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)

R3PGmst **Plains Mesa Grassland with Shrubs or Trees**

General Information

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

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Vegetation Type

Grassland

Dominant Species*

BOGR
BOCU
ACHY
STIPA

General Model Sources

- [x] Literature
- [ ] Local Data
- [x] Expert Estimate

LANDFIRE Mapping Zones

14 24 28
15 25
23 27

Rapid AssessmentModel Zones

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

Geographic Range

Arizona, Colorado, New Mexico, and Utah. This PNV has 2 subtypes; 1 strongly influenced by the Sonoran and Chihuahuan climates that is generally south of 33 degrees latitude and west of 104 degrees longitude; 2 is strongly influenced by the Great Basin and Great Plains climates and is generally north of 33 degrees latitude and west of 104 degrees longitude. Southerly type is characterized by gramma grasses, yuccas and nolina. Northerly type is characterized by Great Basin grasses like Indian Ricegrass and Stipas in addition to the gramma grasses.

Biophysical Site Description

Usually has mollic grassland soils with relatively sand, gravel, or rock content that allows tree and shrub seedling establishment during the monsoon growing season if not killed by fire. The moisture regime is adequate to allow tree and shrub seedling establishment in the absence of fire, but natural fire except in fire protected microsites killed the tree and shrub seedlings. Elevations range from 1250 to 2200 meters on mesas and benches and in valleys. Elevations range from 1050 to 2000 meters on northerly aspects. Elevations range from 1450 to 2400 meters on southerly aspects. Precipiation ranging from 10 inches to 20 inches, with 50-60% occurring from May through August. Annual growing degree days ranging from 3000 to 5000 growing degree days (least sure about value of this in the rule set). REGAP types = CES304.7867 (< 35% canopy may identify encroachment sites); CES305.797 (low height or open canopy); CES306.835 (<35% canopy); CES302.733; CES304.766 (l< 35% canopy); CES304.777; CES302.741 (< 35% canopy);CES304.784; CES302.741; CES306.822 (< 35% canopy); CES303.668 (< 35% canopy); CES303.671 (< 35% canopy); CES304.778 (< 35% canopy); CES304.782 (< 35%); CES304.785 (< 35% canopy); CES304.788 (< 35% canopy); CES301.730 (< 35%). At the coarse scale this PNV was not mapped. It was included in the Desert Grassland (34), Desert Shrub (28), Southwest Shrub Steppe (27), Chaparral (26), Juniper-Pinyon (22) and Warm Sagebrush (70). A rule set based on these PNVs, current cover, precipitation, elevation, aspect, and growing days will be needed to spatially map this type.

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

Vegetation Description

Strongly influenced by the flora, climate, and disturbance regimes of the Sonoran desert to the southwest, Great Basin to the northwest, and Great Plains to the east. Because of fire suppression and grazing of grass fuels precluding fire the current vegetation will usually be dominated by trees and shrubs (juniper, oaks, pine, pinyon, mesquite, sagebrush, greasewood, salt desert shrubs).

Disturbance Description

Naturally this system had frequent fire dominated by replacement fires associated with productive grass fuels and cycles of moisture and drought. Patchy fires (causing 25-75% top-kill) were less frequent and were modeled here as mixed severity, although there is some debate about how often this type of patchy fire might actually occur.

Native ungulate grazing plays a small role in replacement where buffalo herds concentrated, but generally maintained systems. Drought and moist cycles play a strong role interacting with both fire and native grazing.

Adjacency or Identification Concerns

The Plains Mesa Grassland with Shrub-Tree (R3PGmst) usually in a mosaic below Ponderosa pine PNV, Oak-Juniper PNVs, or Mountain Shrub PNV, or these cooler/moister PNVs can occur on northerly aspects. Usually occurs above the Desert Grassland PNV and Desert Shrub PNV or on the relatively more moist aspects, and to the east of the true plains grasslands. R3PGm, R3PGmws, and R3PGmwt were not mapped at the coarse-scale. They were included in Desert Grassland (34), Desert Shrub (28), Southwest Shrub Steppe (27), Chaparral (26), Juniper-Pinyon (22) and Warm Sagebrush (70).

Scale Description

Sources of Scale Data ☐ Literature ☐ Local Data ☑ Expert Estimate

Landscape adequate in size to contain natural variation in vegetation and disturbance regime. Topographically complex areas can be relatively small (< 1000 acres). Uniform large mesas should be relatively large (> 10, 000 acres).

Issues/Problems

Type was not mapped for the coarse-scale or by Kuchler (1964), yet it is an important type identified by Brown 1982, Dick-Pedie 1993, and the NRCS ecological sites. 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, fire scars on old trees in protected sites, species adaptations, etc.

Model Evolution and Comments

Peer review suggested that that all plains grassland types be combined (R3PGm, R3PGmst, R3PGRs, R3PGRsws, R3PGRswt), mixed fire eliminated, and replacement fire interval set at 20 years. Because the workshop participants identified these separate types, they were not lumped together and fire regimes were left as-is, although descriptions were expanded to clarify use of mixed severity fire.

Quality control process found technical rule violations (using Relative Age) and eliminated them, with no change to results.

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*Succession Classes***

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

Class A 15 %

Early1 PostRep

Description

All sites, post-fire grass regrowth, grass seedlings, and forbs. Blue gramma, aster, scurfpea, mallow, primrose

Dominant Species* and Canopy Position

BOGR2
ASTER
NOLIN
EREM

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	15 %	55 %
Height	no data	no data
Tree Size Class	no data	

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

Class B 25 %

Mid1 Closed

Description

More productive sites and moist years. Mature development of sideoats gramma, blue gramma, Indian ricegrass and stipas to the north, threeawns, hairy gramma, black gramma, sand sage, yucca, snakeweed, prickly pear

Dominant Species* and Canopy Position

BOCU
BOGR2
NOLIN
ACHY

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	35 %	55 %
Height	no data	no data
Tree Size Class	no data	

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

Class C 55 %

Mid1 Open

Description

Less productive sites and drought years. Mature development of sideoats gramma, blue gramma, hairy gramma, black gramma, sand sage, yucca, snakeweed, prickly pear

Dominant Species* and Canopy Position

BOGR2
STIPA
OPUNT
YUCCA

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	15 %	35 %
Height	no data	no data
Tree Size Class	no data	

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

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Class D 4 %

Late1 Open

Description

Less productive ridges and rocky areas protected from fire with scattered shrubs and/or juniper, pinyon, long needle pines, and oaks in fire protected sites. Scattered shrubs and/or trees are relatively large and some demonstrate multiple scars.

Dominant Species* and Canopy Position

JUNIP
BOGR2
SHRUB
PIED

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	5 %	15 %
Height	no data	no data
Tree Size Class	no data	

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

Class E 1 %

Late1 Closed

Description

Productive areas missed by fire with thick patches of shrubs and/or young sapling/seedling juniper, pinyon, long needle pines, and oaks in fire protected sites.

Dominant Species* and Canopy Position

JUNIP
PROSO
QUERC
SHRUB

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

	Min	Max
Cover	15 %	65 %
Height	no data	no data
Tree Size Class	no data	

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

Disturbances

Disturbances Modeled

☑ Fire
☑ Insects/Disease
☑ Wind/Weather/Stress
☑ Native Grazing
☐ Competition
☑ Other: Wet Years
☐ Other

Historical Fire Size (acres)

Avg: no data
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
Replacement	20			0.05	76
Mixed	65			0.01538	24
Surface					
All Fires	15			0.06539	

References

Brown, David E., editor. 1982. Biotic communities of the American Southwest–United States and Mexico. Desert Plants 4(1-4): 1-342.

Brown, James K.; Smith, Jane Kapler, eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen.

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Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 257 p.

Dick-Peddie, W. A., 1993. New Mexico vegetation, past, present, and future. University of New Mexico Press.

Kuchler, A. W. 1964. Manual to accompany the map of potential natural vegetation of the conterminous United States. American Geographical Society. Spec. Publ. No. 36. Lib. Congress Cat. Card Num. 64-15417. 156 p.

Schmidt, Kirsten M, Menakis, James P., Hardy, Colin C., Hann, Wendel J., Bunnell, David L. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Gen. Tech. Rep. RMRS-GTR-87. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 41 p. + CD.

U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, December). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/.

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