

Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004 and 2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG)

R5SHNS Shinnery Oak - Mixed Grass

General Information

Contributors (additional contributors may be listed under "Model Evolution and Comments")

Modelers

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Vegetation Type

Shrubland

General Model Sources

- Literature
- Local Data
- Expert Estimate

Rapid Assessment Model Zones

- California
- Great Basin
- Great Lakes
- Northeast
- Northern Plains
- N-Cent. Rockies
- Pacific Northwest
- South Central
- Southeast
- S. Appalachians
- Southwest

Dominant Species*

QUHA
ARTE
ANDR
BOUT

LANDFIRE Mapping Zones

34
26

Geographic Range

This PNVG ranges across the southern Great Plains in parts of Texas, eastern New Mexico, and western Oklahoma with disjunct populations in Arizona and Utah. Estimates of the original extent and current acreages vary widely. Estimates of the original vary from 6 to 15 million acres and current estimates vary from 5.8 to 7.4 million acres (Peterson and Boyd 1998, Dhillion and Mills)

Biophysical Site Description

The shinnery oak grows on sandy plains and sand dunes where it commonly forms dense thickets of shinnery. It grows as a dominant throughout much of the rolling sandhills of the Great Plains. Shinnery oak is typically associated with dry, sunny sites. The soils are a shallow to deep sands and, more rarely, on gypsum. The shinnery cover generally declines as soil/clay content increases. The shinnery oak grows patchy on sandy loam and dense stands grow on deep sand sites. Growing climates for shinnery are associated with a climatic regime described as warm temperate and semiarid. The semiarid regions of West Texas and eastern New Mexico dominated by shinnery receive an average of 16 inches (41 cm) annual rainfall. The growing season averages 200 days at the elevation of 2,300 to 3,400 feet (701- 1,036 m).

Vegetation Description

Sand shinnery oak is a freely branched, clonal, thicket-forming shrub or small tree. Plants generally grow from less than 3 feet to 6 feet (<1-2 m height). Occasionally the species can reach heights of 13 feet (4m) in secluded patchy areas. Since fire suppression and grazing of grass fuels precludes fire, stands extend from 9 to more than 49 feet (3-15 m) in diameter, while individual stems rarely grow more than 0.8 inch (2 cm). Clones are continually rejuvenated through new sprouting as aerial stems senesce. The composition of current vegetation is dominated by trees and shrubs (shinnery, pinyon-juniper, mesquite, sagebrush). Ground cover vegetation consists of *bouteloua* spp., little and big bluestem, and sand sagebrush where grazing has not been too severe.

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Disturbance Description

Fire and grazing are the most important dynamic processes for this type, although drought stress can have significant impact in some areas. Naturally this system had frequent fire dominated by mixed severity fires associated with productive grass fuels and cycles of moisture and drought. The total fire return interval for this type is 5-10 years. Replacement fire that would occur consumes the seed source, but the underground regenerative structures often survive after above ground vegetation is consumed. Periodic drought in this type also acts as a replacement event. Dominant species are very fire tolerant, generally sprouting vigorously after fires. Grazing plays a large role in species diversity of the plant community by reducing the forbs and grass component causing an increase in woody species. Warm temperate, semi-arid conditions, and mixed severity fire maintains a diverse species composition.

Adjacency or Identification Concerns

In the Western Great Plains Sandhill shrubland system, *Quercus havardii* is found in somewhat excessively well-drained, deep sandy soils that are often associated with the dune systems. This species has been found in Western Great Plains Tall Grass Prairie and Western Great Plains Sand Prairie in a sparse to moderately dense woody layer. In some areas, shinnery has been found codominant with sagebrush. Other shrub species may also be present including *Artemisia filifolia*, *Yucca glauca*, *Prosopis glandulosa*, *Rhus trilobata*, and *Prunus angustifolia*. The shinnery is found in the southern range of this system in more sandy soils in eastern New Mexico, western Oklahoma, and Texas-Panhandle.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

Landscape adequate in size to contain natural variation in vegetation and disturbance regime. The most recent estimate of the area occupied by these communities in Texas, New Mexico, and Oklahoma is 3 million ha. This PNVG occurs on dunes extending from eastern New Mexico across Texas high plains and into western Oklahoma at elevations below 1,200m.

Issues/Problems

Type was mapped for the coarse-scale or by Kuchler(71). Ron Masters was the modeler who described this PNVG (SHIN (29)) for FRCC. Discussion at the Rapid Assessment workshop created a concern that the initial PNVG needed to be revisited. After review the PNVG, the group decided to place the PNVG into two groups: Mixed Grass Shinnery and Tall Grass Shinnery. It covers a substantial amount of land in the SW and is much more productive and diverse than the desert grasslands at lower elevation zones or plains grasslands to the east. It would be very valuable to do a very intensive literature search and review on this type as well as associated field recon to assess historic/current photos, local knowledge, soils, species adaptations, etc.

Model Evolution and Comments

I would suggest that researchers and modeler who have more expert knowledge of this PNVG review and comment. This model was adjusted after peer review to add drought disturbance and adjust fire frequencies to more closely match with the tallgrass shinnery.

Succession Classes**

Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).

Class A 20 %

Early1 PostRep

Description

Re-sprouting oak stems typically less than 1.5 feet tall with short, mid or tall grass regrowth dominating the stand depending geographical location, edaphic conditions and associates. Oak canopy cover <40%. Grass cover may have the dominant aspect on some sites, depending on grass species.

Dominant Species* and Canopy Position

QUHA3 Upper
ANDR Upper
BOUTE Upper

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	20 %	40 %
Height	Shrub Dwarf <0.5m	Shrub Short 0.5-0.9m
Tree Size Class	Seedling <4.5ft	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Dominant lifeform is herbaceous. Cover ranges from >60%. Height is herbaceous medium to herbaceous tall

Class B 55 %

Mid1 Closed

Description

Occurs by 4 years post-burn. Height may vary 1.5 feet to 3 feet . Oak canopy cover >50 % Grass cover may be evident.

Dominant Species* and Canopy Position

QUHA3 Upper
ARTE Mid-Upper
ANDR Low-Mid
BOUTE Low-Mid

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 6

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	70 %
Height	Shrub Dwarf <0.5m	Shrub Medium 1.0-2.9m
Tree Size Class	Seedling <4.5ft	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class C 10 %

Mid1 Open

Description

Occurs by 4 years post-burn. Height may vary 1.5 feet to 3 feet . Oak canopy cover <40 % Grass cover may be evident.

Dominant Species* and Canopy Position

QUHA3 Upper
ARTE Mid-Upper
ANDR Middle
BOUTE Middle

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	30 %	40 %
Height	Shrub Dwarf <0.5m	Shrub Medium 1.0-2.9m
Tree Size Class	Seedling <4.5ft	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Dominant lifeform is herbaceous. Cover ranges from >50%. Height is herbaceous medium to herbaceous tall

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Class D 5%

Late I Open

Description

Rarely occurring from fire, as fire is very effective at top-killing shinnery and given the resprouting ability may occur as a result of eudaphic conditions. Oak canopy cover <40%.

Dominant Species* and Canopy Position

QUHA3 Upper
ARTE Mid-Upper
ANDR Middle
BOUTE Middle

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Structure Data (for upper layer lifeform)

	Min	Max
Cover	20 %	50 %
Height	Shrub Dwarf <0.5m	Shrub Medium 1.0-2.9m
Tree Size Class	Sapling >4.5ft; <5"DBH	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Dominant lifeform is herbaceous. Cover ranges from >60%. Height is herbaceous short-herbaceous medium.

Fuel Model 2

Class E 10%

Late I Closed

Description

From 4-15 years for above ground portions of stems as 15 years is the estimated longevity of individual above ground stems, while underground rhizomes may exceed several hundred to over one thousand years. Oak stems 3-6 feet in height, canopy cover >50%. Monotypic stands occurring on isolated dune sands may be somewhat fire-proof if blowouts or other fuel discontinuities were present.

Dominant Species* and Canopy Position

QUHA3 Upper
ARTE Upper
ANDR Lower
BOUTE Lower

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 6

Structure Data (for upper layer lifeform)

	Min	Max
Cover	50 %	80 %
Height	Shrub Short 0.5-0.9m	Shrub Medium 1.0-2.9m
Tree Size Class	Sapling >4.5ft; <5"DBH	

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Disturbances

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Disturbances Modeled

- Fire
- Insects/Disease
- Wind/Weather/Stress
- Native Grazing
- Competition
- Other:
- Other

Historical Fire Size (acres)

Avg: 1000
 Min: 100
 Max: 10000

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

Fire Regime Group: 2

- I: 0-35 year frequency, low and mixed severity
- II: 0-35 year frequency, replacement severity
- III: 35-200 year frequency, low and mixed severity
- IV: 35-200 year frequency, replacement severity
- V: 200+ year frequency, replacement severity

Fire Intervals (FI)

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class. All values are estimates and not precise.

	<i>Avg FI</i>	<i>Min FI</i>	<i>Max FI</i>	<i>Probability</i>	<i>Percent of All Fires</i>
<i>Replacement</i>	7			0.14286	96
<i>Mixed</i>	150			0.00667	4
<i>Surface</i>					
<i>All Fires</i>	7			0.14953	

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