

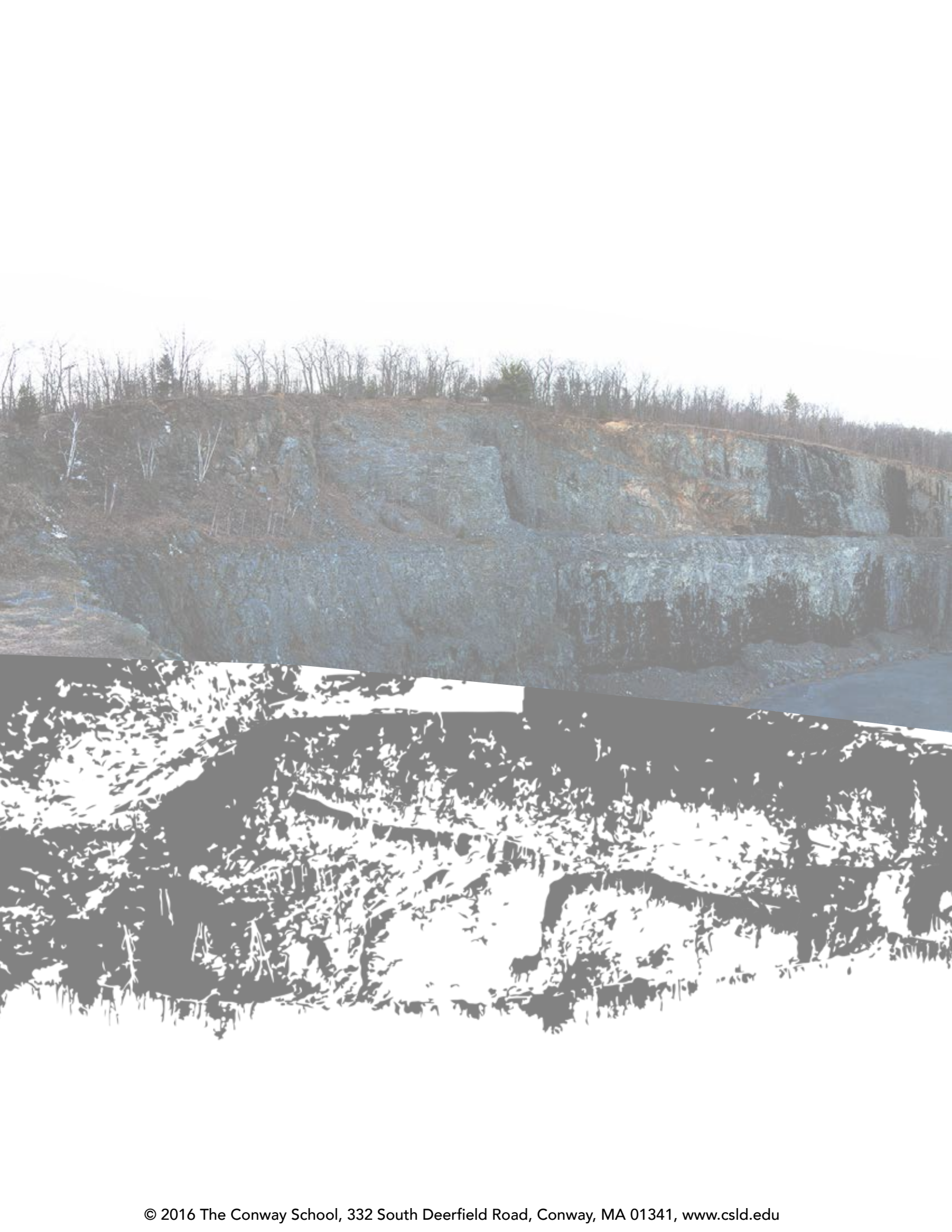
# MT. TOM

## MAKING CONNECTIONS

Prepared for Kestrel Land Trust, Winding River Land Conservancy, and The Mt. Tom Advocacy Group

The Conway School // Winter 2016 // Tia Novak and Kelly Corbin







# MT. TOM ECOLOGICAL ASSESSMENT

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Prepared for Kestrel Land Trust, Winding River Land Conservancy,  
and The Mt. Tom Advocacy Group

The Conway School Winter 2016  
Kelly Corbin • Tia Novak





## ACKNOWLEDGMENTS

Thank you to Mark Wamsley of Kestrel Land Trust, Mary Lou Splain and Rosemary Arnold of Winding River Land Conservancy, and Bill Finn of Mt. Tom Advocacy Group, Kate Cholakis, Mollie Babize, CJ Lammers, Bill Lattrell, Rachel Loeffler, and Glenn Motzkin for their expertise and guidance.



# EXECUTIVE SUMMARY

Visible for miles around, the Mt. Tom range rises 1,200 feet above the floor of the Connecticut River Valley. Known and beloved for its steep basalt cliffs, miles of trails, rare plant and animal species, and history of human activity, Mt. Tom represents many of the reasons people feel a deep connection to the region.

The Mt. Tom range has been the focus of many ecological studies, conservation efforts, and outdoor pastimes over the last century. Smith College and other institutions have long brought students here to explore the rich flora and fauna. Conservation-based groups have worked tirelessly to protect the many species on the range identified by the Natural Heritage and Endangered Species Program. Tram cars and carriages once brought visitors to hotels on Mt. Tom and Mt. Nonotuck for a breath of fresh air and to take in the spectacular views of the Connecticut River Valley. Skiers once made turns down the eastern slopes. Today, hiking and natural history groups travel for miles to witness the natural splendor of the range.

Although people connect to the range from miles around and wildlife traverse the broad fabric of habitats on its heights, many consider Mt. Tom an island. Previous conservation plans use this language frequently, as do people who visit the mountain on a regular basis. In December 2015, Kestrel Land Trust, Winding River Land Conservancy, and The Mt. Tom Advocacy Group hired the Conway School to assess, document, and celebrate Mt. Tom's connectedness—not its isolation—in a way that could enrich and energize efforts to protect the mountain and its surroundings. This account of those human and ecological connections is intended to help all those who have a stake in the mountain understand its larger role in the landscape so that they can play a greater role in assuring its future.

In order to overcome the perception of disconnection, the Conway team assessed many aspects of connectivity. The resulting report seeks to answer the questions "Why is connectivity important?", "Where are the areas of connection and disconnection on the range?", and "How can that connectivity be improved?" In order to reach those answers, the Conway team performed an extensive study of the ecology and human use of the Mt. Tom range.

Mt. Tom is a highly varied landscape that supports an astonishing diversity of plants and animals, many of them of special concern in the state of Massachusetts. The rare and endangered plant and animal species on the Mt. Tom range pose unique stewardship challenges, which are often linked to levels of awareness in the general visitor population. Some of the habitats that support these species are found on areas of the range that are heavily used and not well protected by conservation policies.

People use the range for a variety of recreational purposes, all of which come at a certain environmental cost to the mountain. Higher-use areas are greatly impacted, with eroded trails and fragmented habitat. Visitors often park their vehicles outside of the reservation in order to access a particular area or to continue their hike past the time the reservation gates are locked. These parking practices often encroach on habitat and on private homeowners' properties, plus they are often in unsafe locations. In order to improve human access and experience, additional maintained parking areas, access via public transportation, and increased pedestrian visibility on major roads is needed.

Humans and wildlife both experience barriers on the east side of the range. Abandoned buildings, unused roads, and an old trap rock quarry interrupt the landscape. Few species find adequate habitat there and few hikers feel comfortable exploring this part of the range.

The Mt. Tom range is a wonderful part of life in the Pioneer Valley and keeping it that way requires a focus on improving how humans and wildlife connect to the range. The diverse group of primary land owners need to join together to draft a common land management plan that transcends property boundaries. Areas where humans connect to the range must be made safer and more environmentally sound. The details of how different species move both within and beyond the range need to be studied and that knowledge used to inform conservation decisions. Local human communities should be encouraged to use the range responsibly and share their knowledge about how to do so with others, especially youth.

With the strong support of Kestrel Land Trust, Winding River Land Conservancy, The Mt. Tom Advocacy Group, and many other significant stakeholders, this project demonstrates the many connections between Mt. Tom and the larger region. The resulting study recommends steps to strengthen existing connections and to bring potential connections into reality. As more and more decisions are made for the range's future based on this understanding of connectivity, overall ecosystem health will improve. Mt. Tom has many stakeholders—from large landowners to the smallest salamander—and all benefit from a mountain range that is connected and protected.







# CONTENTS

## EXECUTIVE SUMMARY

### INTRODUCTION

Client Goals and Requests.....	1
Site Orientation.....	2
History of Human Use on Mt. Tom.....	4
Land Ownership.....	6
Public Engagement.....	8

### WHY CONNECTIVITY MATTERS

Context.....	12
Geologic History.....	14
Watershed and Water Flow.....	16
The Barnes Aquifer.....	17
Vernal Pools.....	18
Vegetation.....	20
<i>Ecosystem Services</i> .....	22
Biodiversity.....	
<i>Wildlife</i> .....	23
<i>Climate Change</i> .....	24
Ecological Disturbance.....	25
Cultural Services.....	26
<i>Visitors</i> .....	27
<i>Types of Human Use</i> .....	28
<i>Benefits For Humans</i> .....	29

### WHERE CONNECTIVITY MATTERS

Ecological Connectivity.....	
<i>Terrestrial Wildlife Movement</i> .....	32
<i>Access and Corridors</i> .....	33
<i>Barriers to Access and Movement</i> .....	34
Human Connectivity.....	
<i>Areas of Highest Use</i> .....	35
<i>Parking and Public Transportation</i> .....	36
<i>Barriers to Human Access and Movement</i> .....	37
Humans and Ecological Connectivity: Barriers.....	38
Potential Connectivity.....	
<i>Regional Corridors</i> .....	39
<i>Easthampton</i> .....	40
<i>Holyoke</i> .....	41

### IMPROVING CONNECTIVITY

Broad Recommendations.....	44
Protect and Improve Wildlife Corridors .....	45
Coordinate Land Management and Communication Among Owners.....	47
<i>Case Study: Conservation Aggregations</i> .....	49
Ensure Human Access While Mitigating Environmental Impact.....	50
<i>Case Study: Quarry Reclamation</i> .....	52
Encourage Good Stewardship Through Use and Education.....	53

### APPENDICES

A: Detailed Recommendations.....	56
B: Citations.....	60
C: Map Data Attributions.....	62
D: Participating Stakeholders.....	65



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# **NOTICE**

## **ENDANGERED SPECIES HABITAT RESPECT & PROTECT WILDLIFE**

Harrassment, harm, killing, removal or  
interference is prohibited

Violators subject to criminal prosecution, fines,  
and imprisonment pursuant to MGL ch. 131

**REPORT VIOLATIONS or ENDANGERED SPECIES**

MA Environmental Police  
800-632-8075 or

Natural Heritage Endangered Species Program  
508-389-6356

# CLIENT GOALS AND REQUESTS



In the fall of 2015, a client team comprised of Kestrel Land Trust, Winding River Land Conservancy, and The Mt. Tom Advocacy Group collaborated on a proposal for a project with The Conway School to help establish the Mt. Tom range as an integral part of a larger network of wildlife habitat and recreational opportunities. Although the range is known and loved by many, there is little public awareness of the range as a functional whole. How different land owners manage their parcels, how trail networks lead from one section to the next, and how wildlife moves inside and outside the range—information about these topics and others resides in many different places, making it hard for any one person or organization to understand the full scope of ecological processes and human use on the range.

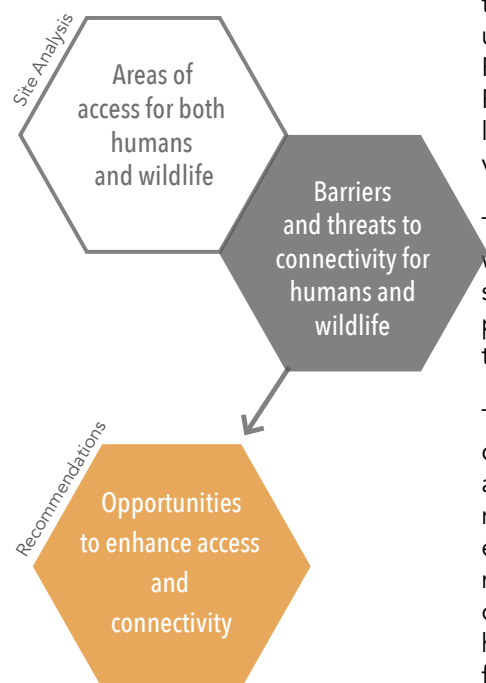
Client requests include the following:

- Identify linkages between the Mt. Tom range and human and wildlife populations
- Recognize ecosystem services provided by the range and the need to link those services to the surrounding landscape
- Identify existing barriers and threats to both human and wildlife connectivity within the range
- Identify examples of places where human access and other natural/human factors threaten to degrade water resources or other ecosystem services
- Explore recommendations on how to further protect and enhance human and wildlife connectivity

The client team represents years of experience in conservation work related to the Pioneer Valley region and the Mt. Tom range. Kestrel Land Trust undertook a significant project in 2014 to protect land around the Holyoke Range to preserve ecosystem health and connectivity there. Winding River Land Conservancy has been instrumental in conserving land in towns located to the west of Mt. Tom. The Mt. Tom Advocacy Group is the primary volunteer stewardship organization working on the range.

This project encompasses many acres, many topics, and many voices. Much work has been done to research the ecology of the Mt. Tom range, but many studies are dated and require new data collection, such as accurate wildlife population data for the range. This data gap, along with limitations due to time and the project's scope, sets the stage for more detailed studies.

The Mt. Tom range has been millions of years in the making but recent changes have presented new challenges to its plant and wildlife populations and to the people who frequent it. Ownership of some parcels is still in negotiation. A new communications tower on the ridgeline has been erected and plans are in the works to dismantle the wind turbine. The 2014 microburst, which leveled thousands of trees with tornado-strength winds on the west side of the range, reminded everyone that natural processes have no regard for parcel boundaries. Climate change pushes the habitats for many plants and animals further north each year. The goal of the Mt. Tom Ecological Assessment is to offer a new vision for the entire range, one that connects the different parts of the range, coordinates land management, and ensures good stewardship so that humans and wildlife can continue to benefit from services offered by the range and cope with all the challenges it faces.

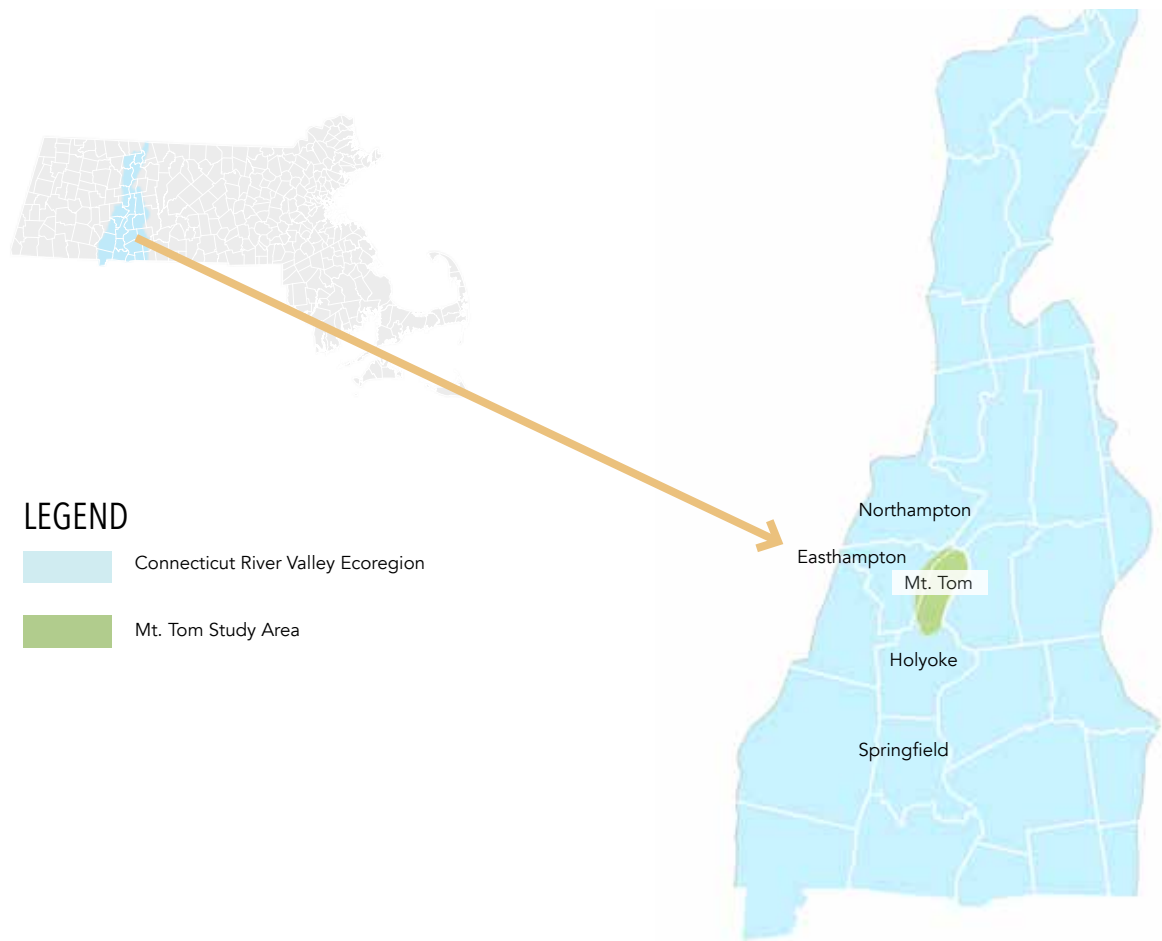


Through analyzing areas of access for both humans and wildlife, and evaluating barriers and threats to connectivity, the Mt. Tom Ecological Assessment will identify opportunities to enhance connectivity.

Opposite page: Endangered species on Mt. Tom share their habitat with several communication towers.



# SITE ORIENTATION



## LEGEND

- Connecticut River Valley Ecoregion
- Mt. Tom Study Area

### OVERVIEW

The Mt. Tom range is located in the cities of Holyoke and Easthampton, in western Massachusetts. Other nearby population centers include Springfield and Northampton.

The Mt. Tom range is part of the Metacomet Range, which extends from southern Connecticut to the southern borders of Vermont and New Hampshire. Because Mt. Tom is part of a larger mountain range, it does not have exact boundaries. For the purposes of this plan, Mt. Tom is defined as an approximately 3,000 acre area, bordered by Route 141 along its western edge and Route 91 along that range's eastern edge.

The Mt. Tom Ecological Assessment focuses on connectivity; other surrounding areas are considered as

influencing or being influenced by the Mt. Tom range.

### ECOREGION

Mt. Tom is part of the Connecticut River Valley ecoregion, an area identified by rich soils, a milder climate than surrounding regions, and rolling topography. Forests are composed of oaks, hickories, maples, beeches, and birches. Mt. Tom's ridgeline rises above the valley, surrounded by working farms, small towns, and several colleges and universities.

The combination of rich ecology and a human community with strong ties to the land creates a unique role for Mt. Tom. The Mt. Tom range is visible for miles around, both by human visitors and migratory birds. The mountain offers refuge for many,

from plants and animals not found anywhere else in the state, to people seeking a rest from their busy lives.

### MT. TOM AND "THE RANGE"






The Mt. Tom range trends north-south. While the mountain has no distinct summit, the Holyoke Gas and Electric property that is home to the communication towers is widely referred to as the summit of Mt. Tom. Although there are other peaks on the range (Mt. Nonotuck, Goat Peak, and East Mountain) the entire range is typically referred to as "Mt. Tom". In this report, the entire Mt. Tom range will be referred to as "Mt. Tom" as well as "the range."

# SITE ORIENTATION

## GENERAL LANDSCAPE PATTERNS ON AND AROUND THE MT. TOM RANGE



### LEGEND

-  Agricultural land/low-density residential development
-  Conserved in perpetuity, public access permitted
-  Urban development
-  Rural residential development and conserved lands
-  Utility owned land, public access permitted

Landscape patterns on and around Mt. Tom include conservation areas, residential areas, and urban areas.

Examining general landscape patterns on and around the range begins to capture the larger context of the landscape. The boundaries shown are intentionally vague, so as to show patterns rather than legal parcels.

Much of the range is land that is permanently conserved, but there are many surrounding areas that are vulnerable to development. Development encroaches from all sides. Some of the rural and agricultural lands adjacent to the range are protected under Massachusetts Chapter 61 or other conservation restrictions but these parcels are not necessarily adjacent to each other. Other conserved parcels need to be connected to the range. Land owned by utility companies offers some measure of protection but is not legally conserved in perpetuity.

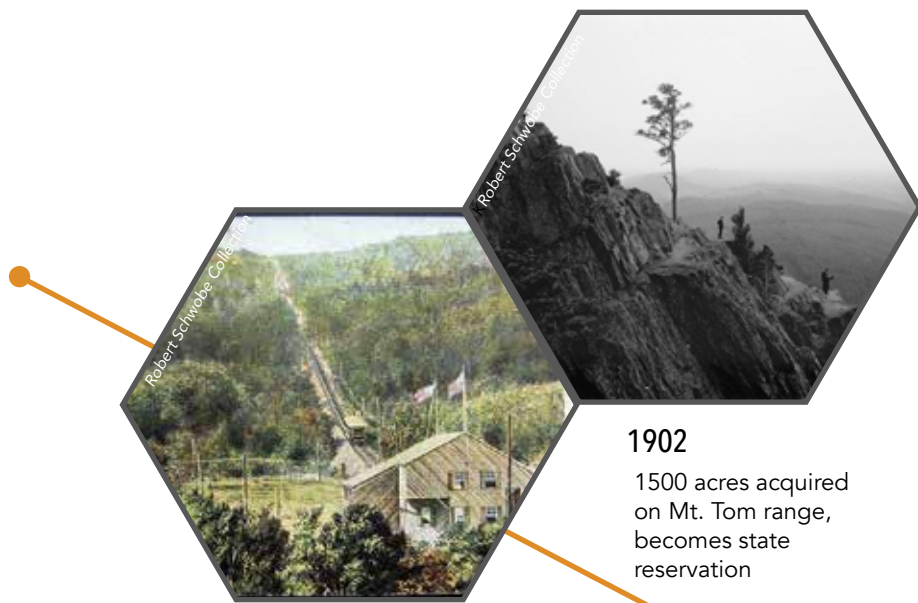


# HISTORY OF HUMAN USE

Mt. Tom has been a cultural landmark in the Pioneer Valley for hundreds of years. The range owes its name to Rowland Thomas, a surveyor working in Springfield, Massachusetts during the mid-1600s. Long before Mr. Thomas arrived, the range was well-traveled by the Pocumtuck and Norwottuck Native Americans, who knew the Mt. Tom area as Pascommuck. Many of the trails currently traversing the ridgeline are ancient Native American footpaths.

A contentious relationship ensued over ownership between the Native Americans and the early settlers of Easthampton and Holyoke. Mt. Tom has continued its tumultuous and ever-evolving existence in the region. Ownership and use grew out of a pastoral colonial past into logging and mining uses. Commercial and recreational pursuits, including hotels, an amusement park, and a ski area, have also found a place on the range.

Mt. Tom continues to evolve in ownership and use. Its value as intact forest habitat was recognized back in 1902, when the initial footprint of the reservation was acquired. Conservation efforts on the range continue today to protect this resource in perpetuity.



**1902**

1500 acres acquired on Mt. Tom range, becomes state reservation

**1897**

Mountain Park built as amusement park.

Mt. Tom Summit House opens, accessed by trolleys



**1946**

A B-17 military transport plane crashes into the east side of Mt. Tom, killing the 25 men aboard

**1861**

Eyrie House built on Mt. Nonotuck



**1962**

Mt. Tom Ski Area opens on the east side of the range



**1987**

Mountain Park closes, rides are dismantled and sold



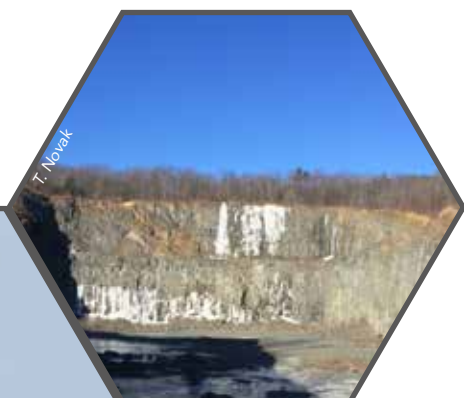
**1998**

Mt. Tom Ski Area closes, buildings and slopes abandoned



**1994**

University of Massachusetts builds a wind turbine on the Mt. Tom ridgeline



**2002**

Mt. Tom Partners buy former ski area, quarry remains under private ownership





Bray Lake is on DCR property but the water that flows into it passes through land owned by Mount Tom Rock, LLC and The Trustees before reaching the lake. The lake drains out through DCR and Holyoke Country Club property.

## OVERVIEW

The area of the range examined in this study totals around 3,000 acres, which is divided among different owners. These owners are a mixture of public and private entities, conservation organizations, utility companies, and businesses. The Department of Conservation & Recreation (DCR) owns the largest portion of the range, totaling approximately 1,800 acres. Much of the exposed ridgeline is on Holyoke Gas & Electric property. Most properties are open to the public, but Mountain Park, the quarry, and the areas surrounding it are not open. Ecosystems traverse property boundaries, but different owners have different priorities, management strategies, and resources. Conservation is not the top priority for all owners.

## SHIFTING OWNERSHIP

In 2002, the Mt. Tom Partners purchased a 396-acre section on the east side of the range. The Partners—DCR, The Trustees, Boys & Girls Club of Greater Holyoke, and U.S. Fish and Wildlife Service (USFWS)—divided this section into parcels managed by each partner. DCR extended the reservation to the south, The Trustees purchased Little Tom Mountain, USFWS owns the old ski slopes, and the Boys & Girls Club bought the ski buildings and the land around them.

## THE QUARRY

DCR intended to purchase the quarry parcel, located just to the north of the ski buildings, but this transaction never took place. This area has potential for recreation and habitat but due to the safety hazards

of the quarry and various financial concerns, the Boys & Girls Club was unable to move forward with their plans to create a summer camp on their property. A lack of visible management on these parcels has led to vandalism and misuse of the ski area buildings. These areas feel unsafe to many people.

## CHALLENGES TO CONNECTIVITY

These highly disturbed parcels present significant challenges to connectivity—vegetation cannot grow in developed areas and most wildlife cannot find suitable habitat. These areas feel unsafe and off limits to human visitors. Reestablishing connectivity through this area will take a strong, collaborative effort from all landowners on the range, as well as input and assistance from the public.

# LAND OWNERSHIP ON MT. TOM

There are a significant number of different landowners on the Mt. Tom range. DCR holds the largest parcel (around 1,800 acres) and the smallest is held by the Massachusetts Department of Fisheries and Wildlife (14 acres). Two utility companies (HG&E and Holyoke Water Works) own land on the range and allow public access to their properties. The "summit area" of Mt. Tom is actually on HG&E property and is the site of many communication towers. Mountain Park is privately owned by a local entrepreneur and is used as an occasional concert venue in the summer.

## CLIENTS:

- Kestrel Land Trust
- Winding River Land Conservancy
- Mt. Tom Advocacy Group

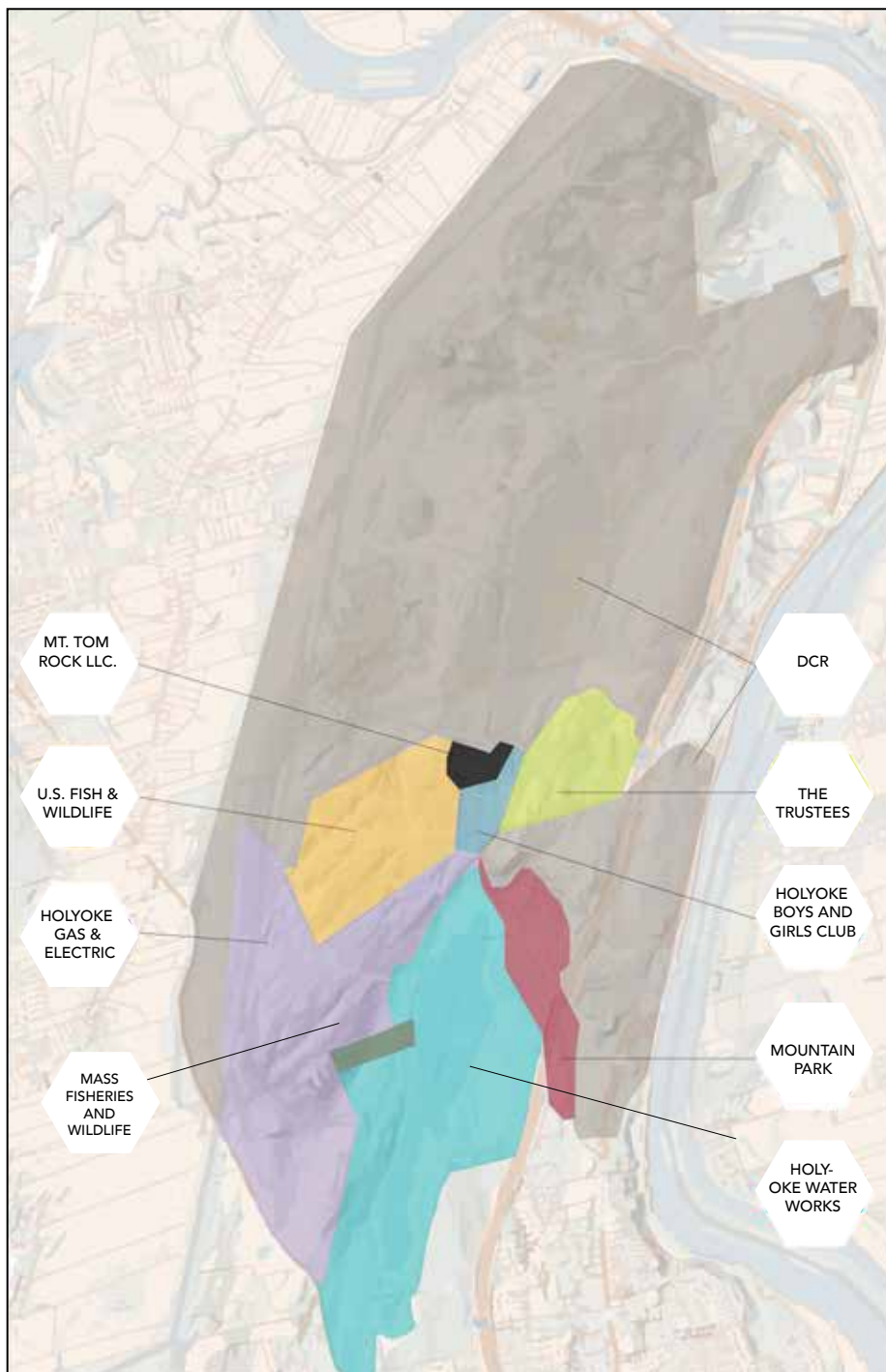
## MT. TOM PARTNERS:

- Department of Conservation & Recreation
- The Trustees
- US Fish and Wildlife Service
- Boys & Girls Club of Greater Holyoke

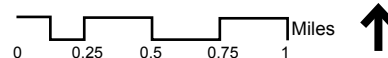
## PRIMARY LANDOWNERS:

- Department of Conservation & Recreation
- The Trustees
- USFWS
- Boys & Girls Club of Greater Holyoke
- Holyoke Gas & Electric
- Mountain Park
- Wyckoff Country Club
- Holyoke Country Club
- Holyoke Water Works
- MA Department of Fisheries and Wildlife
- Mount Tom Rock, LLC

Given the number of different organizations involved in this project, it is useful to refer to them in groups. References to "Clients", "Mt. Tom Partners", and "primary landowners" will be made throughout this project.



The varied ownership on the Mt. Tom range represents many different land uses and priorities. These differences can complicate connectivity for both humans and wildlife.





# PUBLIC ENGAGEMENT

## OVERVIEW

Many voices contributed to this project. In January, the Conway team met with some of the primary landowners on Mt. Tom, plus staff members from local conservation-based groups. In March, the team met with community members who use the range frequently for recreation.

## STAKEHOLDERS

The first meeting focused on eliciting feedback from conservation professionals, including landowners on the range. Representatives from DCR, The Trustees, and USFWS attended. Clients were also present, as were representatives from other local land trusts, Massachusetts Audubon, the Appalachian Mountain Club (who hold an easement on the New England Trail), the Cities of Holyoke and Easthampton, and the Pioneer Valley Planning Commission.

## USER GROUPS

The second meeting invited members of user groups, who serve as eyes and ears on Mt. Tom due to how much time they spend there. Residents from Holyoke, Southamptton, Easthampton, and other towns were present, as well as representatives from Pioneer Valley Hiking Club, Wilbraham Hiking Club, birding clubs, and Holyoke Parks and Recreation.

## FEEDBACK

Both meetings focused on eliciting feedback on why Mt. Tom is such a vital part of this region, barriers for humans and wildlife, and ways in which the range benefits people. Despite the differences in



Members of user groups provided feedback on the benefits they receive from Mt. Tom and the barriers they experience when trying to access it.

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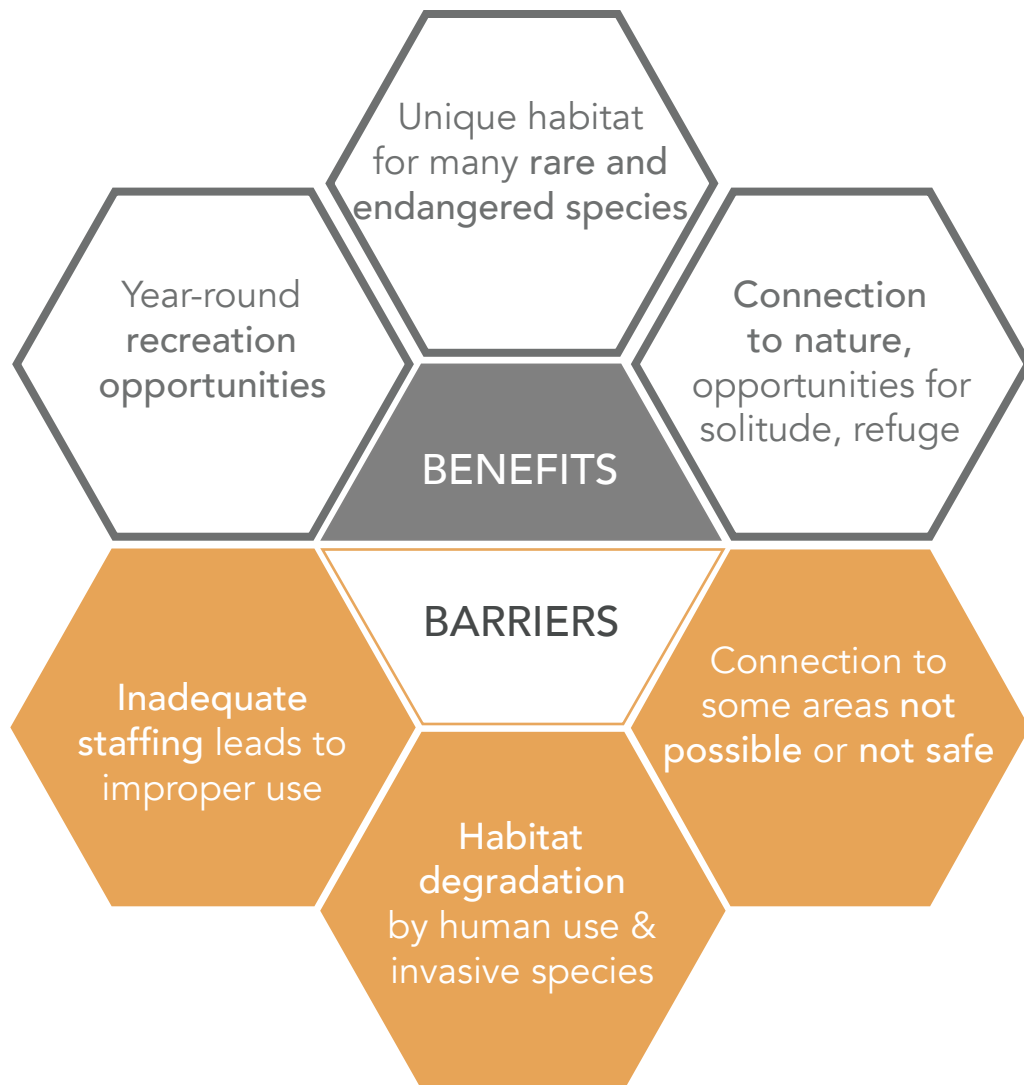


Some of the primary landowners on the range met with staff of various local conservation-based groups to map out where wildlife access the range and the barriers they encounter.

Kelly Corbin

backgrounds and experiences, there was remarkable overlap among participants at both meetings (see diagram, p. 9).






## FEEDBACK SUMMARY

The feedback received from landowners, clients, conservation groups, hikers, birders, and many other community members who value Mt. Tom shows consistent themes around access and connectivity. This consistency confirms that the benefits identified should be supported and the barriers named need to be addressed.

## SHARED VALUES

Both stakeholders and user groups were asked to talk about why they believe Mt. Tom is such a valuable resource. Common ground was evident in the responses of both stakeholders and user groups. Each group valued the plant and wildlife diversity and the human history on the range. The range's opportunities for recreation, education, and community engagement were described by stakeholders and user groups as extremely valuable.

Participants from both meetings saw protecting forest and other habitat as a critical concern.



*"[Mt. Tom]...is a blessing, and the single best reason to live here. I try to hike it once a week."*

*-Community member*

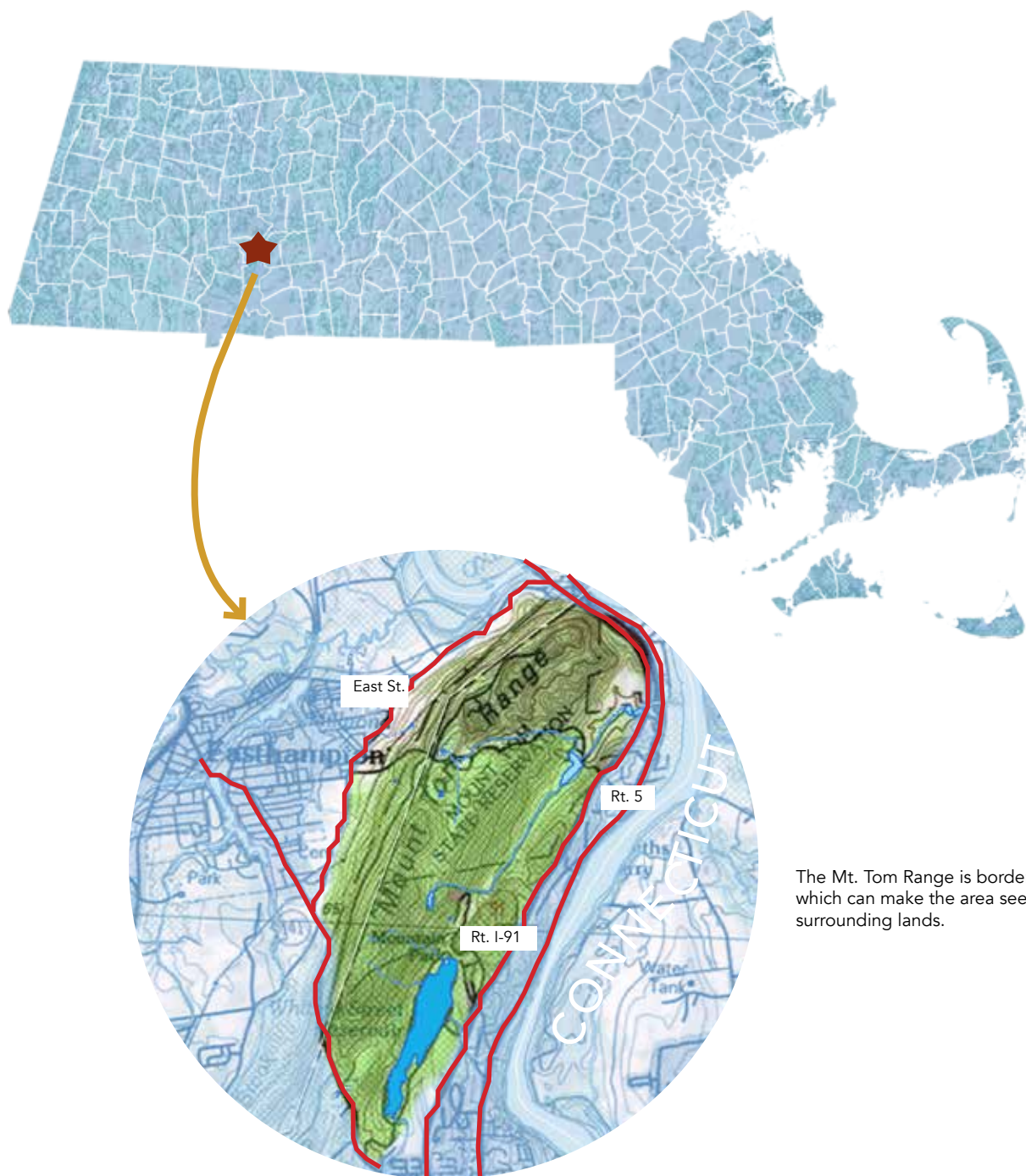
# WHY CONNECTIVITY MATTERS

John Muir famously said, “When we try to pick out anything by itself, we find it hitched to everything else in the Universe.” Mt. Tom demonstrates these interconnections in many ways. Water falling on the rocky slope habitats eventually makes its way into the freshwater habitat of the Connecticut River. The basalt quarry once mined for the trap rock used to build roads leading to Mt. Tom now limits human activity there. Trails built for hikers are often used by deer and other mammals to move about the range. These relationships demonstrate that being hitched together is simply the way of things. Connection is the letter and the law of nature.

In ecology, “connectivity” refers to the degree to which a landscape allows or blocks movement. Areas with high connectivity permit wildlife to move freely and ecosystem processes to function. Those processes—seed dispersal, pollination, predator-prey relationships, energy flows—rely on high connectivity between areas of diverse natural communities. Low connectivity areas have many barriers, such as roads and development, that hinder wildlife movement and overall ecosystem function. This plan applies the concept of connectivity to analysis of human communities as well in order to determine how easily people can access and move throughout the Mt. Tom range.

This section presents information about why connectivity matters, both to ecosystem health and human well-being. Site analyses including geologic history, water, vegetation, biodiversity, ecological disturbance, human access, and others build a strong case to protect existing connectivity and improve it where it is lacking.





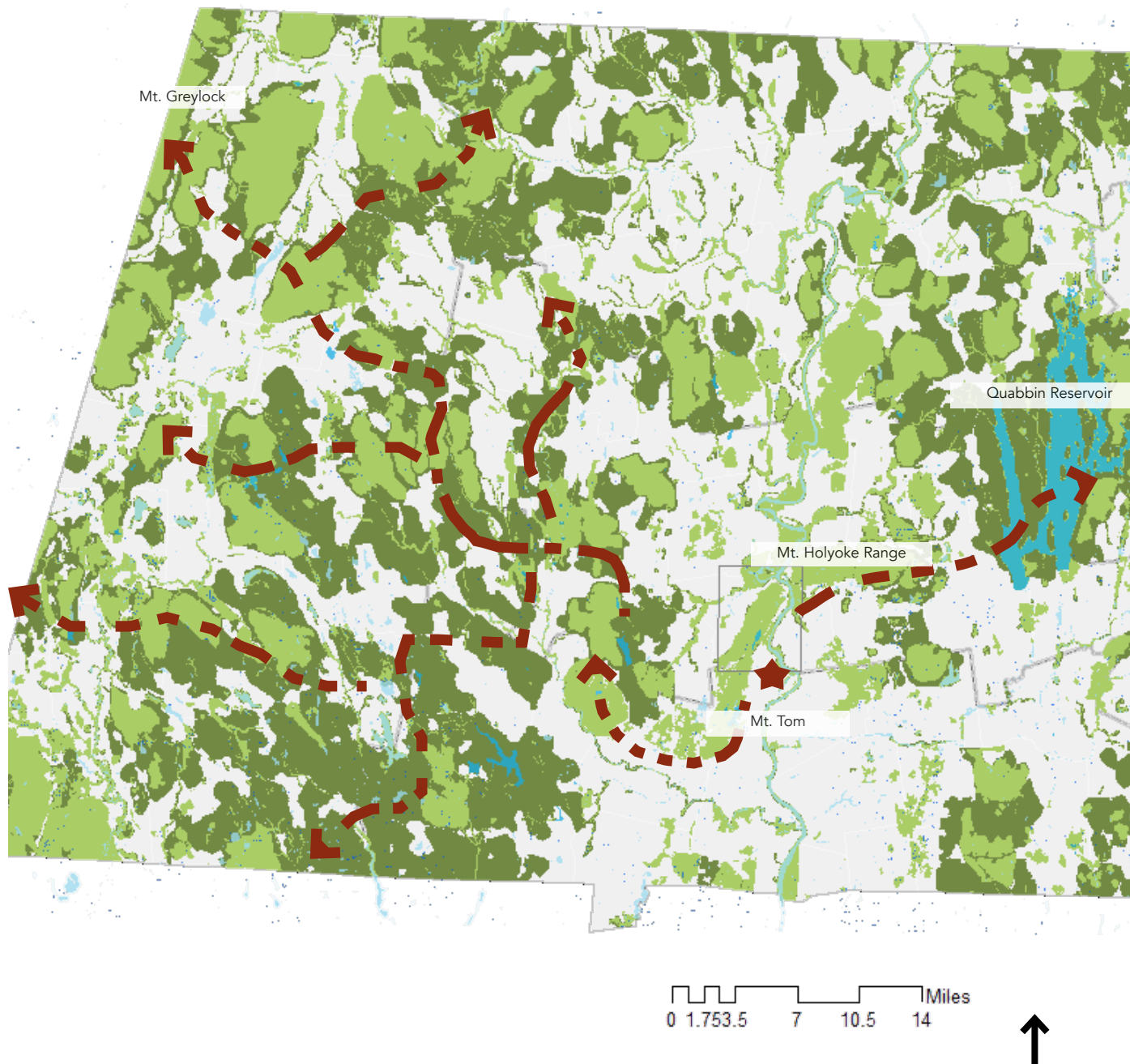
The Mt. Tom Range is bordered by major roads, which can make the area seem isolated from surrounding lands.

“Mt. Tom is an island...” This phrase appears in conservation planning documents, informational websites for the public, and in conversation about the range. The range’s location within a loop created by Routes I-91, 141, and 5, as well as East Street, combined with how it dramatically rises above the landscape, can give the impression

that the range is an isolated fragment of nature.

The Mt. Tom range, however, is deeply embedded in a larger social and ecologic landscape. How would management, stewardship, and understanding of the range change if the focus shifted to the connections the range has to that landscape and its human and wild inhabitants?

“Island” has another meaning for many people in regards to Mt. Tom. The range serves as an oasis—a natural refuge in the midst of development. Humans and wildlife value the range for this reason but must still overcome barriers to reaching that oasis or to move from it to another area of open space nearby. Connecting these oases together is vital conservation work.



A perceptual shift to seeing the Mt. Tom range's connections to the greater region reveals opportunities to improve connectivity and access for both humans and wildlife. Collaboration already exists among many of the major landowners. Through framing the range as connected, these landowners can partner on management practices that respect and encourage

ecosystem processes. A connected landscape allows wildlife easy movement within the range as well as to and from it. People will be able to experience more of the range, distributing their impact rather than concentrating it. A connected Mt. Tom fits like a puzzle piece into the Pioneer Valley, linking conservation areas in all directions.

## LEGEND

- Priority Natural Community
- Critical Natural Landscape
- ➔ Potential Corridors

# GEOLOGIC HISTORY

The Mt. Tom range is home to a variety of plant and animal species rarely found elsewhere in Massachusetts. What makes the range such a unique place that it can host this diversity? The answer requires a look back in time.

## ROCK FORMATION

Around 200 million years ago, North America and Africa pulled apart, creating a layer of basalt rock in the Connecticut River Valley. Layers of sedimentary and basalt rock formed, all of which was then uplifted and tilted. The sedimentary rock eroded, leaving the exposed basalt ridge of the Mt. Tom range.

## SOIL CREATION

Although these events took place millions of years ago, they have profound implications for what Mt. Tom looks like today. The basalt bedrock gives rise to calcium-rich soils, a condition preferred by many plant species. Searcy, et al., 2003, found greater species richness for trees and herbaceous plants on basalt than on similarly located sedimentary rock-based soils. Other soils on the range contain different nutrients, fostering different plant and animal communities. Greater diversity in plant species leads to a greater diversity of animal species. Calcium and other nutrients flow downhill, enriching soils in connecting areas below.




## AQUIFERS

More recently in geologic history, the Barnes Aquifer formed to the west of the Mt. Tom range. Sediments deposited during the melting of the Laurentide ice sheet 15,000 years

BEDROCK MAP OF THE MT. TOM RANGE



## LEGEND

-  Mt. Tom Study Area
-  Basalt
-  Sedimentary Rock

0 0.75 1.5 3 4.5 6 Miles ↑

The bedrock map of the range shows a ridge of basalt running approximately north-south throughout the range and well beyond it. This ridge is clearly visible on the range's west side. Surrounding rock types are primarily sedimentary in origin.

ago created the aquifer (see page 17 for more information).



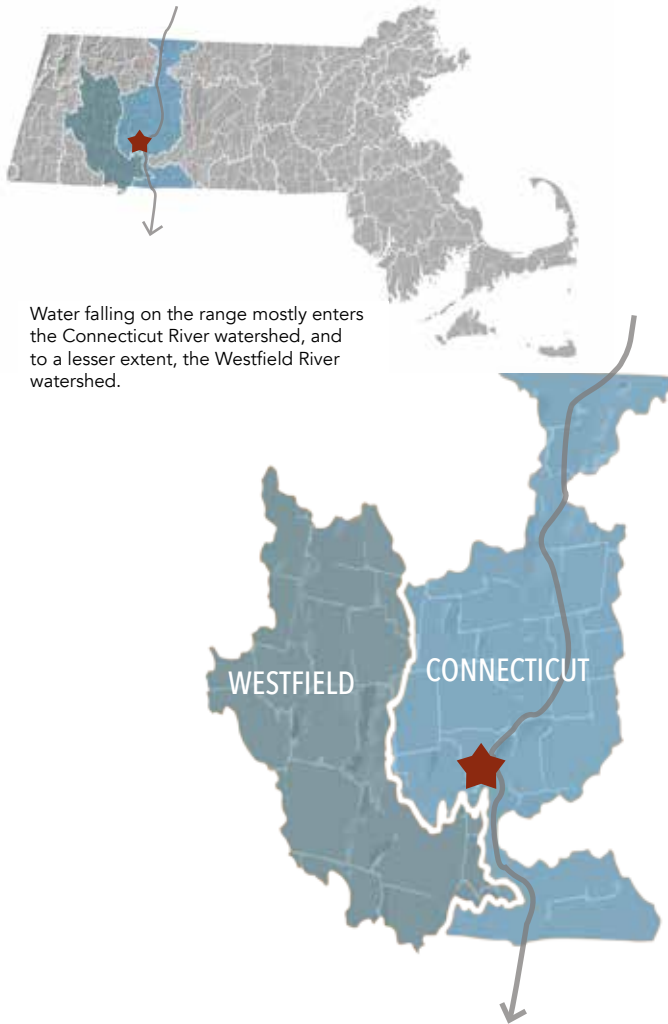
# GEOLOGIC HISTORY



The basalt bedrock that makes up Mt. Tom and the larger Metacomet ridges has not only provided spectacular views of the Pioneer Valley but has also been used as raw building material. The Mt. Tom Quarry was mined for its basalt starting around 1900, which was then broken down into trap rock and used in road building. Concerns about the environmental impact of the quarry began in the 1990s, and the quarry ceased operations in 2012. The parcel was intended to be sold to the DCR at that time but the sale is currently held up due to unresolved drainage problems.

Mt. Tom's basalt bedrock outcrops serve primarily recreational purposes for people today, but have played a role in the economic output of the Pioneer Valley for many years.

# WATERSHED AND WATER FLOW



When rain hits Mt. Tom, it may flow toward the Manhan River to the west, the Connecticut River to the east, or the Whiting Street Reservoir to the south.

The Mt. Tom range lies within the Connecticut River watershed. Water flowing from the mountain eventually reaches the Connecticut River, making its way to the Long Island Sound and into the Atlantic. This connection places Mt. Tom within a larger ecological context and indicates that factors affecting water quality on the range have an impact far downstream.

## WATER FLOW

Water flows from the Mt. Tom range to several other important hydrologic features in the area. Water flowing east from the range enters the Connecticut River. Water moving down the south slopes and to the east

enters the Whiting Street Reservoir, an emergency surface water supply area for Holyoke, which then connects to the river. As water flows from the range to the west, it may enter the Manhan River and eventually, the Connecticut River. Some of the water flow to the west also seeps into the ground, helping recharge the Barnes and Great Brook aquifers.



# THE BARNES AQUIFER

## LOCATION OF THE BARNES AQUIFER IN RELATION TO THE MT. TOM RANGE



The Barnes Aquifer, in green, is a sole source aquifer that underlies Easthampton and receives recharge from the Mt. Tom range.

*Easthampton Open Space and Recreation Plan*

The over 2,000 acres of forested and conserved land on the Mt. Tom range offer important protections for water quality in the region. In a 2004 report, the American Water Works Association declared that conserving forests is critical to protecting drinking water (Ernst et al., 2004). The Trust for Public Land found that a 10% increase in forest cover led to a 20% reduction in costs associated with water treatment.

### THE BARNES AQUIFER

The Barnes Aquifer lies to the west of the Mt. Tom range and provides four towns (Easthampton, Holyoke, Southhampton, and Westfield) with drinking water. It is the sole source aquifer for Easthampton, meaning that the town receives over 50% of its drinking water from the Barnes. Mt. Tom's forested land cover ensures cleaner runoff that may recharge the aquifer. The high level of water quality in the area was proven in 2015, when the City of Easthampton won an award for having the best-tasting water in the United States (NRWA News, 2015).

### WATER QUALITY

While surrounding towns have enjoyed high water quality due in part to Mt. Tom, human activity on the range can compromise that quality. Erosion is a major issue on the range, contributing runoff high in sediment. People create erosion when they park off the road in order to access the range. High impact areas such as the trails up to the summit from the south also show significant erosion, sending that material downslope into the vernal pools that lie at the bottom.



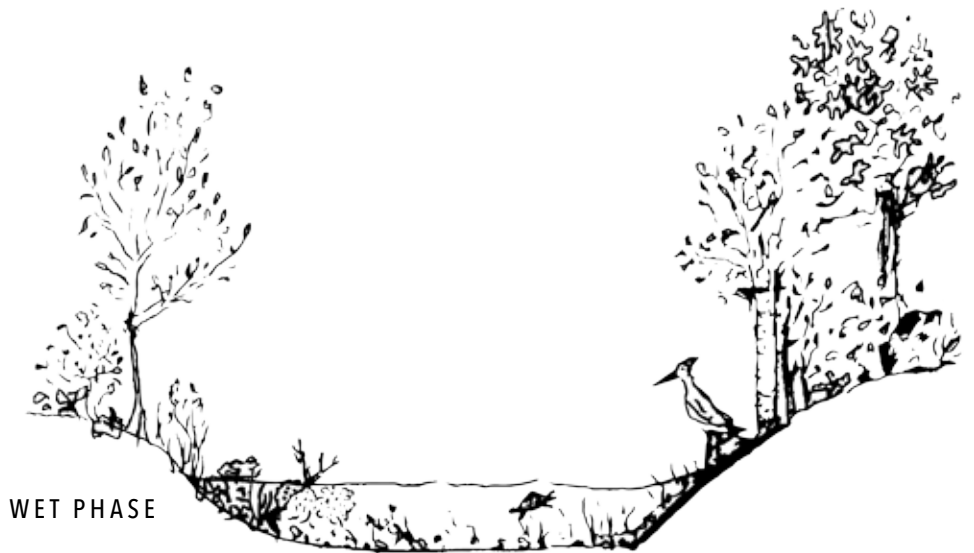
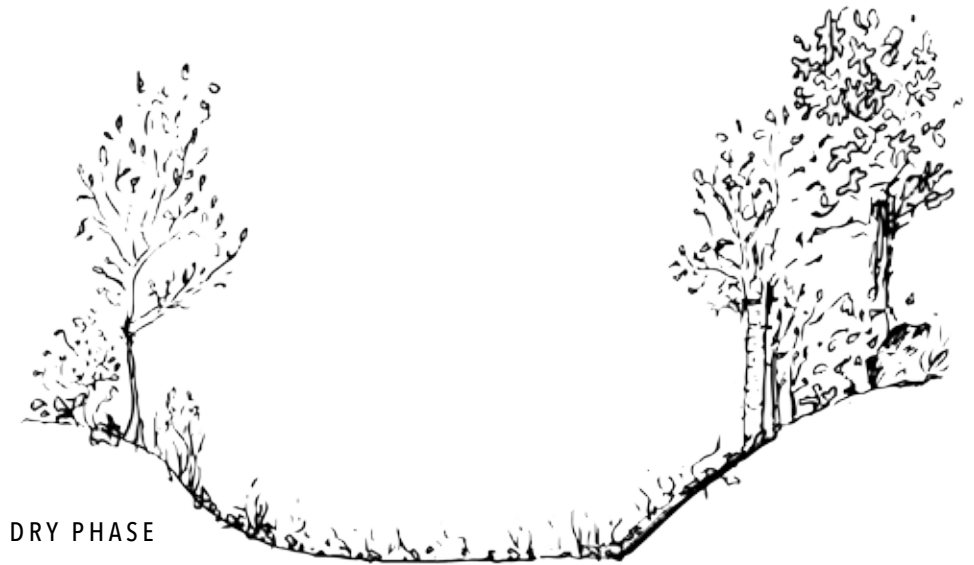
# VERNAL POOLS

Water resources on Mt. Tom offer benefits to wildlife communities as well as humans.

## VERNAL POOLS

Vernal pools are shallow topographic depressions that are seasonally filled with water. Due to their seasonal lack of water, they cannot support fish, making them refuges for species such as frogs and salamanders to breed. Vernal pools and their associated upland forests are critical sources of wildlife diversity in Massachusetts.

Climatic changes associated with each season cause dramatic changes in vernal pools. Vernal pools tend to collect water during winter snow melt and spring rains, fluctuating in volume from season to season. During particularly dry years, vernal pools may not fill at all.



As vernal pools fill with water, they provide breeding habitat for many amphibians and feeding grounds for birds and mammals.



Eastern painted turtle  
Linda Henderson



Jefferson salamander  
VT Biology Technical Note



Wood frog  
Michael Zahner

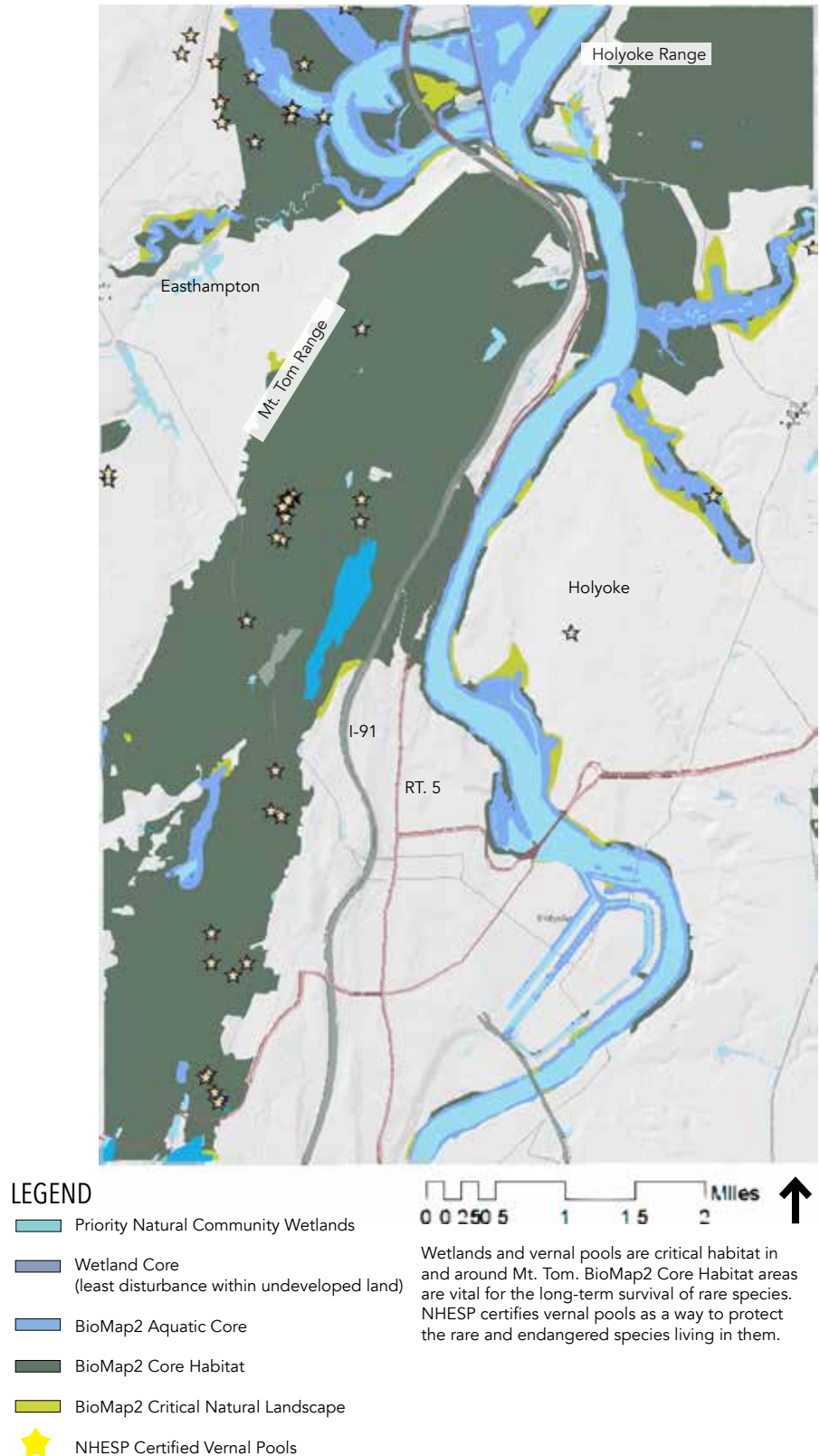
# VERNAL POOLS

The Mt. Tom range is home to some of the most diverse and productive vernal pools in the state of Massachusetts. These pools are critical habitat to some of the state-listed species that live on the range, such as the marbled salamander (DCR 2013). Salamanders, along with other vernal pool creatures, are sensitive to water quality and require clean water in these pools. It is also important that these animals have access to nearby intact habitats, as movement from vernal pools to forested uplands is a key factor in their reproductive cycles. Many amphibian species on the range breed in vernal pools once spring nights have warmed enough to allow their movement to and from the pool. Being able to connect to a number of pools helps ensure genetic variability in their populations (Shah, 2016).

## CERTIFIED VERNAL POOLS

On the Mt. Tom State Reservation, there are eight certified vernal pools and 12 potential pools (DCR 2013). The Natural Heritage and Endangered Species Program (NHESP) uses volunteer data to certify vernal pools, which then creates a buffer zone up to 100 feet beyond the pool's boundary. Several more certified pools are found on land owned by Holyoke Gas & Electric, which does not have the same level of legal protection in perpetuity for natural resources offered by other owners. While official certification provides a vernal pool and its immediate surroundings a buffer zone of protection, it is critical to ensure adequate connectivity for the organisms using vernal pools by protecting

## WETLANDS AND VERNAL POOLS OF THE MT. TOM RANGE



the larger landscape. Pools listed as “potential” need more data collected to qualify for certification.

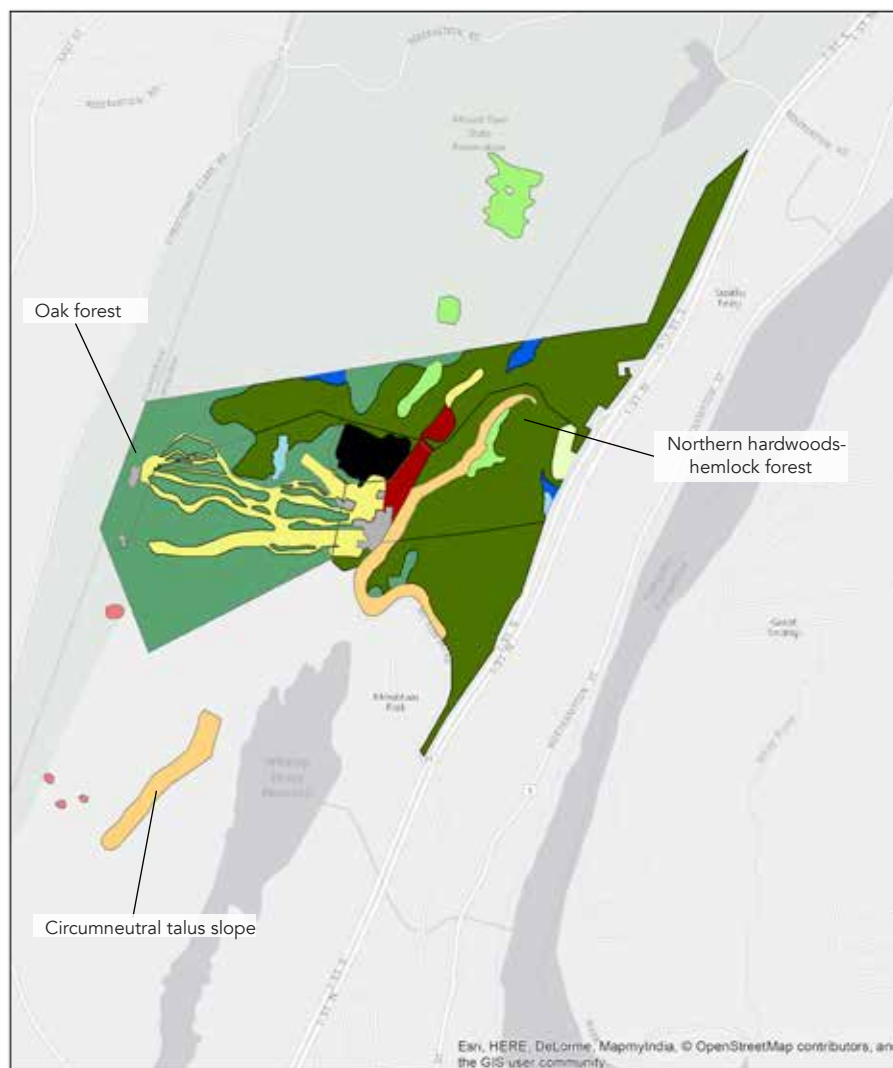
# VEGETATION

This map of vegetation communities on the Mt. Tom range focuses on the properties bought in 2002 by the Mt. Tom partners (DCR, The Trustees, USFWS, and the Boys & Girls Club). It also shows vegetation communities considered priorities by the Natural Heritage and Endangered Species Program that lie on other parcels. Data at this level of detail does not currently exist for these communities in the rest of the range. This map is used as a proxy until that information can be mapped.

## THE NEED FOR MORE DATA

DCR does have more extensive data on natural communities for the nearby Holyoke Range; amassing similar data for Mt. Tom would provide information essential to creating a comprehensive management plan for the entire range.

## VEGETATION COMMUNITIES ON MT. TOM PARTNERS' PROPERTIES



Data on natural vegetation communities only exists for a portion of the Mt. Tom range.

0 .25 .5 1 Miles



## LEGEND

Circumneutral talus slope	Northern hardwoods-hemlock-oak transitional forest
Circumneutral rocky summit/outcrop	Oak forest
Permanent pond/reservoir	Hickory-hop hornbeam forest
Forested swamp/marsh wetland	Non-woody old field
Buildings/surroundings	Red cedar-shrubby old field
Quarry	
Roadside/disturbed place	



# VEGETATION

The natural plant communities (groups of plants commonly found growing together in particular environments) found on Mt. Tom show a broad range of the types of vegetation found in Massachusetts. Data provided by the Mt. Tom Partners (DCR, The Trustees, U.S. Fish and Wildlife) identifies approximately 10 different natural communities on the 396 acres shown in the map at left. Research done on the nearby Holyoke Range found 26 different natural communities; DCR is confident a similar number exists on the Mt. Tom range. Habitat diversity supports animal diversity. The array of natural communities found on the range is another indicator of the wildlife that potentially resides there. The range is also home to many transitional vegetation communities (areas where one community blends with another). These areas are known for their species richness.

## PRIORITY COMMUNITIES

Some of these communities, such as the oak forest or northern hardwoods-hemlock forest, are relatively common across the state. Others, such as the hickory-hop hornbeam forest and circumneutral talus slopes, are considered priority habitat by the Natural Heritage and Endangered Species Program (NHESP). With few of these natural communities left in the state, it is critical to protect the ones that are intact. Priority communities cross property boundaries on Mt. Tom and are sometimes found on land that is not under conservation safeguards, such as the rocky outcrop communities on the summit of Mt.



Pale swallowwort is a highly invasive relative of milkweeds. USFWS and The Trustees are working to eradicate it from their properties on Mt. Tom but other communities likely exist on different parcels, complicating the removal process.

Tom, which is owned by Holyoke Gas & Electric.

## INVASIVES ON MT. TOM

Invasive plants, such as pale swallowwort, are often found in disturbed and revegetated areas. That pattern holds true on Mt. Tom. The old ski slopes, now owned by USFWS, have significant swallowwort invasion, creating a seed source that will affect neighboring properties. A comprehensive land management plan agreed upon by all landowners will help coordinate management of these invasive species and many others.



# VEGETATION: ECOSYSTEM SERVICES

Vegetation can provide a number of the critical ecosystem services shown below. The Mt. Tom range, with its large tract of intact and healthy forest, improves air and water quality for residents of the Pioneer Valley, mitigates climate change, and offers those residents a beautiful place to explore.



**Diversity** of habitats supports a diversity of wildlife.



Forest protects water and **air quality**, prevents erosion, and regulates local temperatures.



Trees and other plants **sequester carbon**, helping to offset the impact of climate change.



Forests offer **recreational opportunities** such as hiking, wildlife viewing, trail running, and nature education.





Spotted salamander (*Ambystoma maculatum*)



Peregrine falcon (*Falco peregrinus*)

Despite being appreciated for its beauty and rich cultural history, few people are aware of Mt. Tom's rich ecological diversity. Mt. Tom is home for many rare and endangered animal species, including the wood turtle, the peregrine falcon, the timber rattlesnake, and the spotted salamander. The diversity of vegetative communities has created an environment that facilitates flourishing wildlife communities.

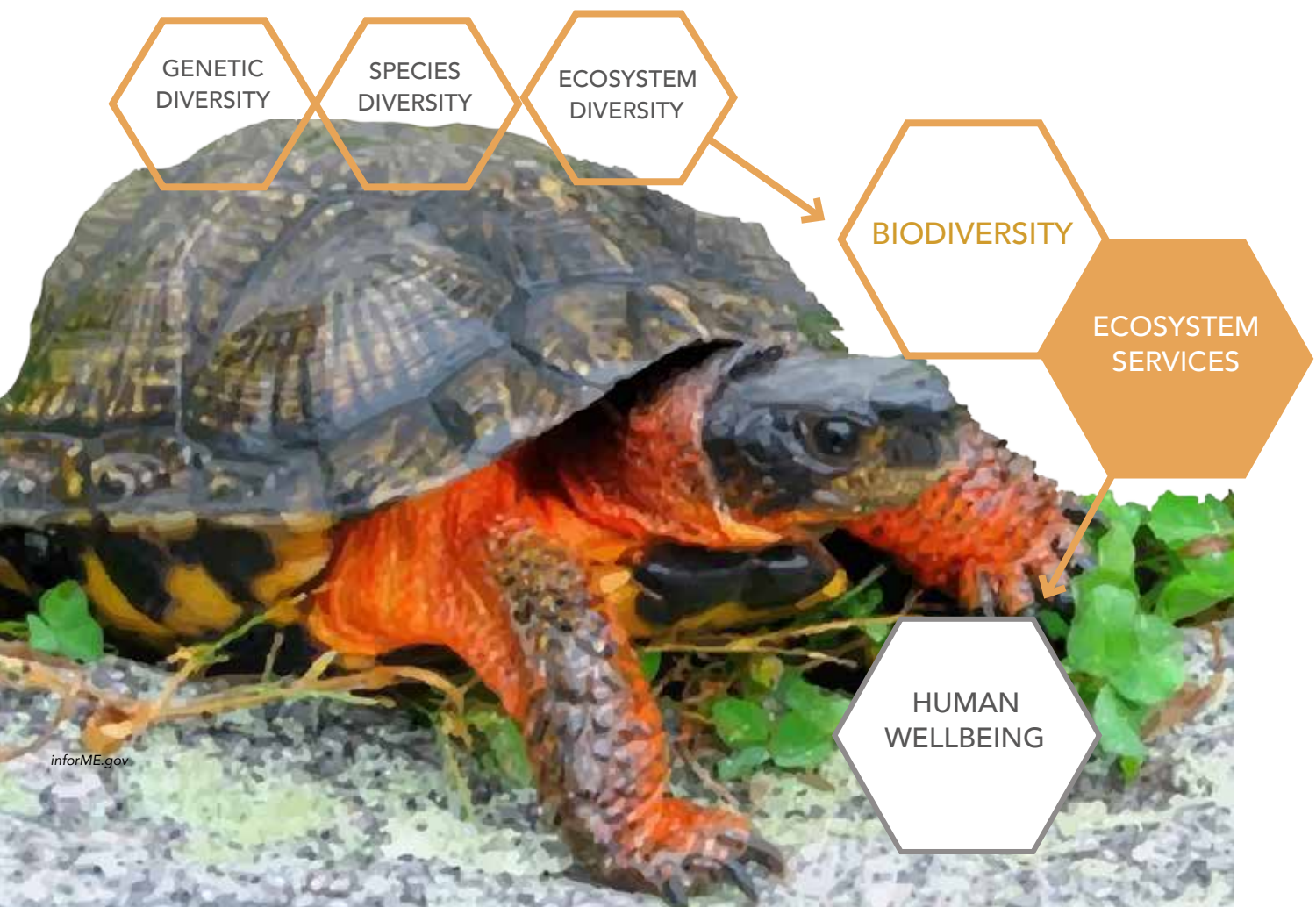
Although scientists understand the value of biodiversity, diverse wildlife communities do not always survive challenging economic, political, and cultural priorities. Often times, people who question the relevance of maintaining biodiversity argue that far too many resources are being spent on conservation. Although it can be framed as a subjective, emotional value, biodiversity is rooted in genetic diversity, which contributes to resilient ecosystems (Shah, 2016) .



Timber rattlesnake (*Crotalus horridus*)



# BIODIVERSITY: CLIMATE CHANGE



Diverse ecosystems contain a full spectrum of organisms, from plants to animals to fungi and more.

Preserving biodiversity is especially important when considering an uncertain environmental future in the face of climate change. Biodiversity is nature's back-up generator. A biodiverse ecosystem is more resilient and more able to bounce back from disturbances and stressors such as climate variability. Biodiversity creates redundancy in an ecosystem, with several species sharing overlapping niches. If one species is lost, there are others to fill the role it played. The ecosystem can continue to provide ecosystem services despite climate effects (Shah, 2016).

## THE EFFECTS OF CLIMATE CHANGE

Considering biodiversity in the context of climate change is important because its impacts are so large and complex. Mt. Tom experienced severe habitat devastation, for both humans and wildlife, during the October 2014 microburst. Such severe weather events will continue to increase in frequency due to climate change. Average yearly temperatures will continue to rise and winter precipitation is predicted to increase. Many species are shifting their habitat ranges and behaviors in response, moving further north or to higher elevations, flowering

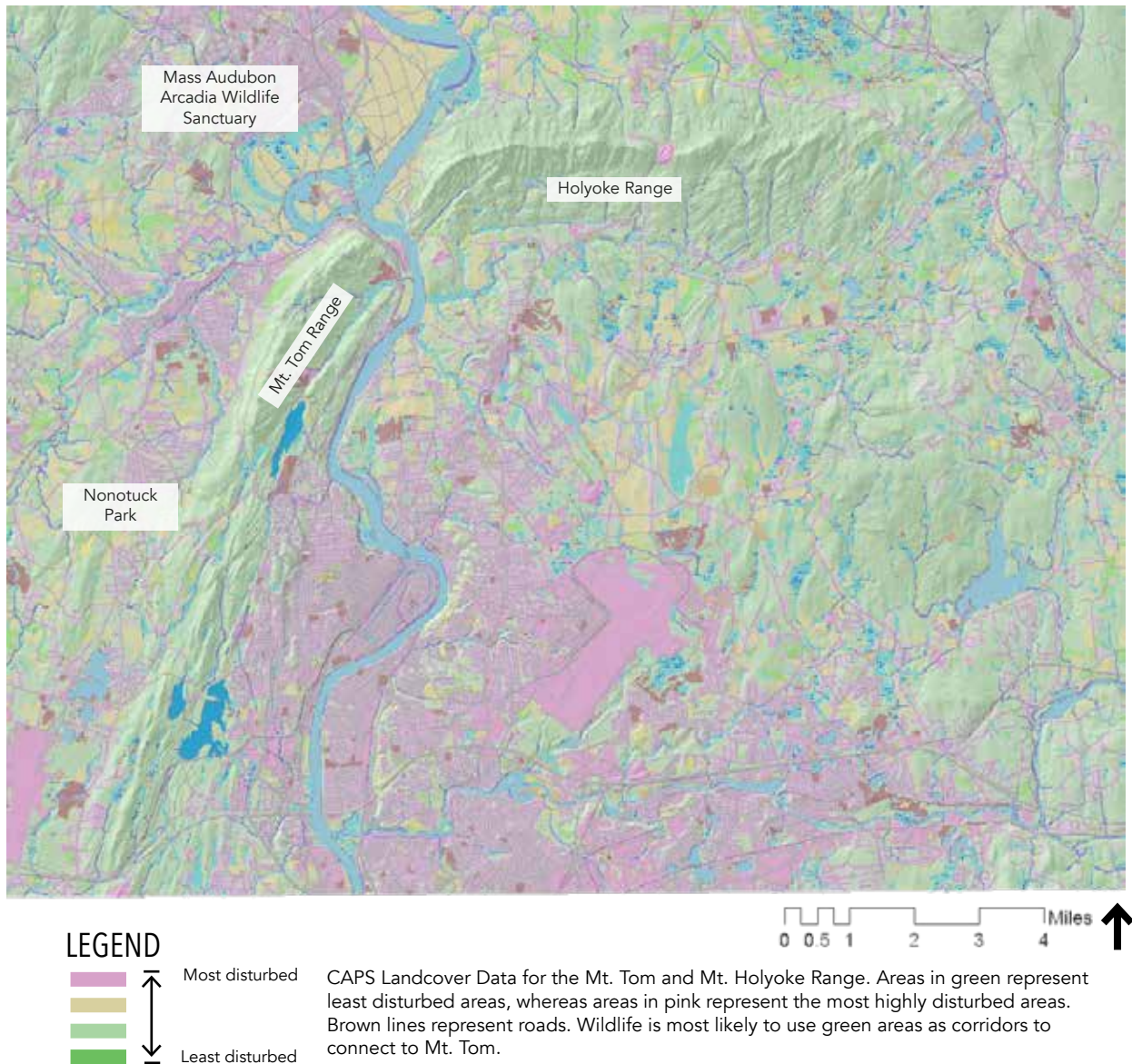
earlier, or altering the timing of their migrations.

## PROTECTING BIODIVERSITY

Biodiversity is important when discussing Mt. Tom's position as an integral part of a larger network of wildlife corridors. The range must be an intact and protected part of this network to support the needs of plants and animals as they attempt to respond to a changing climate.

# ECOLOGICAL DISTURBANCE

## DISTURBED AND UNDISTURBED AREAS IN THE MT. TOM REGION



Protecting connectivity is key to protecting biodiversity. Connectivity ensures that species populations do not become genetically isolated due to barriers to movement or migration. With adequate wildlife corridors, species can disperse and access other habitat areas. Species from other nearby populations can access the range. Areas with low disturbance (shown in green on the map above) offer the highest levels of connectivity.

### IDENTIFYING AREAS OF LOW DISTURBANCE

CAPS (Conservation Assessment

and Prioritization System) was designed by the University of Massachusetts to help regulators identify important wildlife habitat statewide. This information allows conservation groups to prioritize these areas for protection. The scientists who developed CAPS use information about disturbance levels to indicate areas of high quality habitat and connectivity.

### HOW CAPS WORKS

CAPS uses a combination of data, such as traffic on nearby roads and locations of invasive plants, to

consider levels of disturbance (shown in pink above) and connection in the landscape. Using this information, researchers are able to determine the level of ecological integrity of a given point within a landscape. Points away from disturbed areas have higher ecological integrity than areas fragmented by roads and development. The entire Mt. Tom range shows these high levels (in green above), indicating its value as habitat for a diverse array of species.



# CULTURAL SERVICES

Ecosystem services are often understood as the things necessary for physical survival, such as air, water, food, and shelter. But cultural services (the things that enrich quality of life) are also included in the definition of ecosystem services. The Mt. Tom range provides many of these services to its visitors.

## CULTURAL SERVICES OF MT. TOM

Whether people use the range to connect with nature, to connect with a hobby, or to connect with human history, they all receive great cultural benefits from their time on the range.



Massachusetts Office of Tourism

RECREATION AND  
ADVENTURE



Smith College Archives

EDUCATION



John Pielan

HISTORICAL  
SIGNIFICANCE



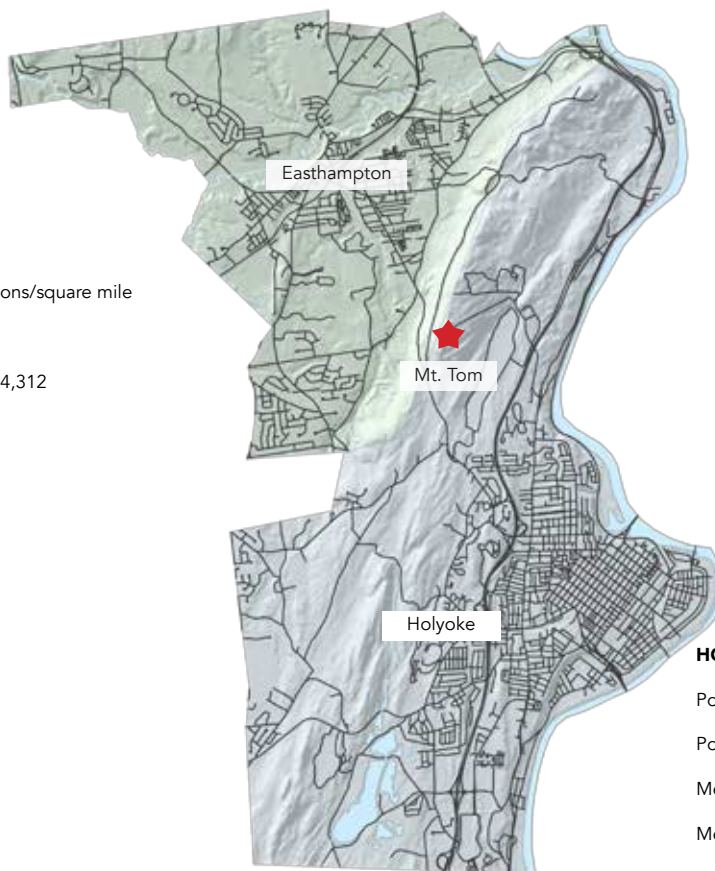
## EASTHAMPTON:

Population: 16,053 (2010)

Population density: 1,192 persons/square mile

Median age: 43

Median household income: \$54,312



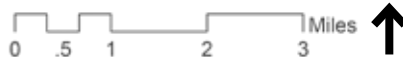
## HOLYOKE:

Population: 39,878 (2010)

Population density: 1,872 persons/square mile

Median age: 35

Median household income: \$33,242



The Mt. Tom range is a highly visible feature of life in the Pioneer Valley, and people connect to the mountain from miles around. While most picnickers, hikers, runners, and other outdoor enthusiasts come from adjacent towns such as Holyoke and Easthampton, the range is a destination people seek out even if they live further afield. Hiking clubs from the larger region regularly travel to Mt. Tom for outings. The annual fall hawk migration is a major draw for birders.

## NEARBY TOWNS

Most of the range lies within Holyoke's boundaries, with the western edge in Easthampton. Holyoke is larger and much more urban, while Easthampton retains

a rural feel. Despite the differences between the two towns in terms of population size and median income, residents of each benefit from the refuge the range offers from daily life.

## ANNUAL VISITOR DATA

DCR data shows that in 2015, an estimated 77,135 visitors came to the Mt. Tom State Reservation. Of those, 25,311 paid to enter. This is a 21% increase in paying visitors from 2012, when the reservation had 20,878 paying visitors. DCR only collects visitor payments from May to September, so this increase took place entirely within a five-month period.

## VISITORS FROM AFAR

Social media websites such as Yelp! and TripAdvisor have postings about Mt. Tom from Oregon, California, Texas, and many other states, suggesting that visitors from far away use these sites to continue their connection to the range while also helping others make similar connections.

# TYPES OF HUMAN USE

Mt. Tom offers many different sanctioned recreational opportunities year round. These opportunities range from structured, facilitated programs, such as ranger-led hikes, to solo adventures.

## HAPPY HIKERS

Out of all survey respondents, 90% replied that hiking is their preferred activity on Mt. Tom. The 25 miles of trails found on DCR property offer an array of challenges for visitors and can connect to trails on The Trustees property as well as to Whiting Street Reservoir.

## OTHER SANCTIONED ACTIVITIES

Birding is also very popular at Mt. Tom. Enthusiasts travel for miles to witness the annual hawk migration from Goat Peak and Bray Tower. Other common activities are picnicking, trail running, fishing at Bray Lake, and golfing on one of the two courses on the range.



## PROHIBITED ACTIVITIES

Other activities, such as hunting, are not allowed on the range but still occur. Debate as to the merit and ecological impact of these activities is ongoing. Some argue that the increasing deer population requires thinning but others question the safety of hunting in such a popular place. Mountain biking is also controversial; there is debate as to the impact it has on the trail system. It may be possible to identify areas of the range that would be appropriate locations for these activities to take place. ATV use on the range is widely agreed upon to be too damaging an activity to allow on Mt. Tom.





# BENEFITS FOR HUMANS



Volunteer trail crews help maintain human recreational opportunities on Mt. Tom as well as fostering a sense of stewardship and community among participants.

Bill Finn

Exposure to the natural world, through a wander in the woods or a hike led by a naturalist, not only helps people appreciate all other ecosystem services but leads to the desire to protect those services. The Mt. Tom range offers many of these cultural services.

## OPPORTUNITIES FOR ALL

Recreational, educational, and historical learning opportunities abound on the Mt. Tom range. DCR manages 25 miles of trails and the long-distance New England Trail runs along the ridgeline. People come from all over New England to watch hawks migrate along the basalt cliffs and trail runners are drawn to the technical terrain. DCR, The Trustees, and many other organizations use the range as inspiration for public

programs about the wealth of natural resources on the mountain. The range has also played a vital role in the human history of the region. The Eyrie and Summit Houses drew visitors for miles around in the late 1800s and early 1900s. A memorial to a B17 bomber that crashed into the eastern slopes sits near the summit and is a frequent destination for visitors.

## CONNECTION TO NATURE

A survey distributed to people who visit Mt. Tom frequently found that 81% of participants said that connection to nature was most the significant benefit they receive from the range. A deep understanding of their connection to the natural world and how they benefit from these ecosystem services allows

them to see themselves as part of that world, rather than separate from it. Frequent visitors to Mt. Tom often cite cultural ecosystem services as the foundation of their love for the range, upon which they have built a desire to see it protected for generations to come.





*"It is a gem in our backyard."*

*- Community member*

# WHERE CONNECTIVITY MATTERS

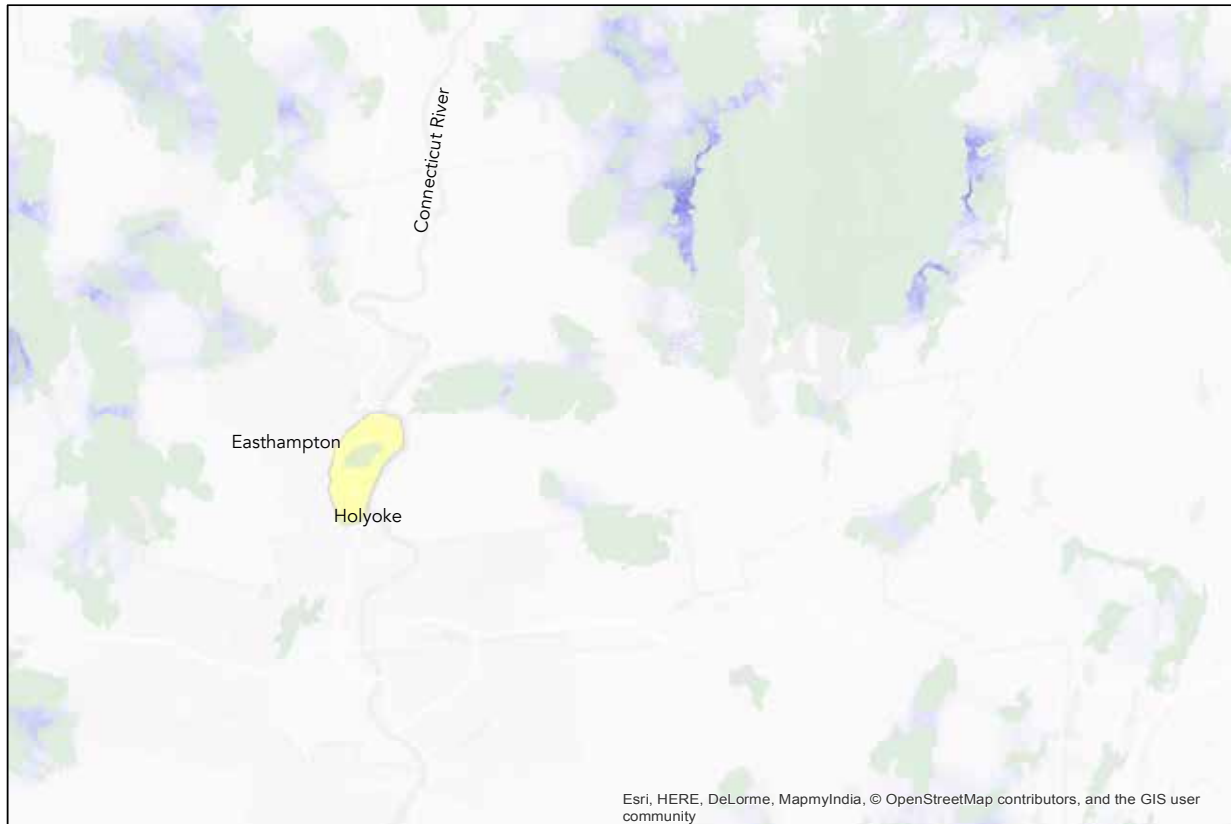
Connectivity is the currency of ecosystems. It keeps ecosystems healthy and able to provide services to both humans and wildlife. It is key to these ecosystems to look at where that currency can be spent freely and where its flow is limited. How do animals move from one pocket of habitat to another? Are there barriers preventing people from accessing certain parts of the range? Investigating where connectivity is open and where it is blocked on Mt. Tom allows for a better understanding of the overall health and patterns of use of the range.

In this section, the plan explores areas on the range and in the greater region where connectivity is available and where it is blocked. It examines limitations and points of access for both humans and wildlife, then looks at overlaps in those areas.

Opposite page: Perfoliate bellwort is just one of the many beautiful wildflowers that bloom on Mt. Tom each spring.

# ECOLOGICAL CONNECTIVITY: TERRESTRIAL WILDLIFE MOVEMENT

## NODES AND CONDUCTANCE IN THE MT. TOM REGION



The Mt. Tom range lacks connectivity to other nodes of conserved areas, limiting wildlife movement and other ecological processes.

0 2 4 8 12 16 Miles



In addition to ecological disturbance, CAPS data can be used to show how natural areas are connected through terrestrial wildlife movement. In the map above, green areas are “nodes”—important conservation areas. Conductance (the amount of terrestrial wildlife movement) between nodes is shown in purple. Darker purple signifies greater amounts of movement.

### POTENTIAL CORRIDORS

Mt. Tom ranks as a node according to CAPS but this data shows no terrestrial wildlife movement between it and other nodes. The Holyoke Range, only a few miles east of Mt. Tom, shows no connection to the range. Natural barriers, such as the Connecticut River, likely contribute to this lack

of connectivity but there are many existing anthropogenic barriers as well. All of these barriers contribute to Mt. Tom’s lack of connectivity to the Holyoke Range and other nearby ecological areas, which will be shown in additional maps in this section.

The range’s surrounding areas show much higher amounts of conductance. Areas to the northeast and northwest of the Tom range appear well-connected to one another. Extending this connectivity to Mt. Tom by establishing more nodes and creating safer wildlife passage options will allow wildlife to disperse and migrate as needed. Conserving new nodes also ensures the health of other ecological processes, such as energy flows and seed dispersal.

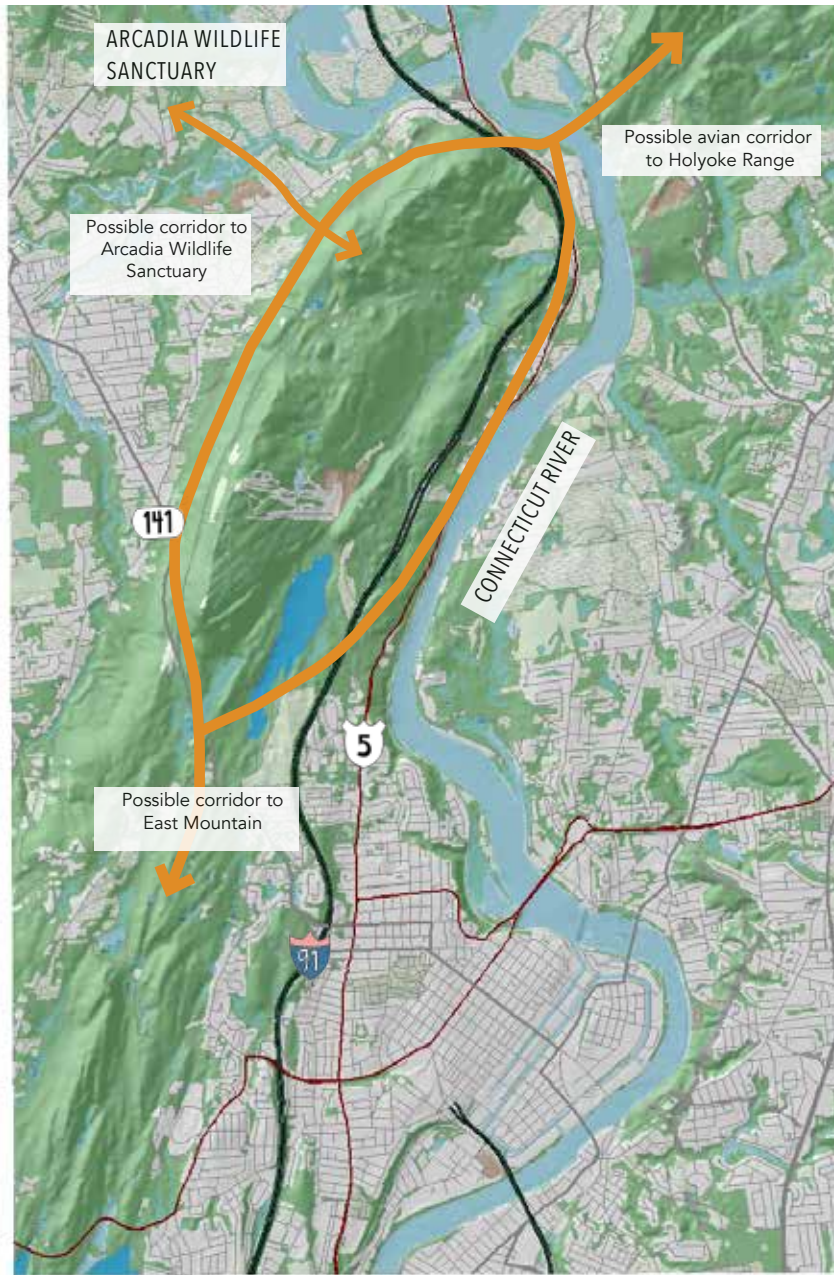
### LEGEND

- Nodes
- Conductance
- Mt. Tom Study Area

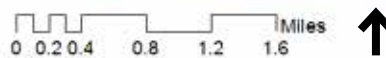


# ECOLOGICAL CONNECTIVITY: ACCESS AND CORRIDORS

## AREAS OF ECOLOGICAL CONNECTIVITY ON THE MT. TOM RANGE



Different kinds of wildlife have different needs in terms of connectivity. Birds have no trouble traversing between the Mt. Tom and Holyoke ranges. Terrestrial species need safe corridors on the ground to allow them passage from one habitat area to another.



### LEGEND

Forest	Orchard/pasture/cropland
Transitional; successional; open	Powerline/utility
Low density residential	Mining/waste disposal
Wetlands	Water
Possible corridor	

Taking land use and the different types of vegetation and wildlife that live on the range into account, some areas of existing and potential connectivity emerge immediately surrounding the range.

### BIRDS

Mt. Tom is a well-known spot for watching the annual fall hawk migration. Kestrels, sharp-shinned hawks, and northern harriers frequently pass by the range en route to their wintering grounds in Central America. Many warbler species find nesting habitat in the interior forests. The range's role in bird migration earned it status as an Important Bird Area (IBA) according to the National Audubon Society.

### AMPHIBIANS

The range is well-connected inside of Routes 141 and 91, making it easier for smaller animals like amphibians to move from forested uplands to the vernal pools they need to breed.

### MAMMALS

Mammals can also move relatively freely inside the range. Leaving the range and moving into forested areas south of it requires crossing Rt. 141, a lesser barrier than many others surrounding Mt. Tom.

### VEGETATION

There are fewer barriers to seed dispersal and pollination within the range than immediately outside of it. Forest community types transition from one to the next within intact portions of the range, creating habitat and protecting biodiversity.

# ECOLOGICAL CONNECTIVITY: BARRIERS TO ACCESS AND MOVEMENT

Terrestrial wildlife access to the interior of Mt. Tom from exterior areas is limited by busy state and interstate highways; parking that contributes to soil compaction, erosion, and habitat encroachment; overused trails; and human use. These factors pose challenges for vegetation as well.

## MAJOR ROADS

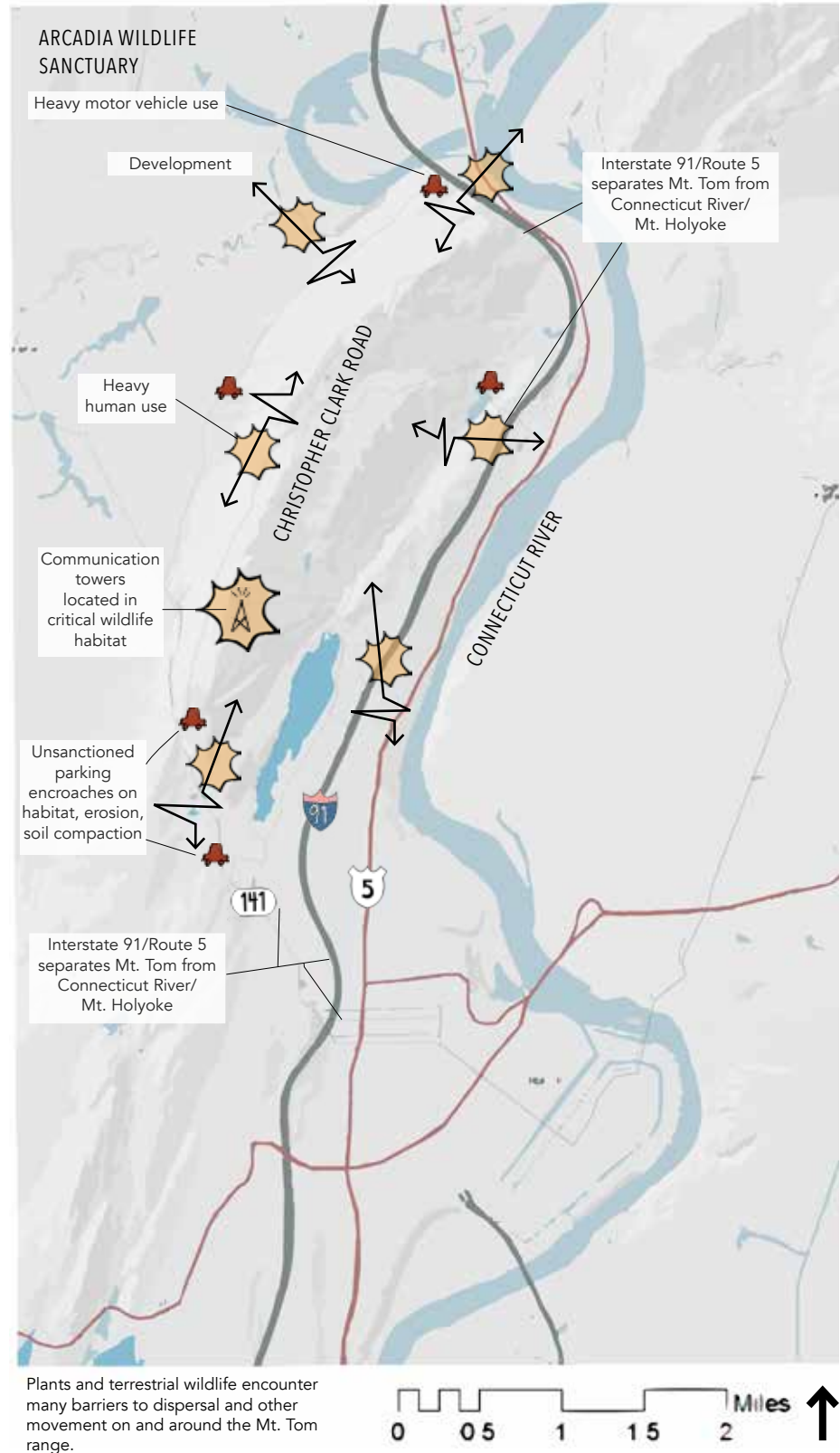
Route I-91 is a major obstacle to any non-avian animal attempting to move between the range and the Connecticut River. The Massachusetts Department of Transportation states that roads with more than 10,000 vehicles per day are nearly impenetrable to wildlife crossing. An average of 50,000 vehicles travel the portion of Route I-91 around Mt. Tom daily. There are few over- or underpasses that permit wildlife to safely cross the highway. Roads fragment the forest, blocking the spread of plants.

## HUMAN USE

Heavy human use is also an ecological barrier. Irresponsible hikers stray off trails, creating erosion and habitat fragmentation. The communication towers on the "summit area" have degraded key habitat for several species of concern.

New development disrupts healthy ecosystems and is another reason to extend conservation measures on and around the range. Developed areas pose obstacles for most animal species. A herd of deer may be brave enough to graze on a golf course, but other species find an open expanse too dangerous to risk.

## BARRIERS TO ECOLOGICAL CONNECTIVITY ON THE MT. TOM RANGE



Developed and disturbed areas tend to host many invasive plant species that outcompete native ones.

## LEGEND

- Barrier to Access
- Unofficial Parking
- Obstructed Access



# HUMAN CONNECTIVITY: AREAS OF HUMAN ACCESS AND BARRIERS

Certain areas on the range offer easy access to human use, while others are less accessible.

## ACCESS

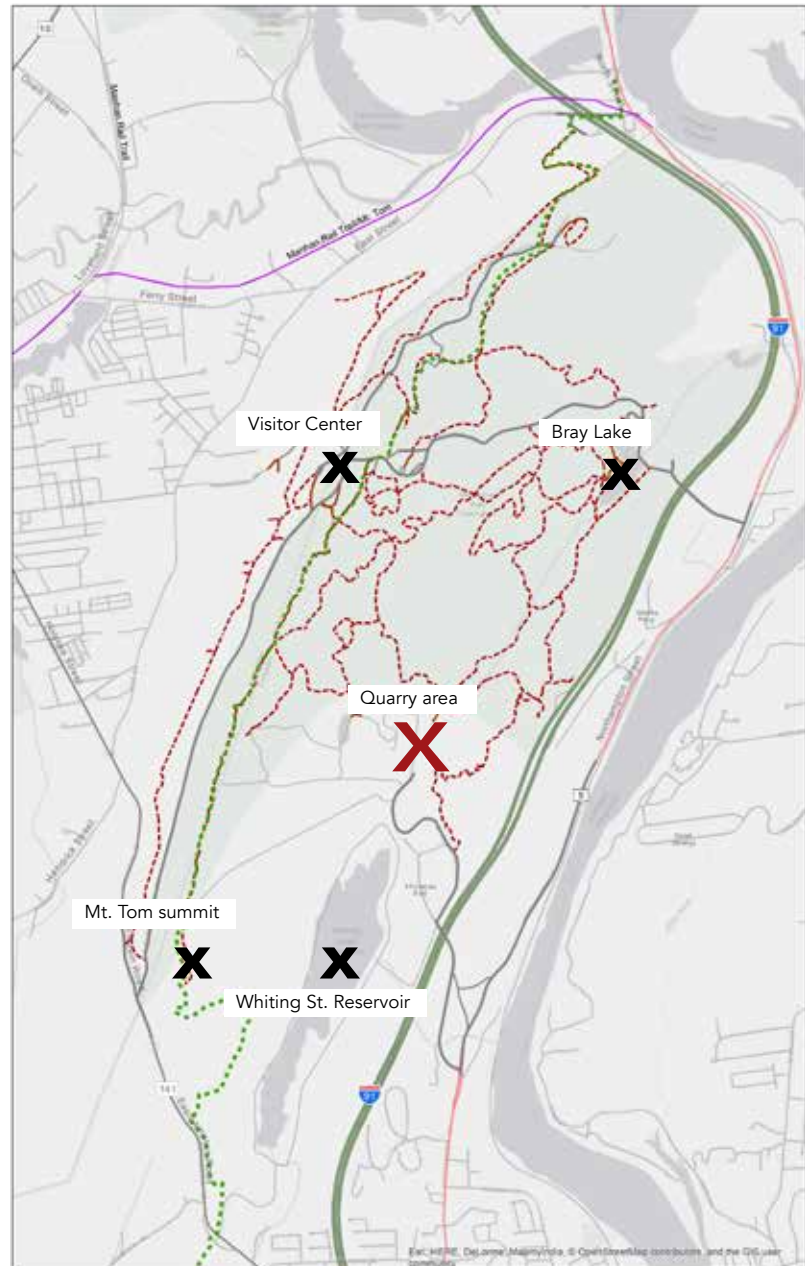
Visitor use on the range is highest at the Visitor Center, the Bray Lake area, the “summit area” of Mt. Tom, and the Whiting Street Reservoir. The Visitor Center and Bray Lake are within the reservation boundaries, the “summit area” is on land owned by HG&E, and the reservoir belongs to the City of Holyoke Water Works. These areas are easy to drive or hike to and offer enticing views, or amenities such as restrooms or a playground. Concentrating use in these areas allows other hikers to find solitude in quieter areas of the range.

## BARRIERS TO HUMAN USE

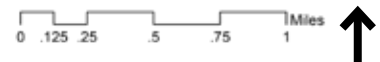
Heavy use of certain areas leads to higher impact in those areas. There are many social trails to the “summit area” from Rt. 141 that have been created over the years, leading to erosion and habitat fragmentation. Some people avoid these areas so as to not add to the impact or because they prefer less popular areas.

The east side parcels near the quarry area owned by the Mt. Tom Partners currently feel unsafe or off limits to many visitors. The quarry has 100-foot-high cliffs and frequent rock fall. The old ski area buildings on the Boys & Girls Club property are in disrepair and have been heavily vandalized. USFWS does not encourage people to hike through their parcels and The Trustees only advises people to hike to Little Mt. Tom by crossing through the

## AREAS OF HIGHEST VISITOR USE ON THE MT. TOM RANGE



Areas that receive the most visitors experience heavier impact. An area with limited use adds to the concentration of visitors in other places.



## LEGEND

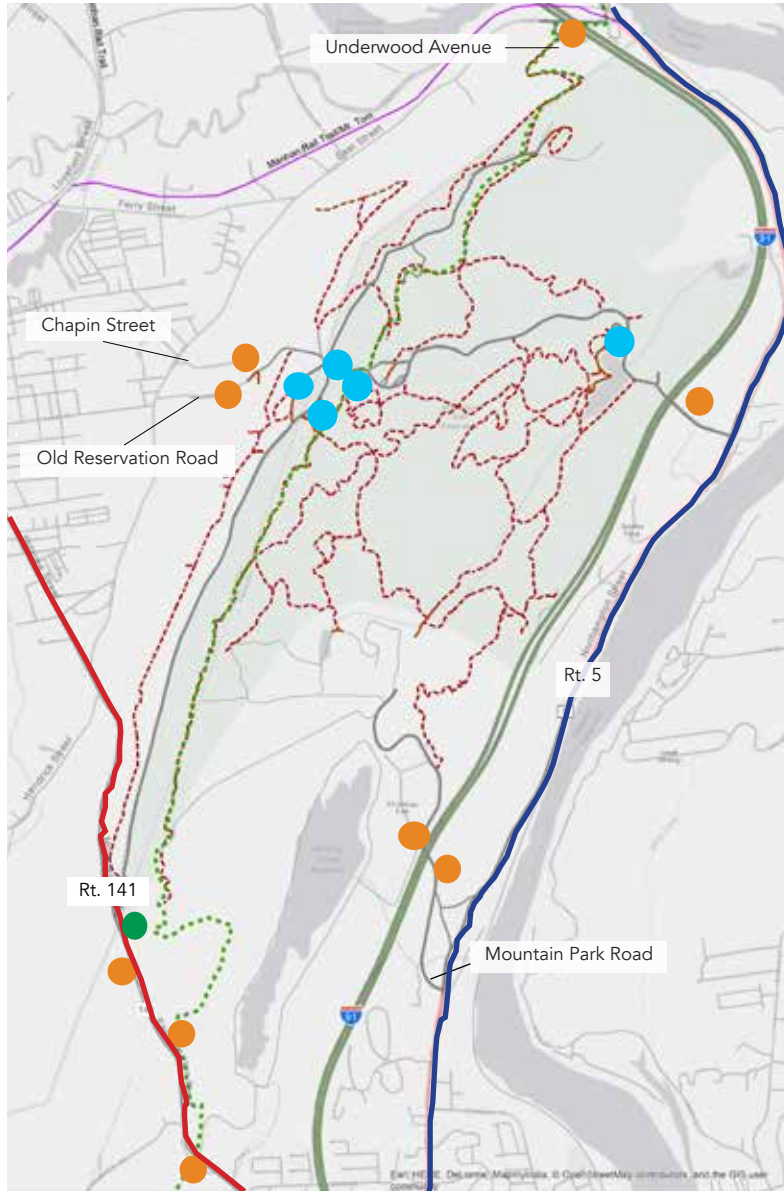
- DCR land
- DCR trails
- New England Trail
- High Use Area
- Limited Use Area

Reservation to the north. Making the quarry area safer and establishing more visible management will make many more acres of land and trail available to the public. Increasing access here would connect this land to the Reservation and allow visitors to responsibly explore more of the range.



# HUMAN CONNECTIVITY: PARKING AND PUBLIC TRANSPORTATION

## PARKING AREAS AND BUS ROUTES



### LEGEND

- Official Parking, Limited Hours
- Official Parking, Always Accessible
- Unofficial Parking, Always Accessible
- DCR Trail
- New England Trail
- DCR Land
- Red 41 Bus Route
- Blue 48 Bus Route
- Manhan Rail Trail

Parking and public transportation are major challenges to the range. Out of all survey respondents, 78% said they drive to the range. While driving allows many people access to the range, parking creates environmental issues and is not available or preferable for everyone.

### ACCESS

Most parking spaces inside the Reservation are located near Bray Lake or the Visitor Center. Gates

open to cars at 8am. In winter, the gates are locked at 4pm. In spring, gates are locked at 6pm and at 8pm in summer. If a visitor's car is still inside after hours, they must call the state police to open the gates.

Many hikers park outside the Reservation so they can start their hikes earlier, end later, or access different parts of the range. DCR maintains one parking area with space for 5-6 cars outside of the gates on Christopher Clark Road. There are other entrances to the park from both Easthampton and Holyoke.

### BARRIERS

The parking areas outside the reservation are generally pull-offs along Rt. 141 that encroach into the forest. These spaces cause soil compaction, leading to increased stormwater runoff. Many of these parking spots require visitors to cross dangerous roads. People park in neighborhoods on Chapin Street, Underwood Avenue, and Old Reservation Road in Easthampton, creating conflicts with neighborhood residents.

Survey respondents expressed a lack of public transportation as a barrier to access. Two Pioneer Valley Transit Authority routes pass by the range, Red 41 and Blue 48, but neither have established stops near trailheads.

The roads running around the range are generally unsafe for pedestrians and cyclists. The Manhan Rail Trail runs north of the reservation and could be used to access trails at Underwood Avenue but there is no bike rack there for cyclists to use.

# HUMAN CONNECTIVITY: BARRIERS TO ACCESS AND MOVEMENT

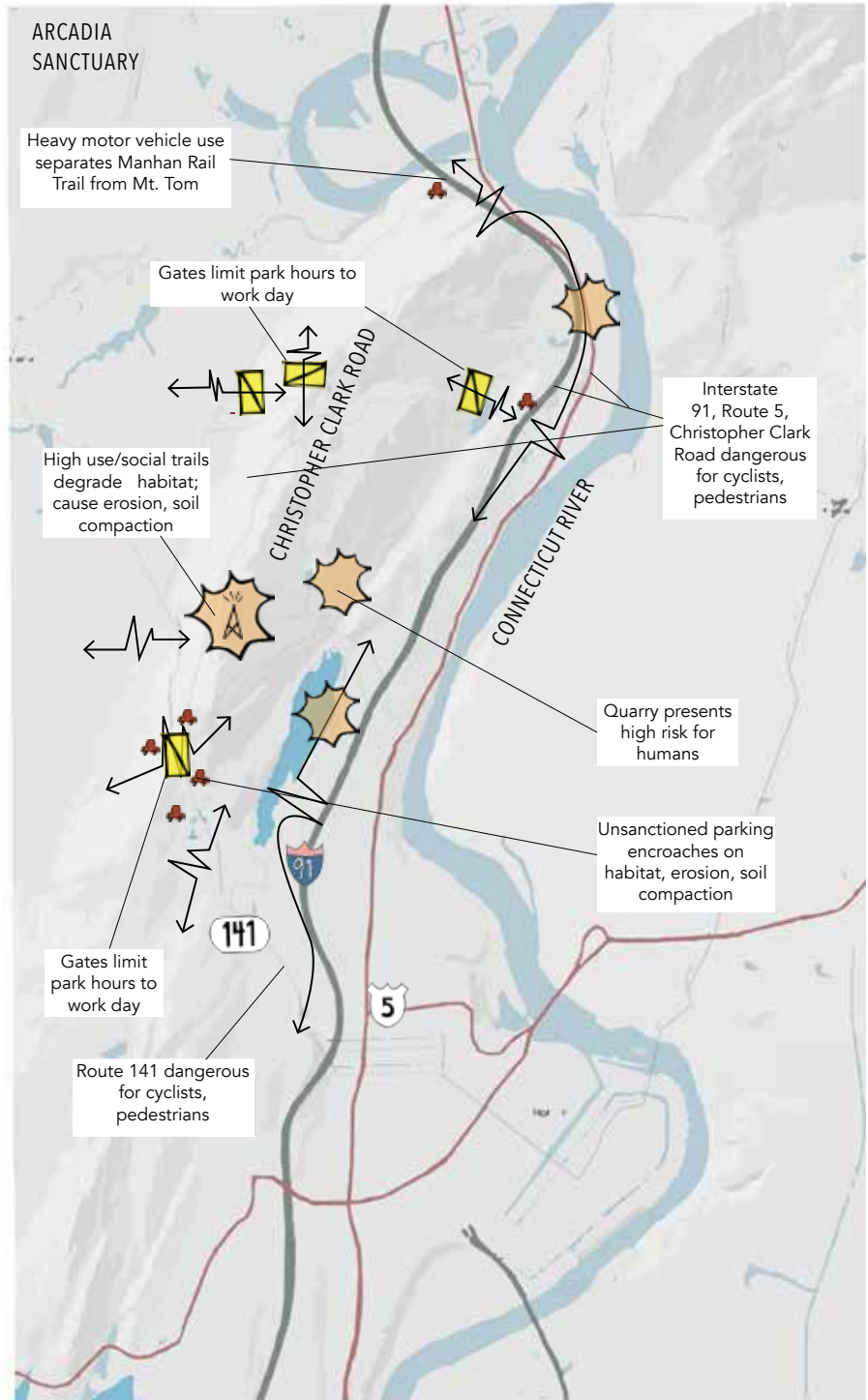
Getting to and from the Mt. Tom range poses a challenge for several different reasons. Limited hours, parking issues, unsafe roads, lack of public transportation, and certain unsafe areas create barriers for many people.

Many community members surveyed said that they would use the reservation more if the gates opened earlier in the day and stayed open later in the evening. Hikers would also be more likely to park inside the reservation rather than on the pull-off areas, which would reduce the negative impact these unofficial parking areas have on the environment.

Adding official stops along the two bus routes running by Mt. Tom that are near trailheads or other access points would provide access to more people. Creating ways to slow traffic and draw attention to pedestrian crossing areas would make walking and biking to the range more appealing for many people.

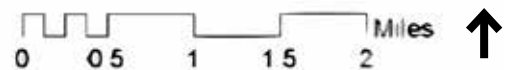
Safety issues also block some people from using parts of the range. The quarry on the east side is not safe for people and many visitors feel uneasy around the abandoned buildings that were once used by the ski area. These buildings are now heavily vandalized and the site of other reported illegal activity. A visible management presence could discourage inappropriate use and allow more visitors to access this area, dispersing use across more of the range.

## BARRIERS TO HUMAN ACCESS ON THE MT. TOM RANGE



### LEGEND

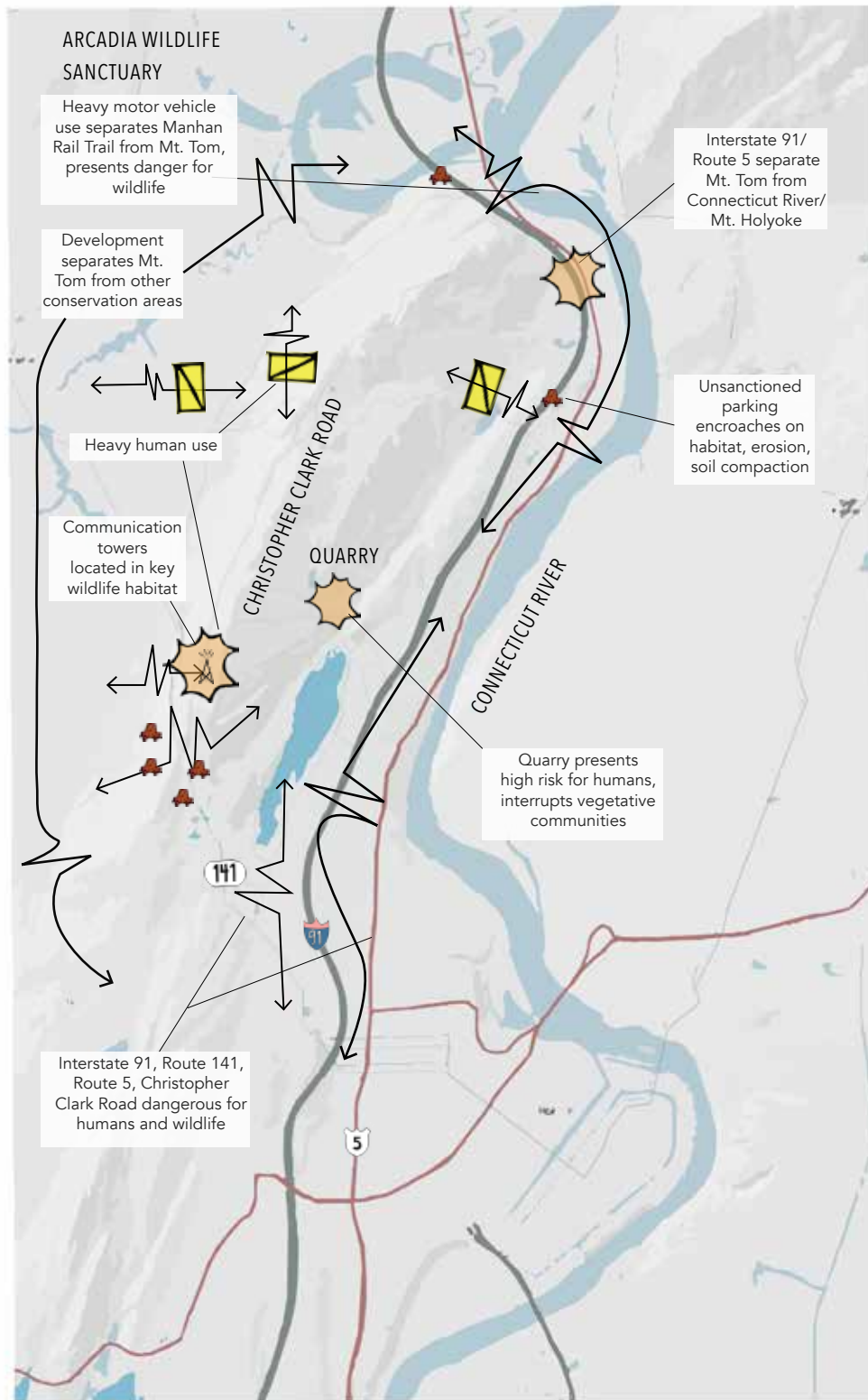
- Barrier to Access
- Gated Entrance
- Unofficial Parking
- Obstructed Access



Humans are mostly limited to accessing the range by private vehicle, and are limited in where they can go on the range.

# HUMAN AND ECOLOGICAL CONNECTIVITY: BARRIERS

## BARRIERS TO HUMAN AND ECOLOGICAL CONNECTIVITY ON MT. TOM



Many barriers on the range affect both humans and wildlife.



### LEGEND

- Barrier to Access
- Gated Entrance
- Unofficial Parking
- Obstructed Access



Many of the barriers to access on the range affect both humans and ecosystem health. Focusing conservation efforts on these areas can improve access and movement for both human visitors and the wildlife that utilizes the range for habitat and dispersal.

#### BUSY ROADS

Although Mt. Tom is easily accessible by car, Interstate 91, Route 141, and Route 5 all create dangerous conditions for cyclists, pedestrians, and wildlife. I-91 and Route 5 form barriers between the Connecticut River and Mt. Tom. Wildlife cannot access the river from the range as the traffic volume on I-91 prohibits wildlife movement across it. High traffic speeds and low visibility create dangerous conditions for pedestrians and cyclists.



Spill-over parking encroaches on forest habitat and leads to dangerous road crossings.

#### PARKING

A lack of adequate parking and early closing hours on the Reservation cause spill-over parking. Several of these areas can be found along the sides of Route 141. These unofficial parking areas fragment the forest and encroach on wildlife habitat. Parking on the sides of the road also creates erosion and leads to an increase in sediment-laden runoff.

#### MT. TOM "SUMMIT"

The communication towers on the "summit area" are located in an area of critical wildlife habitat that coincides with one of the most scenic points on the range. Some hikers choose not to spend time there due to the development and vandalism on the summit, while populations of data-sensitive species have been relocated to accommodate the towers. These towers also create areas that are off-limits to humans. The wind turbine owned by University of Massachusetts is slated for removal but other towers are still in operation. As technology advances, it may be possible to reduce the footprint these towers require or phase them out entirely.



Infrastructure for communications towers limit human use and degrades wildlife habitat.

#### THE QUARRY AREA

The purchase of the lands surrounding the quarry by the Mt. Tom Partners was a significant step in reconnecting this area to the larger landscape but many challenges to access remain for both humans and wildlife. The barren landscape offers habitat for few species of plants and animals. Safety concerns bar many people from exploring this area. Reclaiming the quarry, rehabilitating or removing the old ski buildings, and establishing a more visible management presence can help

this area become an ecologically significant area of the range once again.

#### HEAVY HUMAN USE

The Mt. Tom range is a popular destination for hikers, birders, families, and more. Many of these visitors concentrate their use of the range to a small handful of sites there, which in turn concentrates environmental impact at those sites. High levels of traffic on certain trails has led to significant erosion, creating safety issues and runoff. Other visitors choose to avoid those



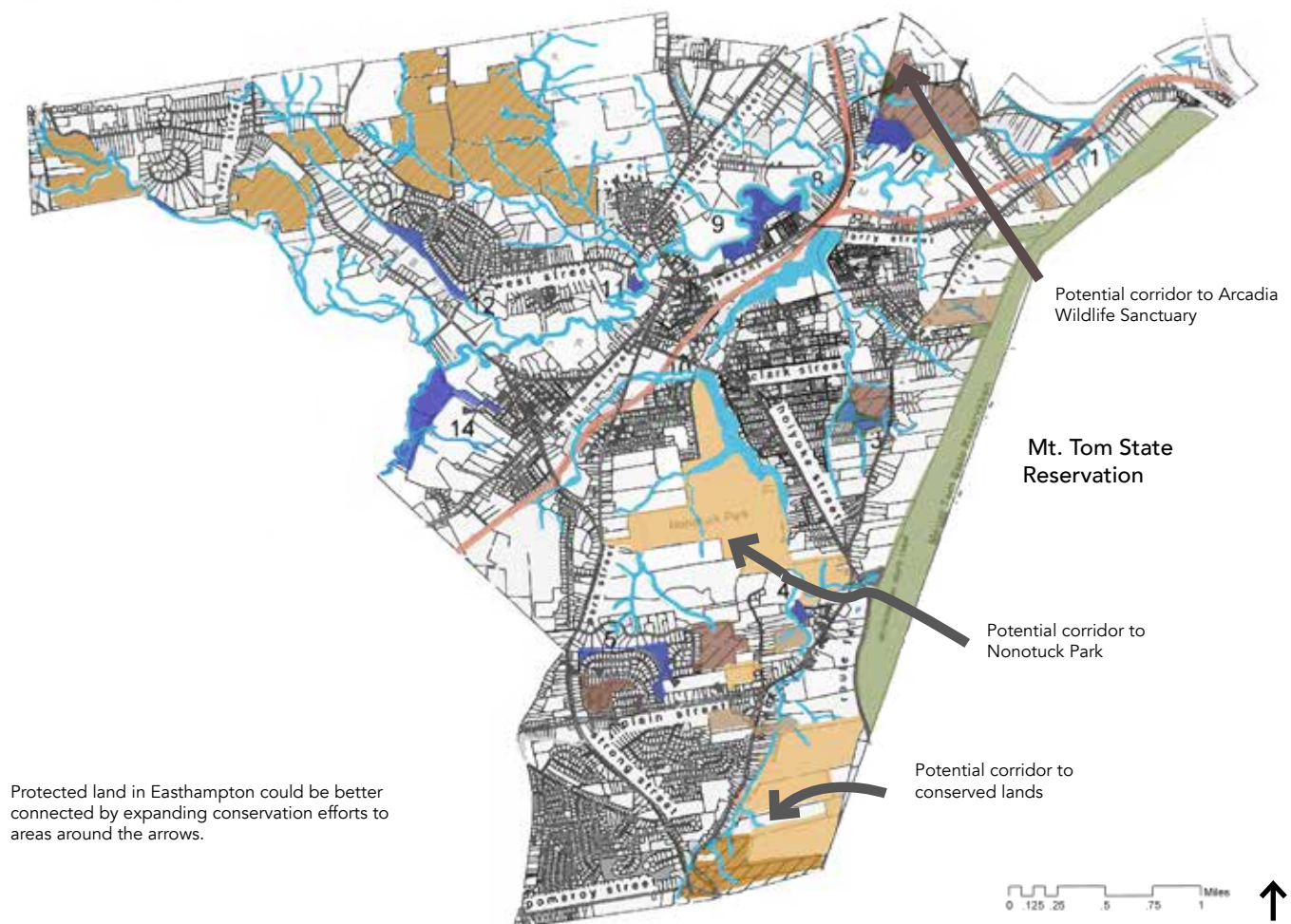
The steep quarry walls limit its use for humans and wildlife.

areas to seek out a more peaceful experience. Areas of high human use may also prevent wildlife from accessing those areas.

Assessing areas that pose challenges to both humans and wildlife shows where to focus conservation and recreation efforts. It is also critical to determine the level of protection on surrounding parcels to assess whether people and animals can safely move off the range to other green spaces.

# POTENTIAL CONNECTIVITY: EASTHAMPTON

## PROTECTED LAND IN EASTHAMPTON



### LEGEND

- DCR Land
- Chapter 61 Land
- City of Easthampton
- Conservation Restriction Land
- Pascommuck Conservation Trust
- Agricultural Land
- Manhan Rail Trail
- Potential corridors to conserved lands

Protected land can serve as potential corridors for humans and ecological processes. There are many ways in which land may be protected, from acquisition by a conservation-based organization to a Conservation Restriction in which land ownership remains private but development is prohibited. All of these vehicles for conserving land ultimately serve the same purpose—to maintain land in a more natural state that allows ecosystem services and processes to flourish.

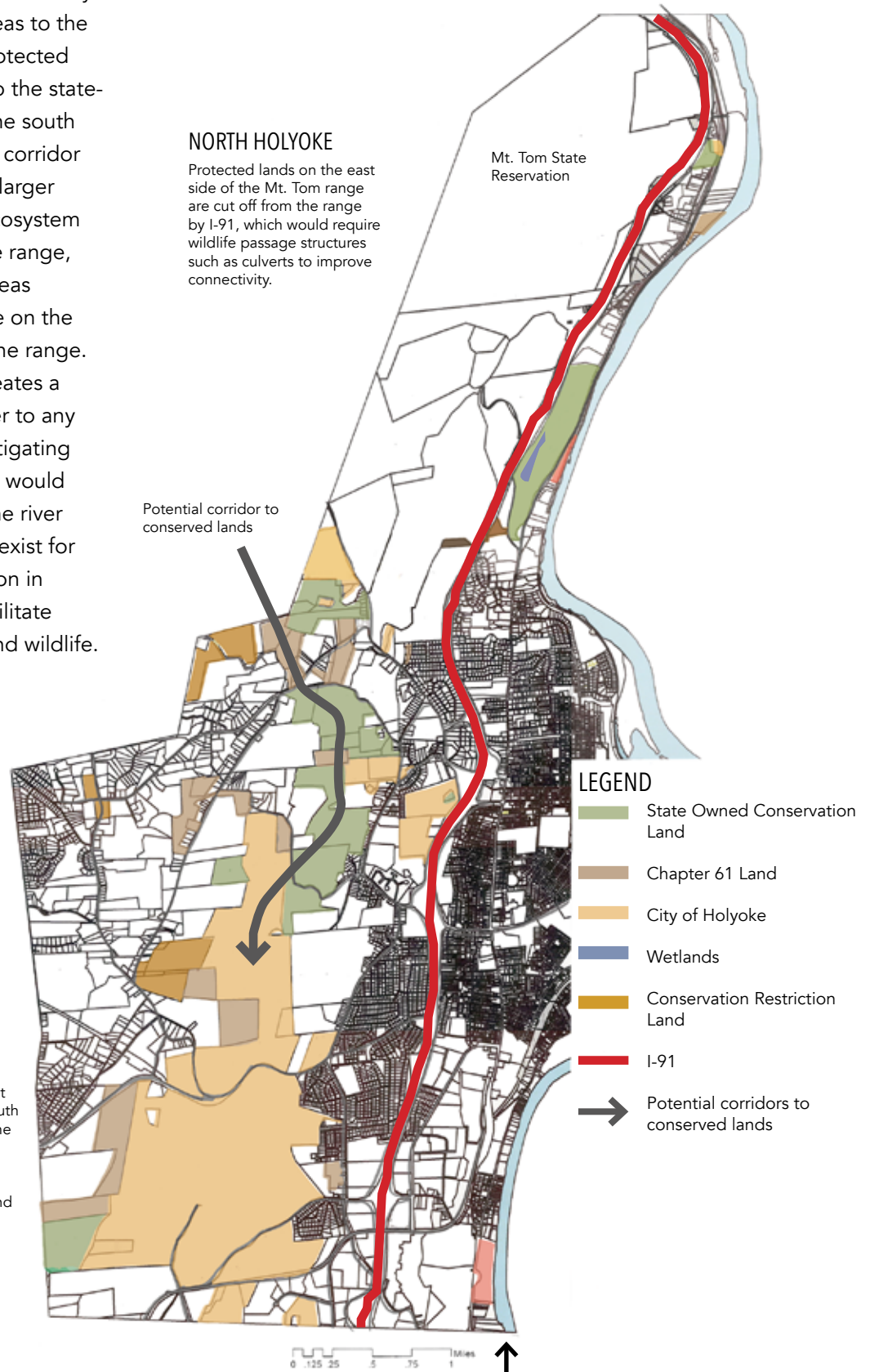
### IDENTIFYING CONNECTIONS

In Easthampton, there are protected lands in the southern part of town, near the park boundary. These parcels, however, are separated by busy roads and are not always directly abutting other conserved areas. There is also a gap between the Reservation and the protected land in Arcadia Wildlife Sanctuary to the north. Exploring opportunities to conserve land in these areas will lead to improved ecosystem health and would provide new avenues for humans to access the range.

# POTENTIAL CONNECTIVITY: HOLYOKE

In Holyoke, there is far more protected land outside of the range in the southwestern parts of the city than in the more urban areas to the southeast. Establishing protected lands that link the range to the state- and city-owned lands to the south would create a substantial corridor for wildlife to travel and a larger zone of connectivity for ecosystem services. To the east of the range, there are few protected areas and those that do exist are on the other side of Rt. 91 from the range. This stretch of highway creates a nearly impenetrable barrier to any type of connectivity. Investigating wildlife passage structures would help animals connect to the river safely. Opportunities may exist for additional land conservation in these areas that would facilitate connectivity for humans and wildlife.

## PROTECTED LAND IN NORTH AND SOUTH HOLYOKE







*"Love that mountain. It's the reason I live here."*

*-Community member*

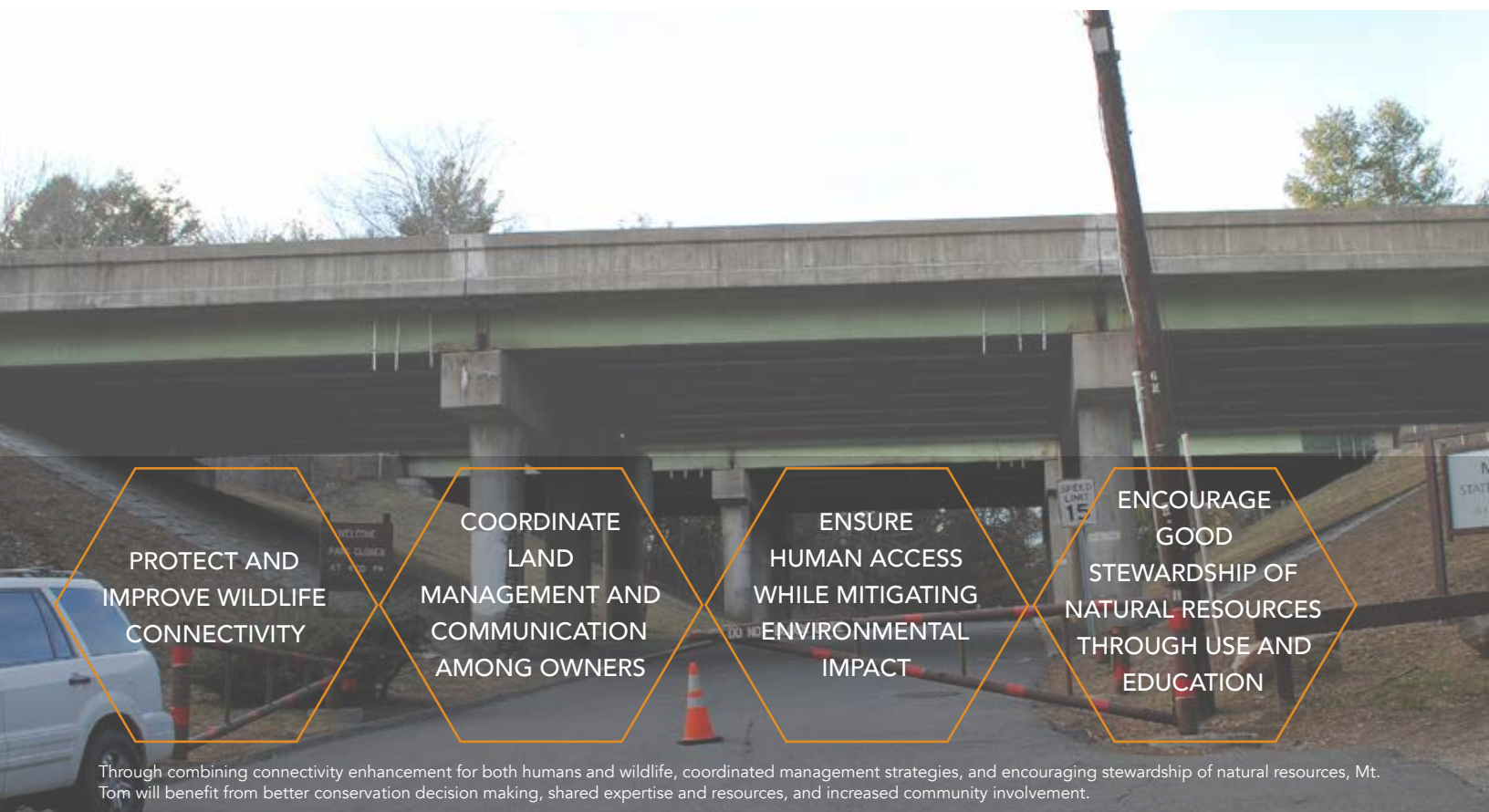
# IMPROVING CONNECTIVITY

Habitat fragmentation, dangerous road crossings, property owners with different conservation priorities—these and other barriers limit the Mt. Tom range from exhibiting its full potential as a connected and healthy ecosystem. Humans and wildlife experience the negative impacts of these barriers and do their best to overcome them. Whether it's a person exploring an area technically off-limits or a deer attempting to cross a busy state highway, people and animals are trying to access the range as well as the larger landscape.

This plan examines why connectivity is important and where barriers to connectivity occur to inform recommendations for improving that connectivity for all Mt. Tom's stakeholders, whether they are furred or feathered, plant or animal, wild or not.

Opposite page: Many people use the Whiting Street Reservoir in the southeastern part of the range as a place to walk, run, or enjoy a quiet moment in nature.

# BROAD RECOMMENDATIONS



## OVERVIEW

The clients for the Mt. Tom Ecological Assessment are a combination of area land trusts and the Mt. Tom Advocacy Group. While none of these groups owns land on the range, all have a vested interest in how it connects to local human and wildlife communities. Kestrel Land Trust played a significant role in protecting lands abutting the Holyoke range to the northeast, ensuring linkages between the range and nearby green spaces. Winding River has a history of protecting lands for the benefits of people and wildlife. The Mt. Tom Advocacy Group organizes stewardship efforts; its members are often the first to recognize issues that need to be addressed, such as trail maintenance or vandalism.

Recommendations are organized into four primary categories: Protect and Improve Wildlife Connectivity, Coordinate Land Management and Communication Among Owners, Ensure Human Access While Mitigating Environmental Impact, and Encourage Good Stewardship of Natural Resources Through Use and Education. Each of these categories is paired with a series of phased recommendations.

The success of collaborative efforts to improve connectivity hinges upon the willingness of those connected to the Mt. Tom range. Collaborations between stakeholders will lead to better decision-making about conservation issues, increased community involvement, and improved resource-sharing among all partners.

### CLIENTS:

- Kestrel Land Trust
- Winding River Land Conservancy
- Mt. Tom Advocacy Group

### MT. TOM PARTNERS:

- DCR
- The Trustees
- USFWS
- Boys & Girls Club of Greater Holyoke

### PRIMARY LANDOWNERS:

- DCR
- The Trustees
- USFWS
- Boys & Girls Club of Greater Holyoke
- Holyoke Gas & Electric
- Mountain Park
- Wyckoff Country Club
- Holyoke Country Club
- Holyoke Water Works
- MA Department of Fisheries and Wildlife
- Mount Tom Rock, LLC



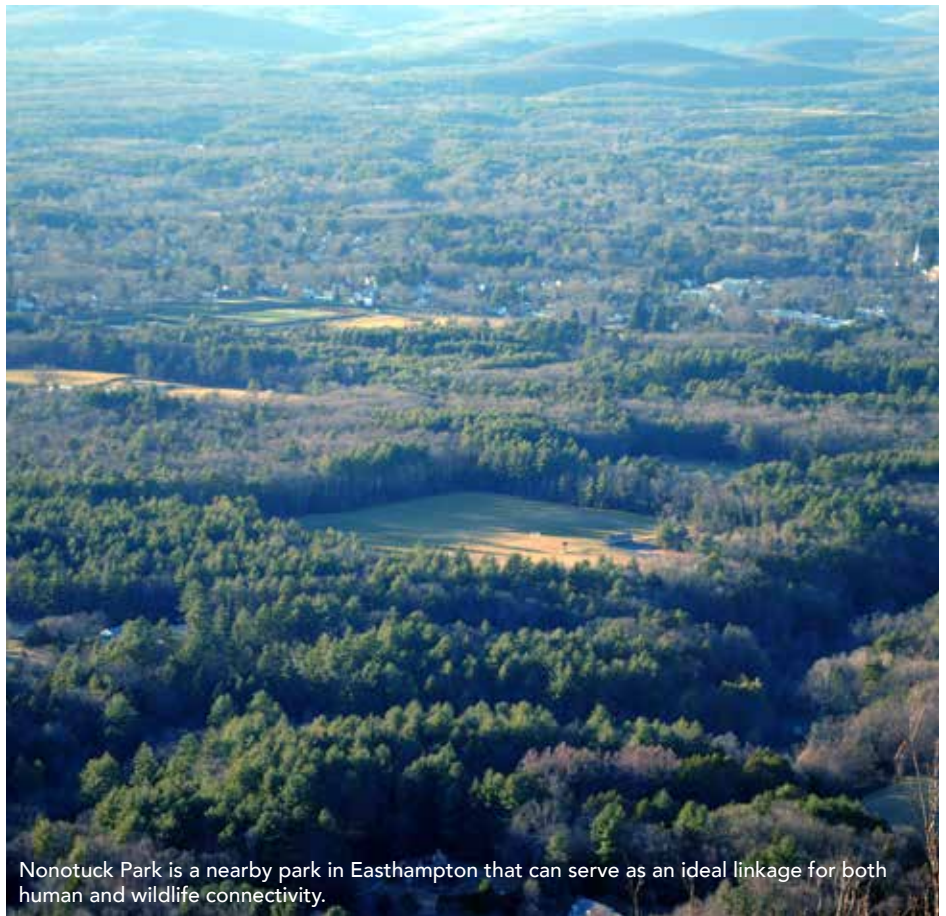
# PROTECT AND IMPROVE WILDLIFE CONNECTIVITY

The Mt. Tom range offers a significant amount of habitat for wildlife. While the movement of some wildlife is largely limited to the range, many species need to move from the range to other areas of intact habitat. In addition to areas of known connectivity, there are areas of potential connectivity that need to be improved and made accessible.

## COMMUNITY AND CONNECTIVITY

The first step in protecting and improving wildlife connectivity is to develop a better understanding of which species live on the range and how they move to, from, and within it. Hosting a BioBlitz on the range to develop a detailed species inventory for Mt. Tom could help to fill in existing data gaps. BioBlitzes are 24-hour events where teams of scientists and community members work together to identify as many species as possible in a certain area. Further analysis of the results should be undertaken in partnership with area colleges and universities. Citizen science projects, such as the North American Amphibian Monitoring Program or FrogWatch USA, will provide useful insights into vernal pool populations and will lead to additional pools being certified and protected. These studies must be connected to research already done on the Holyoke Range and other regional green spaces in order to reveal larger patterns of connectivity and movement.

In places where roads cut through wetlands or vernal pools, such as along Rt. 141, culverts or amphibian tunnels should be explored. Many social paths from Rt. 141 to the



Nonotuck Park is a nearby park in Easthampton that can serve as an ideal linkage for both human and wildlife connectivity.

ridgeline have developed over the years, resulting in habitat fragmentation that impacts wildlife movement. The plan recommends limiting the number of trails leading to the summit and taking steps to encourage users to stay on the New England Trail or the old utility line trail, such as creating barriers to old social trails and installing interpretive signs about the importance of staying on the trail.

## COLLABORATING WITH STAKEHOLDERS

Because many wildlife species do not confine their movement to the range, the plan recommends working with abutting private landowners to determine which species are passing through their properties and how to foster that connectivity. Conversations with these owners will lead to positive

changes in how they manage their own properties, such as reducing toxic chemical use on their lawns and planting native plants that support wildlife.

The plan also advocates that additional conservation measures be taken in several areas around the range. Establishing connectivity between Mt. Tom and Massachusetts Audubon's Arcadia Wildlife Sanctuary in Easthampton will improve wildlife mobility and ecosystem health for both areas. Other areas to look at for conservation purposes are between Hendricks Street and Rt. 141 in Easthampton and south of Rt. 141 in Holyoke. A stronger connection between the range and the East Mountain Wildlife Management Area located there is needed.

# PROTECT AND IMPROVE WILDLIFE CONNECTIVITY



## Within 2 years:

- Engage community and promote citizen science efforts while enhancing ecological integrity
- Develop stronger understanding of species richness and diversity on Mt. Tom
- Continue forest protection and management strategies to safeguard water quality for surrounding towns
- Certify potential vernal pools on range and in surrounding areas
- Confine trail use between Rt. 141 and Mt. Tom "summit area" to the NET and old utility line trail
- Identify and prioritize acquisition of conservation areas of high ecological integrity that show connections to the Mt. Tom range
- Monitor recommended areas for opportunities to expand protection, through conservation restrictions, by acquisition, Chapter 61, etc.
- Establish potential areas for wildlife culverts

## 3-5 years:

- Continue collecting data on species distribution, health
- Continue seeking out opportunities to increase connectivity to Mt. Tom through a variety of conservation vehicles
- Create wildlife culverts on Route 5, Route 141, and Interstate 91 to enhance connectivity of terrestrial and aquatic animals
- Connect with abutting landowners to explore possibilities for enhancing wildlife connectivity through partnerships, easements, and other alternatives to land acquisition

## 6 years and beyond:

- Continue to monitor and update information on biodiversity and ecosystem health on the range
- Continue seeking out opportunities to increase connectivity to Mt. Tom through a variety of conservation vehicles
- Continue to work with abutting landowners to enhance wildlife connectivity for terrestrial, aquatic, avian, and migratory species

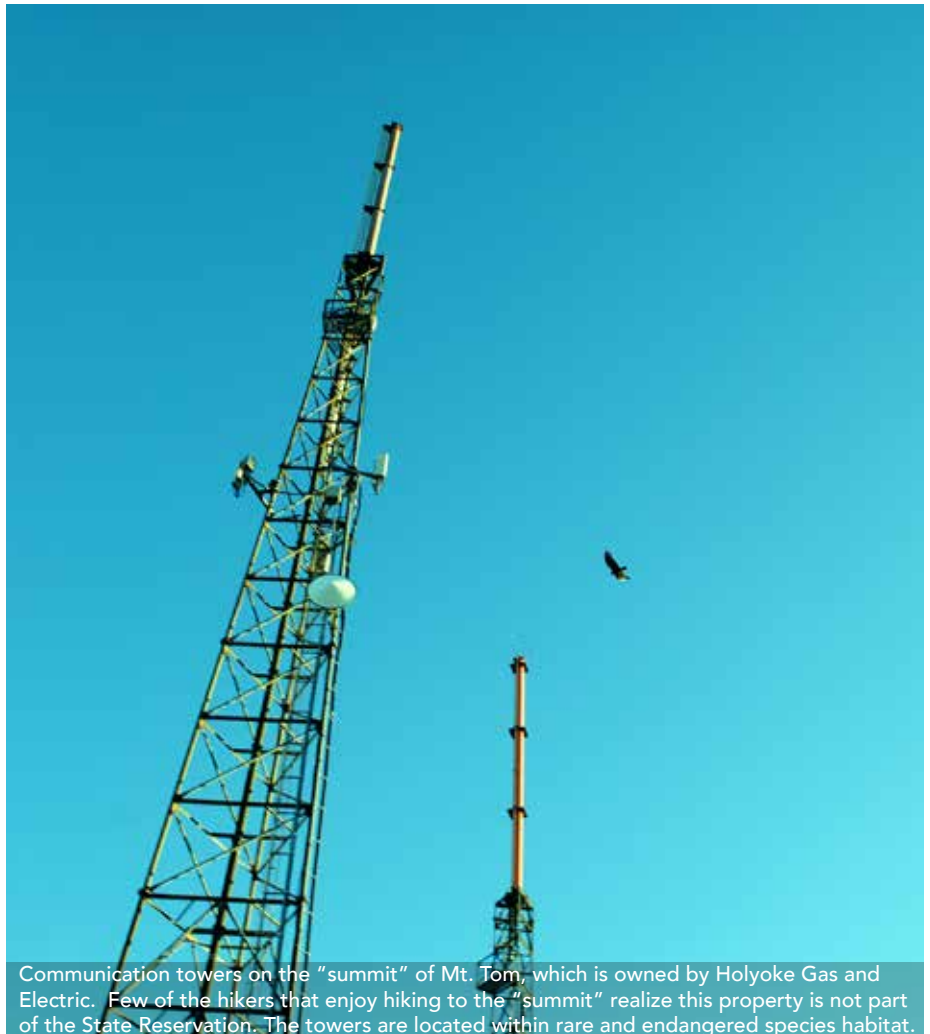
Ownership of large parcels of the range is split among a variety of groups, many but not all of which prioritize conservation. Even though the goals of several of these organizations may be similar, each acts on those goals somewhat differently. The non-conservation-based owners such as Mountain Park and the golf courses have different strategies around land use and management that may negatively affect ecosystem health. Communication around these issues, between landowners and with other stakeholder organizations, needs to be strengthened.

## WORKING TOGETHER

The plan recommends that all landowners meet regularly with the goal of establishing a comprehensive land use and management plan for the range. This plan should address management of ecosystem-scale issues such as disturbance, invasive species, water quality, and wildlife migration.

Current meetings are mostly reactive in nature. A plan that details proactive, long-term strategies will allow these meetings to not only respond to immediate issues but also manage the range for large-scale changes over much longer periods of time. The creation of a conservation aggregation among as many landowners as are willing to join would greatly benefit all stakeholders by formalizing communications, as well as sharing resources and information (see case study on page 49).

This plan also calls for improved communication about use and



Communication towers on the "summit" of Mt. Tom, which is owned by Holyoke Gas and Electric. Few of the hikers that enjoy hiking to the "summit" realize this property is not part of the State Reservation. The towers are located within rare and endangered species habitat.

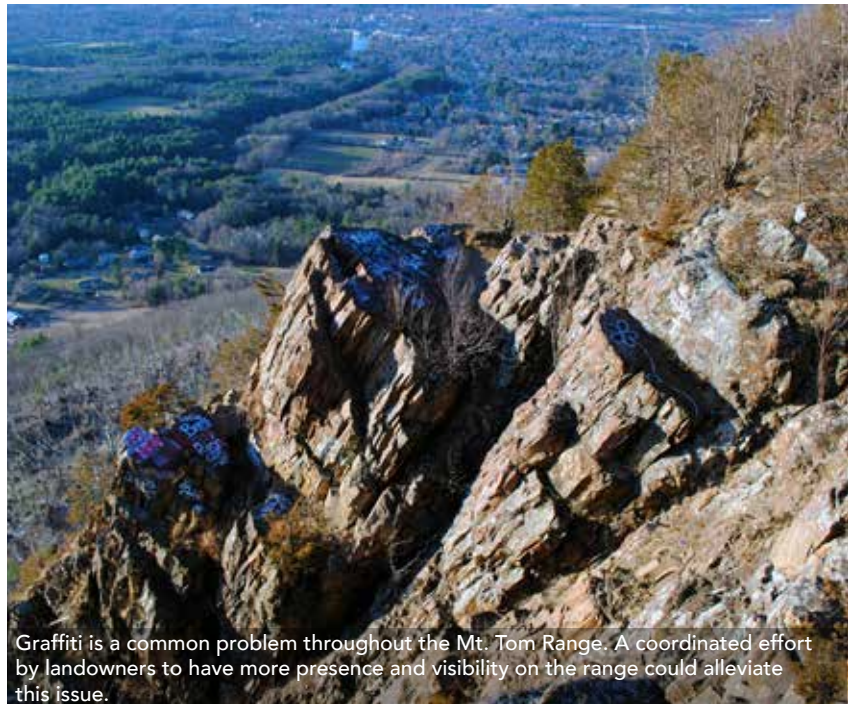
management of the range, between landowners and with groups such as The Mt. Tom Advocacy Group and land trusts. Including the Advocacy Group into communications will benefit all groups, as their members spend many hours on the range and are often aware of problems before the landowners are.

Maintaining regular contact with abutting landowners and land trusts with easements on nearby lands could be favorable for landowners in the collaborative effort to maintain connectivity to these parcels.



# PHASED RECOMMENDATIONS

## COORDINATE LAND MANAGE- MENT AND COMMUNI- CATION AMONG OWNERS



### Within 2 years:

- Primary landowners meet on monthly basis to discuss Mt. Tom conservation.
- Examine opportunities for increased ecological connectivity on “summit” land not under conservation restrictions or held by DCR
- Develop and agree on invasive species management plan as part of overall land use and management plan
- Form a “Friends of Mt. Tom” group to attend meetings, address stewardship issues on all parcels, and communicate with landowners

### 3-5 years:

- Establish plan to enhance protection in areas that create barriers for both humans and wildlife
- Interested parties form conservation aggregation/resource conservation partnership as vehicle to pool resources and funding sources
- Begin dialogue about selling carbon credits as revenue
- Friends of Mt. Tom group continues to expand membership and involvement

### 6 years and beyond:

- Continue regular meetings to address issues and resource conflicts
- Conduct ongoing reassessment and enhancement of established management plan
- Continue to monitor and manage invasive species on the range
- Sell carbon credits from intact forested lands to raise funds for continued conservation and land management projects

# CASE STUDY: CONSERVATION AGGREGATIONS

After over 150 years of reforestation in New England, forest cover decline is transforming and fragmenting landscapes. Forest previously owned by family and industry is sold and divided into smaller parcels, creating an uncertain future for the integrity of New England landscapes and the communities these forested lands support.

In an effort to mitigate the effects of this fragmentation, researchers at Harvard Forest created the “Wildlands and Woodlands” conservation vision. “Wildlands and Woodlands” suggests many approaches to forest conservation in New England. Among the suggested approaches, the concept of conservation aggregation could address the dilemma of fragmented ownership on Mt. Tom.

Conservation aggregation refers to the collaboration of multiple landowners in a single region. By partnering, members of the conservation aggregation share expertise, resources, and advance conservation efforts across multiple parcels. “Wildlands and Woodlands” asserts that bundling multiple projects into a single effort results in expanded organizational capacity, increased landowner outreach, enhanced conservation outcomes, reduced project expenses, and improved fundraising success.

Through aggregating, land trusts can continue to work on the local level with the added benefit of centralized, coordinated staff. This design could be a suitable

model for Mt. Tom, which has many different owners with varying organizational responsibilities and capacities.

The authors of “Wildlands and Woodlands” believe that education is more effective when landowners are partners in collaborative efforts. Mt. Tom has many different owners and abutting landowners due to the mountain’s position between urban landscapes. A conservation aggregation could make educating all landowners about the need for connectivity more effective.

By engaging landowners in a collaborative effort, a conservation aggregation creates improved conservation outcomes. More intact forest and wildlife corridors would make Mt. Tom a better environment for humans and wildlife alike, as it would preserve ecological integrity throughout the range and

surrounding lands.

None of these benefits are possible without proper resources and staff. The lack of management presence on Mt. Tom is perceivable – graffiti, littering, and vandalism are prevalent on the mountain. A conservation aggregation could mitigate the issue of funding and staff through sharing costs, legal fees, and baseline documentation. Conservation aggregations improve the success rate of fundraising by engaging donors across a broader range of priorities through the collective efforts of several organizations.

A conservation aggregation approach to Mt. Tom can bring together diverse landowners for common purposes. By collaborating, landowners can improve the ecological health of the entire Mt. Tom range.



Pascommuck Conservation Trust maintains Brickyard Brook Conservation Area, a popular hiking spot for Easthampton residents. The conservation area is adjacent to Mountain View Farm and Mt. Tom, making it an important location for human and wildlife connectivity.





Despite the high visibility of the Mt. Tom range, there are many obstacles that limit people's ability to connect to the range. Insufficient public transportation, challenges around parking, and unsafe roads all hinder access. There are also challenges to people's ability to use the entire range, with some areas feeling unsafe or off-limits. Human use of the range can also have a negative environmental impact which must be mitigated.

## IMPROVING ACCESS

Additional stops on the Pioneer Valley Transit Authority's Blue 48 and Red 41 routes would enable more visitors to use the range without needing a car. Increasing safe access to the Manhan Rail Trail can also allow more visitors to reach Mt.

Tom without driving. Providing bike racks at trailheads, along with signs reminding visitors that mountain biking is prohibited on the range, will meet the needs of human visitors without compromising the trail system.

The plan recommends that DCR and other Mt. Tom Partners study the development of additional, maintained parking areas in areas that would allow safe access to different parts of the range. When the Partners are ready to allow visitors into the quarry area and surrounding parcels, parking areas can be added there as well. Green infrastructure techniques should be used in order to manage stormwater runoff and prevent people from parking further into the forest. The

plan also recommends working with MassDOT to place traffic calming devices, such as speed humps, pedestrian crossing signs, or flashing lights at crossings, to improve safety as people cross Rt. 141 to connect to the range.

This plan strongly suggests reclaiming the quarry, an expensive but necessary recommendation (see case study on page 52).



# PHASED RECOMMENDATIONS

ENSURE  
HUMAN ACCESS  
WHILE MITIGATING  
ENVIRONMENTAL  
IMPACT



## Within 2 years:

- Begin discussions to protect and enhance pedestrian/bicyclist access
- Begin mediation and negotiation regarding the future of 1) the quarry owned by Mt. Tom Rock LLC., and 2) the future of the Holyoke Boys and Girls Club (HBGC) property
- Identify potential areas for additional parking outside DCR gates
- Study green infrastructure techniques for parking areas
- Install bike racks and signs prohibiting bikes on trails at trailheads on Underwood Ave., Old Reservation Rd., and Chapin St.

## 3-5 years:

- Add pedestrian crossing signs, speed bumps, or other traffic calming devices on Rt. 141 to warn drivers
- Improve connectivity and access for cyclists
- Plan and build 1-2 additional maintained parking areas outside of gates incorporating green infrastructure techniques to safeguard clean water
- Establish public transportation servicing Mt. Tom
- Begin consultation with environmental engineering firms on quarry stabilization and reclamation

## 6 years and beyond:

- Develop spur trail off Manhan Rail Trail leading to Mt. Tom access point in Easthampton
- Adjust PVRTA service to Mt. Tom according to demand
- Finalize plans for quarry reclamation that enhances ecological integrity and facilitates recreation and education
- Begin work on quarry reclamation

# CASE STUDY: QUARRY RECLAMATION

In Chicago, a 380-foot deep former limestone quarry found a new life as a 27-acre public park. The quarry ceased operations in the 1970s and was then used as a dump site for clean construction debris for the next 30 years, when the city decided to find a new purpose for this in-town eyesore. The land was transferred to the Chicago Park District, which hosted a series of public meetings to determine community needs for the space. The city hired Site Design Group to develop an environmentally sustainable design on a \$10 million budget. After intensive reclamation work the Palmisano Park opened to the public in 2009.

The new park exemplifies Chicago's commitment to sustainability by providing native habitat, such as the hillside prairie, and filtering stormwater through a tiered wetland. Much of the original site was filled in, with one corner of the quarry left as a retention pond that is now stocked for fishing. A catwalk leads visitors down into the quarry and the surrounding landscape has been planted with a variety of native vegetation. Visitors can wind their way down into the quarry or walk up a hill looking out toward Chicago's downtown. The park offers a refuge in the city while also teaching residents about native plants, stormwater management, and historic uses of the site.

Reclaiming the traprock quarry on Mt. Tom is an exciting challenge. Turning an area currently so uninviting to humans and uninhabitable to most wildlife offers many possibilities for community participation, education, and ecological restoration.



## ENCOURAGE GOOD STEWARDSHIP THROUGH USE AND



The Mt. Tom range is a beloved feature of life in the Pioneer Valley and many residents access it regularly for recreation, a connection to nature, and to spend time with their families. As the number of people seeking outdoor experiences increases, it becomes even more important to ensure that these visitors use the mountain in a way that does not result in negative environmental impacts. There are many ways to increase stewardship of the range through education and use.

Early exposure to the natural world is key to creating responsible stewards. Partnering with local schools to create outing clubs that visit the range and other natural areas is an excellent way to introduce youth to Mt. Tom. Stakeholders can also work with groups such as the YMCA, Boys

& Girls Clubs, and Parks & Recreation departments from surrounding towns to bring more children to the range for hikes and natural history programs. Grant money exists to support such partnerships and should be investigated. It is recommended that the amount of public educational programs on Mt. Tom offered is increased. The plan also recommends the creation of an environmental education internship position to supplement the work of the DCR interpretation staff during the busy summer months. As visitor numbers to the range continue to increase, a proportional increase in staffing on the range is recommended.

Forming a "Friends of Mt. Tom" volunteer group that works across the range would also improve

stewardship. A more visible stewardship presence can be accomplished through a combination of Friends group volunteers and staff from land-owning organizations. This presence is needed on the quarry/Holyoke Boys & Girls Club parcels to discourage vandalism and other inappropriate uses of those properties.



# PHASED RECOMMENDATIONS

## ENCOURAGE GOOD STEWARDSHIP THROUGH USE AND EDUCATION



### Within 2 years:

- Foster more educational programming opportunities with various birding, geology, and naturalist groups
- Create school outing clubs that take trips to the range to hike and engage in trail work and invasive species removal
- DCR initiates dialogue to obtain more staff and establish internships in keeping with increased visitor numbers
- Host workshops to help interested landowners understand the land conservation options available to them
- Develop a more thorough inventory of natural plant communities on its property; use this information to identify and protect linkages between habitat types
- Form "Friends of Mt. Tom" group and recruit volunteers

### 3-5 years:

- Continue fostering educational programming, including longer-term relationships with schools that offers multi-year sequential programming
- Create and maintain a Facebook page and/or website to consolidate information about events taking place on the range
- Hire more rangers, interpretive staff to be on site during peak times

### 6 years and beyond:

- Offer environmental education opportunities around reclaimed quarry area to showcase ecological restoration work
- Continue to develop and offer educational programming

Opposite page: A bald eagle seeks a meal on the Mt. Tom range.



# APPENDIX A: DETAILED RECOMMENDATIONS



## Within 2 years:

- Engage community and promote citizen science efforts while enhancing ecological integrity
  - Host Bioblitzes on range with scientists and volunteers to conduct wildlife species inventory
  - Connect with colleges, universities to bolster research projects, conduct tracking studies
  - Host Big Night events ( i.e. during peak amphibian migration times on sections of road where they are likely to cross)
  - Connect with abutting landowners to survey backyard wildlife sightings
- Continue forest protection and management strategies to safeguard water quality for surrounding towns
  - Work to identify and certify vernal pools not currently recognized or certified by the NHESP
- Confine trail use between Rt. 141 and Mt. Tom "summit area" to the NET and old utility line trail
  - Clearly mark NET and other major trails using blazes and signs
  - Create barriers to social trails
  - Install interpretive signs about the importance of staying on the trail
- Identify and prioritize acquisition of conservation areas of high ecological integrity that show connections to the Mt. Tom range
- Monitor recommended areas for opportunities to expand protection, through conservation restrictions, by acquisition, Chapter 61, etc.
- Create a more thorough inventory of natural plant communities, use this information to identify and protect linkages between habitat types

## 3-5 years:

- Continue collecting data on species distribution, health
- Develop education programs
  - Encourage use of different parts of the reservation and partner sites
- Create wildlife culverts on Route 5, Route 141, and Interstate 91 to enhance connectivity of terrestrial and aquatic animals
- Connect with abutting landowners to explore possibilities for enhancing wildlife connectivity through partnerships, easements, and other alternatives to land acquisition

## 6 years and beyond:

- Host another round of BioBlitz and other wildlife inventory efforts to determine population health, impacts of climate change
- Continue to work with abutting landowners to enhance wildlife connectivity for terrestrial, aquatic, avian, and migratory species



## APPENDIX A: DETAILED RECOMMENDATIONS



### Within 2 years:

- Primary landowners meet on monthly basis to discuss Mt. Tom conservation.
  - Hold facilitated visioning charette to discuss future of Mt. Tom
  - Develop crisis response plan (major storm events, natural disasters)
  - Establish similarities and differences in management strategies across stakeholders and land owners
  - Establish communication protocol
  - Introduce concept of conservation aggregation
  - Establish monthly meetings as professional obligation
- Examine opportunities for increased ecological connectivity on “summit area” land not under conservation restrictions or held by DCR
- Develop and agree on invasive species management plan as part of overall land use and management plan
- Form a “Friends of Mt. Tom” group to attend meetings with primary landowners, address stewardship issues on all parcels, and communicate with landowners


### 3-5 years:

- Establish plan to enhance protection in areas that create barriers for both humans and wildlife
- Interested parties form conservation aggregation/resource conservation partnership as vehicle to pool resources and funding sources
- Begin dialogue about selling carbon credits as revenue
- Friends of Mt. Tom group continues to expand membership and involvement

### 6 years and beyond:

- Continue regular meetings to address issues and resource conflicts
- Conduct ongoing reassessment and enhancement of established management plan
- Continue to monitor and manage invasive species on the range
- Sell carbon credits from intact forested lands to raise funds for continued conservation and land management projects

# APPENDIX A: DETAILED RECOMMENDATIONS



## ENSURE HUMAN ACCESS WHILE MITIGATING ENVIRONMENTAL IMPACT

### Within 2 years:

- Begin discussions to protect and enhance pedestrian/bicyclist access
  - Conduct community meeting to explore possibility of PVTA shuttle or route alteration to service Mt. Tom
  - Discuss safety solutions for traversing Route 5, Route 141, and Christopher Clark Road
  - Investigate interest in Manhan Rail Trail spur trail connecting to Mt. Tom
- Begin mediation and negotiation regarding the future of 1) the quarry owned by Mt. Tom Rock LLC., and 2) the future of the Holyoke Boys and Girls Club (HBGC) property
  - Explore opportunities for stabilizing, reclaiming, and enhancing ecological integrity of quarry
  - Hold visioning exercise/charette to begin exploring potential solutions for the HBGC property
- Identify potential areas for additional parking outside DCR gates
- Study green infrastructure techniques for parking areas
- Install bike racks and signs prohibiting bikes on trails at trailheads on Underwood Ave., Old Reservation Rd., and Chapin St.


### 3-5 years:

- Add pedestrian crossing signs, speed bumps, or other traffic calming devices on Rt. 141 to warn drivers
- Continue to improve connectivity and access for cyclists
- Plan and build 1-2 additional maintained parking areas outside of gates incorporating green infrastructure techniques to safeguard clean water
- Establish public transportation servicing Mt. Tom
  - Create stops along RED 41 and B48 PVTA routes that connect to Mt. Tom
- Begin consultation with environmental engineering firms on quarry stabilization and reclamation

### 6 years and beyond:

- Develop spur trail off Manhan Rail Trail leading to Mt. Tom access point in Easthampton
- Adjust PVTA service to Mt. Tom according to demand
- Finalize plans for quarry reclamation that enhances ecological integrity and facilitates recreation and education
  - Area is used as a study site for local universities, design schools, etc. interested in ecological restoration
  - Mt. Tom Partners encourage visitors to explore quarry area through events advertised to the general public
- Begin work on quarry reclamation

# APPENDIX A: DETAILED RECOMMENDATIONS



## ENCOURAGE GOOD STEWARDSHIP THROUGH USE AND EDUCATION

### Within 2 years:

- Foster more educational programming opportunities with various birding, geology, and naturalist groups
  - Develop “connectivity hikes” to show how wildlife may be moving from one parcel to another
  - Expand reach of Mt. Tom Advocacy Group to all willing parcels
  - Engage with hiking clubs to include trail building and maintenance as regular activity
  - Create new interpretive signs that focus on connectivity
- Create school outing clubs that take trips to the range to hike and engage in trail work and invasive species removal
- DCR initiates dialogue to obtain more staff and establish internships
- Host workshops to help interested landowners understand the land conservation options available to them
- Develop a more thorough inventory of natural plant communities on its property; use this information to identify and protect linkages between habitat types

### 3-5 years:

- Continue fostering educational programming
  - Collaborate with local recreation departments, YMCA, Boys and Girls clubs to bring more children to the range
  - Work with local schools to bring classes to mountain
  - Develop curriculum related to Mt. Tom (using Massachusetts Environmental Literacy Plan as foundation)
  - Install new interpretive signs that focus on connectivity
- Expand programming and forms partnership with local schools
- Create and maintain a Facebook page and/or website to consolidate information about events on the range
  - Include activities and event updates
  - Incorporate natural history information about Mt. Tom
- Hire more rangers, interpretive staff to be on site during peak times
  - Include internship positions to augment staffing

### 6 years and beyond:

- Foster long-term relationship with area schools with multi-year, multi-age, sequential programming
- Offer environmental education opportunities around quarry area to showcase ecological restoration work.



## APPENDIX B: CITATIONS

- Aber, J.D., et al. "Wildlands and Woodlands". Harvard University Press, Cambridge. 2010. Web. 22 Feb. 2016.
- Ament, R., R. Callahan, M. McClure, M. Reuling, and G. Tabor. 2014. "Wildlife Connectivity: Fundamentals for conservation action." Center for Large Landscape Conservation: Bozeman, Montana. Web. 19 Jan. 2016.
- "BioBlitz, Species Inventory Information, Facts -- National Geographic." National Geographic. Web. 22 Mar. 2016.
- "Barnes Aquifer." Barnes Aquifer. Web. 10 Mar. 2016.
- Chen, I.-C., J. K. Hill, R. Ohlemuller, D. B. Roy, and C. D. Thomas. "Rapid Range Shifts of Species Associated with High Levels of Climate Warming." *Science* 333.6045 (2011): 1024-026. AAAS. Web. 14 Mar. 2016.
- "Climate Action Offsetting: Sale of First Carbon Offsets from Maine Ecological Reserve." Climate Action Reserve. 26 Aug. 2014. Web. 22 Mar. 2016.
- "The Cost of Not Protecting Source Waters." The Trust for Public Land. Web. 09 Mar. 2016.
- Czerwec, Mike. "Water Quality Report 2011." Rep. Easthampton Water Works, Spring 2012. Web. 23 Mar. 2016.
- "The Ecological Value of Mt. Tom." Proc. of Symposium on The Mt. Tom State Reservation, Holyoke Community College, Holyoke, MA. Pioneer Valley Group of The Sierra Club, 1985. Web. 23 Mar. 2016.
- "Ecosystems Services." EPA. Environmental Protection Agency. Web. 22 Mar. 2016.
- "EnviroAtlas." EPA. Environmental Protection Agency. Web. 22 Mar. 2016.
- Ernst, Caryn, Richard Gullick, and Kirk Nixon. "Conserving Forests to Protect Water." American Water Works Association, May 2004. Web. 09 Mar. 2016.
- "Important Bird Area Sites." Mass Audubon. Web. 10 Mar. 2016.
- Kestrel Land Trust. "The Mount Holyoke Range Protection Project. Kestrel Land Trust. Amherst, MA.
- "Massachusetts Natural Heritage & Endangered Species Program." Energy and Environmental Affairs. Web. 22 Mar. 2016.
- Miller-Rushing, Abraham J., and Richard B. Primack. "Global Warming And Flowering Times In Thoreau's Concord: A Community Perspective." *Ecology* 89.2 (2008): 332-41. Boston University. Web. 14 Mar. 2016.
- "Mount Holyoke Range Planning Unit Resource Management Plan". Massachusetts Department of Conservation and Recreation. DCR, 2013. Web. 9 Mar. 2016.
- Natural Heritage & Endangered Species Program. 2010. "Biomap2: Conserving the Biodiversity of Massachusetts in a Changing World." Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife. Westborough, MA.
- "Natural Heritage & Endangered Species Program's Guidelines for the Certification of Vernal Pool Habitat." Massachusetts Department of Fisheries and Wildlife, Mar. 2009. Web. 15 Mar. 2016.
- "North American Amphibian Monitoring Program - Patuxent Wildlife Research Center." North American Amphibian Monitoring Program - Patuxent Wildlife Research Center. Web. 22 Mar. 2016.
- NRWA News. "Easthampton, Mass Has Nation's Best Tasting Water." The National Rural Water Association, 2015. Web. 09 Mar. 2016.
- "Palmisano Park / Stearns Quarry." Landscape Performance Series. 2014. Web. 22 Mar. 2016.

## APPENDIX B: CITATIONS

- Plaisance, Mike. "Quarrying Rights at Holyoke's Mount Tom Set to End." MassLive, 30 July 2012. Web. 18 Mar. 2016.
- "Pioneer Valley Transit Authority of Western Massachusetts." Pioneer Valley Transit Authority of Western Massachusetts. Web. 17 Mar. 2016.
- Pucko, Carolyn, Brian Beckage, Timothy Perkins, and William S. Keeton. "Species Shifts in Response to Climate Change: Individual or Shared Responses? 1, 2." *The Journal of the Torrey Botanical Society* 138.2 (2011): 156-76. Web. 22 Mar. 2016.
- "Regional Traffic Counts". Rep. Pioneer Valley Planning Commission. Web. 18 Feb. 2016.
- Ross, Keith. "Conserve More Land Today through Parcel Aggregation | Autumn 2010." Center for Northern Woodlands Education. 26 Aug. 2010. Web. 18 Mar. 2016.
- Rusanen, Kaisa, Leena Finer, Merja Antikainen, Kirsti Korkka-Niemi, Birgitta Backman, and Ritva Britschgi. "The Effects of Forest Cutting on the Quality of Groundwater in Large Aquifers in Finland." *Boreal Environment Research* 9 (2004): 253-61. Web. 08 Mar. 2016.
- Searcy, Karen B., Brayton F. Wilson, and James H. Fownes. "Influence of Bedrock and Aspect on Soils and Plant Distribution in the Holyoke Range, Massachusetts." *Journal of the Torrey Botanical Society* 130.3 (2003): 158. Web. 23 Mar. 2016.
- Shah, Anup. "Why Is Biodiversity Important? Who Cares?." *Global Issues*. 19 Jan. 2014. Web. 25 Mar. 2016.
- "Site Design Group Ltd." Henry Palmisano Park. Web. 22 Mar. 2016.
- "Wildlife Accommodation." Massachusetts DOT-Highway Department Project Development and Design Guide. Massachusetts Department of Transportation. Web. 18 Feb. 2016.

# APPENDIX C: MAP DATA ATTRIBUTIONS

The maps in this document are for planning purposes only. These maps were created using data from multiple sources. These include:

MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

Google Earth

Pascommuck Conservation Trust

The New England Trail

City of Easthampton

City of Holyoke

Pioneer Valley Transit Authority

Mt. Tom Partners

University of Massachusetts

Massachusetts Department of Fisheries and Wildlife

Data created or processed by The Conway School team: Tia Novak and Kelly Corbin

## Site Orientation Map, pg. 2

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division
- The Conway School Team

## Site Orientation Map, pg. 3

- Google Earth

## Land Ownership, pg. 7

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

## Context, pp. 12-13

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

## Geologic History, pg. 14

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division
- The Conway School Team



## APPENDIX C: MAP DATA ATTRIBUTIONS

### **Watershed and Water Flow, pg. 16**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

### **The Barnes Aquifer, pg. 17**

- City of Easthampton

### **Vernal Pools, pg. 19**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

### **Vegetation, pg. 20**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division
- The Trustees

### **Ecological Disturbance, pg. 25**

- University of Massachusetts Conservation Assessment and Prioritization System

### **Visitors, pg. 27**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

### **Ecological Connectivity: Terrestrial Wildlife Movement, pg. 32**

- University of Massachusetts Conservation Assessment and Prioritization System
- The Conway team

### **Ecological Connectivity: Access and Corridors, pg. 33**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

### **Ecological Connectivity: Barriers to Access and Movement, pg. 34**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

### **Human Connectivity: High Use Areas, pg. 35**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

### **Human Connectivity: Parking and Public Transportation, pg. 37**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division
- The New England Trail

### **Human Connectivity: Barriers to Access and Movement, pg. 38**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

## APPENDIX C: MAP DATA ATTRIBUTIONS

### **Human and Ecological Connectivity: Barriers, pg. 38**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

### **Potential Connectivity: Regional Corridors, pg. 39**

- University of Massachusetts Conservation Assessment and Prioritization System

### **Potential Connectivity: Easthampton, pg. 40**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division
- Pascommuck Conservation Trust

### **Potential Connectivity: Holyoke, pg. 41**

- MassGIS—Office of Geographic Information, Commonwealth of Massachusetts, Information Technology Division

# APPENDIX D: PARTICIPATING STAKEHOLDERS

## CLIENTS

Kestrel Land Trust  
PO Box 1016, Amherst, MA 01004  
413-549-1097  
kestreltrust.org

Winding River Land Conservancy  
56 North Canal Street, Holyoke, MA 01040  
413-315-4908  
windingriver.org

The Mt. Tom Advocacy Group  
billfinn00@comcast.net

## STAKEHOLDER GROUPS

Boys & Girls Club of Greater Holyoke  
70 Nick Cosmos Way Holyoke, MA 01040  
hbgc.org

City of Easthampton  
50 Payson Avenue, Easthampton, MA 01027  
easthampton.org

City of Holyoke  
536 Dwight Street, Holyoke, MA 01040  
holyoke.org

Department of Conservation and Recreation  
251 Causeway Street, Suite 900, Boston, MA 02114  
mass.gov/eea/agencies/dcr/

Holyoke Gas & Electric  
99 Suffolk Street, Holyoke, MA 01040  
hged.com

Holyoke Water Works  
20 Commercial Street, Holyoke, MA 01040  
holyoke.org/departments/water-works

Massachusetts Audubon  
Arcadia Wildlife Sanctuary  
127 Combs Road, Easthampton, MA 01027  
massaudubon.org/get-outdoors/wildlife-sanctuaries/  
arcadia

Massachusetts Division of Fisheries and Wildlife  
341 East Street, Belchertown, MA 01007  
mass.gov/eea/agencies/dfg/dfw/

Mountain Park  
Iron Horse Entertainment Group  
P.O. Box 790 Holyoke, MA 01040  
ihcg.com/mountain\_park\_main.asp

The New England Trail  
(maintained by the Appalachian Mountain Club)  
5 Joy Street, Boston, MA 02108  
outdoors.org

Pascommuck Conservation Trust  
PO Box 806, Easthampton, MA 01027  
pctland.org

Pioneer Valley Planning Commission  
60 Congress St., Floor 1, Springfield, MA 01104  
pvpc.org

Silvio O. Conte National Fish and Wildlife Refuge  
U.S. Fish and Wildlife Service  
103 E. Plumtree Road, Sunderland, MA 01375  
fws.gov

The Trustees  
193 High Street, Holyoke, MA 01040  
thetrustees.org



The Mt. Tom range, visible for miles around, is an iconic part of the Connecticut River Valley and is a well-known destination for recreation, as well as a home for many rare and endangered species. The Mt. Tom Ecological Assessment seeks to provide a comprehensive view of the Mt. Tom range for the public and for conservation professionals. By assessing human and wildlife use of the range, their points of access to it, and ecosystem services, the project attempts to demonstrate the many ways in which the range is connected to the larger landscape. The various threats and barriers to human and wildlife use, and the environmental impact of human use, are also considered. This information is combined with data showing surrounding lands that are already under conservation to explore opportunities to strengthen existing areas of connectivity and to create new linkages.

the **Graduate Program** in Sustainable  
Landscape Planning + Design  
**Conway**School

The Conway School is the only institution of its kind in North America. Its focus is sustainable landscape planning and design and its graduates are awarded a Master of Science in Ecological Design degree. Each year, through its accredited, ten-month graduate program students from diverse backgrounds are immersed in a range of real-world design projects, ranging from sites to cities to regions. Graduates play significant professional roles in various aspects of landscape planning and design.