In the Spotlight: Cumberland Plateau Gravel/Cobble Bar

By Brian Yahn, Vegetation Ecologist

KSNPC Staff photo by Tara Littlefield

KSNPC's "Community Spotlight" is on a unique type of flood-scour riverine community, commonly called a gravel/cobble bar**.** Gravel/cobble bar communities are deposits of gravel, sand, and cobble laid-down along the banks of moderate to high gradient streams, often mixed with boulders. Throughout most of Kentucky, the plants associated with gravel/cobble bars are usually common species, with a good assortment of disturbance-tolerant weeds, capable of withstanding continual flooding disturbance and instable, shifting soils. Floods occur during the winter wet season, and during growing-season rain events. Fast-moving water carries sediments and other debris which scours through the vegetation and against the substrate of the bar. This process is the same in the southern Plateau Escarpment (Woods et. al 2002) of Rockcastle, Laurel, Pulaski and McCreary Counties. But another kind of gravel/cobble bar has developed with a very different array of plant species. This unique type is referred to as the Cumberland Plateau gravel/cobble bar. In Kentucky, it is extremely rare and is only documented from the Rockcastle and Big South Fork Rivers. It supports a flora more typical of western prairie and Coastal Plain regions, supporting an array of rare plants. In fact, one species, the Cumberland rosemary, is only found on these river-scour bars in the Cumberland Plateau of Kentucky and Tennessee, and nowhere else in the world! (Note: A section of the upper Cumberland River (above the Falls) has been reported to support this community as well, but more surveys are needed.)

Since settlement, modern humans have channelized and drained streams, damned rivers into reservoirs and deforested areas around watersheds, which has reduced the range of this community and its distribution on the landscape. As a result of such disturbance and modification, the two best remaining locations in Kentucky occur along densely forested stream corridors of the Daniel Boone National Forest and the Big South Fork National Recreation Area. A seven mile stretch of the Rockcastle and a three and a half mile stretch of the Big South Fork represent the only two areas in Kentucky where the communities occur in a regular, more frequent, distribution (KSNPC 2016, Map 1.). In addition, these high quality stream corridors are further impacted by invading non-native species. The most invasive include: autumn olive, Japanese spiraea, and silk tree. Due to these impacts, KSNPC lists Cumberland Plateau gravel/cobble bar as state endangered (=S1), one of the rarest communities in Kentucky.

Outside of Kentucky, areas to the east, south and west have documented occurrences of gravel/cobble bars somewhat similar to Kentucky's Cumberland Plateau gravel/cobble bar (including but not limited to areas in MD,WV, VA, TN, GA, AL, AR and OK) (NatureServe 2016). In fact, several occurrences in Tennessee (and perhaps Georgia), especially along the Big South Fork, are essentially the same community. With very few occurrences remaining, NatureServe (the national authority on the status of rare species and natural communities) lists the status as globally imperiled (=G2) (NatureServe 2016).

Photo courtesy Dr. Thomas Barnes

A description of the natural condition of this community is defined by the remaining examples in Kentucky. Although these examples are considered high-quality, they're still affected by past and current disturbances and landscape changes (upstream ponding and damns, ditching, draining, nearby logging, erosion, siltation, exotic species invasion, etc.). Soils are silt loam to fine sandy loam mixed with small to large stones. From deep to moderately-deep, the soils are well-drained but also frequently flooded (Byrne et al. 1970). Gravels and cobbles are abundantly exposed at the surface, with occasionally scattered boulders. The gravel/cobble bar is predominately an herbaceous community but shrubs and small trees can occur at high to low densities. Typically, the more frequently flooded and low-lying, flat-level bars have a less woody component.

Lightly scattered shrubs and trees include buttonbush, hazel alder, silky dogwood and sycamore. Prairie grasses such as big bluestem, little bluestem and Indian grass are usually dominant. Characteristic forbs include blue wild indigo, false dragonhead, flaxleaf whitetop aster, Maryland goldenaster, smallhead blazing star, and spiked hoarypea (goat's-rue) (KSNPC 2016). These gravel/cobble bars are so similar to the prairie communities in western regions, they are often referred to as "riverscour prairies" or "riverside prairies".

In Kentucky, Cumberland Plateau gravel/cobble bars provide essential habitat for rare plant and animal species, several found nowhere else outside of this community. At least 14 KSNPC-listed plants have been documented on Cumberland Plateau gravel/cobble bars, with an astounding seven of these being globally rare (KSNPC 2016)! These associated rare plant species (not highlighted below or listed above) include Cumberland sandgrass, mountain witch-alder, northern white cedar, prairie redroot, Rand's goldenrod, Rockcastle aster, sand grape, southern bog goldenrod, sweet-fern, Turk's cap lily, vetchling peavine and Virginia spiraea (KSNPC 2016). Herps associated within these gravel/cobble bars include "copperheads, five-lined skinks, and fence lizards (all in very good numbers in the summer), plus occasional longtail and southern two-lined salamanders, northern water snakes, and queen snakes" (J. MacGregor, KDFWR, personal communication). Also, several rare fish and mussel species are found in the streams where these gravel/cobble bars develop.

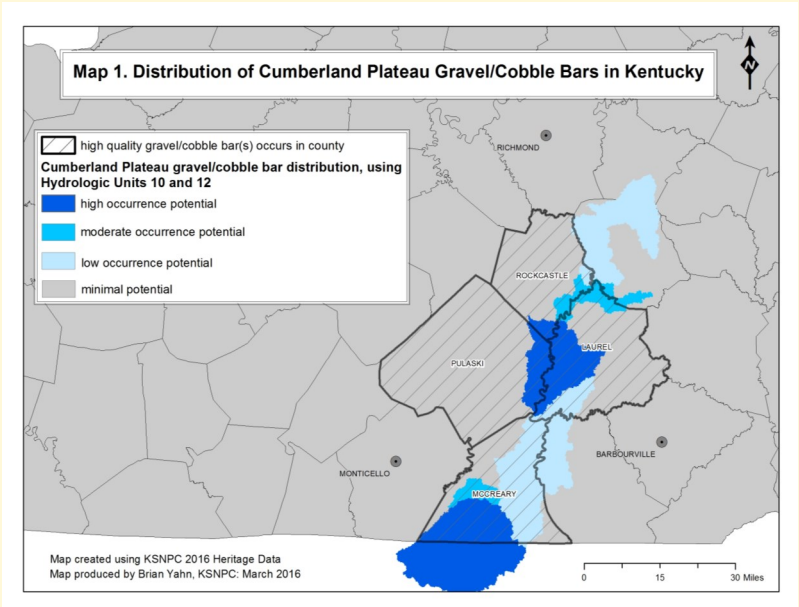
Since the time of Euro-American settlement, Kentucky's wilderness has been disappearing at an alarming rate, with most areas now severely fragmented or completely destroyed. The great human improvements of the Industrial age and the expansion of modern civilization have left humanity with a broken and abused landscape. Rare communities like the Cumberland Plateau gravel/cobble bar hover on the brink of existence (in Kentucky and maybe throughout its range). Steps should be taken to ensure that existing occurrences are protected and efforts to restore stream corridors that support this community should be made. For more information on gravel/cobble bars in Kentucky contact commission ecologists Brian Yahn, (brian.yahn@ky.gov), Martina Hines (martina.hines@ky.gov) or botanist, Tara Littlefield tara.littlfield@ky.gov).

Copperhead pair, Wondering Woods ~ Photo courtesy John R. MacGregor, KDFWR

BEWARE!

Copperheads are often encountered on Cumberland Plateau gravel/cobble bars!!

KSNPC Staff Photo by Tara R. Littlefield



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Species associated with Cumberland Plateau gravel/cobble bar:

Cumberland Rosemary *Conradina verticillata*

KSNPC Staff Photo by Tara Littlefield

KSNPC Status: State endangered **Flowering Period:** May to June

USFWS Status: Federally threatened

General Description: Cumberland rosemary is a small evergreen shrub in the mint family that resembles the popular culinary herb rosemary. It even has a similar smell. The leaves are small and needle-shaped, and the pale purple 2-liped flowers have dots on the corolla tube throat.

Habitat: Cumberland Plateau cobble/boulder bars (prairies of the river).

Range: Endemic to the upper Cumberland plateau in north central Tennessee and adjacent southeastern Kentucky.
http://eppcapp.ky.gov/nprareplants/Details.aspx

Queen Snake *Regina septemvittata*

Photo courtesy John MacGregor, KDFWR

KSNPC Status: None

USFWS Status: None

General Description: The Queen Snake is one of Kentucky's medium-sized, aquatic snakes, ranging from 15 to 24 inches in total length. Overall, the Queen Snake is light brown to gray with a white to pale yellow stripe running along the lower sides. Three faint, narrow black stripes may be visible along the back, with four brown stripes more prominent along its pale belly. Queen snakes feed almost exclusively on soft, newly molted crayfish.

Habitat: Prefers rocky streams, like those where the Cumberland Plateau gravel/cobble bars develop. Often found under large rocks or logs around the edges of these streams or rivers, occasionally basking on branches over water.

Range: Native to the Eastern U.S. and ranging as far north as southern Ontario, Canada and as far south as the panhandle of Florida. It occurs in the central part of Kentucky (north to south), but does not inhabit western Kentucky or most of the Cumberland Plateau in eastern Kentucky.

Large flowered Barbara's buttons *Marshallia grandifolia*

Photo courtesy Ben Moyer

KSNPC Status: State endangered **Flowering Period:** June to July

USFWS Status: None

General Description: Large flowered Barbara's buttons is a perennial herb with solitary white to light blue flowers on a single peduncle (flower stalk). The flower itself has a long hairy tube that is lobed at the end. The leaves are mostly basally disposed, with the lower ones on a long petiole (leaf stalk)

Habitat: Cobble/boulder bars along flood-scoured banks of large, high-gradient Rivers in Kentucky, but also reported from creek banks, bluffs and floodplains elsewhere in its range.

Range: Endemic to the Appalachians in West Virginia and Pennsylvania and the Cumberland Plateau in north central Tennessee and adjacent southeastern Kentucky.