



Cobble Bar Monitoring

Affected Parks:

Big South Fork NRR (BISO)
Obed Wild and Scenic River (OBRI)

Importance / Issues

Cumberlandian cobble bars, or “river scour prairies” are unique plant communities endemic to the Cumberland Plateau of Tennessee and Kentucky. Ranked by The Nature Conservancy as Globally Imperiled (G2) and vulnerable to extinction throughout their range, they exist on open, flood-scoured exposures of bedrock, cobble or gravel along large rivers.



Fewer than 500 acres of Cumberlandian cobble bar habitat remain in existence, with the highest quality examples in Big South Fork NRR and Obed Wild and Scenic River

Typically thick with grasses and flowering herbs, these river prairies share many characteristics with the tallgrass prairies of the American Midwest. Whereas fire is the driving force sustaining midwestern prairies, in the bottom of the deep river gorges of the Cumberland Plateau, water is the ecological driver. Raging floods wash over these habitats on multiple occasions each year, scouring out species that are not adapted to disturbance, including most trees and other woody species. Grasses, herbs, and some low shrubs thrive under these punishing conditions. Twenty-seven rare plant species, including some that grow nowhere else, also flourish in these riparian prairies. Among these are two Federally-listed species -

Cumberland rosemary (*Conradina verticillata*) and Virginia spirea (*Spiraea virginiana*). No other habitat type within these two parks supports such a large assemblage of globally rare plant species.



Cumberland rosemary – a Federally-listed Threatened plant endemic to Cumberland Plateau cobble bars

Monitoring Objectives

The goals of this long-term monitoring effort are to determine whether successional patterns and habitat quality/physical structure of cobble bar communities are changing over time. We are also looking for patterns in cover and distribution of invasive exotic species. If normal flood cycles are disrupted by extended droughts, upstream impoundments or water withdrawal, these open, grassy communities could vanish, replaced by woody species – including non-natives - that would not ordinarily be able to survive here.

Specific objectives are to document:

1. Long-term trends in community structure (e.g., cover, density by height class of woody species; cover and density of grasses and herbs).
2. Long-term trends in abundance and size class distribution of selected rare, threatened and endangered plant species on the cobble bars.
3. Long-term trends in cobble bar substrate composition (sand, gravel, cobble, boulder, coal sediment).
4. Presence and cover, by species, of invasive exotics.

Protocol Development and Status

The cobble bar monitoring protocol has undergone peer review and has been published in the NPS Natural Resource Report Series (NPS/APHN/NRR-2013/698).

MONITORING SITE MAPPING: the distribution of cobble bars in the parks was unknown prior to the beginning of this project. APHN crews mapped them, by boat, during the winter—the only time when water levels are high enough to make navigation possible:

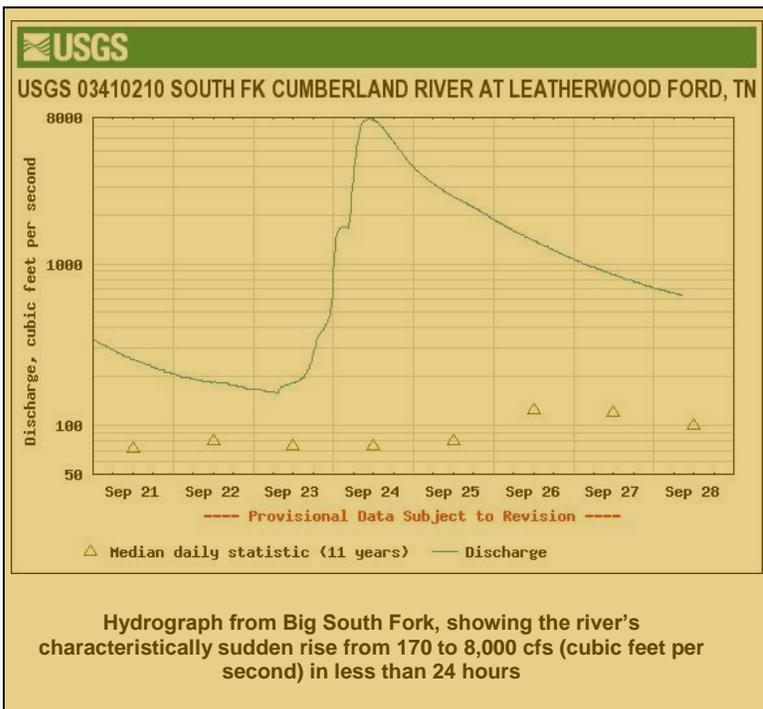
OBRI-45 river miles mapped, 168 cobble bars found
BISO- 75 river miles mapped, 22 cobble bars found

During the course of cobble bar mapping, 64 previously unknown populations of Threatened Cumberland rosemary were documented, proving OBRI to be the most significant remaining stronghold for this species, range-wide.

monitored at least once, using point intercept and line intercept methods to assess vegetation structure and substrate composition, qualitative cover estimates for all non-native invasive species, and counts and cover measurements for Cumberland rosemary.



In the steep-walled sandstone gorges of the Cumberland Plateau, heavy rainfall can drastically raise water levels within hours of a storm. Violent floods are crucial to the long-term survival of the rare, prairie-like cobble bar communities along the rivers' edges.



Management Applications

Information gathered from this monitoring, in concert with water quality monitoring, will provide park managers with a baseline against which to assess future changes in this imperiled community and its rare inhabitants, detrimental resource changes associated with water quality degradation and disruptions of natural hydrological cycles, as well as early detection of invasive exotic species.

METHODS: 103 permanent transects have been established at 21 sites, using restricted random positioning methods. Monitoring sites at OBRI were selected within stream reaches, using stratified random selection procedures. At BISO, where there are many fewer sites, all accessible sites are being monitored. Each site has been

Contact Information

Nora Murdock
Appalachian Highlands I&M Network
67 Ranger Drive
Asheville, NC 28805
Nora Murdock (nora_murdock@nps.gov)