

THE CENTER FOR

Cedar Glade

STUDIES



What Are Cedar Glades?

Limestone cedar glades are endangered ecosystems found primarily in the Central Basin of middle Tennessee. Much of this extremely fragile system has been destroyed or severely damaged by humans. Glades have been viewed historically as wastelands, yet they support plant communities of highly specialized species, some of which are found nowhere else in the world. The soluble limestone rock forms the karst topography of the glades which includes sink holes on the surface and subterranean water. An underlying cave network that is home to many extraordinary cave organisms is also beneath the glades.

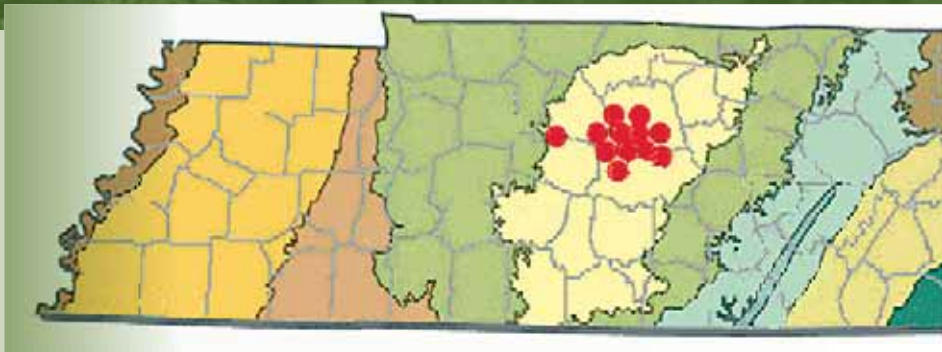
Cedar glades are characterized by very thin soil and exposed, rocky patches surrounded by redcedar trees. In the forested southeastern United States, the glade environment is seasonally contrasting: from standing water in the winter (due to poor drainage) to hot and dry in the summer.



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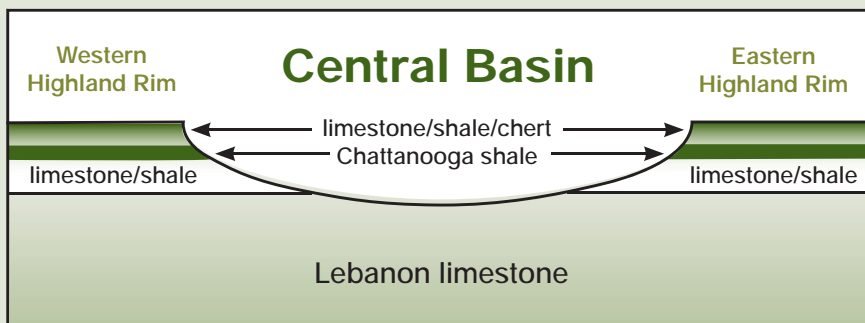
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For more information, visit our Web site at www.mtsu.edu/~gladectr.



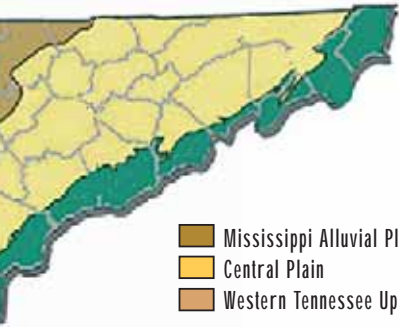
Where Are Lebanon Limestone Glades?

The map above shows cedar glades preserved by the Tennessee Department of Environment and Conservation. Although it shows only a small percentage of all glades, the red dots/circles on the map reflect the concentration of cedar glades in the middle of the Central Basin of Tennessee.



In geology, places must be identified stratigraphically as well as geographically. A cross-section of the Central Basin shows how the surface rock changes from west to east. The cedar glades in middle Tennessee are located primarily on the pure limestone of the Stones River Group in a formation known as the Lebanon Limestone. The limestone/shale/chert and Chattanooga shale have been eroded away in the Central Basin, leaving only the exposed limestone on which cedar glades develop.

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LEBANON

Limestone Glades

- | | | |
|----------------------------|--------------------|----------------------|
| Mississippi Alluvial Plain | Highland Rim | Cumberland Mountains |
| Central Basin | Cumberland Plateau | Ridge and Valley |
| Western Tennessee Uplands | Sequatchie Valley | Blue Ridge |
| | | Glade occurrence |

Habitats in the Glades

Within the Central Basin, the small amount of soil available is distributed primarily by gravity and erosion. Soil accumulates in low places or in cracks in the rock, and high places are frequently left entirely bare.

Three habitats or zones have been identified in glades:

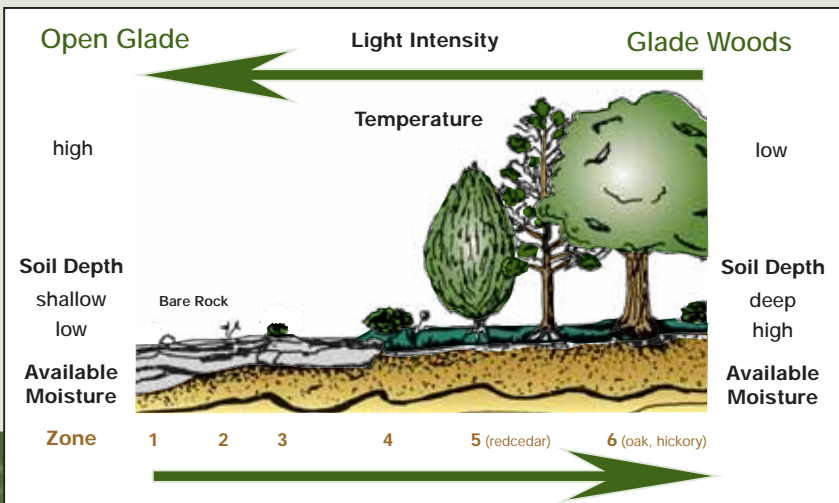
- Zone 1.** Exposed rock with no soil
- Zone 2.** Gravelly glades with 0–2 inches of soil
- Zone 3.** Grassy glades with 2–8 inches of soil

Two additional zones have been identified around the glades:

- Zone 4.** Xeric limestone prairie with 8–12 inches of soil
- Zone 5.** Cedar woods with more than 12 inches of soil

The physical characteristics of the glades change along a gradient from the woods to the open portion of the glade as shown in the chart below.

Each of these zones has its own characteristic plant life.



Endemic Species of the Glades

Several species of plants grow only in cedar glades. With such a geographically limited range, they are considered to be very rare. These plants are called endemic species. Examples include:

- Pyne's Ground Plum (*Astragalus bibullatus*)
- Tennessee Milkvetch (*Astragalus tennesseensis*)
- Leafy Prairie Clover (*Dalea foliosa*)
- Gattinger's Prairie Clover (*Dalea gattingeri*)
- Glade Larkspur (*Delphinium carolinianum* ssp. *calciphilum*)
- Tennessee Coneflower (*Echinacea tennesseensis*)
- Glade Cresses (*Leavenworthia* spp.)
- Gattinger's Lobelia (*Lobelia appendiculata* var. *gattingeri*)
- False Gromwell (*Onosmodium molle*)
- Nashville Breadroot (*Pediomelum subacaule*)
- Glade Phacelia (*Phacelia dubia* var. *interior*)
- Limestone Fameflower (*Talinum calcaricum*)
- Sunnybell Lilly (*Schoenolirion croceum*)

Endemic species persist in specialized habitats for two reasons:

1. **They develop characteristics which make them particularly well-adapted to the specific environment.** Many cedar glade plants have traits that help them survive the hot, dry summer. Some are winter annuals, producing seeds that spend the summer in a dormant state and then germinate in autumn. Others produce very long root systems that creep through bedrock fissures to find water, or they have water storage structures such as fleshy leaves.
2. **They cannot compete successfully in other environments.** Most glade plants are very shade intolerant, which makes it difficult for them to compete in environments with deeper soil that supports the growth of shade-producing shrubs and trees.

Department of Biology • MTSU Box 60 • Murfreesboro, TN 37132
615-904-8283 • gladecenter@mtsu.edu