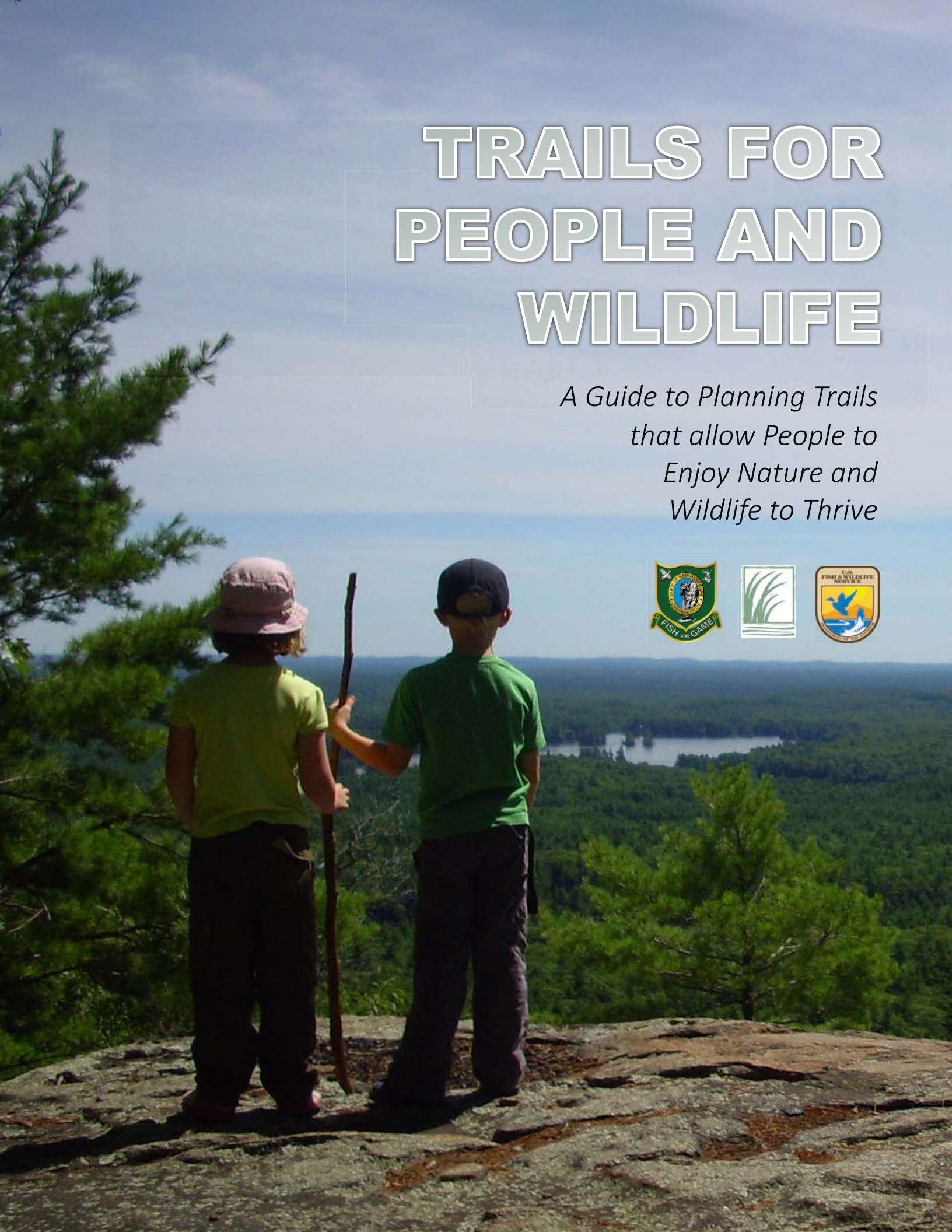


TRAILS FOR PEOPLE AND WILDLIFE

A Guide to Planning Trails that allow People to Enjoy Nature and Wildlife to Thrive

TRAILS FOR PEOPLE AND WILDLIFE

A Guide to **Planning Trails**
that allow ***People to Enjoy Nature***
and ***Wildlife to Thrive*.**

CYNTHIA D'AMBROSIO PHOTO

ACKNOWLEDGEMENTS

This “Trails for People and Wildlife” project was initiated through the Great Bay Resource Protection Partnership and developed by Katie Callahan (GIS Coordinator, New Hampshire Department of Information Technology-NH Fish and Game Department), Jim Oehler (NH Fish and Game Department, State Lands Habitat Biologist), and Rachel Stevens (Wildlife Ecologist with NH Fish and Game Department and Stewardship Coordinator with Great Bay National Estuarine Research Reserve). GIS modeling was completed by Katie Callahan. The project was funded by the US Fish and Wildlife Service with the NH Audubon Society kindly acting as fiscal agent.

The project was improved by comments from representatives of the Great Bay Resource Protection Partnership, Environmental Protection Agency, Ibis Wildlife Consulting, Lakes Region Conservation Trust, Monadnock Conservancy, National Park Service, Natural Resource Conservation Service, NH Audubon Society, NH Department of Transportation, NH Trails Bureau, Society for the Protection of NH Forests, Southeast Land Trust of NH, The Nature Conservancy, UNH Cooperative Extension, US Fish and Wildlife Service, US Forest Service, Upper Valley Trails Alliance, Washington Conservation Commission, and the White Mountain National Forest.

This guide was written by Rachel Stevens and Jim Oehler. It was edited by Haley Andreozzi (Wildlife Outreach Program Manager, UNH Cooperative Extension), Karen Bennett (Extension Forestry Professor and Specialist, UNH Cooperative Extension), Deborah Goard (Stewardship Director, Southeast Land Trust of New Hampshire) and Emily Preston (Wildlife Biologist with NH Fish and Game Department). Photos by Jim Oehler or Rachel Stevens unless otherwise noted. Cover photo by Paul Stevens. Graphics by Rachel Stevens with appreciation to the Integration and Application Network, University of Maryland Center for Environmental Science.

CONTENTS

WHY this GUIDE?

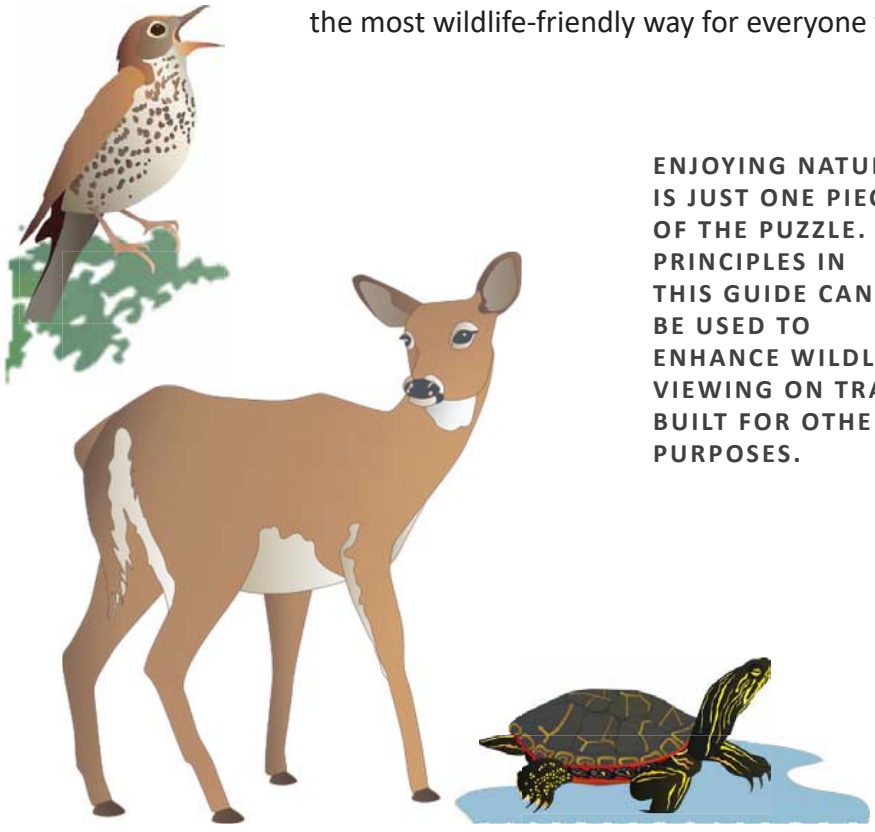
Our goal is to get people outside to enjoy nature while minimizing impacts to wildlife

Hiking, mountain biking, bird watching, and horseback riding are just some of the ways we get outside to enjoy nature and relax. However, even these seemingly low-key activities can have a negative impact on wildlife by reducing their abundance, reproductive success, or even survival.

The purpose of this guide is to help landowners, conservation groups and natural resource professionals develop a thoughtfully located network of well maintained trails that allow people to get outside to enjoy nature while minimizing disturbance to wildlife.

This guide can be used to decide where best to route new trails or to consider where it is best to maintain, reroute, or decommission existing trails.

Trails are built for many purposes, including exploring cultural history sites, going cross country skiing or mountain biking. Often a trail is used for multiple types of activity and consideration of wildlife is just one piece of the puzzle. Whatever a trail's primary purpose, the tips and statewide mapping tool described in this guide can be used to ensure it is laid out in the most wildlife-friendly way for everyone to enjoy.



ENJOYING NATURE IS JUST ONE PIECE OF THE PUZZLE. PRINCIPLES IN THIS GUIDE CAN BE USED TO ENHANCE WILDLIFE VIEWING ON TRAILS BUILT FOR OTHER PURPOSES.

TRAIL IMPACTS to WILDLIFE

TYPES OF IMPACT

There are several ways trail use may affect wildlife. The type and severity of impact will depend on the species of animal present, the season or time of day, and where the trail is located. Disturbance can include one or more of the following types;

Avoiding trails during the breeding season or harsh winter conditions is an easy way to help wildlife

Physiological
Changes in an animal's heart rate, temperature, or stress hormones.

Behavioral
Changes in foraging, vigilance or fleeing from perceived predators.

Reproductive Success
Reduction in the number of nests built, eggs laid or young born and successively raised.

Predation
Scaring an adult away leaves young vulnerable to predation. Adults may be preyed on directly.

Even though these disturbance events may be short in duration, cumulatively they can have significant long-term consequences. Disturbances are particularly impactful during harsh winter conditions, or the breeding season, when animals are already energetically stressed. Seasonal avoidance of trails during these times is an easy way to help wildlife.

CASE STUDY:
WOOD TURTLES IN CONNECTICUT

ONDREICKA/DREAMSTIME.COM

For twenty years researchers studied wood turtles (*Clemmys insculpta*) in a protected wildlife preserve in New Haven County, CT. They used mark-recapture techniques to investigate the population dynamics of 133 individual turtles.

They found turtle populations remained stable when people were restricted from the property. However, once the area was opened to recreational hiking and fishing, the number of turtles steadily declined until, in just ten years, none were left.

Investigation of the cause of the decline showed forest size and road building activity remained the same and the quality of air and water was constant. The authors concluded human recreation was behind the extirpation and that, without proper management, increasing recreational use of parks, reservoirs, and wildlife reserves will adversely affect the long-term survival of the North American wood turtle throughout the nation.

Garber and Burger. 1995. A 20-Yr Study Documenting the Relationship Between Turtle Decline and Human Recreation. Ecological Applications 5(4):1151

A TRAIL'S "CORRIDOR OF INFLUENCE"

As we explore a trail, our presence is detected by wildlife into the distance on either side of where we walk. This area is called a trail's "corridor of influence."

OUR PRESENCE CAN BE DETECTED BY WILDLIFE ON EITHER SIDE OF A TRAIL. THIS IS ITS "*CORRIDOR OF INFLUENCE.*"

The way wildlife responds to disturbance varies according to the severity of perceived danger. If the disturbance is mild they are likely to just interrupt what they are doing, such as sleeping, feeding, or finding a mate, and become "alert" to monitor the situation instead. A mild disturbance may also lead to changes in an animal's heart rate, temperature, or stress hormones. However, if an animal feels it is in imminent danger it will "flee," causing it to use precious energy as it escapes to a new locale. It may also cause an animal to abandon foraging grounds or a nest leaving young unprotected.

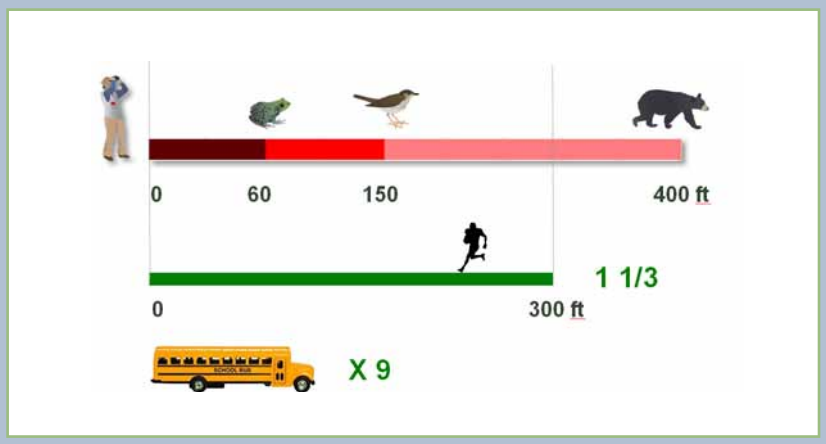
The distance at which an animal becomes alert or flees depends on the species, type of trail use, and surrounding habitat. In general, mammals are more tolerant of human presence than amphibians, reptiles or birds are. Typically, wildlife reacts to people much closer in open habitats than when trails are located in dense forest.

To determine the average corridor of influence for our region, New Hampshire Fish and Game staff did an extensive review of the scientific literature. Sixty-seven articles were used to calculate an average flight distance for amphibians and reptiles of 60 feet, to determine that birds become alert 150 feet on either side of a trail on average, and that mammals become alert to human presence at an average of 400 feet.

This 400 foot corridor of influence is equivalent to the length of one and a third football fields, or nine school buses, on either side of a trail. We can use this distance to assess any mapped network of trails and see the associated area of ground over which wildlife are likely impacted.

CORRIDOR OF INFLUENCE - DISTANCE IN NH

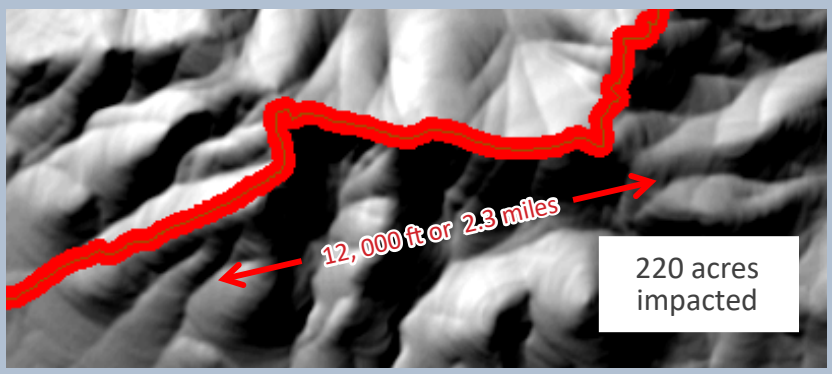
In New Hampshire, a trail's corridor of influence on wildlife is about 400 feet in each direction. This distance is equivalent to one and a third football fields, or the length of nine school buses, on either side of the trail.



CALCULATING A TRAIL'S IMPACT AREA

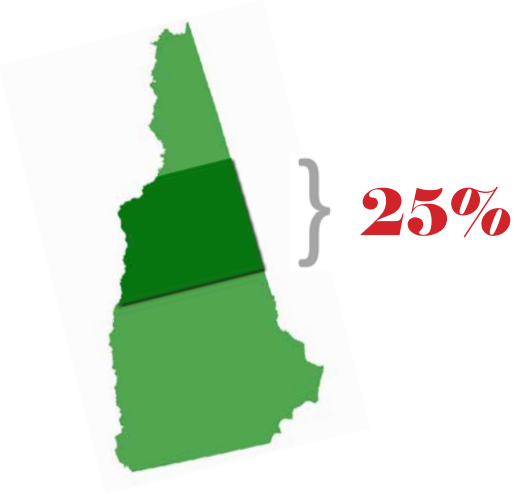
Measuring a 400 foot distance on either side of a mapped trail and multiplying it by the trail length can give us an idea of the area over which wildlife is impacted.

800 ft wide x 12,000 ft long
= 9,600,000 square ft
= 220 acres

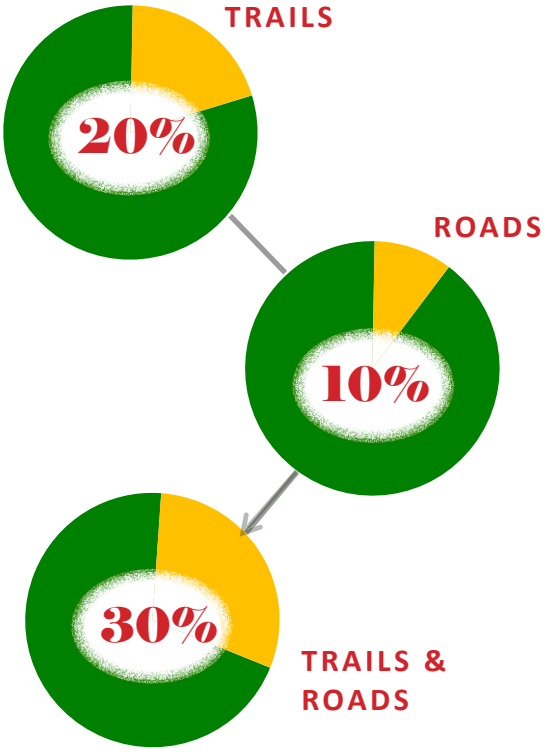


PRESENT DAY TRAILS ON PROTECTED LAND IN NEW HAMPSHIRE

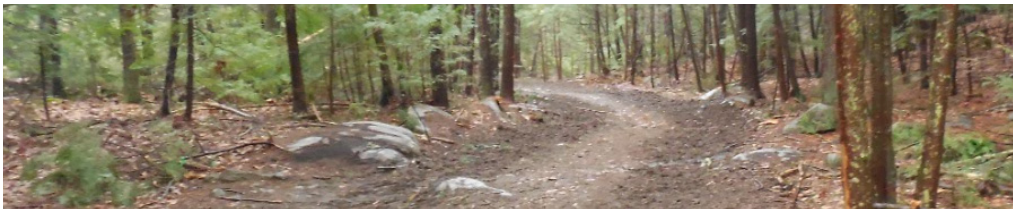
The ethic of land conservation is strong in New Hampshire. Individuals, communities, land trusts, non-profits and government agencies have worked together to protect over 1,503,606 acres statewide. That's just over an acre of protected land for every person, or one quarter of the entire state!



ONE QUARTER OF LAND IN NEW HAMPSHIRE IS PROTECTED. OF THIS, ABOUT 30% IS INFLUENCED BY EXISTING TRAILS AND ROADS.

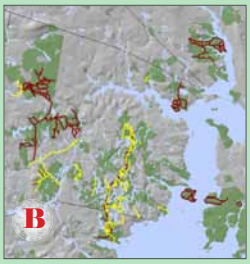


New Hampshire's protected land supports an existing network of trails and roads. Using the 400 foot corridor of influence on each side we can calculate about 293,110 acres are impacted by trails and an additional 153,450 acres by roads. This is a conservative estimate as many trails are not officially mapped so are not included in this study. It also does not include trails on private land which are likely just as prolific.

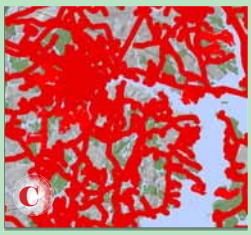


CASE STUDY:
DURHAM - WHAT LAND IS LEFT?

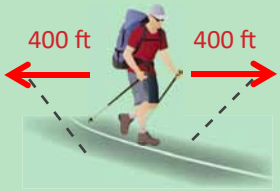
A statewide map of trails is available on the University of New Hampshire's online interactive mapping viewer "GranitView." Figure A to the left shows just those trails located on protected land in the town of Durham.



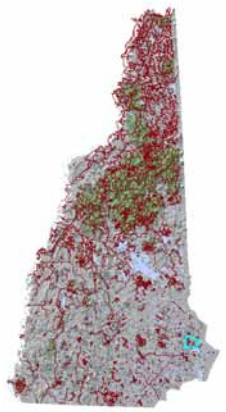
In addition to officially mapped trails, a network of unauthorized "bootleg trails" will exist. These are informal, non-designated trails created from frequent foot traffic. Figure B shows official and bootleg trails on protected land in Durham.



The largest area left in Durham where wildlife are not influenced by trails is 0.8 square miles.



If we add roads and overlay the 400 foot corridor of influence on either side, the areas shown in red in Figure C are where wildlife are impacted. The largest area left is just 0.8 square miles. In comparison, a bobcat's home range is over 30 square miles, an adult female black bear's range is about 10 square miles, and an adult male bear's can be up to 120 square miles.



TRAIL DENSITY IS NOT PARTICULARLY HIGH IN DURHAM COMPARED TO OTHER PARTS OF THE STATE.

LOCATING TRAILS with WILDLIFE in MIND

When looking at the landscape and habitats where an existing trail is located, or where you are considering building a new trail, there are some key principles that can easily be followed that will reduce trail use impacts to wildlife.

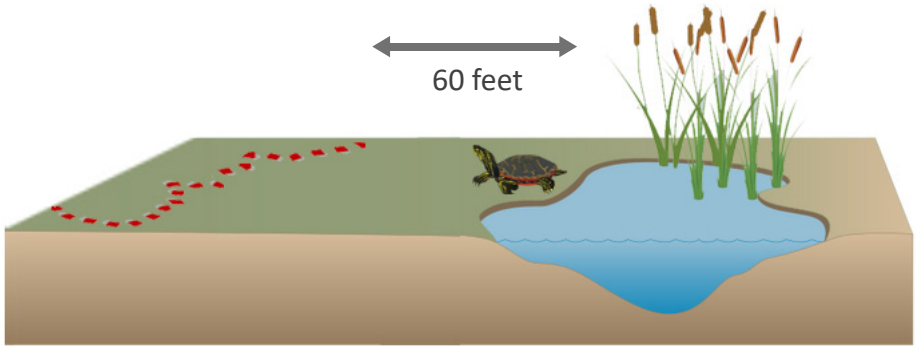
KEY PRINCIPLES

ROUTE TRAILS AWAY FROM WET AREAS

Riparian areas are the vegetated regions surrounding rivers, streams, wetlands, and other surface water bodies. They provide many ecological services including flood control and are particularly important wildlife habitat as they provide food, cover and travel pathways for many species. Routing trails away from wet areas avoids disturbance to wildlife including waterfowl and wetland birds. Minimizing disturbance is particularly important for rare species such as Blanding's and Spotted turtles. Avoiding wet areas or slopes also minimizes trail maintenance as these are commonly areas of erosion.

Avoiding wet areas or slopes protects rare wildlife and also minimizes the need for trail maintenance

ON AVERAGE, NEW HAMPSHIRE AMPHIBIANS AND REPTILES FLEE FROM AN AREA WHEN PEOPLE ARE DETECTED 60 FEET OR LESS AWAY.



AVOID STEEP SLOPES

Peregrine falcons, bobcats and rare small-footed bats are all known to raise young on steep slopes. These hard to access areas mean young are more protected from predators. Just like with wet areas, avoiding steep slopes will also reduce the need for trail maintenance.

CHRIS MARTIN/NH AUDUBON PHOTO

AVOID KNOWN LOCATIONS OF RARE SPECIES

Wildlife are often aware of us even if we think we are passing by undetected. Avoiding known locations of rare species helps minimize disturbance. Places where rare species concentrate are particularly important to avoid. Examples include bat roosts or snake hibernacula.

The NH Natural Heritage Bureau (NHB) maintains data on known locations of rare species and exemplary natural communities. The NHB DataCheck Tool allows anyone planning a project in New Hampshire that requires a permit to find out if there are NHB records in the vicinity of the project. Check out the tool online at www.nhdfl.org/Land-Conservation/Natural-Heritage-Bureau.

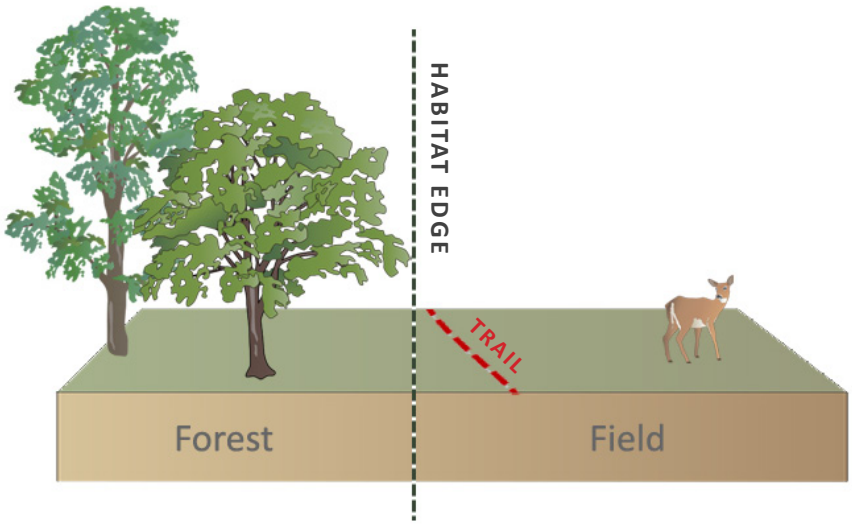
For questions about rare species in NH that are not related to a permit application, call NHB at 603-271-2214 or send an e-mail to NHB.Review@dncr.nh.gov. Talking to local landowners can also be a valuable source of information.

WILDLIFE ARE OFTEN AWARE OF US EVEN IF WE THINK WE ARE PASSING BY UNDETECTED.

In addition to the rare species tracked by NH Natural Heritage, the Trails for People and Wildlife location tool described in the next section of this booklet includes areas where heron rookeries are present and cliffs with current or historic peregrine nests. Rare plants are not included in this layer as field surveying is often a better option to find their locations.

ROUTE TRAILS ALONG HABITAT EDGES

Habitat edges occur where any two structurally different habitats meet. In New Hampshire, this can be the interface of any combination of field, forest, shrubland, pine barren, wetlands, cliffs or alpine area.



Routing trails along edges minimizes fragmentation of large blocks of habitat that support some of our less common specialist species. An example is the ovenbird which nests on the ground in forests making it, and its young, vulnerable to predation. Nesting success is far greater in the forest interior where birds are more protected away from predators such as skunks and raccoons.

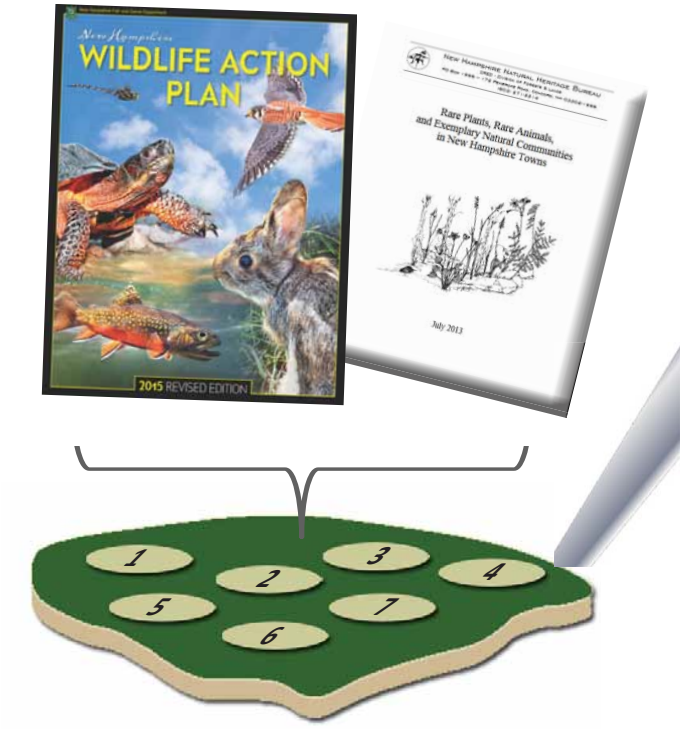
ROUTING TRAILS ALONG HABITAT EDGES PREVENTS FRAGMENTATION OF LARGE BLOCKS IMPORTANT TO SPECIALIST, AND SO LESS COMMON, SPECIES.

AREN'T HABITAT EDGES HOT SPOTS FOR BIODIVERSITY?

Traditionally it has been recognized that habitat edges are where we are likely to find the greatest diversity of species. This is correct as there is a chance we will run across wildlife associated with either of the abutting habitats. However, they are likely to be more generalist species that can make use of a diversity of habitats and less sensitive to disturbance. Routing trails along edges will protect the less common habitat specialists such as bobolinks and eastern meadow larks in grassland and New England cottontails or whip-poor-will in shrubland.

AVOID SPECIAL HABITAT TYPES

Some habitats are rare, or support wildlife that are particularly sensitive to disturbance. The most recent version of New Hampshire's Wildlife Action Plan and the Natural Heritage Bureau's list of exemplary natural communities were used to identify seven key habitat types to avoid locating trails within if possible. A list of exemplary natural communities present in each town is available at www.nhdfl.org/DRED/media/Documents/TownList-(1).pdf.



SEVEN KEY HABITATS

- EXEMPLARY NATURAL COMMUNITIES
- PINE BARRENS
- SHRUBLANDS
- WETLANDS
- ROCKY RIDGES OR TALUS SLOPES
- POORLY DRAINED SOILS
- GRAVEL PITS

University of New Hampshire Cooperative Extension staff have produced a series of habitat stewardship brochures with support from the Sustainable Forestry Initiative and the NH Fish and Game Department. These give tips on how to care for and enhance special habitats and focus on wildlife species of conservation concern associated with them. They include some of the habitats featured in this Trails for People and Wildlife project.

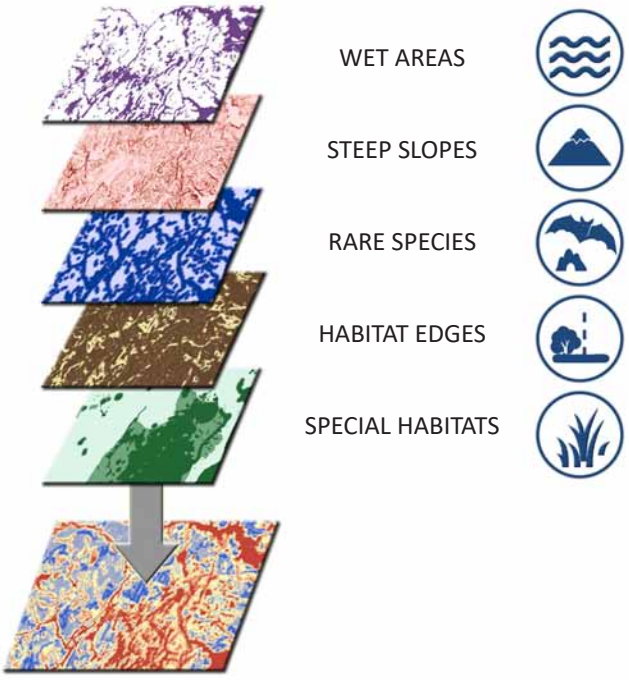
THE TRAILS FOR PEOPLE AND WILDLIFE LOCATION TOOL

HOW WAS IT CREATED?

This statewide trail location tool was developed using the "locating trails with wildlife in mind" principles overviewed in the previous section. Each principle was mapped across the entire New Hampshire landscape using a Geographic Information System (GIS). The five layers were then integrated to show where it is best to locate trails and where, if present, they may be of most impact to wildlife.

A draft model was reviewed by trail planning and wildlife experts at a special workshop before creating the final version. Comments from members of the following organizations improved the trail location tool:

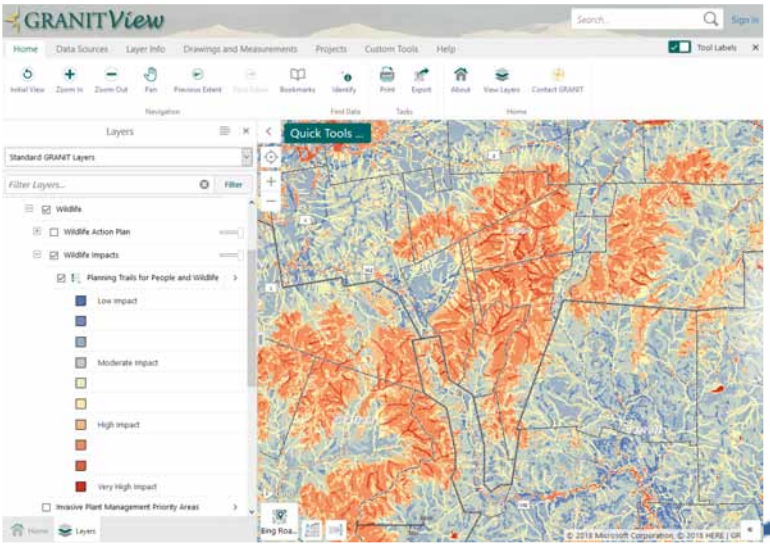
- The Great Bay Resource Protection Partnership
- Environmental Protection Agency
- Ibis Wildlife Consulting
- Lakes Region Conservation Trust
- Monadnock Conservancy
- National Park Service
- Natural Resource Conservation Service
- NH Audubon
- NH Department of Transportation
- NH Trails Bureau
- Society for the Protection of NH Forests
- Southeast Land Trust of NH
- The Nature Conservancy
- UNH Cooperative Extension
- US Fish and Wildlife Service
- US Forest Service
- Upper Valley Trails Alliance
- Washington Conservation Commission
- White Mountain National Forest



MULTIPLE FEATURES CAN BE MAPPED ACROSS OUR NEW HAMPSHIRE LANDSCAPE. WHEN INTEGRATED TOGETHER THEY CREATE AN OVERALL MAP THAT SHOWS US WHERE TRAILS CAN BE ROUTED TO LEAST IMPACT WILDLIFE AND ALLOW PEOPLE TO ENJOY NATURE.

PUTTING IT ALL TOGETHER: HOW TO INTERPRET MAPS

The trail location tool is displayed as a "heat map." Simply put, the warmer the color, the higher impact on wildlife if a trail passes through, so avoiding red areas is particularly important. When planning a trail system, the goal is to "follow the blue" as much as possible to find the best route that minimizes impacts to wildlife while getting people outside to explore and interact with nature.



"FOLLOW THE BLUE"
to find the best route for a trail that minimizes impacts to wildlife

WHERE CAN WE FIND THE TRAIL LOCATION TOOL?

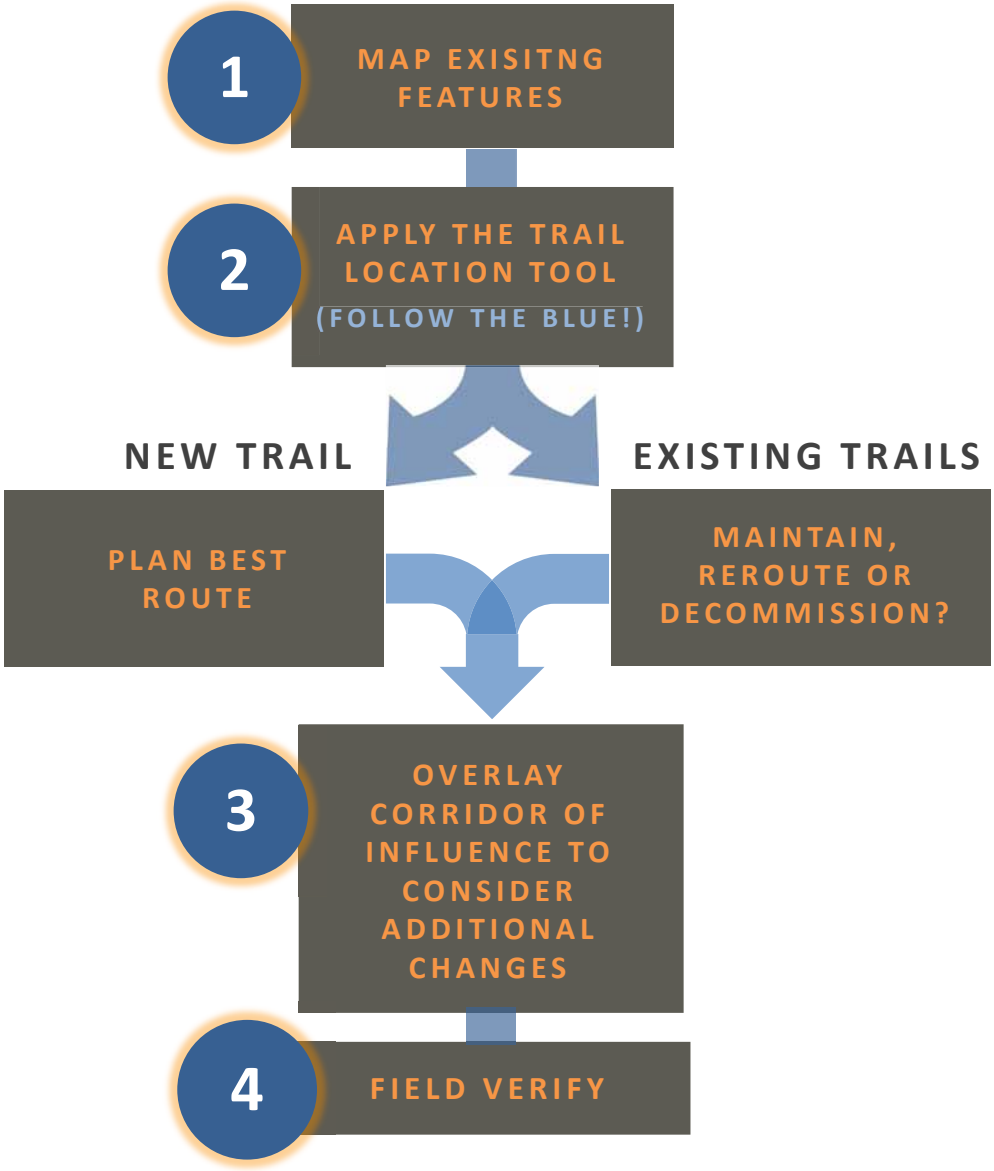
GRANITView granitview.unh.edu

The University of New Hampshire's online mapping service "GRANITView" provides free access to GIS tools through the internet. The Trails for People and Wildlife location tool is available as a clickable layer within this easy-to-use web application. GRANITView allows us to create customized maps that can be zoomed to a specific area of interest, for example a parcel of conservation land, town forest, or schoolyard. Users can search for data and display it in multiple ways. Customized maps can be printed and shared with others in "pdf" format. In addition to displaying data, there are tools to navigate around, and interact with, those data layers. Acreages can be calculated, coordinates plotted, and lines, polygons and text added. A very useful feature is that your own GPS data, collected in the field, can be brought in and added to the map. The data display structure is hierarchical so the trail location tool is found by clicking the "Environment and Conservation" menu, then "Wildlife" menu, then "Planning Trails for People and Wildlife" layer.

For GIS users, the Trails for People and Wildlife coverage is available for download in raster format from NH GRANIT, the state's GIS clearinghouse. Use the data discovery tool to search for the word "trails" to locate it. GIS technical data notes and a compilation of literature used to create this project are included as part of the download.

USING THE TRAIL LOCATION TOOL: AN OVERVIEW

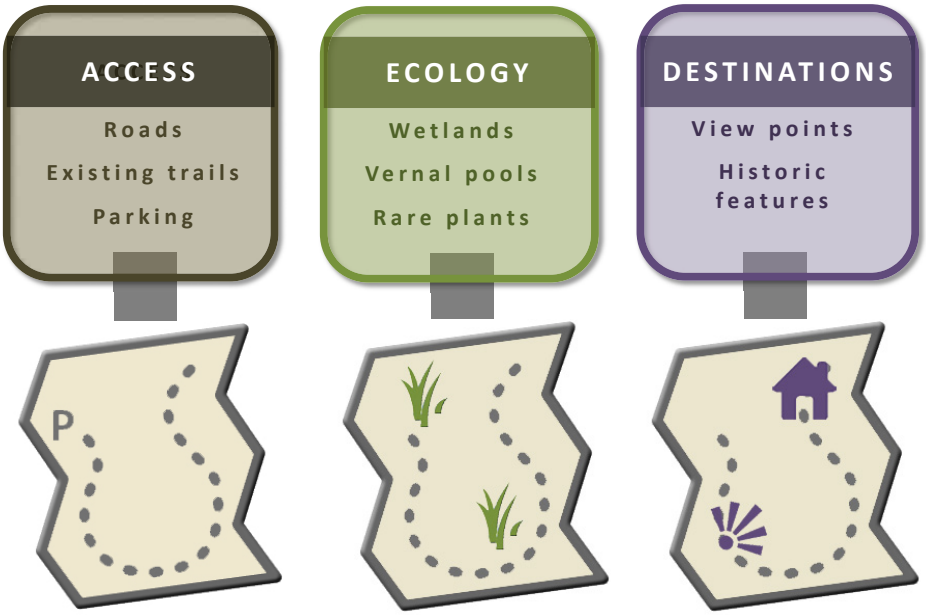
Both planning new trails and assessing existing trail networks follow a similar process shown in the summary diagram below. Numbered steps are shown in more detail in the next section.



USING THE TRAIL LOCATION TOOL: IN MORE DETAIL

1

Map Existing Features Of The Property



Exploring your property and mapping key features is the first step to planning a new trail system, or to assessing an existing one. Anything of interest to you or your organization can be mapped, but key categories of information are existing access points, local ecological features that may have been missed by GIS mapping, and any destination points you would like to guide visitors to, such as a gorgeous view or an old cellar hole.

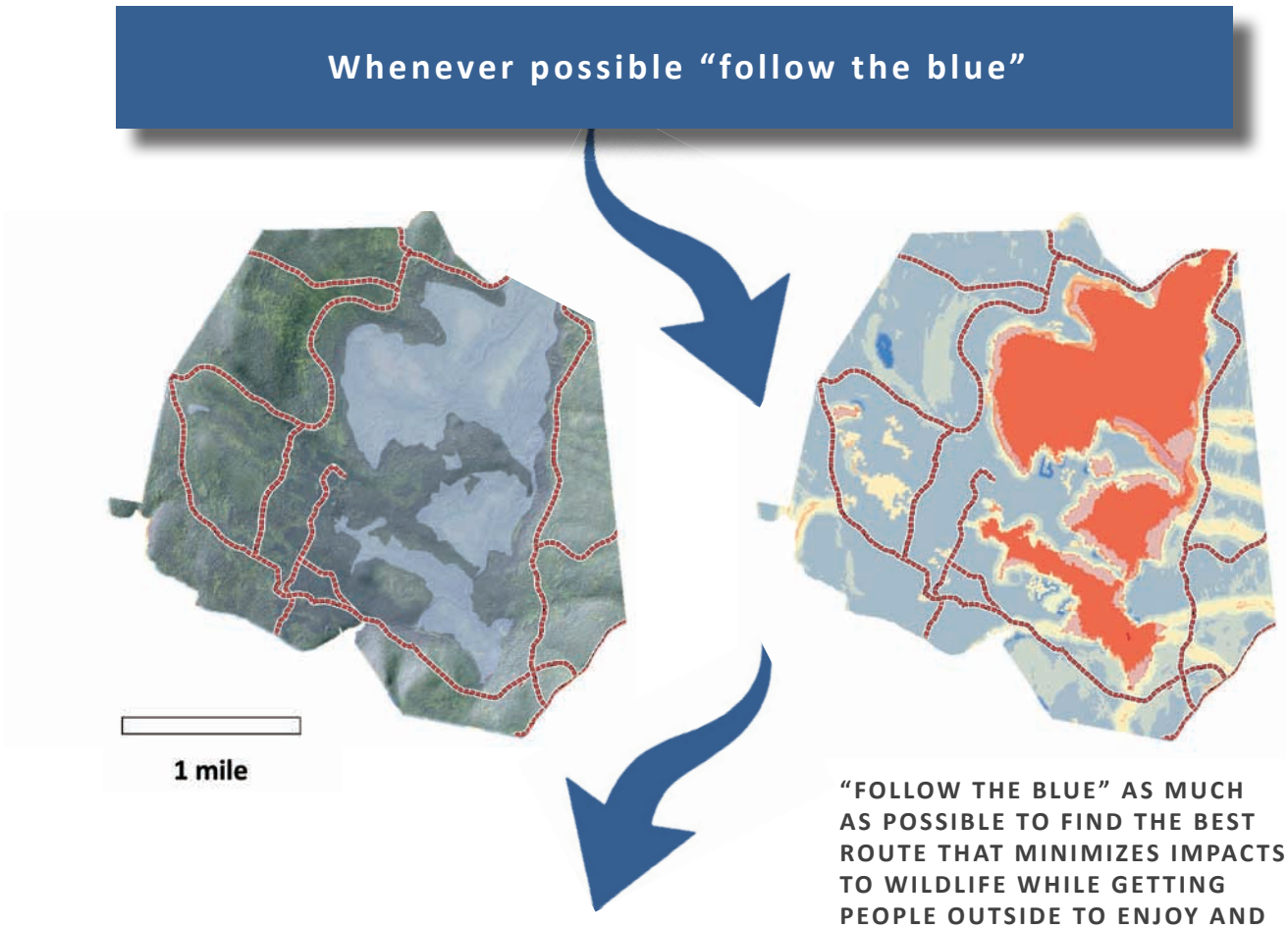
2

Apply The Trails for People and Wildlife Location Tool

Once your key features have been mapped they can be marked on the Trails for People and Wildlife location map to allow you to choose the best routes to connect them. In general, features in the “access” and those in the “destinations” categories will be navigated to and those in the “ecology” category avoided.

i. Planning New Trails

When planning a new trail system, the goal is to route it on as cold a color as possible and to avoid areas shown in red. In general, people prefer loop rather than "there and back" trails. Designing your new trail network with this in mind can prevent bootleg trails being created in the future.

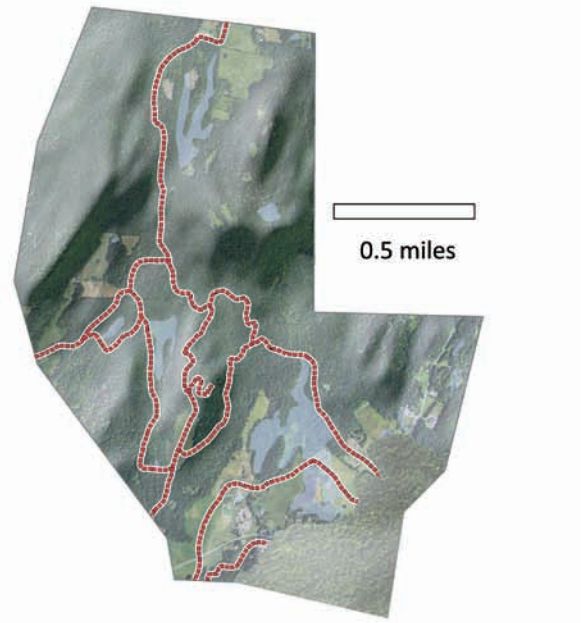


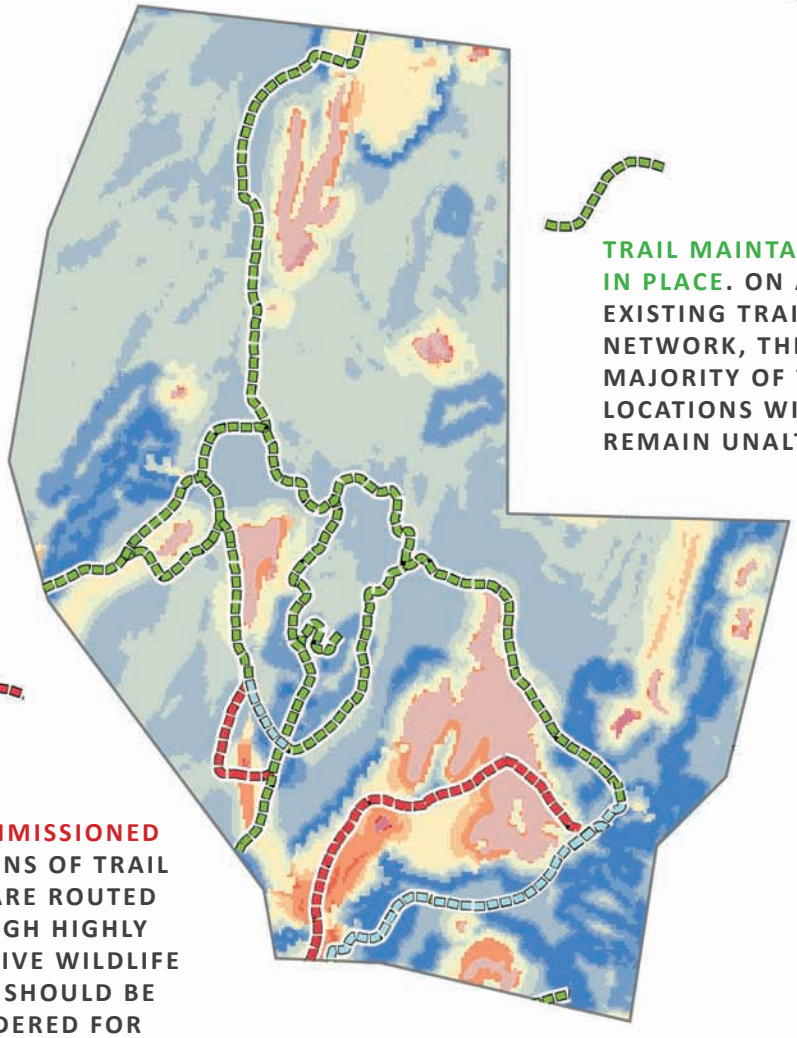
"FOLLOW THE BLUE" AS MUCH AS POSSIBLE TO FIND THE BEST ROUTE THAT MINIMIZES IMPACTS TO WILDLIFE WHILE GETTING PEOPLE OUTSIDE TO ENJOY AND INTERACT WITH NATURE.

ii. Evaluating Existing Trails

As New Hampshire's Trail Bureau says in their guide to trail construction and maintenance "*just because a trail already exists doesn't mean it's in a good location. Some trails and old roads were never designed for the use they are receiving.*" For this reason, it is just as important to use the Trails for People and Wildlife location tool to assess existing trails as it is when planning new trails. The tool can be used to evaluate each section of existing trail allowing you to decide whether to maintain its current location, whether to reroute, or even decommission that section.

In this example, the majority of an 11 mile trail network “follows the blue” when overlaid on the trail location map. This means those trails are of minimal impact to wildlife and can be maintained in place unaltered. They are shown in green in the diagram below. The two sections of trail shown in red go through areas of particularly high impact to wildlife so should be decommissioned if possible. In this case there are opportunities close by to create two new trail sections, shown in blue, to reroute traffic away from wildlife “hot spots” and still maintain nice hiking loops.



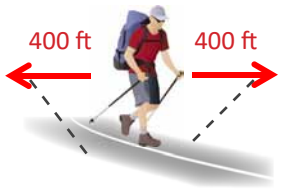


TRAIL MAINTAINED IN PLACE. ON AN EXISTING TRAIL NETWORK, THE MAJORITY OF TRAIL LOCATIONS WILL LIKELY REMAIN UNALTERED.

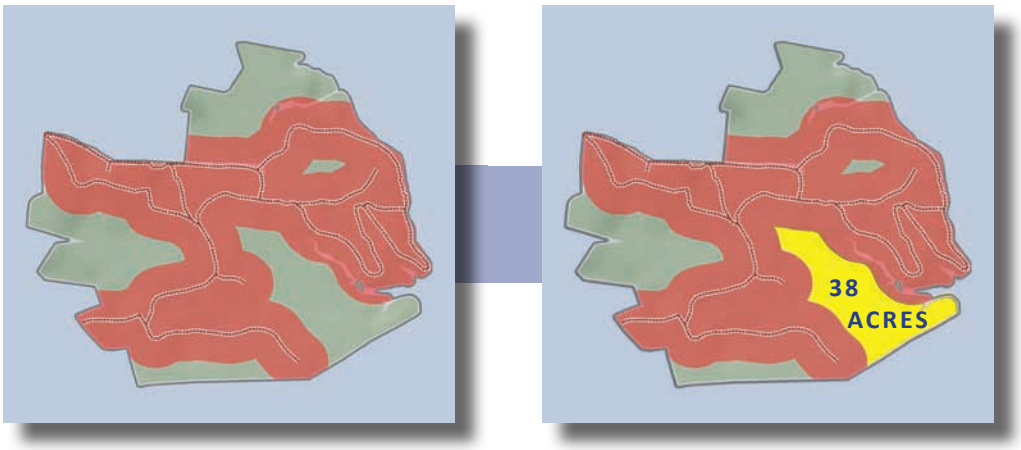
TRAIL DECOMMISSIONED SECTIONS OF TRAIL THAT ARE ROUTED THROUGH HIGHLY SENSITIVE WILDLIFE AREAS SHOULD BE CONSIDERED FOR DECOMMISSIONING OR REROUTING

TRAIL REROUTED OR CREATED. NEW TRAILS MAY BE BUILT TO GUIDE TRAFFIC AWAY FROM PARTICULARLY SENSITIVE WILDLIFE AREAS.

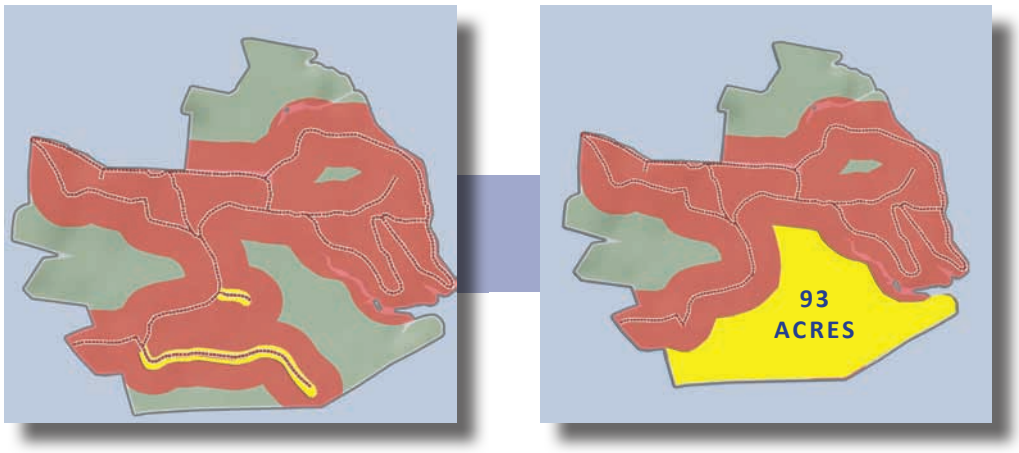
3 Overlay the Corridor of Influence



An important step when evaluating a trail network is to assess its corridor of influence. By overlaying a 400 foot buffer on either side of each trail you can see what part of the land is left for wildlife to carry out their behavior undisturbed.



There are 4.6 miles of existing trails on this example property which influence 267 acres, or 68%, of the entire property. The largest uninfluenced area, shown in yellow, is 38 acres.



The two spur trails highlighted are together 0.5 miles long, just 10% of the entire trail network. If these are closed, it would expand the area largely uninfluenced by trail traffic to 93 acres, almost 2½ times the original while still providing extensive opportunities for visitors to recreate.

4 Verify Your Plan with a Field Visit

ALL THE PLANNING IN THE WORLD DOESN'T BEAT "BOOTS ON THE GROUND." REMEMBER TO VERIFY YOUR PLAN WITH A FIELD VISIT.

Although the resolution of maps we create these days can be impressive, nothing gives us as much information as getting boots on the ground with a field visit. There may be special features, such as a deer yard or bear den, located near your planned route that had been missed during mapping. Alternatively, there may be negative features, such as an old farm dump close to a scenic vista you had planned to lead visitors to, that may cause you to reroute the trail.

In addition to the key principles of planning trails with wildlife in mind, that is avoiding wet areas, steep slopes, rare species, and special habitat types, and routing trails along habitat edges, there are the several other things to keep in mind from a wildlife perspective while field-checking your planned trail route.

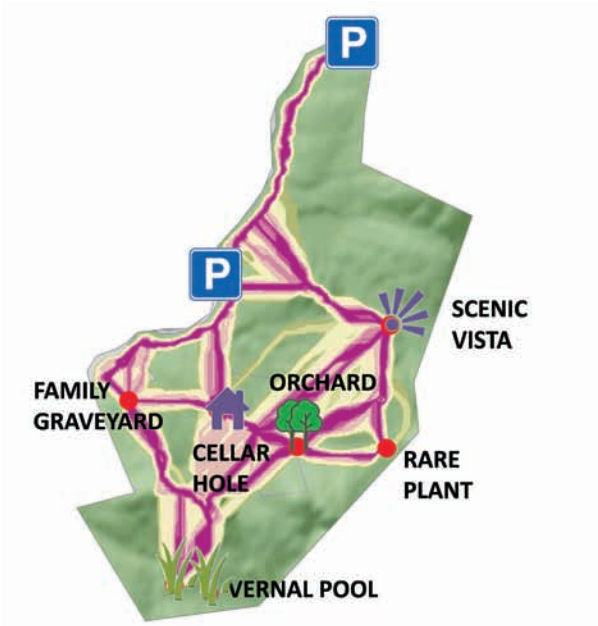
If a view of a water body, such as a beaver pond or river, is desired it is much better to have a spur trail lead up to a specific view point than it is to have a trail that travels along, or around, that water body. People still see the water and all its beauty, but there are many areas wildlife can remain undisturbed. Maintaining a vegetated buffer of *at least* 100 feet between a trail and water body is highly recommended.

A variety of frogs and salamander species lay their eggs in vernal pools. If dogs are allowed to swim in these pools, eggs can be ruptured and developing embryos killed. For this reason, maintaining a buffer of at least 100 feet around vernal pools is also highly recommended.

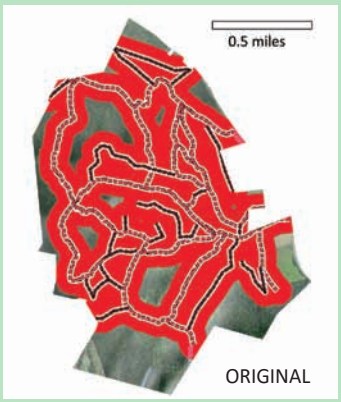
Creating a visual and sound buffer by locating trails and especially supporting facilities, such as kiosks and parking areas, in places where they can be screened by vegetation or topography frequently increases the amount of disturbance wildlife will tolerate.

Linkage Mapper

If you are a GIS user, a helpful tool when designing a trail network is "Linkage Mapper," a free ArcGIS extension. It can be used to automatically find the best alternative routes to connect destination spots by finding least-cost pathways across the landscape. You can choose from the suite of routes Linkage Mapper generates and select which options make the best sense to create a new trail network that connects the destination points you have chosen to feature on that property.



REALITY CHECK: SOME TRAILS, EVEN IN HIGH IMPACT AREAS, DON'T MAKE SENSE TO MOVE

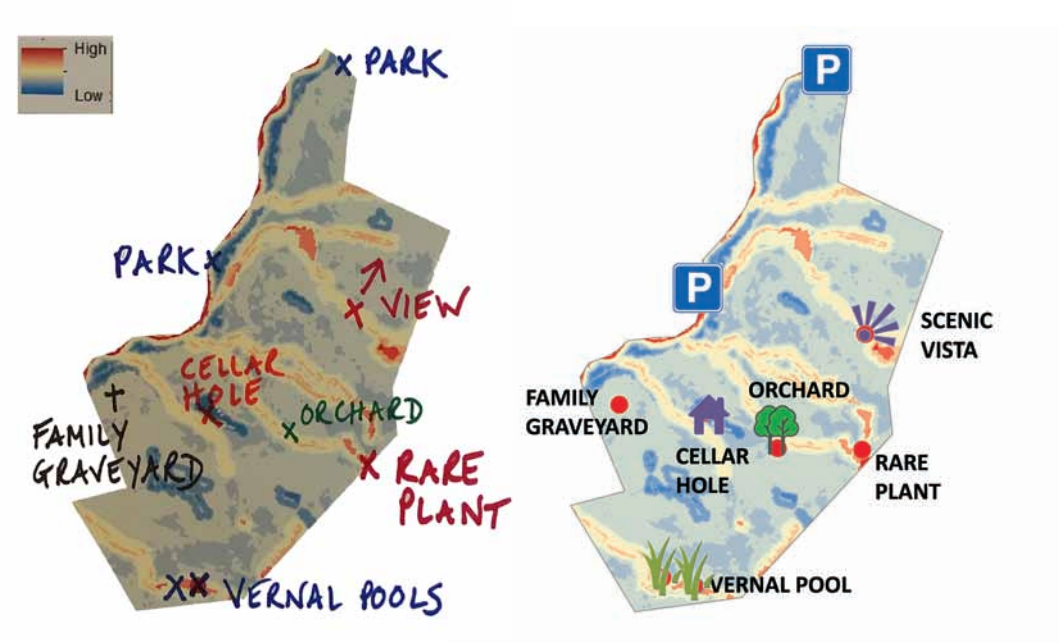


NH Fish and Game Department's 1,056 acre Lower Shaker Wildlife Management Area is a well-loved piece of conservation land located in Enfield, NH. It had an extensive network of trails with a corridor of influence that covered 73% of the entire property. Since the network was so dense several trails were closed, reducing the area impacted by 21%. Some of the trails that were left open are actually in areas of high impact to wildlife but were historic roads built by the Shakers. These well developed roads would be largely unfeasible to close so in this case a balance between cultural significance and ecology was chosen.

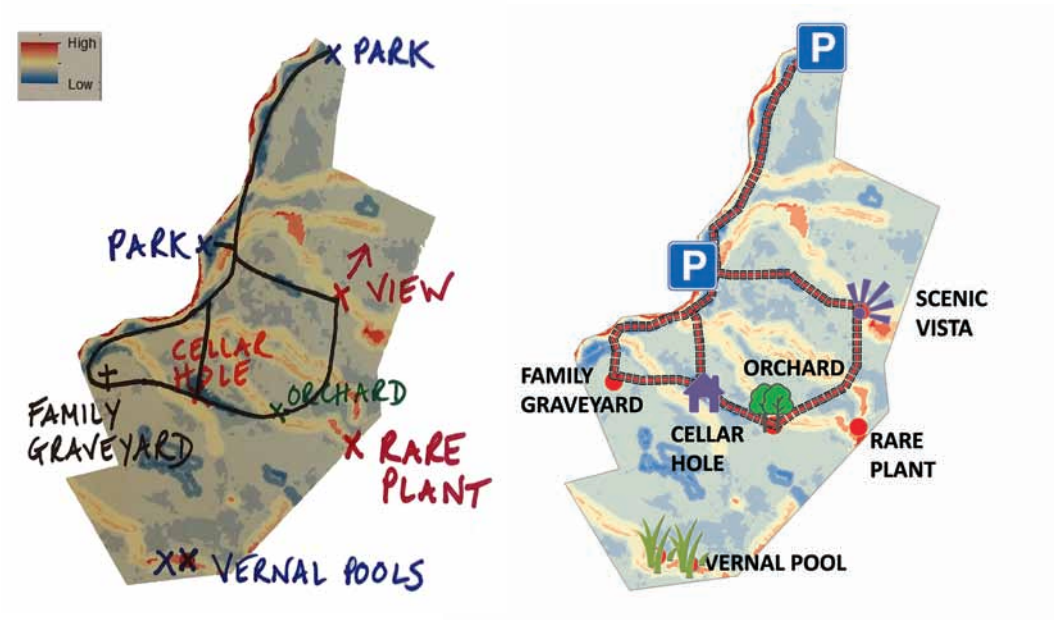
Summary: Each Step Can be Done by Hand or Digitally

Mapping can be as low tech or high tech as you choose to make it. Planning can literally be a table top exercise using pen and a printed Trails for People and Wildlife map, or everything can be done digitally.

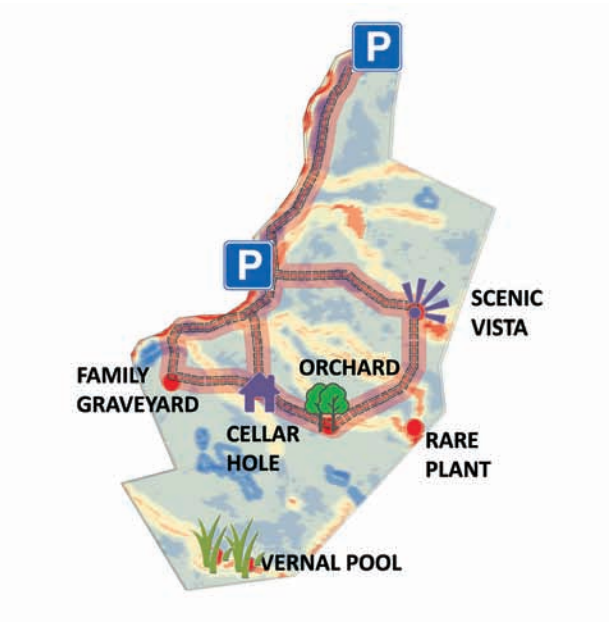
1 Map Existing Features



2 Apply the Trail Location Tool



3 Overlay the Corridor of Influence



4 Verify Your Plan with a Field Visit

OTHER ASPECTS OF SMART TRAIL PLANNING

WHAT TYPES OF RECREATIONAL USE?

After deciding on the location of your trail network, an important next step is to decide what types of recreational use will be allowed on both the trail and the surrounding property. Two major decisions are whether to permit wheeled vehicles, such as mountain bikes and ATVs, and whether to allow hunting, a long-time tradition in our state.

Under state law, properties must be posted using durable signs with any words describing a prohibited activity in letters at least 2 inches high. Signs are required to include the property owner's name and address, must be no further than 100 yards apart, and also be posted at all commonly used entrances. If your property is posted, you can still allow others to hunt if you give them verbal or written permission.

The owner of the property is ultimately responsible for deciding what types of recreational use are permitted. It is important any choices be compatible with property deed language and any other legal restrictions that apply. Posting allowable use signs at trailheads and other access points is a key step in managing trails that are open to the public. New Hampshire Fish and Game Department's Landowner Relations Program has fourteen different types of sign that are available to indicate what types of activities are allowed in an area. Phone 603-271-1137, or visit or visit www.wildlife.state.nh.us/landshare/ols.html for more information.

When installing signs it is good etiquette to use aluminum nails or screws so there is no danger of chainsaw "kick back" if a future forestry operation takes place. It is also a good idea to leave the nail head protruding about a quarter inch to allow for tree growth.

TRAIL ACCESSIBILITY

Trail width, slope, substrate type and compaction are all important in determining how many different types of user-groups can navigate a trail system. Building a network or section of trail that is accessible to wheelchairs also allows strollers to be pushed easily. The U.S. Forest Service is a leader in giving guidance on how to create universally accessible trails and Northeast Passage, based out of UNH in Durham, rents adaptive equipment that helps people explore even the most rugged of trails.

A LEASH LOAN SYSTEM HAS BEEN WORKING WELL IN NEWMARKET.

DOGS AND TRAILS

Getting outside with our pet dogs is a daily treat and a good way to enjoy our natural surroundings. However, it makes sense to keep dogs on a leash, at least during the spring breeding season. The Nature Conservancy has a "leash loan" system at their Lubberland Creek Preserve in Newmarket. Dog leashes are available to pick up at the trailhead, use while on the trail, and drop off at the end of a walk.

KEEPING DOGS ON A LEASH DURING GROUND NESTING BIRD SEASON (MID MARCH THROUGH MID JULY) IS AN EASY WAY TO LIMIT DISTURBANCE DURING THIS CRITICAL PERIOD.

TRAIL CLOSURE

If you decide to close a section of trail, posting with a sign explaining why this choice was made can be helpful. Side spurs to the "Sweet Trail" in Newmarket and Durham were recently closed and posted with the sign below. Removing trail markers and blazing, along with brushing in the trail with logs and other woody material can be effective. Planting the trail opening with saplings from other parts of the property will create a longer term solution. Tree and shrub seedlings grown at the NH State Forest Nursery in Boscawen can be a great option for planting trail openings too. Their goal is to provide customers with the highest quality, bare-root seedlings for forestry, conservation and education purposes at reasonable prices.

You are entering an

Ecologically Sensitive Area

Trail maintenance and clearing beyond this sign is prohibited. Please enjoy the Sweet Trail and other marked trails in this area. They were carefully designed to balance the impacts to wildlife with public enjoyment and recreation. Let's work together to best protect the rare species and important wildlife habitats that make this place special.

Thank you for your cooperation,

from the Land Stewards of this protected landscape.

CONSIDER SEASONAL CLOSURES

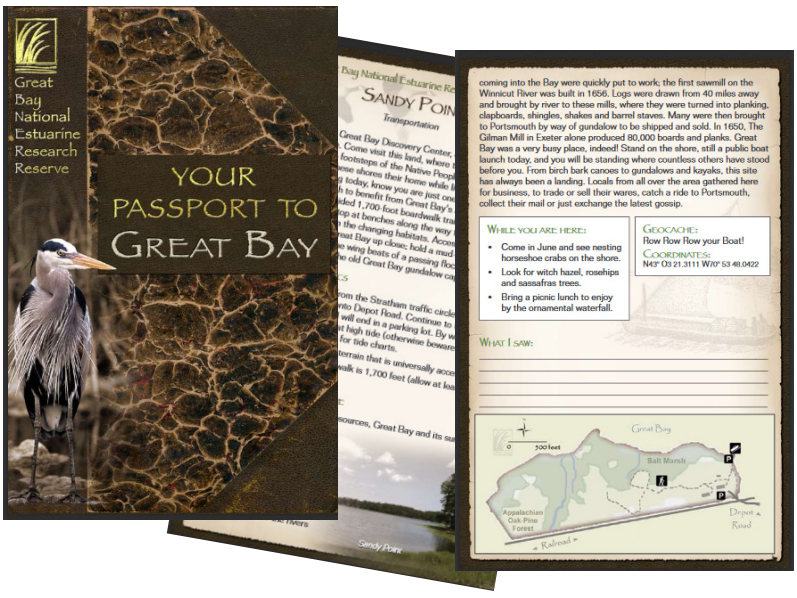
Wildlife are usually most sensitive to disturbance during their breeding season. Young have limited mobility and adults are energetically stressed as they try to find food for both themselves and their offspring. For this reason it may make sense to close a section of trail seasonally. Grassland nesting birds are particularly sensitive as the surrounding vegetation does not provide a visual or sound buffer between their nest and recreational trail use. If sufficient resources are not available to enforce a trail closure during wildlife-sensitive seasons, consider rerouting the trail. Winter is another time of year when wildlife are more energetically stressed. For this reason it is a good idea to route trails away from deer yards and hibernation sites.

PUBLICIZING YOUR TRAIL

It can be amazing how quickly people discover a new trail based just on local knowledge and word of mouth. Installing a trailhead kiosk can provide information about the route and also draws peoples' attention. In addition, you may want to create a printed trail guide, although more and more frequently conservation groups are relying on digital versions instead. There are many websites and apps that can be used to publicize your trail. One that UNH Cooperative Extension currently recommends is "TrailFinder". It can be found at www.trailfinder.info and only includes trails sanctioned by the owner of the land it is routed across.

Although printed and online trail guides are popular, not everyone is a visual learner so an audio trail could be created. The Society for Protection of NH Forests has developed a website that uses the GPS function on your smart phone to audibly notify that you have reached a feature along the trail about which you can read more about.

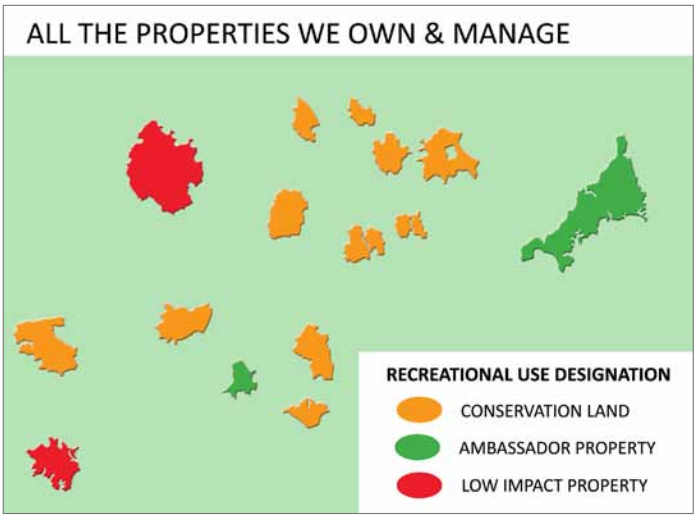
A GUIDE TO KEY NH FISH AND GAME PROPERTIES WITHIN GREAT BAY NATIONAL ESTUARINE RESEARCH RESERVE CAN BE FOUND ONLINE AT GREATBAY.ORG/DOCUMENTS/GREATBAYPASSPORT.PDF



TRAILS FROM A COMMUNITY PERSPECTIVE

PLAN YOUR TRAIL NETWORK OVER MULTIPLE PROPERTIES

When planning a trail network, it is most effective to evaluate all properties in a region that are under one ownership at the same time. For example, all town conservation areas or all properties owned by a land trust, other non-profit, or government agency. Good land stewardship balances public access and maintenance of ecological integrity. This can be done by varying the density and intensity of use of trail systems on different properties depending on the sensitivity of natural features each supports. Some properties will lend themselves to being high recreational use "ambassador" areas with a well-publicized, and well-maintained, network of trails. Others that support particularly sensitive wildlife, plants, or natural communities are usually best with few, or no trails and remaining less publicized. Considering the entire suite of properties under an individual's or organization's management at the same time makes it possible to develop a strategic plan with different tracts having varying levels of public use.



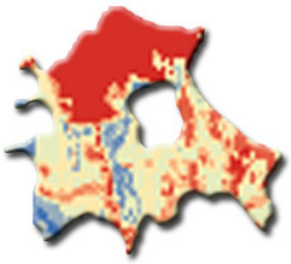
GOOD LAND STEWARDSHIP BALANCES PUBLIC ACCESS WITH ECOLOGICAL INTEGRITY. ENCOURAGING TRAIL USE ON KEY AMBASSADOR PROPERTIES WHILE LEAVING SOME PROPERTIES WITH FEW, OR NO TRAILS IS A GOOD WAY TO ACHIEVE THIS.

USE THE TRAILS FOR PEOPLE AND WILDLIFE TOOL

The Trails for People and Wildlife tool is a good way to start exploring which properties may be best to support different levels of recreational use. In general, those with the most blue areas are good candidates to be designated as ambassador properties as they are the places that trails will impact wildlife least. Properties dominated by areas

of red, representing wildlife impact hot spots, are the most ecologically sensitive so ideally will be left as undisturbed as possible.

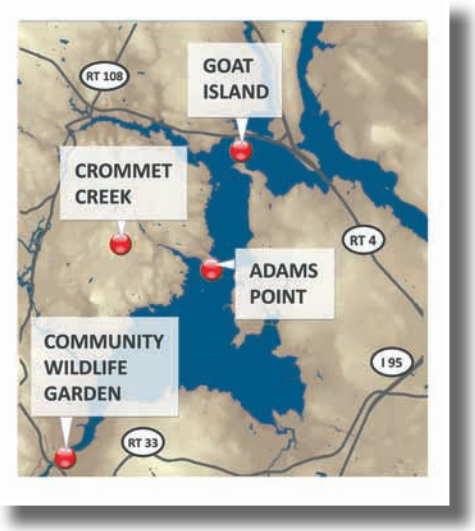
PROPERTIES THAT ARE MAINLY BLUE ARE GOOD CANDIDATES TO BECOME HIGHLY PUBLICIZED AMBASSADOR PROPERTIES.



THOSE THAT ARE MAINLY RED WILL IDEALLY BE LEFT AS UNDISTURBED AS POSSIBLE.

On properties that you have decided to create or maintain a trail system, each section can be evaluated using the Trails for People and Wildlife map for that area. As always, new trails will ideally be routed away from red wildlife hot spots and "follow the blue" as much as possible. Existing trails can be evaluated as to whether it is best for them to remain in place, be rerouted, or decommissioned.

Planning the best locations for trails recognizes the reality of social pressure and politics. Occasionally very popular high-use trails that have been open to the public for generations may not make sense to close, even if it would be best to do so from a wildlife perspective. Integrating such reality checks into your plan allows you to create a trail network that is more sustainable for the long-term and supported by most community members.



NH FISH AND GAME AMBASSADOR PROPERTIES AROUND GREAT BAY.

CONCENTRATE PUBLIC USE ON A FEW TRAILS RATHER THAN DISPERSING OVER MANY

Dispersing public access over a wide area may reduce the need for trail maintenance as each section is likely to receive less use. However, concentrating public access on fewer trails is usually better for wildlife as, over time, they will either move away to other areas or habituate to human presence, depending on each species' tolerance of people. Fewer trails means there are more areas wildlife can go about their activity undisturbed.

MATCH THE AMOUNT OF TRAILS AND INFRASTRUCTURE WITH THE RESOURCES YOU HAVE TO MAINTAIN THEM

A FOCUSED NETWORK OF WELL-MAINTAINED TRAILS SUPPORTS BOTH SAFE PASSAGE FOR PEOPLE AND MINIMIZES DISTURBANCE TO WILDLIFE.

Having fewer trails that are used more frequently allows land managers to focus available resources. This can be the volunteer time, funding, equipment or infrastructure needed to create trails and maintain them in the long term. A focused network of well-maintained trails allows safe and enjoyable passage for people and minimizes disturbance to wildlife at the same time. More frequently trafficked trails tend to be prone to fewer stewardship issues, such as dumping, trash or vandalism.

PUT YOUR PLAN IN WRITING

Once your suite of properties has been evaluated and a plan for recreational use created, write it down. This will ensure it has longevity and the same strategy is maintained as new staff and volunteers come on board. Consider integrating the trail plan into your community natural resource inventory. It often makes sense to involve both conservation commission and recreation committee members as you develop it. Create a summary of your plan and communicate it to people and organizations that are relevant in your community whether it be a planning board, Regional Planning Commission, ecological consultant or trail user group.

PROMOTE EXISTING TRAILS

Guided walks, talks in schools, retirement communities and other venues can all help promote the network of existing trails in your community. For the reasons described in this guide it is not ecologically, or financially, wise to create new trails on every piece of conservation land acquired. Sometimes encouraging people to explore and love trails that have already been built is a much better approach.

MODEL CONSERVATION EASEMENT LANGUAGE

The Deerfield Conservation Commission is a forward thinking group. They developed language for use in new conservation easements they acquire that addresses best management practices for trails and balances the social and ecological needs of trail use.

LOCATING TRAILS:

Trails: Trails may be located, cleared, constructed, and maintained, provided these trails are consistent with the Purposes of this Easement and NH Fish and Game methodology for planning and managing "Trails for People and Wildlife" (www.wildnh.com/trails) or other equivalent science based methodology, including:

a) Keep unfragmented trail-free areas as large as possible

b) Avoid small patches of high quality or special habitats

c) Avoid riparian areas and permanent features in the landscape that serve as important wildlife corridors

d) Avoid locations of rare wildlife

Recreation Trail Management Plan Required. Any and all recreation trail construction maintenance and relocation shall follow a written Recreation Trail Management Plan consistent with this Easement, items (a)-(d) above, and approved in advance and in writing by the Grantee.

Construction and maintenance shall conform to best practices recommended by:

a) Appalachian Mountain Club or similar trail-maintaining organization (for reference, see The Complete Guide to Trail Building and Maintenance, C. Demrow, D. Salisbury, Appalachian Mountain Club, or similar successor publication)

b) NH State Parks Best Management Practices manual https://www.nhstateparks.org/uploads/pdf/BMP-Manual.pdf or similar successor publication and shall be constructed and maintained consistent with requirements of the Management Plan.

Trail making and management activities shall be carried out in accordance with all applicable local, state and federal laws and regulations, and in accordance with current, generally accepted best management practices for the sites, soils and terrain of the Property. Trail design and construction shall be supervised by a licensed professional forester, a certified wildlife biologist, or other qualified person approved in advance and in writing by the Grantee.

GETTING YOUR PROJECT ON THE GROUND

NH BUREAU OF TRAILS

The NH Bureau of Trails publishes the "New Hampshire Trail Construction and Maintenance Manual." It is an excellent guide designed to be helpful to anyone looking to maintain or build new trails. It includes techniques for erosion control, information on permitting, and considerations for installing culverts and bridges on trails. It is available online for free download.

In addition to this publication, the Bureau of Trails offers grants for trail construction, support for clubs, and gives guidance on trail maintenance and etiquette. They also publish information about laws for ATVing and snowmobiling along with Recreational Use Statues including landowner liability and legal posting of land.

UNH COOPERATIVE EXTENSION: NATURE GROUPIE

UNH Cooperative Extension runs the "Nature Groupie" program which encourages outdoor enthusiasts to volunteer for nature in New England. Their online calendar advertises volunteer work days. They also have a series of manuals including "Trail Maintenance for Volunteers: A Training Guide." They publish a directory of trail building professionals and have a tool loan library for stewardship projects.

UNH COOPERATIVE EXTENSION: COUNTY FORESTERS

Cooperative Extension County Foresters are a wealth of information. They can offer advice about best trail location and many other aspects of natural resource management. Contact information is available from the UNH Cooperative Extension Forestry Information Center at forest.info@unh.edu, or by using the information below;

Belknap County
64 Court Street
Laconia, NH 03246
603-527-5475

Carroll County
73 Main Street, PO Box 1480
Conway, NH 03818
603-447-3834

Cheshire County
33 West Street
Keene, NH 03431
603-352-4550

Coos County
629A Main Street
Lancaster, NH 03584
603-788-4961

Grafton County
3855 Dartmouth College Hwy, Box 5
North Haverhill, NH 03774
603-787-6944

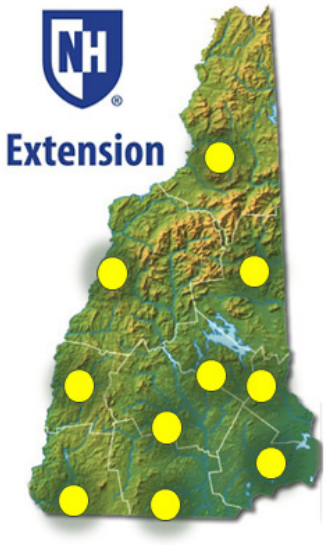
Hillsborough County
329 Mast Road, Suite 101
Goffstown, NH 03045
603-641-6060

Merrimack County
315 Daniel Webster Highway
Boscawen, NH 03303
603-796-2151

Rockingham County
113 North Road
Brentwood, NH 03833
603-679-5616

Strafford County
268 County Farm Road
Dover, NH 03820
603-749-4445

Sullivan County
24 Main Street
Newport, NH 03773
603-863-9200



NH FISH AND GAME DEPARTMENT LANDOWNER RELATIONS PROGRAM

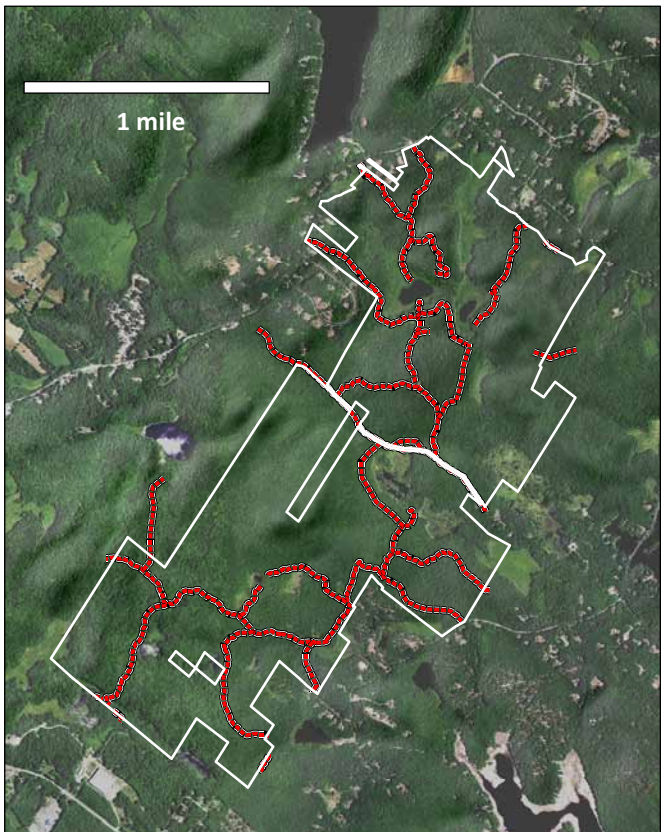
NH Fish and Game Department's Landowner Relations Program promotes respect, stewardship and recreation on private lands. In addition to the allowable use signs they have available, in some cases, staff are available to assist with on the ground placement of a trail system on private land.

STONEHOUSE FOREST: A REAL-WORLD CASE STUDY

A recreation trail management plan was recently prepared by Ibis Wildlife Consulting for Stonehouse Forest in Barrington and Nottingham. The 1,535 acre property is owned by the Southeast Land Trust of New Hampshire with a conservation easement held by the NH Fish and Game Department and a third party interest held by the town of Barrington. Additionally, the purchase of the land included an Executory Interest to the Land and Community Heritage Investment Program which provided funds to acquire the land. The property is the largest undeveloped tract in Barrington and is important habitat for many wildlife species including turtles, bear and red fox.

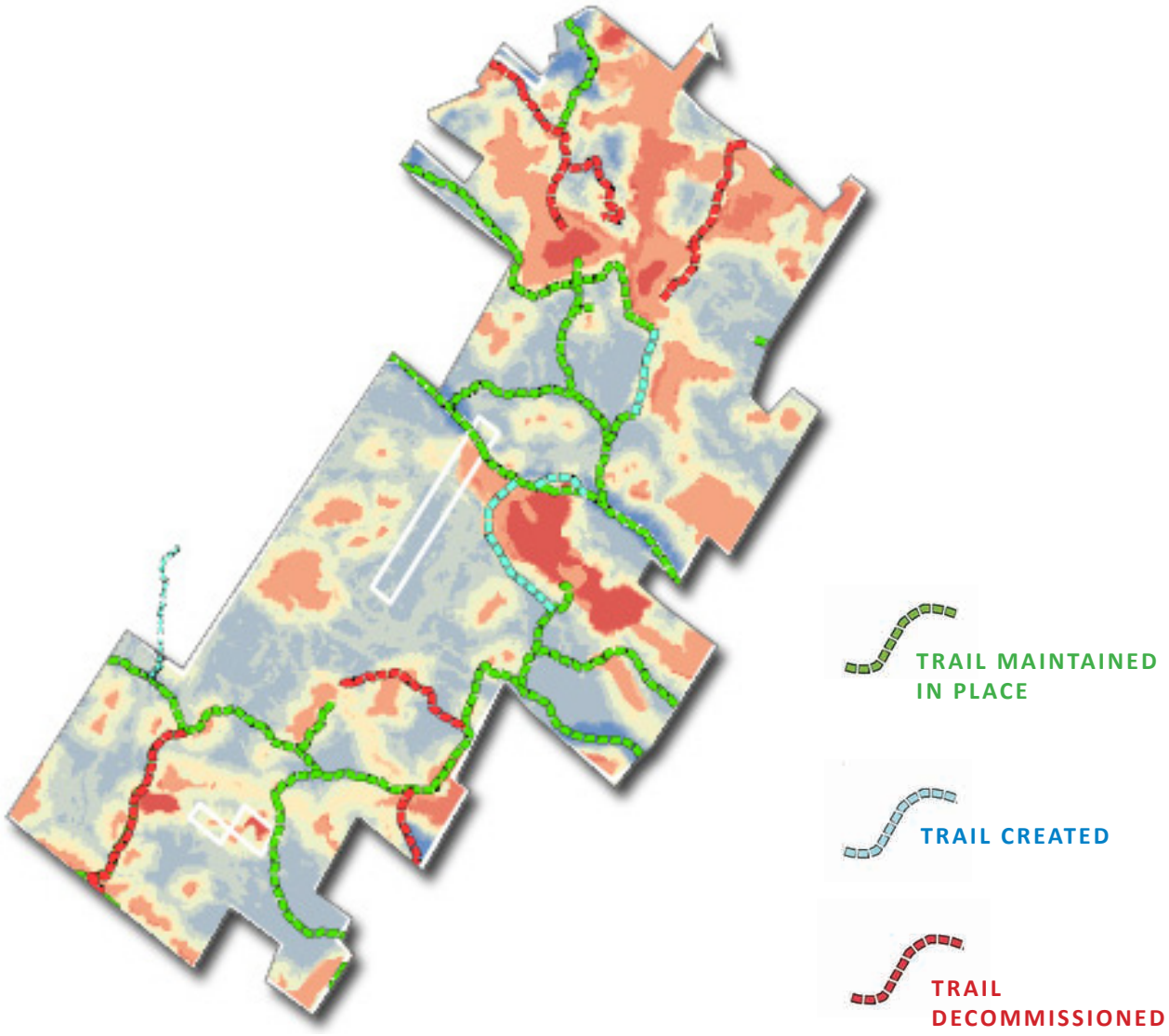
EXISTING TRAILS

When placed into conservation in 2017, Stonehouse Forest had 10.4 miles of existing woods roads and trails that varied in width from approximately one foot to ten feet. This included a Class VI public right-of-way that provides a scenic view of a large beaver wetland close to the center of the property.



STONEHOUSE FOREST IS THE LARGEST UNDEVELOPED TRACT IN BARRINGTON. WHEN PLACED INTO CONSERVATION 10.4 MILES OF EXISTING WOODS ROADS AND TRAILS WERE PRESENT.

Using the trails for people and wildlife map for that area, applying the 400 foot corridor of influence buffer to trails, along with local documentation of vernal pools, it was decided to maintain over seven miles of existing trail, create three new sections of trail totalling approximately one mile, and decommission three point six miles of trail.



Sections of trail that were decommissioned included those that crossed large wetlands or ponds in order to protect water quality, natural communities and wildlife habitat. Other stretches closed were those in high value wildlife habitat and trails without specific destinations or multiple trails that led to the same destination. Finally, sections were closed to help reduce habitat fragmentation, to protect significant peatland and an oak-mountain laurel natural community, and to avoid disturbance to neighboring properties.

To enhance visitor enjoyment and knowledge about the property two permeable surface parking areas, each with an information kiosk, are planned. To help protect water quality and maintain safe passable trails Southeast Land Trust will engage volunteers and recreational user groups to assist in upgrading trails, building bridges, and installing other public access infrastructure.

Five different types of use are allowed on sections of the trail shown on the map on the opposite page;

Pink trails are multi-use including pedestrians, mountain bikes, snowmobiles, and horseback riding.

White trails are multi-use including pedestrians, mountain bikes, and snowmobiles.

Yellow trails are pedestrian and mountain bikes with no snowmobiles or horses.

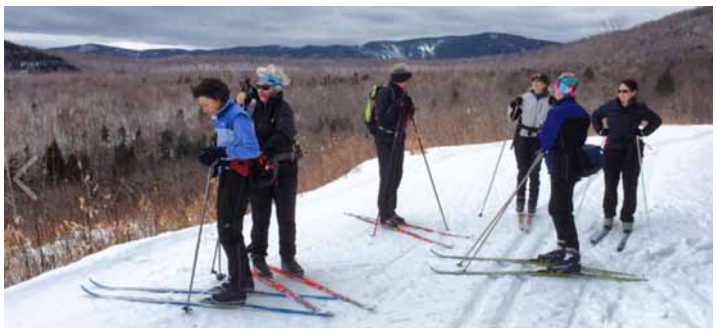
Red trails are pedestrian only.

The green woods roads are for management access onto the property by Southeast Land Trust and its contractors.

Finally a schedule of trail maintenance and monitoring was put together;

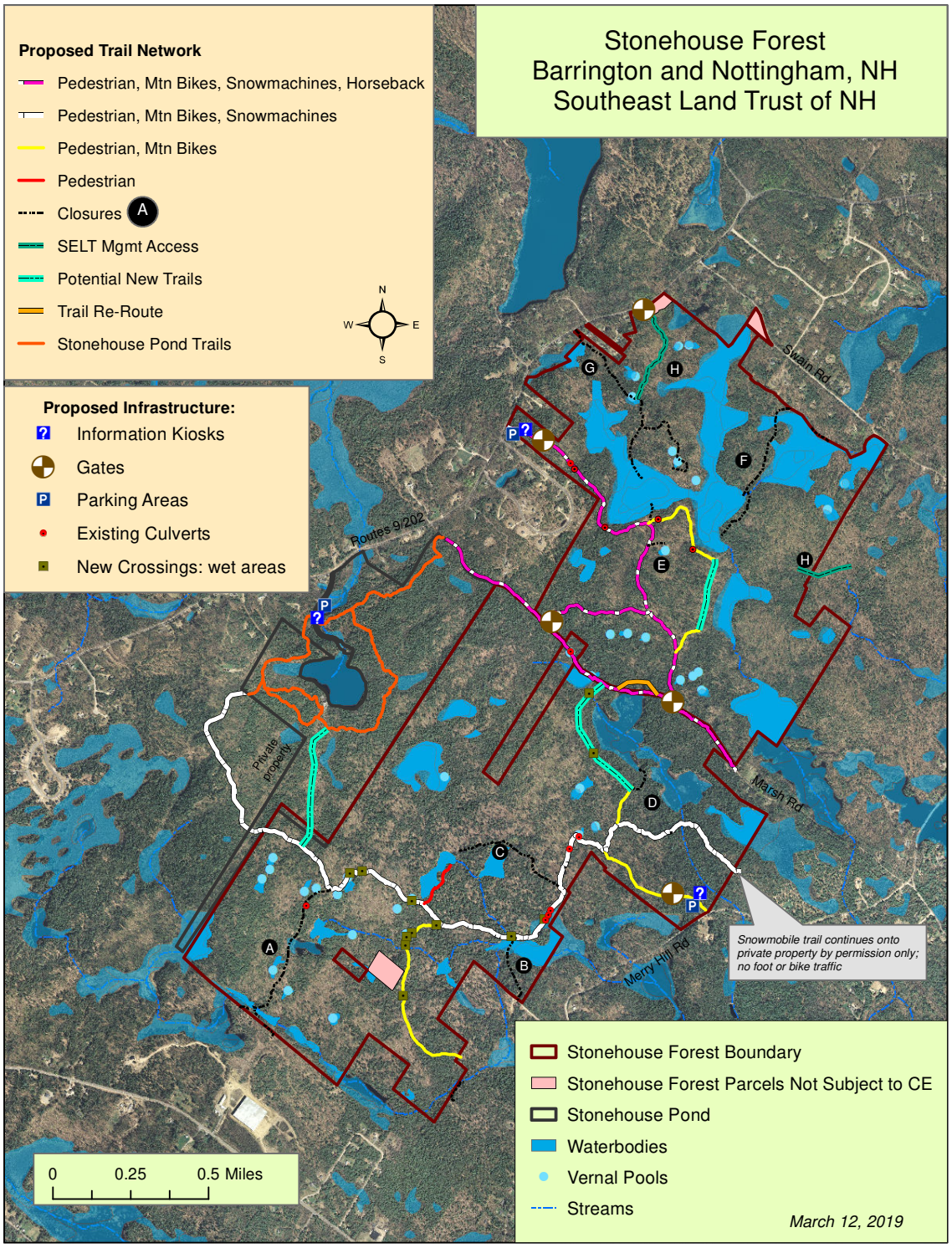
Activity	Description	Schedule
Trail Mowing	Rotary tractor mower	2x per year
Plow out parking area in winter	Snowplowing	Dependent on annual budgets
Property monitoring	Assess trail conditions for signs of erosion, tree falls, other mgmt. issues	Annual
Boundary maintenance	Monitor boundary	Annual
Recreation Plan Update	Plan Update	Every 10 years = 2028

Planning for regular maintenance of trails and associated infrastructure is a cost effective approach to property management as it is likely to catch problems before they become catastrophic and expensive to repair.



WENDY CLARK PHOTO

The Stonehouse Forest recreational trail management plan is a great example of how to develop a thoughtfully located network of well maintained trails that allow people to get outside to enjoy nature while minimizing disturbance to wildlife. Balancing both needs will help maintain the biodiversity and character of the state we love to live in.



ELLEN SNYDER MAP

NOTES

CHRIS COSTELLO PHOTO


New Hampshire
FISH AND GAME
Connecting you to life outdoors
Guardian of the state's fish, wildlife, and marine resources.
wildnh.com/trails