



the Swamp Scene

friends of great swamp national wildlife refuge

ISSUE SIXTY NINE
JULY 2022

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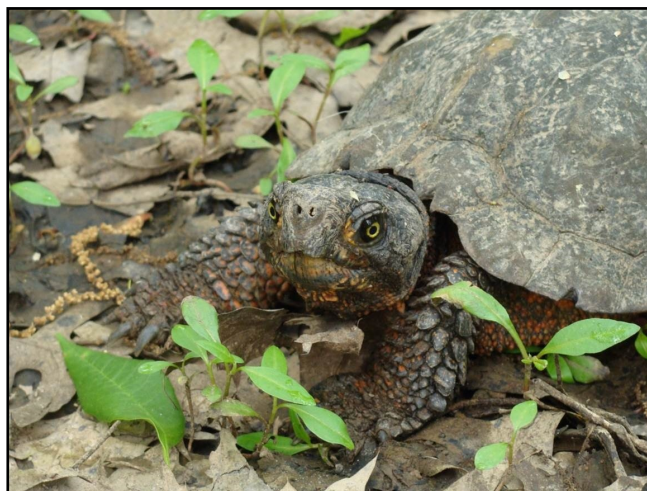
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WOOD TURTLE RECOVERY AT GREAT SWAMP NATIONAL WILDLIFE REFUGE Where We Are After Sixteen Years

By Colin Osborn, Kurt Buhlmann, Jim Angley

This article summarizes the results of our Wood Turtle Population Recovery Project from its inception in 2006 through its last full season in 2021. The 2022 season, which is in progress, will be summarized upon completion, likely in an early 2023 edition of this newsletter.

In May of 2006, a female wood turtle was found dead on a road within Great Swamp National Wildlife Refuge (refuge). Prior to that, over a decade had passed since one had been confirmed there. Wood turtle status on the refuge was uncertain, and their prospects did not seem promising. But shortly thereafter, in a surprising twist of fate, a newly-acquired property containing an abundance of suitable habitat



led to the discovery of a small population that had been able to persist, in part due to its secretive location where it was likely able to go undetected by poachers and illegal collectors. The population that was present consisted almost entirely of old adults; specifically, 8 males and 18 females. With almost no younger age classes documented (subadults or juveniles), there were basically no prospects to take the places of those “founder” individuals when they inevitably passed on. Our excitement at reconfirming the presence of wood turtles and turning up a new population at Great Swamp eventually turned to worry as we realized we were dealing with a “ghost population.” Ghost, or “relict” turtle populations, comprised of mostly old adults, give the perception that all is fine, because these individuals may be observed on the landscape for many years.

To ensure the persistence of this population, and ultimately the species on the refuge, we needed to begin forming those younger age classes. Our first course of action was to protect the nests of every female we could, so their eggs, if viable, at least had a chance to develop into hatchlings. We suspected that an abundance of meso-predators—such as raccoons, foxes, and skunks—were largely to blame for why we were not encountering any young individuals. To complicate matters further, nesting habitat was limited, and an area where we observed several females attempting to nest in 2006—old, unoccupied farmland—was being threatened with development in early 2007.

Continued on page 2

WOOD TURTLE RECOVERY *(continued from page 1)*



Colin, Kurt and former Great Swamp bio-tech Susi Ponce holding eight of the founder males and females before they were released with new transmitters in June 2007.

In order to assure the females had a place to nest later that spring, with the help of then-Watershed Biologist Mike Horne and a backhoe, we constructed an artificial nesting mound on refuge property in a field across the stream from the old farm nesting site. In order to familiarize the females with the new mound, when they were gravid and their eggs felt hard, we carefully hand-carried them to it, so they could at least give it a try if they felt so inclined. Different females took different degrees of convincing, but most eventually acclimated to it. At one point, we even had an unmarked female—one that we had never seen before—show up and nest. Over the first four years of its usage (2007-2010), 142 hatchling wood turtles were produced on the artificial nest mound with eighteen others from nests not on the mound.

After hatching each fall, these quarter-sized babies were individually marked and “directly released” in appropriate nursery habitats throughout the site. However, we failed to recapture nearly any of these individuals in those subsequent years. We note that under natural conditions, hatchling turtle

survivorship is low. But that is really not a problem if the adult population is robust, if adult survivorship is high, and a juvenile or two is reaching maturity each year or so. But a depleted old adult population cannot be rebuilt that way.

Without seeing a return in the efforts we were expending, we began to

question whether all of our hard work was just for naught. Time was unfortunately not a luxury we had, so we couldn’t afford to just wait and see; we needed to come up with a Plan B. Hence, “head-starting”.

The concept is simple. Rear hatchlings indoors for nine months (September-May) and feed and protect them. Left in the wild, they would normally be snacks in the environment, not getting much bigger, and trying to survive their first winter in hibernation. After those nine months indoors, hatchlings can attain the size of a four year-old wild turtle. The larger size reduces the suite of predators that can prey upon them such as northern water snakes, bullfrogs, largemouth bass, crows, and others. This gives them a “head-start” over their wild counterparts. These head-starts were also large enough to handle radio transmitters with a one year

battery lifespan. We fitted all 22 head-starts from the 2011 cohort (the year we initiated head-starting) with transmitters. After release in June 2012, at least 12 of the 22 (54.5%) survived their first year in the wild—a marked increase over the estimated 10-25% of wild hatchlings that survive their first year.

Every successive year since then, each surviving individual from that first 2011 cohort has been given a new transmitter so it could be continuously radio-tracked. Fast forward a decade and four of them (18.2%) are still alive.

Over those 10 years, there have been 279 head-start hatchlings released back on the refuge. A total of 68 (24.4%) were re-encountered alive in 2021 alone. On the other hand, over the entirety of the project (2006-2021), there have been a total of 202 direct-release hatchlings—but only four of them (< 2%) have ever been recaptured. Currently, two of those individuals (both males; one a 2009 direct-release and the other a 2011 direct release) are being radio-tracked). *(continued on page 3)*



All 22 of the first (2011) cohort of head-starts, fitted with radio-transmitters, just prior to their release back on site in late May 2012. Photo by Kurt Buhlmann

WOOD TURTLE RECOVERY *(continued from page 2)*

Clearly, head-starting is producing the increased survival results we had hoped it would and is helping to rebuild that conveyor belt towards adulthood that was missing. And more importantly, it is beginning to produce sexually mature individuals—and at a very critical time—because of the aforementioned eight male and 18 female “founder” individuals, none of the old males and only five of the old females (27.8%) are known to still exist. Remember, these were old individuals when we found them many years ago—so had we not discovered this population back then and began trying to bring it back to life, it would be nearly gone today. After 16 years of effort, including 10 years of head-starting, we have at least nine females of breeding age (the aforementioned five old adult “founders” plus four head-starts [two 2011 and two 2012]) and at least eight males: the two previously-mentioned direct-releases, five head-starts (two 2011 and three 2012), and one old adult male who emigrated into our site. More about him later!

So even with this monumental amount of effort, we are still playing “catch up” and trying to get back to the original numbers of adults we had at the site in the early years. You may be thinking, 202 direct-releases and 279 head-starts released over all of those years and they haven’t even been able to break even with the number of adults? Is all of this even worth it? Yes—we believe it is, in order to ensure the persistence of wood turtles on the refuge.

First, wood turtles take about as long as humans to mature—often 14 to 16 years, although head-starting may be



Our first documentation of two head-starts mating: 2012 head-start male M507 (left) and 2014 head-start female F4034 (right), found in October 2021.
Photo by Colin Osborn

shortening that duration. So, it’s very easy to destroy a population (say, by illegal collecting of the adults) but very hard to rebuild it. And second, turtle conservation is an ultra-marathon, not a sprint, and we’re still in the early stages of that very long race. To put things in perspective, a similar North American turtle recovery project involving head-starting gopher tortoises in the Southeast, another project of co-author Kurt Buhlmann, considers a population to be self-sustaining if it consists of about 200 adult individuals. Our wood turtles are moving in the right direction, but using the aforementioned recovery benchmark as a ballpark target, we still have a long way to go and many more years of effort before we reach our goal of making this population self-sustaining and viable for the long term.

Despite that extensive reach, we remain faithful and optimistic. We’re at an extremely critical turning point now. We have cohorts of head-starts lined up, basically in the

“queue” preparing to reach sexual maturity and bump up those adult numbers—and begin reproducing themselves—to further boost the suites of future head-start cohorts. This year (2022) we expect two more of our 2012 cohort females and up to three 2013 cohort females to “come on line,” and next year there should be three or more 2014 cohort females, the following year it could be five or more 2015 cohort females, and so on. All of our hard work and investment into this population over the past decade is

about to pay consistent annual dividends into the future. And yes, we have many more years of hard work ahead of us, but each year moving forward should be just a tiny bit easier than the last. To sum up our strategy, slow and steady is how we win this race.

In order for the effects of our population augmentation actions to be maximized, we have to routinely care for the wood turtle site as well. To accomplish this, we rely on refuge support for help with various crucial habitat management actions and help from Friends volunteers. *(continued on page 4)*



Founder female F12, our most productive female since the beginning of the project, on the nest mound.
Photo by Kurt Buhlmann

WOOD TURTLE RECOVERY *(continued from page 3)*

Refuge staff conduct annual winter mowing of the fields that provide critical terrestrial habitat used by wood turtles during their active season. Volunteer help comes from Friends board member John Berry and his team who remove invasive plants that threaten to degrade this vital habitat. Collaboration with refuge neighbors through education and outreach, to minimize lawnmower accidents for example, has been and will continue to be implemented to reduce unintentional mortality.

Last April, something unexpected happened. We made a surprising discovery when an old adult marked male showed up at our site. However, his notch code, M207, was not one of our numbers, and we were baffled about where he could have come from. Was he one of the individuals marked and radio-tracked on the opposite end of the refuge by a graduate student in the mid-1990s? Or one of the first ones ever marked here in the 1970s



Co-author Jim Angley holds Male M207 on the day this wood turtle was found at the refuge site in late April 2021.

Photo by Colin Osborn

by Rutgers researchers at another separate site? None of the codes used for any of those individuals back then matched up though. So we reached out to the staff at New Jersey Division of Fish and Wildlife's Endangered and Nongame Species Program. They maintain a database of all wood turtles marked in the state, and they were able to confirm his origins.

M207 was marked two years prior at a separate preserved property along a completely different but connected waterway, over four miles away. It was an area known to contain a small population in the 1990s, but the habitat quality has decreased over the years. So it was no surprise to us that he seemingly vacated this site, likely in search of better habitat and more females, but it was quite the surprise that he moved as far as he did, and found our population. We attached a transmitter to him and tracked him regularly throughout the season. Not only did we note him routinely moving upstream and downstream throughout the majority of our site, but we also found him mating with several of our founder females. His presence was a welcome addition to the site for many reasons, but the increase in genetic diversity he is now providing is surely the most significant.

Over the years we have noted several of our founder females traveling a mile upstream when gravid to search for a nest site. We've noted two of our young adult male head-starts, a 2011 and a



Colin with Male M207 and founder Female F24 after they were found mating in mid-May 2021. Photo by Jim Angley

2012, move about a half mile and a mile, respectively, seemingly looking to establish territories in their own areas of the stream. There is a hierarchy in wood turtle populations where the oldest and most dominant males control the prime portions of the stream where the greatest numbers of females reside. When young males reach maturity they are typically driven from these prime areas, often forced to venture significant distances to find and set up their own territories. We've had several individuals even venture into a different nearby stream altogether. And in addition to M207, about six years ago, Dan Hannon, turtle project field technician at the time, found an old adult female, possibly from the same home site as M207, crossing a gravel road within the refuge. We attached a transmitter to her and tracked her for two seasons, during which she moved over 2.5 miles, also found the stream in which our population resides, and nearly made it there. She unfortunately died during hibernation after choosing a questionable hibernaculum in a backyard pond; one of the many risks

(continued on page 5)

WOOD TURTLE RECOVERY *(continued from page 4)*

involved with making these long-distance journeys into unfamiliar territory. It is truly a gamble when they choose to make these ventures; but it also speaks to how great the reward is if they are successful, as they are literally willing to bet their lives on it.

In conclusion, thanks to another very kind and substantial donation from the Friends of Great Swamp, our efforts on this project are going full strength in 2022. The nesting output from our females last year was unfortunately low, as was their success, giving us only eight hatchlings, the lowest number we have had in our 15 years of protecting nests. But all of them survived and grew substantially during their nine month stay at Bristol County Agricultural High School, and were released back on site this spring.

This spring, for the second year in a row, we conducted our early-season stream surveys, which were exceptionally successful, and once again enabled us to account for many non-radioed head-starts. In response to these excellent results, we have had discussions with refuge staff about surveying other suitable streams on the refuge, especially ones that may have remnant, relict populations and ones that had historic populations. This would not only allow further documentation of the status of the species on the refuge, but could also

present additional potential opportunities for population recovery projects and genetic diversity. Marking individuals from other sites would also allow confirmation of their origins and could provide valuable migration data should they show up at our main site (like M207 did), or elsewhere. Even in a worst-case scenario where none of those sites produce results, we still have a small but solid and growing population at our main site. We have proven that turtles are expanding out of this main site into adjacent habitat and additional waterways, and some outsiders are even entering into it, thus having a positive impact well beyond its footprint and across the refuge as a whole.

What started as a small, localized attempt to recover wood turtles at one site has now grown into a much larger-scale effort that is well on its way to assuring the persistence of the species at Great Swamp National Wildlife Refuge and beyond. To have come this far, when just 16 years ago the fate of the species here was unknown and their outlook grim, is an accomplishment that we are extremely proud of.

We would like to take this opportunity to deeply thank the Friends of Great Swamp NWR, who have loyally and very generously supported the project every year since our initiation of head-

starting 11 years ago. Without their steadfast backing, the project would not be anywhere near as successful as it is today. The three of us, and all of the turtles, are forever grateful for their endorsement and we're proud to say that we "get by with a little help from our Friends!"



IT REALLY WORKS!

These two turtles are siblings, both hatched in August 2012. The larger turtle on the top is a head-start turtle and the smaller one below was directly released on the refuge after it hatched. The photo was taken in 2013. Photo by Kurt Buhlmann



HERE'S A GREAT WAY TO KEEP UP WITH REFUGE NEWS & EVENTS

Did you know that the Friends publish a monthly email newsletter called "Happenings"? Each issue brings you current information on upcoming events, recent wildlife sightings and other news about Great Swamp National Wildlife Refuge and the Friends.

It is delivered right to your email in-box each month so you won't miss a thing. You may sign up to receive Happenings from the home page of the Friends website. Sign up and stay in touch.

VOLUNTEERS ARE DEDICATED & GENEROUS WITH THEIR TIME & SKILLS

Listed below are the active volunteers who reported hours from April 1, 2021 through March 31, 2022. There were 117 individual volunteers plus a number of corporate and school groups contributing a total of 15,291.5 hours during that 12 month period. The number in parenthesis is each volunteer's cumulative hours, which is the total number of hours contributed since first becoming a volunteer.

We are continuing to feel the effects of the Covid pandemic. There are fewer opportunities for volunteers at the refuge and important events, such as our annual Fall Festival, have been cancelled for the past two years. However, the situation is improving and we have been seeing an increase in new volunteers this past spring. Volunteers contribute so much to this refuge. It is impossible to thank them all enough for the contributions of their time, their talents, and their enthusiasm. But we try!

Jim Angley (1,230)	Stephen Herdman (1,753)	Christine Pirog (143)
Joann Apgar (439)	Richard Hiserodt (1,257)	Roberto Reisinger (799)
Pete Axelrod (656)	Helen Hoffman (769.5)	George Ross (23)
Joseph Balwierczak (2,003)	Bob Hofmann (639)	Phillip Round (257)
John Baxley (3)	Leo Hollein (7,549.5)	Johnny Roush (695.5)
Jane Bell (758)	Mike Hollein (8)	Tina Roush (679)
Steve Bell (28.5)	Mary Hollein (8)	Nancy Schenck (3,549)
John Berry (2,484)	Greg Hunter (RV Volunteer) (79)	Judy Schmidt (7,914.5)
Brenda Bourassa (352.5)	Jill Hunter (RV Volunteer) (76)	Robert Schwaneberg (344.5)
Barry Bowman (1,038)	Dave Katz (1,270)	Ginnie Scott (183.5)
John Breault (676.5)	Susan Katz (205.5)	Mark Shoengold (58.5)
Lee Brush (235.5)	Neil Klingenburg (908)	Gina Smith (337)
Tom Cartwright (1,083.5)	Bill Koch (683.5)	Tom Smith (783.5)
Teri Catalano (682.5)	Murali Krishna (136)	Bill Smullen (257)
Bill Craine (RV Volunteer) (1,360)	Terry Kulmane (2,589.5)	Dorothy Smullen (4,011.5)
Rena Craine (RV Volunteer) (693)	Lorrie Lane (435)	George Solovay (4,873)
Gina Dekens (17.5)	Paul Lauber (828.5)	Margaret Southwell (231)
John Dekens (18)	Peter Lebovitz (227)	Kent Stevens (414)
Jim DeTizio (1,734.5)	Robert Lin (382.5)	Elaine Taub (812.5)
Judi DiMaio (2,074)	Randy Little (26.5)	Gail Vollherbst (9)
Randi Emmer (9,792.5)	Sean Lyons (64.5)	Mir Vyas (28)
Corinne Errico (633)	Lynne Marquis (353.5)	Mary Jane Walsh (654.5)
Nancy Felicito (1,440.5)	Judy Marsh (275)	Esther Warner (937.5)
Paul Fenske (1,166.5)	Betty Mills (804.5)	Martha Wells (2)
George Fricke (17)	Evelyn Morton (140)	Pat Wells (2)
Jim Gilbert (54.5)	Bridget Mracek (820)	Alex Weng (18.5)
Lynda Goldscheine (168.5)	Jim Mulvey (1,117)	Elaine Weyuker (205)
Charles Gould (276.5)	Robert Muska (518)	Dennis White (53)
Laurel Gould (11,253.5)	Bonnie O'Connor (97)	Barbara Whitmore (650.5)
Ellen Greenhorn (590)	David Ogens (12.5)	Kathleen Willwerth (605)
Steve Gruber (1,869.5)	Brian Osborn (192.5)	Walter Willwerth (2,496.5)
Rita Guibert (56)	Claudia Osborn (250.5)	John Wilmot (2,452.5)
Tom Gula (1,807)	Colin Osborn (397.5)	Christopher Wilson (8)
Jim Halsey (1,077.5)	Peter Osborn (261)	Peggy Wilson (19)
Mary Beth Hansbury (391)	Tom Ostrand (250.5)	Carl Woodward (756)
Lois Harold (719)	Candace Paska (998)	Kathy Woodward (10,912)
Anne Hebenstreit (713)	Guy Percival (38)	Meg Zaleski (65.5)
Matt Heiss (1,739)	Jennifer Percival (22.5)	
Greg Henderson (1,457)	Gail Petrillo (270.5)	

VOLUNTEER MILESTONE AWARDS

Although every volunteer hour is appreciated, there are certain milestones that receive special recognition.

Milestone awards include a Blue Goose Name Tag (100 hours), Milestone hour pins, perpetual plates on the 500 hour Honor Board and a "blue goose" for every 1,000 hours on the Blue Goose Honor Board.

100 HOUR CLUB

Murali Krishna, Colin Osborn,
Christine Pirog

150 HOURS

Lynda Goldschein, Colin Osborn,
Ginnie Scott

250 HOURS

Judy Marsh, Claudia Osborn, Colin
Osborn, Tom Ostrand, Phillip Round

500 HOURS

Rena Craine, Paul Lauber, Betty Mills,
Robert Muska, Tina Roush

1,000 HOURS

Jim Angley, Barry Bowman, Tom
Cartwright, Bill Craine, Jim Halsey,
Richard Hiserodt, Dave Katz

1,500 HOURS

Judi DiMaio, Tom Gula, Matt Heiss

2,000 HOURS

Joe Balwierczak, Judi DiMaio,
Terry Kulmane

2,500 HOURS

Terry Kulmane

3,500 HOURS

Nancy Schenck

4,000 HOURS

Dorothy Smullen

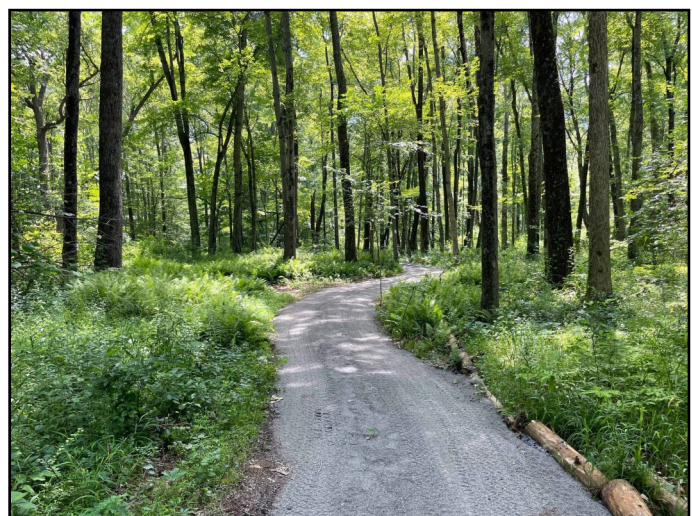
4,500 HOURS

George Solovay

WHITE OAK TRAIL IMPROVEMENT PROJECT—PROGRESS REPORT



Phase II of the White Oak Trail renovation project, a distance of about 1,700 feet, is nearing completion. By the end of September this section of the trail will be reopened. Phase II entailed widening two bridges to seven feet, installing numerous drainage culverts, adding underlayment, and the spreading of 80 tons of stone dust on long stretches of trail. A new section of boardwalk and a deck overlooking a vernal pool will also be constructed. This work is being done by ten volunteers of the Friend's Construction Crew, and funded by Friends and U.S. Fish & Wildlife. Work on Phase III, the last 1,700 feet of the trail, will begin in Spring 2023.



RED FOXES BREED IN GROUNDHOG DEN

By Leo Hollein, GSNWR and Friends Volunteer

This Spring, to the delight of visitors and photographers, red foxes (*Vulpes vulpes*) bred in the groundhog den (*Marmota monax*) on the septic mound at the recreational vehicle (RV) site near the South gate, easily visible from Pleasant Plains Road. The foxes had five kits.

Red foxes use burrows during the breeding season. They can excavate their own burrows as well as using burrows dug by other animals. Some fox dens in the refuge are under buildings or sheds. Outside the breeding season, most red foxes live in the open, in densely vegetated areas. The refuge has an abundant red fox population.

Red fox kits can be friendly towards people and become acclimated to humans. Please avoid close contact.

And **never** feed kits or adult foxes.

Foxes are a common predator of groundhogs in the refuge, as well as coyotes, bears, and eagles. However despite the presence of the breeding foxes, groundhogs remained in the area. After the foxes left, the groundhogs appeared more often near their den.

Groundhogs are excellent at tunneling. They use their dens or burrows throughout the year for safety,



Two of the five fox kits with their mother on the septic mound. Photo by Chuck Hantis

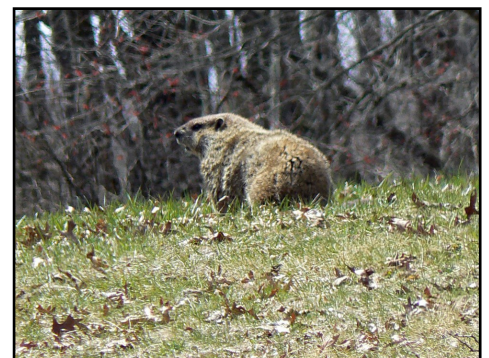
breeding and hibernation. Groundhogs create a burrow that has rooms for sleeping, rearing young, and hibernating. Their burrows can reach five feet in depth. There are typically multiple burrow openings or holes. The photo below shows a main entrance and smaller holes. A groundhog atop the septic mound is shown at right.

Groundhogs are the largest members of the ground squirrel or marmot family. An adult weighs between five and 12 pounds. Groundhogs are vegetarians. Their diet consists predominantly of grasses and plants as well as fruits and tree bark. Groundhogs are the bane of many a gardener as they can decimate a vegetable plot overnight.

Groundhogs are one of the few species that truly hibernate. Groundhogs hibernate from three to five months in the refuge depending on the weather conditions. Groundhogs emerge from hibernation with some remaining body fat to live on until the warmer spring weather produces vegetation for food.

Their hibernation trait likely gave rise to the popular American custom of Groundhog Day that is held on the second of February every year. Tradition dictates that if a groundhog sees its shadow that day, there will be six more weeks of winter. Such a prediction seems senseless in New Jersey as we always seem to have at least six more weeks of winter weather after early February.

Look for the groundhog burrow and possibly a groundhog as you pass the RV site septic mound on Pleasant Plains Road.



Groundhog atop septic mound on Pleasant Plains Road.



THE GREAT SWAMP OF NEW JERSEY REVEALED BY NJ PBS

Reprinted from NJ PBS Blog, June 15, 2022

Treasures of New Jersey is an original NJ PBS documentary series that features the Garden State's most iconic places, from historic landmarks and cultural centers to popular destinations. It was so exciting to learn that Great Swamp National Wildlife Refuge had been selected to be a featured "treasure". This half-hour program covers a lot from history and geology to present day refuge management and Friends volunteers. Although it aired on June 29, 2022, the program is available for viewing from njtvonline.org or from the home page of the Friends website. Read about the program in this excerpt from their Blog. Enjoy!



The Great Swamp National Wildlife Refuge stretches across southern Morris County, from Chatham to Basking Ridge, and is just 26 miles from New York City. Countless species make their homes within its more than 7,700 acres, and hundreds of volunteers are partnering with the U.S. Fish and Wildlife Service to make it more accessible for years to come. Its miles of trails include boardwalks that make it possible to hike across the watery ground and see wild creatures up close.

The history of the Great Swamp intertwines geology, biology and human culture. The water basin it covers formed about 25 thousand years ago as the Wisconsin glacier was melting. It left behind the prehistoric Lake Passaic, which covered 300 square miles. Beginning at least 12,000 years ago, Indigenous peoples including the Lenape and their ancestors used the Great Swamp for hunting, fishing and to grow food.

In modern times, the Great Swamp came under political and public scrutiny when it was targeted as a site for a jetport in the 1950's. Environmentalists and community members raised one million dollars to purchase 3,000 acres here to block that development and give the land to the federal government. In 1968, Congress designated the eastern half of the refuge as the first national wilderness area on Department of Interior lands.

In the decades that followed, volunteers from the organization Friends of Great Swamp and the U.S. Fish and Wildlife Service staff have worked together to make the refuge a success. It is a critical stopover area for migratory birds and is called home to a wide variety of species including turtles, fox,

owls and amphibians. The western half of the Great Swamp National Wildlife Refuge is carefully managed to create and maintain habitat that might otherwise have vanished.

"This is one of the few places in New Jersey that is wilder now than it was 50 years ago," says Friends of Great Swamp board member Kathy Woodward in the film.

The Friends, working with other volunteer and corporate organizations, have built and extended trails that allow people into and across the swamp's often muddy terrain. The trails are one of the Great Swamp's biggest volunteer projects and part of a long legacy of volunteer action here, one that includes making the refuge accessible to all and a place of learning and inspiration for all ages.

Such accessibility is a change in philosophy from traditional thinking. Wildlife Refuge Specialist Jared Green explains in the film, "Wildlife refuges were a place that were kind of closed off. They were meant strictly for wildlife protection. We've realized in recent years (that) we need to make people aware of our national wildlife refuges so that they can develop an appreciation for the refuges, come out and enjoy them in whichever way that they choose."

One example of that accessibility is welcoming young people to the refuge, many of whom go there to experience wilderness for the first time in their lives.

"One of my favorite parts of my job," Green says in the film, "is doing our environmental education and outreach work with urban youth."



WATER ENOUGH FOR EVERYONE

By Jack Donohue

Our country has a water imbalance
States have too much or not near enough
So how can we share water efficiently?
To get a state water when things get too rough.

This is not an insurmountable problem!
We address it now with simple conventions
With fire hydrant networks to disperse water locally
And large reservoirs for regional water retention.

Today entire regions need water
The southwest is suffering worst of all
Forest fires rage throughout California
Lake Mead's water level continues to fall.

We know how to solve this dilemma.
The solution is quite close at hand
We don't have to search for more water
It already exists for us to command.

Many states have water in excess
The Pacific Northwest has water to spare
Gulf coast states will donate hurricane water
The east coast has storm water to share.

New Jersey would be happy to donate
The Passaic River has water in excess
Manville and Bound Brook would contribute
Many shore towns would gladly acquiesce.

So, if we choose to solve the problem
Given the water we need is at hand
Let's find a way to make it happen
To save what's left of our parched precious land.

Man has laid thousands of miles of pipeline
To funnel oil from Russia to Singapore
Why can't we do the same thing with water?
And distribute excess water from the rich to the poor.

When we see the high price of gas
Our reaction is to gasp and recoil
But if we make a simple comparison
Isn't water much more precious than oil?

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
32 Pleasant Plains Road, Basking Ridge, New Jersey 07920

ANNUAL MEMBERSHIP APPLICATION

☐ **EASTERN BLUEBIRD—\$15-\$49**

☐ **PAINTED TURTLE—\$50-\$99**

☐ **RIVER OTTER—\$100-\$249**

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We need more Friends ...

**Become a Friend Today—or,
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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
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Basking Ridge NJ 07920

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THE SWAMP SCENE JULY 2022

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.