

VERMONT

F^{ORESTRY} LETTER SERIES

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Enhancing Forests for Wildlife

Many landowners state that the opportunity to observe wildlife in their forest is an important consideration to them. Greater diversity in habitat means greater diversity in wildlife. No matter what size area you have, there are basic needs that must be met in order for wildlife to flourish. Before a landowner can evaluate and make habitat improvements, there are some basic concepts that need to be understood. So, let's start with some of these.

HABITAT REQUIREMENTS

There are four basic habitat attributes necessary for any species of wildlife. They are food, water, cover (or shelter), and space. Each individual species has its own particular requirements. Knowing these requirements for the species you are trying to attract or discourage will allow you to make better management decisions. Habitat requirements may change with the time of year, so keep this in mind as well. Vermont contains great ecological diversity within our borders. Landowners should consider the regional characteristics associated with their property as well as specific habitat features present. Once you know what species you would like to encourage and you research their habitat requirements, evaluate your property to determine if it will provide the required elements.

SUCCESSIONAL STAGES

Succession is defined as the orderly change of one plant community to another. However, our forests were not created or maintained in an orderly fashion. The landscape is a shifting mosaic created by natural disturbance. If the stages of succession were to progress in order they would change from: 1) bare ground 2) annual grasses & weeds 3) perennial grasses & weeds 4) shrubs 5) early successional shade-intolerant trees and finally 6) late-successional shade-tolerant trees. In New England, forest environments are constantly changing in response to wind, rain, and storm events and to human disturbances. Landowners can utilize sound forest management principles to guide that change to benefit wildlife on their property. The practice of manipulating the forest environment is called silviculture.

Dendrology clue #1: *Fagus grandifolia* is the only species of _____ in North America. It is seldom severely browsed by white-tailed deer. When other, more desirable tree species are available, it is usually nipped only sparingly.

The rate and stage of forest succession in a given stand varies due to many factors, such as soil condition, topography, frequency of natural disturbances, herbivory, and amount of competing vegetation. The species and abundance of wildlife also changes as a forest matures, due to the changes in the type of food, water, cover, and space available. Some wildlife species will require multiple successional stages to satisfy their year-round habitat requirements. Landowners should keep in mind that the greater the diversity of successional stages, the greater the diversity of wildlife. It is also important to consider that maximizing diversity on your woodlot may not necessarily be beneficial to wildlife at the landscape level. For instance, if your woodlot is a larger block of mature forest surrounded by early-successional forest, you should manage it for species that require the habitat type that isn't being accounted for on your neighbors land.

Your third quiz: ↓☺

Dendrology Challenge #3: *Dendrology is the botanical study of trees. Each forestry letter will highlight an important Vermont tree by displaying its leaves, seeds, nuts or silhouette within the issue. Can you guess what tree it is? Why is it important? What benefits does it provide to people, wildlife or the environment? See the clues throughout this letter and the answer on page 8 (no peeking!).*

Dendrology clue #2: This tree is the only nut producer in the northern hardwood tree type. Its distinctive triangular nuts are eaten by people and many kinds of wildlife, including ruffed grouse, wild turkeys, black bears, raccoons, red/gray foxes, white tail deer, rabbits, squirrels, chipmunks, opossums, and porcupines.

WATER, WATER, WATER

Water is an element that cannot be overlooked when considering the needs of wildlife. Wildlife can obtain sufficient water from their food, dew, raindrops on leaves, or puddles. But will often avoid otherwise suitable habitat for lack of a good water source. In addition to being used for drinking, water is used for bathing, for breeding (in the case of amphibians and reptiles), and for feeding.

There are a variety of water features that can occur on your land. These include swamps, marshes, bogs, streams, and temporary pools. It is important to identify and map these areas. Specific management recommendations and requirements can be made once the wetland types are identified. To protect the integrity of a wetland, it is recommended, and in some cases required, to leave a buffer strip around it. These buffers, particularly on riparian areas, offer travel corridors for wildlife which allow for safer travel between preferred habitats. If livestock are present, they should be fenced out of a wetland area and provided an alternative water source. If no water source is on or near your land, it is possible to create a pond, vernal pool, or other water feature. Consulting with a resource professional can help to determine the type of water sources on your property or the opportunity to create one.

SPACE AND COVER

Space and cover encompass the general layout and size of the habitat. Different layers of vegetation and their arrangement in relationship with each other affect the wildlife and their use of the habitat. For instance, some species may require the ground layer for food and the shrub or tree layer for cover. Edges (where two or more types of land cover types meet) attract or discourage wildlife inhabitants. How the cover types are arranged determines the ability of the habitat to support wildlife. Note that wildlife needs structure; in other words, they like it messy. Mowed yards or cleared underbrush limits the occurrences of many species.

Wildlife corridors, defined as areas of connected habitat, allow animals to travel from one fragmented habitat to another. These corridors are important for wildlife movement and dispersal especially in areas where fragmentation has occurred due to human or natural disruption.

MANAGEMENT PRACTICES

Depending on the species you wish to see, the habitat on your property may need to be altered or enhanced. There are a number of common management practices that can be undertaken to improve the quality of habitat on your land. However, some management choices that enhance one species may exclude or manage against another. It is also important to recognize that good habitat management requires landowners keep an eye toward the characteristics of the lands around them. As most woodlots are not large enough to meet all of the needs of wide-ranging species of wildlife, knowing how your land fits into the landscape is necessary to make good wildlife decisions. Landscape context is important for species that have smaller home-ranges as well. Given that wildlife diversity is dependent on habitat diversity, providing the same habitat condition on your land that your neighbor is providing may not benefit wildlife at the landscape level.

Forest Management

Timber harvesting is an important tool for landowners to increase the wildlife diversity on their land. Carefully planned harvests can be implemented to create the horizontal and vertical diversity necessary for good habitat. Horizontal diversity can be described as “patchiness”, where the landscape is composed of many different forest types or size classes (e.g. sapling, pole, sawtimber) of any one type. The greater the number of forest types and size classes within those types, the greater the wildlife diversity. Horizontal diversity can be enhanced via even-aged forest management that creates clearcut stands, sapling stands, pole timber stands, and sawtimber stands spread across the landscape.

Vertical diversity refers to the extent to which plants and trees are layered within a stand. The degree of layering is determined by the arrangement of growth forms (trees, vines, shrubs, & herbs), by the distribution of different tree species having different heights and crown characteristics, and by trees of different ages of the same species. A mature forest with a well-developed understory, mid-story, and canopy will support more wildlife species than a forest in which most of the vegetation is concentrated in one layer. Over time, uneven-aged forest management using selection harvesting will create forests with high vertical diversity. Vertical diversity is of greatest importance to mature-forest species, such as the scarlet tanager and the northern flying squirrel, while horizontal diversity is most important to early-successional species, such as the chestnut-sided warbler and the ruffed grouse.



Dendrology clue #3: The wood from this tree is excellent for turning and steam bending. It wears well, is easily treated with preservatives, and is used for flooring, furniture, veneer, turned products, containers and novelties, plywood, railroad ties, baskets, pulp, charcoal, and rough lumber. It is especially favored for fuelwood because of its high density and good burning qualities.

Native Tree Species

Native tree species composition refers to the combination and relative abundance of the tree species that make up a stand. Maintaining the natural tree species that are appropriate to the site and successional stage of the stand will benefit wildlife as each species of tree provides habitat for different species of wildlife. For instance, golden and ruby crowned kinglets nest exclusively in the tips of spruce branches while pine warblers nest and forage in pines. The relative proportions in which tree species occur in a stand can determine their influence on wildlife. Pure stands of spruce-fir are needed by some species, such as spruce grouse, whereas a single hemlock tree in a hardwood stand can be a wildlife magnet; hemlock provides cover, as well as “false truffles”, which grow with the hemlocks’ root system and are prized by mammals. The presence of yellow birch in a stand affects the distribution of many forest songbirds as it is sought out and preferred by foliage-gleaners.



Inclusions: Maintaining or creating overstory inclusions that are distinct from the surrounding forest type can also greatly increase the habitat diversity of forest stands. Typically these inclusions are too small to be mapped or treated as separate stands. Examples include patches of yellow birch in spruce-fir stands or groups of hemlock in northern hardwood stands. These inclusions may be the result of small scale site differences in soils or topography, or variations in the disturbance history of a stand. Many of Vermont’s forest bird species and mammals utilize these inclusions in one way or another.

Mast: Mast provides critical food resources for many species of wildlife. “Hard mast” refers to nuts and seeds while “soft mast” refers to fruits and berries. The high nutritional value in mast contributes to fat stores critical for migration or hibernation.

Hard Mast: American beech and red oak are the primary hard mast species in Vermont. Beechnuts are an important food source for black bears as well as white-tailed deer, wild turkey, ruffed grouse, and blue jays. Beech trees begin heavy nut production at about 40 years of age and produce good crops at 2-8 year intervals. There is considerable variation in the production capacity of individual trees where some trees consistently produce bumper crops of viable nuts while others rarely do. The trunks of smooth barked beech will tell the story of the trees’ value; the telltale sign of claw marks can be found on the good producers. Though limited to certain areas in Vermont, red oak also provides an important wildlife food source. Red oak begins producing acorns at 25 years of age and bears heavy crops at 2-5 year intervals, with peak production occurring when trees are 19-22 inches in diameter.

The seeds of maples, birches, ashes, and conifers are also important mast for small mammals and many species of songbirds. Conifer seed crops cause fluctuations in red squirrel populations, and songbirds such as the white-winged and red crossbills, pine grosbeaks, black-capped and boreal chickadees, and red-breasted nuthatches “invade” southward in winter during years of failed cone crops.

Some recommended practices to maintain or encourage hard mast producing trees include:

- 1) When harvesting, retain any beech with recent, fresh claw marks on the trunk or clumps of broken branches in the crown (bear nests).
- 2) Manage red oak stands on long rotations (>100 years or 20-26” diameter) to maximize acorn production by growing large trees with large crowns.
- 3) Manage stands for multiple species of mast producing trees and shrubs to maintain a diversity of available mast.

Soft Mast: Black cherry is the only canopy-level tree in Vermont that produces soft mast. Black bears, small mammals, and 28 species of birds include black cherries in their diet. Peak productions of black cherry trees occur between 30-100 years of age with good crops occurring at 1-5 year intervals. Numerous understory trees, shrubs, and herbaceous plants, including pin and choke cherries, mountain ash, highbush cranberry, and raspberries and blackberries produce soft mast as well.

Dendrology clue #4: This tree is monoecious, with flowers of both sexes on the same tree. The flowers are quite vulnerable to spring frosts. Male flowers occur in long-stemmed heads; female flowers in clusters of two to four.



Recommended practices to encourage or maintain soft mast for wildlife include:

- 1) Retain black cherry trees with good fruit production or evidence of use by black bears.
- 2) Maintain a component of openings dominated by raspberry and pin cherry.
- 3) When planting mast-producing shrubs, never plant invasive species such as multiflora rose, Japanese barberry, winged euonymous and autumn olive. Contact your local County Forester or Extension Office for a list of native species to plant on your specific site.

Apple Trees: Wild apple and crabapple trees planted by early settlers have survived and become naturalized on abandoned farms now reverting to forest. Over time these apple trees are crowded by shrubs and shaded by over-topping trees. Apple trees that are crowded and shaded over time do not bear fruit. There may be many of these apple treasures hiding in your woods. Releasing, or opening up these trees to direct sunlight, will help to increase their productivity. Annual pruning is another way to ensure consistent fruiting and tree health. Once producing apples again, these trees offer a wonderful food source for wildlife on your property. To help you identify apple trees and learn about pruning techniques consult resource professionals from the UVM Extension Office, Dept of Forest Parks and Recreation or VT Dept. of Fish and Wildlife.



SNAGS, DOWNED WOODY DEBRIS AND CAVITY TREES

Snags are dead or partially dead trees that are still standing. They often have cavities or are hollow. These provide a source of shelter for cavity dwelling animals. They are also an important food source as many insects use them to lay their eggs. The hatching insects attract woodpeckers and nuthatches. The moist areas of decaying trees often produce fungi and mushrooms providing a food source for chipmunks and squirrels. Caution should be used when leaving snags standing. As long as there is not a safety issue involved, some snags should be left for wildlife use. Most foresters and wildlife biologists recommend a minimum of 6 snag or den trees per acre. An old growth forest would have 2-3 times this many. Eventually snags fall and become part of the downed woody material. These are useful to a number of wildlife species. The usefulness varies with the stages of decomposition. Downed logs provide drumming sites for ruffed grouse, as well as denning sites for a variety of mammals such as opossums, rabbits, and skunks. Decomposing logs provide the moist, cool habitat required by many amphibians and reptiles and eventually become rich compost for the soil layer.

LEGACY RETENTION

Legacy retention is a tool used to retain ecological features that contribute to biodiversity and are most vulnerable to being lost due to timber harvesting. Legacy retention can be implemented in either a dispersed or patch methodology. Patch retention is most suitable when maintaining small dispersal limited species such as amphibians, flowering plants, mosses, and lichens. Patch retention can be used in clearcuts, shelterwood cuts, or areas that have rotation ages less than 100 years. A special consideration is in over-mature or old growth stands. Legacy patches should be maintained wherever such stands occur, regardless of harvest technique. Dispersed retention can be used successfully where features can persist without a buffer.



Examples of Legacy retention features include the following:

- 1) Single large live trees that provide nesting habitat for raptors, or are a substrate for “old growth” lichens and mosses, such as Lobaria sp. and “ladder moss”. These trees will eventually become snag and large woody debris.
- 2) Forested wetlands including woodland seeps, vernal pools, and riparian buffers which are critical for water quality, wildlife habitat, and travel corridors.
- 3) Rare plants, or uncommon plants that indicate high site quality sites.
- 4) Large patches and buffer strips that separate clearcuts. These are most efficient when there are characteristics such as large trees, lichens and/or mosses that have ecological significance in the proposed cut areas.
- 5) Smooth bark beech trees provide mast and may propagate disease-free strains of beech.
- 6) Pockets of softwood in hardwood stands or the inverse add to diversity.
- 7) Trees with fresh cavities which indicate recent woodpecker use or other cavity dependent species.



PERMANENT OPENINGS

Maintaining permanent openings of old field and brushy cover in a forested landscape provides valuable habitat for many species of wildlife. These areas, which are dominated by grasses, forbs, brambles, or fruity shrubs, provide for over 20% of Vermont's wildlife species. Prior to European settlement, these habitats were found previously in wet areas such as beaver-created meadows and in areas cleared by Native Americans. Non-forested habitats increased greatly with the expansion of agriculture through the mid-1800s but have been declining for the last 150 years. The value of these openings depends on the surrounding landscape. They are more beneficial in large areas of contiguous forested cover. Permanent openings should be maintained at 3-5 year intervals by brush-hogging (mowing), brush-cutting, or prescribed burning. Landings used for timber harvests can be cleaned of debris, leveled, smoothed, and seeded if necessary to prevent soil erosion to provide this habitat. Landowners should check with their County Forester on the availability of cost-share programs designed to reimburse the costs of these practices.

SPECIAL WILDLIFE HABITATS

Special wildlife habitats are features or places within a landscape that make unique contributions to wildlife diversity. Special habitats requiring consideration include woodland raptor nest sites, vernal pools, deer wintering areas, woodland seeps of springs, neotropical songbird habitat and beaver-influenced ecosystems.

Woodland Raptor Nest Sites: Nest sites for woodland raptors are limited in the landscape because these birds can be sensitive to human disturbance and habitat change in the vicinity of nests. Species such as the red-tailed hawk, red-shouldered hawk, broad-winged hawk, sharp-shinned hawk, and northern goshawk build large stick nests in major forks of mature hardwood and on the branch whorls of large white pine. Raptor nest trees must be sufficiently large and have branches strong enough to support the large nests of these species. Some recommended practices to maintain this habitat include:



- 1) Check mature white pine and large diameter hardwood trees for stick nests and retain during harvest. Also refrain from harvesting trees with 3 pronged forks and cavity trees.
- 2) Avoid harvesting activities within 1600 feet of nest site to curtail disturbance during the breeding season.
- 3) Surround raptor nests with an uncut buffer of at least 66' and maintain 65-85% canopy closure within a 165' radius.
- 4) When using the even-aged management technique of clearcutting, leave a group of several large trees to ensure future availability of mature trees for nest sites.

Vernal Pools: Vernal pools are an important habitat for many amphibians. Many pools occur naturally from spring runoff and snow melt, but vernal pools can be made if none are present on your property. Consulting with your forester, a biologist, or other knowledgeable person can help determine if vernal pools are present on your property, or if you have sites that would be satisfactory to establish one or more of these pools. If vernal pools are present, it is important to recognize that the pool itself is not the only important amphibian necessity; the surrounding forest habitat plays a crucial role in their life cycle as well. Adequate forest canopy provides shade and rotting logs provide cool moist shelter, both of which are necessary when the vernal pool dries up. If management activities are planned near a vernal pool, a buffer zone should be established so that disturbance to this area is minimized.

Deer Wintering Areas: White-tailed deer in Vermont live near the northern limit of their geographical range. Because of the severe winter conditions found in Vermont, deer require special habitats to survive. Deer wintering areas are typically lowland softwood stands that provide shelter from harsh winter weather by reducing snow accumulation and wind speed, while allowing access to food resources and escape from predators. Managing for deer wintering areas involves providing a minimum of 50% of the entire area in functional shelter at all times. Functional shelter is softwood cover that is at least 35' tall with crown closures of 65-70%. Deer mobility throughout a wintering area can be provided by managing unbroken canopies of softwood cover at least 200' wide. The Vermont Department of Fish and Wildlife has mapped most historic and active deer wintering areas in Vermont. Landowners should contact their District Wildlife Biologist to see if deer wintering areas occur on their land.

Dendrology clue #5: The wood is heavy, hard, tough and strong, and, until the advent of the modern chainsaw, during lumbering this species was often left uncut. As a result, many areas today still have extensive old groves of these trees that would not otherwise naturally occur.





Dendrology clue #6: A major killer of _____ this bark disease is initiated when a scale insect, *Cryptococcus fagisuga*, attacks the silvery-gray bark of this tree and renders it susceptible to bark canker fungi of the genus *Nectria*. Landowners who own trees with smooth undiseased bark should consider keeping them for wildlife and future growing stock.

Woodland Seeps and Springs: Woodland seeps and springs are small areas usually less than ¼ acre that occur where groundwater comes to the surface. Soils in these areas are typically saturated throughout the growing season and often remain wet throughout the winter. Because these sites are the first to green-up in the spring, they provide important access to food resources for black bears and early migrants, such as woodcock and American robins. Unfrozen seeps also provide a source of water for wildlife during the winter months and hibernation sites for some amphibians. Some management practices to consider include:

- 1) In stands containing woodland seeps, schedule harvests to occur on frozen ground or during the driest season.
- 2) Avoid running heavy equipment within 50 feet of a seep's edge. Also avoid interrupting groundwater flow above or below the seep by carefully laying out skid roads and trails before snowfall.
- 3) Conduct uneven-aged management in the vicinity of seeps. If using even-aged management, use seeps as nuclei for uncut patches to retain snags, cavity trees, and other site-specific features.

Neo-Tropical Songbird Habitat: Some neo-tropical songbirds are currently in decline for a variety of reasons. Some are due to habitat loss in the breeding territory and others to habitat loss in wintering grounds. Northern Vermont is a breeding habitat for these songbirds. Providing optimum breeding habitat will go a long way in allowing long-term success for these species. The following songbirds are the species considered “responsibility birds” or at-risk by Audubon Vermont (The Birder’s Dozen): American Woodcock, Yellow-bellied Sapsucker, Eastern Wood-pewee, Blue-headed Vireo (stable), Veery, Wood Thrush, Chestnut-sided warbler, Black-throated Blue Warbler (stable), Black-throated Green Warbler, Canada Warbler, White Throated Sparrow, and Scarlet Tanager (stable).

The following management practices may be implemented to maintain and improve habitat for these at-risk songbirds. It is important to understand that not all practices can be implemented on every property.

- 1) Create and enhance vertical structure; one way to accomplish this is to manage using single tree and small group selection silviculture, and to create small gap openings in the forest canopy.
- 2) Limit management activities to late summer, fall or winter, in order to minimize impact on nesting birds.
- 3) Keep forest buffers along streams.
- 4) When harvesting, retain a percentage of mast-bearing overstory trees, such as beech, oak, and black cherry, as well as mid-layer trees, such as hop hornbeam and apple where present.
- 5) Retain deadwood including standing snags and downed trees. Dead or dying trees will provide roosting, perching, foraging and nesting sites for roughly 40 bird species.
- 6) Soften edges between habitats. Negative edge effects caused by predation and nest parasitism can be minimized by feathering the edge, or developing irregular shaped edges.
- 7) Maximize forest interior. Forest blocks greater than 50 acres will increase the diversity of birds your woodlot can support. Forest interior is defined as habitat that occurs in unbroken forest at least 200-300 feet from the habitat edge. This is important for species such as scarlet tanager, black-throated green and black-throated blue warbler, and eastern wood-pewee.
- 8) Conversely, retain early-successional forest habitat. Early successional habitat may be accomplished through patch cutting or managing abandoned agricultural land. Patch cuts provide for early-successional bird species, such as chestnut-sided warbler, veery, and woodcock.

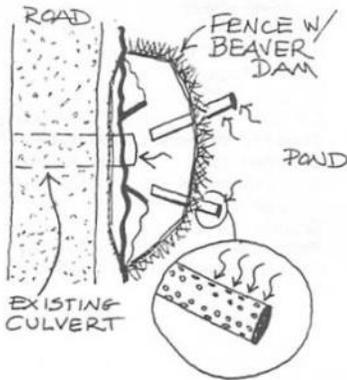


Scarlet tanager

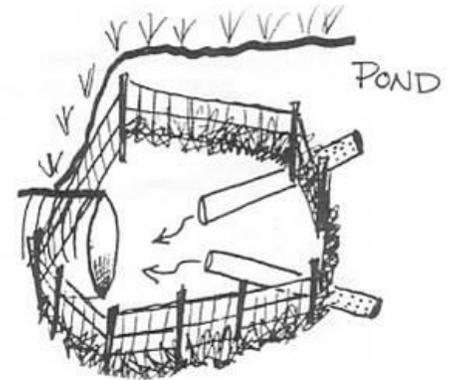


Beaver-Influenced Ecosystems: Beaver are considered a keystone species because they create habitat conditions for many species of wildlife. Openings created by beaver in forested landscapes progress from newly flooded areas to stagnant ponds to marsh to shrub land to young forest. Each stage of the cycle provides habitat for changing assemblages of wildlife. The pond stage provides for fish, turtles, waterfowl, furbearers, herons, osprey, swallows, and flycatchers. The meadow stage provides for amphibians, snakes, woodcock, and bear. The shrub-sapling stage provides nesting habitat for numerous species of songbirds. Recommended practices to encourage or maintain these habitats include:

- 1) Consider regenerating aspen and other hardwoods in small patches or strips along riparian corridors.
- 2) Locate new roads and trails where they are unlikely to be flooded by new dam sites.
- 3) Consider installing water control devices at culverts where beavers have flooded roads and trails rather than tearing out the dam. See sketch below. Consult your district biologist for assistance with these devices. You may also need to contact the Vermont Water Quality Division regarding permitting.



Build a horseshoe shaped fence (heavy gauge wire) around the upstream side of the culvert to keep beavers from plugging the culvert. For persistent problems, install perforated pipes through the fence into the pond.



What does it all Mean?

Choosing to manage your property with wildlife as one of your goals requires you to have an understanding of the resources you have and the species you would like to attract. However, you do not need to be the expert. Having a forest management plan will greatly improve your ability to positively affect wildlife on your property. Consult with professionals from the VT Dept of Fish and Wildlife, VT Dept of Forest Parks and Recreation and the UVM Extension office. Once you have exhausted the free resources you may wish to retain the services of a consulting forester and wildlife biologist.

Just remember, wildlife like it messy. When we see a brushy fence row or an overgrown field wildlife see home. Diversity should be your overall objective if you are looking to provide wildlife habitat. Keep in mind the year-round needs of your target species and work those into your management plan. Consider the basic needs of all wildlife species: food, water, cover, and space. With these in mind and with well thought out management objectives you are sure to see a great deal of wildlife utilizing your woods. The next step is to get out there and watch them!

Dendrology clue #7: The thin smooth bark of this tree is often the target of graffiti. One such tree in Jefferson County, Kentucky, in what is now Iroquois Park, bore the legend "D. Boone kilt a bar 1803 zois". This carving was never authenticated but the tree trunk section is now folklore and is part of the permanent collection at the Filson Historical Society Museum in Louisville. The tree died of disease and was cut down in 1932. The tree was located near an old trail which ran from the Falls of the Ohio to the Green River, via the salt works at Manslick and Bullitt's lick. According to Audubon's "Episodes", 1803 was the year that Boone supposedly was in the Green River area giving testimony at a land suit.



Photo courtesy of The Filson Historical Society

RESOURCES

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Check out the wildlife brochures from the Upper Valley Conservation Network at: extension.unh.edu/Wildlife/Wildlife.htm

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Lead Contact: Lisa Sausville 802-388-3880*

Coming up next.... Issue #4,
Forest Management

To contact RC&D about this letter or the
Forestry Letter Series call 802-828-4595
or beth_ann.finlay@vt.usda.gov

Dendrology Challenge Answer #4:
American Beech, *Fagus grandifolia*
Sources: U.S. Forest Service, Arbor Day Foundation, James J. Holmberg -Curator of Special Collections -The Filson Historical Society, Blue Planet Biomes, wikipedia, Pennsylvania Dept of Conservation & Natural Resources & Oregon State University, Net State, Google and www.elharo.com.

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