Not Just ‘Penn’s Woods’ – Meadows in PA

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By Keith Williams, Vice President of Engagement & Education, and Eric Roper, Forester

The wind hisses through the big and little bluestem grasses, bends the mountain mint, and sends waves of green and shiny silver through the field to the horizon. A flash of orange flits across the trail and lands on a purple bee balm blossom. This monarch was brand new – recently emerged from his chrysalis, where his caterpillar body was biochemically completely rearranged into an adult winged one which led to his completely new life, from an earth-bound juvenile to an aerial adult. Monarchs are struggling. Their population declined 50% in the last year.

Monarch on butterfly weed

Monarchs are migratory. Generation 1 starts on the mountains of central Mexico and migrates to about the Texas line, where they have babies and die. Generation 2 travels a bit further north where they have babies and die. Generation 3 does the same, and births generation 4. And this clean, unscathed, new-to-the-air monarch was the most recent addition who will make the 3,000-mile flight back to Mexico. How will he know how to do that, when he is four generations removed from his ancestors who left five months ago? This is one of the many meadow mysteries.

This magical place, a native eastern meadow, is one of the rarest ecosystems on the planet now, but they were common before European settlement. The misperception is that this region was covered in eastern deciduous forest. But the reality was that ecological disturbance – grazing and fire – kept large patches of our landscape in early successional habitats like meadows and grasslands for the last 15,000 years, and meadows were abundant here up until 200 years ago.

So where did the meadows go?

Left undisturbed, seeds from adjacent forests sprout and grow, ultimately changing meadow to forest. This is called succession. It's the progression of ecosystems until they reach a steady state called a climax ecosystem. But disturbance can prevent a climax ecosystem from developing, allowing earlier successional stages to prevail. A healthy landscape is a patchwork of systems in different stages of succession.

Clark Nature Preserve meadow with forest in the background (Photo by Peggy Eppig)

One of the ways European settlers altered the landscape was by eliminating the ecological disturbances that maintained gaps in the forest. Dry lightning strikes ignited fires. Native people used fire as a management tool. Aggressive fire suppression and the removal of Native people from the landscape also removed this important ecological disturbance. Large mammals, like eastern woodland bison and elk, used to graze the sprouting trees out of the meadows. They were hunted out of our region, and the eastern bison was extinct by 1815.

Additionally, meadows and grasslands were the easiest to develop into farm fields, and farm fields were the easiest to develop into towns, cities, and suburbs. All of this contributed to the rarity of native eastern meadows and grasslands today. We stabilized their disturbance regimes and developed them out of existence.

Besides being historical fixtures of this landscape, meadows are ecologically significant. They provide a more stable carbon storage than forests because 90% of

their carbon is stored below ground in root matter, whereas most of the forest's carbon is stored in above ground vegetation. The deep root systems of grassland plants that provide stable carbon storage also act as sponges, helping rainwater soak into the ground and recharge groundwater, rather than running over land and carrying muddy water into streams.

Meadows are biodiversity hot spots and support a large number of plants, insects, birds, reptiles, and mammals. They are the homes of organisms that provide critically important services to us, like pollination.

Although meadows may be disappearing, there are steps we can take to restore them. Beginning in 2021, Lancaster Conservancy engaged with the Natural Resources Conservation Service and Pheasants Forever to develop plans to convert fields at Safe Harbor, Kellys Run, Tucquan Glen, and Wizard Ranch into warm season grass pollinator meadows. Restoration timelines are often long, but in April 2024, we drill seeded the first fields at Kellys Run Nature Preserve. The seed mixtures, designed specifically for these sites in consultation with our partners, are tailored to provide crucial habitat for imperiled species including monarchs, American bumblebee, regal fritillary, and frosted elfin.

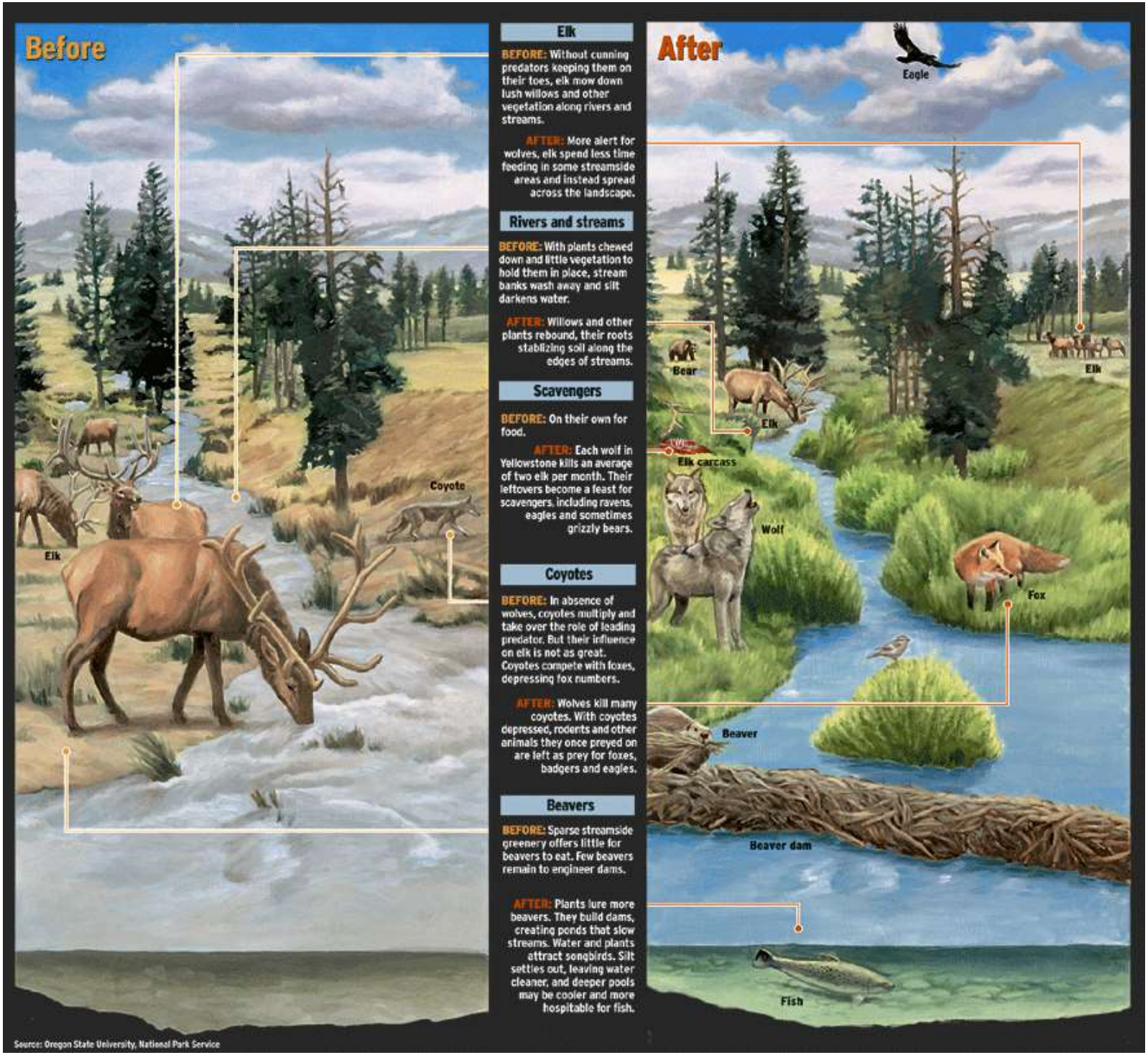
Kellys Run Nature Preserve meadow (Photo by Rachel Haynes)

Once a meadow is established, it is imperative to manage fast-growing invasive species that can outcompete desirable meadow species. Invasive species are typically introduced into a new area from their original ecosystem – often their original ecosystem is on another continent – which means the typical population controls like diseases and predation (or herbivory) aren't there to keep their numbers in check. Their populations can grow exponentially, and they outcompete native organisms for resources like food, water, sunlight, and nutrients. Their overall effect is a reduction in biodiversity.

Depending on the species, once an invasive plant is allowed to establish itself within a meadow and produce seed, the seedbank from that plant can sit dormant in the soil for up to seven years, meaning any efforts to control the establishment and spread of the invasive species can last for up to seven years (and that is assuming that, over that timeframe, control efforts are sufficient to prevent the dispersal of additional seed).

In addition to the management of invasive species, successful meadow management also sometimes means managing species that would be desirable in a different habitat type, such as young stems of sycamore, tulip polar, and black locust. Left to their own devices, these pioneer forest species will seed into a meadow in the process of ecological succession. Left alone, these woody species will expand and begin to change ecological interactions as the meadow begins to transition into an early successional woodland. While both have their benefits, meadows and early successional woodlands provide different ecological services. The control of woody stems can be accomplished using a variety of methods including cutting, prescribed mowing, and prescribed fire.

Lancaster Conservancy is working to support healthy meadows at nature preserves including Clark, Kellys Run, and Donegal Highlands.



Trophic cascade is an ecological phenomenon triggered by the addition or removal of top predators and involving reciprocal changes in the relative populations of predator and prey through a food chain, which often results in dramatic changes in ecosystem structure and nutrient cycling.

Image from: http://srcomm.umn.edu/news/trophic-cascades-highlight-need-apex-predators

Managing Open Space for Wildlife Species

Adapted from the PA Game Commission's "Mowing for Wildlife"

Many property owners want clean-cut, attractive lawns or fields. However, what appears to be a healthy lawn to property owners isn't necessarily the best option for wildlife. In fact, continual mowing can reduce or remove valuable habitat and discourage many wildlife species from visiting a landowner's property. Properly used, however, mowing can be a useful habitat management tool.

Key Facts for Wildlife-Friendly Mowing

Realistic goals must be considered for any habitat management practice, including mowing. If you are targeting a particular species, the species must occur – or potentially occur – at the desired location, based on its habitat requirements, life cycle, and distribution. After determining that a target species may occur on your property, several considerations should be kept in mind when deciding if you should mow and at what time you should apply this habitat management practice. For instance, mowing during spring and summer months may reduce or even kill nesting and young animals, such as eastern meadowlarks, bobwhite quail, ring-necked pheasants, rabbits and deer. The uncut areas protect young animals from predators and provide seasonal forage and thermal cover.

Weeds can be described as unwanted or undesirable vegetation. Mowing to control "weeds" also may not be beneficial for some wildlife. Although controlling problem plants such as thistles and *Ailanthus* is important, many "weeds," including nettles, foxtail and ragweed, are palatable to wildlife or attract insects needed to meet the diet requirements of many bird species. The trick is providing a balance between volunteer forbs (weeds) and other desirable plants.

Pennsylvania's native grasses grow in clumps. This growth habit provides excellent year-round cover and forage for wildlife, while retaining enough bare ground areas for animals to move through the field in search of food. Still, to maintain the existence of a native grass field, occasional disturbance from mowing, burning, spraying, or disking is needed. Without mowing or other disturbances, succession will take place, and the grassland will be replaced by woody vegetation. Subsequently, wildlife requiring grassland or meadow habitat will be replaced by more common woodland wildlife.

Common Wildlife Nesting Periods:
White-tailed deer - May 15th to July 15th
Eastern cottontail rabbits - February 1st to September 30th
Wild turkeys - April 15th to July 31st
Bobwhite quail - April 15th to July 31st
Ring-necked pheasant - April 15th to June 30th
Grassland songbirds: - Average (June 1st to August 15th)

- **Eastern meadowlark** - May 15th to July 31st
- **Grasshopper sparrow** - June 1st to August 15th
- **Field sparrow** - May 15th to August 15th

Mowing Considerations: When to mow

To maximize wildlife benefits and reduce wildlife mortality, mowing should be done outside of the nesting and brood-rearing season, which generally occurs from April to August. Late summer and late winter are the best times to mow for wildlife. Old field areas experiencing woody encroachment should be mowed during late winter (February or early March) or early fall (September) to maintain

food and cover for wildlife. The key, as with grasses, is to avoid mowing during the prime nesting and brood-rearing periods.

Moving Considerations: Reasons for mowing/not mowing

Reasons to mow:

- To maintain or enhance wildlife habitat.
- To maintain grasslands and meadows.
- To suppress the growth of noxious weed species such as Canada thistle and multiflora rose.
- To prepare land for other land management practices, such as applying herbicides, prescribed burning, and seeding.
- If local zoning ordinances require a specific lawn length and the management of “weeds.”

Reasons not to mow:

- Mowing is expensive. Fuel costs are high, and equipment must be repaired and maintai3 ed.
- Continuous mowing has little value for wildlife. Areas not mowed frequently provide excellent habitat for wildlife to nest, raise young, and forage.
- Grasses with shallow roots cannot uptake nutrients or prevent erosion as well as grasses that are deeply rooted.
- Mowing takes time.
- Mowing adds pollutants to the air.
- Frequent mowing creates thatch buildup, resulting in undesirable groundcover conditions.

Mowing Considerations: Where to mow

Yards or Lawns (less than 1 acre)

Maintaining grass at a height of at least three inches and setting aside other areas of the yard for wildlife-friendly plantings (e.g. black-eyed Susan, red clover, alders, viburnums, dogwoods, etc.) will enhance wildlife habitat and wildlife feeding areas. However, some urban and suburban jurisdictions restrict lawn length and the presence of “weeds.” You should check with your local zoning board and adhere to mowing requirements if they exist or propose changing them to benefit wildlife.

Fallow Fields, Grasslands, and Maintaining Existing Cover

To keep valuable grasses from being overtaken by competition, mow one-third of a field once a year in succession, rotating sections of the opening so each is mowed every third year. Mow one strip the first year, a different strip the next year, and the last untouched strip the next year. This will create diverse vegetation stands with differing age structures, which will provide food and cover for many wildlife species. It will also keep woody stems small enough to be mowed. When possible, grasses should be baled to remove thatch from the field and prevent buildup at ground level. Mowing should be performed outside of wildlife nesting periods (mid-August). This allows nesting wildlife such as cottontails and quail to mature during the spring and summer with minimal disturbance. Mowing height is also critical. Native grasses should not be cut below 10 inches. Cutting these grasses too low may damage or kill them, because the grasses store much of their energy at their bases. Also, cutting at a minimum height of 10 inches, provides some wildlife cover until regrowth of the plant canopy can occur.

Roadsides, Ditches, and Field Edges

These areas provide important nesting and foraging areas for birds, small mammals, deer and insects. Wildlife habitat can be enhanced along roadsides by reduced mowing, delayed mowing, planting native grasses, and mowing at a higher height. Contrary to popular belief, mowing more than 10 feet along roadsides does not significantly reduce mortality of wildlife on roads.

Mowing should be limited along roadsides, ditches, and field edges. By limiting how often designated areas are mowed, you allow vegetation to attain optimal height for wildlife habitat. Mowing once every

two or three years at a minimum height of 8-12 inches will prevent woody growth from taking over an area. Mowing along roadsides should occur in late summer (August 1-31) to allow most nesting birds and small mammals to successfully rear their young. Countless nests and young are destroyed with mowing earlier in the year, and most equipment operators are unaware of the high number of nests that are destroyed while they are mowing.

Mowing Considerations: Alternatives to Mowing

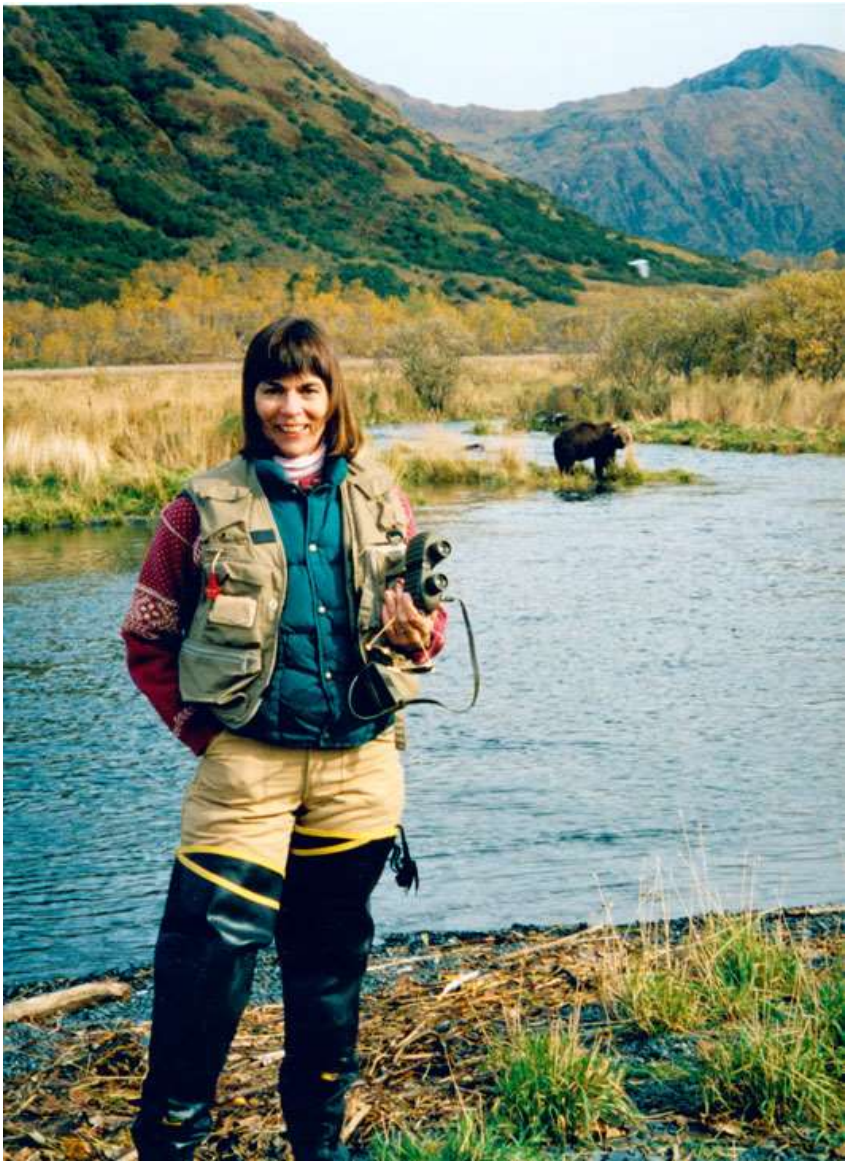
For controlling noxious weeds and woody plant invasion on grass stands, the preferred alternative to mowing is spot spraying with selective herbicides. Controlling invasive plants in grass stands is more economical and effective if outbreaks are treated at first detection.

Another alternative to mowing is strip or rotational disking. Disking is a simple, effective, and inexpensive wildlife habitat management tool. In strip disking, a disk or harrow is used to create ground disturbance and set back natural succession by breaking up grassy vegetation. Disking opens up grass stands, reduces thick mats of grass, stimulates germination of seed-producing plants, and increases insect populations as a wildlife food source.

Controlled burning also should be considered as an alternative to mowing, especially when managing many larger fields. Controlled fire sets back natural succession and stimulates growth of valuable grasses and legumes, by releasing nutrients. Controlled burning is less expensive and time consuming than mowing and produces many wildlife and forage benefits. However, controlled burning requires careful planning and controlled conditions to be an effective management tool.

Mollie Beattie, Headed Wildlife Service

By William Dicke, June 29, 1996



Mollie H. Beattie, director of the United States Fish and Wildlife Service passed away at 49 years old in 1996. She left an incredible legacy of appreciation for biodiversity.

A forester by training, Ms. Beattie was the first woman to head the agency. In three years as director, she defended the Endangered Species Act against attacks from many in the opposing party in Congress at the time, and fought efforts to reduce the agency's budget, not always successfully.

"In the Clinton Administration, she was probably the strongest single voice for wildlife conservation," said Rodger Schlickeisen, president of a nonprofit group that works to protect and preserve species.

Ms. Beattie was a strong proponent of the effort to have gray wolves in Yellowstone National Park for the first time since the 1920's. Mr. Schlickeisen said one of his most vivid memories of her was seeing her rub cold water on the belly of a wild wolf at Yellowstone in April to cool it so the animal could be moved to another site for release. Despite the rain in her face, he recalled, she smiled broadly and said, "Any day I can touch a wild wolf is a good day."

As director, she was responsible for the wildlife service's 7,000 employees and an annual budget for resource management of $501 million in the current fiscal year, down from $511 million the previous year. The agency, part of the United States Interior Department, enforces wildlife laws, administers the Endangered Species Act and carries out wetland protection and management.

Ms. Beattie sought to conserve species by managing entire ecosystems rather than waiting until individual species became endangered and presided over the addition of 15 national wildlife refuges to a system that now has 508 in 1996.

The agency said that under her direction 140 habitat conservation plans were established and 300 more were being developed. These plans are formal agreements between landowners and the Fish and Wildlife Service that allow the owners to harm individual members of a species listed as endangered or threatened if they take steps to help the species as a whole to recover.

She argued that such plans demonstrated that the Endangered Species Act, under which they are carried out, has the flexibility to conserve species while allowing economic development. In fact, she said, the act "has been one of the

biggest success stories of the conservation movement in America," contending that many myths had been spread about the act's supposedly onerous effects.

Just before her passing, she led efforts to resume the listing of endangered species after a 13-month moratorium imposed by Congress, which sharply cut the agency's money for such listings in the current fiscal year.

Representative Don Young, Republican of Alaska, introduced legislation in the House and Senator Ted Stevens, Republican of Alaska, in the Senate to name an eight-million-acre wilderness in the Arctic National Wildlife Refuge after her.

Mollie Beattie was born on April 27, 1947, in Glen Cove, Long Island, New York. She earned a bachelor's degree in philosophy at Marymount College in Tarrytown, N.Y., in 1968 and a master's degree in forestry at the University of Vermont in 1979. She also received a master's degree in public administration from Harvard University in 1991.

She was program director and lands manager for the Windham Foundation, a nonprofit organization that conducts seminars on critical issues facing Vermont, from 1983 to 1985; commissioner of the Vermont Department of Forests, Parks and Recreation from 1985 to 1989, and deputy secretary of the state's Agency of Natural Resources from 1989 to 1990. She left to become executive director of a public policy institute, the Richard A. Snelling Center for Government in Vermont, before taking her post at the Fish and Wildlife Service.

One of Mollie's most famous quotes:

"When Americans are asked what the most pressing environmental issues are, they cite pollution issues such as toxic wastes and clean water. Problems like loss of biodiversity, rapid depletion of natural resources and the international problems of population explosion are way down the list. And yet these are the issues that are of greatest importance to the long-term health of our world."

Source: Mollie Beattie's obituary in the New York Times, June 29, 1996

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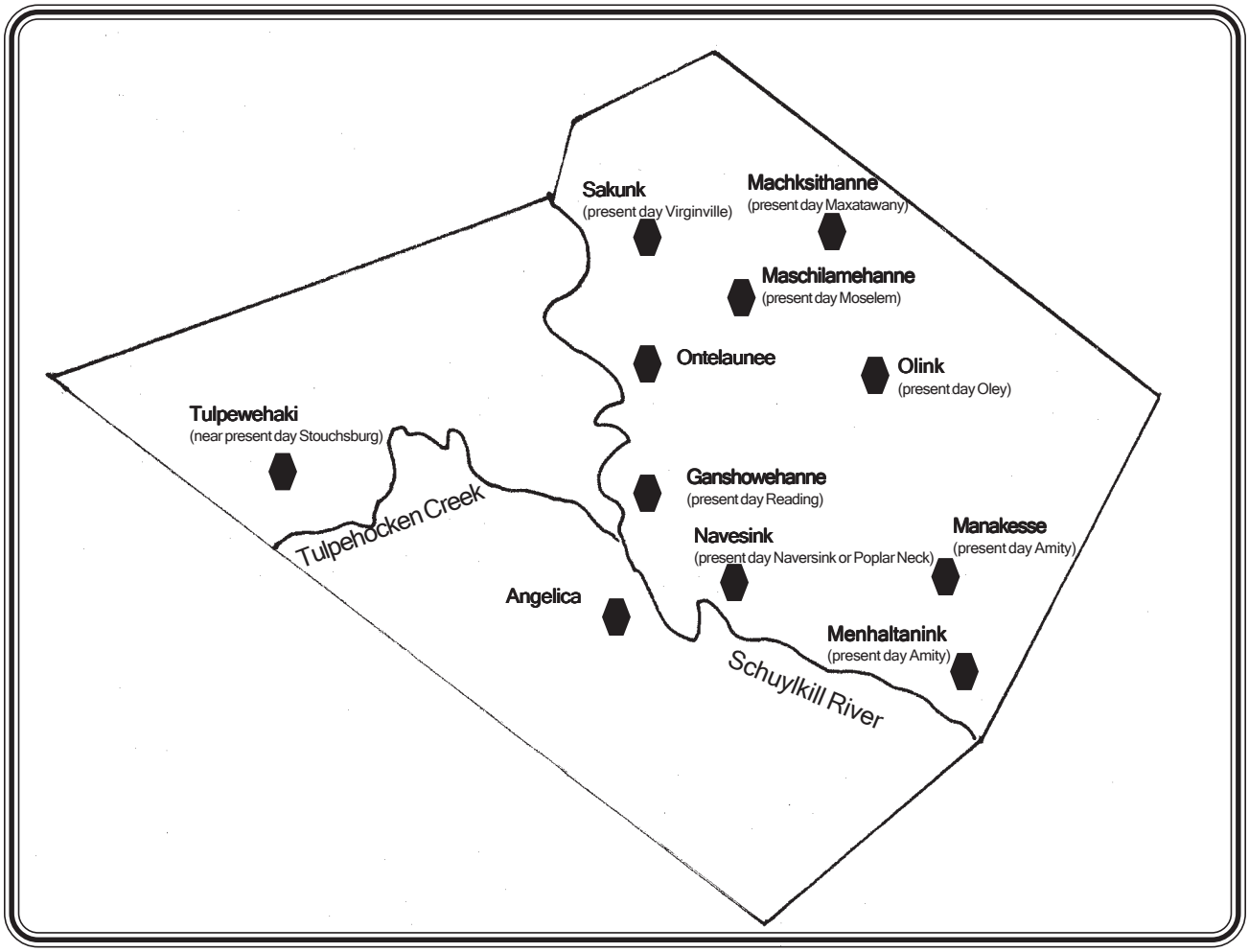
The Lenni Lenape

The Lenni Lenape, or Delaware Indians, were living on Hawk Mountain when the first Europeans from Holland and Sweden came to the New World in the early 1600s. "Lenni" is the American Indian word for original or common and "Lenape" means "people". The Lenape were hunters, fishers, gatherers, and farmers, with no written language, but with a rich oral tradition of telling stories. For this reason, most of what we know about the Lenape comes from incomplete descriptions and accounts of the first Europeans.

The Lenape nation consisted of three main tribes, the Unami (Turtle tribe), the Wunalachtico (Turkey tribe), and the Minsi (Wolf tribe.) Although they were all Lenape, each tribe had different language dialects and most likely, different tribal customs. The Lenape near Hawk Mountain belonged to the Unami tribe.



Locations of Lenape villages in Berks County

(Adapted from: Conie Andrews (1997). Berks County Native American Past. Newspaper in Education: Reading Eagle Company, Reading PA.)

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Family Life

The Lenape lived in clans, groups of related families that traced their origins to common ancestors. Clan membership was passed down through succeeding generations of women. Every person belonged to the same clan as his or her mother. This is called matrilineal descent. Matrilineages held the rights to households and clan lands, and owned them in trust for their clan. When a Lenape couple married, they went to live with the bride's family. This allowed women from the same clan to stay together on the same land over the course of many generations.

Children were very important to the Lenape and were greatly desired and loved. After birth, the baby was wrapped in an animal skin and tied to a cradleboard. This cradleboard could be carried on the mother's back or leaned against something while she worked. Lenape children did not receive names until they were four or five years old. Before that time, a nickname was used. A person received their name from a name-giver. No two people were given the same name. Name-giving was an important tradition to the Lenape.

Houses

The Lenape lived in wigwams or long houses, and not the teepees often associated with American Indians of the Great Plains. To make a wigwam, a frame was made by bending saplings into a dome-like shape. The dome was then covered with sheets of bark, evergreen branches, and animal skins. A hole was cut in the top of the roof to let smoke escape during cooking. Long houses were much larger than wigwams. Large long houses measured 60 feet long by 20 feet wide and housed several families. Each family would have their own space inside, and their own fireplace. Sweat lodges ("steam rooms" used for spiritual and medicinal purposes) were built in much the same way, though on a smaller scale.

Tools and Utensils

The Lenape used many different tools and utensils, for many different purposes. Most farming was done with small hand tools including the celt (a stone ax), the dibble (a sharply pointed stick with a fire-hardened tip used for making holes to plant seeds), and hoes made from blades of stone attached to a handle. Although these instruments could penetrate the soil and break up clods of earth, they did not dig very deeply or very efficiently.

Stone was a common medium for tool making. Wood was also used, and the two were often combined for tools like a mortar and pestle. The mortar might be made from a tree trunk, while the pestle was make from stone. Knifes, arrowheads, and hammers were also made from stone. Bones were also used for making tools and dishes. Turtle shells were used as bowls, and the shoulder blade of a deer or elk sometimes was used in place of stone to make hoes.

Women made dishes and cups of carved wood, gourds, and seashells. The Lenape women also were potters, and made dishes in a variety of shapes and sizes to serve as cooking and storage vessels, and to hold water. Clay was obtained from lake beds and riverbanks.

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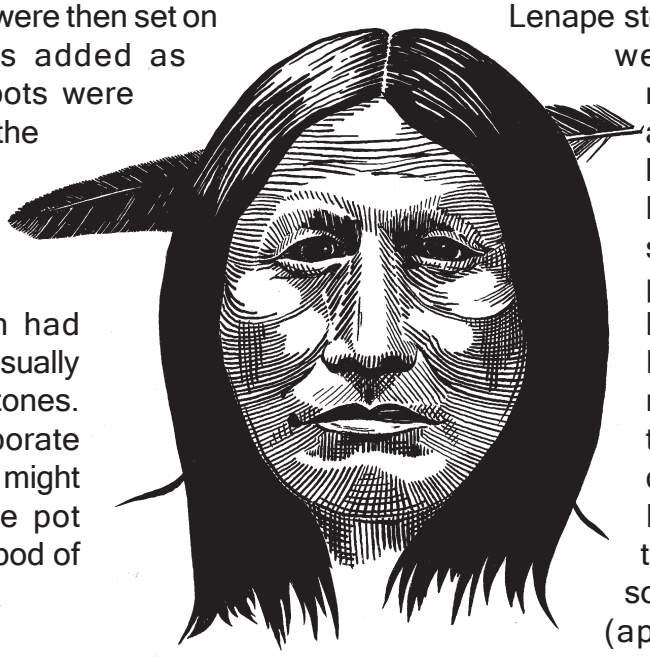
To make a pot, a measured amount of temper (crushed stone, shell, and plant fibers) was added to dry clay and mixed until the ingredients were blended. Water was added, and the mixture was wedged, or kneaded. Coil pots were made by rolling clay into rope, coiling the rope into a circle, and placing one rope on top of another. Pinch pots were formed by pinching the clay with the fingers. Pots were decorated with various designs and shapes. They were then dried thoroughly and covered with dried corncobs, bark, or wood, which were then set on fire. More fuel was added as required, until the pots were glowing hot. Heating the pots transformed the clay into a more durable ceramic.



Lenape pots, which had round bottoms, were usually supported by three stones. Some pots had elaborate collars to which a cord might be attached and the pot suspended from a tripod of three sticks.

Hunting and Farming

The Lenape grew corn, beans, and squash. Women were in charge of the crops, and preparation and storage of the food. Corn was prepared in a variety of ways. It was cooked with beans to make succotash, mixed with water to make hominy, eaten on the cob, dried and pulverized to make flour, or cooked with a number of other ingredients, including meat from the hunt. Much of the harvest was dried and preserved for the winter months when food became more scarce.

The Lenape understood what sort of conditions were best for growing desired crops. Lenape placed their gardens and fields on flood plains near streams, where rich, alluvial soils and sunlight were more readily available.

To prepare land for crops, the Lenape first cut down the smaller trees and girdled the larger ones, killing them. They then cut the dead trees. The trees were felled with celts, Lenape stone axes. After the trees were removed, the remaining twigs, stumps, and underbrush were burned. The ash created helped fertilize the soil. In spring, seed was then planted between the blackened stumps. Because the Lenape did not practice crop rotation, the fertility of the soil was depleted fairly rapidly. The Lenape simply moved their villages when nearby soils were no longer fertile (approximately every 10 years).

Men were in charge of hunting, although women often helped. The Lenape used bows and arrows, and spears to hunt deer, elk, black bear, raccoon, rabbit, turkey, goose, and turtle. One hunting strategy involved getting a large group of men and women together to surround a section of the forest and set fire to it. The animals were driven out of the forest towards the waiting hunters. In winter, the Lenape ate food grown during the

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summer and trapped beaver, muskrat, otter, and other fur-bearing mammals.

What They Looked Like

Young Lenape men shaved their heads almost entirely, leaving only a circular patch of hair on the top of the skull. Body and face paint was used, and tattoos were common. In warm weather, men wore breech cloths. In cooler weather, animal skins were sewn together and worn with the fur against the body. Moccasins kept the feet warm and protected in harsher weather. The men also wore pendant necklaces or tobacco pouches suspended from their neck or around their waist.

Lenape women had long, dark hair pulled back from the face and tied at the nape of the neck with a piece of leather. They occasionally painted their faces, but not to the same extent as did the men. In warm weather, women wore wrap-around skirts that extended below the knees. In winter, they wore leggings, and, like the men, fur cloaks and moccasins. They also wore pendant necklaces, earrings, armbands, bone combs, head or neck rings made from coils of dyed deer hair, and various other ornaments.

Maladies and Medicines

Sickness, accidents, and death were attributed to spirits or lesser supernatural beings who had been slighted or offended, or to witches and other evil people.

Herbal teas and poultices were used to help cure or alleviate the pains of arthritis, rheumatism, menstrual pains, cuts, bruises, dental problems, and abscesses, among other ailments. Medicinal plants were gathered carefully and with great ceremony. Offerings of tobacco and other valued items were left on the ground before the plant was picked. Many of the plants that are found at or near Hawk Mountain were used by the Lenape as medicine, including:

-**Tall Ironweed** (*Veronia altissima*) was applied to face to cure acne and to improve the complexion;

-Ragweed (*Ambrosia artemisiifolia*) was used in a poultice to prevent blood poisoning;

-**Wild Strawberry** (*Fragaria virginiana*) was crushed and applied as a face mask to improve the complexion;

-**Elderberry** (*Sambucus canadensis*): made into tea and given to newborn babies as a tonic and to cure colic;

-**Sumac** (*Rhus glabra*) root was used to cure toothaches and canker sores, and made into tea for use as a gargle and to cure pyorrhea; and

-Corn silk (*Zea mays*) was boiled into tea and used, hot and cold, as a remedy for kidney ailments.

Games and Entertainment

The Lenape enjoyed many games. Games were fun and relaxing, a way to sharpen skills that might be needed in other parts of life, and to exercise. Games included:

The Moccasin Game in which four moccasins were lined up with an object hidden under one. The player had to guess which moccasin the object was hidden under; and

Jackstraws in which a bunch of sticks were dropped into a pile. Sticks had to

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be removed without disturbing any of the remaining sticks. The player drawing the most sticks won.

The boys played a game involving throwing a spear through a rolling hoop. Girls enjoyed a game in which a piece of leather with a hole punched in it was attached to a pin-shaped object. Participants threw the leather piece into the air and tried to catch it on the pin. Girls also played with dolls made of leather, wood, or cornhusks.

Wrestling, obstacle courses, and contests of strength were also common. Many of the games that children played prepared them for the roles that they would play as adults in Lenape society.

The Lenape held village-wide dances on evenings. Dancing also played a role in many religious ceremonies. Special dances occurred when war was declared, after the return of the war parties, and before and after hunting trips.

Singing was a major part of Lenape society. Drums and turtle rattles provided the musical accompaniment. Storytelling also was an important pastime. In addition to entertainment value, stories were important teaching tools. Through stories, children learned about their ancestors and tribal customs.

Life for the Lenape After the Europeans Arrived

When Europeans came – first from Holland and Sweden, and later from England, Ireland, Scotland, and Germany – they brought with them new farming practices, tools, and guns. In some ways, these changes made life easier for American Indians, but it soon led to their decrease. Diseases brought from Europe decimated American Indians populations. Settlers continued to push the American Indians further and further west, seizing land as their own and buying it from American Indians at low prices. Fighting became common, and the settlers broke many treaties with the Lenape. Many Lenape moved to Ohio, and after that, Oklahoma.

For the same reasons that we do not know very much about Lenape history, the Lenape of today also know little of their past. A lack of written records, considerable migration, and the deaths of knowledgeable elders all contributed to the loss of Lenape culture. Even so, place names in eastern Pennsylvania, New Jersey, and New York bear Lenape names, including Manhattan, Hackensack, Passaic, Tamaqua, and Tulpehocken. Even the Kittatinny Ridge gets its name from the Lenape word for “endless mountain”. Although some Lenape descendants remain in Canada and Wisconsin, much of their culture has been lost.

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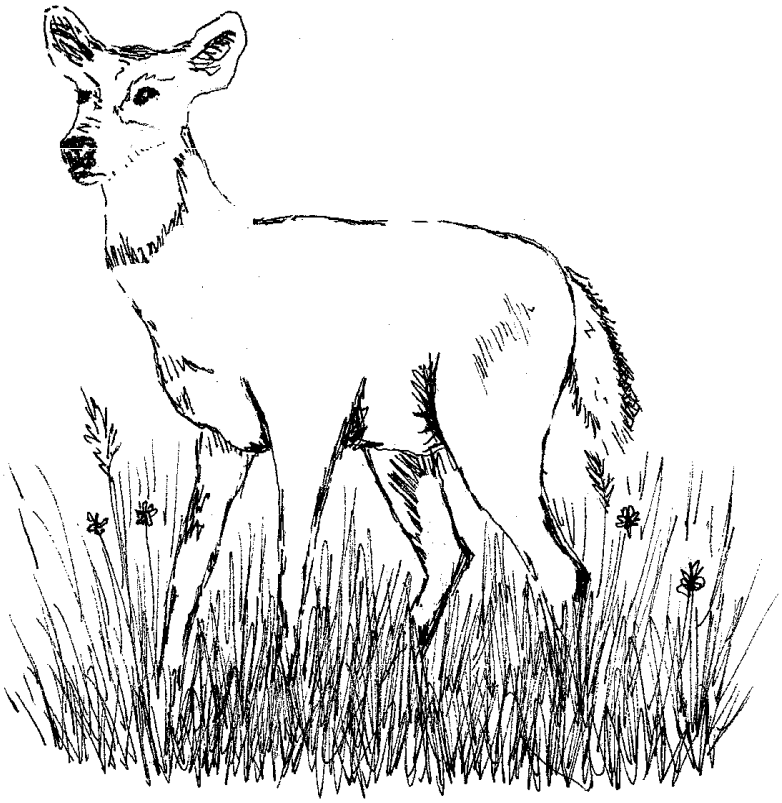
ACHTU (ACH-too) The Deer

Deer were important to the Lenape. Because the Lenape did not waste animal or plant parts, almost everything had a use, especially the deer!

Meat

Deer meat was smoked and dried to preserve it. (Even today many people enjoy smoked, dried deer jerky). Sometimes, the meat was pounded, and pressed into the layered "bricks", between which was layered dried, pounded berries, including blueberries, cranberries, shadberries, or dried, crushed mint leaves. Today, we call this food Pemmican.



Skin

Clothes and moccasins were made from deer skin. Deer hair was often used to decorate clothing. Rawhide was used to attach stones to wooden handles. The rawhide, which was applied wet, would shrink upon drying, creating a secure lashing.

Bones, Antlers & Hoofs

Bones and antlers were made into pendants, combs, awls, hoes, projectile points (arrowheads), game pieces, and dishes. Long bones were split for use as scrapers. Jaw bones were used to remove corn from the cob, especially when the corn was still fresh, to make succatash. Hollow bones were turned into musical instruments and whistles. Bone slivers were made into needles. Deer hoofs were used as dance "bells."

(Adapted from : Carla J.S. Messinger, Lenni Lenape Historical Society, RD 2, Fish Hatchery Road, Allentown, PA)

Note To Teachers

Do not be intimidated by teaching about American Indians, their rich cultural history,beliefs and traditions are a wonderful addition to any cirriculum.

The following guidelines may be useful in teaching students about American Indians:

1. Do not group all American Indians into one category. It is more appropriate to refer to a specific tribe or nation. Seek specific information on the tribe or nation you are discussing with your students.
2. Avoid the statement: “Back when the Indians were here...” There are American Indians living today in every state of the Union and in most metropolitan areas.
3. Should I dress up in traditional dress? This is up to the interpreter, but one should not copy the dress of another. Each item of dress, including colors, designs, and ornamentation, has a significant meaning for that person. In addition, do NOT give your students Indian sounding names, as these are demeaning and insulting to American Indians.
4. Include native literature, art, music, food and games into your discussion. Including a field trip to your local museum may increase students interest as well.
5. Where do I go to find accurate information? Your best place to start is by contacting tribal members. They will probably have a person responsible for archival and historic information. Also use the State Historical Society, local library, historians in the county and university. Be careful of books that group all American Indians together.
6. Avoid interpreting anything to do with the religion of the people, stories you have not been given permission to retell, and information that you question and cannot verify.
7. Involve the tribal members in the planning and presentation of their culture. Make contacts by attending powwows, contacting tribal offices, and involving American Indians at your facility, if possible have a tribal member visit your classroom or facility.
8. Always conduct thorough reseach before you present any information to your students.

Adapted from:

Interpretation of Cultural and Natural Resources. Douglas M. Knudson, Ted T Larry Beck. (1999) Ventura Publishing, State College, PA

Additional Resources:

Indian Country: Teacher’s Guide. Karen D. Harvey and Lisa D. Harjo. (1994) North Amer. Press, Golden, CO.

Europeans' Uses of the Land

Topic Page

Charcoal Making

In the early 1800s, several iron furnaces operated near Hawk Mountain. Charcoal was used to fuel these furnaces, and trees on Hawk Mountain provided wood to make that charcoal.

Charcoal making was a long, time-consuming process. In nearby forests, charcoal was produced by slowly burning large piles of hardwood logs under a covering of damp leaves, charcoal dust, and soil that prevented air from entering. First, a level circular space called a hearth was cleared. One or more poles, approximately six feet high and from three to six inches in diameter were placed in the center of the hearth, and a crude "Lincoln log" style chimney was constructed. *Billets* of wood about four feet long were then piled around the chimney lengthwise. Three lengths were stacked one on top of each other. Smaller pieces of *lap-wood* were used to fill the space between the billets. When completed, the pile of wood was about forty feet in circumference, six to twelve feet high, and shaped like a cone with the top cut off. The center poles were then withdrawn and the hole was filled with chips and dry shavings. The mound was covered with several inches of leaves, forest duff, and charcoal dust to make it air tight, allowing the wood to smolder instead of burning outright. Chips and shavings were lit, and holes were made at the bottom along the outer edge so that the fire would burn downward. The fires were tended around the clock by men called "colliers." Colliers lived in the woods from May through October to be near their work.

A charcoal mound consisted of approximately 25 to 50 cords of wood. It was not unusual to produce 35 to 45 bushels of charcoal per cord of wood.

To make one ton of iron required the heat produced by nearly 400 bushels of charcoal or a half an acre's worth of twenty-five to thirty year-old trees. Most iron furnaces produced two tons of iron every 24 hours. Eight or nine charcoal hearths might be needed to feed one furnace. As a result, the forest was full of smoke much of the time.

The charcoal industry thrived until anthracite coal replaced charcoal as a preferred fuel in the mid-1800s. Even then the forest was logged to provide timber needed to build struts for the coal mines.

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Europeans' Uses of the Land

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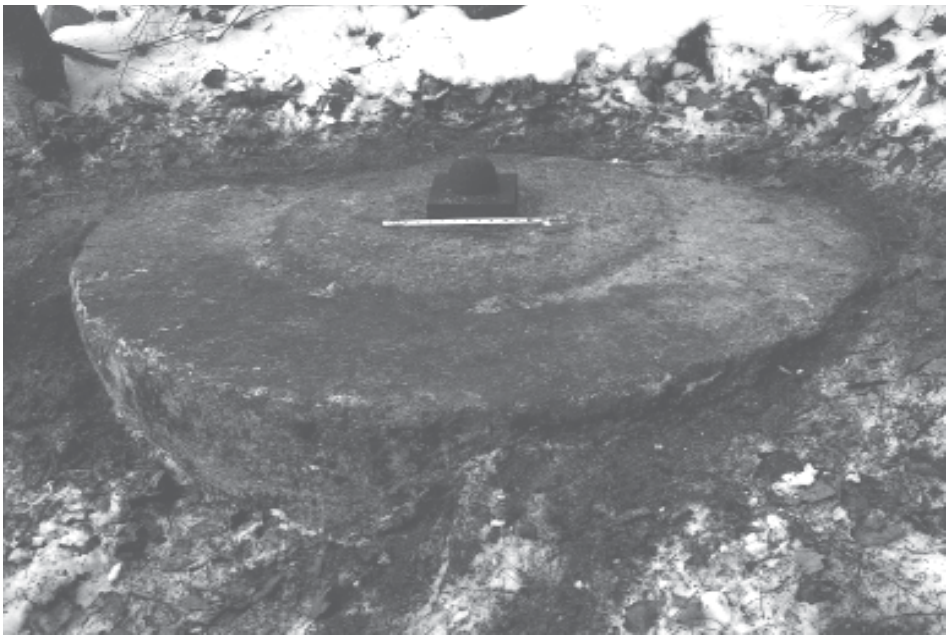
Sandstone Quarrying

In the middle of the nineteenth century a small sandstone quarry was operating on top of Hawk Mountain. The J.D. Stone & Co. Quarry was 500 yards west of the North Lookout at a place known today as the "Hall of the Mountain King." On an 1830 Schuylkill County map, this point is marked as a "body of remarkable sand," and referred to as the "Sand Head."

Sand from the quarry was initially hauled down the mountain to the Little Schuylkill Railroad in wagons by mules. Later, rocks were loaded into large cars and eased down the mountain to the river by a cable railroad. This railroad operated by gravity and was almost identical to the incline of today. The car at the top was loaded with rock and let down the mountain, pulling an empty car at the bottom of the mountain upwards on the same cable. The two cars passed one another at a switch-out mid-way in route. Two brake houses were used in this operation, one at the top of the mountain and one at the bottom. The foundation of the brake house at the top of the mountain can still be seen today at what we call the "Slide".

At the bottom of the "Slide," the sandstone was crushed and transported by rail to manufacturers south of the ridge. Quarrying ended shortly before the turn of the century when a fire destroyed the machinery.



Sand mining relic at Hawk Mountain

Europeans' Uses of the Land

Activity Page

Industry on the Mountain

1. Imagine that you are a collier living in the woods at Hawk Mountain for half a year from May to October during the early 1800s. Write a one-page journal entry describing a day in your life on the mountain. Include wildlife sightings, if any, living conditions, a sketch of a hearth, and fire tending.

Advanced Questions:

1. The production of one ton of iron required heat from 400 bushels of charcoal, which required half an acre of 30-year-old trees. An iron furnace on average produced 2 tons of iron every 24 hours. How many acres of forest trees would be cut to keep one furnace running per year?

2. Did a young forest produce more or less wood per acre than older forests?

3. If one charcoal hearth produced 800 bushels, how many charcoal hearths would need to be burning to supply the monthly needs of one furnace?

4. What was the impact of charcoal making on forest ecosystems?

Topic Page

Schaumboch's--The Haunted Tavern?

"There never was a house like Schaumboch's, the little stone house by the side of the mountain road," wrote Maurice Broun, the first curator of Hawk Mountain. Maurice and his wife Irma called it home for many years. The myths that surround this lonely outpost are rather intriguing and involve stories of gunfights, murders, and the presence of unearthly spirits.

Schaumboch's, which is located on the east side of Hawk Mountain, was built by Jacob Gerhardt in colonial times. In 1755 when Jacob was 7 years old, his family was massacred by the Lenape. Jacob was the only survivor. He later built the small sandstone and chestnut house on the mountain where he lived for fifty-eight years.

After Jacob's death, the Blue Mountain house as it was then called, was owned by Priscilla and George Bolich. It became a convenient stopping place for people carrying goods and produce over the mountain.

In 1851 **Mathias Schambacher** and his wife Becky moved in. It wasn't long after Schambachers' arrival that rumors spread across the area. People told of merchants that would head up Blue Mountain (Hawk Mountain) never to be seen again. Allegedly, Schambacher

Schaumboch's--The Haunted Tavern?

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would get the travelers drunk on homemade applejack and then coax them into his barn. Once inside the barn, he would then dispose of the travelers by driving an ax into their heads, and dumping their bodies into a well. Supposedly, Mathias would then steal all the victim's possessions and take them to Port Clinton where with the help of his brother, the goods would be shipped to Philadelphia to be sold. Rumor had it that about eleven men were killed in this way.

Many people have related their own personal accounts of the goings-on. In 1939 a man from Auburn told **Maurice Broun** about his father who had been traveling past Schambacher's one night when a violent storm threatened. His father hoped to get out of the storm and stay the night at Schambacher's. Mathias agreed to let him stay and advised him to put his horses in the barn across from the tavern. However, when he pulled up at the old barn, his team of horses reared up and shied away. The horses seemed "possessed with terror" and flatly refused to enter the barn. When the man went into the barn, he found traces of fresh blood. It's not known where or whom the blood came from, but the man left the barn and headed down the road in spite of the storm. Others reported similar experiences. At this time people trusted the instincts of horses, and the stories spread rapidly.

Oscar Lutz, who also knew Mathias Schambacher, tells the story of his friend Elias Featherolf who had a brush with this "mean looking man." Elias had been walking up the mountain road one day when he heard a strange noise coming from the barn. As he neared the barn, he realized that the noise sounded like someone moaning. He went into the barn to investigate and found Schambacher up in the loft with a hatchet in his hand. When Mathias noticed that Elias was watching him, he became enraged and started yelling, "Go away; go away quick or I'll sink this hatchet in your head!" An infuriated man with a raised hatchet was enough to make Featherolf run like a scared rabbit.

Ed Trexler relates probably one of the most incriminating Schambacher stories. His parents told him about a peddler that headed up the mountain road loaded down with old civil war uniforms and supplies. The peddler went up one side of the mountain and was never seen or heard from on the other side. Later, Schambacher was seen selling these same uniforms and old civil war guns. Schambacher's guilt was never proved but his evil reputation became known throughout the area.

Schambacher died in 1879. He is buried in New Bethel Church cemetery, and many believe that his ghost still wanders the graveyard.

William Turner followed Schambacher as the tavern's innkeeper. Turner, who had ten children, lived in the tavern for about twenty years. Turner made Blue Mountain tea from sweet goldenrod, which he served it to the travelers passing over the mountain. Many of the people that were served by William were hawk-shooters that came to gun down the hawks as they migrated past the mountain during the fall. With 12 people living in the tavern and customers coming and going, Schaumboch's was a very busy place.

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Schaumboch's--The Haunted Tavern?

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In 1922, the tavern was sold to John E. Wenz. Wenz spent much time in Schaumboch's entertaining his buddies. The wild get-togethers were relatively civilized until prohibition; then things became exciting. Wenz rented the tavern to a group of bootleggers that set up a gin mill inside. The bootleggers lived in a shed outside Schaumboch's and watched their "plant" night and day.

Around 1930, authorities began to suspect that illegal activity was going on up on the mountain. One cool fall day, prohibition agents attempted to enter Schaumboch's and the shed. The bootleggers yelled at the agents from the shed and warned them that it would be wise for them to leave. After the agents disregarded the warnings, gunshot rang out from the shed. The authorities took shelter, and returned fire. Then they crashed into Schaumboch's, and after reinforcements arrived from Reading, the culprits were arrested. Schaumboch's was left in shambles.

In 1938, (after refusing to sell the property for 3 years), Wenz sold Schaumboch's to **Hawk Mountain Sanctuary**. Its location near the mountain's top made it ideal for the Sanctuary Headquarters. In August of 1938, Maurice Broun, and his wife Irma moved into Schaumboch's. They cleaned up the cottage and the grounds around it, which proved to be a great undertaking. When they had finished cleaning, repairing, and furnishing Schaumboch's, it looked better than it had in a long time. Although electricity and plumbing came much later, it turned out to be a very comfortable home. The Brouns' welcomed many into the house including geologists, writers, professors, and naturalists, adding to the colorful history of the tavern.

Interesting events continued to occur at Schaumboch's even after the Brouns moved in. In 1941, Schaumboch's was suspected of being a Nazi camp. It seemed perfectly logical to a group of men talking in a bar one night that there were a bunch of Nazis up on the mountain. Suspicious out-of-state cars traveled up and down the mountain, and some people would even stay the night at Schaumboch's. One man reported that he had seen a big dog and a uniformed man with a rifle guarding the door. Another man said that men were signaling from one of the lookouts (this actually was a man wielding a butterfly net). Yet another man jumped into the conversation by saying that in the woods behind the cottage was an ammunition dump. Word traveled fast after that night and it wasn't long before Sam Greenawalt, a state trooper, was assigned to investigate Schaumboch's and its inhabitants. After 3 weeks of careful observations, he determined that Schaumboch's was definitely not a Nazi camp.

After Maurice and Irma Broun left Schaumboch's, the tavern continued to house Sanctuary staff and it does even today.

Hawk Mountain Founders

Topic Page

Richard Pough

In 1931 Richard Pough, a Philadelphia photographer, naturalist, and hawk-lover, read an article about the "Status of the Goshawk in Pennsylvania." The article mapped the locations from where goshawks had been sent in for bounty, and Pough noticed an inordinate concentration of goshawks shot in the area north of Hamburg. In the fall of 1932, he set off to find the popular shooting ground, and stumbled upon Hawk Mountain, on a day when it was crowded with gunners.

He returned the next week with his brother and his friend Henry Collins. They happened to come on a windless day, when no hawks were flying, and no gunners were on the mountaintop. The ground was littered with dead and injured hawks, left over from previous days of shooting. The three men put the live hawks out of their misery, and then lined up the hundreds of carcasses and took pictures of them.

During the next two years, Pough tried various avenues to have the shooting stopped, with little success. In the fall of 1933, he showed his photographs and spoke about the problem to a meeting of the Hawk and Owl Society. The National Audubon Society expressed an interest in the situation and sent a scout to investigate. Unfortunately, there was no wind nor birds that day and the matter was dropped.

Rosalie Edge

In June of 1934, Pough received a call from a woman named Rosalie Edge. She had listened to Pough's plea at the meeting, and was ready to act on her own concerning Hawk Mountain. The fifty-six-year-old Rosalie Edge was a rare kind of person who was able to act independently on the strength of her own convictions; such courage and energy is all the more amazing when we remember how profoundly her behavior conflicted with women's usual role in the society at that time.

Besides being a bird lover, Rosalie Edge was an amateur poet and an ardent feminist; she drew much of her strategies and tactics from her experiences in the women's suffrage movement. As she described it:

> "When we suffrage women attacked a political machine, we called out its name, and the names of its officers, so that all could hear. We got ourselves inside the recalcitrant organization, if possible, and stood up in meeting."

An ability to rebel against powerful institutions led her not to accept certain practices in the National Audubon Society, of which she was a life member. These practices included the trapping of animals for fur, for which the Association was paid.

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Hawk Mountain Founders

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Starting in 1929, she began to attend Audubon Association meetings, and demand accountability from its leaders.

In protest, Edge and some friends formed the Emergency Conservation Committee (E.C.C.), an organization that would not only act against Audubon, but also would take on conservation projects that Audubon failed to adopt. One historian described Edge as a "radical amateur" conservationist, a fitting contrast to the then bureaucratic, cautious, and conservative organizations which she transcended.

In 1934, Edge borrowed the money to lease with an option to buy. She raised the funds to buy 1,398 acres of the land in 1938. She paid $2.50 an acre. In doing so, she established the first Sanctuary in the world for birds of prey.

Rosalie Edge

Hawk Mountain Founders

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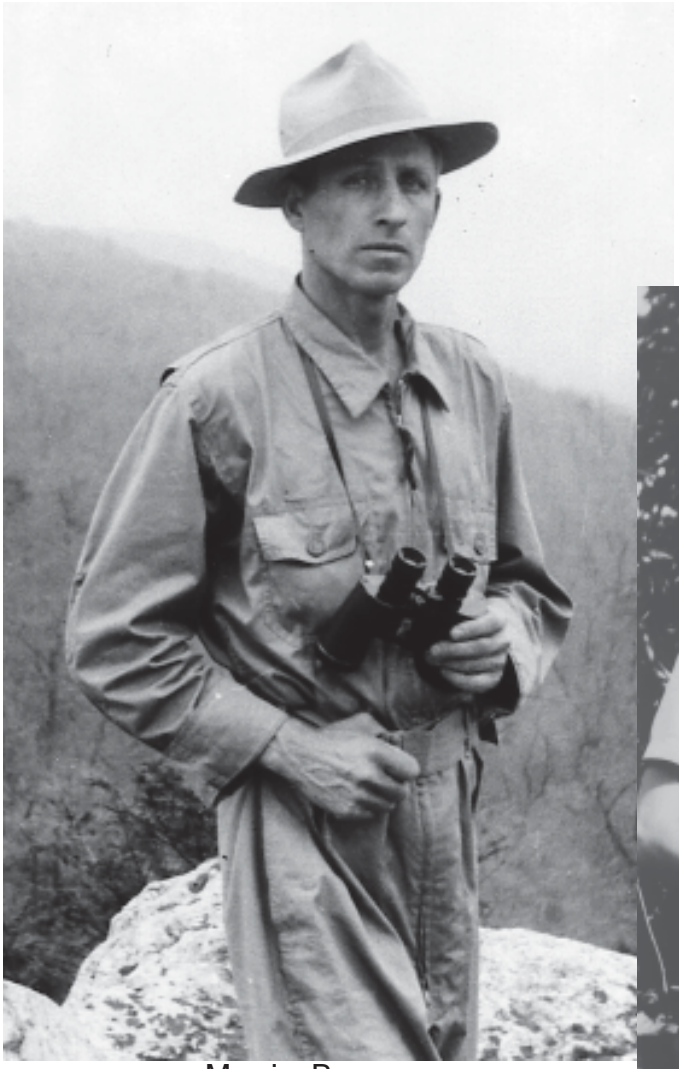

Maurice Broun

Maurice and Irma Broun

Rosalie Edge needed somebody to make sure the hawks at Hawk Mountain would be protected, and so she hired Maurice Broun to guard the Sanctuary. Maurice Broun was an ornithologist from Boston. Born of Romanian immigrant parents, Broun was orphaned at an early age. He lived in foster homes until he was 15 years old whereupon he began living on his own. His determination and courage well matched that of Rosalie Edge, as he spent his first seasons at Hawk Mountain directly confronting 166 hunters who came to the mountaintop to shoot, as well as posting signs in the area surrounding the Sanctuary. He faced tremendous local threats, hatred and opposition, but luckily no personal harm came to him.

Irma Broun

Maurice Broun's wife, Irma, worked alongside him for the 35 years during which he remained curator; often she acted as "keeper of the gate," while he remained on North Lookout to count the hawks as they

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Hawk Mountain Founders

continued ...

flew by. The couple lived at Schaumboch's for 18 years. They were without electricity or hot running water until 1950, when the Hawk Mountain road was finally paved.

Maurice and Irma remained on Hawk Mountain until 1966, and it was during these years that the education, research, and monitoring programs, which now distinguish the Sanctuary, came into being. Hawk Mountain's conservation efforts have broadened in a way that parallels the broadening of conservation efforts worldwide. What began as a desperate measure to protect the hawks flying over the Kittatinny Ridge has grown to 2,480 acres of increasingly precious preserved woodland habitat, and an organization with national and international repute.

Maurice and Irma conducted their own informal education programs, transmitting their infectious enthusiasm for conservation along with hawk identification pointers. Many Hawk Mountain "old-timers" fondly recall afternoons or evenings spent on the porch of Schaumboch's, chatting with the remarkable couple.

Except for the several years during which Maurice was in service in World War II, hawk counts have been made from Hawk Mountain's lookouts every fall since 1934. These early hawk counts provided a beginning to the Sanctuary's current research program.