

Notes from

FLT



The Newsletter of Francestown Land Trust, Inc. Fall 2007

The “Global Waterworks”

Note: This is the first of two articles on water. It is intended to provide an introduction to a more complete discussion of water by Professor Barry Wicklow.

“They’re not making any more of it.” Often said about land but also true of water. It is easy to forget that a dew drop, rain, a snow flake, the water we drink has been in other places on our planet, has been used, perhaps, by some other living thing. Perhaps by any number of living things: A peasant who irrigated crops along the Yellow River in China hundreds of years ago, an alpine hunter who walked a glacier in Europe thousands of years ago or a dinosaur drinking from a pool in an early rain forest. In fact, water connects us with every thing, every place and every time, both past and future. This ‘virtual’ power of water is not in jeopardy. However, the lives and lifestyles that real water supports are. To intelligently address the threats¹, we need to understand the

1. Water is a huge topic and contemporary problems related to water are so complex and vast that we cannot begin to do them justice. Accordingly, this article has a very local focus.

2. Some groundwater is so deep and has been stored for so many millennia that it is called fossil water. Recharging or refilling these stores takes so long that pumping it from artesian wells is called ‘mining’ and the water itself is considered a non-renewable resource. Much of our groundwater we depend upon is not so deep but recharge still takes time.



High Water on the Piscataquog Flows to the Future

dynamics of how water cycles through time and space in a hydrosphere or global ‘waterworks’, appreciate the global perspective and examine resources, behaviors and values at the local level.

The hydrosphere, very simplistically, refers to the closed system of earth and its atmosphere in which water is constantly on the go in an endless cycle of evaporation (from water to the atmosphere), transpiration (from humans and trees to the atmosphere) precipitation and run-off. Along the way, water may be put in short-term or long-term storage in the form of moisture in the soil, glaciers, polar ice caps, underground aquifers², etc. When it’s working well this global waterworks also removes salt and

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TRANSITIONS

Greg Neilley's retirement as Chairman of the FLT Board of Directors offers the opportunity to take a moment to take stock. During Greg's 4 year tenure as Chair, FLT, along with your support, has become a much stronger organization:

- The total acreage that FLT helps to protect has more than doubled to 934 acres.
- Of this total, the Rand Brook Forest now totals 581 acres; the forest not only protects water resources and habitat for wildlife, but offers a variety of recreational opportunities for area residents.
- Educational outreach was increased with our semi-annual newsletter and with collaborative monthly awareness spots in the Francestown News; .
- Increased membership, an annual fund campaign, improved donor relations and an aggressive program of grant applications are providing the financial strength to assure responsible stewardship into the future.



Chair, Dennis Calcutt and Vice-Chair Greg Neilley

Dennis Calcutt succeeds Greg as Chair of FLT. He and his family are in a way symbolic of the bright future ahead for FLT. Dennis, his wife Tiffany, and 3 year old daughter Eva, have just welcomed new family member Holland Flick Calcutt. In August, the Calcutts, who live on Woodard Hill Road in Francestown, donated an easement on 16 acres of land along the Piscataquog River. Together with their neighbors they now protect approximately 4,300 feet of contiguous river frontage and flood plain.

All this at the same time that FLT is taking big steps forward in several areas: working with the Francestown Conservation Commission and the Francestown Library we are developing an exciting new educational series - the Joan Hanchett Nature series. While helping to wrap-up the Headwaters Project along Rand and Brennan Brooks, FLT is about to increase its conservation responsibilities by 35 acres in the Red House Road area and by several hundred acres along Dinsmore and Collins Brooks. Although the latter area has a variety of forest types and south facing slopes, it is the rivers, marshes and flood plains that make this an especially important resource for wildlife. This new undertaking is another collaborative project with the Francestown Conservation Commission, local landowners and the Russell Foundation and will move the town closer to its goal of protecting 2010 acres by the year 2010. With these beginnings, the next four years are certain to be as exciting as the last four.

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A Fragment of the Rainbow

By Meredith J. Allen

Photos by Ben Haubrich

The last of the migrating hummingbirds, mainly immatures and females, had passed through in mid-September. My feeders hung, neglected. As I took them down, I thought again of how my passionate love affair with Ruby-throated Hummingbirds had begun so dramatically thirty years ago.

Thunk! An odd, sharp sound had caused me to look up from my book. After a minute, I understood what I had heard. There, impaled on the screen by its rapier-like bill, was a hummingbird. Imprisoned by the inch of beak that protruded through the window screen, the tiny creature was still. Its outspread wings appeared to be arranged neatly on the mesh. Its eyes were closed, and as I watched, horrified, the bird's body began to arch back, slowly, stiffly. Surely the beautiful little thing was dead, its neck snapped, perhaps, when it collided with the screen.

Working as gently and as swiftly as I could, I freed the minute prisoner. The hummingbird lay weightless on my palm, a dazzling toy dropped by a careless child. I marveled at its perfection, the showy symmetry of its pea green feathers. Carefully I placed the little bird under a fern. The camouflage was so perfect that one had to look closely to see it. When I returned a half hour later, it was gone.

From that moment on, I was obsessed with hummingbirds. I read all I could find about the elusive little birds, and the more I read, the more fascinated I became. I was astonished to learn that these diminutive travelers migrate more than 2000 miles south, crossing the expanse of the Gulf of Mexico to spend the winter like privileged vacationers in Central America. And every year, by the fifteenth of May, a male appears in my old lilac.

The hummer's legs are very poorly developed. They enable him to cling to perches, but he never walks or even hops. His wings are used to cover even short distances, and they are his most extraordinary feature. Compared with those of any other bird, the hummingbird's upper wing bones are short, the lower bones disproportionately elongated. Fully 30% of the bird's weight is concentrated in the wing muscles. The unusual construction of the shoulder girdle muscles enables him to turn or to reverse his wings, allowing backward flight. I had known that hummers are the world's fastest flyers, based on the

number of wing beats per minute. But I was amazed to learn that those powerful wings beat *55 times per second* while hovering, *75 times per second* during normal flight, and an *incredible 200 beats per second* as the males besiege the females during courtship flights.

During daylight hours, these airborne acrobats expend an incredible amount of energy. Because hummingbirds consume their weight in food daily, much of each day's activities consist of sipping flower nectar and devouring tiny insects. Every 10 to 15 minutes, perhaps 50 to 60 times per day, they stop to feed. That long, slender bill enables them to reach deep into a blossom. Throat muscles pumping, the hollow tongue becomes a straw for sipping the flowers' juice. This spring, in an article in Bird Watcher's Digest, I learned how hummers capture insects. The birds are able to bend their lower bill downward thus opening the bill wider. They "even flex their lower jaw laterally to widen their gape" making insect trapping easier. The researchers were surprised to find that, unlike most flycatchers, hummingbirds do not have a joint in their lower bill. The humming bird is unique in hav-



ing the "ability to flex their bills in two dimensions!"

The male hummer returns to his breeding grounds a week before the arrival of the female. Pugnacious by nature, the males wage aerial combat, each attempting to secure for himself the most desirable nesting area. His courtship flight is designed to dazzle his intended by displaying his brilliant iridescence in a series of dizzying dives. Like a pendulum suspended on a wire, he flashes back and forth in front of her in a succession of precise arcs. I have also seen such dives used to chase other birds away from a feeder.

After copulation, the female is abandoned. She constructs a nest composed of soft bits of fern woven together by threads from spider webs, shingled all over with tiny specks of lichen. Two eggs, slightly larger than pea beans, are deposited in this walnut-sized cradle. After nearly two weeks of incubation the twins hatch. To understand how small they really are, con-

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sider that four newly hatched hummingbirds would flounder in the bowl of a teaspoon! Fed on a steady diet of aphids, mites, and spiders, the young birds are ready to launch themselves straight up from the nest in about three weeks. This short maturation period leaves the industrious female time to rear a second brood before she must rest and gain weight for the long flight to the tropics. By August, the young males may be distinguished by tiny carmine pinstripes on their throats. Except for a slightly frowsy appearance, the immature females are replicas of their mother.

The hummingbirds in my gardens and at the feeders are one of summer's greatest pleasures. I never tire of watching these fascinating Lilliputians. I see



Female Hummingbird

them flash by my window, the sun glinting on iridescent feathers, and I am reminded of Audubon's words: "a glittering fragment of the rainbow...a lovely little creature moving on humming winglets through the air, suspended as if by magic on it, fluttering from one flower to another."

Collins Brook Project

The Francestown Land Trust is once again joining forces with the Francestown Conservation Commission, the Russell Foundation and local landowners in a project to expand the Shattuck Pond conservation area into the Shattuck, Collins and Dinsmore Brook drainage areas. This is a rugged area of town, with boulder fields and, in one place, ledges so substantial they can be called a cliff. Interspersed is a large wetland complex of brooks, floodplains and marshes extending from the Shattuck Pond outlet to the golf course on the Second NH Turnpike North. An existing trail system will offer plenty of recreational opportunities to area residents.



The Conservation Commission will be seeking public input about the first part of this project, a 219 acre piece currently owned by TPR Development, on Wednesday, November 7th at 7:30 PM in the Town Offices' downstairs meeting room. You will also read more about this exciting initiative in our spring newsletter.

Hikes, 'Fun in the Forest', Joan Hanchett Nature Series, School Programs

FLT is involved in offering more opportunities to area families to enjoy the outdoors and learn more about nature and the environment.

Do you know what the oldest known hardwood in the US is? Do you know where to find it in Francestown? Have you learned what role it plays for wildlife? If not, you should be reading the monthly "Saving Special Places" mini-articles in the Francestown News; or joining one of our hikes intended to introduce area residents to the wonderful community resources that the Rand Brook Forest offers; or discovering nature's secrets with Carol Lunan's "Fun in the Forest" family programs like the last summer's successful scavenger hunt.

Now there are even more ways to learn about our environment. This past summer FLT joined forces with the Conservation Commission, the Francestown Library and the Francestown News to offer family programs

2010 By 2010: Saving Special Places



that deal with nature and agriculture. Falcons and hawks were the subject of the first program and bears will be the topic on January 18. If you have topics that you would like to see covered by this program please contact FLT's Gerri Bernstein, the FCC's Betsy Hardwick or the Library's Carol Brock.

Black gum trees are the oldest known hardwood in the US. With one NH native documented at 679 years, black gums are also the oldest tree of any kind in our state. Because they share their root system with each other, the genetic age of black gums may be considerably greater—1,000+ years! This clonal root system along with brittle branches which break easily under the stress of ice, snow and wind may partly explain their longevity. . . .

FLT has also donated \$300.00 to the Francestown Elementary PTO to help support the nature based curriculum currently being provided by the FCC and the Harris Center.

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pollutants to make water potable for human consumption.

What the waterworks doesn't do is to create new water. Nor do its 'pipes' leak so that water is lost — although it may seem that way depending on where you live. Rather, the global waterworks *redistributes* water which often means it is redistributing wealth as well. Water is not allocated on the basis of population or general need. There are floods and droughts. There are areas where people die simply due to a lack of clean water or lack of water, altogether. And there are areas blessed with such abundance of water and technology that its inhabitants are free to splurge on recreational and other discretionary uses or to divert the water to distant parts where they prefer to live, play or grow crops. In many arid places, like Saudi Arabia and Texas, groundwater is being mined for agriculture. What those of us who have water tend to forget is that groundwater can take a long time to recharge, that today's run-off may not return to us in equal quantity, that tomorrow when the global waterworks redistributes, our glasses and wells may not be as full.

There are several striking things about the global water supply. First, less than 3% of the supply is freshwater (non-salt water) on which all human life depends. The water most of us in Francestown and surrounding towns depend upon for household use is groundwater, the second largest source of freshwater.

Global Water Resource Profiles

Water Location	% of Global Waterworks
Saltwater: Oceans and inland seas	97.24
Icecaps and glaciers	2.14
Groundwater	.61
Freshwater lakes	.009
Moisture in the soil	.005
Water in the atmosphere	.001
Rivers	.0001

Estimates of the breakdown in where our water is currently stored vary somewhat. The above come from a fascinating new book for children (adults will enjoy it also): "One Well, The Story of Water on Earth" by Rochelle Strauss, from the Kids Can Press, Ltd. This book is now available at the Francestown Library, courtesy of FLT.

If water is withdrawn faster than it is replaced, the water table will fall and some of our wells will go dry.

Francestown, like most of the area towns, is presently well endowed with surface water and wetland soils which together account for more than 20% of the town's acreage. It's hard for us to go anywhere without passing wetlands, brooks and ponds. Groundwater is not visible, at least when it's in the ground. But, we see it occasionally emerging in seeps; and we see gallons of it every day flowing in and out of our homes, creating a false sense of an inexhaustible supply.

Local Water Resource Profiles¹

Estimates of Water Type	Francestown	Greenfield
Ponds - Area in Acres	419	350
Miles of Water courses	49	N/A
Wetland Soils-Acres	3,427	2,595
Aquifers of adequate size for public water systems ²	2 small areas	N/A
Other Groundwater	N/A	N/A
Total Acreage of Town	19,712	16,778

Notes:

1. Sources: Francestown 1994 Master Plan, Greenfield Master Plan 1989 and 2002 Update. Comparable information from Lyndeborough was unavailable.

2. Bill McAuley, President of the Francestown Water Company, says that small public systems like the one serving the center of Francestown can, and do, function well on groundwater aquifers with lower rates of flow.

A look at our history in this area affords a good perspective on our impact on water. A relatively high water table eventually allowed settlers to dig wells, although in our rocky soils and at some depths of over 40 feet, the price of water wasn't cheap. Nor was it as convenient as it is today. (See insert on page 7.)

Until the late 19th century, domestic water consumption was measured by the pail. Today most of us use un-metered water from artesian wells in bed-rock aquifers. However, if you begin to do the math for your household - how many flushes per day at a minimum of a pail (2 1/2 gallons) per flush, how

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FRANCESTOWN LAND TRUST RECENT AND UP-COMING ACTIVITIES

Naturalist and Bear Behaviorist Ben Kilham
January 18, 2008, 7PM



The Joan Hanchett Nature Series continues on Friday January 18, 2008 at 7:00 PM, a location in Frankestown still to be determined. Benjamin Kilham of Lyme, NH will show a film on his experiences studying bears and rehabilitating them to the wild. (Bears will not be in attendance: They are drowsing through the winter months of limited food supplies.)

The 52 minute film, produced in co-operation with the National Geographic society, will be followed by a question and answer period along with a raffle of an autographed copy of Ben Kilham's 'Among the Bears'. Those wishing an advance preview can find the book at the Frankestown Library.

For more information about the program contact Gerri Bernstein or the Frankestown Library.

Hike the Rand Brook Forest
With Ben Haubrich and Friends
Friday, December 7, 2007

Join the Harris Center/Senior Focus hike of the newly expanded Rand Brook Forest. A moderately easy 3 ½ mile **loop** with 500' elevation change will take us over Rand Brook twice, past cellar holes, , through a remote field, early successional habitat, and more. Meet co-leader Ben Haubrich at 10:20 AM at the Rand Brook Forest parking area immediately adjacent to Old County Rd South . (From the center of Frankestown, take the first left off Route 136 on the way to Greenfield. Bear right a few hundred feet after the intersection with Birdsall Road. Old County dead-ends at the parking lot.) Hike will end by 3:00PM. Bring water, a snack and lunch. NOTE – As this is a nature hike, no pets, please. For more info contact Ben at 547-2075 or bph03043@netzero.com .

Carol Lunan's 'Scavengers'

Families shared the thrill of discovering many of nature's treats in the Rand Brook Forest last July.



Joan Hanchett Nature Series Takes Flight

In collaboration with the Frankestown Conservation Commission, the Frankestown Library and the Frankestown News, FLT has begun a family oriented educational nature series named in memory of Joan Hanchett who died earlier this year. Joan was the town's long-time librarian, a board member of the News and an ardent conservationist. The first in the series, a program on the habits and behavior of hawks and falcons program drew over 150 people. Dozens of young people of all ages had the thrill of having either Fire or Smoke, young Harris Hawks, fly onto their gloved hand to capture a piece of chicken. Despite her name and interest in the crowd, Banshee, a Peregrine Falcon, declined the invitation to dine. The birds are owned and trained by

Nancy Cowan, licensed falconer, of the NH School of Falconry in Deering. The second program in the series will be a slide presentation by Ben Kilham on black bears. **See above article.**

“Running Water”

Writing about the “hardships” of early settlers in his 1895 History of Francestown, Cochrane sympathized: “For many years the patient mother had to carry every pail of water (20+ pounds) from five to fifty rods (approx. 80 to 800 feet). Wells were dug when they became able to have such luxuries, but were generally at some distance from the house. Meantime they went to the nearest brook or spring, and the tired woman lugged her pail of water through rain or snow. And when they succeeded after long waiting in securing a well near the house, she hung her pail upon a hook on the end of a pole, and stooping down with it so as to reach the water, she drew it up full by main strength.”

This well on Driscoll Hill Road in the Rand Brook Forest is about 10 feet from the cellar hole behind it. Still, not fun on a sub-zero day.



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many baths (40 gallons for a large tub), etc. - you can get a quick feel for how much our personal consumption of water has increased since the 1700's or how much more we use than residents in water-poor countries today¹.



Old mill foundations on many of our brooks and streams testify to earlier needs for local water power to saw logs, grind grain, etc. This foundation on Shattuck Brook in Francestown, that depended on a massive dam upstream, is believed to have been a saw and shingle mill built around 1855 by Levi White. It was still operating in 1895.

Although the size of local populations is just starting to surpass what it was in the early 1800's, our domestic use of groundwater is probably at least 20 times what our predecessors consumed. But it is not just what we do inside that impacts our water resources. What we do outside can have an equally important impact as our predecessors discovered in hindsight:

The 1895 Town History of Francestown observes that

“In the first half century of the town², the water power was probably twice what it is at the present day. In several places there were mills well provided with power half the year where now no water runs except in the wettest times. The same is true of all the surrounding towns. With the loss of old forests, either less rain

falls or it evaporates more rapidly from the ground. There were more brooks, more meadows, more marshy, water-covered land than now (1895)³.”

Although much of our forest has returned in the last hundred years since this was written and although we have largely exported our water needs for power and agriculture to other parts of the country and the world, our forests and water supplies are again under threat. These threats include: the demands of an increasing local population for water and open spaces to build; heavy runoff in the form of flooding, from pollution; pressure to ‘export’ groundwater to more distant population centers; and, of course, potential impacts from global warming. Now is the time to stop well wishing and to pump up our efforts to protect water quality and quantity by: Requiring naturally vegetated buffers along our watercourses; protecting wetlands that filter pollutants from our water and recharge groundwater; and, supporting conservation efforts to protect water, land and habitat along the most sensitive areas. . . . (to be continued in next issue)

Notes:

1. Americans don't just use more water than the most poorly endowed populations. According to Wikipedia, “the US leads the world in per capita water consumption,” using over twice as much as the average Frenchman and 8 times as much as the average Dane. Rochelle Straus reports that the average American uses 143 gallons/day compared to the average Ethiopian with the barely subsistence amount of 2.6 gal. (roughly 1 pail-full).
2. Reference is a little vague, probably prior to 1840-1850.
3. It should be noted that this account does not mention the widespread erosion, stream silting and soil degradation that accompanied the clear cutting which followed the Revolutionary War.



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**Friends Snooze
While Kilham Speaks
Friday, January, 18, 2008 7PM**
(see article on page 6)

Look carefully to see sleeping bear and cub. Photo
by Benjamin Kilham



What's Inside

Answer to Water Quiz found in article page 1
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**Hike the Rand Brook Forest
With Ben Haubrich and Friends
Friday, December 7th**
(see article on page 6)

*Brook Photo
By
Jenny Fritz*



Water Quiz

'Hydrosphere' refers to which one of the following modern realities?

- A. The dome over indoor ski resorts like that in Dubai in the Arabian desert.
- B. The humidity bubble created over the desert city of Las Vegas by thousands of swimming pools and fountains as well as by the convergence of a Grand Canal, artificial Nile, Hudson, and numerous unnamed 'lazy' rivers.
- C. A global waterworks that recycles and redistributes water.
- D. The global market for bottled water, such as Perrier from France and Fiji from the South Pacific Island of the same name.