

Geology—The Foundation and Framework of Ecosystems

Geologic diversity begets biologic diversity. The more diverse the geologic setting, the more diverse biologic communities are likely to be. Understanding the geology of an area (mineral nutrient distribution, substrate textures, subsurface water distribution) helps us understand the nature of biologic communities.

Given time, synergistic relationships among rocks, climate, and plants create diverse and constantly changing landscapes on the Nation's forests and grasslands. Composition, texture, and orientation of rocks are fundamental controlling factors in what a landscape looks like and how ecosystems function.



Forest Service photograph

Parent material (rocks) is one of the controlling factors in soil formation and plant habitat preferences. Geology can be a key factor in the distribution of rare plants.



Forest Service photograph

See the patterns in this landscape? Underlying geology of this valley controls topography, vegetation patterns, and distribution of both surface water and groundwater.

About Us

The Geology Program of the Forest Service, an agency of the U.S. Department of Agriculture, manages geologic resources and hazards on national forests and grasslands and provides technical geoscience expertise to other Forest Service programs such as watershed management, land management planning, recreation, and other resources, uses, and activities on the Nation's forests and grasslands.

The Office of Geologic Resources, Hazards, and Surface Management, part of the national Minerals and Geology Management staff, provides policy, oversight, direction, and project services to Forest Service headquarters, regional offices, and the field.

For more information, visit

<http://www.fs.fed.us/geology/geology.html>



Mike Fracasso, Forest Service

Scenic badlands landscape, Toadstool Geologic Park, Nebraska National Forest.



United States Department of Agriculture

Geology on Your National Forests and Grasslands



Dave Bunnell



Steve Wagner



Forest Service photograph



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The Geology Program Supports Science-Based Land Management

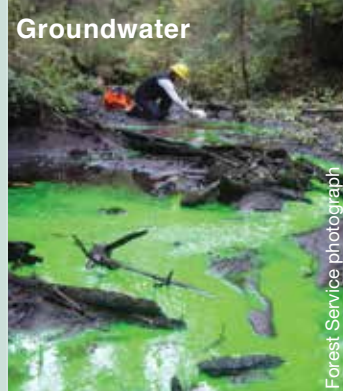
Particularly scenic areas and unique landscapes are often geologically significant. The Forest Service manages such areas for their scientific and educational importance, ecologic uniqueness, and aesthetic value and meaning to the public.

Geologic hazards include landslides and rock falls, flooding, volcanism, earthquakes, subsidence, and sinkholes, and naturally occurring hazardous minerals and gases, such as asbestos and radon. Forest Service geologists apply specialized knowledge and skills to identify, map, and assess geologic hazards to support mitigation of dangerous conditions and to minimize threats to life, health, and infrastructure.

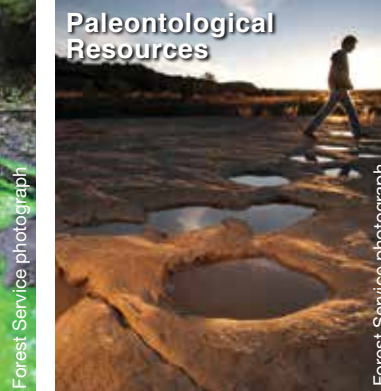
Caves and karst systems are important geologic resources that require special management because they support critical groundwater systems and unique biological communities. Caves also contain a wealth of information useful for studying climate, human history, paleontology, and minerals. The Forest Service manages caves and karst systems in order to protect and maintain the biologic, geologic, mineralogic, paleontologic, hydrologic, cultural, educational, scientific, and recreational values of these resources.

Groundwater and surface water are interconnected and interdependent in almost all ecoregions. Groundwater plays significant roles in sustaining the flow, chemistry, and temperature of streams, lakes, springs, wetlands, and cave systems in many settings. It governs slope stability and limits soil compaction and land subsidence. The Forest Service works to protect, manage, and improve groundwater resources in order to maintain the quality and availability of water for people and important biological communities.

Rock sequences contain records of biological evolution, ancient ecosystems, species origins and extinctions, climate change, natural disturbances, and fire history over billions of years of earth history. The Forest Service promotes discovery and management of paleontologic resources for scientific and educational purposes.



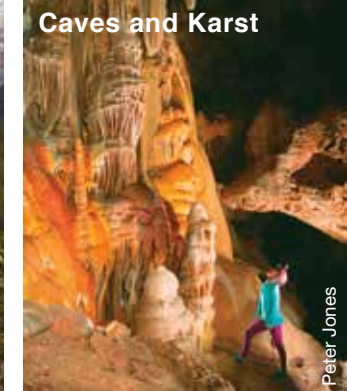
Forest Service employee injects environmentally friendly fluorescein dye in an insurgence to delineate groundwater flow.



Dinosaur tracks in limestone on the Comanche National Grassland.

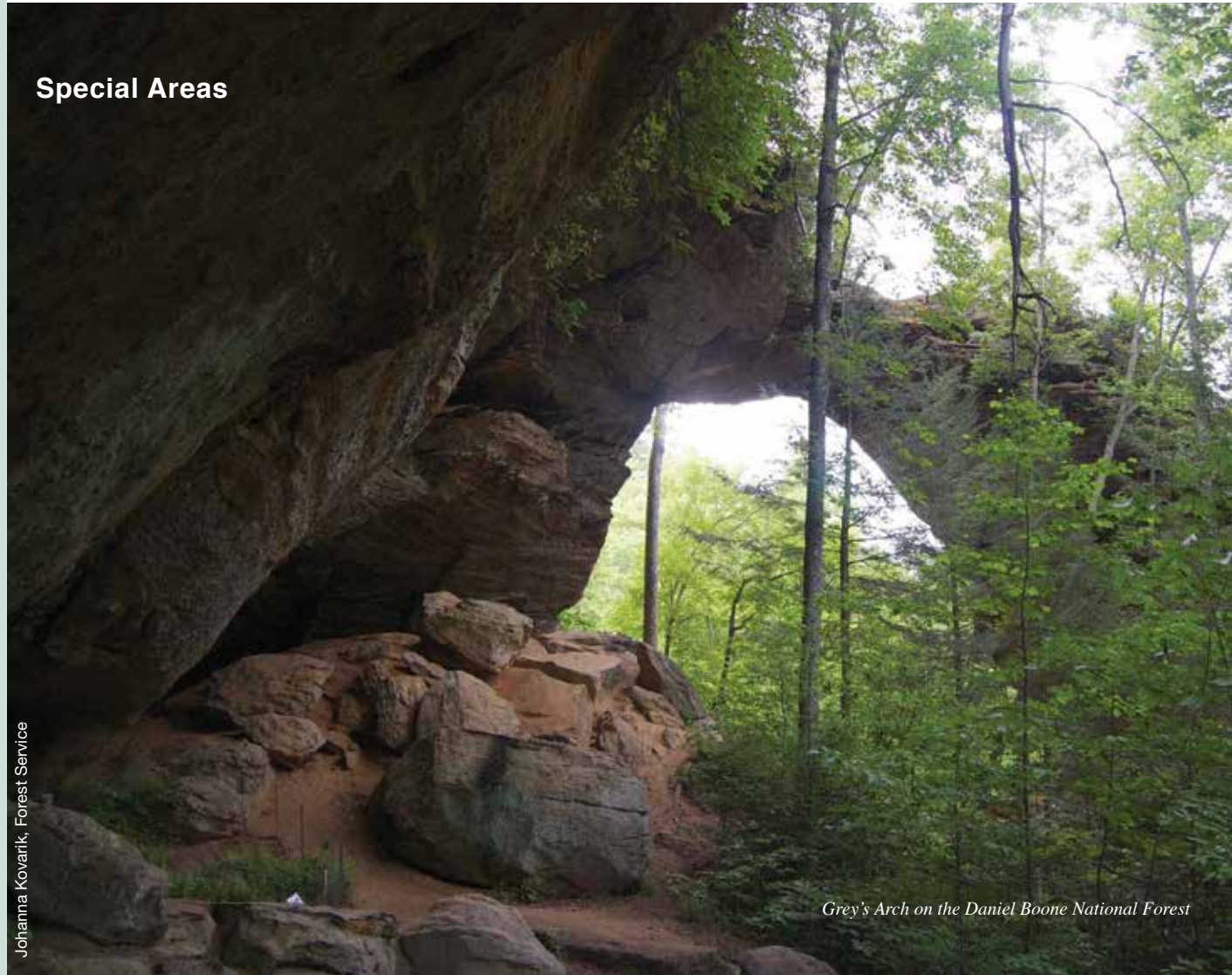


The White River debris flow on the south slopes of Mount Hood transported 800,000 cubic yards of material into the White River Valley.



Val Lewis looks at the Temple of the Fiery Cave God, Lincoln National Forest.

Special Areas



Johanna Kovarik, Forest Service

Grey's Arch on the Daniel Boone National Forest