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Again, we thank Catskill Hudson Bank!

The Delaware Valley Eagle Alliance

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- Right Bottom © Ken Bohn, SDZG Photographer



Tripod Rock (front and back views) © Yoke Bauer DiGiorgio, Photographer

HIKING PYRAMID MOUNTAIN

Located in Morris County New Jersey, Pyramid Mountain Natural Historic Area is over 1,500 acres and includes nearly 30 miles of marked trails. It provides opportunities to experience expansive views from flat-topped ridges, visit glacial erratics, see waterfalls and observe wetlands. The highest point in the park is 934 feet with a magnificent view of the New York City skyline.

Visit the Pyramid Mountain Visitor Center to experience a variety of interactive educational exhibits about the history and wildlife of the area, including the Lenape Indians and early European settlers, habitats, and how the Wisconsin Glacier shaped the land. Amazing photography featuring the park and its inhabitants in each of the four seasons adorns the walls. Use the sound board exhibit to listen to recordings of local wildlife, or touch real natural and historical artifacts found on site. Enjoy observing the live insects and trying crafts and games.

The Visitors Center is also a starting point for the loop hikes. The trail system here is good for beginning hikers, but interesting enough for experienced hikers. Easily visible when hiking the trails, are the unusual glacial erratics, such as the park's most popular feature - Tripod Rock, a 180-ton boulder balanced on three smaller boulders deposited by the Wisconsin Glacier over 18,000 years ago. Also, located nearby is Bear Rock, one of New Jersey's largest glacial erratics.

The flat-topped ridges and narrow valleys in the park are not only beautiful, but also vital in the water cycle, feeding downstream reservoirs, supplying needed aquifers, and supporting flora and fauna.

Digital trail maps are available online; Pyramid Mountain Natural Historic Area is included on the Jersey Highlands Trails map set

RESOURCES:

<https://www.nynjtc.org/park/pyramid-mountain>
<http://morrisparks.net/index.php/parks/pyramid-mountain-natural-historic-area/>

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Dave Numer taking a group of students on a geology hike.

© Olivia Miseroy, Photographer

DEVIL'S PUNCHBOWL MOUNTAINS MEET THE DESERT

by Dave Numer

Regional Park Superintendent, Los Angeles County Fish & Game Warden

Remarkable and critically important, the Devil's Punchbowl is a natural area, where mountains meet the desert. Located within the San Gabriel Mountains National Monument and Angeles National Forest, I am so fortunate to have been able to spend the last 43 years of my working life here.

Growing up on the edge of the Mojave Desert was an exciting experience. My sister and I would hike most of the day across the open desert plains to reach rocky butte hills that climb a thousand feet higher than the surrounding terrain. Our mother gave us strict instructions that we could hike the desert as much as we wanted but we must be back home for dinner and "we must never hike toward the highway because it was dangerous". People would often ask me, "so what about the dangers of the desert - the Mojave Rattlesnakes, scorpions, coyotes, and tarantulas? But my Mom was certain that the fast moving traffic of the nearby highway was a much greater threat. As I grew up, I saw her wisdom because all these creatures were only interested in avoiding danger, and thus trying hard to avoid contact with humans.

From where we lived we could look south at the majestic snowcapped San Gabriel Mountains which climb to 10,064

feet in elevation. The Devil's Punchbowl sandstone slabs appeared as great white flakes protruding from the side of the mountain range. It was my love of plants, animals and geology that drew me to this site. In 1974 at the age of 24, I was blessed to become the caretaker/guardian of this special creation. I soon learned that my love of people would also play a great part in this profession

Established in 1963, the Devil's Punchbowl County Park now includes 1,310 acres. The most visible features of the Park are geological. The Punchbowl is a deep canyon cut by the runoff of large quantities of water from the higher San Gabriel Mountains occurring over millions of years. The Park's Nature Center is located at 4,740 feet above sea level and the Punchbowl Canyon is 300 feet deep below the vista point.

The primary attractions of the Devil's Punchbowl County Park are its geological formations. The peculiar "up-tilted" rock formations occurring throughout the entire area are layers of sedimentary rocks that were formed long ago by the depositing of loose material in horizontal layers by water. Later they were squeezed into their present steeply-tilted form by the continuing action of uplift along the

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© Yoke Bauer DiGiorgio, Photographer

Looking into the Devil's Punchbowl you can see the sandstone edges of the formation have been folded upward, and the center has dipped.

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DEVIL'S PUNCHBOWL MOUNTAINS MEET THE DESERT

Punchbowl and Pinyon Faults and pressures along the San Andreas Fault. The Punchbowl Fault is to the south of the rock formation while the Pinyon and San Andreas Faults are to the north.

Plants contribute greatly to the particular "look" of the landscape of an area. I continue to be amazed as I drive from my home up to the Park's Nature Center by the distinctive changes in the landscape. Further down in the flat-lands of the Antelope Valley there is an almost a complete absence of large shrubs or trees. The road then climbs into a belt of Joshua Trees and California Junipers. As I enter the Park boundaries, the Joshuas are left behind and I enter a region dominated by Pinyon Pine Woodland, with shrubs of the Desert Chaparral as an understory. The streambeds, both of the Punchbowl Creek at the bottom of the bowl and the other watercourses down in the Antelope Valley, have their own type of vegetation with cottonwoods, willows and other plants that required more water. The next plant community above is the Coulter Pines and Yellow Pine forest of the higher San Gabriel Mountains. Above these trees you

can see the White Firs silhouetted against the sky on the high slopes and peaks.

Many types of mammals live here but most are nocturnal. Over the course of my many years here, I have observed gray fox in the early mornings and at dusk and deer crossing the road. Chipmunks and California ground squirrels are active during most of the day and much more abundant in number. Many additional species migrate through the area at various times of the year.

The reptile and amphibian fauna of the Park represents a unique blend of the types found in the deserts and in the mountains. Rattlesnakes are a common inhabitant but are leery of people and are rarely encountered. Insects and spiders are seasonally abundant. They may be seen on flowers and shrubs throughout the park, especially during the spring and summer.

Educating the visiting public to the wonders of each creature and marvels of the geological forces around us has been a passion for me. At the Nature Center, we focus on the flora, fauna, and geological features of the Park. We also offer school programs, parties, guided park tours, as well as telescope programs. I found that after 43 years of service, I am continually being renewed by a feedback loop. I share my excitement only to be nourished by our excited visitors. Our visitors include students and adults from this region, as well as, from all over the world.

To get a closer look at the many natural features of the Park, we encourage visitors to take a walk on the trails. The self-guiding "Pinyon Pathway" trail is about a third of a mile and only takes a few minutes to read the brochure and walk the trail. A one mile "Loop Trail" is longer and quite strenuous with a 300 foot elevation drop into the canyon and

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© Jonathan Numer, Photographer

Devil's Punchbowl Sandstone Formation - the edges of the formation have been folded upward.

DEVIL'S PUNCHBOWL MOUNTAINS MEET THE DESERT



Top: © Yoke Bauer DiGiorgio, Photographer
Center: © Yoke Bauer DiGiorgio, Photographer
Bottom: © www.devils-punchbowl.com

Top: Punchbowl Nature Center; *Center:* Loop Trail information; and *Bottom:* Rock formations visible on one of the trails.

back to the top above the picnic area and parking lot. A much longer trail to the Devil's Chair and the eastern canyons of the park is also available. This trail is 3.7 miles to the Devil's Chair or about 7 1/2 miles round trip and approximately 4 hours hiking time.

We protect that which we understand and love. Being able to educate and share my passion and love of this unique and amazing area with others continues to be such a rewarding experience. The Devil's Punchbowl, the variety of the Southwest deserts and mountains are treasures for all of us to enjoy and protect. **And what a great variety it is!**

For More Information:
www.devils-punchbowl.com

MORE ABOUT THE GEOLOGY

The **Theory of Plate Tectonics** has done for geology what Charles Darwin's theory of evolution did for biology. It provides geology with a comprehensive theory that explains "how the Earth works." The theory states that Earth's outermost layer, the lithosphere, is broken into 7 large, rigid pieces called plates: the African, North American, South American, Eurasian, Australian, Antarctic, and Pacific plates. Several minor plates also exist, including the Arabian, Nazca, and Philippines plates.

The plates are all moving in different directions and at different speeds (from 2 cm to 10 cm per year--about the speed at which your fingernails grow) in relationship to each other. The plates are moving around like cars in a demolition derby, which means they sometimes crash together, pull apart, or sideswipe each other. The place where the two plates meet is called a plate boundary. Boundaries have different names depending on how the two plates are moving in relationship to each other.

Places where plates slide past each other are called transform boundaries. Transform boundaries are marked in some places by linear valleys along the boundary where rock has been ground up by the sliding. In other places, transform boundaries are marked by features like stream beds that have been split in half and the two halves have moved in opposite directions.

Perhaps the most famous transform boundary in the world is the San Andreas fault. Although transform boundaries are not marked by spectacular surface features, their sliding motion causes lots of earthquakes. The strongest and most famous earthquake along the San Andreas fault hit San Francisco in 1906.

Mountains, earthquakes, and volcanoes form where plates collide. Millions of people live in and visit the beautiful mountain ranges being built by plate collisions. For example, the Rockies in North America, the Alps in Europe, the Pontic Mountains in Turkey, the Zagros Mountains in Iran, and the Himalayas in central Asia were formed by plate collisions.



© Michael Fort, Photographer
San Andreas Fault (running through center of photograph top to bottom) and Punchbowl (upper center circular area) taken from an airliner.

The Devil's Punchbowl is a fascinating display of geological forces.

The Devil's Punchbowl is a large sandstone syncline (a fold in the rock where the axis dips caused by horizontal compression), where the edges of the formation have been folded upward, and the center has dipped. The sandstone of the Devil's Punchbowl Formation was deposited about thirteen million years ago into a basin. This basin was not under water but was filled by terrestrial stream deposits flowing from the north/west.

Continuous faulting and erosion over millions of years have been the major forces in creating the impressive structure now seen in the Devil's Punchbowl. Vertical movement on the Punchbowl Fault raised the San Gabriel Mountain block. It took more than a million years to accomplish the vertical relief seen today.

To learn more click on link:
<http://www.devils-punchbowl.com/pages/nhistory/geology/geology1.html>

RESOURCES:
www.devils-punchbowl.com
<http://www.cotf.edu/ete/modules/msese/earthsysflr/plates3.html>



Coastal sage scrub, a globally imperiled ecosystem, is a key focus of San Diego Zoo Global's Plant Conservation efforts.

© Ken Bohn SDZG Photographer

SAVING SEEDS, SAVING THE FUTURE

by Wendy Perkins
Staff Writer, San Diego Zoo Global

In 2016, San Diego Zoo Global (SDZG) staff reintroduced 30 species to the wild. That may not surprise those familiar with the conservation organization's focus and efforts. Yet there is a "plot twist": 22 of those species were flora, not fauna.

San Diego County is recognized as a biodiversity hotspot with more than 1,500 native plant species; 83 globally imperiled plants occur in San Diego County; 37 species listed as threatened or endangered. SDZG's Native Plant Seed Bank, begun in 2000, aims to conserve the diversity of San Diego County's flora by drying and freezing seed for long-term storage. Each seed collection preserves the invaluable genetic material of thousands of individuals from a plant population. Over 550 such collections, representing over 375 unique plant taxa, reside in the freezers at the San Diego Zoo Global Institute for Conservation Research (ICR) and the Botanical Conservation Center (BCC)—an 880-square-foot straw bale building and a 663-square foot nursery located on the grounds of the San Diego Zoo Safari Park.

The seeds stored in the Native Plant Seed Bank provide insurance against catastrophic loss in the wild, protect against erosion of genetic diversity by habitat fragmentation and loss, offer material for research into germination cues and propagation, and provide material for restoration.



© Joe Davitt SDZG Researcher

*The flower: Dunn's mariposa lily (*Calochortus dunnii*) is found only in San Diego County and northern Baja.*

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SAVING SEEDS, SAVING THE FUTURE

The Plant Conservation team not only carefully collects seed and curates the bank, but also conducts research to develop dormancy-breaking protocols that ensure seeds can be grown as needed.

Seed has been withdrawn from the bank to propagate plants to improve the habitat of coastal cactus wrens and other coastal sage scrub dependent plants and animals. Tecate cypress (*Cupressus forbesii*) seeds have been propagated in order to establish a field gene bank to provide large amounts of seed should one of the three remaining populations in San Diego County be consumed by fire. SDZG Plant conservation researchers also study the best uses of seed for enhancement plantings, including a study of San Diego thornmint (*Acanthomintha ilicifolia*) examining the phenological and morphological differences between populations.

“As a member of the California Plant Rescue partnership, we’ve been working with the City of San Diego and other land managers to gain access and find rare plant populations, monitor the blooming cycle, and eventually make a responsible seed collection,” explains Joe Davitt, a research assistant in the Plant Conservation department. *“We spent many long days in the field, hiking in search of flowering populations of Dunn’s mariposa lily (*Calochortus dunnii*), Orcutt’s brodiaea (*Brodiaea orcuttii*), the tiny (smaller than a penny) short-leaved dudleya (*Dudleya brevifolia*), and other rare and endangered plants, in hopes of collecting viable seeds,”* says Joe. Back at the Beckman Center and the BCC, the seeds are separated from the plant material, cleaned, dried, and sorted.

“Given the importance of their precious contents, seed banks represent an invaluable cornerstone for conservation—we are definitely banking on the future of plants.” Joyce Maschinski, Ph.D, VP of Conservation and Science for CPC and Director of Plant conservation at ICR and SDZG. We are currently working on collecting seeds from nine types of plants that are species of concern, some of which are found in vernal pools. *“We’ll grow some out here for repatriation and restoration in the future,”* explains Joyce. The team is striking while the iron is hot...or in this case while the soil has been soaked. *“The great thing about this past year is that we got so much rain,”* says Joyce. Many species lifecycles are dependent on weather, and the heavy rains over the winter of 2016/2017 have brought to life seeds that have lain dormant for many years. *“We’re finding hundreds of specimens of some species, where as next near we may only see a dozen,”* says Joyce.

In 2016, San Diego Zoo Global announced a new partnership with the Center for Plant Conservation, enhancing both organizations’ efforts to preserve the Earth’s botanical heritage. *“Our goal is to be a global*



Top and Center: © Ken Bohn SDZG Photographer
Bottom: © Joe Davitt SDZG Researcher

Top: Seed collection requires focus and endurance; **Center:** Data on soil type, slope, and surrounding vegetation are also recorded; **Bottom:** *Ceanothus verrucosus*.

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SAVING SEEDS, SAVING THE FUTURE



Dudleya brevifolia has a range as minute as its size: a limited area in San Diego County—and nowhere else in the world!

© Joe Davitt SDZG Researcher

model for plant conservation,” says John Clark, Ph.D., president of the Center for Plant Conservation and Director of Plant Collections and Strategy, Institute for Conservation Research, San Diego Zoo Global. “We are implementing new technology-based initiatives, including advanced conservation genetics, which can be incorporated into the Zoo’s conservation toolbox to save plants.” As SDZG’s Plant Conservation team collects, preserves, and germinates seeds, pieces of habitat are preserved for the future, moving forward in the organization’s goal of ending extinction.

San Diego Zoo Global (SDZG) is a not-for-profit organization headquartered in San Diego that operates the San Diego Zoo, the San Diego Zoo Safari Park, the San Diego Zoo Institute for Conservation Research, and the San Diego Zoo Global Wildlife Conservancy.

The mission of SDZG is to save species worldwide by uniting expertise in animal and plant care and conservation science with dedication to inspiring passion for nature and striving to be at the forefront of wildlife conservation and education.

For more information:

<http://www.sandiegozooglobal.org/>;

<http://zoonooz.sandiegozoo.org/2016/11/29/grow-well-looking-back-moving-forward/>



© Joe Davitt SDZG Researcher

The endangered San Diego mesa mint *Pogogyne abramsii* is found in ephemeral vernal pool ecosystems. However, intensive habitat alteration, off-road vehicles, invasive species, and drought seriously threaten the species.



Female wood turtle on nest mound with radio transmitter.

© Colin Osborn/USFWS, Photographer

CONSERVATION AT THE GREAT SWAMP NWR

Wood Turtle Head-start Program

by Laurel M. Gould

Board Member and Volunteer, Friends of Great Swamp National Wildlife Refuge, NJ

In 2010, the future of the wood turtle (*Glyptemys insculpta*) population at the Great Swamp National Wildlife Refuge in New Jersey was not encouraging. Although Wildlife Biologist Colin Osborn and turtle expert Dr. Kurt Buhlmann had been doing surveys over the past five years, and had discovered a new wood turtle population on the refuge (good news), the individuals that they found were nearly all mature adults – there were almost no young wood turtles (bad news). Even though the females' nests were now being protected annually, which increased the production of wood turtle hatchlings each year, there was no evidence that these juvenile wood turtles were surviving, with predation suspected as the primary reason. Wood turtle hatchlings are very small (slightly larger than the size of a quarter) with soft shells – a perfect snack for everything from raccoons to great blue herons. There simply were no young turtles to ensure the long-term survival of the refuge's wood turtle population.

It was time to try something different. So, in 2011, funded by the Friends of Great Swamp National Wildlife Refuge, the wood turtle head-start program at Great Swamp NWR was launched.

What is a head-start program?

According to Dr. Buhlmann, "head-starting programs for turtles are presumed to give hatchling turtles a better chance

of surviving their first year by keeping them protected from predators while also giving them the chance to grow when they would normally be hibernating." Therefore, more individuals are put on the trajectory to maturity than would normally be expected. The goal of this program is to rejuvenate and augment an existing small population of wood turtles on the refuge.

How does a head-start program work?

For several years, Dr. Buhlmann had been spearheading a new head-start program for Blanding's turtles (*Emydoidea blandingii*) on the Assabet River National Wildlife Refuge in Massachusetts, partnering with the Bristol County Agricultural High School in Dighton, Massachusetts. High school students had been feeding and caring for the Blanding's turtle hatchlings over the winter. The turtles were then released on the refuge in the spring – at the size of wild four-year olds, even though they themselves were only 9-months old. Subsequent recaptures of the head-started turtles indicated that a large percentage continued to survive. Based on this success, Dr. Buhlmann asked if the school would be willing to head-start a number of wood turtles from New Jersey. Needless to say, there were permits to be obtained from the NJ Division of Fish and Wildlife (after all, this is a New Jersey Threatened Species) and the Massachusetts Department of Fish and Wildlife (to allow

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CONSERVATION AT THE GREAT SWAMP NWR

Wood Turtle Head-start Program

the NJ turtles to be sent there). But with these permissions in hand, 22 of 42 hatchlings that were collected from five protected nests in September 2011 were taken to the high school. There, instead of hibernating, they would be fed a diverse diet and kept active all winter. The remaining 20 hatchlings were released at that time on the refuge to forage and hibernate as usual. All of the hatchlings, those that were direct-released as well as the head-starts, were individually marked through a system of notches on the upper shell (carapace).

All 22 of the head-start turtles survived and were brought back to the refuge in May 2012. They were all fitted with radio transmitters for tracking during the season and then released near their respective nest sites. During the summer, biology interns tracked the turtles to provide data on survivorship, behavior, habitat use and home range establishment. The questions included whether they would become established in the same area as the adults and whether they would find suitable hibernation sites in the fall.

Progress and Results

This innovative head-start turtle research program is now in its 6th year at Great Swamp NWR. Results are impressive. In 2013, the team was thrilled to find sibling turtles, both hatched in August 2012 that could be compared side-by-side. According to Dr. Buhlmann, "the larger turtle on the left went to Massachusetts and was fed in the school greenhouse for nine months. The smaller one on the right was directly released on the refuge when it hatched in late August 2012. It did not have much opportunity to grow and simply hibernated to survive the winter. Emerging in the spring, the direct release turtle started growing, but was still a soft pliable snack for predators. The head-started turtle, on the other hand, is much larger and has a hard shell."

Radio-tracking, recapture, and data collection results show that the young turtles are doing the things that are expected of wood turtles. They start foraging immediately upon release and have been observed eating the natural foods found in their environment, specifically snails, slugs, earthworms, and berries. They are setting up home ranges, using the appropriate wood turtle habitat on the refuge, and growing – substantially. Research shows that head-starting advances these turtles on average by about three to four years in size and mass. Tracking shows that the head-start turtles successfully overwinter, often using the same areas in the streams as the adult wood turtles.

From the 2011 to 2015 cohorts (released in spring 2012 to spring 2016, respectively), a total of 152 head-start wood turtles have been released on the refuge. Survivorship numbers are excellent, based on radio-tracking and recapture of individuals and extrapolating numbers for



Top: © Brian Bastarache, Photographer;
Bottom: © Kurt Buhlmann, Photographer

Top: Students Measure Wood Turtles; Bottom: 2012 Siblings

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CONSERVATION AT THE GREAT SWAMP NWR

Wood Turtle Head-start Program



Left: © Kurt Buhlmann, Photographer; **Right:** © Colin Osborn/USFWS, Photographer
Left: Racks and filters at Bristol County Agricultural High School; Right: Wood turtle hatchlings.

the entire population. Dr. Buhlmann notes: "From fall 2007 to fall 2015, we released a total of 227 direct-release hatchlings. To date, we have only recaptured three of them (1.3%). Of the aforementioned 152 total head-starts released to date (through 2016), we documented the existence (recaptured or were actively tracking) 38 of them (25%) in 2016 alone. Those numbers indicate a clear and major survivorship advantage as a result of head-starting.

At the 2017 Endangered Species Day program at Great Swamp National Wildlife Refuge, visitors got to see some of the head-start turtles, including a turtle from the initial cohort (2011) which was beginning to display obvious characteristics indicating that it was a male: a large head, a concave bottom shell (plastron), and a long, thick tail; all indications of the sex of the individual. Research results to date are very promising. With funding from Friends of Great Swamp NWR, the head-start turtle research will continue as there are still unanswered questions, which will require time, continued research, and detailed documentation. The hope is that this head-start concept can be applied to other at-risk turtle species, such as the closely-related,

Federally-threatened bog turtle (*Glyptemys muhlenbergii*).

Wildlife biologist Colin Osborn is thrilled: "Head-starting is clearly doing what we hoped it would by increasing the survivorship of these juvenile turtles which should eventually boost the rate of new adults entering the population and ultimately increase the population size in the long run."

It's hard to imagine a swamp without turtles and Great Swamp NWR has many. Even though it's a common sight, it's still thrilling to view a string of painted turtles basking on a log, or catch sight of the smaller spotted turtles as they emerge from winter hibernation, or watch a female snapping turtle as she lays her eggs.

As a result of this head-start research program, it's possible wood turtles may one day be a common sight for visitors to the Refuge.

Acknowledgements

This innovative head-start turtle research program involves many partners. Thanks to: Friends of Great Swamp National Wildlife Refuge (NJ); Colin Osborn, Fish and Wildlife Biologist, Walkkill River, Cherry Valley, and Great Swamp National Wildlife

Refuges; Dr. Kurt Buhlmann, Senior Research Associate, University of Georgia, Savannah River Ecology Laboratory; Brian Bastarache, Department Chair, Natural Resource Management Department, Bristol County Agricultural High School (Dighton, MA).

About The Great Swamp National Wildlife Refuge (NWR)

Established in 1960 (part of the National Wildlife Refuge System) and located in Morris County, NJ. Today, the Great Swamp NWR consists of 7,768 acres of varied habitats, has become an important resting and feeding area for more than 244 species of birds, and is home to fox, deer, muskrat, turtles, fish, frogs and a wide variety of wildflowers and plants.

In 1966, the National Park Service designated the Great Swamp NWR a registered National Natural Landmark. The eastern half of the refuge was designated by Congress as a National Wilderness Area in 1968. This was the first Wilderness Area on Department of Interior lands. The Wilderness Area provides a more primitive outdoor experience for the general public and serves as an outdoor classroom and laboratory.

RESOURCES / INFORMATION:

www.fws.gov/refuge/great_swamp/
www.friendsofgreatswamp.org/



The healthy, clean waters of the Upper Delaware River are ideal for fish—and anglers!

© David B. Soete, Photographer

COMMON GROUND

by Bethany Keene

Outreach and Development Team Lead, Delaware Highlands Conservancy

We all have one thing in common.

No matter what you celebrate, where you work, what you like to do for fun, or what you believe—there is something we all share. We all need clean water to drink, and clean air to breathe. And it's not just people that need these things. Wildlife—from the smallest fish in the river to the bald eagle soaring overhead—share the same needs.

At the Delaware Highlands Conservancy, our mission is to work in partnership with you—our members and friends in the community (working primarily in the four counties that border the Upper Delaware River—Pike and Wayne Counties in Pennsylvania, and Sullivan and Delaware Counties in New York)—to protect everything that's special about the Upper Delaware River region, now and for future generations. As an accredited land trust, we work with landowners to protect working farms and forests, clean drinking water, safe habitat for

our wildlife, and our sustainable local economies (protecting more than 14,000 acres of forests, farms, and waters in this region).

All of this helps to protect our region's exceptional quality of life: the beautiful scenic vistas; opportunities to get outdoors and connect to nature through hiking, biking, birding, or paddling; and local farms providing fresh, healthy foods.

But it's easy to forget all these things we have in common—or to feel overwhelmed with the challenges the natural world is currently facing. Fortunately, there's something else we all share: the ability to make a difference.

Every day, you make dozens of choices at home and at work, and each one of those choices represents an opportunity to have a positive impact on the natural world. For instance, this summer—will you use fertilizer on your lawn or will you allow your property to have a variety of plants for pollinators and wildlife? Do

you mow right up to the edge of a pond or stream or do you allow for a buffer to capture and clean the stormwater before it enters the stream? Do you allow the rain to simply run off your property or do you collect rain from your gutters using a rain barrel?

Addressing any one of these issues could help prevent your local stream, river, lake, or wetland from becoming polluted and reduce the amount of water you use. And if you would like to calculate your savings, visit mydelawariver.clearchoicescleanwater.org to enter your actions and put yourself on the map. You'll be able to see exactly how many gallons of water you saved or pounds of algae you prevented.

For landowners who want to ensure their cherished farm or forest is protected for future generations, no matter who owns the property, you also have the opportunity to work with the Conservancy to permanently protect your land with a tool known as

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PROTECTING YOUR LAND
About Conservation Easements
(excerpts from: www.delawarehighlands.org)

A conservation easement is a voluntary but legally binding agreement between a landowner and an accredited land trust, such as the Delaware Highlands Conservancy (Conservancy), to permanently protect a portion (or all) of a land's natural value.

Not only is there personal satisfaction and peace of mind from conserving your property for future generations, but there may be financial benefits for landowners who donate a conservation easement. These benefits may include a federal tax deduction, an estate tax reduction, and in the case of a New York State property, a NYS Property Tax Credit.

The Conservancy works with the landowner to craft a flexible agreement that will protect the core conservation values of the land, yet be adaptable to future needs. This legacy is recorded in the property deed and the Conservancy agrees to work in partnership with the landowner and future landowners to ensure the terms of the agreement are met, forever.

Conservation Easements ensure that:

- The land remains in private ownership (landowner retains title and pay taxes);
- Scenic character, wildlife habitat, water quality, and agricultural and forestland productivity of the property will be protected by limiting future subdivision and development;
- Continued use of the land for agriculture, forestry, recreation, or the multitude of other purposes compatible with conservation;
- Compatible land use and development—landowner reserves the right to construct or maintain a residence on the property and may reserve the right to construct and maintain additional residences on the property.

Certain areas will be sited to accommodate existing and future development taking into account the entirety of the natural potential of the land as well as its scenic resources. A Minimal Protection Area (MPA) will be designated in an area to promote compatible land use and development so that it will be available for a wide variety of activities, uses, and additional improvements subject to minimal constraints necessary to achieve conservation objectives outside the MPA.

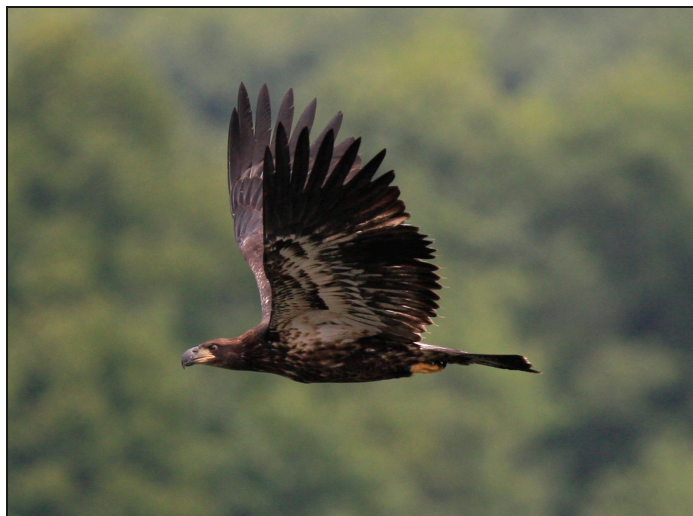
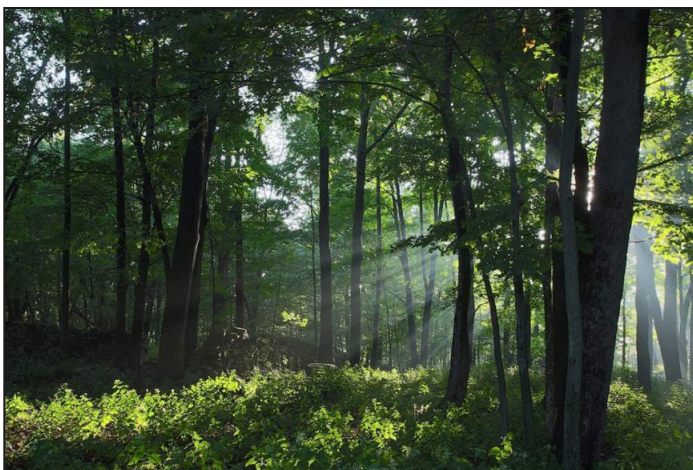
To ensure your conservation objectives are met, the Conservancy is responsible and required to monitor the land on an annual basis and set aside money into a Stewardship and Legal Defense Fund. This fund is designed to guarantee the resources are available to protect and defend the easement in perpetuity.

The amount placed into the fund varies with the size and complexity of the property and the terms of the conservation easement. In making this gift to the community, we ask the landowner to contribute these tax deductible funds or, if you are unable to donate the full amount, we may be able to raise the funds from other sources.

To learn more: www.delawarehighlands.org

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COMMON GROUND



Top © David B. Soete, Photographer; *Center*: © Photograph provided by www.delawarehighlands.org; *Bottom*: © John A. DiGiorgio, Photographer
Healthy forests keep our drinking water clean.

a conservation easement. Each land protection agreement is unique and tailored to your conservation goals for your property, and will ensure that the land is never subdivided or developed.

Any action you take—whether it's something as simple

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Find local farms and farm markets at DelawareHighlands.org/ShopLocalSaveLand.

© David B. Soete, Photographer

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COMMON GROUND

as taking a shorter shower or as powerful as permanently protecting your land—will have a positive impact on the Upper Delaware River region, and the people and wildlife that call this area home.

We love where we live—and we know you do, too. We invite you to join us for a hike, a workshop, or an eagle-viewing bus tour this year to connect to nature and learn more about the Conservancy and our work. Visit our website for more information on our educational and volunteer programs, community outreach initiatives, and land protection projects. Together, we can protect what we all have in common—a healthy, vibrant natural world.

For More Information: www.delawarehighlands.org

MORE ABOUT LAND TRUSTS

Land trusts are private, nonprofit organizations that acquire and manage land for the purpose of permanent conservation. They also steward land for public benefit. Land trusts harness three fundamental aspects of the American ethos: volunteerism, community spirit and connection to the land. Most land trusts are community-based, making them deeply connected to local needs and well positioned to provide local benefits such as trails, school programs and more.

The **Land Trust Alliance**, founded in 1982 and based in Washington, D.C., is the voice of the land trust community. It represents more than 1,000 member land trusts across the nation.

For more information or to find a land trust near you:
www.landtrustalliance.org or <http://findalandtrust.org>



Top: © Photograph provided by www.delawarehighlands.org

Bottom: © John A. DiGiorgio, Photographer

The protected lands in our region provide safe habitat for wildlife.



Al Gore speaking at a Climate Reality Leadership Corps training.

© Photograph provided by The Climate Reality Project

Making America's Clean Energy Future a Reality

by Ken Berlin

President & CEO, The Climate Reality Project

With seas rising, global heat records falling, and storms becoming more and more devastating, the reality of climate change has never been clearer. But with clean energy solutions like wind and solar getting more affordable, batteries getting better, and buildings becoming more efficient every year, neither has the way forward.

At The Climate Reality Project, with our founder and chairman, former Vice President Al Gore, our mission is to catalyze a global solution to the climate crisis by making urgent action a necessity across every level of society. The good news today is that with the clean energy

revolution underway around the world – creating demand for green tech products and services and putting over 2 million Americans to work already – taking action to solve the crisis isn't just about creating a sustainable future for the planet. It's also about creating create jobs and business opportunities here at home and building a stronger economy that works for all Americans.

First, the challenge. Ninety-seven percent of climate scientists agree that man-made climate change is a reality. We know it's happening, and we know why: carbon pollution is warming our planet and creating dirty weather like extreme droughts,

flooding, wildfires, and superstorms.

So what can we do? The most important step is reducing carbon pollution. Right now, scientists tell us that we're on track to see global temperatures rise up to 4°C by the end of the century. By replacing dirty fossil fuels like oil and coal with renewables like wind and solar integrated in a twenty-first century smart grid, we can cut dangerous emissions while powering our economy safely, reliably, and affordably.

Cities, states, towns, and businesses have already begun the hard work. They're divesting from fossil fuels, investing in clean energy solutions

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Making America's Clean Energy Future a Reality



© Photograph provided by The Climate Reality Project
Ken Berlin speaking at a Climate Reality Leadership Corps training.

and moving forward with sustainability initiatives like our **100% Committed** campaign, which helps local governments, schools and businesses commit to transition to 100 percent renewable electricity by 2030 or sooner. And this initiative is just one example of many.

The most exciting part of this movement is that it's not being driven by government bureaucrats off in DC, but by regular Americans of all walks of life. Americans who understand that being a citizen today means exercising political power and taking action in their own lives and communities.

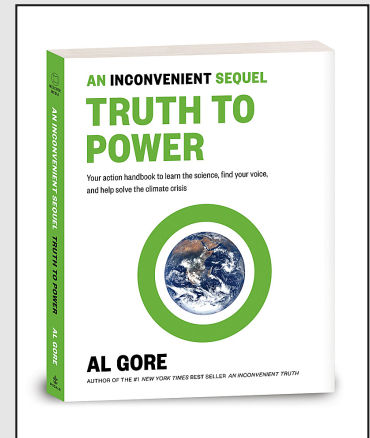
We at Climate Reality have seen this firsthand in building a global network of 12,000 Climate Reality Leaders trained by Vice President Gore. They're men and women of all ages, beliefs, and political affiliations, all unified by the conviction that a clean energy future is in our hands – and now it's up to us to make it a reality.

The climate crisis affects us all. We know we must solve it. The solutions available today show us that we can. *And with millions standing together, we know we will!*

The Climate Reality Project is a non-profit organization headquartered in Washington D.C., founded by Al Gore in 2011, involved in education and advocacy related to climate change.

For more information and/or how you can get involved:
www.climate realityproject.org

AN INCONVENIENT SEQUEL: TRUTH TO POWER



Follow up to #1 New York Times bestselling book *An Inconvenient Truth*:

An Inconvenient Sequel: Truth to Power, the book, is a daring call to action, exposing the reality of how humankind has aided in the destruction of our planet and groundbreaking information on what you can do now.

Vice President Al Gore, a leading expert in climate change, combines cutting-edge research from top scientists around the world with photos, personal anecdotes, and observations to document the fast pace and wide scope of global warming. He presents, with alarming clarity and conclusiveness, that the fact of global climate change is not in question and that its consequences for the world we live in will be disastrous if left unchecked. Follow Vice President Gore around the globe as he tells a story of change in the making and offers real actionable steps that you can take to help reverse the damage.

The book will be available on July 25, 2017.

Follow up to Academy Award-winning documentary film *An Inconvenient Truth*:

A decade after *An Inconvenient Truth* brought climate change into the heart of popular culture, comes *An Inconvenient Sequel: Truth to Power*, the follow-up that shows just how close we are to a real energy revolution.

Vice President Al Gore continues his tireless fight traveling around the world training an army of climate champions and influencing international climate policy. Cameras follow him behind the scenes – in moments both private and public, funny and poignant – as he pursues the inspirational idea that while the stakes have never been higher, the perils of climate change can be overcome with human ingenuity and passion.

The film is scheduled to open in theaters July 28, 2017.

RESOURCES: www.inconvenientsequel.com

FOR MORE INFORMATION ABOUT THE FILM AND/OR TO PRE-ORDER THE BOOK: www.inconvenientsequel.com



© John A. DiGiorgio, Photographer

EVERGLADES OF THE NORTH

Blackwater National Wildlife Refuge

by Yoke Bauer DiGiorgio

Director, Delaware Valley Eagle Alliance, Naturalist, Filmmaker, Author

We have within the United States an expansive network of public lands and waters which have been “set aside” called the National Wildlife Refuge System. Established in 1903, the System’s mission is *“to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”* Today, the National Wildlife Refuge System has grown to over 562 national wildlife refuges and 38 wetland management districts and encompasses more than 150,000,000 acres.

Blackwater National Wildlife Refuge (NWR), also referred to as the *Everglades of the North*, was established in 1933 as a refuge for migratory birds. Located on the eastern shore of Maryland, 12 miles south of Cambridge, Blackwater NWR is home to an incredible amount of plant and animal diversity in its three major habitats – forest, marsh and shallow water. Comprising over 28,000 acres, it supports essential ecosystem services, and provides nesting and wintering habitat for many wildlife species. It is home to the largest natural population of the formerly endangered Delmarva peninsula fox squirrels and the largest breeding population of American bald eagles on the East Coast, north of Florida.

Several years ago, my husband, John and I were fortunate to be able to attend a “Classroom in the Wild” workshop offered by the American University at Blackwater NWR. The workshop included creating a short documentary about and for the Refuge. We broke into teams and agreed

on a topic - climate change and its impact on Blackwater NWR. We spent several days exploring the Refuge and interviewed several individuals including, Matt Whitbeck, Supervisory Wildlife Biologist responsible to oversee the habitats of Blackwater NWR.

Sea levels are rising along the Chesapeake Bay at rates much faster than the global average according to research conducted by the U.S. Geological Survey. This is the result of a combination of rising waters due to global climate change and sinking land (called subsidence).

Matt talked to us about the need to adapt to the sea level rising climate changes now taking place at Blackwater NWR. Historic marsh lands are being lost while new marsh lands are forming in the adjacent uplands. Efforts are being directed more now to maintaining the ecological functions



© John A. DiGiorgio, Photographer

Matt Whitbeck speaking to our “Classroom in the Wild” workshop team about the changing topography at Blackwater.

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EVERGLADES OF THE NORTH

Blackwater National Wildlife Refuge

that were present on the landscape, versus restoring the marshes to where they once existed. Four management tools / adaption strategies are being employed to this changing landscape:

- Facilitate the “natural migration” of marsh across the landscape (the single most important strategy);
- Increase the quality of the shallow open water habitat being created;
- Manage existing marshes the best way possible and hang on to remnant marshes for as long as possible;
- Where feasible, full restoration of marshes.

Maintaining critical habitats and ecosystem services on the landscape, even if not in the exact historic location, reflects an important change in conservation efforts. Recognizing that the topography is changing and planning for changes resulting from climate change is essential to benefit both wildlife and people.

Blackwater NWR is an amazing place to experience – renowned for its wildlife and environmental photographic opportunities, and its proactive work to remain resilient against climate change. Before we left, John and I had the opportunity to explore more on our own. We drove the Wildlife Drive and were able to observe many of the resident birds along the shore, including the several great blue herons and a pair of bald eagles. We hiked several of the hiking trails and were able to hear and see several Delmarva fox squirrels scurrying about. As we had not come with our kayaks or bicycles, we were not able to take advantage of the paddling trails and miles of cycling.

The Visitor Center is a great resource for all information about Blackwater – its wildlife, public use, calendar of bird migrations, and upcoming events and educational programs (and much more). Want to plan a trip to Blackwater NWR? Be sure and check out the websites below to learn more about the different activities and what you can see and/or experience throughout the year.

RESOURCES:

https://www.fws.gov/refuges/policiesandbudget/HR1420_missionGoals.html

www.fws.gov/refuges

www.fws.gov/refuge/Blackwater

www.friendsofblackwater.org

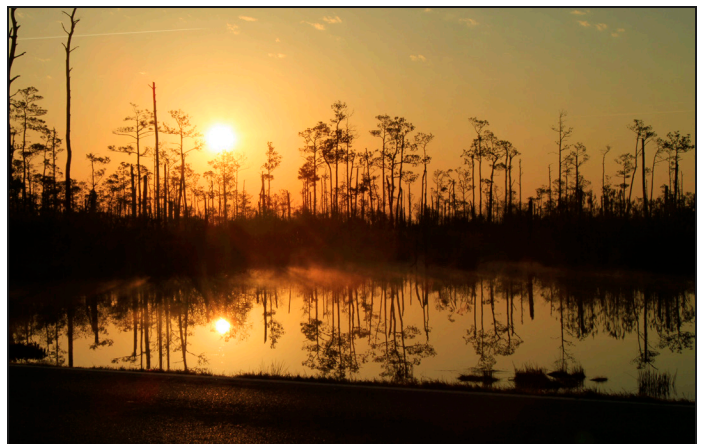
www.chesapeakebay.net/issues/issue/climate_change#inline

<https://chesapeake.usgs.gov/index.html>

<https://www.facebook.com/BlackwaterNWR/>

TO DOWNLOAD BLACKWATER NWR BROCHURE:

www.fws.gov/uploadedFiles/Region_5/NWRS/South_Zone/Chesapeake_Marshlands_Complex/Blackwater/BlackwaterBrochure.pdf



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DISCOVERING NATURE



Top and Bottom Left: © Yoke Bauer DiGiorgio, Photographer
Bottom Right: © John A. DiGiorgio, Photographer

NO MILKWEED NO MONARCHS

Milkweed (Scientific name: *Asclepias*) are native perennial plants that come in many sizes, flower colors, and growth habits in North America. Easy to grow, they make beautiful additions to your new or existing garden, or can easily add color to your balcony. But most importantly, milkweed plants are the host plants for the monarch butterfly (*Danaus plexippus*). They are the only food for the monarch larvae, or caterpillars. Without milkweeds, the monarch butterfly has no chance for survival.

The female monarch butterfly deposits one egg to the bottom of the leaf of a milkweed plant. She repeats this multiple times on dozens of plants. The larvae hatch on the leaves, eat the egg capsules, and start munching on the milkweed leaf tissue. Because the sap found in milkweed plants contains toxic chemicals (a characteristic that repels insects and other herbivorous animals), the caterpillars and later, the butterflies, become toxic or unpalatable to many birds.

Essential for monarch survival is having lots of milkweed. Because of modern changes, such as suburbanization, there is a lot less milkweed than there was in the past. When planning your garden, adding milkweed is a great way to help monarchs in their survival. It is recommended that you look for seeds or plants grown from seeds responsibly collected in your own region. Want more monarchs - plant milkweed for them to lay their eggs on.

RESOURCES:

<https://en.wikipedia.org/wiki/Asclepias>
www.ourhabitatgarden.org/creatures/milkweed-growing.html
<http://monarchjointventure.org/resources/downloads-and-links/>
<https://www.fieldmuseum.org/science/blog/five-milkweeds-save-monarch-butterflies-and-beautify-your-garden>

THE DELAWARE VALLEY EAGLE ALLIANCE

*working towards the conservation of
our wildlife and natural resources*

ABOUT US

The Delaware Valley Eagle Alliance is a 501 (C)(3) not-for-profit organization; our mission: to increase awareness, understanding and promote conservation of our wildlife and the natural environment.

We believe that raising awareness and understanding will change attitudes toward conservation and our natural resources. We are committed to this because we believe that it is essential to enabling all life to exist and prosper on Earth.

We are dedicated in our focus to bring awareness through our publications, projects and programs.

*John A. DiGiorgio, Chairman and President
Richard Crandall, Director and Vice President
Yoke B. DiGiorgio, Director and Treasurer
Debra Reimer, Secretary*

THE NATURE'S NEWSLETTER

Facilitating the free access and exchange of information of critical issues in the world today; to educate, inspire and empower all to take part and take action to enable all life to exist and prosper on Earth.

*Nature's Newsletter Corporate Sponsor
www.chbny.com*



PROJECTS AND PROGRAMS

We are available to work closely with biologists and conservation groups to document ecological and wildlife research on rare, sensitive and endangered wildlife and environmental issues. We collaborate with communities and other organizations to develop and organize wildlife and environmental educational and entertaining programs.

SUPPORT

The Delaware Valley Eagle Alliance grew out of a grassroots effort of individuals to help protect our wildlife and habitat. Our organization depends on individuals and organizations who share our concern for wildlife and the environment. Our publications, projects and programs would not be possible without the generosity of our supporters and sponsors.

For more information and/or to make a tax deductible donation please contact Yoke Bauer DiGiorgio at: yokedvea@gmail.com; or call 201-841-5168

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