



the Swamp Scene

friends of great swamp national wildlife refuge

ISSUE FORTY NINE
NOVEMBER 2015

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NEW TRAIL EXPANDS RECREATIONAL OPPORTUNITIES AT VISITOR CENTER

By Laurel Gould



After more than a year of planning, clearing, and construction, the new one-mile White Oak Trail officially opened for visitors on October 10, 2015. The trail passes through different habitats, including brushland, forest, meadow, and wetlands, and visitors may see birds, reptiles, amphibians, butterflies and other insects, mammals on occasion, and many different kinds of trees, shrubs, fungi and flowering plants. A short offshoot of the trail provides a close-up look at the 250 year-old Swamp White Oak for which the trail was named.



Thanks go to the many Refuge staff members, Friends, and volunteers who helped make this trail a reality. Thank you also to you—our Friends members and donors—whose generous contributions made this project, and so many others, possible.

The White Oak Trail is even more exciting and "wild" than I could have hoped for; what a great job all the volunteers and staff did to make it possible.

As I walked the trail today, I was so impressed by the gift our wildlife refuge is to us and the public. Nature gives us humans reason to pause, reflect, and enjoy.

Elaine Seckler, President, Friends of Great Swamp NWR



Swamp White Oak (top); Unveiling the new sign (middle); BASF volunteers clear brush; Volunteer Terry Kulmane marks the trail; Silver-spotted skipper.

WORKING TO SAVE THE MONARCH—SUCCESS BEYOND EXPECTATIONS

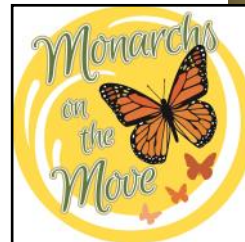
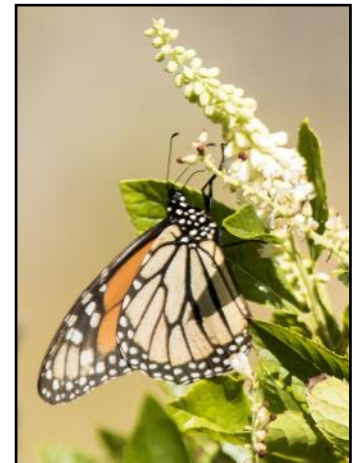
By Kathy Woodward

The monarch initiative, started earlier this year, grew and succeeded in many delightful ways. The demonstration monarch garden, planted with swamp, purple and tall milkweed and nectar plants was discovered by monarch females. Mid-August through mid-September, the milkweed plants had so many monarch caterpillars that, when the leaves of the plants were stripped bare, volunteers relocated caterpillars to the common milkweed plants in nearby fields and purchased additional swamp milkweed plants for the garden. Volunteers weeded and watered the garden regularly. Photographers appreciated the opportunity to document the monarch lifecycle. Visitors enjoyed the garden and the display inside the Visitor Center of caterpillars and chrysalises.

The theme of this year's Fall Festival was *Monarchs on the Move*. With volunteers in monarch orange tee shirts, four performances of an original play about the amazing journey of the monarchs, the Visitor Center bulletin board featuring monarchs, and cooperative monarchs that emerged during the festival, many people learned more about monarchs. A special Sunday program in September focused on tagging and tracking monarchs to their wintering mountains in Mexico.

Numerous volunteers raised and released monarchs for the first time. They shared their excitement and passion, and encouraged everyone to plant milkweed and nectar plants. Their understanding of the complexity of the monarch journey made them strong advocates for improving habitat across the country.

Several volunteers participated in the fall festival at Wallkill River NWR in September. Not surprising—Great Swamp's display was about monarchs. Again, a monarch cooperated, emerged and was released by Puddles, the Blue Goose.



INVASIVE SPECIES CONTROL—A PRIORITY FOR THE FRIENDS

An End of Season Update

Friends, staff, interns and volunteers have spent another busy season working on invasive plant species control on the Refuge in order to improve habitat for wildlife.



Volunteer Walter Willwerth tackling invasives at the Overlook

PERVASIVE INVASIVES

The Thursday team, working on “pervasive” invasives tackled multiflora rose, Japanese barberry, autumn olive, euonymus, phragmites, Oriental bitter-sweet, and stilt grass. Between May and September, 2015, eight work days were held on alternate Thursday mornings. Twenty-seven volunteers participated in the program on one or more days, donating a total of 332 hours to improve habitat on the Refuge. According to Kathy Woodward, team co-leader with Anne Hebenstreit, “Much of the work focused on areas around the Visitor Center, along the trails, near restoration plantings and roadsides. Some of these areas have been treated in previous years but frequent monitoring is necessary. One work day focused on removing invasives along the newly created White Oak Trail. One day was spent at the Overlook, continuing work on a restoration site in the circle begun in 2013. The regrowth of a variety of native species in this area is encouraging.

GREAT SWAMP STRIKE TEAM

The Great Swamp Strike Team focuses on detecting and eradicating emerging invasive plant species, with the hopes of keeping them in check so they do not become the next multiflora rose. The team spent 11 mornings on the first and third Fridays of each month from April to October, 2015. Twenty-two volunteers participated, donating 280.5 hours. They tackled glossy buckthorn, Callery pear, mine-a-minute, ailanthus, and Japanese knotweed.

These two programs continue to provide significant benefit for the Refuge. New volunteers join the group each year and members from the groups also assist with corporate workdays focused on invasive plant removal. For both teams, recruiting volunteers continues to be a priority. If you are interested in helping out, look for the kick-off sessions for both groups on next spring’s Calendar of Events.

COMING SOON! PURPLE MARTINS AT THE VISITOR CENTER



Dave Miller (far right) lowered the gourds to show Friends young purple martins in the nest.

Building on the incredible and exciting success of the purple martin gourd rack at Refuge Headquarters, the Friends have purchased a similar gourd rack which has been installed at the Visitor Center.

Refuge Heavy Equipment Operator Dave Miller, the official champion of this new initiative, installed the gourd rack in July knowing the nesting season was over, but hoping to catch the attention of migrating purple martins who would be returning next year. The rack will be taken down and stored for the winter but will be raised again next spring.

Dave will be doing a program, most likely in June 2016, on purple martins and how to attract and manage these engaging native birds. Watch for this announcement in our summer Calendar of Events.

*There is something infinitely healing in the repeated refrains of nature—
the assurance that dawn comes after night, and spring after winter.*

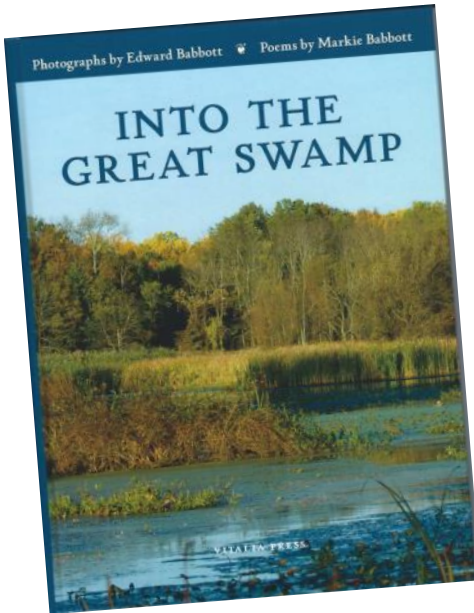
—Rachel Carson



Kurt Chiappone

A NEW BOOK EXPLORES GREAT SWAMP IN PICTURES AND POETRY

Into the Great Swamp: photographs by Edward Babbott, poems by Markie Babbott



The Friends were honored to host the launch of a new book about Great Swamp at the Fall Festival, September 12, 2015.

Titled *Into the Great Swamp*, this book is a beautiful and moving collection of photographs and poetry—a collaboration between Edward Babbott—the photographer, and his daughter Markie—the poet.

The Babbotts moved to Harding Township in 1964 and Markie grew up with the newly formed Great Swamp National Wildlife Refuge in her back yard. She recalls the first boardwalks and viewing stations being built during her childhood. Edward Babbott has been involved with the New Jersey Conservation Foundation for more than 42 years.

During the book launch, the audience enjoying watching a slide show featuring Edward's photographs as Markie treated the group to a reading of several of her remarkable and poignant poems.

In his remarks, Edward noted: "Daughter Markie and I have had great fun putting this book together. Her poems do not eulogize the bark on my trees or the geese on my pond, and my photos do not illustrate her beautiful descriptions of the connection between living beings, animals or human, and the natural world. But they merge together to make a cohesive whole."

Copies of the book are available in the Friends Nature Shop at the Helen C. Fenske Visitor Center.

2015 PHOTO CONTEST WINNERS ANNOUNCED AT FALL FESTIVAL

Winners of the 2015 Great Swamp National Wildlife Refuge Photo Contest were announced at the 16th annual Fall Festival, September 12, 2015. Friends of Great Swamp board member Laurel Gould thanked all of the photographers who submitted photos for this year's contest. Contest judges Bill Koch and Jim Gilbert remarked on the quality and diversity of the photos making judging a challenging task. All entries are being shown in the Discovery Den at the Visitor Center. Winners may be seen on the Friends web site.

The 2016 Friends Photo Contest has begun! There are five categories: Birds, Wildlife, Landscape, Plants, and Youth. An entry form will be available on the Friends web site soon. The deadline for submitting entries is June 30, 2016.

2015 REFUGE PHOTO CONTEST WINNERS

Category: Landscape

First place: Larry West
Second place: Richard Harris
Honorable mention:
Robert Stapperferne

Category: Wildlife

First place: Carol Duffy
Second place: Maureen Duffy
Honorable mention: Gay Raab

Category: Birds

First place: Chuck Hantis
Second place: Jim Duffy

Honorable mention:
Dorota Jansiewicz

Category: Plants

First place: Maureen Duffy
Second place: Carol Duffy
Honorable mention: Margaret Whiting

Category: Wilderness

First place: Jim Duffy
Second place: Gay Raab
Honorable mention:
Robert Stapperferne

Category: Youth

Best of Youth: Samantha Moy
Honorable mention: Madison Kenny
Honorable mention: Caitlin Moy
Honorable mention: Caroline Monks
Honorable mention: Justine Wang



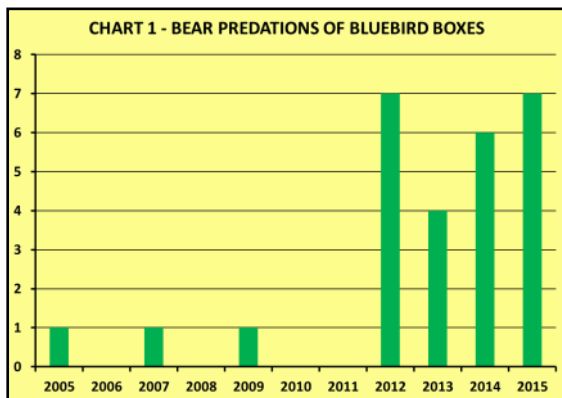
First place—Birds: Chuck Hantis "Barred Owl"

BLACK BEARS AND BLUEBIRDS

By Leo Hollein, Volunteer

I have only seen a black bear once in the Refuge. However, there are numerous signs that bears are present. In and around the Refuge they raid trash cans, bee hives and bird feeders. This year bears tore apart the outdoor wood duck pen where Judy Schmidt raises orphan wood ducks for the Raptor Trust before they are released into the wild. While anecdotal observations suggest the bear population in and around the Refuge has increased, data has been gathered documenting an increase based on the damage they inflict on the Refuge's bluebird nest boxes.

The history of black bear predations of bluebird boxes is shown in the chart below.



Black bear predation of bluebird boxes is a relatively new activity. There were no predations in the 2001 to 2004 period. The first observed bluebird nest

box and post taken down by a black bear in the Refuge was in 2005. From 2006 through 2011, bear activity was limited to taking down one or no boxes in a season. Bear activity took a steep rise starting in 2012 as they took down from four to seven boxes every year from 2012 through 2015. This represents three to five percent of the boxes in the Refuge. Black bears are now a main cause of bluebird nest box predation. Unfortunately there is no practical way to deter bears from predating these nest boxes.

Black bears have a superb sense of smell. Every bluebird box taken down during the nesting season contains either bird eggs or hatchlings. It is likely

boxes as the eggs and hatchlings are small. This lack of nourishment may discourage bears from taking down even more nest boxes in the future.

Over 80 percent of the bear predations have occurred in May and June. These are the months when the boxes have the highest occupancy rates of nesting birds. The photo below shows a bluebird box predated by a bear. The remains of the bird nest and feathers are visible. In most cases the bear bends the nest box post to the ground to get at the contents since bears prefer to dine at ground level. Obviously the post and nest box had to be replaced following this attack. However, posts and nest boxes only needed to be replaced in about one third of the bear predations; in many cases the posts can be straightened and the boxes salvaged.

Bears seem to randomly select nest boxes to predate, but there are some trends. Twenty-seven bear predations have been noted since 2005. Eleven have been boxes right next to unpaved Refuge roads in the Management Area indicating that bears travel these roads as it is easier than



Trail camera bear photo (Casey Wagnon)

bushwhacking through dense vegetation. Seven boxes near buildings have been predated suggesting bears were looking for trash bins. Four times bears have predated boxes on remediated sites. Boxes on these sites are surface supported and easy for a bear to tip over.

Casey Wagnon, a graduate student from Frostburg State University, studied the predator population in the Refuge using motion sensor trail cameras.

Casey concluded that six individual bears were photographed. These could be residents or bears passing through the area. The Wallkill River National Wildlife Refuge in Northern Sussex County has a significant bear population. In 2012, Wallkill had 25 percent of their bluebird boxes predated by bears. Hopefully bear predation of the bluebird boxes in the Refuge has plateaued and will not increase beyond the current levels.



Bluebird box predated by black bear (Leo Hollein)

FISH AND MACROINVERTEBRATE STUDIES—PRELIMINARY OBSERVATIONS

By Richard Raesly and Jered M. Studinski, Frostburg State University, Maryland

Little is known about the fishes and macroinvertebrates inhabiting streams, ponds, and impoundments of Great Swamp National Wildlife Refuge. To date, only a single fish survey focusing on the Refuge has been conducted. This survey, a collaborative effort between Rutgers University and the U.S. Fish and Wildlife Service, documented the presence of 17 species. This list appears in Appendix A of "Saving the Great Swamp." To the best of our knowledge, no surveys of aquatic macroinvertebrates have been done on the refuge, although the Great Swamp Watershed Association has a biological monitoring program that has used these organisms to assess the ecological health of streams adjacent to the Refuge since 2000.

Due to the small size (7,768 acres) and limited habitat diversity of the Refuge relative to the much larger (725,172 acres) Passaic-Hackensack watershed in which it resides, species diversity of aquatic organisms is not likely to be very high. However, Great Swamp is likely to be a refuge for a number of



Electrofishing on Great Brook (John Berry)

species that have been eliminated from the surrounding region by development.

In order to address the lack of information on aquatic biodiversity, the Friends of Great Swamp NWR funded a survey of fishes and aquatic macroinvertebrates that began in mid-March 2015. This survey, initially scheduled for one year, has been extended through 2016. Thus far in 2015, biologists from Frostburg State University and volunteers from the Friends of Great Swamp have sampled 41 sites for fishes and 66 sites for macroinvertebrates.

Macroinvertebrates were collected from a variety of habitats including temporary ponds, impoundments, and rivers and streams. Nearly all of the fish surveys took place in rivers and streams.

Because most of the characteristics of aquatic macroinvertebrates used to identify individual specimens to family and genus level are microscopic, these organisms were collected and preserved for later taxonomic identification. This identification work is currently underway, with 18% of the samples fully identified.

These samples contained 25 taxa (mostly genera). Nearly all of the completed samples were collected from temporary systems where low diversity is expected, so the number of taxa is likely to increase significantly as the work progresses. Additionally, 14 species of adult dragonflies were collected from approximately 25 locations within the Great Swamp. Currently, no threatened or endangered invertebrates have been identified but much work remains. *(continued on page 10)*

GREAT SWAMP'S GREAT AQUATIC ADVENTURE

By Rich Dufort, Friends Board Member and Volunteer

Imagine yourself walking through waist deep water, surrounded by lush green vegetation, the loudest sound the swish of the people moving through the water. You are dry because you're wearing chest waders. You are carrying what could pass for a mini but-



terfly net, trying to keep up with two intrepid researchers who use a backpack electric shocker to temporarily stun the fish in the stream. The fish float to the surface and your job is to catch them in the net in about twenty seconds before they wake up and swim away. The stream bottom is well over ankle deep with mud, sometimes almost to your knees, full of snags and your preoccupation is not catching the fish but making sure you don't fall in.

*Welcome to Great Swamp's
Great Aquatic Adventure*

Rich Raisly and Jered Studinski, professors at Frostburg State University in

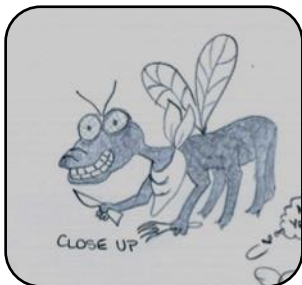
Maryland, have spent much of the summer surveying fish and aquatic invertebrates in Great Swamp. They were assisted by a \$20,000 grant from the Friends, paid for in part by your membership dollars. During the last two weeks of August, they opened their research up to volunteer participation. Fourteen of us jumped at the opportunity. And what an adventure it was.

Rich and Jered's article about what they learned is on page six of this newsletter. My job is to try to capture the volunteer experience. I solicited feedback from the volunteers about what it was like for them. Here are some of their comments. *(continued on next page)*

GREAT AQUATIC ADVENTURE *(Continued from page 6)*

THE EXPERIENCE.

Judi DiMaio said “We drove out to a segment of the Black Brook. The horseflies and deer flies were hungrily looking us over. They had their knives and forks at the ready. Once outfitted in our chest waders, we



Drawing by Judi DiMaio

took our equipment and ventured into the woods. First hurdle—crossing part of the brook that was not moving, which translates into “very soft bottom”. Jered encouragingly said, as we were slowly sinking, ‘You’ll stop eventually.’ I just hoped it was before I went under...” and then “We made our way through water, rocks, muck, mud, tree branches, slippery banks, and when the stream was impassable, on land through the poison ivy, nettles and various other waist-high thorny vegetation. A pileated woodpecker oversaw our excursion, letting us know—quite loudly—what it thought of our progress.”

Carolyn Rubinfeld commented: “The process itself I can describe as slogging through mud in waders while standing on guard for fish to catch. These fish are temporarily stunned by an electrofishing apparatus, just long enough to be quantified and released.

Besides fish, we were confronted with three large—one



very large—snapping turtles along the stream bed. Weaving around these beasts only added to the adventure.”

THE MUD

Everybody talked about the mud. Lorrie Lane described her experience as: “We didn’t take pictures in the water because we were spending all our time

navigating the deep mud. I even went for a swim, falling backwards when I couldn’t get my legs out of knee deep mud ... I had a blast.”

And from Jane Bell, “The most memorable moment was seeing Rich stuck up to his waist in muck, trying calmly to free himself and save the \$6,000 piece of equipment strapped on his back.”

THE GOLFERS

Laurel Gould’s adventure was in the Passaic River near the Visitor Center. She was delighted to see the Refuge from a totally new perspective—everything looked so different. As they waded by the Basking Ridge Country Club, they began to find more golf balls than fish—both on the bank and in the water. “What was amazing”, she commented, “was that the golfers, up on the



bank above the river, seemed totally unfazed by seeing four people, in chest-high waders, making their way upriver with nets and heavy equipment.”

On what they found, Ginnie Scott said: “It is ironic that so many different and beautiful fish, including sunfish, could flourish in a stream called Black Brook.”

A SPECIAL OPPORTUNITY

And to sum it up, Jane Bell said: “Best part of the experience—while driving to our fish study destination, we were able to take a back road that is usually cordoned off. Seeing the wide open spaces dedicated to wildlife habitat gave me a better understanding of the conservation efforts at the Great Swamp. Being with two biologists and a longtime volunteer really made the outing educational and so interesting!”



WHAT’S NEXT

So if you are intrigued by this adventure, but missed your chance, stay tuned. One of our goals is to try to give our volunteers the opportunity to see the Refuge the way it is when you get off the roads and paths.

One volunteer activity coming up is a repeat of last year’s deer survey which will be expanded and take place after the November deer hunt. The need is to backpack corn (not too much) out to bait areas in front of motion detecting cameras. The sites will be all over the Refuge and this year will include the Somerset County Environmental Education Center. And the sites are chosen by grid-lines on a map, not ease of access. So call this a *terrestrial adventure*.



If you are interested in volunteering, send an email to [<friendsofgreatswamp@gmail.com>](mailto:friendsofgreatswamp@gmail.com)



TWO SPECIES OF SWANS ARE FOUND AT GREAT SWAMP NWR

Story and photos by Leo Hollein

Two swan species can be observed at times in the Great Swamp National Wildlife Refuge. One is a native migratory swan and the other is a non-native species, introduced from Europe, that resides year round in New Jersey. Both are large white birds that are admired for their elegant appearance and stately manor. Swans are the largest birds in New Jersey.

black bill and its neck is usually straight. Some might show a bit of yellow on their lores. The tundra swan weighs over 14 pounds and has a wing span of 5 ½ feet. It is large, but significantly smaller than the mute swan.

Mute swans are a non-native, invasive species introduced to this country from Europe for their aesthetic value. Mute swans were released into the wild on Long Island and the

black face patch with a fleshy knob on the forehead that overlays an orange bill. The diet of mute swans consists of submerged aquatic vegetation found in water as deep as 4 feet. They also eat a variety of plant species on land and consume about 4 to 8 pounds of vegetation daily. They are not mute but are less vocal than other swans. Their most notable sound is the loud throbbing of their wings as they take flight.

Mute swans nest on large mounds four to five feet across that they build with water-side vegetation in shallow water or on islands in the middle or at the edge of a body of water. On average they lay six very large eggs (4.5 inches long). There is a swan egg in a display case at the Visitor Center. The eggs take about five weeks to hatch. The cygnets (swan chicks) will fly in four to six weeks and will start breeding in three or four more years. Mute swans have no natural predators once they reach adulthood.

An adult with seven cygnets (swan hatchlings) is shown at right. This photo was taken in



Mute swan

the Refuge in 2014. Only one of these cygnets reached adulthood. Presumably snapping turtles and mammalian predators took the others. Mute swans also nested in 2015 in the Refuge. One cygnet from this clutch survived.

Mute swans consume a lot of resources used by native fauna. They also harass native water fowl and can disrupt their breeding. At times they behave aggressively towards people

who enter their territory.

Mute swans can be attractive nuisances and are not protected under the Federal Migratory Bird Treaty Act. Mute swans have been culled at the Refuge and by the New Jersey Division of Fish and Wildlife at various locations in New Jersey.



Tundra swan

The tundra swan, also known as the whistling swan, nests in the tundra in the far north of Canada and Alaska. Tundra swans spend the winter on both the eastern and western coasts. In the East, most over-winter from southern New Jersey to the Carolinas. Tundra swans have been reported in the Refuge during migration for the last few years.

A photo of a tundra swan taken in the Refuge is shown above. The tundra swan has a

Hudson valley in 1910. They established themselves and spread. They currently breed throughout New Jersey including the Refuge. They tend to remain on their breeding range during the entire year. However, they will move to open water, such as along the Jersey shore, if the water freezes.

An adult mute swan is shown above. An adult has an average weight of 22 pounds and a wing span of over 7 feet. Both sexes have a



Mute swan with cygnets

MIGRATORY BIRD TREATY CENTENNIAL 1916—2016

The year 2016 marks the centennial of the treaty between the U.S. and Great Britain (acting on behalf of Canada) for the protection of migratory birds; the treaty was signed



Photo by Robert Lin

August 16, 1916 by President Woodrow Wilson and Congress codified the treaty in 1918.

The treaty was enacted at a time when many bird species were threatened by the commercial trade in birds, bird feathers which were used in fashionable hats, and nest and egg hunters who decimated seabird breeding colonies. It is one of the first Federal environmental laws. In later years, the U.S. signed similar treaties with Mexico (1936), Japan (1972), and the Soviet Union (1976). These treaties, according to the U.S. Fish and Wildlife Service, “form the cornerstones of our efforts to conserve birds that migrate across international borders.”

The U.S. Fish and Wildlife Service is the lead Federal agency for managing and conserving migratory birds in the United States. There are over 1,000 species on the List of Protected Species under the Migratory Bird Treaty Act and the list is

reviewed and updated regularly. Contrary to popular belief, not all bird species are protected under the Migratory Bird Act. Birds that are considered non-native, human-introduced species are not protected, such as the house sparrow and European starling. The Act also grants the Secretary of the Interior authority to establish hunting seasons for certain migratory game bird species; hunters are required to purchase a Federal Duck Stamp, proceeds from which are used to acquire land for refuges.

“Migratory birds are some of nature’s most magnificent resources. They have a significant role in the health of the environment, economy, and culture in the U.S. and internationally.” The goal of the centennial celebration is to create awareness, promote key actions, increase support, and expand opportunities for engagement in the conservation of migratory birds. For more information: <www.fws.gov/birds/MBTreaty100>.

MINNESOTA BROTHERS MAKE HISTORY AT 2015 FEDERAL DUCK STAMP CONTEST

A trio of brothers from Minnesota made history as they took the top three spots in the 2015 Federal Duck Stamp art contest.

Joseph Hautman, of Plymouth, Minnesota, won the contest with his acrylic painting of a pair of trumpeter swans. This is Hautman’s fifth Federal Duck Stamp contest win, making him one of only two artists to have his art appear on five duck stamps. Joseph’s brothers, Bob and Jim, took second and third place, respectively.

Hautman’s painting will be made into the 2016-2017 Federal Duck Stamp, which will go on sale in late June 2016.

U.S. Fish and Wildlife Service Assistant Director for Migratory Birds Jerome Ford stated: “Buying Federal Duck Stamps remains the simplest way to make a difference in conserving our nation’s birds and their habitats. For more than



80 years, bird watchers and millions of people who simply care about the environment have ‘put their stamp on conservation’ with their duck stamp purchases.”

IT WORKS!

Since its creation in 1934, the Federal Duck Stamp has raised almost \$1 billion and has allowed the purchase or lease of more than six million acres of wetlands, grasslands, and other waterfowl habitat, including nearly 3,000

acres at Great Swamp NWR. This year, duck stamp dollars purchased refuge lands in Texas, Oregon, and California as well as 758 acres at Blackwater National Wildlife Refuge in Maryland.

So if you enjoy Great Swamp National Wildlife Refuge, won’t you invest \$25 on the current Federal Duck Stamp—and help ensure that special places like these, that we all enjoy, are available for future generations.

The current Federal Duck Stamp, a pair of ruddy ducks, is available at the Friends Nature Shop in the Helen C. Fenske Visitor Center. A lucite holder for your stamp is available free with your purchase.



FISH STUDIES *(continued from page 6)*

Fishes, like other vertebrates, are generally larger and can be unambiguously identified in the field to species level with only a few exceptions. There are several species, however, that require identification by microscopic examination of features such as fin rays, scales, and gill arches. Field and laboratory identifications have been completed for all fishes captured in



Mud sunfish

2015. Thus far, 29 species of fishes have been captured. The most diverse families occurring on the Refuge are minnows (10 species) and sunfishes (nine species). Species representing six other families (eels, suckers, catfishes, pickerels, mudmin-

nnows, perches) were also captured, with the number of species in each of these groups ranging from one to three. Two of the 17 species previously recorded from the Refuge, the non-native smallmouth bass and goldfish, were not collected in 2015. The current study found 14 fish species not previously known to occur on the Refuge, including the regionally-rare mud sunfish (shown above). The swallowtail shiner (a minnow) is a new record for the Passaic-Hackensack drainage. It is abundant at several sites in the Passaic River and also occurs in the lowermost reaches of Great Brook. Fish diversity is not evenly distributed across the Refuge; most species occur along the western margin of the

Refuge, either in the Passaic River or the lower portions of Great Brook and Black Brook. The smaller, headwater streams in the wildlands portion of the refuge have fewer species.

Only five of 29 species (17.2%) of fishes occurring on the refuge are not native to the Passaic-Hackensack watershed. Four of these non-native species are sunfishes (bluegill, black crappie, green sunfish, largemouth bass)

that have been widely introduced for recreational fishing. This percentage is low from a regional perspective, as most drainages in the northeastern United States have more than 25% of their fish faunas comprised of non-native species.

Some additional sampling will take place in late fall 2015 as aquatic vegetation dies back in the impoundments. Pool 2 had little standing water in mid-summer 2015 and consisted of the stream channels of Great Brook and Primrose Brook. This was the only "impoundment" sampled for fishes thus far.

In 2016 additional fish and macroinvertebrate sampling will occur to fill in gaps between existing sites in streams and survey pools 1, 3a, and 3b. Several sites will be resampled to assess annual variation in species composition and abundances.



(L to r) Rich Raesly, Volunteer
Steve Gruber, Jared Studinski



FRIENDS LAUNCH NEW WEB SITE



Check out the newly updated and "mobile-friendly" Friends of Great Swamp NWR web site. We still provide a wealth of information about things to do on your visit as well as a current Calendar of Events highlighting the many activities and programs that are offered at the Refuge.

Becoming a member, or renewing your membership online, is easy with your credit card or your PayPal account. Explore the many volunteer opportunities and submit an application online. We've added the Swamp Scene newsletter to the website and will load some of the back issues in the near future. This year, plans include providing an option for photo contest entries to be submitted online for the first time. Many thanks to webmaster Ann Campbell who created the new site and makes us look good!

And don't forget to "Like" us on Facebook too. We're excited to be approaching 1,000 "likes".

FRIENDS OF GREAT SWAMP NATIONAL WILDLIFE REFUGE MEMBERSHIP APPLICATION

The Friends of Great Swamp is an independent, non-profit organization organized in 1999. Our operations and activities are managed by an all-volunteer Board of Directors. As our mission statement indicates, our focus is Refuge-centric — we support the goals, projects, and mission of the Great Swamp National Wildlife Refuge.

To become a member of the Friends of Great Swamp, fill out the information on this form, and mail with your check to:

Friends of Great Swamp National Wildlife Refuge
241 Pleasant Plains Road, Basking Ridge, New Jersey 07920

ANNUAL MEMBERSHIP APPLICATION

☐ **EASTERN BLUEBIRD—\$15-\$49**

☐ **PAINTED TURTLE—\$50-\$99**

☐ **RIVER OTTER—\$100-\$249**

☐ **MONARCH BUTTERFLY—\$250-\$499**

☐ **WOOD DUCK—\$500 +**

☐ **New Member?**

TOTAL ENCLOSED \$ _____

You may also join online at www.friendsofgreatswamp.org

Name _____

Address _____

City _____

State, Zip Code _____

Phone Number _____

E-Mail Address _____

Gift Membership From: _____

(If this is a gift, please include your full name on the line above so we may notify the recipient)

We need more Friends ...

**Become a Friend Today—or,
Give a gift membership to a friend.**

Thank you



Memberships help support the projects and programs at Great Swamp National Wildlife Refuge.

Membership Benefits

- The Swamp Scene Newsletter.
- A 10% discount in Friends Nature Shop .
- Notifications of upcoming events.
- Satisfaction in knowing you are helping protect wildlife and wild places while safeguarding a national treasure for future generations.

Gift Memberships will include a coupon redeemable at the Friends Nature Shop for a free Great Swamp pin or Great Swamp patch.

Friends of Great Swamp NWR
241 Pleasant Plains Road
Basking Ridge NJ 07920



THE SWAMP SCENE NOVEMBER 2015

Friends of Great Swamp National Wildlife Refuge
Is an independent, volunteer, non-profit organization
dedicated to

Promoting stewardship of the natural resources of the Refuge,

Inspiring an appreciation of nature through education and outreach,

Engaging in partnership activities that support and enhance the Great Swamp National
Wildlife Refuge and the National Wildlife Refuge System.