

Table 29: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8" + dbh), *pine plantation covertype*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus taeda</i>	8.03	63.64	104.43	202.65	87.81	89.93	87.64	80.40
snag	0.80	18.18	10.40	14.23	6.17	6.32	8.73	11.08
<i>Quercus stellata</i>	0.10	6.82	1.30	2.00	0.87	0.89	1.09	2.93
<i>Pinus echinata</i>	0.13	4.55	1.73	3.95	1.71	1.75	1.45	2.58
<i>Quercus falcata</i>	0.03	2.27	0.43	1.07	0.46	0.47	0.36	1.04
<i>Nyssa sylvatica</i>	0.03	2.27	0.43	0.87	0.38	0.38	0.36	1.01
<i>Quercus velutina</i>	0.03	2.27	0.43	0.57	0.25	0.25	0.36	0.96
Totals	9.17	100.00	119.17	225.33	97.64	100.00	100.00	100.00

Table 30: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), *pine plantation covertype*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Carya tomentosa</i>	3.73	14.88	48.53	3.54	1.53	14.25	24.56	17.90
snag	2.27	14.88	29.47	3.29	1.43	13.24	14.91	14.34
<i>Pinus taeda</i>	1.13	7.44	14.73	6.32	2.74	25.46	7.46	13.45
<i>Quercus alba</i>	1.97	6.61	25.57	2.88	1.25	11.59	12.94	10.38
<i>Quercus stellata</i>	1.00	9.92	13.00	1.79	0.78	7.22	6.58	7.91
<i>Ulmus alata</i>	1.00	7.44	13.00	1.24	0.54	5.01	6.58	6.34
<i>Quercus velutina</i>	0.97	6.61	12.57	1.18	0.51	4.76	6.36	5.91
<i>Cornus florida</i>	1.10	6.61	14.30	0.83	0.36	3.33	7.24	5.73
<i>Pinus echinata</i>	0.57	5.79	7.37	1.32	0.57	5.33	3.73	4.95
<i>Prunus serotina</i>	0.30	4.13	3.90	0.62	0.27	2.49	1.97	2.87
<i>Nyssa sylvatica</i>	0.20	3.31	2.60	0.43	0.19	1.74	1.32	2.12
<i>Prunus mexicana</i>	0.27	1.65	3.47	0.51	0.22	2.07	1.75	1.83
<i>Quercus falcata</i>	0.07	1.65	0.87	0.39	0.17	1.58	0.44	1.22
<i>Quercus rubra</i>	0.10	2.48	1.30	0.10	0.04	0.40	0.66	1.18
<i>Acer rubrum</i>	0.23	0.83	3.03	0.13	0.06	0.53	1.54	0.96
<i>Quercus marilandica</i>	0.13	1.65	1.73	0.07	0.03	0.28	0.88	0.94
<i>Juniperus virginiana</i>	0.07	1.65	0.87	0.12	0.05	0.47	0.44	0.85
<i>Fraxinus americana</i>	0.03	0.83	0.43	0.05	0.02	0.22	0.22	0.42
<i>Crataegous</i> sp.	0.03	0.83	0.43	0.01	0.00	0.02	0.22	0.36
<i>Ostrya virginiana</i>	0.03	0.83	0.43	0.00	0.00	0.01	0.22	0.35
Totals	15.20	100.00	197.60	24.84	10.76	100.00	100.00	100.00

Table 31: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, *pine plantation covertype*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Carya tomentosa</i>	0.60	20.45	160.69	25.06	22.76
<i>Callicarpa americana</i>	0.27	9.09	115.96	18.09	13.59
<i>Quercus stellata</i>	0.40	13.64	41.41	6.46	10.05
<i>Quercus velutina</i>	0.20	6.82	38.10	5.94	6.38
<i>Rhus copallinum</i>	0.10	3.41	57.98	9.04	6.23
<i>Carya texana</i>	0.17	5.68	43.07	6.72	6.20
<i>Vaccinium arboreum</i>	0.20	6.82	29.82	4.65	5.73
<i>Quercus alba</i>	0.13	4.55	24.85	3.88	4.21
<i>Quercus falcata</i>	0.13	4.55	11.60	1.81	3.18
<i>Ulmus alata</i>	0.10	3.41	14.91	2.33	2.87
<i>Cornus florida</i>	0.10	3.41	13.25	2.07	2.74
<i>Prunus serotina</i>	0.07	2.27	19.88	3.10	2.69
<i>Diospyros virginiana</i>	0.07	2.27	13.25	2.07	2.17
<i>Robinia pseudoacacia</i>	0.03	1.14	19.88	3.10	2.12
<i>Fraxinus americana</i>	0.07	2.27	9.94	1.55	1.91
<i>Quercus rubra</i>	0.07	2.27	9.94	1.55	1.91
<i>Sassafras albidum</i>	0.07	2.27	3.31	0.52	1.39
<i>Ostrya virginiana</i>	0.03	1.14	6.63	1.03	1.08
<i>Juniperus virginiana</i>	0.03	1.14	1.66	0.26	0.70
<i>Liquidambar styraciflua</i>	0.03	1.14	1.66	0.26	0.70
<i>Magnolia acuminata</i>	0.03	1.14	1.66	0.26	0.70
<i>Quercus marilandica</i>	0.03	1.14	1.66	0.26	0.70
Total	2.93	100.00	641.08	100.00	100.00

Table 32: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, *pine plantation covertype*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Toxicodendron radicans</i>	52.00	126.00	6.27	5.19	5.73
<i>Dichantheium laxiflorum</i>	40.00	100.00	4.97	3.99	4.48
<i>Chasmanthium sessiliflorum</i>	33.00	83.00	4.13	3.29	3.71
<i>Dichantheium dichotomum</i>	36.00	62.00	3.08	3.59	3.34
<i>Scleria oligantha</i>	32.00	59.00	2.93	3.19	3.06
<i>Vitis rotundifolia</i>	26.00	67.00	3.33	2.59	2.96
<i>Clitoria mariana</i>	26.00	49.00	2.44	2.59	2.52
<i>Pteridium aquilinum</i>	17.00	63.00	3.13	1.70	2.41
<i>Helianthus hirsutus</i>	22.00	48.00	2.39	2.20	2.29
<i>Smilax bona-nox</i>	23.00	42.00	2.09	2.30	2.19
<i>Galactia volubilis</i>	25.00	37.00	1.84	2.50	2.17
<i>Dichantheium commutatum</i>	21.00	41.00	2.04	2.10	2.07
<i>Chamaecrista fasciculata</i>	23.00	30.00	1.49	2.30	1.89
<i>Rubus argutus</i>	17.00	41.00	2.04	1.70	1.87
<i>Dichantheium linearifolium</i>	14.00	37.00	1.84	1.40	1.62
<i>Erechtites hieraciifolius</i>	16.00	30.00	1.49	1.60	1.54
<i>Lespedeza procumbens</i>	15.00	32.00	1.59	1.50	1.54
<i>Vaccinium pallidum</i>	15.00	31.00	1.54	1.50	1.52
<i>Dichantheium acuminatum</i>	16.00	26.00	1.29	1.60	1.44
<i>Rubus</i> sp.	12.00	33.00	1.64	1.20	1.42
<i>Parthenocissus quinquefolia</i>	14.00	27.00	1.34	1.40	1.37
<i>Schizachyrium scoparium</i>	12.00	28.00	1.39	1.20	1.29
<i>Oxalis dillenii</i>	15.00	17.00	0.85	1.50	1.17
<i>Vaccinium arboreum</i>	11.00	25.00	1.24	1.10	1.17
<i>Quercus stellata</i>	10.00	25.00	1.24	1.00	1.12
<i>Rhus copallinum</i>	9.00	26.00	1.29	0.90	1.10
<i>Desmodium laevigatum</i>	9.00	25.00	1.24	0.90	1.07
<i>Desmodium obtusum</i>	8.00	25.00	1.24	0.80	1.02
<i>Monarda russeliana</i>	11.00	18.00	0.90	1.10	1.00
<i>Danthonia spicata</i>	9.00	21.00	1.04	0.90	0.97
<i>Phlox pilosa</i>	12.00	14.00	0.70	1.20	0.95
<i>Lactuca canadensis</i>	11.00	15.00	0.75	1.10	0.92
<i>Rudbeckia hirta</i>	9.00	19.00	0.94	0.90	0.92
<i>Solidago petiolaris</i>	9.00	17.00	0.85	0.90	0.87
<i>Pinus taeda</i>	11.00	12.00	0.60	1.10	0.85
<i>Lespedeza repens</i>	9.00	16.00	0.80	0.90	0.85
<i>Carya tomentosa</i>	6.00	21.00	1.04	0.60	0.82
<i>Carya texana</i>	6.00	20.00	0.99	0.60	0.80
<i>Acalypha gracilens</i>	10.00	10.00	0.50	1.00	0.75
<i>Kummerowia striata</i>	7.00	16.00	0.80	0.70	0.75
<i>Chamaecrista nictitans</i>	9.00	10.00	0.50	0.90	0.70
<i>Carex</i> sp.	8.00	12.00	0.60	0.80	0.70
<i>Solidago ulmifolia</i>	8.00	12.00	0.60	0.80	0.70
<i>Ulmus alata</i>	7.00	14.00	0.70	0.70	0.70
<i>Ruellia pedunculata</i>	8.00	11.00	0.55	0.80	0.67

<i>Lespedeza cuneata</i>	5.00	17.00	0.85	0.50	0.67
<i>Pseudognaphalium obtusifolium</i>	7.00	11.00	0.55	0.70	0.62
<i>Dichantherium boscii</i>	6.00	13.00	0.65	0.60	0.62
<i>Lespedeza virginica</i>	6.00	13.00	0.65	0.60	0.62
<i>Liatris aspera</i>	6.00	13.00	0.65	0.60	0.62
<i>Conyza canadensis</i>	6.00	11.00	0.55	0.60	0.57
<i>Nyssa sylvatica</i>	6.00	11.00	0.55	0.60	0.57
<i>Prunus serotina</i>	6.00	10.00	0.50	0.60	0.55
<i>Symphoricarpos orbiculatus</i>	5.00	11.00	0.55	0.50	0.52
<i>Vitis aestivalis</i>	5.00	11.00	0.55	0.50	0.52
<i>Eupatorium serotinum</i>	5.00	10.00	0.50	0.50	0.50
<i>Monarda fistulosa</i>	5.00	10.00	0.50	0.50	0.50
<i>Antennaria plantaginifolia</i>	5.00	9.00	0.45	0.50	0.47
<i>Echinacea pallida</i>	4.00	11.00	0.55	0.40	0.47
<i>Scutellaria ovata</i>	6.00	6.00	0.30	0.60	0.45
<i>Physalis heterophylla</i>	5.00	8.00	0.40	0.50	0.45
<i>Rubus flagellaris</i>	5.00	8.00	0.40	0.50	0.45
<i>Andropogon gerardii</i>	4.00	9.00	0.45	0.40	0.42
<i>Potentilla simplex</i>	4.00	9.00	0.45	0.40	0.42
<i>Viola pedata</i>	5.00	6.00	0.30	0.50	0.40
<i>Callicarpa americana</i>	4.00	8.00	0.40	0.40	0.40
<i>Coreopsis grandiflora</i>	4.00	8.00	0.40	0.40	0.40
<i>Hypericum hypericoides</i>	4.00	8.00	0.40	0.40	0.40
<i>Croton willdenowii</i>	4.00	7.00	0.35	0.40	0.37
<i>Lespedeza violacea</i>	4.00	7.00	0.35	0.40	0.37
<i>Symphyotrichum patens</i>	4.00	7.00	0.35	0.40	0.37
<i>Quercus velutina</i>	3.00	8.00	0.40	0.30	0.35
<i>Rhynchosia latifolia</i>	3.00	8.00	0.40	0.30	0.35
<i>Lespedeza hirta</i>	3.00	7.00	0.35	0.30	0.32
<i>Tradescantia ohiensis</i>	3.00	7.00	0.35	0.30	0.32
<i>Liatris sp.</i>	4.00	4.00	0.20	0.40	0.30
<i>Dichantherium polyanthes</i>	3.00	6.00	0.30	0.30	0.30
<i>Quercus alba</i>	3.00	6.00	0.30	0.30	0.30
<i>Symphyotrichum sp.</i>	3.00	6.00	0.30	0.30	0.30
<i>Kummerowia stipulacea</i>	3.00	5.00	0.25	0.30	0.27
<i>Muhlenbergia sobolifera</i>	3.00	5.00	0.25	0.30	0.27
<i>Stylosanthes biflora</i>	3.00	5.00	0.25	0.30	0.27
<i>Elymus glaberrimus</i>	2.00	7.00	0.35	0.20	0.27
<i>Piptochaetium avenaceum</i>	2.00	7.00	0.35	0.20	0.27
<i>Quercus marilandica</i>	2.00	7.00	0.35	0.20	0.27
<i>Amphicarpaea bracteata</i>	3.00	4.00	0.20	0.30	0.25
<i>Conyza canadensis</i>	3.00	4.00	0.20	0.30	0.25
<i>Eupatorium serotinum</i>	3.00	4.00	0.20	0.30	0.25
<i>Solidago nemoralis</i>	3.00	4.00	0.20	0.30	0.25
<i>Strophostyles umbellata</i>	3.00	4.00	0.20	0.30	0.25
<i>Acer rubrum</i>	3.00	3.00	0.15	0.30	0.22
<i>Physalis sp.</i>	3.00	3.00	0.15	0.30	0.22
<i>Ruellia strepens</i>	3.00	3.00	0.15	0.30	0.22
<i>Viola sororia</i>	3.00	3.00	0.15	0.30	0.22
<i>Carex latebracteata</i>	2.00	5.00	0.25	0.20	0.22

<i>Baptisia sphaerocarpa</i>	2.00	4.00	0.20	0.20	0.20
<i>Carex muehlenbergii</i>	2.00	4.00	0.20	0.20	0.20
<i>Desmodium paniculatum</i>	2.00	4.00	0.20	0.20	0.20
<i>Liatris pycnostachya</i>	2.00	4.00	0.20	0.20	0.20
<i>Ostrya virginiana</i>	2.00	4.00	0.20	0.20	0.20
<i>Pycnanthemum albescens</i>	2.00	4.00	0.20	0.20	0.20
<i>Solidago odora</i>	2.00	4.00	0.20	0.20	0.20
<i>Symphyotrichum anomalum</i>	2.00	4.00	0.20	0.20	0.20
<i>Acalypha monococca</i>	2.00	3.00	0.15	0.20	0.17
<i>Acalypha virginica</i>	2.00	3.00	0.15	0.20	0.17
<i>Galium obtusum</i>	2.00	3.00	0.15	0.20	0.17
<i>Smilax glauca</i>	2.00	3.00	0.15	0.20	0.17
<i>Viburnum rufidulum</i>	2.00	3.00	0.15	0.20	0.17
<i>Celtis occidentalis</i>	2.00	2.00	0.10	0.20	0.15
<i>Chasmanthium latifolium</i>	2.00	2.00	0.10	0.20	0.15
<i>Croton monanthogynus</i>	2.00	2.00	0.10	0.20	0.15
<i>Hieracium gronovii</i>	2.00	2.00	0.10	0.20	0.15
<i>Viola palmata</i>	2.00	2.00	0.10	0.20	0.15
<i>Viola sagittata</i>	2.00	2.00	0.10	0.20	0.15
<i>Diospyros virginiana</i>	1.00	4.00	0.20	0.10	0.15
<i>Fraxinus americana</i>	1.00	3.00	0.15	0.10	0.12
<i>Helianthus divaricatus</i>	1.00	3.00	0.15	0.10	0.12
<i>Pycnanthemum tenuifolium</i>	1.00	3.00	0.15	0.10	0.12
<i>Rudbeckia grandiflora</i>	1.00	3.00	0.15	0.10	0.12
<i>Vernonia baldwinii</i>	1.00	3.00	0.15	0.10	0.12
<i>Andropogon virginicus</i>	1.00	2.00	0.10	0.10	0.10
<i>Aristolochia reticulata</i>	1.00	2.00	0.10	0.10	0.10
<i>Bromus pubescens</i>	1.00	2.00	0.10	0.10	0.10
<i>Carex rosea</i>	1.00	2.00	0.10	0.10	0.10
<i>Ceanothus americanus</i>	1.00	2.00	0.10	0.10	0.10
<i>Cornus florida</i>	1.00	2.00	0.10	0.10	0.10
<i>Crataegus marshallii</i>	1.00	2.00	0.10	0.10	0.10
<i>Crataegus uniflora</i>	1.00	2.00	0.10	0.10	0.10
<i>Crotalaria sagittalis</i>	1.00	2.00	0.10	0.10	0.10
<i>Carex complanata</i>	1.00	2.00	0.10	0.10	0.10
<i>Desmodium glabellum</i>	1.00	2.00	0.10	0.10	0.10
<i>Dichantherium aciculare</i>	1.00	2.00	0.10	0.10	0.10
<i>Erigeron strigosus</i>	1.00	2.00	0.10	0.10	0.10
<i>Galium texense</i>	1.00	2.00	0.10	0.10	0.10
<i>Lamium amplexicaule</i>	1.00	2.00	0.10	0.10	0.10
<i>Physalis virginiana</i>	1.00	2.00	0.10	0.10	0.10
<i>Prunus mexicana</i>	1.00	2.00	0.10	0.10	0.10
<i>Sanicula canadensis</i>	1.00	2.00	0.10	0.10	0.10
<i>Solanum carolinense</i>	1.00	2.00	0.10	0.10	0.10
<i>Sorghum halepense</i>	1.00	2.00	0.10	0.10	0.10
<i>Symphyotrichum lanceolatum</i>	1.00	2.00	0.10	0.10	0.10
<i>Tridens flavus</i>	1.00	2.00	0.10	0.10	0.10
<i>Vaccinium stamineum</i>	1.00	2.00	0.10	0.10	0.10
<i>Aristolochia tomentosa</i>	1.00	1.00	0.05	0.10	0.07
<i>Crataegous sp.</i>	1.00	1.00	0.05	0.10	0.07

<i>Cyperus</i> sp.	1.00	1.00	0.05	0.10	0.07
<i>Euphorbia corollata</i>	1.00	1.00	0.05	0.10	0.07
<i>Juncus tenuis</i>	1.00	1.00	0.05	0.10	0.07
<i>Lechea tenuifolia</i>	1.00	1.00	0.05	0.10	0.07
<i>Menispermum canadense</i>	1.00	1.00	0.05	0.10	0.07
<i>Penstemon</i> sp.	1.00	1.00	0.05	0.10	0.07
<i>Pinus echinata</i>	1.00	1.00	0.05	0.10	0.07
<i>Pityopsis graminifolia</i>	1.00	1.00	0.05	0.10	0.07
<i>Rosa carolina</i>	1.00	1.00	0.05	0.10	0.07
<i>Salvia lyrata</i>	1.00	1.00	0.05	0.10	0.07
<i>Scleria</i> sp.	1.00	1.00	0.05	0.10	0.07
<i>Trifolium campestre</i>	1.00	1.00	0.05	0.10	0.07
<i>Triodanis perfoliata</i>	1.00	1.00	0.05	0.10	0.07
unknown forb 7	1.00	1.00	0.05	0.10	0.07
<i>Viola</i> sp.	1.00	1.00	0.05	0.10	0.07
Total	1,002.00	2,011.00	100.00	100.00	100.00

Appendix G. Species importance values by strata and treatment type.

Table 33: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8" + dbh), *untreated plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	3.90	27.96	50.76	126.02	39.01	42.59	41.62	37.39
<i>Pinus taeda</i>	3.17	12.90	41.17	104.25	32.27	35.24	33.76	27.30
snag	0.62	17.20	8.05	17.59	5.44	5.94	6.60	9.92
<i>Quercus stellata</i>	0.60	13.98	7.74	17.74	5.49	5.99	6.35	8.77
<i>Quercus alba</i>	0.36	6.45	4.64	12.56	3.89	4.25	3.81	4.84
<i>Carya tomentosa</i>	0.31	7.53	4.02	6.99	2.16	2.36	3.30	4.40
<i>Nyssa sylvatica</i>	0.07	3.23	0.93	1.85	0.57	0.63	0.76	1.54
<i>Quercus rubra</i>	0.12	1.08	1.55	3.06	0.95	1.03	1.27	1.13
<i>Prunus serotina</i>	0.05	2.15	0.62	1.81	0.56	0.61	0.51	1.09
<i>Ulmus alata</i>	0.05	2.15	0.62	1.08	0.33	0.37	0.51	1.01
<i>Carya texana</i>	0.05	1.08	0.62	1.04	0.32	0.35	0.51	0.64
<i>Liquidambar styraciflua</i>	0.02	1.08	0.31	0.62	0.19	0.21	0.25	0.51
<i>Juniperus virginiana</i>	0.02	1.08	0.31	0.43	0.13	0.14	0.25	0.49
<i>Quercus marilandica</i>	0.02	1.08	0.31	0.43	0.13	0.14	0.25	0.49
<i>Quercus falcata</i>	0.02	1.08	0.31	0.39	0.12	0.13	0.25	0.49
Totals	9.38	100.00	121.95	295.86	91.58	100.00	100.00	100.00

Table 34: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), *untreated plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	5.40	7.21	70.26	32.46	10.05	30.31	12.36	16.63
snag	4.64	10.66	60.36	10.22	3.16	9.55	10.62	10.27
<i>Quercus stellata</i>	4.60	8.46	59.74	12.64	3.91	11.80	10.51	10.26
<i>Carya tomentosa</i>	4.29	9.09	55.71	10.63	3.29	9.93	9.80	9.61
<i>Quercus alba</i>	3.57	6.90	46.43	9.26	2.87	8.65	8.17	7.90
<i>Ulmus alata</i>	3.10	7.21	40.24	3.94	1.22	3.68	7.08	5.99
<i>Ostrya virginiana</i>	3.55	2.51	46.12	2.33	0.72	2.17	8.11	4.26
<i>Nyssa sylvatica</i>	1.93	4.70	25.07	2.52	0.78	2.35	4.41	3.82
<i>Cornus florida</i>	1.40	5.33	18.26	1.57	0.49	1.47	3.21	3.34
<i>Prunus serotina</i>	1.21	5.02	15.79	2.32	0.72	2.17	2.78	3.32
<i>Liquidambar styraciflua</i>	1.57	0.94	20.43	4.01	1.24	3.74	3.59	2.76
<i>Quercus rubra</i>	1.10	2.82	14.24	2.00	0.62	1.87	2.50	2.40
<i>Quercus marilandica</i>	0.86	3.76	11.14	0.72	0.22	0.67	1.96	2.13
<i>Quercus velutina</i>	0.55	3.76	7.12	1.42	0.44	1.33	1.25	2.11
<i>Acer rubrum</i>	0.98	2.82	12.69	0.96	0.30	0.90	2.23	1.98
<i>Carya texana</i>	1.45	1.25	18.88	1.41	0.44	1.31	3.32	1.96
<i>Pinus taeda</i>	0.38	1.88	4.95	3.27	1.01	3.05	0.87	1.94
<i>Juniperus virginiana</i>	0.48	2.19	6.19	1.07	0.33	1.00	1.09	1.43
<i>Acer saccharum</i>	0.45	1.25	5.88	0.92	0.29	0.86	1.03	1.05
<i>Prunus mexicana</i>	0.43	1.57	5.57	0.60	0.19	0.56	0.98	1.04
<i>Carya glabra</i>	0.29	0.94	3.71	1.37	0.42	1.28	0.65	0.96
<i>Viburnum rufidulum</i>	0.24	1.57	3.10	0.09	0.03	0.08	0.54	0.73
<i>Quercus falcata</i>	0.19	1.25	2.48	0.47	0.15	0.44	0.44	0.71
<i>Vaccinium arboreum</i>	0.33	1.25	4.33	0.09	0.03	0.08	0.76	0.70
<i>Carpinus caroliniana</i>	0.29	0.94	3.71	0.15	0.05	0.14	0.65	0.58
<i>Amelanchier arborea</i>	0.10	0.63	1.24	0.04	0.01	0.04	0.22	0.29
<i>Morus rubra</i>	0.05	0.63	0.62	0.02	0.01	0.02	0.11	0.25
<i>Ulmus americana</i>	0.02	0.31	0.31	0.32	0.10	0.30	0.05	0.22
<i>Fraxinus pennsylvanica</i>	0.02	0.31	0.31	0.19	0.06	0.18	0.05	0.18
<i>Rhus glabra</i>	0.07	0.31	0.93	0.01	0.00	0.01	0.16	0.16

<i>Prunus americana</i>	0.05	0.31	0.62	0.02	0.01	0.02	0.11	0.15
<i>Prunus sp.</i>	0.02	0.31	0.31	0.01	0.00	0.01	0.05	0.13
<i>Ilex opaca</i>	0.02	0.31	0.31	0.01	0.00	0.01	0.05	0.13
<i>Celtis laevigata</i>	0.02	0.31	0.31	0.01	0.00	0.00	0.05	0.12
<i>Chionanthus virginicus</i>	0.02	0.31	0.31	0.01	0.00	0.00	0.05	0.12
<i>Crataegous sp.</i>	0.02	0.31	0.31	0.01	0.00	0.00	0.05	0.12
<i>Fraxinus americana</i>	0.02	0.31	0.31	0.00	0.00	0.00	0.05	0.12
<i>Rhus copallinum</i>	0.02	0.31	0.31	0.00	0.00	0.00	0.05	0.12
Totals	43.74	100.00	568.60	107.10	33.15	100.00	100.00	100.00

Table 35: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, *untreated plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Ulmus alata</i>	0.45	8.80	104.13	10.29	9.54
<i>Quercus rubra</i>	0.36	6.94	73.36	7.25	7.10
<i>Quercus stellata</i>	0.40	7.87	55.61	5.50	6.68
<i>Carya tomentosa</i>	0.31	6.02	73.36	7.25	6.63
<i>Acer rubrum</i>	0.21	4.17	59.16	5.85	5.01
<i>Prunus serotina</i>	0.29	5.56	43.78	4.33	4.94
<i>Vaccinium arboreum</i>	0.24	4.63	35.50	3.51	4.07
<i>Carya texana</i>	0.21	4.17	37.86	3.74	3.95
<i>Quercus velutina</i>	0.21	4.17	34.31	3.39	3.78
<i>Callicarpa americana</i>	0.12	2.31	49.70	4.91	3.61
<i>Ostrya virginiana</i>	0.19	3.70	34.31	3.39	3.55
<i>Quercus alba</i>	0.21	4.17	29.58	2.92	3.55
<i>Rhus copallinum</i>	0.07	1.39	53.25	5.26	3.33
<i>Acer saccharum</i>	0.10	1.85	42.60	4.21	3.03
<i>Quercus marilandica</i>	0.19	3.70	16.57	1.64	2.67
<i>Nyssa sylvatica</i>	0.12	2.31	26.03	2.57	2.44
<i>Juniperus virginiana</i>	0.14	2.78	13.02	1.29	2.03
<i>Pinus echinata</i>	0.02	0.46	35.50	3.51	1.99
<i>Quercus falcata</i>	0.12	2.31	13.02	1.29	1.80
<i>Liquidambar styraciflua</i>	0.10	1.85	15.38	1.52	1.69
<i>Cornus florida</i>	0.10	1.85	8.28	0.82	1.34
<i>Carya glabra</i>	0.07	1.39	11.83	1.17	1.28
<i>Viburnum dentatum</i>	0.05	0.93	15.38	1.52	1.22
<i>Rhus glabra</i>	0.05	0.93	14.20	1.40	1.16
<i>Fraxinus americana</i>	0.07	1.39	9.47	0.94	1.16
<i>Carpinus caroliniana</i>	0.05	0.93	13.02	1.29	1.11
<i>Viburnum rufidulum</i>	0.05	0.93	11.83	1.17	1.05
<i>Quercus nigra</i>	0.02	0.46	13.02	1.29	0.87
<i>Amelanchier arborea</i>	0.05	0.93	7.10	0.70	0.81
<i>Smilax bona-nox</i>	0.02	0.46	9.47	0.94	0.70
<i>Frangula caroliniana</i>	0.05	0.93	4.73	0.47	0.70
<i>Hamamelis virginiana</i>	0.05	0.93	3.55	0.35	0.64
<i>Prunus americana</i>	0.05	0.93	3.55	0.35	0.64
<i>Rubus argutus</i>	0.02	0.46	5.92	0.58	0.52
<i>Smilax rotundifolia</i>	0.02	0.46	4.73	0.47	0.47
<i>Aralia spinosa</i>	0.02	0.46	3.55	0.35	0.41
<i>Cercis canadensis</i>	0.02	0.46	3.55	0.35	0.41
<i>Prunus sp.</i>	0.02	0.46	3.55	0.35	0.41
<i>Vitis aestivalis</i>	0.02	0.46	3.55	0.35	0.41
<i>Vitis rotundifolia</i>	0.02	0.46	3.55	0.35	0.41
<i>Ampelopsis arborea</i>	0.02	0.46	1.18	0.12	0.29
<i>Chionanthus virginicus</i>	0.02	0.46	1.18	0.12	0.29
<i>Crataegus crus-galli</i>	0.02	0.46	1.18	0.12	0.29
<i>Crataegous sp.</i>	0.02	0.46	1.18	0.12	0.29

<i>Diospyros virginiana</i>	0.02	0.46	1.18	0.12	0.29
<i>Ilex opaca</i>	0.02	0.46	1.18	0.12	0.29
<i>Prunus mexicana</i>	0.02	0.46	1.18	0.12	0.29
<i>Sassafras albidum</i>	0.02	0.46	1.18	0.12	0.29
<i>Vaccinium</i> sp.	0.02	0.46	1.18	0.12	0.29
<i>Vaccinium stamineum</i>	0.02	0.46	1.18	0.12	0.29
Total	5.14	100.00	1,011.68	100.00	100.00

Table 36: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, *untreated plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Vitis rotundifolia</i>	46.00	140.00	6.91	4.24	5.57
<i>Parthenocissus quinquefolia</i>	40.00	100.00	4.93	3.69	4.31
<i>Toxicodendron radicans</i>	38.00	87.00	4.29	3.50	3.90
<i>Smilax bona-nox</i>	42.00	77.00	3.80	3.87	3.83
<i>Pinus echinata</i>	43.00	64.00	3.16	3.96	3.56
<i>Scleria oligantha</i>	42.00	65.00	3.21	3.87	3.54
<i>Chasmanthium sessiliflorum</i>	29.00	77.00	3.80	2.67	3.24
<i>Vaccinium pallidum</i>	21.00	44.00	2.17	1.94	2.05
<i>Dichanthelium laxiflorum</i>	19.00	44.00	2.17	1.75	1.96
<i>Dichanthelium dichotomum</i>	21.00	37.00	1.83	1.94	1.88
<i>Schizachyrium scoparium</i>	17.00	35.00	1.73	1.57	1.65
<i>Danthonia spicata</i>	15.00	35.00	1.73	1.38	1.55
<i>Helianthus hirsutus</i>	16.00	31.00	1.53	1.47	1.50
<i>Dichanthelium linearifolium</i>	15.00	32.00	1.58	1.38	1.48
<i>Clitoria mariana</i>	17.00	27.00	1.33	1.57	1.45
<i>Acer rubrum</i>	19.00	23.00	1.13	1.75	1.44
<i>Solidago ulmifolia</i>	18.00	23.00	1.13	1.66	1.40
<i>Ostrya virginiana</i>	16.00	26.00	1.28	1.47	1.38
<i>Pteridium aquilinum</i>	10.00	37.00	1.83	0.92	1.37
<i>Monarda russeliana</i>	18.00	21.00	1.04	1.66	1.35
<i>Antennaria plantaginifolia</i>	14.00	26.00	1.28	1.29	1.29
<i>Ulmus alata</i>	14.00	25.00	1.23	1.29	1.26
<i>Dichanthelium acuminatum</i>	14.00	24.00	1.18	1.29	1.24
<i>Dichanthelium boscii</i>	12.00	25.00	1.23	1.11	1.17
<i>Rubus</i> sp.	9.00	27.00	1.33	0.83	1.08
<i>Carya tomentosa</i>	10.00	23.00	1.13	0.92	1.03
<i>Lespedeza procumbens</i>	11.00	21.00	1.04	1.01	1.02
<i>Lespedeza repens</i>	12.00	19.00	0.94	1.11	1.02
<i>Prunus serotina</i>	12.00	19.00	0.94	1.11	1.02
<i>Smilax glauca</i>	12.00	17.00	0.84	1.11	0.97
<i>Amphicarpaea bracteata</i>	11.00	18.00	0.89	1.01	0.95
<i>Quercus stellata</i>	10.00	19.00	0.94	0.92	0.93
<i>Carex</i> sp.	11.00	17.00	0.84	1.01	0.93
<i>Symphyotrichum anomalum</i>	12.00	15.00	0.74	1.11	0.92
<i>Quercus alba</i>	10.00	18.00	0.89	0.92	0.90
<i>Galactia volubilis</i>	11.00	16.00	0.79	1.01	0.90
<i>Nyssa sylvatica</i>	10.00	15.00	0.74	0.92	0.83
<i>Rubus flagellaris</i>	7.00	20.00	0.99	0.65	0.82
<i>Rhus copallinum</i>	7.00	19.00	0.94	0.65	0.79
<i>Liatris aspera</i>	8.00	14.00	0.69	0.74	0.71
<i>Quercus marilandica</i>	7.00	15.00	0.74	0.65	0.69
<i>Solidago nemoralis</i>	8.00	13.00	0.64	0.74	0.69
<i>Dichanthelium commutatum</i>	8.00	12.00	0.59	0.74	0.66
<i>Carya alba</i>	8.00	11.00	0.54	0.74	0.64

<i>Rudbeckia hirta</i>	6.00	14.00	0.69	0.55	0.62
<i>Smilax rotundifolia</i>	6.00	14.00	0.69	0.55	0.62
<i>Viola sororia</i>	8.00	10.00	0.49	0.74	0.62
<i>Desmodium laevigatum</i>	6.00	13.00	0.64	0.55	0.60
<i>Symphyotrichum patens</i>	7.00	10.00	0.49	0.65	0.57
<i>Erechtites hieraciifolius</i>	6.00	11.00	0.54	0.55	0.55
<i>Scutellaria elliptica</i>	6.00	11.00	0.54	0.55	0.55
<i>Vaccinium arboreum</i>	5.00	12.00	0.59	0.46	0.53
<i>Oxalis dillenii</i>	7.00	8.00	0.39	0.65	0.52
<i>Quercus rubra</i>	5.00	11.00	0.54	0.46	0.50
<i>Cornus florida</i>	5.00	10.00	0.49	0.46	0.48
<i>Rubus argutus</i>	4.00	11.00	0.54	0.37	0.46
<i>Carya texana</i>	5.00	9.00	0.44	0.46	0.45
<i>Conyza canadensis</i>	5.00	9.00	0.44	0.46	0.45
<i>Kummerowia stipulacea</i>	5.00	9.00	0.44	0.46	0.45
<i>Viola sagittata</i>	6.00	7.00	0.35	0.55	0.45
<i>Berchemia scandens</i>	5.00	8.00	0.39	0.46	0.43
<i>Carex latebracteata</i>	5.00	8.00	0.39	0.46	0.43
<i>Lespedeza virginica</i>	5.00	8.00	0.39	0.46	0.43
<i>Asplenium platyneuron</i>	6.00	6.00	0.30	0.55	0.42
<i>Desmodium obtusum</i>	4.00	9.00	0.44	0.37	0.41
<i>Lactuca canadensis</i>	5.00	7.00	0.35	0.46	0.40
<i>Callicarpa americana</i>	4.00	8.00	0.39	0.37	0.38
<i>Carya texana</i>	4.00	8.00	0.39	0.37	0.38
<i>Piptochaetium avenaceum</i>	4.00	7.00	0.35	0.37	0.36
<i>Quercus nigra</i>	4.00	7.00	0.35	0.37	0.36
<i>Stylosanthes biflora</i>	4.00	7.00	0.35	0.37	0.36
<i>Rhynchosia latifolia</i>	3.00	8.00	0.39	0.28	0.34
<i>Galium circaezans</i>	4.00	6.00	0.30	0.37	0.33
<i>Prunus mexicana</i>	4.00	6.00	0.30	0.37	0.33
<i>Ruellia pedunculata</i>	4.00	6.00	0.30	0.37	0.33
<i>Solidago odora</i>	4.00	6.00	0.30	0.37	0.33
<i>Eupatorium serotinum</i>	3.00	7.00	0.35	0.28	0.31
<i>Liquidambar styraciflua</i>	3.00	7.00	0.35	0.28	0.31
<i>Scutellaria ovata</i>	4.00	5.00	0.25	0.37	0.31
<i>Hypericum hypericoides</i>	3.00	6.00	0.30	0.28	0.29
<i>Acalypha gracilens</i>	4.00	4.00	0.20	0.37	0.28
<i>Liatris sp.</i>	4.00	4.00	0.20	0.37	0.28
<i>Desmodium nudiflorum</i>	3.00	5.00	0.25	0.28	0.26
<i>Sanicula canadensis</i>	3.00	5.00	0.25	0.28	0.26
<i>Echinacea pallida</i>	2.00	6.00	0.30	0.18	0.24
<i>Vitis aestivalis</i>	2.00	6.00	0.30	0.18	0.24
<i>Celtis occidentalis</i>	3.00	4.00	0.20	0.28	0.24
<i>Chamaecrista nictitans</i>	3.00	4.00	0.20	0.28	0.24
<i>Maianthemum racemosum</i>	3.00	4.00	0.20	0.28	0.24
<i>Vicia caroliniana</i>	3.00	4.00	0.20	0.28	0.24
<i>Dichantherium polyanthes</i>	2.00	5.00	0.25	0.18	0.22
<i>Lespedeza violacea</i>	2.00	5.00	0.25	0.18	0.22
<i>Symphoricarpos orbiculatus</i>	2.00	5.00	0.25	0.18	0.22

<i>Viola</i> sp.	3.00	3.00	0.15	0.28	0.21
<i>Acer saccharum</i>	2.00	4.00	0.20	0.18	0.19
<i>Carex blanda</i>	2.00	4.00	0.20	0.18	0.19
<i>Carex glaucodea</i>	2.00	4.00	0.20	0.18	0.19
<i>Cynoglossum virginianum</i>	2.00	4.00	0.20	0.18	0.19
<i>Hamamelis virginiana</i>	2.00	4.00	0.20	0.18	0.19
<i>Pseudognaphalium obtusifolium</i>	2.00	4.00	0.20	0.18	0.19
<i>Quercus velutina</i>	2.00	4.00	0.20	0.18	0.19
<i>Vaccinium stamineum</i>	2.00	4.00	0.20	0.18	0.19
<i>Acalypha virginica</i>	2.00	3.00	0.15	0.18	0.17
<i>Chamaecrista fasciculata</i>	2.00	3.00	0.15	0.18	0.17
<i>Cunila organoides</i>	2.00	3.00	0.15	0.18	0.17
<i>Hieracium gronovii</i>	2.00	3.00	0.15	0.18	0.17
<i>Matelea baldwyniana</i>	2.00	3.00	0.15	0.18	0.17
<i>Morus rubra</i>	2.00	3.00	0.15	0.18	0.17
<i>Phlox pilosa</i>	2.00	3.00	0.15	0.18	0.17
<i>Salvia lyrata</i>	2.00	3.00	0.15	0.18	0.17
<i>Solidago petiolaris</i>	2.00	3.00	0.15	0.18	0.17
<i>Symphytichum lanceolatum</i>	2.00	3.00	0.15	0.18	0.17
<i>Trachelospermum difforme</i>	2.00	3.00	0.15	0.18	0.17
<i>Viola pedata</i>	2.00	3.00	0.15	0.18	0.17
<i>Crataegus marshallii</i>	2.00	2.00	0.10	0.18	0.14
<i>Croton monanthogynus</i>	2.00	2.00	0.10	0.18	0.14
<i>Croton willdenowii</i>	2.00	2.00	0.10	0.18	0.14
<i>Dioscorea villosa</i>	2.00	2.00	0.10	0.18	0.14
<i>Elephantopus tomentosus</i>	2.00	2.00	0.10	0.18	0.14
<i>Pinus taeda</i>	2.00	2.00	0.10	0.18	0.14
<i>Solidago delicatula</i>	2.00	2.00	0.10	0.18	0.14
<i>Strophostyles umbellata</i>	2.00	2.00	0.10	0.18	0.14
<i>Viola palmata</i>	2.00	2.00	0.10	0.18	0.14
<i>Andropogon gerardii</i>	1.00	3.00	0.15	0.09	0.12
<i>Carex complanata</i>	1.00	3.00	0.15	0.09	0.12
<i>Desmodium viridiflorum</i>	1.00	3.00	0.15	0.09	0.12
<i>Lespedeza hirta</i>	1.00	3.00	0.15	0.09	0.12
<i>Pycnanthemum tenuifolium</i>	1.00	3.00	0.15	0.09	0.12
<i>Sporobolus clandestinus</i>	1.00	3.00	0.15	0.09	0.12
<i>Viburnum dentatum</i>	1.00	3.00	0.15	0.09	0.12
<i>Aralia spinosa</i>	1.00	2.00	0.10	0.09	0.10
<i>Bromus pubescens</i>	1.00	2.00	0.10	0.09	0.10
<i>Carex muehlenbergii</i>	1.00	2.00	0.10	0.09	0.10
<i>Carex blanda</i>	1.00	2.00	0.10	0.09	0.10
<i>Coreopsis grandiflora</i>	1.00	2.00	0.10	0.09	0.10
<i>Crotalaria sagittalis</i>	1.00	2.00	0.10	0.09	0.10
<i>Desmodium glabellum</i>	1.00	2.00	0.10	0.09	0.10
<i>Elymus virginicus</i>	1.00	2.00	0.10	0.09	0.10
<i>Fraxinus americana</i>	1.00	2.00	0.10	0.09	0.10
<i>Lamium amplexicaule</i>	1.00	2.00	0.10	0.09	0.10
<i>Lathyrus venosus</i>	1.00	2.00	0.10	0.09	0.10
<i>Physalis virginiana</i>	1.00	2.00	0.10	0.09	0.10

<i>Sanicula canadensis</i>	1.00	2.00	0.10	0.09	0.10
<i>Solanum carolinense</i>	1.00	2.00	0.10	0.09	0.10
<i>Symphyotrichum</i> sp.	1.00	2.00	0.10	0.09	0.10
<i>Tridens flavus</i>	1.00	2.00	0.10	0.09	0.10
<i>Vitis cinerea</i>	1.00	2.00	0.10	0.09	0.10
<i>Aristolochia serpentaria</i>	1.00	1.00	0.05	0.09	0.07
<i>Baptisia sphaerocarpa</i>	1.00	1.00	0.05	0.09	0.07
<i>Bidens aristosa</i>	1.00	1.00	0.05	0.09	0.07
<i>Botrychium dissectum</i>	1.00	1.00	0.05	0.09	0.07
<i>Carex rosea</i>	1.00	1.00	0.05	0.09	0.07
<i>Celtis tenuifolia</i>	1.00	1.00	0.05	0.09	0.07
<i>Chasmanthium latifolium</i>	1.00	1.00	0.05	0.09	0.07
<i>Crataegous</i> sp.	1.00	1.00	0.05	0.09	0.07
<i>Cyperus</i> sp.	1.00	1.00	0.05	0.09	0.07
<i>Desmodium</i> sp.	1.00	1.00	0.05	0.09	0.07
<i>Desmodium perplexum</i>	1.00	1.00	0.05	0.09	0.07
<i>Dichanthelium</i> sp.	1.00	1.00	0.05	0.09	0.07
<i>Dryopteris marginalis</i>	1.00	1.00	0.05	0.09	0.07
<i>Elymus glabriflorus</i>	1.00	1.00	0.05	0.09	0.07
<i>Euphorbia corollata</i>	1.00	1.00	0.05	0.09	0.07
<i>Eupatorium serotinum</i>	1.00	1.00	0.05	0.09	0.07
<i>Frangula caroliniana</i>	1.00	1.00	0.05	0.09	0.07
<i>Galium arkansanum</i>	1.00	1.00	0.05	0.09	0.07
<i>Heliotropium tenellum</i>	1.00	1.00	0.05	0.09	0.07
<i>Houstonia longifolia</i>	1.00	1.00	0.05	0.09	0.07
<i>Juncus tenuis</i>	1.00	1.00	0.05	0.09	0.07
<i>Kummerowia striata</i>	1.00	1.00	0.05	0.09	0.07
<i>Lactuca floridana</i>	1.00	1.00	0.05	0.09	0.07
<i>Lechea tenuifolia</i>	1.00	1.00	0.05	0.09	0.07
<i>Lonicera sempervirens</i>	1.00	1.00	0.05	0.09	0.07
<i>Packera obovata</i>	1.00	1.00	0.05	0.09	0.07
<i>Passiflora lutea</i>	1.00	1.00	0.05	0.09	0.07
<i>Potentilla simplex</i>	1.00	1.00	0.05	0.09	0.07
<i>Rhus aromatica</i>	1.00	1.00	0.05	0.09	0.07
<i>Rosa carolina</i>	1.00	1.00	0.05	0.09	0.07
<i>Ruellia strepens</i>	1.00	1.00	0.05	0.09	0.07
<i>Sambucus canadensis</i>	1.00	1.00	0.05	0.09	0.07
<i>Scleria</i> sp.	1.00	1.00	0.05	0.09	0.07
<i>Scutellaria parvula</i>	1.00	1.00	0.05	0.09	0.07
<i>Smilax</i> sp.	1.00	1.00	0.05	0.09	0.07
<i>Trifolium campestre</i>	1.00	1.00	0.05	0.09	0.07
unknown forb 2	1.00	1.00	0.05	0.09	0.07
unknown forb 3	1.00	1.00	0.05	0.09	0.07
unknown forb 7	1.00	1.00	0.05	0.09	0.07
<i>Vicia sativa</i>	1.00	1.00	0.05	0.09	0.07
Total	1,085.00	2,027.00	100.00	100.00	100.00

Table 37: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8" + dbh), *burned-only plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus taeda</i>	4.03	24.56	52.41	114.89	46.68	49.92	50.19	41.56
<i>Pinus echinata</i>	2.56	29.82	33.31	81.39	33.06	35.36	31.91	32.36
snag	0.63	14.04	8.13	14.09	5.72	6.12	7.78	9.31
<i>Quercus stellata</i>	0.44	15.79	5.69	11.95	4.86	5.19	5.45	8.81
<i>Quercus alba</i>	0.16	5.26	2.03	3.79	1.54	1.64	1.95	2.95
<i>Quercus rubra</i>	0.06	3.51	0.81	1.05	0.43	0.46	0.78	1.58
<i>Carya texana</i>	0.06	1.75	0.81	0.75	0.30	0.32	0.78	0.95
<i>Quercus falcata</i>	0.03	1.75	0.41	1.07	0.43	0.46	0.39	0.87
<i>Liquidambar styraciflua</i>	0.03	1.75	0.41	0.62	0.25	0.27	0.39	0.80
<i>Quercus velutina</i>	0.03	1.75	0.41	0.57	0.23	0.25	0.39	0.80
Totals	8.03	100.00	104.41	230.17	93.50	100.00	100.00	100.00

Table 38: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), *burned-only plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	5.72	11.11	74.34	15.34	6.23	34.57	27.60	24.43
<i>snag</i>	3.00	14.20	39.00	6.64	2.70	14.97	14.48	14.55
<i>Quercus stellata</i>	2.28	12.96	29.66	4.04	1.64	9.10	11.01	11.02
<i>Carya tomentosa</i>	2.00	9.88	26.00	2.55	1.04	5.76	9.65	8.43
<i>Pinus taeda</i>	0.63	2.47	8.13	4.81	1.95	10.83	3.02	5.44
<i>Carya texana</i>	1.19	4.94	15.44	1.69	0.69	3.80	5.73	4.82
<i>Quercus alba</i>	0.81	4.32	10.56	2.12	0.86	4.78	3.92	4.34
<i>Cornus florida</i>	0.81	4.94	10.56	0.69	0.28	1.55	3.92	3.47
<i>Ulmus alata</i>	0.50	4.94	6.50	0.98	0.40	2.20	2.41	3.18
<i>Quercus rubra</i>	0.44	3.70	5.69	1.58	0.64	3.57	2.11	3.13
<i>Prunus serotina</i>	0.50	3.70	6.50	1.01	0.41	2.27	2.41	2.79
<i>Ostrya virginiana</i>	0.88	2.47	11.38	0.75	0.30	1.69	4.22	2.79
<i>Quercus marilandica</i>	0.25	3.70	3.25	0.49	0.20	1.11	1.21	2.01
<i>Juniperus virginiana</i>	0.19	3.09	2.44	0.31	0.12	0.69	0.90	1.56
<i>Quercus velutina</i>	0.31	1.85	4.06	0.21	0.08	0.47	1.51	1.28
<i>Liquidambar styraciflua</i>	0.13	1.85	1.63	0.48	0.20	1.08	0.60	1.18
<i>Quercus falcata</i>	0.19	1.85	2.44	0.08	0.03	0.17	0.90	0.98
<i>Acer rubrum</i>	0.34	0.62	4.47	0.21	0.09	0.48	1.66	0.92
<i>Vaccinium arboreum</i>	0.16	1.23	2.03	0.05	0.02	0.11	0.75	0.70
<i>Fraxinus americana</i>	0.06	1.23	0.81	0.09	0.04	0.20	0.30	0.58
<i>Nyssa sylvatica</i>	0.06	1.23	0.81	0.04	0.02	0.10	0.30	0.54
<i>Viburnum rufidulum</i>	0.06	1.23	0.81	0.02	0.01	0.05	0.30	0.53
<i>Ulmus americana</i>	0.09	0.62	1.22	0.09	0.04	0.21	0.45	0.43
<i>Prunus americana</i>	0.06	0.62	0.81	0.03	0.01	0.08	0.30	0.33
<i>Fraxinus pennsylvanica</i>	0.03	0.62	0.41	0.06	0.02	0.14	0.15	0.30
<i>Amelanchier arborea</i>	0.03	0.62	0.41	0.02	0.01	0.04	0.15	0.27
Totals	20.72	100.00	269.34	44.37	18.03	100.00	100.00	100.00

Table 39: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, *burned-only plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Carya texana</i>	0.47	8.29	203.44	12.63	10.46
<i>Quercus stellata</i>	0.50	8.84	184.81	11.48	10.16
<i>Carya tomentosa</i>	0.59	10.50	156.85	9.74	10.12
<i>Acer rubrum</i>	0.22	3.87	222.08	13.79	8.83
<i>Callicarpa americana</i>	0.31	5.52	127.35	7.91	6.72
<i>Rhus copallinum</i>	0.25	4.42	132.01	8.20	6.31
<i>Quercus rubra</i>	0.28	4.97	57.46	3.57	4.27
<i>Quercus alba</i>	0.25	4.42	55.91	3.47	3.95
<i>Pinus echinata</i>	0.16	2.76	65.23	4.05	3.41
<i>Vaccinium arboreum</i>	0.25	4.42	31.06	1.93	3.17
<i>Cornus florida</i>	0.25	4.42	26.40	1.64	3.03
<i>Ulmus alata</i>	0.19	3.31	37.27	2.31	2.81
<i>Ostrya virginiana</i>	0.13	2.21	54.36	3.38	2.79
<i>Vitis rotundifolia</i>	0.13	2.21	48.14	2.99	2.60
<i>Quercus marilandica</i>	0.19	3.31	12.42	0.77	2.04
<i>Prunus serotina</i>	0.16	2.76	18.64	1.16	1.96
<i>Fraxinus americana</i>	0.13	2.21	18.64	1.16	1.68
<i>Smilax bona-nox</i>	0.09	1.66	18.64	1.16	1.41
<i>Quercus falcata</i>	0.13	2.21	9.32	0.58	1.39
<i>Rhus glabra</i>	0.09	1.66	15.53	0.96	1.31
<i>Liquidambar styraciflua</i>	0.09	1.66	12.42	0.77	1.21
<i>Rubus argutus</i>	0.06	1.10	17.08	1.06	1.08
<i>Diospyros virginiana</i>	0.06	1.10	12.42	0.77	0.94
<i>Robinia pseudoacacia</i>	0.03	0.55	18.64	1.16	0.85
<i>Carpinus caroliniana</i>	0.06	1.10	7.77	0.48	0.79
<i>Quercus velutina</i>	0.06	1.10	6.21	0.39	0.75
<i>Rhus aromatica</i>	0.06	1.10	3.11	0.19	0.65
<i>Smilax rotundifolia</i>	0.06	1.10	3.11	0.19	0.65
<i>Vitis aestivalis</i>	0.03	0.55	6.21	0.39	0.47
<i>Cercis canadensis</i>	0.03	0.55	4.66	0.29	0.42
<i>Aralia spinosa</i>	0.03	0.55	3.11	0.19	0.37
<i>Juniperus virginiana</i>	0.03	0.55	3.11	0.19	0.37
<i>Prunus sp.</i>	0.03	0.55	3.11	0.19	0.37
<i>Symphoricarpos orbiculatus</i>	0.03	0.55	3.11	0.19	0.37
<i>Amelanchier arborea</i>	0.03	0.55	1.55	0.10	0.32
<i>Magnolia acuminata</i>	0.03	0.55	1.55	0.10	0.32
<i>Morus rubra</i>	0.03	0.55	1.55	0.10	0.32
<i>Prunus americana</i>	0.03	0.55	1.55	0.10	0.32
<i>Quercus nigra</i>	0.03	0.55	1.55	0.10	0.32
<i>Quercus phellos</i>	0.03	0.55	1.55	0.10	0.32
<i>Sassafras albidum</i>	0.03	0.55	1.55	0.10	0.32
Total	5.66	100.00	1,610.48	100.00	100.00

Table 40: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, *burned-only plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Toxicodendron radicans</i>	58.00	130.00	4.82	4.22	4.52
<i>Pinus echinata</i>	57.00	83.00	3.08	4.15	3.61
<i>Dichanthelium dichotomum</i>	49.00	87.00	3.23	3.57	3.40
<i>Dichanthelium laxiflorum</i>	40.00	95.00	3.52	2.91	3.22
<i>Helianthus hirsutus</i>	39.00	89.00	3.30	2.84	3.07
<i>Scleria oligantha</i>	41.00	75.00	2.78	2.99	2.88
<i>Schizachyrium scoparium</i>	31.00	93.00	3.45	2.26	2.85
<i>Chasmanthium sessiliflorum</i>	34.00	79.00	2.93	2.48	2.70
<i>Clitoria mariana</i>	38.00	64.00	2.37	2.77	2.57
<i>Vitis rotundifolia</i>	31.00	77.00	2.86	2.26	2.56
<i>Dichanthelium commutatum</i>	37.00	63.00	2.34	2.69	2.52
<i>Smilax bona-nox</i>	33.00	67.00	2.48	2.40	2.44
<i>Galactia volubilis</i>	39.00	50.00	1.85	2.84	2.35
<i>Lespedeza procumbens</i>	30.00	57.00	2.11	2.18	2.15
<i>Rubus argutus</i>	26.00	64.00	2.37	1.89	2.13
<i>Quercus stellata</i>	23.00	63.00	2.34	1.68	2.01
<i>Dichanthelium linearifolium</i>	26.00	51.00	1.89	1.89	1.89
<i>Parthenocissus quinquefolia</i>	23.00	54.00	2.00	1.68	1.84
<i>Vaccinium arboreum</i>	21.00	48.00	1.78	1.53	1.65
<i>Chamaecrista fasciculata</i>	27.00	35.00	1.30	1.97	1.63
<i>Desmodium laevigatum</i>	17.00	33.00	1.22	1.24	1.23
<i>Danthonia spicata</i>	15.00	33.00	1.22	1.09	1.16
<i>Carya texana</i>	13.00	36.00	1.33	0.95	1.14
<i>Dichanthelium boscii</i>	15.00	31.00	1.15	1.09	1.12
<i>Vaccinium pallidum</i>	13.00	34.00	1.26	0.95	1.10
<i>Rubus flagellaris</i>	14.00	29.00	1.08	1.02	1.05
<i>Monarda russeliana</i>	14.00	27.00	1.00	1.02	1.01
<i>Antennaria plantaginifolia</i>	13.00	28.00	1.04	0.95	0.99
<i>Symphyotrichum anomalum</i>	14.00	25.00	0.93	1.02	0.97
<i>Dichanthelium acuminatum</i>	16.00	21.00	0.78	1.17	0.97
<i>Rhus copallinum</i>	11.00	27.00	1.00	0.80	0.90
<i>Ulmus alata</i>	12.00	25.00	0.93	0.87	0.90
<i>Lespedeza repens</i>	13.00	23.00	0.85	0.95	0.90
<i>Oxalis dillenii</i>	15.00	16.00	0.59	1.09	0.84
<i>Solidago petiolaris</i>	11.00	21.00	0.78	0.80	0.79
<i>Coreopsis grandiflora</i>	11.00	19.00	0.70	0.80	0.75
<i>Stylosanthes biflora</i>	13.00	15.00	0.56	0.95	0.75
<i>Solidago ulmifolia</i>	11.00	18.00	0.67	0.80	0.73
<i>Kummerowia striata</i>	9.00	21.00	0.78	0.66	0.72
<i>Chasmanthium laxum</i>	8.00	22.00	0.82	0.58	0.70
<i>Symphyotrichum patens</i>	10.00	16.00	0.59	0.73	0.66
<i>Desmodium obtusum</i>	7.00	21.00	0.78	0.51	0.64
<i>Rubus</i> sp.	7.00	21.00	0.78	0.51	0.64
<i>Erechtites hieraciifolius</i>	10.00	15.00	0.56	0.73	0.64

<i>Ceanothus americanus</i>	7.00	19.00	0.70	0.51	0.61
<i>Vitis aestivalis</i>	8.00	17.00	0.63	0.58	0.61
<i>Acer rubrum</i>	10.00	13.00	0.48	0.73	0.61
<i>Lespedeza cuneata</i>	6.00	19.00	0.70	0.44	0.57
<i>Rudbeckia hirta</i>	7.00	17.00	0.63	0.51	0.57
<i>Ostrya virginiana</i>	8.00	15.00	0.56	0.58	0.57
<i>Phlox pilosa</i>	10.00	11.00	0.41	0.73	0.57
<i>Lespedeza virginica</i>	7.00	13.00	0.48	0.51	0.50
<i>Quercus alba</i>	7.00	13.00	0.48	0.51	0.50
<i>Lactuca canadensis</i>	7.00	12.00	0.44	0.51	0.48
<i>Carex rosea</i>	6.00	13.00	0.48	0.44	0.46
<i>Andropogon gerardii</i>	5.00	14.00	0.52	0.36	0.44
<i>Desmodium viridiflorum</i>	6.00	12.00	0.44	0.44	0.44
<i>Carya tomentosa</i>	4.00	15.00	0.56	0.29	0.42
<i>Sanicula canadensis</i>	6.00	10.00	0.37	0.44	0.40
<i>Pteridium aquilinum</i>	4.00	13.00	0.48	0.29	0.39
<i>Coreopsis palmata</i>	5.00	11.00	0.41	0.36	0.39
<i>Pseudognaphalium obtusifolium</i>	6.00	9.00	0.33	0.44	0.39
<i>Pinus taeda</i>	7.00	7.00	0.26	0.51	0.38
<i>Scutellaria ovata</i>	7.00	7.00	0.26	0.51	0.38
<i>Quercus marilandica</i>	4.00	12.00	0.44	0.29	0.37
<i>Liatris aspera</i>	5.00	10.00	0.37	0.36	0.37
<i>Monarda fistulosa</i>	5.00	10.00	0.37	0.36	0.37
<i>Viola palmata</i>	6.00	8.00	0.30	0.44	0.37
<i>Viola sororia</i>	6.00	8.00	0.30	0.44	0.37
<i>Carex latebracteata</i>	4.00	11.00	0.41	0.29	0.35
<i>Smilax rotundifolia</i>	4.00	11.00	0.41	0.29	0.35
<i>Solidago odora</i>	6.00	7.00	0.26	0.44	0.35
<i>Lespedeza hirta</i>	5.00	8.00	0.30	0.36	0.33
<i>Physalis heterophylla</i>	5.00	8.00	0.30	0.36	0.33
<i>Acalypha gracilens</i>	6.00	6.00	0.22	0.44	0.33
<i>Symphoricarpos orbiculatus</i>	4.00	9.00	0.33	0.29	0.31
<i>Tradescantia ohiensis</i>	4.00	9.00	0.33	0.29	0.31
<i>Ruellia pedunculata</i>	5.00	7.00	0.26	0.36	0.31
<i>Nyssa sylvatica</i>	4.00	8.00	0.30	0.29	0.29
<i>Quercus rubra</i>	4.00	8.00	0.30	0.29	0.29
<i>Elymus glaberrimus</i>	3.00	9.00	0.33	0.22	0.28
<i>Ruellia strepens</i>	5.00	5.00	0.19	0.36	0.27
<i>Galium obtusum</i>	4.00	6.00	0.22	0.29	0.26
<i>Callicarpa americana</i>	3.00	7.00	0.26	0.22	0.24
<i>Quercus velutina</i>	3.00	7.00	0.26	0.22	0.24
<i>Acalypha monococca</i>	4.00	5.00	0.19	0.29	0.24
<i>Conyza canadensis</i>	4.00	5.00	0.19	0.29	0.24
<i>Berchemia scandens</i>	3.00	6.00	0.22	0.22	0.22
<i>Carex complanata</i>	3.00	6.00	0.22	0.22	0.22
<i>Potentilla simplex</i>	3.00	6.00	0.22	0.22	0.22
<i>Solidago nemoralis</i>	3.00	6.00	0.22	0.22	0.22
<i>Hypericum hypericoides</i>	4.00	4.00	0.15	0.29	0.22
<i>Sorghastrum nutans</i>	2.00	7.00	0.26	0.15	0.20

<i>Desmodium paniculatum</i>	3.00	5.00	0.19	0.22	0.20
<i>Lespedeza violacea</i>	3.00	5.00	0.19	0.22	0.20
<i>Muhlenbergia sobolifera</i>	3.00	5.00	0.19	0.22	0.20
<i>Cornus florida</i>	3.00	4.00	0.15	0.22	0.18
<i>Hieracium gronovii</i>	3.00	4.00	0.15	0.22	0.18
<i>Scutellaria elliptica</i>	3.00	4.00	0.15	0.22	0.18
<i>Rudbeckia grandiflora</i>	2.00	5.00	0.19	0.15	0.17
<i>Chamaecrista nictitans</i>	3.00	3.00	0.11	0.22	0.16
<i>Amphicarpaea bracteata</i>	2.00	4.00	0.15	0.15	0.15
<i>Croton willdenowii</i>	2.00	4.00	0.15	0.15	0.15
<i>Carex glaucoidea</i>	2.00	4.00	0.15	0.15	0.15
<i>Dichantherium malacophyllum</i>	2.00	4.00	0.15	0.15	0.15
<i>Helianthus divaricatus</i>	2.00	4.00	0.15	0.15	0.15
<i>Kummerowia stipulacea</i>	2.00	4.00	0.15	0.15	0.15
<i>Pityopsis graminifolia</i>	2.00	4.00	0.15	0.15	0.15
<i>Pycnanthemum albescens</i>	2.00	4.00	0.15	0.15	0.15
<i>Pycnanthemum tenuifolium</i>	2.00	4.00	0.15	0.15	0.15
<i>Ruellia humilis</i>	2.00	4.00	0.15	0.15	0.15
<i>Crataegus uniflora</i>	2.00	3.00	0.11	0.15	0.13
<i>Dichantherium polyanthes</i>	2.00	3.00	0.11	0.15	0.13
<i>Echinacea pallida</i>	2.00	3.00	0.11	0.15	0.13
<i>Eupatorium serotinum</i>	2.00	3.00	0.11	0.15	0.13
<i>Packera obovata</i>	2.00	3.00	0.11	0.15	0.13
<i>Solidago hispida</i>	2.00	3.00	0.11	0.15	0.13
<i>Viburnum rufidulum</i>	2.00	3.00	0.11	0.15	0.13
<i>Diospyros virginiana</i>	1.00	4.00	0.15	0.07	0.11
<i>Piptochaetium avenaceum</i>	1.00	4.00	0.15	0.07	0.11
<i>Aristolochia serpentaria</i>	2.00	2.00	0.07	0.15	0.11
<i>Croton glandulosus</i>	2.00	2.00	0.07	0.15	0.11
<i>Prunus serotina</i>	2.00	2.00	0.07	0.15	0.11
<i>Smilax glauca</i>	2.00	2.00	0.07	0.15	0.11
<i>Albizia julibrissina</i>	1.00	3.00	0.11	0.07	0.09
<i>Baptisia sphaerocarpa</i>	1.00	3.00	0.11	0.07	0.09
<i>Carya texana</i>	1.00	3.00	0.11	0.07	0.09
<i>Delphinium carolinianum</i>	1.00	3.00	0.11	0.07	0.09
<i>Dichantherium</i> sp.	1.00	3.00	0.11	0.07	0.09
<i>Elymus virginicus</i>	1.00	3.00	0.11	0.07	0.09
<i>Fraxinus americana</i>	1.00	3.00	0.11	0.07	0.09
<i>Rhus aromatica</i>	1.00	3.00	0.11	0.07	0.09
<i>Rubus trivialis</i>	1.00	3.00	0.11	0.07	0.09
<i>Symphotrichum dumosum</i>	1.00	3.00	0.11	0.07	0.09
<i>Vaccinium stamineum</i>	1.00	3.00	0.11	0.07	0.09
<i>Verbesina alternifolia</i>	1.00	3.00	0.11	0.07	0.09
<i>Vernonia baldwinii</i>	1.00	3.00	0.11	0.07	0.09
<i>Andropogon virginicus</i>	1.00	2.00	0.07	0.07	0.07
<i>Asplenium platyneuron</i>	1.00	2.00	0.07	0.07	0.07
<i>Carex muehlenbergii</i>	1.00	2.00	0.07	0.07	0.07
<i>Crataegus marshallii</i>	1.00	2.00	0.07	0.07	0.07
<i>Desmodium</i> sp.	1.00	2.00	0.07	0.07	0.07

<i>Desmodium perplexum</i>	1.00	2.00	0.07	0.07	0.07
<i>Dichanthelium aciculare</i>	1.00	2.00	0.07	0.07	0.07
<i>Dichanthelium scoparium</i>	1.00	2.00	0.07	0.07	0.07
<i>Galium pilosum</i>	1.00	2.00	0.07	0.07	0.07
<i>Hypericum gentianoides</i>	1.00	2.00	0.07	0.07	0.07
<i>Lespedeza frutescens</i>	1.00	2.00	0.07	0.07	0.07
<i>Lespedeza stuevei</i>	1.00	2.00	0.07	0.07	0.07
<i>Liquidambar styraciflua</i>	1.00	2.00	0.07	0.07	0.07
<i>Mimulus alatus</i>	1.00	2.00	0.07	0.07	0.07
<i>Rosa carolina</i>	1.00	2.00	0.07	0.07	0.07
<i>Sanicula canadensis</i>	1.00	2.00	0.07	0.07	0.07
<i>Solidago rugosa</i>	1.00	2.00	0.07	0.07	0.07
<i>Strophostyles umbellata</i>	1.00	2.00	0.07	0.07	0.07
<i>Symphyotrichum lanceolatum</i>	1.00	2.00	0.07	0.07	0.07
<i>Symphyotrichum sp.</i>	1.00	2.00	0.07	0.07	0.07
<i>Tephrosia virginiana</i>	1.00	2.00	0.07	0.07	0.07
<i>Verbena stricta</i>	1.00	2.00	0.07	0.07	0.07
<i>Acalypha virginica</i>	1.00	1.00	0.04	0.07	0.05
<i>Aristolochia tomentosa</i>	1.00	1.00	0.04	0.07	0.05
<i>Chasmanthium latifolium</i>	1.00	1.00	0.04	0.07	0.05
<i>Circaea canadensis</i>	1.00	1.00	0.04	0.07	0.05
<i>Cirsium carolinianum</i>	1.00	1.00	0.04	0.07	0.05
<i>Conyza canadensis</i>	1.00	1.00	0.04	0.07	0.05
<i>Dalea candida</i>	1.00	1.00	0.04	0.07	0.05
<i>Desmodium rotundifolium</i>	1.00	1.00	0.04	0.07	0.05
<i>Erigeron tenuis</i>	1.00	1.00	0.04	0.07	0.05
<i>Euphorbia corollata</i>	1.00	1.00	0.04	0.07	0.05
<i>Galium circaeans</i>	1.00	1.00	0.04	0.07	0.05
<i>Houstonia longifolia</i>	1.00	1.00	0.04	0.07	0.05
<i>Ilex decidua</i>	1.00	1.00	0.04	0.07	0.05
<i>Lactuca floridana</i>	1.00	1.00	0.04	0.07	0.05
<i>Menispermum canadense</i>	1.00	1.00	0.04	0.07	0.05
<i>Polygala verticillata</i>	1.00	1.00	0.04	0.07	0.05
<i>Salvia lyrata</i>	1.00	1.00	0.04	0.07	0.05
<i>Triodanis perfoliata</i>	1.00	1.00	0.04	0.07	0.05
unknown forb 5	1.00	1.00	0.04	0.07	0.05
<i>Verbesina helianthoides</i>	1.00	1.00	0.04	0.07	0.05
<i>Viola pedata</i>	1.00	1.00	0.04	0.07	0.05
<i>Viola sagittata</i>	1.00	1.00	0.04	0.07	0.05
Total	1,373.00	2,697.00	100.00	100.00	100.00

Table 41: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8" + dbh), *burned + thinned plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	4.00	70.00	52.00	33.32	48.13	75.44	75.00	73.48
<i>Pinus taeda</i>	1.22	20.00	15.89	10.13	14.64	22.95	22.92	21.96
snag	0.11	10.00	1.44	0.71	1.03	1.61	2.08	4.56
Totals	5.33	100.00	69.33	44.16	63.79	100.00	100.00	100.00

Table 42: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), *burned + thinned plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	2.22	19.23	28.89	3.39	4.89	61.55	27.78	36.19
snag	1.78	23.08	23.11	1.06	1.53	19.27	22.22	21.52
<i>Quercus stellata</i>	2.11	15.38	27.44	0.41	0.59	7.49	26.39	16.42
<i>Quercus rubra</i>	0.56	11.54	7.22	0.28	0.40	5.06	6.94	7.85
<i>Quercus alba</i>	0.33	7.69	4.33	0.20	0.28	3.58	4.17	5.15
<i>Carya texana</i>	0.33	7.69	4.33	0.11	0.16	2.06	4.17	4.64
<i>Quercus falcata</i>	0.22	3.85	2.89	0.02	0.03	0.43	2.78	2.35
<i>Prunus serotina</i>	0.22	3.85	2.89	0.01	0.02	0.23	2.78	2.29
<i>Quercus marilandica</i>	0.11	3.85	1.44	0.01	0.01	0.19	1.39	1.81
<i>Cornus florida</i>	0.11	3.85	1.44	0.01	0.01	0.14	1.39	1.79
Totals	8.00	100.00	104.00	5.50	7.94	100.00	100.00	100.00

Table 43: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, *burned + thinned plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Carya texana</i>	0.56	8.93	452.79	21.52	15.23
<i>Quercus stellata</i>	0.67	10.71	242.96	11.55	11.13
<i>Acer rubrum</i>	0.22	3.57	265.05	12.60	8.08
<i>Quercus velutina</i>	0.44	7.14	115.96	5.51	6.33
<i>Rhus copallinum</i>	0.22	3.57	160.13	7.61	5.59
<i>Carya tomentosa</i>	0.44	7.14	77.31	3.67	5.41
<i>Pinus echinata</i>	0.22	3.57	110.44	5.25	4.41
<i>Quercus alba</i>	0.33	5.36	71.78	3.41	4.38
<i>Quercus rubra</i>	0.33	5.36	66.26	3.15	4.25
<i>Liquidambar styraciflua</i>	0.11	1.79	138.05	6.56	4.17
<i>Rubus argutus</i>	0.22	3.57	88.35	4.20	3.89
<i>Ulmus alata</i>	0.33	5.36	49.70	2.36	3.86
<i>Quercus marilandica</i>	0.33	5.36	33.13	1.57	3.47
<i>Prunus sp.</i>	0.22	3.57	33.13	1.57	2.57
<i>Fraxinus americana</i>	0.22	3.57	22.09	1.05	2.31
<i>Prunus serotina</i>	0.22	3.57	11.04	0.52	2.05
<i>Carya glabra</i>	0.11	1.79	38.65	1.84	1.81
<i>Callicarpa americana</i>	0.11	1.79	33.13	1.57	1.68
<i>Vitis rotundifolia</i>	0.11	1.79	33.13	1.57	1.68
<i>Cornus florida</i>	0.11	1.79	16.57	0.79	1.29
<i>Diospyros virginiana</i>	0.11	1.79	11.04	0.52	1.16
<i>Ostrya virginiana</i>	0.11	1.79	11.04	0.52	1.16
<i>Nyssa sylvatica</i>	0.11	1.79	5.52	0.26	1.02
<i>Quercus nigra</i>	0.11	1.79	5.52	0.26	1.02
<i>Rhus glabra</i>	0.11	1.79	5.52	0.26	1.02
<i>Ulmus americana</i>	0.11	1.79	5.52	0.26	1.02
Total	6.22	100.00	2,103.82	100.00	100.00

Table 44: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, *burned + thinned plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Toxicodendron radicans</i>	19.00	50.00	6.48	5.35	5.91
<i>Dichanthelium laxiflorum</i>	15.00	33.00	4.27	4.23	4.25
<i>Helianthus hirsutus</i>	13.00	24.00	3.11	3.66	3.39
<i>Dichanthelium dichotomum</i>	11.00	27.00	3.50	3.10	3.30
<i>Pinus echinata</i>	13.00	22.00	2.85	3.66	3.26
<i>Scleria oligantha</i>	11.00	22.00	2.85	3.10	2.97
<i>Chasmanthium sessiliflorum</i>	7.00	27.00	3.50	1.97	2.73
<i>Quercus stellata</i>	8.00	23.00	2.98	2.25	2.62
<i>Vitis rotundifolia</i>	7.00	23.00	2.98	1.97	2.48
<i>Lespedeza procumbens</i>	8.00	17.00	2.20	2.25	2.23
<i>Rubus argutus</i>	7.00	18.00	2.33	1.97	2.15
<i>Clitoria mariana</i>	9.00	12.00	1.55	2.54	2.04
<i>Parthenocissus quinquefolia</i>	7.00	16.00	2.07	1.97	2.02
<i>Smilax bona-nox</i>	7.00	15.00	1.94	1.97	1.96
<i>Schizachyrium scoparium</i>	6.00	17.00	2.20	1.69	1.95
<i>Galactia volubilis</i>	8.00	12.00	1.55	2.25	1.90
<i>Dichanthelium acuminatum</i>	7.00	13.00	1.68	1.97	1.83
<i>Danthonia spicata</i>	6.00	13.00	1.68	1.69	1.69
<i>Rubus flagellaris</i>	6.00	13.00	1.68	1.69	1.69
<i>Lespedeza repens</i>	5.00	14.00	1.81	1.41	1.61
<i>Carex</i> sp.	6.00	10.00	1.30	1.69	1.49
<i>Dichanthelium commutatum</i>	5.00	12.00	1.55	1.41	1.48
<i>Lespedeza cuneata</i>	5.00	12.00	1.55	1.41	1.48
<i>Rubus</i> sp.	4.00	11.00	1.42	1.13	1.28
<i>Dichanthelium linearifolium</i>	4.00	10.00	1.30	1.13	1.21
<i>Erechtites hieraciifolius</i>	4.00	9.00	1.17	1.13	1.15
<i>Lactuca canadensis</i>	4.00	9.00	1.17	1.13	1.15
<i>Rubus trivialis</i>	4.00	9.00	1.17	1.13	1.15
<i>Dichanthelium</i> sp.	3.00	11.00	1.42	0.85	1.13
<i>Stylosanthes biflora</i>	4.00	8.00	1.04	1.13	1.08
<i>Solidago odora</i>	4.00	7.00	0.91	1.13	1.02
<i>Carya texana</i>	3.00	9.00	1.17	0.85	1.01
<i>Smilax rotundifolia</i>	3.00	9.00	1.17	0.85	1.01
<i>Antennaria plantaginifolia</i>	3.00	7.00	0.91	0.85	0.88
<i>Desmodium obtusum</i>	3.00	7.00	0.91	0.85	0.88
<i>Potentilla simplex</i>	3.00	7.00	0.91	0.85	0.88
<i>Pteridium aquilinum</i>	2.00	9.00	1.17	0.56	0.86
<i>Chamaecrista fasciculata</i>	4.00	4.00	0.52	1.13	0.82
<i>Carex complanata</i>	3.00	4.00	0.52	0.85	0.68
<i>Hieracium gronovii</i>	3.00	4.00	0.52	0.85	0.68
<i>Oxalis dillenii</i>	3.00	4.00	0.52	0.85	0.68
<i>Symphyotrichum patens</i>	3.00	4.00	0.52	0.85	0.68
<i>Amphicarpaea bracteata</i>	2.00	6.00	0.78	0.56	0.67
<i>Fraxinus americana</i>	2.00	6.00	0.78	0.56	0.67

<i>Desmodium viridiflorum</i>	2.00	5.00	0.65	0.56	0.61
<i>Kummerowia striata</i>	2.00	5.00	0.65	0.56	0.61
<i>Quercus alba</i>	2.00	5.00	0.65	0.56	0.61
<i>Quercus velutina</i>	2.00	5.00	0.65	0.56	0.61
<i>Solidago altissima</i>	2.00	5.00	0.65	0.56	0.61
<i>Ulmus alata</i>	2.00	5.00	0.65	0.56	0.61
<i>Coreopsis palmata</i>	2.00	4.00	0.52	0.56	0.54
<i>Dichanthelium malacophyllum</i>	2.00	4.00	0.52	0.56	0.54
<i>Scleria muehlenbergii</i>	2.00	4.00	0.52	0.56	0.54
<i>Vaccinium arboreum</i>	2.00	4.00	0.52	0.56	0.54
<i>Eupatorium serotinum</i>	2.00	3.00	0.39	0.56	0.48
<i>Hypericum hypericoides</i>	2.00	3.00	0.39	0.56	0.48
<i>Phlox pilosa</i>	2.00	3.00	0.39	0.56	0.48
<i>Pinus taeda</i>	2.00	3.00	0.39	0.56	0.48
<i>Solidago rugosa</i>	2.00	3.00	0.39	0.56	0.48
<i>Solidago ulmifolia</i>	2.00	3.00	0.39	0.56	0.48
<i>Galium circaezans</i>	2.00	2.00	0.26	0.56	0.41
<i>Lespedeza virginica</i>	2.00	2.00	0.26	0.56	0.41
<i>Physalis sp.</i>	2.00	2.00	0.26	0.56	0.41
<i>Carya tomentosa</i>	1.00	4.00	0.52	0.28	0.40
<i>Vaccinium stamineum</i>	1.00	4.00	0.52	0.28	0.40
<i>Acer rubrum</i>	1.00	3.00	0.39	0.28	0.34
<i>Callicarpa americana</i>	1.00	3.00	0.39	0.28	0.34
<i>Carex laxiculmis</i>	1.00	3.00	0.39	0.28	0.34
<i>Ceanothus americanus</i>	1.00	3.00	0.39	0.28	0.34
<i>Carex glaucoidea</i>	1.00	3.00	0.39	0.28	0.34
<i>Desmodium paniculatum</i>	1.00	3.00	0.39	0.28	0.34
<i>Ostrya virginiana</i>	1.00	3.00	0.39	0.28	0.34
<i>Prunus serotina</i>	1.00	3.00	0.39	0.28	0.34
<i>Smilax glauca</i>	1.00	3.00	0.39	0.28	0.34
<i>Arisaema dracontium</i>	1.00	2.00	0.26	0.28	0.27
<i>Baptisia sphaerocarpa</i>	1.00	2.00	0.26	0.28	0.27
<i>Berchemia scandens</i>	1.00	2.00	0.26	0.28	0.27
<i>Carex blanda</i>	1.00	2.00	0.26	0.28	0.27
<i>Conyza canadensis</i>	1.00	2.00	0.26	0.28	0.27
<i>Coreopsis tinctoria</i>	1.00	2.00	0.26	0.28	0.27
<i>Croton willdenowii</i>	1.00	2.00	0.26	0.28	0.27
<i>Dichanthelium boscii</i>	1.00	2.00	0.26	0.28	0.27
<i>Dichanthelium polyanthes</i>	1.00	2.00	0.26	0.28	0.27
<i>Elephantopus carolinianus</i>	1.00	2.00	0.26	0.28	0.27
<i>Elymus glabriflorus</i>	1.00	2.00	0.26	0.28	0.27
<i>Erigeron strigosus</i>	1.00	2.00	0.26	0.28	0.27
<i>Euphorbia corollata</i>	1.00	2.00	0.26	0.28	0.27
<i>Kummerowia stipulacea</i>	1.00	2.00	0.26	0.28	0.27
<i>Liatris aspera</i>	1.00	2.00	0.26	0.28	0.27
<i>Quercus rubra</i>	1.00	2.00	0.26	0.28	0.27
<i>Ruellia humilis</i>	1.00	2.00	0.26	0.28	0.27
<i>Scutellaria elliptica</i>	1.00	2.00	0.26	0.28	0.27
<i>Solidago petiolaris</i>	1.00	2.00	0.26	0.28	0.27

<i>Sorghum halepense</i>	1.00	2.00	0.26	0.28	0.27
<i>Symphyotrichum anomalum</i>	1.00	2.00	0.26	0.28	0.27
<i>Symphoricarpos orbiculatus</i>	1.00	2.00	0.26	0.28	0.27
<i>Symphyotrichum</i> sp.	1.00	2.00	0.26	0.28	0.27
unknown forb 1	1.00	2.00	0.26	0.28	0.27
<i>Vernonia baldwinii</i>	1.00	2.00	0.26	0.28	0.27
<i>Viola palmata</i>	1.00	2.00	0.26	0.28	0.27
<i>Chamaecrista nictitans</i>	1.00	1.00	0.13	0.28	0.21
<i>Croton glandulosus</i>	1.00	1.00	0.13	0.28	0.21
<i>Desmodium laevigatum</i>	1.00	1.00	0.13	0.28	0.21
<i>Dioscorea villosa</i>	1.00	1.00	0.13	0.28	0.21
<i>Liatris</i> sp.	1.00	1.00	0.13	0.28	0.21
<i>Lonicera japonica</i>	1.00	1.00	0.13	0.28	0.21
<i>Matelea baldwyniana</i>	1.00	1.00	0.13	0.28	0.21
<i>Penstemon</i> sp.	1.00	1.00	0.13	0.28	0.21
<i>Quercus</i> sp.	1.00	1.00	0.13	0.28	0.21
<i>Rhus copallinum</i>	1.00	1.00	0.13	0.28	0.21
<i>Rosa carolina</i>	1.00	1.00	0.13	0.28	0.21
<i>Ruellia pedunculata</i>	1.00	1.00	0.13	0.28	0.21
<i>Ruellia strepens</i>	1.00	1.00	0.13	0.28	0.21
<i>Sanicula canadensis</i>	1.00	1.00	0.13	0.28	0.21
<i>Solidago flexicaulis</i>	1.00	1.00	0.13	0.28	0.21
<i>Viola sororia</i>	1.00	1.00	0.13	0.28	0.21
Total	355.00	772.00	100.00	100.00	100.00

Table 45: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of overstory species (8" + dbh), *thinned-only plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	5.50	33.33	71.50	30.41	39.54	56.55	62.50	50.80
<i>Pinus taeda</i>	2.30	27.78	29.90	18.26	23.74	33.95	26.14	29.29
snag	0.60	16.67	7.80	2.91	3.78	5.41	6.82	9.63
<i>Juniperus virginiana</i>	0.20	11.11	2.60	0.94	1.22	1.74	2.27	5.04
<i>Quercus rubra</i>	0.10	5.56	1.30	0.74	0.96	1.37	1.14	2.69
<i>Quercus falcata</i>	0.10	5.56	1.30	0.53	0.69	0.98	1.14	2.56
Totals	8.80	100.00	114.40	53.78	69.91	100.00	100.00	100.00

Table 46: Frequency, relative frequency, stems/acre, basal area, basal area/acre, relative basal area, relative density, and importance value of midstory species (2 cm – 7.9" dbh), *thinned-only plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Sum BA	Sum BA/Acre	Relative BA	Relative Density	Importance value
<i>Pinus echinata</i>	10.60	9.86	137.80	16.98	22.07	61.00	27.32	32.73
snag	5.20	9.86	67.60	2.29	2.98	8.24	13.40	10.50
<i>Quercus stellata</i>	5.20	8.45	67.60	2.18	2.83	7.84	13.40	9.90
<i>Ulmus alata</i>	2.70	8.45	35.10	0.79	1.02	2.83	6.96	6.08
<i>Quercus rubra</i>	2.20	5.63	28.60	1.78	2.32	6.40	5.67	5.90
<i>Carya texana</i>	2.70	7.04	35.10	0.45	0.58	1.61	6.96	5.20
<i>Acer rubrum</i>	1.80	5.63	23.40	0.55	0.71	1.97	4.64	4.08
<i>Prunus serotina</i>	1.30	7.04	16.90	0.48	0.63	1.74	3.35	4.04
<i>Quercus alba</i>	1.30	5.63	16.90	0.66	0.86	2.37	3.35	3.78
<i>Carya tomentosa</i>	1.00	5.63	13.00	0.21	0.27	0.74	2.58	2.99
<i>Quercus velutina</i>	0.90	4.23	11.70	0.20	0.26	0.72	2.32	2.42
<i>Juniperus virginiana</i>	0.70	2.82	9.10	0.50	0.65	1.80	1.80	2.14
<i>Quercus marilandica</i>	0.90	2.82	11.70	0.16	0.21	0.59	2.32	1.91
<i>Ostrya virginiana</i>	0.30	2.82	3.90	0.05	0.07	0.18	0.77	1.26
<i>Cornus florida</i>	0.30	2.82	3.90	0.04	0.05	0.15	0.77	1.25
<i>Amelanchier arborea</i>	0.20	2.82	2.60	0.09	0.12	0.32	0.52	1.22
<i>Vaccinium arboreum</i>	0.30	2.82	3.90	0.02	0.02	0.06	0.77	1.22
<i>Pinus taeda</i>	0.60	1.41	7.80	0.09	0.11	0.31	1.55	1.09
<i>Nyssa sylvatica</i>	0.40	1.41	5.20	0.17	0.22	0.62	1.03	1.02
<i>Quercus falcata</i>	0.10	1.41	1.30	0.14	0.19	0.51	0.26	0.73
<i>Liquidambar styraciflua</i>	0.10	1.41	1.30	0.00	0.00	0.01	0.26	0.56
Totals	38.80	100.00	504.40	27.83	36.18	100.00	100.00	100.00

Table 47: Frequency, relative frequency, stems/acre, relative density, and importance value of shrub species, *thinned-only plots*, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Frequency	Relative Frequency	Stems/Acre	Relative Density	Importance Value
<i>Acer rubrum</i>	0.50	13.89	99.39	16.39	15.14
<i>Nyssa sylvatica</i>	0.10	2.78	134.18	22.13	12.45
<i>Ulmus alata</i>	0.50	13.89	59.64	9.84	11.86
<i>Carya texana</i>	0.30	8.33	64.61	10.66	9.49
<i>Vaccinium arboreum</i>	0.40	11.11	44.73	7.38	9.24
<i>Carya tomentosa</i>	0.30	8.33	29.82	4.92	6.63
<i>Liquidambar styraciflua</i>	0.10	2.78	59.64	9.84	6.31
<i>Quercus stellata</i>	0.30	8.33	24.85	4.10	6.22
<i>Ostrya virginiana</i>	0.20	5.56	9.94	1.64	3.60
<i>Cornus florida</i>	0.10	2.78	19.88	3.28	3.03
<i>Callicarpa americana</i>	0.10	2.78	9.94	1.64	2.21
<i>Prunus serotina</i>	0.10	2.78	9.94	1.64	2.21
<i>Quercus velutina</i>	0.10	2.78	9.94	1.64	2.21
<i>Rhus copallinum</i>	0.10	2.78	9.94	1.64	2.21
<i>Juniperus virginiana</i>	0.10	2.78	4.97	0.82	1.80
<i>Quercus alba</i>	0.10	2.78	4.97	0.82	1.80
<i>Quercus marilandica</i>	0.10	2.78	4.97	0.82	1.80
<i>Quercus rubra</i>	0.10	2.78	4.97	0.82	1.80
Total	3.60	100.00	606.30	100.00	100.00

Table 48: Frequency, total cover, relative cover, relative frequency, and importance value of ground layer species, *thinned-only* plots, for the Arkansas and Oklahoma CFLRA project, June 2015-2016.

Species	Total Cover	Frequency	Relative Cover	Relative Frequency	Importance Value
<i>Toxicodendron radicans</i>	16.00	46.00	9.85	6.35	8.10
<i>Chasmanthium sessiliflorum</i>	13.00	38.00	8.14	5.16	6.65
<i>Vitis rotundifolia</i>	9.00	30.00	6.42	3.57	5.00
<i>Acer rubrum</i>	15.00	17.00	3.64	5.95	4.80
<i>Smilax bona-nox</i>	12.00	21.00	4.50	4.76	4.63
<i>Dichanthelium laxiflorum</i>	9.00	20.00	4.28	3.57	3.93
<i>Scleria oligantha</i>	11.00	13.00	2.78	4.37	3.57
<i>Pinus echinata</i>	11.00	11.00	2.36	4.37	3.36
<i>Smilax glauca</i>	9.00	13.00	2.78	3.57	3.18
<i>Clitoria mariana</i>	8.00	14.00	3.00	3.17	3.09
<i>Dichanthelium dichotomum</i>	8.00	14.00	3.00	3.17	3.09
<i>Vaccinium arboreum</i>	6.00	11.00	2.36	2.38	2.37
<i>Vaccinium pallidum</i>	5.00	12.00	2.57	1.98	2.28
<i>Carya texana</i>	5.00	11.00	2.36	1.98	2.17
<i>Monarda russeliana</i>	6.00	9.00	1.93	2.38	2.15
<i>Dichanthelium linearifolium</i>	5.00	9.00	1.93	1.98	1.96
<i>Rubus</i> sp.	4.00	10.00	2.14	1.59	1.86
<i>Schizachyrium scoparium</i>	4.00	10.00	2.14	1.59	1.86
<i>Ulmus alata</i>	4.00	9.00	1.93	1.59	1.76
<i>Ostrya virginiana</i>	4.00	5.00	1.07	1.59	1.33
<i>Echinacea pallida</i>	3.00	6.00	1.28	1.19	1.24
<i>Parthenocissus quinquefolia</i>	3.00	6.00	1.28	1.19	1.24
<i>Lactuca canadensis</i>	4.00	4.00	0.86	1.59	1.22
<i>Dichanthelium acuminatum</i>	3.00	5.00	1.07	1.19	1.13
<i>Hypericum hypericoides</i>	3.00	5.00	1.07	1.19	1.13
<i>Quercus rubra</i>	3.00	5.00	1.07	1.19	1.13
<i>Solidago delicatula</i>	3.00	4.00	0.86	1.19	1.02
<i>Cornus florida</i>	2.00	5.00	1.07	0.79	0.93
<i>Viola pedata</i>	3.00	3.00	0.64	1.19	0.92
<i>Andropogon gerardii</i>	2.00	4.00	0.86	0.79	0.83
<i>Antennaria plantaginifolia</i>	2.00	4.00	0.86	0.79	0.83
<i>Dichanthelium commutatum</i>	2.00	4.00	0.86	0.79	0.83
<i>Lespedeza repens</i>	2.00	4.00	0.86	0.79	0.83
<i>Liatris pycnostachya</i>	2.00	4.00	0.86	0.79	0.83
<i>Lespedeza violacea</i>	2.00	3.00	0.64	0.79	0.72
<i>Nyssa sylvatica</i>	1.00	4.00	0.86	0.40	0.63
<i>Pteridium aquilinum</i>	1.00	4.00	0.86	0.40	0.63
<i>Aristolochia serpentaria</i>	2.00	2.00	0.43	0.79	0.61
<i>Chamaecrista nictitans</i>	2.00	2.00	0.43	0.79	0.61
<i>Galium circaeazans</i>	2.00	2.00	0.43	0.79	0.61
<i>Hieracium gronovii</i>	2.00	2.00	0.43	0.79	0.61
<i>Prunus serotina</i>	2.00	2.00	0.43	0.79	0.61
<i>Solidago ulmifolia</i>	2.00	2.00	0.43	0.79	0.61
<i>Symphotrichum anomalum</i>	2.00	2.00	0.43	0.79	0.61

<i>Carex</i> sp.	1.00	3.00	0.64	0.40	0.52
<i>Dichanthelium boscii</i>	1.00	3.00	0.64	0.40	0.52
<i>Galactia volubilis</i>	1.00	3.00	0.64	0.40	0.52
<i>Quercus marilandica</i>	1.00	3.00	0.64	0.40	0.52
<i>Rhus copallinum</i>	1.00	3.00	0.64	0.40	0.52
<i>Rudbeckia grandiflora</i>	1.00	3.00	0.64	0.40	0.52
<i>Aristolochia reticulata</i>	1.00	2.00	0.43	0.40	0.41
<i>Ceanothus americanus</i>	1.00	2.00	0.43	0.40	0.41
<i>Conyza canadensis</i>	1.00	2.00	0.43	0.40	0.41
<i>Coreopsis palmata</i>	1.00	2.00	0.43	0.40	0.41
<i>Desmodium obtusum</i>	1.00	2.00	0.43	0.40	0.41
<i>Fraxinus americana</i>	1.00	2.00	0.43	0.40	0.41
<i>Galium texense</i>	1.00	2.00	0.43	0.40	0.41
<i>Prunus mexicana</i>	1.00	2.00	0.43	0.40	0.41
<i>Rudbeckia hirta</i>	1.00	2.00	0.43	0.40	0.41
<i>Solidago odora</i>	1.00	2.00	0.43	0.40	0.41
<i>Vitis aestivalis</i>	1.00	2.00	0.43	0.40	0.41
<i>Acalypha gracilens</i>	1.00	1.00	0.21	0.40	0.31
<i>Callicarpa americana</i>	1.00	1.00	0.21	0.40	0.31
<i>Danthonia spicata</i>	1.00	1.00	0.21	0.40	0.31
<i>Desmodium</i> sp.	1.00	1.00	0.21	0.40	0.31
<i>Dichanthelium aciculare</i>	1.00	1.00	0.21	0.40	0.31
<i>Erechtites hieraciifolius</i>	1.00	1.00	0.21	0.40	0.31
<i>Euphorbia corollata</i>	1.00	1.00	0.21	0.40	0.31
<i>Eupatorium serotinum</i>	1.00	1.00	0.21	0.40	0.31
<i>Helianthus hirsutus</i>	1.00	1.00	0.21	0.40	0.31
<i>Kummerowia stipulacea</i>	1.00	1.00	0.21	0.40	0.31
<i>Phlox pilosa</i>	1.00	1.00	0.21	0.40	0.31
<i>Physalis</i> sp.	1.00	1.00	0.21	0.40	0.31
<i>Pityopsis graminifolia</i>	1.00	1.00	0.21	0.40	0.31
<i>Quercus alba</i>	1.00	1.00	0.21	0.40	0.31
<i>Symphyotrichum patens</i>	1.00	1.00	0.21	0.40	0.31
<i>Symphyotrichum</i> sp.	1.00	1.00	0.21	0.40	0.31
Total	252.00	467.00	100.00	100.00	100.00

Appendix H. Photo comparisons.

Untreated plots

Plot 382 – 2016



Plot 325 – 2015



Plot 370 – 2016



Burned-only plots
Plot 335 – 2015



Plot 371 - 2016



Plot 352 – 2016



Burned + thinned plots

Plot 328 – 2015



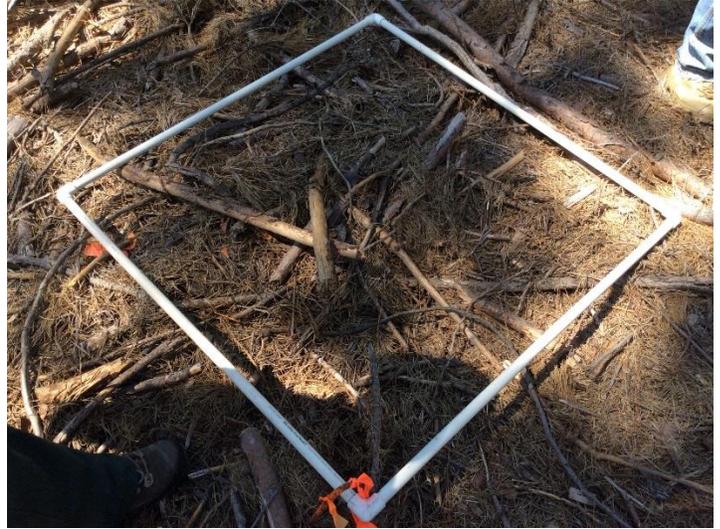
Plot 355 – 2016



Plot 334 – 2015



Thinned-only plots
Plot 365 - 2016



Plot 326 - 2015



Plot 310 - 2015

