Exposed Rock and Sand

Brief Description

C. Phillips

Glades, such as this rhyolite glade, are typically found within other natural habitat types, such as within forests, as in this example.

Exposed rock and sand habitats are generally sparsely vegetated and caused by lack of moisture, periodic fires, and erosion. They have little or no soil, and the underlying rock protrudes through the surface. They are usually located within other types of natural habitat, such as forest or savanna. Exposed rock and sand habitats include areas such as glades, cliffs, talus, quarries, sand/gravel bars, dunes, and beaches.

Glades are rocky barrens that are largely dominated by grasses but usually contain some sparse woody vegetation. They are often situated with a south to western exposure, on moderately steep slopes, and are interspersed with rock fragments. Cliffs, areas with steep, vertical exposures of rock, frequently occur along river bluffs. The rock ledges or shelves formed by cliffs are often sandstone or limestone. Sandstone escarpments support dominant tree species such as post oak, blackjack oak, red cedar, and winged elm, with canopies of oak and hickory on the more gradual slopes. Limestone escarpments support tree species such as buckthorn, dwarf hackberry, red cedar, and blue ash. At the base of these cliffs are large piles of broken and fragmented rock known as talus. **In between the broken fragments, the many hollow pockets and channels act as refugia for a variety of amphibians and reptiles.** Quarries are cliffs that have been created by humans through mining activities.

Sand and gravel bars occur in streams and riverbeds where frequent flooding regularly deposits and adds to these habitat types. Gravel bars are usually more vegetated with small trees and shrubs when compared to sand bars. Please refer to the Rivers and Streams habitat module for more information on these environments.

Beaches are the sandy areas closer to shorelines that usually lack vegetation. Dunes are a mix of sand ridges and swales formed by the lowering of water levels after glacial periods where wind deposited sand. Low sand dunes near beaches contain sand-stabilizing plants such as grasses, berry shrubs, and junipers, whereas more dry inland ridges can support sand cherry, willows, some prairie forbs, prickly-pear cactus, and even deciduous forests comprising various scrub-oak species, cottonwood, and aspen. Other natural communities such as sand prairies, sand savannas, fens, alkaline panes, sedge meadows, and marshes can be found within dunes.

S. Ballard

The Western Hognose Snake is a specialized burrower in sandy habitats.

CRITICAL CONSIDERATIONS FOR EXPOSED ROCK AND SAND

- These areas are surprisingly fragile. Protect them from heavy use.
- Prevent overgrowth by shrubs and trees that would reduce the openness of the area.
- Prevent erosion that might fill gaps between rocks.
- Restrict off-road vehicle use to preselected, less sensitive/lower quality areas.

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Species Associated with Exposed Rock and Sand

Amphibians are much less abundant than reptiles in this habitat. The most visible amphibians that occur in these xeric (dry) habitats are Fowler's and American Toads. However, other amphibian species could be hidden underneath rocks on a talus slope or in deep crevices and fissures within the face of a cliff. Examples include Spotted Salamanders, Long-tailed and Cave Salamanders, and Narrowmouth Toads.

Six-lined Racerunners, Collared Lizards, Eastern Coachwhips, Copperheads, and Timber Rattlesnakes use the exposed rock that is the most distinguishing feature of the glade and cliff communities. Prairie Ringneck Snakes, Flathead Snakes, Rough Earth Snakes, and Western Worm Snakes are found under exposed rock. Western Hognose and Bullsnakes are specialized burrowers in sandy habitats, like dunes.

S. Ballard

Six-lined Racerunners can be found on exposed rocks in glade and cliff habitats.

Managing Exposed Rock and Sand to Benefit Amphibians and Reptiles

Ironically, exposed rock and sand areas can be incredibly fragile habitats. Therefore, the most important concern is protection. Threats include mining/quarrying and use by motorized vehicles, particularly off-road vehicles In most cases, these activities are incompatible with amphibian and reptile conservation because they destroy the habitat by breaking rocks (which many species use for cover) or contribute to erosion of finer materials such as gravel and sand. In addition, vehicular mortality is a major cause of amphibian and reptile decline in various parts of the country. **Closing roads or seasonally reducing ORV and vehicular use within primary habitat areas can stabilize and even reduce this loss of native amphibian and reptile populations and their habitats.**

S. Ballard

Snake denning sites may also occur near suitable rock climbing areas. By applying seasonal access restrictions, snake-rock climber interactions will be minimized.

Most exposed rock and sand areas have open areas with little or no vegetation. Prescribed burning is a management tool that maintains this openness by reducing the encroachment of open areas by woody species. **Prescribed burning should be conducted during the dormant season for most amphibians and reptiles to reduce mortality.** Please refer to the Prescribed Fire section of the Toolkit for more recommendations on the use of this management technique.

Herbicides may also be used to control vegetation in exposed rock and sand habitats. However, **one must avoid the drift of chemicals to non-target areas such as wetlands** when applying herbicides. Refer to the Herbicides section of the Toolkit for more recommendations.

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It is important to protect the spaces between rocks from filling with soil eroding from above by preventing logging or grazing on fragile, thin-soiled glades and cliffs. Dunes and beaches can be enhanced and even partially restored by removing windbreaks, since wind movement carries the sand particles that form and maintain this habitat. Artificial perches on dunes or beaches should be removed or at least reduced, to minimize the deposition of woody plant seeds by birds, which could cause undesirable encroachment and closing of open areas. These artificial perches can also act as small windbreaks and negatively alter the wind distribution and maintenance of sand areas.

Integrative Management Ideas

A. Resetar

Shallow wetlands in intradunal areas are especially fragile habitats and should be protected from destructive activities such as ORV use.

Exposed rock and sand habitats draw an array of visitors and users. **In addition to the highly destructive off-road vehicles mentioned above, hikers, horse-back riders, rock climbers, and rock collectors all compete for the recreational use of these habitats.** Integrative management of all exposed rock and sand habitat areas includes designating use areas or times for various special interest groups as needed; establishing buffers; maintaining or creating connectivity to other similar habitats; establishing ecological or ecosystem partnerships, and education efforts to interpret the amphibian and reptile resource to the general public and users of the site.

When possible, direct activity towards areas of lesser importance to amphibians and reptiles. If no low quality areas exist, seasonal use by these groups during times when amphibians and reptiles are not active could be a good compromise. However, any intrusive use must be avoided in areas that have steep slopes; are breeding, denning, and birthing sites for amphibians or reptiles; or are high quality natural plant communities. Well-placed trail systems and/or seasonal closure of some trails can help alleviate conflicts between the resource and potential users of the site.

Dunes and beaches may need some stabilization to maintain the structure of their sand, but any stabilization techniques must consider the needs of resident herp species. For example, if stabilization structures create barriers to amphibian and reptile dispersion, they must have some sort of tunnel or underground crossing available.

As mentioned above, **buffer areas should be established around the site to shield it from outside forces**. Keep in mind that buffer areas can still allow for multiple uses such as special interest group activities like rock climbing. If the site is already connected to another piece of exposed rock or sand habitat, it is important to maintain the connectivity so that amphibians and reptiles can have safe dispersal corridors to other outside areas.

This is the Exposed Rock and Sand module of the PARC publication, "**Habitat Management Guidelines for Amphibians and Reptiles of the Midwest," ISBN # 0-9667402-1-1.** Please visit www.parcplace.org for further information or copies of the complete document, or visit http://herpcenter.ipfw.edu for a Web-based version of these materials.