National Park Service U.S. Department of the Interior Natural Resource Stewardship & Science National Natural Landmarks Program





Figure 1. Mount Monadnock, NH (photo by Katharine Wall)

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"Nature is painting for us, day after day, pictures of infinite beauty." —John Ruskin

WELCOME

Outstanding examples of the beauty and diversity of America's natural heritage can be found at any of the 599 designated National Natural Landmark (NNL) sites. These paintings of nature, cared for and managed by an array of public and private land stewards, are national treasures to behold. Raising awareness and facilitating connections to support and advance conservation of these significant areas, remain high priorities for the NNL Program. This sampling of landmark highlights NNL sites from Fiscal Year 2019, are shared to inform, generate connections and honor those working hard to manage and conserve these significant places.



SCIENCE AND CONSERVATION IN ACTION

き Youth volunteers, through the Heart of Oregon Corps (HOC), gave their sweat-

equity to help control non-native plants in and around the Fort Rock State Natural Area visitoruse area in central Oregon. HOC engages local youth to provide job skills training, education, and leadership development to kids that face major barriers to success. In the course of 8 hours, these 15 individuals removed roughly 50 pounds of exotics such as cheatgrass and scotch thistle. Such efforts assist park managers and help connect the next generation of stewards to significant natural features, like Fort Rock State Monument NNL.



Figure 2. Volunteers at Fort Rock State Monument (photo courtesy of Fort Rock State Natural Area).

Nottingham Park, Chester County Pennsylvania's first park, grew by 80 acres in early 2019, increasing the park's size by more than 10% to 731 acres. The Nature Conservancy conveyed the preserved tract of land to the county at no cost. Acquisition



Figure 3. Pitch pine and serpentine barrens at Nottingham Park, PA.

of the additional acreage by Chester County will allow for integrated and improved management across the conservation area and help protect the site's significant serpentine barrens, designated as the **Nottingham Park Serpentine Barrens NNL** in 2009.

chesco.org/CivicAlerts.aspx?AID=896

Diffeen years of restoration work are paying big dividends in the form of native plant regeneration, nesting rare marsh birds and fish spawning at Mentor Marsh NNL in central Ohio. Located near the shores of Lake Erie, this site was designated an NNL in 1966 for its diversity of marsh vegetation, aquatic plants, swamps, and bottomland and upland forests. The Cleveland Museum of Natural History initiated a large-scale restoration project in 2004 to combat the non-native *Phragmites australis* that had completely taken over the nearly 800-acre wetland basin since its introduction in the

early 1970's. Over 85% of the *Phragmites* have been removed and the native ecological system is well on its way to being restored because of the extraordinary efforts of museum staff, partners, contractors, volunteers and inmates. cmnh.org/mentor-marsh



Figure 4. Boardwalk through Mentor Marsh State Nature Preserve (photo by Ohio Department of Natural Resources).



Wissahickon Valley, located within the city limits of Philadelphia, was designated an NNL in 1964 as a symbol of natural area preservation within a vast urban complex. Friends of the Wissahickon (FOW) works in partnership with the Philadelphia Parks and Recreation Department to conserve the natural beauty and wildness of the valley. With funding from various state and private organizations and individual donors/members, FOW recently completed a one-million-dollar project to restore three heavily eroded streambank



Figure 5. Stream restoration in the Wissahickon Valley.

sections of Forbidden Drive. Formerly the Wissahickon Turnpike, the five-mile trail was renamed Forbidden Drive when the turnpike closed to cars in 1920. This action protected wildlife habitat and water quality in the Wissahickon Creek and transformed the road into a multi-use trail that now connects visitors to the park's 50 miles of trails and beyond to a regional trail network. <u>fow.org/project-update-forbidden-drive-streambank-stabilization-complete/</u>

Dolly 40 minutes north of St. Paul, Minnesota sits a site that was integral to some of the foundational work in ecosystem ecology and where radio telemetry was developed. Cedar Creek Ecosystem Science Reserve is a University of Minnesota biological field station, member of the Long-Term Ecological Research Network, and contains the Cedar Creek Natural History Area-Allison Savanna NNL. A highly active research location, some of the long-term projects underway include ecosystem responses to nitrogen deposition, elevated carbon dioxide, exotic species invasions and a recent study looking at using bison to help restore oak savanna ecosystems. youtube.com/watch?v=WR1kchEZfRk



Figure 6. Bison at Cedar Creek Preserve, MN.



COLLABORATION AND CONNECTED CONSERVATION

Making Connections

At the foundation of the NNL Program are partnerships and collaboration. NNL sites often have more than one landowner and NNL designation can provide a catalyst that brings NNL owners/managers and other partners together.

80 Lynnfield Marsh NNL, in

eastern Massachusetts, is an inland, fresh-water marsh that provides excellent habitat for numerous and rare bird species, attracting thousands of hikers, birders, school groups and nature enthusiasts. Management of this site, known locally as Reedy Meadow, is shared by the neighboring towns of



Figure 7. Lynnfield and Wakefield Conservation Agents walk the Partridge Island Trail at Reedy Meadow, MA.

Lynnfield and Wakefield. A 2019 visit to the site by NNL Program staff brought representatives from both towns together to discuss projects each have underway and how they can partner on collaborative stewardship of the significant resource they share. town.lynnfield.ma.us/conservation-commission/news/reedy-meadow-site-visit-national-natural-landmarks-program-coordinator

EXE Seeking ways to better connect and share information with the hundreds of landmark owners and managers from across the country, the NNL Program established an <u>NNL Owners and Managers Group</u> within the <u>Common Learning Portal</u> (CLP), the NPS' new online communication and networking platform. This group is intended to provide: 1) a space where materials about the program and NNL designation can be accessed, 2) a forum for asking questions and enabling group discussions, and 3) a platform for distributing news and information in a timely manner. We invite all landmark owners and managers to join this group. Please email your regional NNL staff contact for specific instructions to join this group. mylearning.nps.gov

Collaboration

Shared goals, such as landmark conservation, can also spur great collaboration, which can pool resources, improve innovation, and strengthen commitment and connection to the outcome. The conservation community is flush with great examples of collaboration, including a few highlighted below.

20 Oregon State Park managers and the U.S. Forest Service, Columbia River Gorge National Scenic Area, are working together in an effort called Sustainable Trail Co-Visioning. Engaging and receiving input from state and federal agencies, non-profit



and tribal organizations, partner groups and the general public, their effort seeks "to build shared understanding and a common vision for a socially, ecologically, and economically sustainable trail system across jurisdictional boundaries." Declared one of the seven wonders of Oregon, the Columbia River Gorge, is a highly visited area, with over five million visitors to the 34 state parks within the gorge, one of which is Vista House along Crown Point Scenic Corridor. Rising 725 feet above the Columbia River, **Crown Point NNL** is a prominent feature within the gorge and will benefit from this cooperative effort. fs.usda.gov/detail/crgnsa/home/?cid=FSEPRD636752



Figure 8. View of Columbia River Gorge from high point above the river.

EXEMPTICAL STATE The species of native orchids have been located within the Sanctuary. Current orchid research includes an inventory of orchid populations, investigating the species research includes and provide the species of sanctuary. To the sanctuary and provide the species of the spe

Savage Gulf NNL, located in Tennessee, was recently part of a \$200,000 grant awarded by the National Fish and Wildlife Foundation through its Cumberland Plateau Stewardship Fund. The grant will be matched by partnering organizations and The Lyndhurst Foundation to double its impact. The project will engage public and private landowners through outreach and technical assistance to restore and enhance more than 5,400 acres of short-leaf pine forests, including more than 4,000 acres of



Figure 9. Looking down into Savage Gulf, TN.



prescribed burning. The project supports work on private and public tracts of land, including more than 2,000 acres within the Savage Gulf State Natural Area.

Deep Springs Marsh NNL, located in California's Deep Spring Valley east of the Sierra Nevadas, is a stunning example of the increasingly rare desert marsh and one of

the few places containing black toad (*Anaxyrus exsul*) habitat. Deep Springs College, the primary landowners at this site, partner with the California Department of Fish and Wildlife (CDFW) to provide monitoring of this state endemic species. CDFW biologists conducted a presence/absence survey for black toads in the spring of 2019, providing recent confirmation that toads in all age classes continue to be present in all the springs within the NNL.

Connected Conservation

10 The summer of 2019 was the third year that NNLs participated in the **Dragonfly-Mercury Project**. Alongside over 50 units of the National Park System, staff and volunteers at the following landmark sites, spent time in the field sampling dragonfly larvae and contributing data to this national, long-term project. nps.gov/articles/dragonfly-mercury-project.htm

- Bear Meadows Natural Area, PA
- East Inlet Natural Area, NH
- Battle Creek Cypress Swamp, MD



Figure 12. Dragonfly larva sampling at Battle Creek Cypress Swamp, MD (photo by Calvert County Natural Resources).



Figure 11. Penn State entomology PhD candidate sampling dragonfly larva at Bear Meadows Natural Area, PA (photo by Jonah Ulmer).

Extending Conservation Benefits

"The Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world." This is the second part of the mission of the National Park Service (NPS), and the NNL Program is an excellent avenue for engaging with partners to do just that. Upon request, the NPS can provide or help broker conservation assistance, as illustrated by the following story.





Figure 10. Black toad (photo courtesy of CaliforniaHerps.com).

W Jefferson County Open Space and Friends of Dinosaur Ridge, facilitated by NNL Program staff, recently went through a strategic Foundation Planning exercise for Dinosaur Ridge, which is a part of the **Morrison-Golden Fossil Areas NNL**. The planning model used was developed by the NPS and is currently being implemented at every park unit within the National Park System. This planning effort helped the landowners and managers identify and prioritize the area's six fundamental resources and their condition, articulate the site's significance, and guide improved interpretation.



Figure 13. The main tracksite at Dinosaur Ridge, CO.

NNLs MAKING A SPLASH

The **Orono Bog NNL** provides a classic example of a northern sphagnum bog that is uniquely and universally accessible to the public. Reconstruction of the mile-long, wheelchair-friendly Orono Bog Boardwalk in Maine was completed in July 2019 after nearly a decade of fundraising and laboring by more than 120 volunteers. This stellar accomplishment was celebrated with a ribbon-cutting event on August 17.

bangordailynews.com/2019/08/17/news/bangor/after-7-years-120-volunteers-and-1-56-million-the-orono-bog-boardwalk-replacement-is-done/



Figure 14. A handful of the many volunteers that have worked over the years to replace the Orono Bog boardwalk in ME (photo by Donna Dwyer).





Description of the second seco

Figure 15. Book cover for "The Bog Walker's Companion".

າຍ The desert in SUPER bloom!

Steady rains followed by warm temperatures early in 2019, brought the second super bloom in as many years to **Anza-Borrego Desert State Park** in southern California. Designated an NNL in 1974, the site contains some of the best examples of the various biotic communities and geological phenomena of the Colorado Desert region is the largest desert state park in the nation, abduba org/pages (02flora/rg



Figure 16. Super bloom at Anza-Borrego Desert State Park, CA (photo by Anza-Borrego Desert Natural History Association Member, Dr. Juergen Schrenk).

the nation. abdnha.org/pages/03flora/reports/current.htm

80 International recognition was bestowed upon the Corkscrew Swamp Sanctuary in

spring 2019, when it became the first wetland in the southern United States to be recognized as a Wetland of Distinction by the Society of Wetland Scientists. Under stewardship of the Audubon Society, this southern Florida significant area is also an NNL, a Ramsar Wetland of International Importance, an Important Birding Area, and a gateway to the Great Florida Birding and Wildlife Trail.



Figure 17. Elevated boardwalk within Corkscrew Swamp Sanctuary, FL (photo by RJ Wiley).

corkscrew.audubon.org/news/wetland-distinction-coverage



Delta Already recognized as nationally significant for its illustration of geologic thrust faulting and beloved for its striking scenery and recreational opportunities, dinosaur discovery can be added to the list for Valley of Fire State Park NNL. One hundred-million-year-old rock and bone recently uncovered at the park are believed to contain the first unique dinosaur to come from Nevada. Paleontologists are confident that after peer review, the bones will officially belong to a new species of dinosaur, a duck-billed dinosaur, fifteen to twenty feet long. news3lv.com/news/local/new-dinosaur-species-discovered-in-valley-of-fire



Figure 18. Valley of Fire State Park (photo by Lea Fallscheer).

CELEBRATING LANDMARKS

w In early September, a celebration and guided hike was held at the **Piney Falls NNL**, showcasing the NNL plaque in its newly mounted location and celebrating the addition of almost 400 acres to the park. Located in eastern Tennessee, Piney Falls State Natural Area nearly doubled in size. This significant acquisition, which contains stunning views of the ridge and valley of the Cumberland Plateau, provides additional protection for Upper Piney Falls. The acquisition, made possible with a Tucker Foundation grant and Open Space Institute funds, transfers the land to the state from The Nature Conservancy.



Figure 19. Celebrating Piney Falls NNL, TN (photo by Tennessee Department of Natural Areas).



Quinquagenary Anniversaries

✤ Designated in 1969, the following four landmarks saw their golden anniversary in 2019 (from left to right):



- Pygmy Forest, California
- Baker University Wetlands, Kansas
- Sugar Loaf Mountain, Maryland
- Grants Lava Flow, New Mexico

RAISING AWARENESS

Raising awareness of the significant natural features found at NNL sites and visibly acknowledging landowners for their participation in the NNL Program comes in many forms, including some of the following creative ways.

Interpretive Displays

EXA A former dairy barn now houses fossil displays and educational media that tell the story of the **Chazy Fossil Reef NNL**. Located at the Goodsell Ridge Preserve, within the Vermont portion of the NNL, the restored Conservation Barn also provides local art exhibit and concert space. Situated in Lake Champlain between Vermont and New Hampshire, this NNL represents the oldest known occurrence of a biologically diverse fossil reef in the world, the earliest appearance of fossil coral in a reef environment, and the first documented example of the ecological principle of faunal succession. ilmpt.org/wp/?page_id=45



Figure 20. The Conservation Barn at Goodsell Ridge Preserve, before and after restoration (photo on right by Linda Fitch, Isle La Motte Preservation Trust).



EXAMPLANCE NOTE Berlin-Ichthyosaur State Park in central Nevada, has brought science to life with a full-sized Ichthyosaur replica hanging directly above actual *Ichthyosaur* bones within its sheltered-quarry. Created, and personally delivered by a Texas dinosaur-enthusiast, this new addition helps visitors understand and visualize the mass of bones embedded in stone before them. Designated in 1973, **Ichthyosaur Site NNL** contains the



Figure 21. New Ichthyosaur replica hangs directly above actual fossil bones.

most abundant concentration, and largest known remains, of *Ichthyosaurs*, a marine reptile from 225 million years ago. parks.nv.gov/parks/berlin-ichthyosaur

Battle Creek Cypress Swamp NNL, Maryland's first Nature Conservancy preserve, used their participation in the Dragonfly-Mercury Project as an opportunity to educate their visitors about the "Lives of Dragons & Damsels" in their *Odonata*-themed library display case within the preserve's education center.

Educational Programs

✤ For the last 15 years, the cooperatively managed Fish Slough NNL, in the Owen's Valley of California, has been offering place-based, hands-on youth educational



Figure 22. Springs emanating here at Fish Slough, CA provide habitat for the endangered Owens pupfish.

opportunities through the Hands on the Land program. Designed to bring the classroom learning to life and connecting the next generation to our forests, parks, waterways, and wildlife refuges, the natural classroom of Fish Slough helps science come alive for children. This site, designated an NNL in 1975, is a large, essentially undisturbed desert wetland that provides habitat many rare fish, plant and animal species, including the endangered Owens pupfish. Hundreds of students each year have the

opportunity to net, identify and sort aquatic invertebrates, investigate the habitat for the Owens pupfish, discover soil characteristics, plant community adaptations and the amazing geology responsible for the life-giving waters of Fish Slough. handsontheland.org/site-profiles?Itemid=5&alias=fish-slough



NNL Bronze Plaque

The NPS provided a replacement bronze plaque to Cook Forest NNL, when, after 40 years, their original plaque went missing. Previously mounted to wood, park managers opted for a stone masonry mount and a more visible location to enhance security for the new plaque. A



Figure 23. New NNL bronze plaque at Cook Forest, PA.

boulder placed along the Longfellow Trail now provides a new and prominent home for the NNL plaque.

Illustrating America's Natural Heritage

EXAMPLA 1 The NNL Program was pleased to release the second set of artwork pieces in 2019, which illustrate **waterfalls and caves**. Joining prairies and swamps from 2018, this series portrays and celebrates the beauty and diversity of the outstanding natural features represented at NNL sites and draws attention to learning about and increased appreciation of America's natural heritage. These works, along with information about the natural feature and places where



Figure 24. Illustrations of waterfalls and caves natural features.

they can be found, are included on the NNL Program website nps.gov/subjects/nnlandmarks/nnlartwork.htm

NNL Videos

W Over the several months leading up to National Fossil Day 2019, the NNL Program released a three-part **Telling the Dinosaur Story video series**. Told through various NNLs in and along the Rocky Mountain Front, these videos can be watched independently, or back-to-back, and explore the Triassic, Jurassic, and the Cretaceous periods, respectively. They can be found on the NNL Program website. nps.gov/nnlandmarks

CONSERVATION CHALLENGES

Management challenges come in many forms, from human-induced or enabled, to purely natural phenomena. Across the country, natural area stewards work tirelessly to best manage and conserve these special places, in the face of these various challenges.



Exploding Resources

EXECUTE: Located within the Alaska Maritime National Wildlife Refuge, **Bogoslof Island** was designated an NNL in 1967, recognizing it as an important rookery and haulout for endangered Steller sea lions and nesting grounds for over 50,000 murres, kittiwakes and other sea birds. However, all elements of significance at this NNL were impacted due to its namesake volcano erupting in 2016-17.

The Alaska Volcano Observatory and US Fish and Wildlife Service are monitoring how the eruptions change the size and shape of the island and the wildlife in and around the island; a perfect opportunity to better understand responses to an island ecosystem after a natural reboot. Preliminary monitoring observations include: 1) birds nesting in the volcanic rock, in depressions in the sand/cobbles on the beach, and using seaweed in response to the lack of any vegetation 2) black-legged kittiwakes, thick-billed murres, puffins, and glaucous-winged gulls, including chicks and eggs, are present, and 3) the ratio of fur seals to sea lions seems to have flipped. Continued monitoring will be important. adn.com/alaska-

news/science/2019/02/09/life-returns-fast-to-bogoslof-island/

Rising Waters

 High water levels and wave action are creating management challenges for shoreline sites of the Great Lakes, including Ridges Sanctuary-Toft's
Point-Mud Lake Area and Point
Beach Ridges NNLs in Wisconsin, situated along the shores of Lake
Michigan. Great lake levels have fluctuated dramatically, from extremely low levels in 2014, to extreme highs in 2019, surpassing high-water marks from the mid-1980's.
Recent extremes have affected the two



Figure 25. Ridges and swales along the shores of Lake Michigan and Point Beach Ridges NNL..

youngest ridges at Ridges Sanctuary, eroding away the outer-most ridge, stripping vegetation from the next ridge in, and completely filling in the intervening swale with sand. This dune/swale system, allows for microclimates that support a diverse plant community, including several T&E species. Similarly, Point Beach Ridges has experienced dune erosion along its shoreline and impacts to the boardwalk that provides beach access to visitors. washingtonpost.com/weather/2019/11/08/great-lakes-water-levels-have-swung-record-lows-record-highs-heres-why/



✤ Farther east, situated along eastern Lake Ontario in New York, Lakeview Marsh and Barrier Beach NNL, part of the largest natural fresh-water barrier beach system



Figure 26. Shoreline erosion along Lakeview Marsh and Barrier Reef NNL, NY.

in New York State, endured notable erosion in summer 2019, associated with high lake levels and storm events. Approximately five meters of beach was eroded, as evidenced by exposed trees and roots. The marsh side of the dunes however, appeared to be robust and intact. High water levels have likely contributed to a notable reduction in cattail, which were previously choking open ponds and tributaries.

A 2014 water management plan, prepared by

the International Joint Commission (IJC), designed to return the St. Lawrence River and Lake Ontario to more natural flows, was implemented in January 2017. This coincided with extreme weather/high precipitation in the Great Lakes, resulting in exceptionally high-water levels and flooding. It is unclear how much the flooding can be attributed to the new management plan vs. severe weather; however, it is expected that lake water levels will continue to fluctuate significantly. Various efforts are underway at regional levels to address these issues, including the Great Lakes Coastal Resiliency Study, a collaborative, regional initiative to provide an opportunity for federal agencies, states, and local stakeholders to develop an infrastructure strategy for the future management of the Great Lakes coast.

army.mil/article/217554/great lakes partners pursues great lakes coastal resilienc y_study

Invasive Species

& A new and fast spreading invasive insect in southeastern Pennsylvania is the spotted lanternfly (*Lycorma delicatula*), a sap-feeding planthopper. It feeds on and may be harmful to a wide range of hosts including grapes, stone fruit, willow and other hardwood trees. It was first detected in the U.S. in 2014 in Berks County, PA and has now been detected in 14 of the state's 67 counties. To slow or stop the insect's spread, the PA



Figure 27. Spotted lanternfly identification card (photo by Penn State).

Department of Agriculture has imposed a quarantine on these 14 counties, regulating the movement of plants, plant-based materials and outdoor household items. Designated resources at a handful of PA NNLs are vulnerable to this exotic insect, including **Wissahickon Valley**, where it has already been detected. extension.psu.edu/spotted-lanternfly



NNL PROGRAM ACTIVITIES

Landmark Updates

W NNL Program staff **connected with and reported on 108 NNL sites in FY2019**. These periodic contacts with NNL landowners and managers provide opportunities to check in on the status and condition of sites, update contact information, inquire about conservation needs or issues, and identify potential collaboration opportunities.

Program Work Planning

🕲 Ridges Sanctuary-Toft's Point-Mud Lake

Area NNL in Door County Wisconsin hosted NNL Program staff for their 2019 annual meeting. Designated in 1967 in recognition of the site's sand ridge and swale complex and associated range of habitats, the site provided an inspiring backdrop for FY2020 work planning. Meeting at an NNL site offered the opportunity to engage with the Program and Land Managers for the



Figure 28. NNL Program staff meeting with Ridges Sanctuary managers.

Ridges Sanctuary. Program staff also visited with the park Superintendent at nearby **Point Beach Ridges NNL**. Continuing the story of remnant ridges and swales from glacial Lake Nippissing, along the present shoreline of Lake Michigan, this state natural area was designated an NNL in 1980. These on-site opportunities allow for learning about the site's diverse resources, on-going research, education programs and conservation challenges.

NNL Program Staff

EXE Seven NPS employees are committed to advancing the work of the NNL Program and supporting landmark owners.

- Adrienne Lindholm, DOI Region 11 (AK)
- <u>Carolyn Davis</u>, DOI Region 2 and parts of Regions 1 & 4 (AL, FL, GA, KY, MD, MS, NC, Puerto Rico, SC, TN, VA VI, WV)
- Deb DiQuinzio, DOI Region 1 (CT, MA, ME, NH, NJ, NY, PA, RI, VT)
- Jeff Orlowski, DOI Regions 5, 6, 7 & parts of 4, 8 & 9 (AR, AZ, CO, KS, MT, ND, NE, NM, OK, SD, TX, WY, UT)
- Laurie Lee Jenkins, DOI Regions 9, 10, 12 & part of 8 (Am. Samoa, CA, Guam, HI, ID, NV, OR, WA)
- Leo Acosta, DOI Region 3 & part of 4 (IA, IL, IN, MI, MN, MO, OH, WI)
- Heather Eggleston, Program Manager

Full contact information can be found on the NNL Program website nps.gov/orgs/1211/contactus.htm

