

### Missisquoi Matters

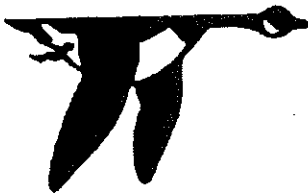
is the quarterly newsletter of the Friends of Missisquoi National Wildlife Refuge, Inc., a non-profit 501(c)(3) organization, dedicated to promoting a better awareness, appreciation, conservation, and responsible utilization of the Missisquoi National Wildlife Refuge.

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Newsletter edited by Ken Copenhaver

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Dave Frisque, *Assistant Refuge Manager*  
Eddie Edwards, *Zone Enforcement Officer*  
Lisa Swainbank, *Office Administrative Assistant*  
Joe Bertrand, *Maintenance Mechanic*

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MNWR HQ hours are  
Monday thru Friday  
8:00am – 4:30pm  
Saturdays June 4 to mid-October  
10:00 AM – 2:00 PM

## Friends News Shorts – June 2011

**Water, Water, Everywhere!** The big news at the refuge this spring is the flooding. High water closed the Louie's Landing fishing access and has greatly restricted the use of refuge trails. The Stephen Young Marsh Trail is the only trail that remains fully open, and even there waterproof boots are highly recommended. The beginning of the Old Railroad Passage Trail is usable, but it is flooded just past where it enters the woods. Please read Russ Ford's and Dave Frisque's excellent accounts, beginning on the next page, for more information on the causes and probable effects of the high waters.

**IMBD Canceled.** Due to the lack of usable trails and no way to launch boats in the river, the annual International Migratory Bird Day and Open House activities in May were canceled. The Friends board of directors is currently working with refuge personnel to plan an Open House, possibly on the second weekend of October. Stay tuned for further details.

**New Board Members.** At the Friends Annual Board Meeting on May 24, two new directors were elected to the board. Carol Yarnell from Alburg has joined the board, and Joe Belanger, former Friends president, has rejoined. Welcome Carol and welcome back Joe!

**Refuge Cleanup.** An after-effect of the flooding will likely be a considerable amount of debris on trails, parking lots, and other areas of the refuge. The Friends has offered to organize cleanup crews to help in this effort. Since it is too soon to guess how long it will be until the water level goes down, no dates have been set. The Friends board will be contacting members for help, so please consider lending a hand!

**New Website.** Word is that the Friends' new website is getting close to completion, possibly sometime in July.

**New Refuge Manager.** Ken Sturm has been selected by the U.S. Fish and Wildlife Service as the new manager of Missisquoi NWR. Ken comes to us from Canaan Valley NWR in West Virginia where he is the Supervisory Wildlife Biologist and acting refuge manager. He graduated from the University of Vermont in the School of Natural Resources (Wildlife Fisheries & Biology) and says he always wanted to return to Vermont. Depending on moving arrangements, Ken is expected to arrive in early July. Welcome back to Vermont!

### Friends Bimonthly Board Meeting Tuesday, July 12, 2011 at 6:30 pm

The meeting will be held at Swanton House of Pizza (downstairs). The reason for the change in location is for availability of a wireless internet connection so that the directors can preview the new website.

Members are welcome and encouraged to attend. Come and find out what the board is planning and give us your thoughts and ideas for how the Friends can be a more effective organization.

## Effects of Flooding on the Refuge

*By Dave Frisque, Assistant Refuge Manager*

The month of May has been an amazingly unique period. Water levels in Lake Champlain have not dropped below record high levels for the entire month. This situation has created profound problems in a variety of natural and human activities. Refuge trails are inundated with the exception of the Stephen Young Marsh Trail. Refuge parking areas and boat launch areas remain inundated, restricting access to the Missisquoi River and Lake Champlain for many who enjoy boating, canoeing, and kayaking. It has been interesting to watch osprey, great blue herons, and American bitterns trying to catch their next meal while hovering or stalking the edge of grassland fields along Tabor Road or in hayfields along Route 78. Water levels are simply too deep for wading birds and raptors who hunt for fish to use traditional marsh areas. Waterfowl likewise are seeking the shallow waters along fields to find water depths that will allow dabbling ducks the ability to “tip up” and feed near the bottom.

The water levels are likely affecting the ability of many other marsh dwelling species to reproduce and rear young. Muskrat houses and beaver lodges are inundated and are not visible across the watery landscape. Many furbearers have sought “high ground” along Route 78, a heavily-used state highway bisecting the refuge, with devastating results. Dozens of black terns are feeding along the inundated fields across from the refuge headquarters. Refuge personnel have provided floating nesting platforms at various locations on the refuge for black terns to use. Black terns typically construct a nesting bowl from floating vegetation virtually all of which have floated or have been blown away from traditional nesting marshes this year. We are hopeful that the floating platforms will supplement the few remaining floating mats of vegetation.



Fishing Access parking lot. Photo by Ken Copenhaver

While the impact on the habitats that most refuge species require has not been documented as yet, our expectation is that numerous vegetative communities will be affected by the prolonged high water. Most tree species are adapted to intermittent flooding, typically in the spring, but flooding that lasts well into June and perhaps beyond will stress most species. Reduced oxygen levels in the root systems of these tree species have already resulted in stunted leaf size and early color changes (yellowing) in some areas of the refuge. The shallow root systems are not adequate to support larger trees, and “blow downs” are evident along the Missisquoi River and Dead Creek. Emergent vegetation, including wild rice, bulrushes, cattail, pickerelweed, and many other species, will be greatly suppressed this year and will no doubt have an impact on available food and cover for broods and returning fall migrants.

Flooding of this magnitude has not been experienced within recorded history in the Lake Champlain watershed. Impacts on people and wildlife will need to be assessed over the course of the summer before the full measure of this flooding will be known. The Missisquoi NWR will also be documenting impacts to habitats and facilities through the summer as we clean up after the floods of 2011.

## The Great Lake Flood of 2011

*By Russ Ford, Friends Board Member*



Mac's Bend parking area. Sign says "No Fires."

*Photo by Russ Ford*

As I write this, the highest water levels ever recorded on Lake Champlain are barely beginning to recede from the Missisquoi Delta. Waters are still lapping at the traveled lanes on Route 78. The parking area at Louie's Landing has been under water for a full month, along with the Charcoal Creek Trail and the Old Railroad Passage Trail across Maquam Bog. The lake level peaked at 103.3 feet above sea level in early May, and for nearly the entire month remained above the previous record of 102.1 feet, set in May, 1869.

What caused this flood? April this year brought a 'perfect storm' of persistent rain and a rapid melt of a substantial snowpack. Lake Champlain's major tributaries, including the Missisquoi, ran well above average for the entire month. Quebec's Richelieu River is our lake's only outlet. The elevation of the bedrock at the Chambly Rapids on the Richelieu River is about 93 feet above sea level, which basically sets the lower limit on possible water levels in the lake, and the speed with which the lake water level is dropping is controlled by the amount of water the Richelieu's channel can handle. The

wet spring has continued through May, keeping lake levels high.

I have been impressed by the thick layers of sand and silt left behind by the river on its banks and in fields upstream of the Delta by the spring high water. Floods carry immense loads of nutrients, sediment, and debris. The phosphorus and other nutrients washed off of farm fields during the April and May rains raise concerns for their potential to fuel algae blooms in Missisquoi Bay. Tree trunks and other woody debris swept down by the floods are feared by motorboaters on the lake, but large woody debris provides necessary structure and habitat for fish and for shoreline plant and animal communities. For example, think of the half-floating snags favored by Spiny Softshell turtles in the Refuge as spots to haul themselves into the sun.

We may like to think of the image of water washing away stone, drip by tiny drip, but in the life of a river the channel is shaped far more by the occasional flood than by the normal daily flow. At 25,000 cubic feet per second in late April, the Missisquoi River looked like a thick brown stew from all the sediment eroded from fields and ditches up river or mobilized from the river's own bed and banks.



Louie's Landing parking lot.

*Photo by Rich Kelley*

If the river had run this high early in the autumn, when the lake levels are typically low, the rampaging river might have washed parts of the Refuge into Missisquoi Bay. But coming in conjunction with high lake water, the river and its

sediments have spread through the refuge, dropping the load of sediment far back on the trees and marshes. Floods like these are what built the delta over the last few thousand years.

Today the Missisquoi Delta is divided by the embankments of Route 78 and the railroad. These embankments keep the silt-laden river water from reaching the Maquam Bog and Charcoal Creek parts of the refuge. I would expect that if we measure the thickness of the silt left behind by this flood it will be thick on the river side of the embankments, and that the Maquam side is relatively starved of sediment.

What will be the effects of the Great Flood of 2011 on the Missisquoi National Wildlife Refuge? One way to think about this is in terms of the flood tolerance of plants and plant communities in the Refuge. Plant survival in an area of bogs and wetlands is closely tied to what plant ecologists call 'micro-topography,' or small dips and depressions in the landscape.

During the height of the flood I carried my canoe in to the Old Railroad Passage Trail at the refuge, and paddled the trail down to the lakeshore. Over the years the edges of the raised trail have been colonized by trees such as yellow birch, aspen, and American Beech that can't grow a few feet away in the lower, wetter peat soils of the Maquam Bog. The root systems of American Beech cannot function for more than a few days underwater, so this flood may eliminate the Beech from along the trail.

This year's prolonged high water has left most of the refuge under several feet of water for weeks on end. The large and stately Silver Maples that line the Missisquoi River from Mac's Bend down to the lake have seen many floods, and are among the species that are adapted to grow and reproduce despite long

emersion. Adult Red Maple and Silver Maple can both survive an entire growing season in soils saturated by water or under water. Seedlings are usually less tolerant of water, and continued immersion the following year can stress or even kill adult trees. Dead snags will likely remain for many years, and as they decay some will become valuable nesting habitat for cavity-nesting birds such as Wood Ducks and Hooded Mergansers.



Water is nearly up to the railroad tracks beside Rte 78.

Photo by Rich Kelley

The root systems of many other species do not share this flood tolerance, and 'drown' from lack of oxygen, changes in pH, and other factors. Some of the more upland species whose seeds may have reached the refuge since the last big flood are likely to die or be stunted by this year's water, including Sugar Maple, American Beech, Yellow Birch, and White Ash. In these ways, the flood-prone Missisquoi Delta remains a haven for specialized bog and wetland species, protected by periodic floods from upland 'invaders.'

*Russ Ford researches the Missisquoi watershed for the aquatic ecology program at the University of Vermont.*

## National Waterfowl Collection

*by J. Eddy Edwards, Refuge Zone Law Enforcement  
Officer, Vermont/ New Hampshire*

The U.S. Fish and Wildlife Service's (USFWS) National Conservation Training Center (NCTC) in Shepherdstown, West Virginia, is currently considered one of the finest facilities in the country for providing training to wildlife professionals. Located in northeastern West Virginia, the Center is just a stone's throw from the Civil War's Antietam Battlefield. During the past couple of years, I have been serving as the lead waterfowl instructor for new refuge law enforcement officers just starting their career for the USFWS.

Officer trainees come to NCTC from Alaska, Florida, and everywhere in between to get the specialized training they need to enforce federal wildlife laws. Every year approximately 50 officer trainees attend this class before becoming federal game wardens. A collection of senior USFWS officers from around the country provides training to help these new officers learn skills that will make them a better game warden.

Over the course of time, many of these new officers will eventually transfer to new positions at refuges around the country; therefore, they must be proficient in identifying every species of the 44 waterfowl found in North America. To add to the challenge, the officer must know the daily bag limit for each waterfowl species. However, the real challenge is that the officer must use their skills to identify individual waterfowl species by only a wing (attached to a headless, featherless carcass). That's because the Migratory Bird Treaty Act requires hunters to transport migratory game birds with either a head or one fully feathered wing attached to the bird. The wing of each waterfowl species in North America is not only unique among species, but is also unique between drakes (males) and hens (females). Can you imagine opening up a hunter's cooler and digging through cold wet carcasses without any heads or body feathers attached? No pressure there!

Last summer, I secured funding to collect both drake and hen specimens of every species of waterfowl in North America. So future classes will now have the opportunity to learn waterfowl by looking at a fully feathered mounted bird besides just the wing. I worked with game wardens, wildlife biologists, and state partners from all over the country. The collected birds were either shot legally during the hunting season, found dead of natural causes, or were seized because they were illegally shot. While some species like the mallard are commonly found across the country, others like the king eider are not. Particularly challenging was the collection of endangered or threatened species such as the Steller's eider, Emperor goose, and Nene (Hawaii's state bird). Fortunately for our collection, but unfortunately for the birds, all were collected from hunters who had killed them illegally. Another challenge was that every collected bird had to have a good left wing that wasn't broken or damaged. As waterfowl hunters can attest, this isn't an easy thing to do when firing shotgun shells!

While I wasn't able to secure every species for the collection this year, I was able to collect 72 of the 88 specimens needed. This total includes a few other water birds such as the pied-billed grebe, which is quite often shot by hunters who think the grebe is actually a duck! A few tough ones such as the Barrow's goldeneye, Eurasian wigeon, and hen harlequin still remain and hopefully we will be able to add those species to our collection in subsequent years.

The taxidermist has been very busy preparing the birds that were collected this year, and we are hoping that the work will be completed by the first week of June. Each bird will be mounted on a dowel rod and have the left wing fully extended to depict its "field marks" on the wing. When completed, the collection will be kept on display at NCTC. But before it travels to West Virginia, I plan to display the birds at Missisquoi NWR headquarters. While I can't give an exact date for when the birds will be on display, I suspect it will be sometime in mid June. This will be a unique opportunity for the public to come and see waterfowl from all over the country, even those that are not found in Vermont.



## Summer Activities Schedule at Missisquoi National Wildlife Refuge

29 Tabor Rd.  
Swanton, VT 05488

All programs and tours are free, but registration is required where noted.

### Kids Fishing Derby

(tentative) Saturday, July 30

Due to prolonged high water in the Lake Champlain Basin and on the Missisquoi River, the Children's Fishing Derby, originally scheduled for June 4, has been changed to Saturday, July 30. The postponement is necessary as flood waters now completely cover all fishing sites and access points along the Missisquoi River from Louie's Landing to the Missisquoi Bay delta. Significant clean up effort is expected once flood waters recede, and possible repair of damaged roads, buildings, parking areas and other facilities on the refuge may be required. The Saturday, July 30 date is still tentative pending assessment of damage to facilities and clean up needs. Please watch for additional announcements as the date for the Derby approaches. **Registration is required. Please call 802-868-4781 to sign up for this activity.**

### Monthly Nature Walks

Join Friends of Missisquoi NWR board member Joe Belanger for nature walks on various refuge trails, held the first Saturday of each month (except for July, which will be the second Saturday). All walks will be from 9:00 AM to 11:00 AM. Registration is not required. The schedule for the next three months is:

**July 9: Maquam/Black Creek Trail.** Meet at the parking lot on the south side of Rte 78.

**August 6: Old Railroad Passage Trail.** Meet at the parking lot on Tabor Rd, about a half mile past the refuge headquarters and across from Stephen Young Marsh.

**September 3: Jeep Trail.** Meet at the Louie's Landing fishing access parking lot.

### Monthly Bird Monitoring Walks

Friends board members Bridget Butler and Ken Copenhaver will lead bird monitoring walks on various refuge trails on the third Saturday of each month. The purpose of the walks is to gather long-term data on the presence of birds, their abundance, and changes in populations. Observations will be entered into the Vermont e-Bird database where data is stored by the Cornell Lab of Ornithology and the National Audubon Society. These walks are appropriate for all levels of birders and provide a wonderful opportunity to learn about birds throughout the seasons. All walks will be from 8:00 AM to 10:00 AM. Registration is not required. Locations are subject to change depending on trail conditions.

**June 18 at Old Railroad Passage Trail.** Meet at the parking lot on Tabor Rd, about a half mile past the refuge headquarters and across from Stephen Young Marsh.

**July 19 at Maquam/Black Creek Trail.** Meet at the parking lot on the south side of Rte 78.

**August 20: Jeep Trail.** Meet at the Louie's Landing fishing access parking lot.

To check for any schedule changes, visit the activities calendar on the Friends website at [www.friendsofmissisquoi.org](http://www.friendsofmissisquoi.org) and click on the "Events" link.

## A "Tail" of Two Rodents

by Judy Sefchick Edwards, *Wildlife Biologist,  
Missisquoi NWR*

It's another rainy day on this rainiest of Aprils at Missisquoi National Wildlife Refuge, but we're out in the boat anyway. After all, there's field work to be done: new osprey nests to predator-guard, refuge signs to put out, and wildlife surveys to conduct. Don't worry, we're not the only ones out here; the muskrats and beaver are too, though they don't seem real happy about it. During springtime, these creatures are usually enjoying the easiness of the season by being warm and dry in their houses, and preparing for the birth of young. But not this year! With Lake Champlain at an all-time record high, muskrat and beaver houses are flooded, giving these waterlogged critters no choice but to be out in the water and rain, resting on hummocks, floating logs, mats of vegetation, or any high ground they can find!

Muskrats and beaver are an ordinary part of life in Vermont, or so it seems. But if you take a closer look, you'll see that these industrious, scaly-tailed rodents are anything but ordinary! Unique mammals in the fact that their homes are in water, muskrats and beaver build lodges that are similar in appearance, but not size. Beaver lodges are enormous (sometimes towering 7 feet high and spreading over 30 feet!) since they're made from tree trunks and branches. After all, strong jaws and teeth allow beavers to gnaw through a 6-inch tree in as little as fifteen minutes flat! Muskrat houses are more petite (extending at most to 5 feet in height and 8 feet in diameter), constructed from grasses, roots, and aquatic plants carefully piled together with mud. Though their lodges differ in construction, both provide a safe, dry place for the animals to live and raise young.

Many people incorrectly think that muskrats and beavers are closely related. Or they mistake a muskrat for a beaver at first glance. What distinguishes a muskrat from a beaver? Why it's the

tail of course! Both have 10-inch tails that act as rudders while swimming, but muskrats have long thin tails, while beavers have wide, flat, paddle-shaped tails that are used for balancing, signaling danger, and storing fat. Another appreciable difference is size. Unlike other mammals, beavers continue to grow throughout their lives and can weigh upwards of 80 pounds. It's no wonder beaver grow so big, after all, they can live for 20 years. Muskrats, however, top out at a mere 4 pounds and are usually part of the geriatric scene by age 4!

Despite the obvious differences, muskrats and beaver share many characteristics that make them distinctly adapted to life in the water. More active by night than by day, beady-eyed and all-business, these critters can be found diligently working—always digging, building, repairing lodges, finding food, or eating, while awake. Dense, waterproof fur traps air underneath for insulation and buoyancy. Valves, resembling flaps of skin, close off their nostrils, ears, and mouth for underwater feeding and traveling. Special clear eye membranes serve as natural goggles to allow underwater vision and protect the eyes from irritation. Hand-like front feet are used in building lodges, holding food, and digging burrows and channels, while large hind feet act as paddles during swimming. Though not webbed like the beaver's, the muskrat's hind feet have specialized hairs that help propel it through the water.

If you've ever watched them, you know that muskrats and beavers are polished aquatic athletes. Swimming is what these no-nonsense freshwater rodents do best! Muskrats travel low in the water with their head, rump, and tail slightly exposed above the water's surface. They can swim at a rate of 2 to 3 miles per hour, and they swim backward as easily as they swim forward (don't try this without a snorkel, folks)! Beavers may have an ungainly waddle on land, but they become graceful gliders once they hit the water. In fact, these speedy swimmers can move 5 miles per hour, a pace that Olympic athletes would be challenged to match! And don't forget about the diving. Having highly

developed abilities that would rival those of Houdini, muskrats and beavers can stay submerged underwater for up to fifteen minutes. As a matter of fact, a large beaver is capable of traveling nearly a half mile under water before it has to surface for air! How can they do that? Research has shown that muskrats and beavers relax their muscles and reduce their heart rate, which slows the body's use of oxygen in order to do this.

In Vermont, spring is usually a welcome sight—for muskrats and beaver, it means they've survived another long New England winter. During the winter, beavers rely on food caches of twigs and branches that they place deep underneath the water's surface during the fall. Since they're well-prepared, beavers just have a quick swim from their lodge to a nearby underwater cache in order to eat and survive.

Muskrats, however, approach winter in a more reckless way. While full-bellied beavers and humans remain snug in the warmth of their homes, muskrats are out in the cold, searching for roots and stems. Because they don't store food, and they consume about one-third of their body weight in food every day, muskrats are forced to travel long distances under water. Truly remarkable creatures, muskrats can find food under a meter of ice and snow, in ice cold water, and in almost total darkness,

all while using air bubbles trapped beneath the ice in order to breathe!

As if that weren't enough, researchers also discovered that muskrats pause before plunging into cold water. By taking a moment to sit quietly, muskrats can elevate their body temperature by about 2 degrees Fahrenheit. It may not seem like much, but this modest increase allows muskrats to stay under the ice an extra 9 minutes before their body temperature drops back to normal! Not to be outdone, beavers can do the same thing, only better; they need only a 1 degree rise in temperature to accomplish the same thing!

Another rainy two weeks have gone by and we're out in the boat on the refuge again. The water hasn't receded much, but the refuge's flood victims seem to be taking it in stride. This time we notice that multi-talented muskrats and beavers are regrouping and rebuilding. Some muskrats are using hollowed-out trees or stumps for shelter, while beavers are constructing new lodges. I learned a long time ago not to underestimate the abilities of these curiously clever creatures. After all, it's what they do. Although this may be the soggiest springtime season that Vermont has ever experienced, it'll take a lot more than a great flood to keep these wily wetland creatures down!

### Cambridge Third Grade Class Donates to Friends

Each year, Jacquelyn Longley's third grade class at Cambridge Elementary School collects change to donate to an organization that protects endangered and threatened species. The Friends of the MNWR are the proud recipients of this year's award. A \$50 check was presented to the Friends by the class on Friday, June 3. The Friends, in turn, invited the class to spend the morning at the refuge. They went on a tour of the Stephen Young Marsh, explored the exhibits in the Refuge Headquarters, and enjoyed a picnic lunch.

One of the goals of the Friends of the MNWR is to promote awareness of the importance of preserving wildlife habitat for migratory birds and indigenous species. Another is to introduce youngsters to the wonders of nature. We are pleased that our efforts were recognized by the third grade of Cambridge Elementary School and that they were able to explore the refuge with us.



## The Friends' Store

at the Missisquoi National Wildlife Refuge

BOOKS    GAMES    GIFTS    TEE SHIRTS    HATS

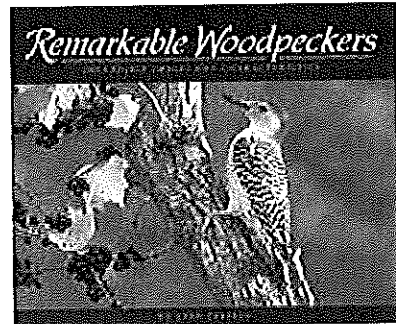
for people of all ages who love the outdoors

### New at the Friends' Store

### *Remarkable Woodpeckers*

By Stan Tekiela

\$ 14.95, paper 144 pages, 9 x 7 ½ full-color photographs



No other bird is quite like the woodpecker—from their striking plumage to their industrious method of getting food, every aspect of their lives will help you develop an appreciation for these remarkable birds.

Experience woodpeckers as you've never seen them before. Stan Tekiela shines a spotlight on these extraordinary winged creatures, depicting their lives through his award-winning photographic talents and with compelling text based on years of personal observations. If you love birds, you must have this book!

Stan Tekiela is a naturalist, wildlife photographer, and the originator of many popular state-specific field guides. He has authored over 100 field guides, nature books, and audio CDs, presenting many species of birds, mammals, reptiles and amphibians, trees, wildflowers, and cacti.

To order by phone, call 802-868-4781. To order by mail, fill out this order form and send to:  
The Friends' Store MNWR, 29 Tabor Rd, Swanton, VT 05488  
Please add \$5.00 shipping and handling.

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Phone \_\_\_\_\_ Email \_\_\_\_\_

Please send me:  Remarkable Woodpeckers (\$14.95)

Payment: Enclose check or money order, or fill in Credit Card information.

Type of card:  MasterCard     Visa

Credit Card Number \_\_\_\_\_ Exp date \_\_\_\_\_

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