

# Kemp's Point

A newsletter of the Kemp Natural Resources Station  
Volume 7, Number 2 - Fall 2006

## Kemp Research Report: Don't Forget the Bugs!

One day Tim Meehan, a researcher staying at Kemp, was walking along Kemp Road and I wondered what he was up to. Turned out he was collecting caterpillars, and he had quite a variety of the little critters in tow. He was planning to measure each animal's frass output rate, that is, how much solid excrement the animal produced in a given time period. I thought, "Wow! Any project that involves measuring the rate at which a bug poops has got to be worth writing about!"

Tim is a post-doctoral researcher working with Dr. Richard Lindroth of the Department of Entomology at UW-Madison. Dr. Lindroth has been studying the effects of carbon dioxide and ozone on plant chemistry and insect activity at the Aspen FACE site in Harshaw since 1997. Tim spent his days working at the FACE site, so we arranged for him to give me a tour and talk more about the project.

I was somewhat familiar with the Aspen FACE site, as there's been some local news coverage of it. Located on US Forest Service land, it operates as a Department of Energy User Facility. The research there is a collaborative effort by numerous organizations, including UW-Madison. FACE is an acronym for Free-Air Carbon Dioxide Enrichment, with "free-air" meaning the study sites are not enclosed.

Making up the site are 12 forest plots, each 90 feet across. Three of the plots receive extra carbon dioxide, three receive extra ozone, three receive extra carbon dioxide

and ozone, and three control plots receive air from the natural environment only. The plots are exposed to the different atmospheric mixtures through an elaborate system of vertical vent pipes that blow the gasses from the edges toward the centers of the plots.

Within each plot is a forest of aspen, maple and birch. But these are miniature forests like no other. Each is wired to the hilt with monitors, sensors, and the like, all collecting data or taking measurements of some sort. There are flags and flagging; baskets, bottles and chutes gathering samples; and even little cameras that photograph roots underground! Running down the center of each plot is scaffolding supporting a catwalk where researchers gain access to the tree tops, or forest canopy.

The first thing Tim's research group wants to know is how increases in carbon dioxide and ozone in the lower atmosphere affect leaf chemistry. Accessing the canopy via the catwalk, Tim and his colleague, UW-Madison graduate student John Couture, collect leaf samples within each of the plots. To keep the leaves fresh, they are flash frozen in liquid nitrogen and packed in dry ice for transport back to the lab on campus, where their chemical content is analyzed.

If leaf chemistry is altered by extra carbon dioxide and ozone, then they want to know how the



*Tim Meehan explains how baskets on the forest floor collect fallen debris.*

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leaf chemistry change affects the activity of herbivorous insects. This too is determined from leaves gathered from the canopy in each plot. In the lab, the leaves are scanned so the leaf area consumed by the insects can be determined using image analysis software.

Finally, they want to know how changes in herbivorous insect activity translates to changes in ecosystem functioning. They are particularly interested in how insect herbivory influences nitrogen cycling and plant litter decomposition. Why? Because nitrogen cycling influences tree growth, and trees have enormous aesthetic and economic value to people. Plant litter decomposition is examined because carbon dioxide levels in the atmosphere are dependent upon decomposition rates, and because atmospheric carbon dioxide influences global climate.



*Tim and his colleagues spend hours gathering data on the canopy catwalk.*

One way they collect data to examine these points is with the use of specially designed baskets placed on the forest floor within each plot. To the non-scientific eye, these are laundry baskets with cloths draped over their openings. These baskets collect materials (including frass) dropped by the insects eating leaves up in the forest canopy. Debris that has fallen into the baskets is regularly collected and sorted into frass, green fall (i.e., crumbs from feeding insects above), and other. These samples are analyzed for carbon, nitrogen and phosphorous content, providing information on how much “fertilizer” is deposited by herbivorous insects under the different atmospheric conditions.

The other tool used to help examine ecosystem functioning is old-fashioned insect identification. Hours are spent on the canopy catwalk identifying and counting insects, one bug at a time. Another of Tim’s colleagues, UW-Madison graduate student Mike Hillstrom, knows his herbivorous insects well and does most of this work. Mike goes from tree to tree, turning each leaf over, checking for insects,

identifying and recording as he goes. This information will help them understand how the diversity and abundance of tree munchers are affected by the different atmospheric conditions.

Before learning about this research, I never gave any thought to how much insect activity occurs in a forest canopy, let alone the role these critters play in carbon and nitrogen cycling. Next time you’re in the woods, look up and notice the leaves. You’ll likely see leaves with jagged edges where insects have eaten and leaves that have been mined, leaving behind a transparent network of veins in the leaves. There are more insect species on earth than any other group of animals. Maybe because they’re relatively small in size, they are often overlooked or thought to be insignificant. But if you want to make an accurate assessment of a situation and get the full

picture, you can’t forget such a large piece of the puzzle. -K.O. 🍄

Learn more about this research and the people involved at these web sites:  
<http://entomology.wisc.edu/~lindroth/>  
<http://entomology.wisc.edu/~tdmeehan/>  
<http://aspenface.mtu.edu/>

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*This newsletter is also available as a PDF at the Kemp website, [www.kemp.wisc.edu](http://www.kemp.wisc.edu).*



# Wild Wonders

## *Castor canadensis*

A few years ago on a canoe visit to “the inkpot,” a bog lake near Kemp Station, I had my first beaver encounter. My husband and I were peacefully paddling along when suddenly a SMACK on the water’s surface startled me. That is, until I realized, “Hey, that was a beaver! Cool!” Since then I’ve been intrigued with this animal. Because of the damage they can cause to property, beavers are often disliked and unwanted. However, I think they are unique and fascinating animals worthy of admiration for their way of life.

As North America’s largest rodent, the adult beaver typically weighs between 45 and 60 pounds, but weights up to 110 pounds have been recorded. The beaver’s broad, flat tail acts as a rudder while swimming and as a fifth leg for balance when standing upright. Slapped against the surface of the water, a warning is issued, recognizable by other beavers up to a half mile away. The other signature character of the beaver is its large, orange, front teeth (incisors). The incisors grow continuously and are sharpened by gnawing and chewing. Very hard enamel on the incisor surfaces gives them the orange color.

Beavers are specially adapted to live in aquatic environments. All four feet are webbed for swimming, and equipped with claws for digging and manipulating materials. Each hind foot has a split claw used for grooming. Their dense fur is composed of a lower mat of fine fur and an outer layer of guard hairs. During the grooming process, oil from glands near the anus is applied to the pelt. Preening and

oiling keeps the pelt waterproof. Beavers are equipped with nose and ear valves that close when underwater. And if there is submerged



wood to be cut or chewed, the beaver can draw its lips closed tightly behind its front teeth and get the job done.

Beavers may be best known for their dam building. In fact, they are the only animal, besides humans that construct dams. According to the Encyclopedia Britannica, “Dams are built to provide irrigation, flood control, water supply, improvement of navigation, and electric power.” You might say humans build dams to improve their habitats. And beavers build dams for precisely the same reason, to improve the habitat they’ve selected to live in. Beavers require a year round water depth of 2 to 3 feet. This provides adequate protection from predators, ample room for food storage, and open water below the ice in the winter. Beavers will build a dam only if their habitat needs to be “brought up to code,” so to speak. Dams are built with piled logs and trees secured with mud, masses of plants, rocks and sticks.

The beaver’s home, or lodge, is constructed in much the same way and is built either in the middle of a pond, or on the bank of a waterway. Beavers will spend about a month constructing a lodge, usually in autumn. Lodges typically have separate areas for eating and resting, both of which are above the water level. Air holes at the structure’s top provide fresh air to the interior, and two underwater tunnel entrances allow for escape in case a predator enters the lodge. These entrances and “rooms” are dug and gnawed out of the lodge structure, or, in the case of a bank den, the bank itself. This lodge will remain the colony’s home until the area food supply runs out and they must relocate.

Beavers also build canals. These canals are typically dug inland from the waterway and can be up to several hundred feet long. The canals are used to transport food and building materials back to the lodge. Beaver canals average about 1.5 meters wide and 1 meter deep.

The work of a beaver is done between dusk and dawn, as the animals rest during the day. Unless we make a point to observe beaver while they’re “on the clock,” we’re likely only to see their final construction projects, or signs of their work. I

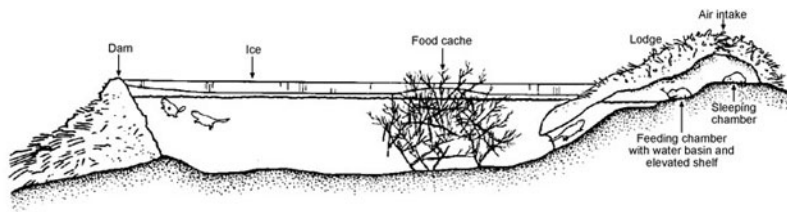
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always enjoy seeing the stumps left by beavers after they cut a tree. Look closely and you'll see the tooth marks on the peaked stump and large woodchips can be found littering the ground. Beavers cut trees to obtain building materials and food. It is said that when the tree being cut snaps, the beaver runs, which must be quite the sight because beavers are built for water, not for land! On average, trees used in dam building are 4 to 12 inches in diameter, but trees up to 5 feet in diameter have

first month despite being able to see, walk and swim at birth. The kits get the first summer off from work, but help with the colony's construction and food gathering chores during their second year. Some offspring may remain in their home colony a third year, but most disperse after two in response to a strong innate urge to find their own place and mate.

As you can see, beavers have a rather nifty lifestyle, but it is not without dangers. Predators include bear, wolves, coyote, red fox,



been observed in beaver dams. Each fall beavers cache food under water near their lodge. This cache is made up primarily of green branches cut to short lengths, and transported to the food storage site either from shore or farther inland. Thus in winter, beavers rely on a woody diet, and they must store enough to sustain their family for the entire season. The beaver will retrieve a branch from the cache and return to the lodge to dine on the bark. Like many other herbivores, in spring beavers return to an herbaceous diet, including sedges, lily pads and roots, grasses, fruit, and the roots and tubers of various aquatic plants.

January and February are mating months for beavers, with kits born in May or June. An average of 3 or 4 kits make up the litter and they remain in the lodge for the

bobcat, otter and humans. Beavers are most susceptible to predation while foraging on land or relocating to new habitat. Humans value the fur of the beaver, although not to the extent today as it once was. Between the mid-1600's and the 1830's, the beaver felt hat was enormously popular in Europe. The demand for these hats nearly led to the beaver's extinction as thousands of pelts were shipped from North America and Canada to supply the hat demand. Together, low beaver populations and the silk hat, made popular by Prince Albert in the 1840's, saved the beaver's hide, literally.

Since then, beaver populations have recovered. In Wisconsin, the 2005 estimated population of beaver was 93,100 animals. Population estimates are obtained from annual trapper surveys and aerial

surveys conducted roughly every three years. The beaver has been labeled by some as a "keystone species," one that plays a dominant role in an ecosystem and affects many other organisms. Whether this role is good or bad is up for debate. On one hand, beaver ponds help prevent drought and flooding and provide valuable wetland habitat for a myriad of life. On the other hand, property damage occurs when roads and private land is flooded or favorite trees are harvested by the animals. It is clear that human and beaver lifestyles do not always mesh well. In any case, the beaver is a distinctive animal that can provide hours of wildlife watching enjoyment. -K.O. 🐿

*Editor's Note: A number of years ago, I read a book that introduced me to beavers and quickly made me a fan. Beaversprite: My Years Building an Animal Sanctuary, by Dorothy Richards and Hope Sawyer Buyukmihci, is a great read for anyone curious about beavers and their behaviors. Richard's and Buyukmihci's advocacy for beavers has led to more and more people seeking non-lethal solutions to human-beaver conflicts.*

*Much information about the beaver is available on-line. Search engine keywords: "beavers," "beaver dams"*

<http://dnr.wi.gov/org/land/wildlife/TRAP/beaverwebversion1.pdf>

Wisconsin DNR publication, Beaver Damage Control: Guidelines for people with beaver damage problems

<http://www.beaversww.org/>  
Beavers: Wetlands & Wildlife, a 501c3 educational nonprofit organization established by friends and associates of Dorothy Richards





## Scott Craven Takes a Turn at Bat

Imagine stepping into someone's shoes for a year. And then imagine doing so without first taking off your own shoes! That's essentially what Scott Craven did on August 1 at Kemp Station when Superintendent Tom Steele left for Newfoundland on a one-year study sabbatical.

In addition to being Interim Kemp Superintendent, Scott continues his positions with UW-Madison's Department of Wildlife Ecology, as Chairperson, Faculty, and Extension Wildlife Specialist! Fortunately, Scott doesn't lack experience juggling positions or working at Kemp. Scott pinch hit for Tom the last time he went on sabbatical.

Indeed, Scott Craven has a long history with Kemp Station. He was introduced to Kemp by a colleague studying coyotes in the early-1970's. The area appealed to Scott because it reminded him of northern New Hampshire and Maine where he grew up. Ray Kennedy was the station caretaker at the time. Both he and Scott shared interests in fishing and hunting and soon became friends. Scott regularly visited the Station to lead outreach programs, or to work on projects in the area. It was through Ray that Scott met Sally Greenleaf and Susan Small, granddaughters of Minnie Kemp and the women responsible for the property donation that created Kemp Station.

As Interim Superintendent in 1998-99, Scott helped Susan work with the UW Foundation in making her final land gift to Kemp. And he helped Sally negotiate a conservation easement on her remaining forest lands adjacent to station property. These land transactions have provided valuable additional acreage for students and researchers to access while working out of Kemp Station. Scott also spent time documenting the history of the Kemp family, with help from Sally and Susan.

In alternating years, the Department of Wildlife Ecology holds a 3-week summer camp at Kemp, a course Scott established in 1999. Besides coordina-



tion and teaching for camp, he also does the cooking! The Coverts Workshop is another program Scott is heavily involved in at Kemp. For the past 5 years, landowners have spent a weekend learning about land management issues as they relate to wildlife. Again, Scott does the cooking!

This time around, Scott steps in to help oversee the completion of the lower level of the new Mead Residence Hall. In addition to dealing with the day-to-day operation of the station, Scott also hopes to do something for Kemp during his year on site, whether it is additional fund raising, or another project that will help advance the Station's mission. Working at Kemp Station also gives Scott the opportunity to work with different groups in the area as Extension Wildlife Specialist that he can't ordinarily do from Madison. - K.O. 🍷

### On the Radio

Hear Scott discuss various wildlife related topics and issues. He is a guest of the Larry Meiller show on Wisconsin Public Radio at 11:00 am the first Wednesday of each month.

Filling in for Tom Steele, Scott is also heard Thursday mornings, at 7:30 and 9:00, "Outdoors" on WXPR, 91.7, Rhinelander.

Listen to each on-line too, at [www.wpr.org](http://www.wpr.org) and [www.wxpr.org](http://www.wxpr.org).



## Mead Residence Hall Dedicated and Celebrated

Over 100 friends and dignitaries enjoyed a beautiful July afternoon, celebrating the dedication of the new Dorothy & Stanton Mead Residence Hall. Visitors toured the new facility and enjoyed refreshments and fellowship with others. The day's activities culminated with a formal dedication ceremony. David Hogg, Interim CALS Dean, served as program emcee. "Today is a special day and I want to thank all of you for being here to help celebrate the beginning of the next generation of natural resources research here in the Northwoods," Hogg told the audience.

Program speakers included: Paul DeLong, Chief State Forester and Administrator of the Wisconsin Department of Natural Resources' Division of Forestry; Tom Steele, Kemp Station Superintendent; Rose Barroilhet, Administrative Officer for UW-Madison's Division of Facilities Planning & Management; Elton Aberle, CALS Emeritus Dean; and George Mead, representing the Mead Family for whom the facility was named. Speakers recognized the important role this new facility will play to advance Kemp Station's mission of natural resources research and education, and they thanked the many individuals who made this dream a reality.

Emeritus Dean Aberle, with assistance from Marcy Heim, who was instrumental in raising funds for the project, presented plaques to the project's major donors. These included: Andrew and Barbara McEachron, Don and Greta Janssen, William and Doris Willis, Jim Fralish, Dudley and Mary Pierce, George Mead, Thomas Wright, and Madeline Wright.

The festivities concluded when Dean Hogg presented the ceremonial ribbon-cutting scissors to George Mead who did the honors of cutting the green ribbon draped across the building entrance. The Stanton and Dorothy Mead Residence Hall provides long-term, cost-effective lodging at the Kemp Natural Resources Station. It provides scientists and students with convenient access to Kemp Station's modern laboratory, office, and computing resources and its ecologically unique forests and lake. And, it reinforces Kemp Station's position as a national center for natural resources research and education.

Naming and funding opportunities for the project still exist. If you would like to support the new Mead Residence Hall, please use the pledge form on page 7. Or for more information, please contact Scott Craven, Interim Superintendent, at 715-356-9070.



## Kemp Station Receives 2006 Connor Award

The Kemp Natural Resources Station has been recognized by the Forest History Association of Wisconsin (FHAW) for its contribution to forestry education. The Connor Award is given in appreciation and recognition of organizations supporting the mission of the FHAW. The FHAW is dedicated to educating the citizens of Wisconsin on the history and importance of forests. Kemp Station contributes to the goals of this mission in a number of ways. The station supports the work of academic and agency researchers with its facilities and services such as lodging, laboratory space, high speed Internet access, and equipment. Through Kemp's outreach program, which includes public education sessions and a semi-annual newsletter, information related to current forestry-related research is shared. Kemp hosts a number of field courses in which the natural resource professionals of the future are trained. Finally, the new Mead Residence Hall is decorated in part to honor the history of forestry in Wisconsin, with old logging camp photos and tools. The award was presented at the 31st annual meeting of FHAW in September and is now proudly displayed at Kemp Station.

To learn more about the history of forestry in Wisconsin, you are encouraged to visit Camp Five Museum in Laona, Wisconsin. Once a logging camp, visitors can ride a steam train, visit a blacksmith's shop, go on a forest tour, and explore the museum and nature center. For more information, visit [www.camp5museum.org](http://www.camp5museum.org) or call 800-774-3414.

## Kemp Natural Resources Station Mead Residence Hall Project Pledge Form

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

I/we wish to join other friends and alumni in enhancing the teaching, research and outreach programs at the Kemp Natural Resources Station by contributing as indicated below to the Mead Residence Hall project.

\_\_\_\_ Enclosed is my/our contribution to the Mead Residence Hall project:

\_\_\_ \$5,000 Eagle \_\_\_ \$1,000 Loon  
\_\_\_ \$500 Chickadee \_\_\_ Other \$ \_\_\_\_\_

\_\_\_\_ I/we wish to pledge \$ \_\_\_\_\_ each year for  
\_\_\_ years beginning in \_\_\_\_\_ (year).  
Please remind me/us of the annual amount I/we  
have pledged in \_\_\_\_\_ (month).

\_\_\_\_ Please charge \$ \_\_\_\_\_ to my:  
\_\_\_ Master Card \_\_\_ Visa \_\_\_ American Express

Card number: \_\_\_\_\_

\_\_\_\_\_

Exp Date \_\_\_/\_\_\_

Cardholder's Name (please print):  
\_\_\_\_\_

Cardholder's Signature:  
\_\_\_\_\_

Please make your gifts payable to the  
**UW Foundation-Mead Residence Hall Project**  
UW Foundation, US Bank Lockbox,  
PO Box 78807, Milwaukee, WI 53278-8807



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