

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)

R5SHNT Shinnery Tallgrass

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 SPCR
ANHA
ARFI2
SCHIZ

LANDFIRE Mapping Zones

34
26

Geographic Range

Geographic Area: This PNVG ranges throughout the Southern High Plains in parts of the Texas Panhandle, and southwest New Mexico. Estimates of the original extent and current acreages vary widely. Estimates of the original extent 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 1999). Mapping sand system extent yields 8.4 million acres of shinnery system in OK, TX, and NM. Of this, 5.3 million acres are the western tallgrass dominated system.

Biophysical Site Description

This PNVG is characterized by deep to shallow, well sorted, and very well to well drained sands. Sand source in Oklahoma and adjacent Texas tends to be riverine from the Canadian, Arkansas, and tributaries. In SE New Mexico and adjacent Texas sand grains are very uniform in size and source is paleo sands eroded from caprock sandstones of the Llano Estacado (Muhs and Holliday 2001) known as the Mescalero Sandsheet.

Vegetation Description

The vegetation is dominated by sand shinnery oak (*Quercus havardii*) occurring on sandy soils, including shallow sandsheet and dunes, usually associated with sand sagebrush (*Artemisia filifolia*), sand dropseed (*Sporobolus cryptandrus*) and little bluestem (*Schizachyrium scoparium*). Shin oak may form near monotypic stands without disturbance. These stands are often interspersed with lenses of shortgrass on sandy loams or clays. Shin oak is a clonal species occurring in mottes of varying area. Above-ground growth averages 3 feet in height with occasional mottes up to 12 feet that may be hybrids with Mohr's oak (*Q. mohriana*) and possibly with *Q. gambelii* and *Q. undulata*. (Pettit 1994, Peterson and Boyd 1998, Dhillion et al 1999, Hoagland 2000). Rhizomes several thousand years of age have been reported while above ground portions of the stems may live up to 15 years without disturbance. May be either well interspersed with tallgrasses or as contiguous dense shrubland without a significant grass component. Under these conditions tallgrass seed may persist in the sandy soil for years or decades. Woody associates may

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

include sand sagebrush (*Artemisia filifolia*), sand plum (*Prunus gracilis*), and fragrant sumac (*Rhus aromatica*). Mesquite (*Prosopis glandulosa*) occurs in areas of tighter soils in response to grazing and a lack of fire.

Defoliation by grasshoppers may be significant during drought conditions. Bison (*Bos bison*) may have had significant influence on this community but were effectively extirpated from the region by the 1870s. The shinnery community influenced by fire is very important for lesser prairie chickens (*Tympanuchus pallidicinctus*) (Peterson and Boyd 1998).

Disturbance Description

This system likely had frequent stand replacement fires associated with productive grass fuels and cycles of moisture and drought. Bison probably played a significant role in creating localized disturbances, especially in places with recent burns that would provide more local forage during migration. Fire would be more likely to occur in younger stands with a larger grass component than in older stands, although even monotypic stands of shinnery will burn well under the right conditions. Drought and moist cycles play a strong role interacting with both fire and native grazing. When fuels loads were reduced, mixed intensity fires would occur. Wind events and disturbance from grazing could also drive the system to open sand dunes which might take years to recover vegetation and stabilize.

Adjacency or Identification Concerns

Is there actual differentiation between tallgrass and shortgrass shinnery systems? Should shinnery be lumped in a deep sand shrubland model that includes sandsage-bluestem types?

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

Landscape scales in the deep sand shrubland system defined by TNC through fragmentation as being on the order of 250,000 acres with patch size exceeding 5,000 acres.

Issues/Problems

There are no real fire data in this western system, although research on this is beginning in FY05. Much of the inference about vegetation dynamics and fire comes from treatments with tebuthiuron herbicide.

Model Evolution and Comments

Terry Bidwell of OK State, Dave Haukos (USFWS Lubbock)

Succession Classes**														
<i>Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).</i>														
Class A 15 %	<u>Dominant Species* and Canopy Position</u> SPCR Upper SCHIZ4 Upper ANHA Upper	<u>Structure Data (for upper layer lifeform)</u> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Cover</td> <td>0 %</td> <td>25 %</td> </tr> <tr> <td>Height</td> <td>no data</td> <td>no data</td> </tr> <tr> <td>Tree Size Class</td> <td colspan="2">no data</td> </tr> </tbody> </table>		Min	Max	Cover	0 %	25 %	Height	no data	no data	Tree Size Class	no data	
	Min	Max												
Cover	0 %	25 %												
Height	no data	no data												
Tree Size Class	no data													
<u>Description</u> All sites; postfire resprout by bluestems and dropseeds.	<u>Upper Layer Lifeform</u> <input checked="" type="checkbox"/> Herbaceous <input type="checkbox"/> Shrub <input type="checkbox"/> Tree	<input type="checkbox"/> Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:												
	<u>Fuel Model</u> 1													

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Class B 30 %

Mid1 Open

Description

One to three years post-fire dominated by tallgrasses in shallower and more stable sandsheet areas. Grass cover dominant with rapid recovery of shin-oak resprouts.

Dominant Species* and Canopy Position

SPCR Upper
SHIZ4 Upper
ANHA Upper
QUHA3 Middle

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 1

Structure Data (for upper layer lifeform)

	Min	Max
Cover	25 %	75 %
Height	no data	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 30 %

Mid1 Closed

Description

Three to ten years post-fire shinnery cover recovers to become dominant, although grasses remain co-dominant. May also contain significant component of sand sagebrush.

Dominant Species* and Canopy Position

QUHA3 Upper
SHIZ4 Upper
ANHA Upper
SPCR Upper

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	75 %	100 %
Height	Shrub Medium 1.0-2.9m	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 D 10 %

Late1 Closed

Description

Ten or more years post-fire closure by shinnery and significant decline in grass component. May also contain significant component of sand sagebrush.

Dominant Species* and Canopy Position

QUHA3 Upper
ARFI2 Upper

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model 2

Structure Data (for upper layer lifeform)

	Min	Max
Cover	75 %	100 %
Height	Shrub Medium 1.0-2.9m	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 E 15 %

Early1 Open

Description

Windblown sand and dunes, unstabilized

Dominant Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height	no data	no data
Tree Size Class	no data	

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

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

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Disturbances

Disturbances Modeled

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

Historical Fire Size (acres)

Avg: 10000
 Min: no data
 Max: no data

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.

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
<i>Replacement</i>	7			0.14286	93
<i>Mixed</i>	100			0.01	7
<i>Surface</i>					
<i>All Fires</i>	7			0.15287	

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