The Weather Vane

The Newsletter of the Heartland Inventory and Monitoring Network

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News in Brief

Park abbreviations are given on page 2

Aquatic Monitoring

Data analyses and reports continue for springs, rivers and small streams.

Invertebrates — Reviewers are working on BUFF, OZAR and WICR reports. We drafted GWCA and PIPE reports. Sample processing continues.

Fish — We published the HEHO fish report in January. Staff presented fish monitoring data from WICR and OZAR at the Missouri Natural Resources Conference.

Data Management

Staff have worked on the river fish monitoring database and the EPMT staff data management business plan. The plan will identify EPMT data products and the activities required to produce them.

Exotic Plant Management Team

The EPMT and partner parks are planning the upcoming field season. We hope to start projects in early March.

Fire Ecology

The current fiscal uncertainty stymied fire ecology planning. The Prairie Naturalist will publish our manuscript on patch burn grazing at TAPR.

Great Plains Fire Science Exchange — We hosted a workshop at the Society of Range Managers meeting February 4. We are helping to plan an Integrated Fire Technology Decision Support System training in Rapid City, SD later in February.

Vegetation Monitoring

Plant Community — Staff continue to analyze 2012 field data and to work on reports for GWCA, PERI and WICR.

Invasive Plant — Staff completed an invasive plant monitoring report for Powder Mill Natural Area, OZAR.

Wetland Monitoring

We posted a position for 1 to 2 seasonal wetland biotechnicians for this year. Work

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Ordination Analysis—Fishy Patterns

When HTLN biologists monitor fish communities in your park, we also collect physical and chemical habitat data. You may wonder why this is.

Different fish species prefer different stream conditions or habitats; yet, fish can live within a range of those conditions. It is important, as biologists and resource managers, to know what habitat characteristics influence fish community structure. We should also understand how these factors differ across time and within/among parks.

For example, HTLN staff analyzed data from main-stem river sites at BUFF and OZAR to determine fish community similarity among locations within these parks. We also wanted to clarify habitat characteristics that influenced these communities. A Nonmetric Multidimensional Scaling analysis (NMS) was used to visualize patterns and clusters in fish community types.

Fish communities at OZAR clustered by their site locations in the watershed. Figure 1 demonstrates that fish communities in the upper Current River (sites C1, C2 and C3) were more similar to each other, more tightly clustered, than those in the lower Current River (sites C4, C5 and C6) or the Jacks Fork (J1, J2 and J3).

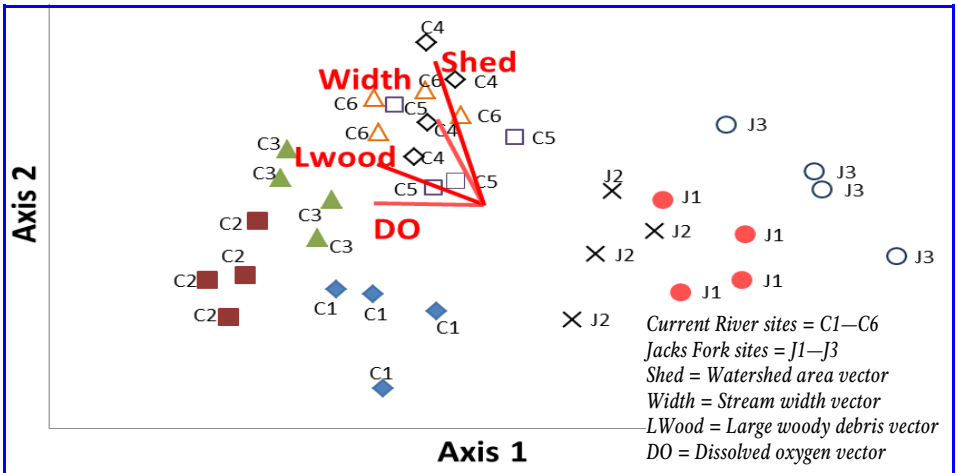

Figure 1. Example ordination plot for OZAR

Each point represents a fish community at a site in one of the four years in which the site was sampled. Points are color coded by site. The distances among the points reflect relative degrees of similarity in fish species abundance (i.e., closer points represent more similar communities).

Vectors represent another layer of the analysis. Each vector represents a habitat characteristic with a significant correlation to the fish communities. The direction of each vector indicates its relative association with the ordination axes and the length is proportional to the strength of the correlation.

Sites at BUFF clustered by year sampled, rather than by site. This finding indicates that fish communities at sites sampled in one year regardless of location in the river were more similar than sites sampled in other years.

We found measurements of site size (watershed area and/or stream width) correlated to fish community composition at both BUFF and OZAR. In addition, presence of large woody debris and concentration of dissolved oxygen

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Heartland Network
Natural Resource Monitoring

Nestedness in Ozark Stream Fish Communities

Nestedness is a pattern of community organization in which the species present at species-poor sites represent subsets of the species present at species-rich sites. Virtually no communities ever demonstrate perfect nestedness, however, and almost all communities exhibit some degree of nestedness. The trick is determining whether a group of sites is "significantly" nested (i.e., displays greater nestedness than one would expect by chance).

The relevance of nestedness to ecological monitoring is that the degree of nestedness, like any other variable, may vary over time, and indicate an important change in the community. Thus nestedness is a metric that could be useful in monitoring community-level vital signs.

We evaluated nestedness in two network parks, BUFF and OZAR. These are the same sites discussed in our feature article starting on the first page of this issue.

We used a nestedness metric based on overlap to obtain a measure of nestedness, and then we used a Monte Carlo procedure (resampling the data to compare to a null model) to evaluate significance.

Significantly nested groups of sites display greater nestedness than would be expected to occur by chance. The Venn diagram on left indicates significant overlap and the diagram on the right demonstrates a small degree of overlap.

High degrees of significant nestedness were found consistently for sites at OZAR. The degree and significance of nestedness for the sites at BUFF, however, depended upon the year. The Current River and Jacks Fork at OZAR are fed by numerous springs, and annual base flow conditions are relatively constant. The Buffalo River, in contrast, is subject to low annual base flows, which vary among years, and this may drive the variability in nestedness observed over time.

The results obtained so far primarily indicate the degree of inherent variability in nestedness that exists for these river systems and demonstrate that BUFF has the greater variability of the two river systems. Future data can be compared to these baseline results to further evaluate changes in patterns of community assembly.

— submitted by Lloyd Morrison, HTLN

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focuses on protocol development.

Wildlife Monitoring

Breeding Bird — HTLN staff will survey birds at HOME, PIPE, HEHO and EFMO this spring. The rest of the parks in the bird monitoring program should begin recruiting volunteer birders. Please contact David Peitz if you need assistance.

Whitetail Deer Monitoring — Early results of surveys indicate deer abundance is greater at PERI and WICR and down at APRO from the previous year. The College of the Ozarks' concurrent monitoring netted nearly 20,000 photos in a 14-day survey.

Abbreviations

NPS = *National Park Service*
ARPO = *Arkansas Post National Memorial*
BUFF = *Buffalo National River*
CUVA = *Cuyahoga Valley National Park*
EFMO = *Effigy Mounds National Monument*
EPMT = *Exotic Plant Management Team*
GWCA = *Geo. Washington Carver Nat. Mon.*
HEHO = *Herbert Hoover Nat. Historic Site*
HOME = *Homestead Nat. Mon. of America*
HOCU = *Hopewell Culture Nat. Historical Park*
HOSP = *Hot Springs National Park*
LIBO = *Lincoln Boyhood National Memorial*
OZAR = *Ozark National Scenic Riverways*
PERI = *Pea Ridge National Military Park*
PIPE = *Pipestone National Monument*
TAPR = *Tallgrass Prairie National Preserve*
WICR = *Wilson's Creek National Battlefield*

Access versus SQL Server

Data management staff are exploring options for migrating some large monitoring databases from Access to SQL Server. Software applications can store and retrieve data through the SQL Server on the same computer or on another computer within a network. Several editions of Microsoft SQL Server target differing data management situations from single user on a single computer to thousands of users and computers. Advantages of SQL Server include concurrent user access, an integrated backup system, transaction rollbacks, and complete support for users/passwords and database object permissions. Disadvantages of SQL Server include less portability and requirement for VB, C#, Java or other language to develop forms and reports.

— submitted by Gareth Rowell

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in the river were correlated with fish communities at OZAR (Figure 1). Water temperature, amount of canopy over the river, presence of trees/roots providing fish cover along the banks and bank stability measurements correlated to fish community composition at BUFF.

The NMS analysis is a good method to identify key environmental variables driving biotic communities and can lead to further analyses (see Morrison's article on page 2). This tool is not limited to river systems and can be used with other vital signs in Network parks to describe spatial and temporal patterns and determine abiotic variables that influence these patterns.

— submitted by Hope Dodd

More on the Web

HTLN website: http://science.nature.nps.gov/im/units/htln/index.cfm

Network with Great Plains Fire Science Exchange — www.facebook.com/GPFireScience , and the training information — http://blogs.missouristate.edu/gpfirescience/tag/training-exchange/

Need a report or resource brief — http://science.nature.nps.gov/im/units/htln/articles.cfm