

14100

Llano Uplift Acidic Forest-Woodland-Glade

BpS Model/Description Version: Aug. 2020

Update: 4/13/2018

Modelers		Reviewers	
Lee Elliott	lelliott@tnc.org	David Riskind	david.riskind@tpwd.state.tx.us
Jeff Sparks	jeff.sparks@tpwd.state.tx.us	Eric Keith	None
None	None	None	None

Vegetation Type

Forest and Woodland

Map Zones

35

Geographic Range

This upland matrix system occurs primarily on coarse soils derived from the weathering of underlying granites in the Llano Uplift region of Texas (ECOMAP Subsection 315Dc; Cleland et al. 2007).

Biophysical Site Description

Though named as an uplift because it is an intrusion of Precambrian metamorphic rocks and large granitic massifs, this area is generally lower in elevation than the surrounding Edwards Plateau (Walters and Wyatt 1982, Riskind and Diamond 1988). At a regional scale, it is a topographic bowl, though rock outcrops such as Enchanted Rock often produce dramatic increases in elevation at a local scale. Aside from these massif intrusions, topography is generally level to rolling. The substrate of granites, gneisses and schists determines the range of this system in central Texas. Elevation ranges from 251-686m above sea level (825-2250ft). Rainfall averages about 76cm (30in), peaking in May or June and September.

The central mineral region occupies approximately 1.5m ha in central Texas (Riskind and Diamond 1988). Mineralogy of the granitic material varies, with hornblende schist, graphite schist, quartz-feldspar gneiss and quartz-plagioclase-microcline rock common (Riskind and Diamond 1988). Soils are predominantly acidic. The underlying granitic substrate determines the range of this system. In the central mineral region of central Texas, granite glades and barrens are surrounded by areas of deeper soils derived from granite that support denser herbaceous or woody vegetation that includes many species found sparsely on the glades.

Vegetation Description

This system is typified by a mosaic of mixed oak forests and savannas over coarse soils and sparsely vegetated areas on rock outcrops. Species such as blackjack oak (*Quercus marilandica*), plateau oak (*Q. fusiformis*), post oak (*Q. stellata*), black hickory (*Carya texana*), cedar elm (*Ulmus crassifolia*) and honey mesquite (*Prosopis glandulosa*) may dominate the canopy of this system. Some areas are characterized by dense forest patches (mottes) of *Q. fusiformis*, with various mixtures of other oaks and shrubs surrounded by open grasslands. Subcanopy species may include Texas persimmon (*Diospyros texana*), whitebrush (*Aloysia gratissima*), Mexican buckeye (*Ungnadia speciosa*), lotebush (*Ziziphus obtusifolia* var. *obtusifolia*), Texas

kidneywood (*Eysenhardtia texana*), Ohio buckeye (*Aesculus glabra* var. *arguta*), Texas pricklypear (*Opuntia engelmannii* var. *lindheimeri* = *O. lindheimeri*), Buckley's yucca (*Yucca constricta*), Texas sacahuista (*Nolina texana*) and Christmas cactus (*O. leptocaulis*). The ground flora may contain little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), hairy grama (*Bouteloua hirsuta*), sideoats grama (*B. curtipendula*), Texas wintergrass (*Nassella leucotricha*), plains lovegrass (*Eragrostis intermedia*), prairie tea (*Croton monanthogynus*) and Wright's plaintain (*Plantago wrightiana*).

In addition to oak woodlands and grasslands, this system also includes granitic glades and barrens. These are sparsely vegetated areas characterized by crustose and foliose lichens, several ferns and fern allies, and cacti, including fairyswords (*Cheilanthes lindheimeri*), cliffbrake (*Pellaea ternifolia*), Riddell's spikemoss (*Selaginella arenicola* ssp. *riddellii*), Peruvian spikemoss (*S. peruviana*), Wright's spikemoss (*S. wrightii*), lace hedgehog cactus (*Echinocereus reichenbachii*) and Arizona hedgehog cactus (*E. coccineus*). Other species that may occur in cracks and crevices or slight depressions with shallow, gravelly soil include tall buckwheat (*Eriogonum tenellum*), San Saba pinweed (*Lechea san-sabeana*), yellow stonecrop (*Sedum nuttallianum*), American fiveminute grass (*Tripogon spicatus*), Wright's Cliff Brake (*P. wrightiana*), sunbright (*Talinum parviflorum*), yellowdicks (*Helenium amarum*), basin bellflower (*Campanula reverchonii*), Arkansas dozedaisy (*Aphanostephus skirrhobasis*) and orangegrass (*Hypericum gentianoides*). Small-scale shallow vernal pools formed within barrens by weathering of the granitic surface support water pygmyweed (*Crassula aquatica*), yellow stonecrop (*Sedum nuttallianum*), sunbright (*Talinum parviflorum*), sand spikerush (*Eleocharis montevidensis*), shortseed waterwort (*Elatine brachysperma*), slimpod rush (*Juncus diffusissimus*), meadow garlic (*Allium canadense*), crowpoison (*Nothoscordum bivalve*), evening rainlily (*Cooperia drummondii*), petiteplant (*Lepuropetalon spathulatum*), blackfoot quillwort (*Isoetes melanopoda*) and the Texas endemic rock quillwort (*I. lithophila*). Larger pools often exhibit a pattern of zonation of the vegetation as soil accumulates in the center. Crevices in the rock outcrops tend to support scattered, stunted individuals of trees and shrubs found in the adjacent woodland. Endemics or near-endemics occurring within this ecological system include rock quillwort, basin bellflower, tall buckwheat (*Eriogonum tenellum* var. *ramosissimum*), shortseed waterwort (*Elatine brachysperma*), Edwards Plateau cornsalad (*Valerianella texana*), Great Plains ragwort (*Packera texensis*), Edwards plateau spiderwort (*Tradescantia pedicellata*), brazos mint (*Brazoria enquistii*), coastal indigo (*Indigofera miniata* var. *texana*) and American fiveminute grass (*Tripogon spicatus*).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
QUMA3	<i>Quercus marilandica</i>	Blackjack oak
QUFU	<i>Quercus fusiformis</i>	Plateau oak
QUST	<i>Quercus stellata</i>	Post oak
CATE9	<i>Carya texana</i>	Black hickory
SCSC	<i>Schizachyrium scoparium</i>	Little bluestem
BOCU	<i>Bouteloua curtipendula</i>	Sideoats grama
ALGR2	<i>Aloysia gratissima</i>	Whitebrush

Species names are from the NRCS PLANTS database. Check species codes at <http://plants.usda.gov>.

Disturbance Description

The different physiognomies are maintained by an interaction between site conditions and disturbance dynamics. The forest patches, woodlands, savannas and grasslands are thought to have been maintained historically by various fire frequencies and intensities. In the absence of natural or prescribed fire, increased cover of woody vegetation has increased in some occurrences. Native grazing may have also played a role in preventing woody encroachment though the rough terrain of much of this system would have limited the extent of native grazers.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	17	30		
Moderate (Mixed)	26	19		
Low (Surface)	10	51		
All Fires	5	100		

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

As a complex, this system covered large areas (>2000ha), but occurrences of individual physiognomies (forests, woodlands, grasslands and barrens) may occur as large (50-2000ha) or small (1-50ha) patches.

Adjacency or Identification Concerns

This system will be identifiable by the lack of *Juniper* spp. compared to other Edwards Plateau systems. Granitic geology and acidic soils will help identify this system. The coarse-scale national geology layer will identify this system.

Issues or Problems

Native Uncharacteristic Conditions

Currently, mesquite (*Prosopis glandulosa*) invades this system.

Comments

Succession Classes

Mapping Rules

[illegible]

Tree	>50	C	C	C	C	C	C	C	C	C	C
------	-----	---	---	---	---	---	---	---	---	---	---

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

Description

Class A 29 Early Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
SCSC	Schizachyrium scoparium	Little bluestem	Upper
BOCU	Bouteloua curtipendula	Sideoats grama	Upper
NALE3	Nassella leucotricha	Texas tussockgrass	Upper

Description

Herbaceous dominated with resprouts of the oaks and few shrubs. Woody species will be less than 10% of the total cover.

Maximum Tree Size Class

None

Class B 7 Mid Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUFU	Quercus fusiformis	Plateau oak	Upper
QUST	Quercus stellata	Post oak	Upper
SCSC	Schizachyrium scoparium	Little bluestem	Lower

Description

Small resprouted trees with a grassy herbaceous understory.

Maximum Tree Size Class

Sapling >4.5ft; <5"DBH

Class C 64 Late Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUFU	Quercus fusiformis	Plateau oak	Upper
QUST	Quercus stellata	Post oak	Upper
SCSC	Schizachyrium scoparium	Little bluestem	Lower

Description

Trees dominate with grassy herbaceous understory.

Maximum Tree Size Class

Medium 9-21"DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:OPN	0	Mid1:OPN	15
Mid1:OPN	16	Late1:OPN	50
Late1:OPN	51	Late1:OPN	999

Probabilistic Transitions

Disturbance Type	Disturbance occurs In	Moves vegetation to	Disturbance Probability	Return Interval (yrs)	Reset Age to New Class Start Age After Disturbance?	Years Since Last Disturbance
Replacement Fire	Early1:OPN	Early1:OPN	0.2	5	Yes	0
Replacement Fire	Mid1:OPN	Early1:OPN	0.003	333	Yes	0
Surface Fire	Mid1:OPN	Mid1:OPN	0.1	10	No	0
Mixed Fire	Mid1:OPN	Mid1:OPN	0.1	10	No	0
Replacement Fire	Late1:OPN	Early1:OPN	0.003	333	Yes	0
Mixed Fire	Late1:OPN	Late1:OPN	0.05	20	No	0
Surface Fire	Late1:OPN	Late1:OPN	0.15	7	No	0

References

Cleland, D.T.; Freeouf, J.A.; Keys, J.E.; Nowacki, G.J.; Carpenter, C.A.; and McNab, W.H. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. Gen. Tech. Report WO-76D [Map on CD-ROM] (A.M. Sloan, cartographer). Washington, DC: U.S. Department of Agriculture, Forest Service, presentation scale 1:3,500,000; colored

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 10 February 2007.

Riskind, D.H. and D.D. Diamond. 1988. An introduction to environments and vegetation. In: Amos, B.B. and F.R. Gehlbach (eds.). Baylor Edwards Plateau Vegetation: plant ecological studies in central Texas: Univ. Press, Waco, TX. Pages 1-16.

Walters, T.W. and R. Wyatt. 1982. The Vascular Flora of Granite Outcrops in the Central Mineral Region of Texas. *Bulletin of the Torrey Botanical Club*, Vol. 109, No. 3 (Jul. - Sep., 1982), pp. 344-364.