



Cumberland HCP

NEWSLETTER VOLUME 3, ISSUE 2

SPRING 2010

ITEMS OF INTEREST:

- White-nose syndrome continues to spread in Tennessee.
- The Forest Resources HCP is on schedule for submittal to USFWS this fall.
- The Water Resources HCP Steering Committee met on February 24th and May 19th.
- The new HCP website is live.

INSIDE THIS ISSUE:

Environmental Effects of Personal Care Products	1
Science Advisory Committee Update	2
Forest Resources HCP Update	3
HCP Spotlight: Brant Miller	3
Basics of the Water Cycle	4
Water Resources HCP Update	5
Featured Species: Green Salamander	5
Events and Announcements	6
TN Yards and Neighborhoods	6

FOR MORE INFORMATION ABOUT THE CUMBERLAND HCP PROJECT, CONTACT: JENNIFER GIHRING JGIHRING@UTK.EDU OR (865) 974-1955

Notes from Alex Wyss, HCP Project Director

A new national poll commissioned by The Nature Conservancy found that the public is almost evenly split between those who feel it is most important to protect nature for its own sake and those who feel it is more important to protect nature for the benefits that it provides to people. These statistics highlight a reality: for the HCP to be successful, it must benefit both nature *and* people. The structure of the HCP reflects this balance. For example, the water quality benefits achieved through HCP conservation

measures improve wildlife habitat but also provide clean and beautiful places to recreate and relax. Nature-based recreation that relies on a healthy environment fuels the local economy. It is impossible to separate the benefits of conservation for the environment and human quality-of-life, especially in the Cumberlands where nature and the economy are so intertwined. This human side is a less obvious but equally compelling reason for why the HCP makes sense in the Cumberlands.

From the Medicine Cabinet to the River

Environmental effects of personal care products

Residues of over-the-counter and prescription medications, shampoos, cosmetics, detergents and a host of other products we use everyday are finding their way into the nation's waterways. Pharmaceutical and personal care products, or PCPPs, have been found almost everywhere researchers have looked for them. Some of the most common PCPPs found in streams, lakes, and rivers include acetaminophen (Tylenol®), ibuprofen (Advil®), triclosan (anti-microbial chemical found in many household soaps), DEET (insect repellent),

benzophenone (found in soaps and perfumes), carbamazepine (Tegretol® anti-seizure medication), cotinine (a nicotine by-product), SSRIs (like Prozac®), and caffeine. Although the benefits of these chemicals are undisputed, PCPPs found in a single bathroom medicine cabinet, multiplied house-by-house, hold the potential to substantially affect environmental quality.

In many cases, the compounds enter the water when people excrete them, wash them away in the shower, or they wash off directly while swimming. Some also enter the water when people flush outdated or unused

White-Nose Syndrome Update: Four More Caves

In April, White-nose syndrome (WNS) was confirmed in four more Tennessee caves: Grindstaff Cave (Carter Co.), Camps Gulf Cave (Van Buren Co.), East Fork Saltpeter Cave (Fentress Co.), and White Oak Blowhole Cave (Great Smoky Mountains National Park). These are in addition to the cases reported in Sullivan and Montgomery Counties in March.

The deaths of over one million bats in the northeastern U.S. have been attributed to WNS, an infectious fungus. There are strong indications that this fungus is a non-native, invasive species. Although WNS is highly contagious and deadly to bats, there is currently no evidence to suggest that WNS is harmful to humans or other organisms.

In addition to ongoing research on fungicides and biological controls, USFWS, TWRA, TDEC, the National Park Service, Arnold Air Force Base, and other partners are surveying gray bat summer roosts to obtain accurate population numbers. Partners are also closely monitoring several caves in the Obey River area that host populations of the endangered Indiana bat.

As bats return to maternity sites and summer roosts, contact the USFWS office in Cookeville (www.fws.gov/cookeville) if you notice changes in the number of bats or bat colonies compared to previous years.

Experts believe WNS is spread not only bat-to-bat but also by humans who enter caves. Slowing the spread of WNS will buy time for researchers to develop control methods. Staying out of caves is the best way you can help slow the spread of WNS in Tennessee.

continued on page 2

Science Advisory Committee News

Collaboration among HCP staff and the broader scientific community continued this spring through staff presentations at the Tennessee State Chapter of the Wildlife Society and Tennessee Rare Fishes meetings. Participation in these type of meetings expands awareness of the HCP and provides an opportunity for direct feedback from the scientific community.

Graduate students from Tennessee Tech University started field work this spring on several HCP covered species (Allegheny woodrat, Swainson’s warbler, pristine crayfish, Black Mountain salamander, and Cumberland dusky salamander) and hydrology of the Obed River. UT researchers are conducting studies of

cerulean and golden-winged warblers. This information will inform development of the Water Resources HCP take model and future refinement of the Forest Resources HCP model.

In the mid-1990's, the National Park Service (NPS) started the Inventory and Monitoring Program — a long-term initiative to inventory natural resources in select NPS units. The program was created to acquire the information needed by park managers to protect park resources and maintain ecosystem integrity in the face of multiple threats. The Big South Fork National River and Recreation Area, Blue Ridge Parkway, Great Smoky Mountains National Park, and Obed Wild and Scenic River participate in

the program under the umbrella of the Appalachian Highlands Network. Vegetation, amphibian, bird, fish, mammal, and reptile inventories were initiated in these four NPS units in 2001 and are nearing completion. The program’s monitoring components are extensive, including invasive plants, rare fish, freshwater mussels, landscape change, air quality, water quality, and effects of climate change. This spring, HCP and NPS staff discussed integration of the inventory and monitoring data into the HCP. More information about the NPS Inventory and Monitoring Program, including inventory reports for the Big South Fork and Obed, are available here: science.nature.nps.gov/im/units/aphn/.

Personal Care Products (cont. from page 1)

prescription medications or wash them down the drain.

Up to 90 percent of many prescription drugs that humans consume find their way into wastewater. PCPPs typically pass through the sewage-treatment process and septic tanks, which effectively remove solids and bacteria but are not designed to remove PCPPs. PCPPs may

also enter the environment through the land application of wastewater treatment residues (i.e. biosolids). Excretion by agricultural and domestic animals is another source.

As early as the 1950s, chemists were studying “conventional pollutants” — industrial chemicals like DDT, PCBs,

and dioxins. Agriculture and industry were long considered the major sources of chemical pollutants in the environment. PCPPs were not widely recognized as an environmental issue until the 1990s when the complicated chemical analyses necessary

to detect these “nonconventional pollutants” were developed. However, since that time hundreds of scientific studies have been conducted which contribute to our understanding of how PCPPs affect the environment.

Although there is little evidence that PCPPs in the environment are harmful to humans,

(endocrine) system. Collectively, these compounds are known as “endocrine disruptors.” Aquatic effects include the feminization of male fish, alteration of breeding behavior, and reduced egg fertilization success — all of which decrease the ability of fish to reproduce. A multitude of other aquatic effects have been observed because hormone systems are central to the

development, functioning, and reproduction of most organisms. Steroids are only one type of the thousands of PCPPs that enter our waterways. In addition to singular impacts, these chemicals also interact in their effects on aquatic organisms. For example, male snapping turtles exposed to a combination of PCPPs found in household wastewater showed significant reduction in body weight, which also leads to decreased reproductive success.

Scientific research is ongoing to better understand how these chemicals interact, their effects in the environment, and ways to modify standard wastewater treatment to help decrease concentrations of PCPPs that are released into the environment.

HOW YOU CAN HELP

- Dispose of unwanted prescription and over-the-counter medicines in the trash (see www.whitehousedrugpolicy.gov/publications/pdf/prescrip_disposal.pdf)
- Choose personal care and cleaning products with plant-based and natural ingredients, like vinegar and baking soda
- Minimize the use of personal care products, especially those with unnecessary chemicals (like antibacterial soap and scented detergent)
- Visit the National Geographic “Green Guide” for more tips on selecting products that minimize environmental impacts:
 - Cosmetics and personal care: www.thegreenguide.com/personal-care
 - Insect repellent: www.thegreenguide.com/buying-guide/insect-repellents
 - Sunscreen: www.thegreenguide.com/buying-guide/sunscreen
 - Cleaners: www.thegreenguide.com/buying-guide/all-purpose-cleaners

the impacts to aquatic critters are clear. One class of PCPPs has received particular attention: steroids. Steroidal chemicals, such as estrogens found in birth control pills, are designed to act upon the human hormonal

Forest Resources HCP Update

Cerulean warblers are a species of local and global concern that may be federally listed during the lifespan of the FRHCP. Much of the FRHCP Core Teams' efforts this spring focused on developing conservation measures for ceruleans and other covered species that spend all or part of their life in forests and woodlands. These conservation measures integrate habitat protection for forest species and TWRA's oak regeneration goals. In March, HCP staff facilitated a meeting to share the state of the science on cerulean warblers and their habitat needs. Over 30 TWRA staff, academic scientists, and other interested parties attended. There were many eye-openers for the participants, such as strong nesting tree species preferences and a relative lack of information about cerulean females. Everyone left the meeting with a much better understanding of where the science is strong, unknowns that remain, and the decisions TWRA is facing.

The HCP team extends a large "thank you" to Dr. Paul Hamel, Dr. Dave Buehler, and Than Boves for presenting the latest research and participating in small-group discussions.

Following the general workshop, TWRA staff, USFWS, and HCP staff participated in a three-day workshop in which the group worked through a [structured decision making](#) exercise. Structured decision making is an organized approach to identifying and evaluating alternative actions for complex issues. During this exercise, TWRA identified the fundamental objectives of the agency and how the HCP can support those objectives. Alternatives for cerulean warbler conservation were developed and evaluated in the context of the agency's oak regeneration and other land management priorities. HCP staff and TWRA continue to

apply outcomes of the workshop to the final forest and woodland community conservation measures.

In addition to work on the forest and woodland conservation measures, HCP staff held a workshop with TWRA to discuss the HCP monitoring plan. HCP staff are preparing the draft plan and will meet again with TWRA in early summer to discuss monitoring and adaptive management details.

HCP and TWRA staff also completed the draft introductory sections of the HCP. Upon integration of TWRA's comments, the HCP team will submit

Looking for more information about covered species and covered activities? Check out the Water Resources and Forest Resources Gateways on the HCP website:

www.cumberlandhcp.org

draft Sections 1-5 to the USFWS Cookeville office for preliminary review. Early review by the field office should help facilitate review of the final HCP.

Thanks to a lot of hard work on the part of TWRA staff, the Forest Resources HCP remains on track for completion by this fall.

HCP Spotlight: Brant Miller

After a long trip through boat rides with Pete Seeger to help clean up the Hudson River, an ill-fated hitchhiking trip to the Adirondacks, pizza delivery, and a shot at making it big in Nashville, Brant Miller landed at the Tennessee Wildlife Resources Agency in 1994. In his role as statewide Wildlife Forestry Coordinator, Brant has been a tremendous positive force pushing the Forest Resources HCP toward completion.

Fresh from forestry school at the State University of New York-Syracuse, Brant spent two years as a forester with the Peace Corps in Honduras. After time in the tropics, he cooled off for a few years with the U.S. Forest Service in Alaska. Prior to joining TWRA, Brant worked as the Area Forester for the Tennessee Division of Forestry in Roane and Morgan Counties. During that time, he had the opportunity to work with the Forest Stewardship Program where he gained a deeper understanding of the critical role forestry plays in

wildlife conservation. Working together with state foresters, biologists, academic scientists, and others has been an "interesting process" according to Brant. "We are learning new ways to use forestry to manage wildlife species."

Though he is a professional forester, it was not forestry that originally brought Brant to Tennessee. Brant is an accomplished guitar, mandolin, and harmonica player, with a gift for clever songwriting. This talent drew him to Nashville, where he spent about six years in the music business. Although he now spends more days in the woods than on stage, Brant performs as part of the

country/bluegrass trio, [Second Nature](#). With his fellow band-mates and others, Brant has written several award winning bluegrass and country songs, including "The Roadkill Bill," which was featured on NPR's Car Talk.

Always congenial and easy-going, Brant is quick to recognize the contributions of those around him:

"The guys in the field are the ones doing the day-to-day work to make [the HCP] happen. I appreciate having good foresters to work with on the HCP."

What lies ahead for Brant? Be it forestry, wildlife conservation, or

professional songwriting, his words will hold true, "Collaboration is the way of the present and the way of the future." Thank you, Brant, for helping make the HCP collaboration possible.



Basics of the Water Cycle

Since ancient times, many have speculated about the source of clouds, rain, streams, and the oceans. As early as 500BC, Greek philosophers speculated that the sun lifted water from the oceans and deposited it as rainfall where it was stored in underground reservoirs that fed rivers. This is partially correct, but it was not until the 1500s when scientist Bernard Palissy showed that rivers and springs originate solely from rainfall. These philosophers and scientists were some of the first hydrologists.

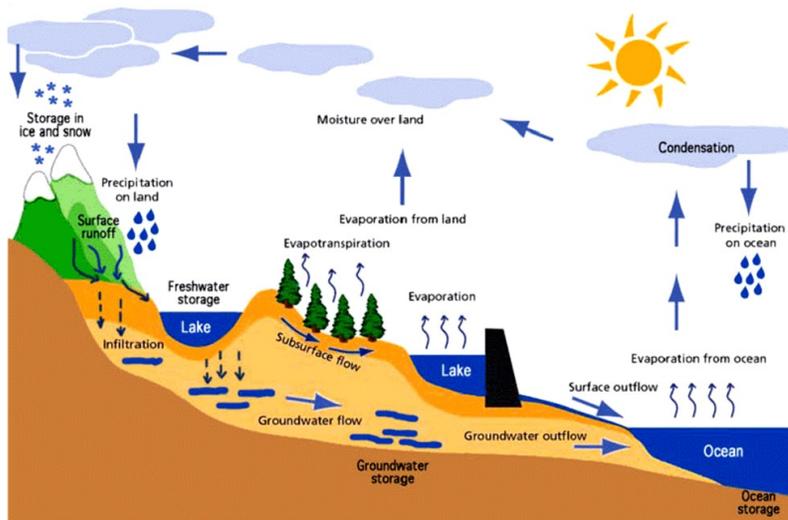
Hydrology is the study of the [water cycle](#).

The water cycle is driven by a combination of the sun and gravity. The sun evaporates water from the oceans, lakes, and rivers. Water vapor rises into the atmosphere where it condenses and falls as precipitation back onto the

ocean or onto the trees, grass, rock, soil, buildings, streets, etc. that cover the land surface. A portion of this water enters streams and rivers as surface runoff. Much of this water soaks into the ground, a process called *infiltration*. Some water infiltrates deep into the ground and replenishes *aquifers* (underground sand, gravel, or rock that stores and transports water). Some of this groundwater stays close to the land surface and can seep back into streams and lakes (called *baseflow*). Some groundwater finds openings in the land surface and emerges as

freshwater springs. Lakes and reservoirs capture and store surface runoff and some groundwater. Over time, water keeps moving back to the ocean where the water cycle begins anew.

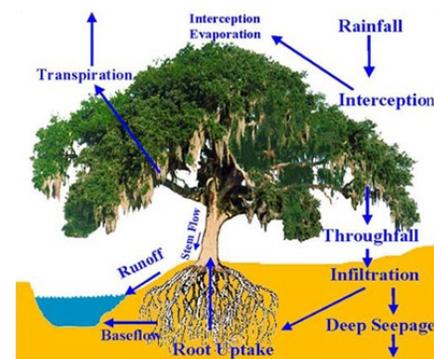
Hydrology is a quantitative and applied science within the discipline of civil engineering. We need water for drinking, domestic use, irrigation, hydropower, industry, and to support healthy ecosystems. Balancing all of these demands requires calculation (*quantification*) of how much water there is to go around. Hydrologists quantify



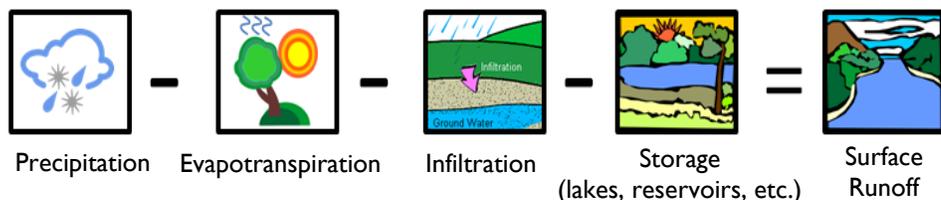
the water cycle using the concept of a “water balance” — knowledge that although water is constantly being transported from one place and form to another, the overall quantity of water does not change. The graphic below shows a typical water balance equation for a given drainage basin or watershed. The only source of water to the basin is precipitation, but water leaves by several means. It can be lost directly to the atmosphere via *evapotranspiration*, a term that combines evaporation from surface water and transpiration of water from vegetation.

Water that does not leave through infiltration, evapotranspiration, or remains in lakes and reservoirs leaves the basin as runoff.

This simple equation provides a powerful way to calculate how much water will flow in a river and how changes in the land will affect flow and hence aquatic habitat. For example, urban trees and natural forests can significantly alter the balance of this equation. When it rains, a tree’s leaves hold about a third of the water (called *interception*) and return it directly back to the atmosphere via evaporation. This water never hits the ground. Roughly another third of the rain falls through the canopy (*throughfall*) or runs down the tree trunk and infiltrates into the soil around the base of the tree. This water is eventually is drawn up through the roots and returned to the atmosphere via transpiration through the leaves. By intercepting nearly 60% of rainwater, tree cover reduces the need for infrastructure to manage stormwater and prevent flooding. If that same area were paved, evapotranspiration and infiltration would be virtually eliminated, thus increasing surface runoff. Increased surface runoff is associated with more frequent and intense flooding and a variety of [water quality problems](#). Maintaining an urban tree canopy helps improve the health of aquatic ecosystems.



WATER BALANCE EQUATION



On the Cumberland Plateau, the amount of surface runoff is a key factor affecting the health of aquatic systems. Sometimes there is too much water (flooding), sometimes too little (drought). Hydrologists working with the HCP are identifying effective practices to provide hydrologic conditions that promote sustainability of rare species.

Water Resources HCP Update

This spring, the Water Resources HCP (WRHCP) Core Team continued work on biological goals and objectives, covered species, covered activities, and the take model.

Steering Committee

The WRHCP Steering Committee met twice this spring: February 24th and May 19th. Discussion topics at the February meeting included the timeline for HCP development and clarification of the Steering Committee's role. The Steering Committee consists of applicant representatives, other affected and interested parties, and agency staff. Questions from Steering Committee members during the February meeting covered a wide range of topics, including permitting, the use of best available technology,

enforcement, monitoring, and selection of covered species.

At the May meeting, Geoff Call (USFWS) provided an overview of Endangered Species Act terminology. Robert Baker (TDEC) discussed the role of rare species in TDEC's permitting decisions. The Committee reviewed the covered species decision tree. A key discussion topic was how to incorporate species that were observed historically (e.g. before 1990), but have not been observed since. The Core Team is currently revising the species selection decision tree based on feedback from the Committee. The next Committee meeting is scheduled for the afternoon of Wednesday, June 30th in Wartburg. Discussion topics will include the take model and

the covered activity selection process.

Biological Goals and Objectives

The HCP biological goals and objectives outline what the conservation plan is designed to achieve. Organized by communities (i.e. habitat types), the draft goals and objectives identify the specific environmental factors that need to be included in the HCP in order to maintain viable populations of covered species.

Upcoming Activities

In the next few months, the Core Team will develop draft covered species lists, pursue expert review, update the decision tree for selection of covered activities, and continue work on the take model.

DRAFT WRHCP BIOLOGICAL COMMUNITIES

A "biological community" is a set of plants, animals, and microorganisms that live in a particular type of habitat. The Core Team developed the following list of communities as a way to structure the WRHCP. Stay tuned in future newsletters for an update on biological goals and objectives associated with each community.

Isolated Wetlands

Riparian Floodplains

Gravelbars

Intermittent Headwaters

Perennial Headwaters

Perennial Mainstems

Forests and Woodlands

Grasslands and Shrub/Scrub

Featured Species: Green Salamander

The green salamander, *Aneides aeneus*, is a slender, lungless amphibian with long legs, a flattened body, and squared toe tips used for grasping rock surfaces. Amphibians are cold-blooded animals that reproduce by laying eggs. The body temperature of cold-blooded animals changes with the outside temperature of their environment. Adult green salamanders may reach a length of 3-5 inches.

Where do green salamanders live?

Green salamanders are generally found in deep, shady, moist rock crevices. They mate and lay their eggs inside these crevices during early spring through summer. Females may use the same nest site for several years. Salamanders and egg clusters also have been found under loose bark and in stumps, logs, and tree trunks. During winter, adults and juveniles crawl deep into the crevices to hibernate.

Its current range extends from southern Pennsylvania to northern Mississippi. In Tennessee, the green salamander is found

primarily from the Cumberlands west to the [Eastern Highland Rim](#) (which extends from Clay to Lincoln Counties).

Why is it a species of concern?

Studies of the green salamander suggest that it is becoming increasingly rare. Several reasons have been proposed for the decline of the green salamander, but loss of forests surrounding rock outcrops is considered the most likely. Loss of forests allows the sun to dry the rock outcrops. Salamanders can suffocate when conditions are too hot and dry because they need to keep their skin and mouth moist to breathe.

Why protect green salamanders?

With their permeable skin, amphibians

easily absorb chemicals and are particularly sensitive to changes in moisture and temperature. These traits make amphibians, and salamanders in particular, particularly susceptible to environmental change. The health of amphibian populations is often a



direct indicator of overall ecosystem health. Amphibians also are an exciting way for kids to learn about nature.

How can we protect green salamander habitat?

Although habitat destruction is one of the most significant threats to green salamanders, it is also the most preventable. Maintaining a buffer of healthy native vegetation (including tree cover) near cool, shady outcrops helps keep these areas cool and moist.

HELP YOUR YARD HELP THE ENVIRONMENT — JOIN THE TENNESSEE YARDS & NEIGHBORHOODS PROGRAM

The landscaping around one's home provides color in the spring after a long, cold winter and a shaded refuge on a hot summer day. Fruits, flowers, and pollen attract birds, butterflies and bees. In addition, the plants placed on your property also have the power to protect the environment. You can help keep local streams and rivers clean by making thoughtful choices when designing and maintaining your yard.

The Tennessee Yards and Neighborhoods (TYN) program focuses on simple steps to improve the environmental benefits and reduce environmental impacts of yard maintenance. The goal of TYN is to promote horticultural practices that reduce costs, reduce time spent on maintenance, conserve water, and improve water quality in our communities.

The program is based on nine principles:

- | | |
|-----------------------------------|--|
| 1. Right plant, right place | 6. Managing yard pests |
| 2. Managing soils and mulches | 7. Reducing stormwater runoff and pollutants |
| 3. Managing turf grass | 8. Providing wildlife habitat |
| 4. Watering efficiently | 9. Protecting the water's edge |
| 5. Using fertilizer appropriately | |

For [Stuart and Mary Bartholomaus](#), participants since 2008, "TYN provided a road map for creating a water-sensitive environment with resources that are readily available and some time and labor. It has been and will continue to be a joyful and productive life-giving experience."

The TYN program is open to everyone and does not require any previous horticultural knowledge. Visit tnyardsandneighborhoods.tennessee.edu to find out how you can become part of the program. Join TYN and start making a difference today!

Photo credits:

Page 4 (Tree): University of FL Extension, edis.ifas.ufl.edu

Page 4 (Water Cycle): www.louisianacoastalwetlands.com

Page 4 (Water Balance): www.aperfectworld.org

Page 6: www.herpetology.us

The Cumberland HCP Project includes state and local governments, state agencies, organizations, landowners, and other private citizens working together to address issues of growth and conservation of the forests and waters of the Cumberlands of Tennessee.

Check us out on the web: www.cumberlandhcp.org

New HCP Website

The Cumberland HCP website has been redesigned. The new site is easier to navigate and has new information about ecology in the Cumberlands. Check it out at www.cumberlandhcp.org.

SFI Invests in Community Partnerships

The Sustainable Forestry Initiative (SFI) announced its new Conservation and Community Partnerships Grant program in May. SFI has committed \$675,000 to fund nine projects, including a **test planting of blight-resistant American chestnuts** implemented by the American Chestnut Foundation, TN Tree Farm Committee, TN Sustainable Forestry Initiative Committee, Georgia-Pacific, and MeadWestvaco. Visit the SFI website: www.sfi-program.org for more information.

Upcoming Events

Tennessee Great Outdoors Month

Lace up your boots, air up your tires, pack your fishing pole, or brush your horse and enjoy the outdoors with your kids. June 2010 is "Tennessee Great Outdoor Month." The Governor's proclamation supports recent efforts of the Every Child Outdoors Tennessee Coalition. More than 100 groups joined together in the Coalition to encourage Tennessee children to experience the outdoors. See the [American Hiking Society](http://www.americanhiking.org) (www.americanhiking.org) or [Every Child Outdoors](http://www.everychildoutdoorstn.org) (<http://www.everychildoutdoorstn.org>) websites for ideas!

National River Cleanup

Is paddling more your thing? Organizing a river cleanup is another great way to connect with family, friends, neighbors, and other people within your watershed. Visit the [National River Cleanup](#) page on the [American Rivers](#) website for more information about how to organize a cleanup for your favorite river.

First week of July: Great North American Secchi Dip-In

The Great North American Secchi Dip-In is an effort organized by Kent State University to increase citizen participation in monitoring, create a national water quality snapshot, and provide information about changes in water quality over time. (Don't know what a Secchi disk is? [Click here](#) to find out.) The Dip-In is open to anyone, regardless of experience. Contact the [Obed Watershed Community Association](#) (931) 484-9033 to participate.

Did you know...

...more than 900,000 volunteers have participated in a National River Cleanup™ event?

...the Big South Fork has more federally-listed endangered mussels and fish than any other unit in the National Park Service?

...a study in Modesto, CA, showed that for every \$1 spent their urban tree program, the City received \$2 in environmental services and increased property values?

We'd like to hear from you! For more information about the Cumberland HCP project, contact: Jennifer Gihring jgihring@utk.edu or (865) 974-1955

