

News in Brief

Vegetation Monitoring

Staff completed monitoring of 28 sites at TAPR, Manley Woods at WICR, seven new sites at HOSP, and seven new sites at PERI. Data entry and verification began for recently collected data.

Invasive Plant Monitoring

Davey Resources, an Ohio-based environmental consulting firm, began implementing the HTLN protocol at CUVA.

Rare Plant Monitoring

Network staff completed the Missouri bladderpod monitoring report for 2007. Abundance estimates at Bloody Hill Glade, WICR, range from 15,158 to 44,798 plants.

White-tail Deer Monitoring

We completed the 2007 status reports for ARPO, PERI and WICR in mid June. Based on outside review and our 2007 findings, we will make some changes to the final protocol.

Black-tailed Prairie Dog Monitoring

A crew will visit SCBL July 23 - 27 to count numbers and map colony extents.

Grassland Bird Monitoring

The 2007 bird monitoring at ARPO, LIBO, HOCU and TAPR was completed in mid June. Staff appreciated the interest shown and help provided by parks.

Wetlands Monitoring

Sonia Bingham, the new HTLN wetland biologist, continues pilot monitoring this summer at CUVA.

Fish Community Monitoring

Staff completed annual fish monitoring at BUFF in June. Staff continue to work on the Spring Fish Community protocol for OZAR and to revise the prairie fish monitoring protocol for TAPR and PIPE with the addition of seven parks (EFMO, GWCA, HEHO, HOME, HOSP, PERI, and WICR).

Aquatic Invertebrate Monitoring

Staff finalized the river invertebrate protocol and database. We completed sampling at GWCA and WICR and continue sample processing for all FY 07 samples. The Spring Communities Protocol draft nears completion.

Please see **Who? 4-letter Acronyms**, p. 2 for park names.

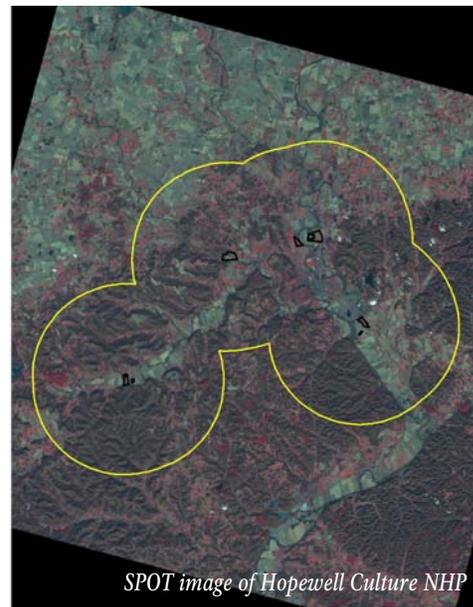
Adjacent Land-Use Analysis

Many changes have occurred at a landscape scale in the Midwest. Some examples of these changes include conversion of croplands into woodlands, grasslands into residential development, and rivers into reservoirs. Landscape changes surrounding park lands can affect what happens inside our National Parks. Some changes are only visual, such as urban encroachment changing a view shed. While other changes, such as increased impervious cover, may affect plant and animal populations, water quality and hydrology. Park managers track adjacent land-use changes at the landscape-level in order to anticipate impacts on the ecological integrity and visitor experience in our National Parks.

In March, HTLN staff met with Dr. Robert Weih of the University of Arkansas, Monticello, to discuss the progress on the Land-Use / Land-Cover Monitoring Protocol. Weih expects to complete a draft of the protocol by the end of this year.

Dr. Weih is comparing two alternative classification methods to determine which process has the greatest accuracy for land use classification around HTLN parks. Both methods involve the use of satellite imagery with multi-spectral bands. An example of the kind of satellite imagery that will most likely be used by the HTLN is SPOT. The SPOT image, shown here, displays Hopewell Culture National Historical Park in Chillicothe, Ohio and its vicinity in 2006. The polygon in yellow represents a 10 kilometer buffer around park boundaries. The image has a 10 meter spatial resolution and includes green, red, near infrared and short-wave infrared bands.

Dr. Weih's two classification methods use (1) a spectral-pixel classifier and (2) a feature-based classifier combined with a spectral-pixel classifier. With a spectral-pixel classifier, the classification process only considers the spectral reflectance of each pixel. However, when spectral-pixel and feature-base classifiers are combined, the process considers both spectral reflectance



SPOT image of Hopewell Culture NHP

and object-spatial layout of the pixels. Along with the protocol, Dr. Weih will also complete a 2006/2007 land-use/land-cover classification for Hot Springs National Park.

The HTLN will complete land use analysis with the new protocol on the first parks, Hot Springs NP (completed by the end of the year), Hopewell Culture NHP (imagery received, fieldwork complete, classification not started), Lincoln Boyhood National Monument (½ imagery received, fieldwork in process, classification not started), and Buffalo National River (imagery out for bids, fieldwork scheduled for fall of 2007, classification not started) before moving forward with other parks. The HTLN intends to complete land use analysis for all of the parks over the next several years.

—Jennifer Haack

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Hot Water Springs up Outside of Hot Springs NP

Congress established Hot Springs Reservation on April 20, 1832 to protect a unique flow of geothermal water that supports therapeutic baths of extraordinary quality. Hot Springs received National Park status in 1921, and continues to preserve the rich history of a Historic Landmark District and the quality of 47 hot springs for public use.

Conservation of the hot springs and their water quality necessitates protection of the rock formation that encapsulates them. Scientists originally thought that a single confined groundwater reservoir contained within the park boundary fed the geothermal springs. This suggested that best management practices within the park would ensure water quality and quantity in the hot springs.

An incident in 2006 caused scientists and resource managers to reconsider the park reservoir hypothesis. They now know that the geothermal waters extend beyond park boundaries and could be impacted by development in and around the city. Historically, only one major exit for the springs existed. Now, through human disturbance, there are several known exit points with some located geologically "down hill" of the park.

The Arkansas Highway and Transportation Department, Federal Highway Administration, U.S. Geological Survey (USGS), and NPS forged a partnership to prevent impairment of the geothermal springs. The highway departments suspended all construction on a four-lane beltway that may have been linked to the 2006 incident.

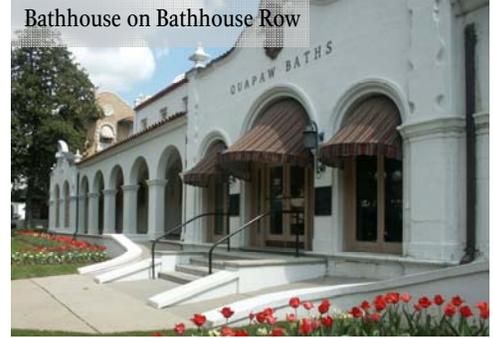
Research began in October 2006 to define the hydrogeology for the hot springs. Scientists from the USGS performed reconnaissance in areas where the local geology suggested a connection to the rock formation associated with the springs. They discovered higher temperatures than expected in private wells, indicating geothermal water was exiting the groundwater reservoir through new

passage ways and entering the wells.

The USGS drilled several new wells and used a sophisticated geophysical data logger to collect a wide range of information. One well located near the center of a highly fractured rock formation thought to contain the geothermal reservoir, but higher in the water column than hot water would be expected, showed presence of hot water. This site lies very near the planned beltway construction.

Further investigation revealed a thrust fault that intersects the reconnaissance area. The fault could provide a conduit for geothermal water. The appearance of thermal water in the test wells and the 2006 incident occurred after blasting associated with construction took place nearby.

Scientists have focused on data collection to date, but will ramp-up their data analysis



this fall. Geothermal water has appeared in wells more than five miles east of the park's boundary, suggesting that activities outside of NPS ownership or influence could impact the hot springs. Research will conclude in September of 2009 with NPS managers having a better understanding of the hot springs.

Thank you to Steve Rudd for assistance with this article

Who? 4-letter Acronyms

The NPS, like most government agencies, uses more than its share of acronyms. The Weather Vane allows park acronyms within News in Brief, but identifies park names within articles. Rule-of-thumb, park acronyms use the first two letters of the first two words in the park name, unless they duplicate another park, or they form an inappropriate four-letter word. The HTLN (Heartland Network, an exception to the rule) and Prairie Cluster parks acronyms consist of:

AGFO Agate Fossil Beds National Monument
ARPO Arkansas Post National Memorial
BUFF Buffalo National River
CUVA Cuyahoga Valley National Park
EFMO Effigy Mounds National Monument
GWCA George Washington Carver National Monument
HEHO Herbert Hoover National Historic Site
HOME Homestead National Monument of America
HOCU Hopewell Culture National Historical Park

HOSP Hot Springs National Park
LIBO Lincoln Boyhood National Historic Park
OZAR Ozark National Scenic Riverways
PERI Pea Ridge National Military Park
PIPE Pipestone National Monument
SCBL Scotts Bluff National Monument
TAPR Tallgrass Prairie National Preserve
WICR Wilson's Creek National Battlefield

Welcome Sherry Leis

Sherry, an employee of Missouri State University and HTLN partner, fills the role of fire ecologist, providing expertise on fire effects on plant communities. Her interests include investigating disturbances such as fire, grazing, and off-road vehicle use on grassland communities. Sherry worked as a plant ecologist in grassland management before joining HTLN.

Welcome Sonia Bingham

Sonia became the new HTLN biologist stationed at CUVA. She is completing an MS degree at Ohio State University and will join HTLN staff full time following graduation. Sonia works under the direction of Craig Young to further design and implement wetlands monitoring at CUVA.

Cuyahoga Valley NP Findings on Sampling Technology

The last issue of The Weather Vane, June-July 2007, we covered testing of new sampling technology for low concentrations of organic compounds in Tinkers Creek, Ohio. A progress report is out and a final report is expected in September: *Using Polar Organic Chemical Integrative Sampling Technology to Investigate Organic-Wastewater Compounds Entering Tinkers Creek in Northeast Ohio*, by John Tertuliani, US Geological Survey.

Don't Miss It!

HTLN Annual Meeting, August 15-17 in Springfield, MO. This year's meeting invites an interpreter from each park to participate. Tom Richter will hold a special meeting. Interpreters will work with natural resource staff on interpretive products. Contact Tom Richter (402-661-1892) or the HTLN (417-732-6438) for details.

More on the Web

Hot Springs NP <http://www.nps.gov/hosp> email Stephen_Rudd@nps.gov

Remote Sensing http://www.nps.gov/gis/remote_sensing/education.html

Check out new look to HTLN website <http://www1.nature.nps.gov/im/units/htln/>