State of Nature

A Call for Conservation Action

In the Northeast Region

The Nature Conservancy, Eastern Conservation Science

A Call for Conservation Action

Conservation challenges are growing but dollars are in short supply. As citizens, it is imperative that we evaluate our successes and failures, take stock of the obstacles ahead, and focus action on the places and strategies most needed to sustain the natural landscapes of the region. To that end, The Nature Conservancy undertook a three-year study to gauge the status of the natural world across the Northeast and Mid-Atlantic.

The study was guided by a regional monitoring framework developed by the Northeast Association of Fish and Wildlife Agencies[1] and designed to assess the status of the region's species and habitats.

By highlighting **conservation successes and gaps**, these six fact sheets and accompanying maps aim to spur renewed conservation efforts and to direct such efforts to those places most in need of permanent protection, both to secure our region's **unique natural habitats** and to ensure **permanent homes for wildlife**.

Six Key Findings

Conserved Land:
Private conservation has increased extraordinarily and now accounts for over 4 million acres of land, more acreage than the state of Connecticut and Rhode Island combined. Multiple use easements make up 95% of that land, and only 5% is secured explicitly for nature. Land conversion still surpasses land conservation 2 to 1.

Forests:
Forest cover has returned to the region, but trees are small, stands are young, and forest patches are highly fragmented by over 732,000 miles of roads. Forests on conservation reserves are indeed older and contain larger trees. Forests on land secured for multiple uses are variable but slightly older than unsecured forests.

Forest types:
Oak-Pine forests are less protected, more fragmented, and changing faster than other forests. Among bird species typical of these forests 22 are declining and 17 are increasing, a more rapid transition in wildlife than seen in other forest types.

Wetlands:
Estimates suggest that over 25% of our varied wetland habitats have been lost to land conversion. Floodplains urgently need protection being the most converted and least secured wetland type with a ratio of 11 acres converted to every 1 secured for nature.

Unique Habitats:
Conservation efforts have largely missed the diverse habitats of lowlands and productive soils. Among fertile limestone valleys, 51 acres are converted for every one secured for nature. In contrast, on acidic granite and steep slopes we have secured more land than we have converted.

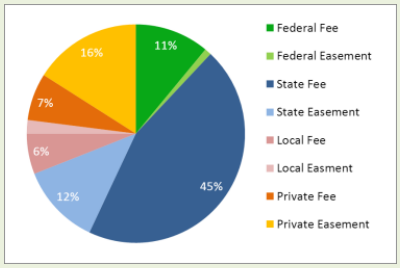
Rivers and Streams:
The majority of our river miles once existed as huge connected networks over 5000 miles long. Today none of these remain. Streams average 7 dams and 106 road crossings per 100 miles, and 65% have flows altered by human activities.

[1] Tomajer et al. 2008. Monitoring the Conservation of Fish and Wildlife in the Northeast

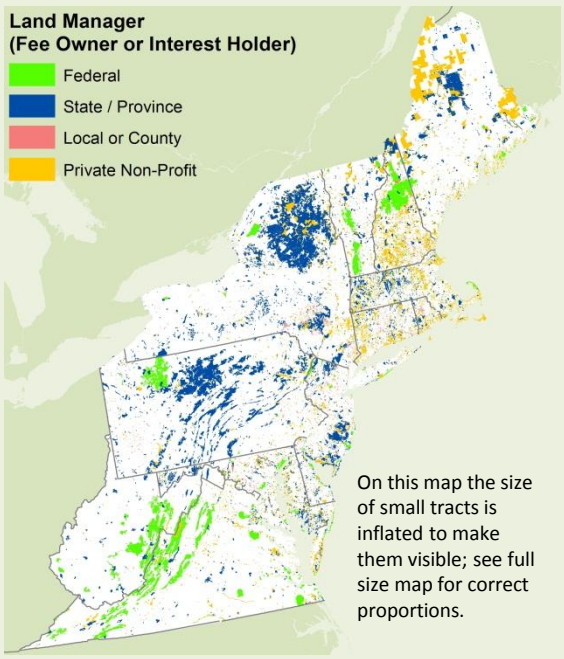
CONSERVATION LAND – The Power of Private Conservation

In 1955, when the newly-formed Nature Conservancy rallied to purchase 555 acres of old growth hemlock forest in New York's Mianus River Gorge, who could have predicted that by 2012 the region would be home to more than 3,000 private land trusts, conservation organizations, and individual easement holders? Collectively, these private entities hold over 4.3 million acres of land: more area than the states of Connecticut and Rhode Island combined. The majority of private conservation land is held in easements designed for multiple natural resource uses (GAP 3).

Only five percent of all privately held conservation land is protected specifically for nature (GAP 1 and GAP 2).



Ownership of the 24 Million Acres of Secured Land



On this map the size of small tracts is inflated to make them visible; see full size map for correct proportions.

In the Northeast, the 4 million acres of privately secured conservation land now rivals the federal land holdings of 6 million acres.

The rapid growth of private conservation land supplements the 12 million acres protected by individual states.

Land Conversion Far Exceeds Land Securement

In all, land converted to agriculture or development accounts for 43 million acres or 28 percent of the region. Land secured from development accounts for 24 million acres or 16 percent of the region. Thus, land conversion exceeds land securement by almost 2 to 1.

* The term "Northeast" and all statistics refer to the 13 New England and Mid-Atlantic states.

GAP 1: Permanently Secured from Development and **Intended Only for Nature and Natural Processes**

GAP 2: Permanently Secured from Development and **Intended for Nature with Some Management**

GAP 3: Permanently Secured from Development and **Intended for Multiple Natural Resource Uses** (e.g. forest management)

Underlying data developed by The Nature Conservancy's Eastern Science Office with support from the Northeast Association of Fish and Wildlife Agencies.

Fact sheet supported by Sweet Water Trust
www.sweetwatertrust.org

For the full report and large maps go to:

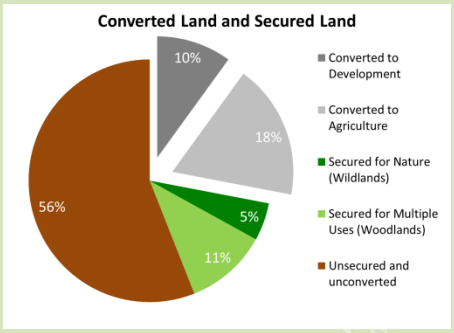
http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/stateofnature

Secured Land: 24 million acres

In the Northeast, **only five percent** of all land is set aside specifically for nature. These “Wildlands” are classed as GAP Status 1 or 2. Another 11 percent are managed for multiple natural resource uses like forest products and drinking water. These “Woodlands” are classed as GAP Status 3. Overall, secured land that is permanently conserved against conversion to development - totals 16 percent.

Converted Land: 43 million acres

Land that is converted to development, roads, transmission lines, agriculture, or other non-natural conditions, currently accounts for almost twice as much area as secured land. Declines in water and air quality, depletion of soil nutrients, losses of species diversity, and increases in disease are all associated with land conversion. Converted land in the Northeast totals 28 percent.



Getting to Scale: Conservationists are learning how to locate and manage conservation lands to produce the greatest benefits: the largest positive impact on wildlife diversity or water quality. The key is to match the intent and type of protection to the needs of each situation. The use of conservation easements has grown rapidly; 74 percent of private secured land is now protected by easement.

Impressive strides have been made in securing important places for their natural values, but more needs to be done - especially in the habitats highlighted in this series of fact sheets.

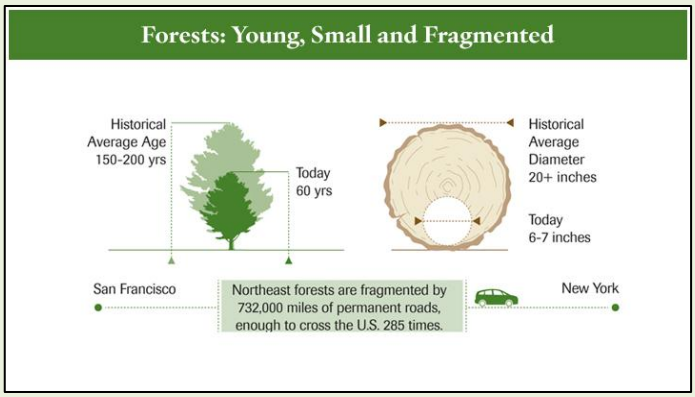
Full size map at **http://tinyurl.com/TNCStateofNature**

MATURE FORESTS – Continuing the Comeback

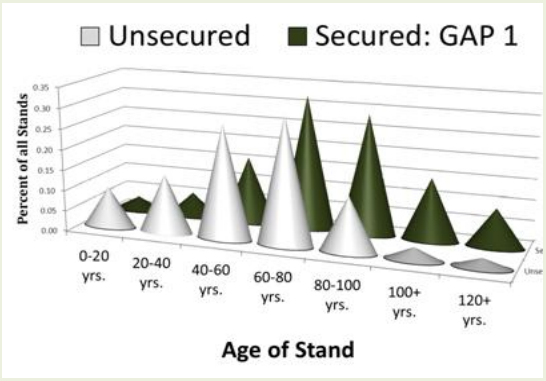
The tangled canopies and humus-rich soils of a mature forest provide homes to thousands of species, from nesting warblers to elusive martins. Many of these species show a strong preference for the quiet, secluded environments of the forest interior. Yet the forests that now blanket our landscape bear only a superficial resemblance to the forests of the past.

Forever Young: Eastern forests are not growing older.

Cleared for pasture and agriculture at the turn of the century, the return of the forest to the Northeast is a story of recovery laced with repeated setbacks. Harvesting, now on its third or fourth cycle, is pervasive and periodic. Data show that individual forest stands, naturally living for several centuries, rarely make it past 60 years of age. This results in a perpetually young forest of thin trees.



As forest cover returned to the Northeast, human population grew from a few thousand to 70 million. Roads went from nonexistent to ubiquitous, and are now extensive enough to circle the earth 29 times. Development and roads fragment the forest into patches, dramatically decreasing the amount of forest interior by introducing noise, predators and disturbances.



Old Forests

Citizens and public agencies together have set aside 5 percent of all forest land specifically for nature (GAP 1). Data show that these secured forests are older and have more structure (logs, snags, understory) that promotes diversity and builds stability.

Barring any unforeseen change, our grandchildren may be able to experience older forests at a scale that does not currently exist, bringing with it cleaner water and thriving forest birds, plants and other wildlife.

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Structure of Old Forests
Tip-up mounds, rotting logs, and understory, create stability and diversity.

Old logs create wildlife habitat and seedbeds for new trees.

Young forests tend to have thin trees and little structure.

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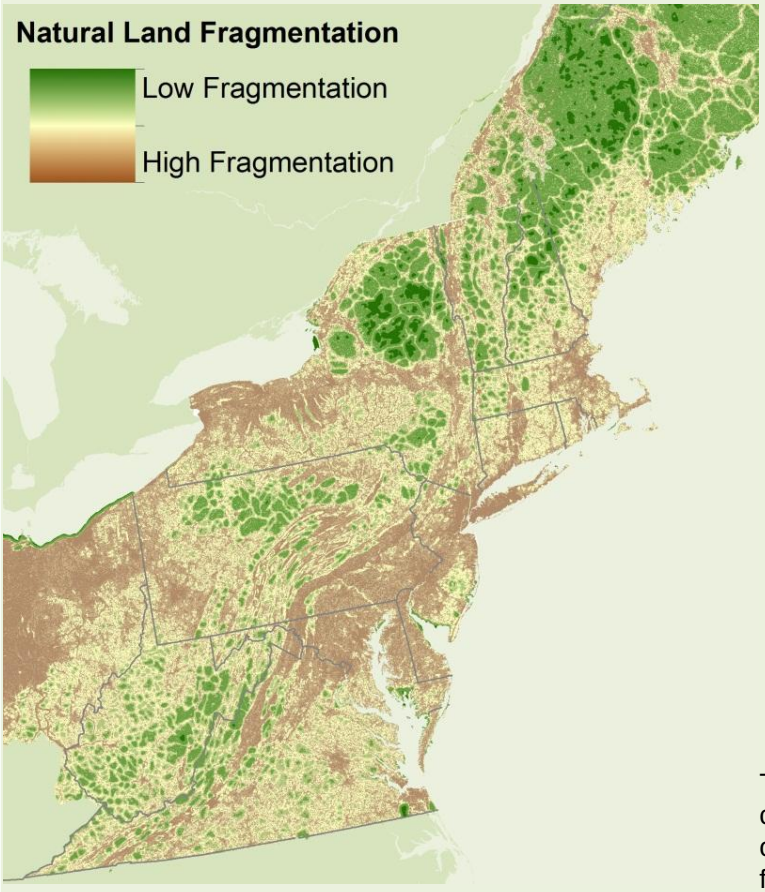
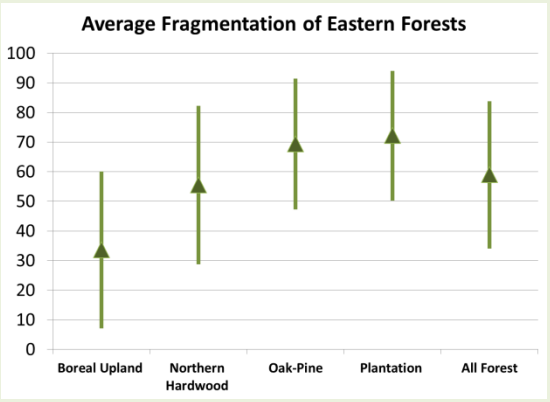
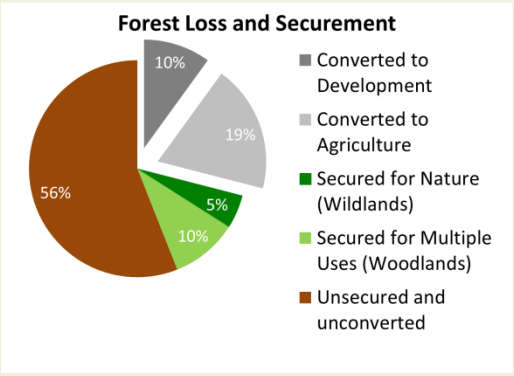


Connected Forests

Although trees have regrown in the Northeast, the forest is no longer one large connected system. Individual stands are often cut off from other stands by roads, development, or open fields. On a scale from "0" (seamlessly connected) to "100" (completely cut off) the average fragmentation of forest stands now scores "59," indicating a loss of over half their connectedness.



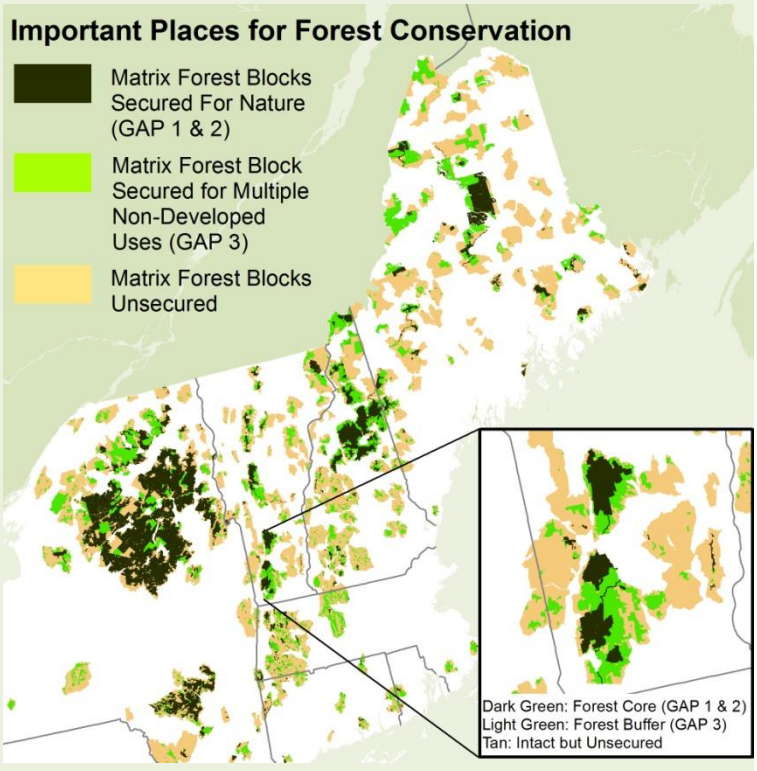
To offset trends in fragmentation and loss, citizens and conservation entities have focused on securing large tracts of forest still capable of functioning as a complete forest ecosystem.



Cores and Buffers

The ownership and management of conservation forests by non-government entities has expanded. Conservation organizations have identified key places for conserving large forest tracts, known as Matrix Forest Blocks. The goal of these efforts is two-fold:

- **Large core areas:** *secured for nature*, where high quality forest habitat can fully develop.
- **Extensive buffer areas:** *secured for multiple uses*, maintaining forest cover around the cores through nature-friendly management.

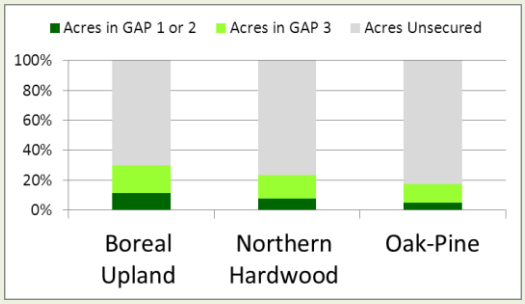


Full map of Matrix Forest Blocks at
http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/stateofnature

FOREST TYPES – Balancing Conservation

The huge success in forest conservation by public agencies and private entities - over 20 million acres - is cause for celebration. It is a good time to take stock of what we have accomplished and what challenges remain. We know from widespread sampling that the current forests are young and fragmented, and that they lack the key characteristics of old forests so important to natural diversity (see forest fact sheet). What do we know about the types of forests we have conserved?

Percent Secured by Forest Type

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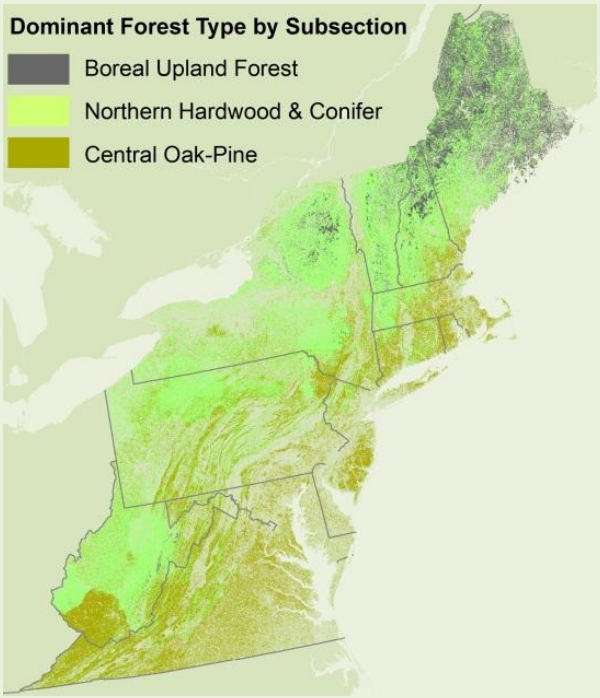


Unbalanced Conservation

Collectively, public and private entities have had the most success securing boreal upland forests (30 percent of total) and northern hardwood forests (23 percent of total).

Low elevation forests of oak and pine remain largely unsecured (17 percent of total) with only five percent secured for nature.

Fragmented Oak-Pine Forests

The 732,000 major roads that crisscross our region divide our forests into blocks. Oak-Pine forests have more roads and fewer large blocks than any other forest type. Small blocks of forest have less of the quiet, sheltered, and secluded forest interior habitat preferred by many forest dwelling species. Instead, each block has increased edge: exposed, noisy, and weedy regions that track the boundaries of major roads.

* The term “Northeast” and all statistics refer to the 13 New England and Mid-Atlantic states.


© NH Natural Heritage Program

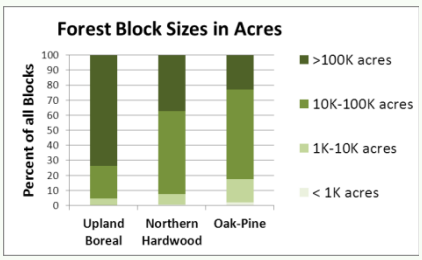
Northern Hardwood Forest


© NH Natural Heritage Program

Oak-Pine Forest


© ME Natural Areas Program

Boreal Upland Forest



Proportion of Large Forest Blocks

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Changing Oak–Pine Forests

Forest Birds In Transition: At least 45 bird species breed in oak-pine forests, taking advantage of the striking production of acorns and other nuts. But data indicate that the fauna of these forests are changing rapidly. Over the last four decades:

- 11 species of birds show steady declines across states
- 12 species show steep declining regional trends
- 10 species show steady increases across states
- 7 species show steep increasing regional trends*

This is markedly more change than seen in other forest types, and it may reflect the effects of fragmentation.

Change and Fragmentation: Why is there so much change in the bird populations of oak-pine forests? These forests do not differ from other forest types in average stand age or average tree diameter, and they have lower average harvest levels: 6 percent for Oak-Pine vs. 14 percent for Upland Boreal.

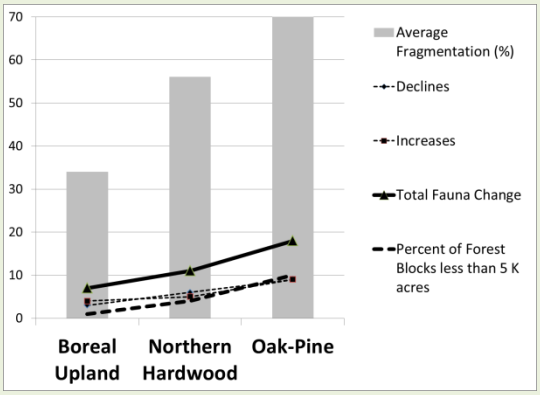
The increasing trends of some species - such as wild turkey and eastern bluebird - reflect successful conservation efforts. The declines and overall fauna change correlate with the degree of fragmentation. Two metrics, the percent of forest in small blocks surrounded by roads and the average fragmentation of a forest stand, reveal oak-pine forests to be more fragmented than northern hardwoods or upland boreal forests.

Steep Declines*

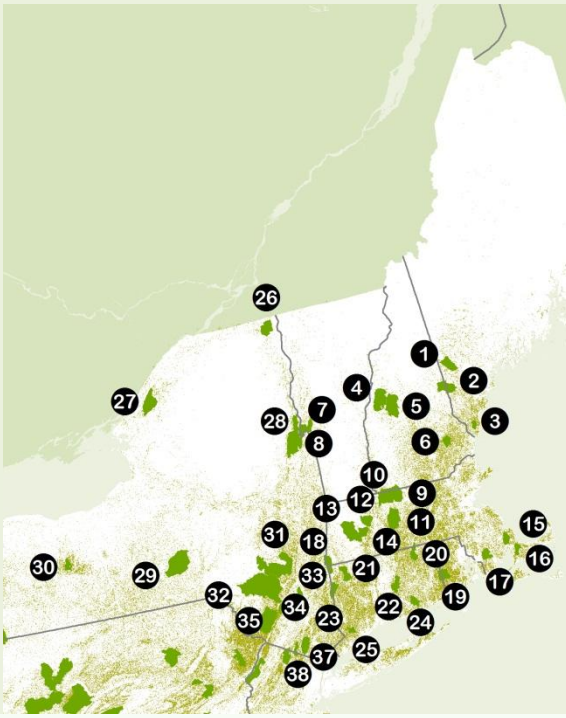
- Eastern towhee
- Northern flicker
- Brown thrasher
- Whip-poor-will
- Canada warbler

Steep Increases*

- Wild turkey
- Red-bellied woodpecker
- Pileated woodpecker
- White-breasted nuthatch



Oak-Pine Forests have the highest level of fragmentation and the least conservation.



Key Sites for Oak Pine Conservation

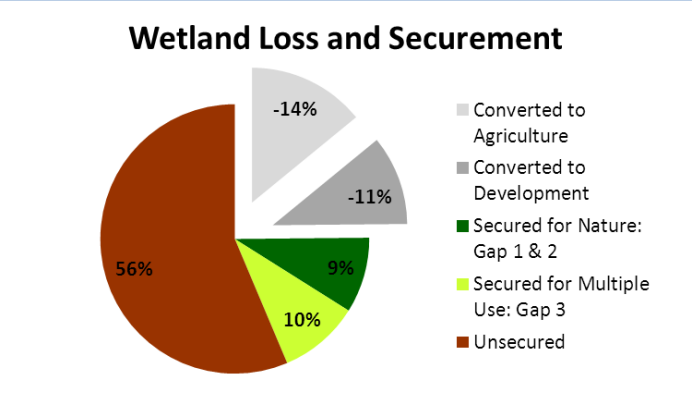
1. Pleasant Mountain, ME
2. Leavitt Forest, ME
3. Mt. Agamenticus Matrix, ME
4. Mascoma, NH
5. Mt. Cardigan, NH
6. Pawtuckaway, NH
7. Bomoseen, VT
8. Bald Mountain, VT
9. Royalston, MA
10. Warwick, MA
11. Quabbin, MA
12. Big Kitty/Whately, MA
13. Middlefield - Peru, MA
14. Westhampton, MA
15. Myles Standish Matrix, MA
16. Mass. Military Reservation , MA
17. Freetown-Fall River Matrix, MA
18. Mt. Washington - Mt. Riga, MA
19. Wood River Barrens/Pachaug, RI
20. Yale-Myers Forest, CT
21. Canaan Mountain, CT
22. Meshomasic State Forest, CT
23. Macedonia Brook, CT
24. Eight Mile Matrix, CT
25. Saugatuck Forest, CT
26. Lake Alice/Altona, NY
27. Black/Indian River Lakes, NY
28. Lake George/S. Bay, NY
29. Chenango Highlands, NY
30. Bristol Hills, NY
31. Sugarloaf, NY
32. Beaverkill, NY
33. Shaupeneak, NY
34. Northern Shawangunk, NY
35. Greater Bushkill, NY
36. Allegheny State Park, NY
37. Harriman, NY
38. Ringwood, NY

* Full sized map at **http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/stateofnature**

* Numbers are based on declines in 3 or more states, and regional trend over 2 degrees slope.

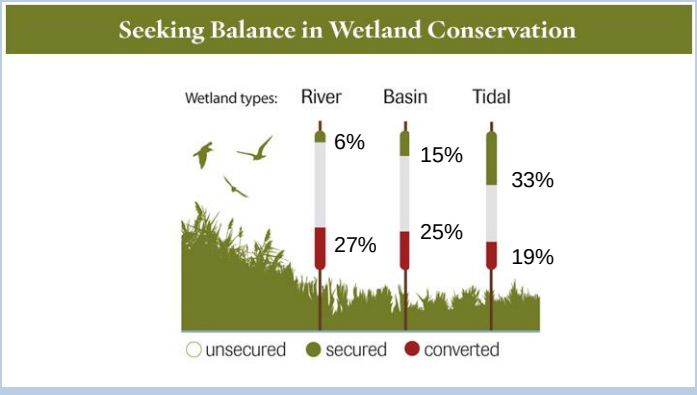
WETLANDS - The Next Big Challenge

Marshes, swamps, bogs, fens, floodplains: wetlands are among the most productive and diverse ecosystems on Earth and are a distinctive feature of the eastern landscape. The Northeast contains over 750,000 individual wetlands that together account for 8.4 million acres, or 5 percent of the region's area. This small percentage of land area supports a large proportion of the region's biodiversity, including over 1,500 types of wetland plants and 475 rare species.



How much wetland has been lost? The immense value of wetlands was unrecognized for most of the last two centuries; during that time they were systematically drained to create land suitable for agriculture and development. The amount lost, estimated from detailed topographic and land cover models, is between 2.8 million and 5.6 million acres. Thus, at least 25 percent of all wetlands have been lost to conversion.

Of our remaining wetlands, only a quarter are secured from development.



Vanishing Riverine Wetlands: Over the last two decades, conservationists have secured 2 million acres of wetlands, making particular progress in protecting tidal wetlands. But river-related wetlands, like floodplain forests, have seen five times more conversion than securement for nature, compounding other impacts like altered flooding.

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Basin Wetland
Swamps, marshes, bogs formed in depressions

Riverine (Alluvial) Wetland
Floodplain forest and marsh formed where rivers flood

Tidal Wetland
Coastal saltwater or brackish marsh

Underlying data developed by The Nature Conservancy's Eastern Science Office with support from the Northeast Association of Fish and Wildlife Agencies.

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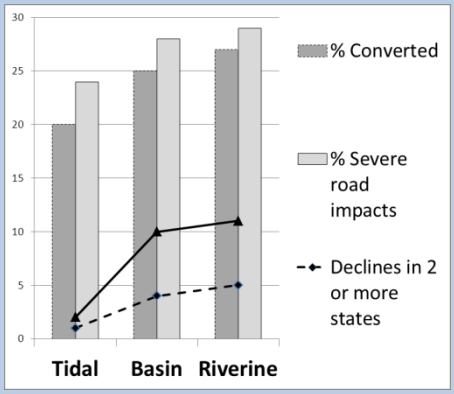
Riverine Wetlands

Enhanced by periodic floods of nutrient-rich waters, riverine wetlands are hot spots of diversity. For instance, many fish spawn and feed in floodplains.

Due to their productive soils and prime valley-bottom locations, floodplains are often converted to farms and are rarely secured from development. Commonly, their boundaries are flanked by roads and their natural flood cycles are altered by dams. The past 40 years have seen declines in several floodplain-associated birds.

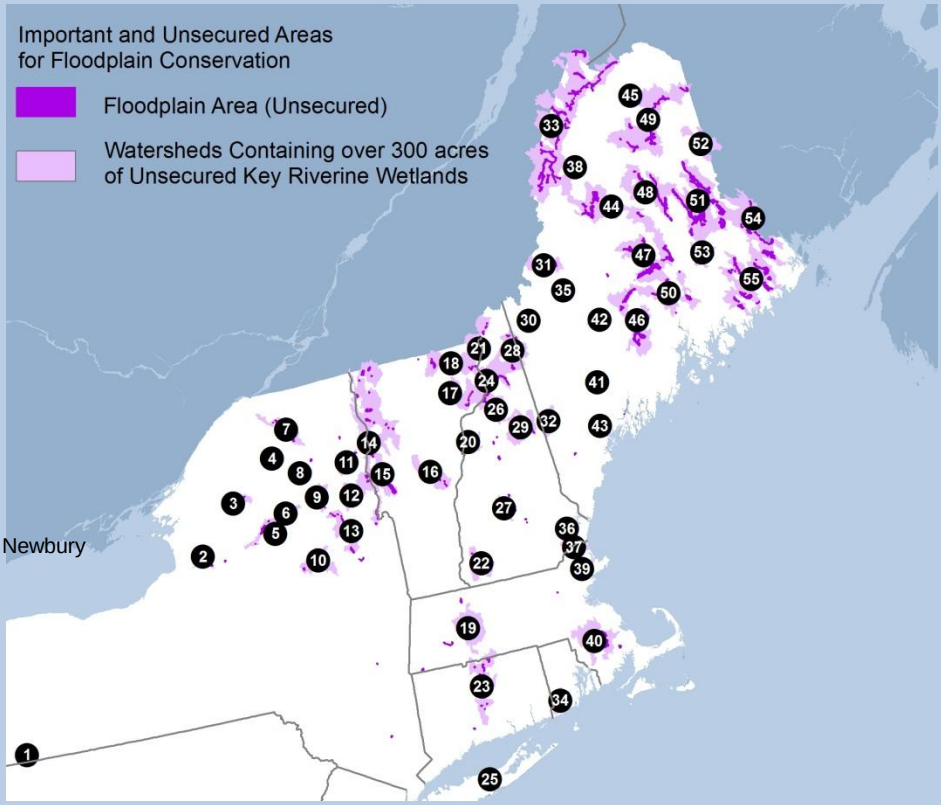
Floodplain Birds Declining*

- Cerulean warbler, Eastern wood pewee
- Yellow-breasted chat
- Common yellowthroat
- Veery



Riverine Wetlands have the highest levels of direct conversion, road impacts, and degree of bird species change.

Important Areas for Floodplain and Riparian Conservation



1. Tunungwant Creek
2. Salmon River
3. West Branch Oswegatchie River
4. Jordan River
5. North Branch Moose River
6. Raquette Lake
7. East Branch Saint Regis River
8. Raquette River
9. Hudson River
10. Sacandaga River
11. Boquet River
12. Schroon River
13. Hudson River
14. Lake Champlain and Poultney River
15. Otter Creek
16. White River and Third Branch
17. Moose River and Passumpsic
18. Clyde, Barton, Black River
19. Connecticut River: Pioneer Valley
20. Connecticut River: Haverhill, Bradford, Newbury
21. Upper Connecticut and Nullhegan
22. Ashuelot River
23. Lower Connecticut
24. Upper Ammonoosuc
25. Peconic River
26. Ammonoosuc River
27. Blackwater River
28. Magalloway and Androscoggin River
29. Saco River, Albany Intervale
30. Kennebago River
31. Moose River
32. Saco River, Old Course Saco River
33. Upper Saint John River
34. Pawcatuck River
35. Dead River
36. Exeter and Pawtuckaway River
37. Powwow River
38. Allagash Stream
39. Ipswich River
40. Taunton River
41. Dead River, Pickerel Pond
42. Kennebec River and Carrabassett
43. Royal River
44. West Branch Penobscot River
45. Fish River
46. Sebasticook River
47. Piscataquis River
48. East Branch Penobscot River
49. Aroostook River
50. Kenduskeag, Pushaw, Blackman Stream
51. Mattawamkeag River
52. North Branch Meduxnekeag River
53. Passadumkeag River
54. Saint Croix River and Tomah Stream
55. Downeast Rivers: Dennys to Narraguagus

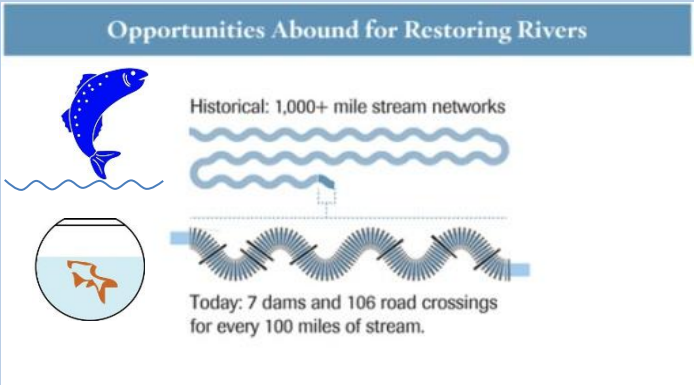
*birds showing significant declines in 2 or more states

Full sized map at
http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/stateofnature

STREAMS AND RIVERS - Restoring Nature's Lifelines

From a tiny trickle in a headwater stream to the vast volume of water flowing in our mighty rivers, stream systems provide habitat for a tremendous diversity of life. Although they total over 200,000 miles in length, the stream networks of today are disconnected and altered fragments of what they once were.

A typical resilient stream occurs as a long connected network with unaltered water flow and forested, intact riparian areas. Resilient streams support a diversity of native fish, aquatic animals and plants.

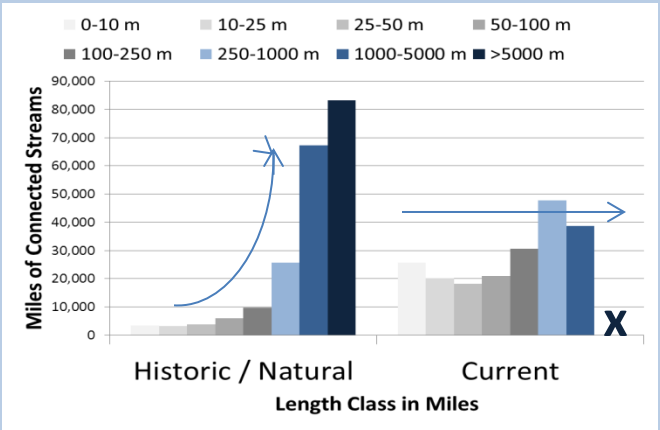


Loss of Connectivity

Historically, 41 percent of the region's streams were part of larger interconnected networks, each over 5,000 miles long. Today none of those large networks remain, and even those over 1,000 miles long have been reduced by half. There has been a corresponding increase in short networks under 25 miles long, which now make up 23 percent of all stream miles. This highly fragmented pattern reflects the density of barriers in the region. There is currently an average of 7 dams and 106 road-stream crossings per 100 miles of stream.

Distribution of the Region's Streams by Network Length

The historic 5000-mile stream networks are gone, broken up by dams that increase the amount of short stream networks (200,000 miles total).



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Long Connected Networks

Unaltered Flow

Intact Riparian Areas

Underlying data developed by The Nature Conservancy's Eastern Science Office with support from the Northeast Association of Fish and Wildlife Agencies

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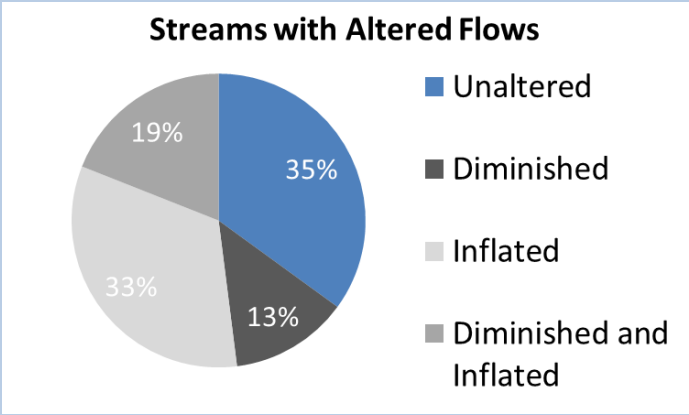
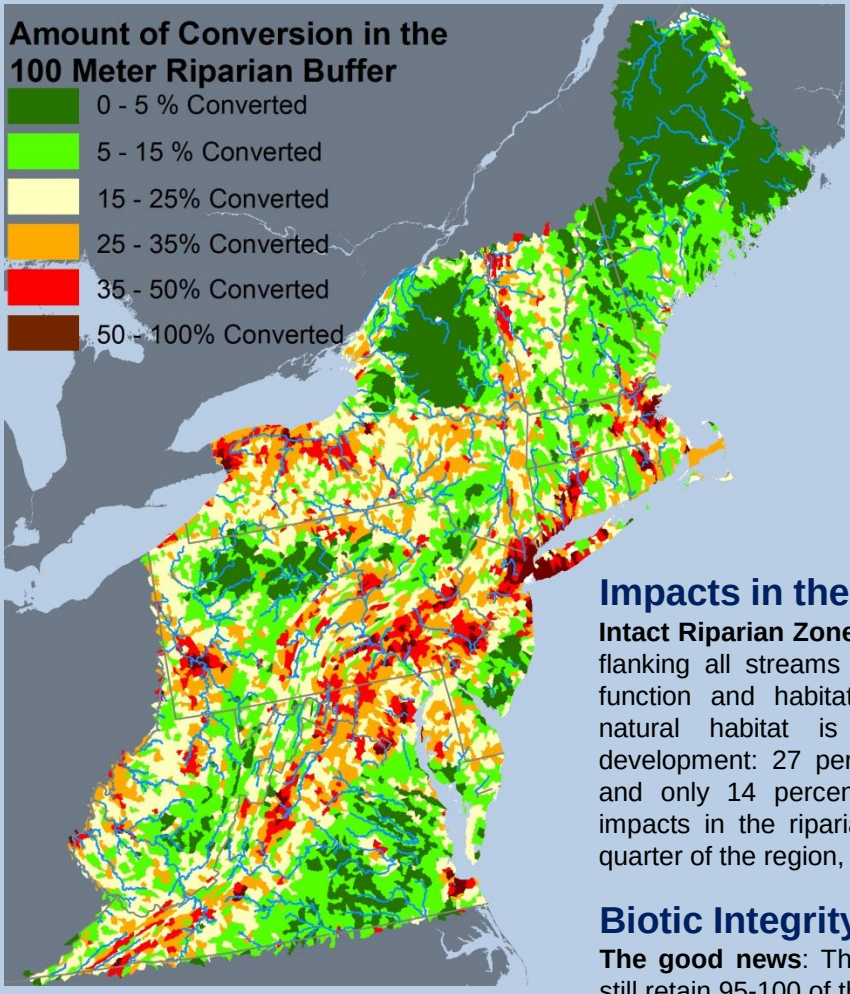
Altered Flow



Flow is the essence of a stream ecosystem, but the majority of the region's streams have flow regimes that are altered enough to result in biotic impacts. Thirteen percent have diminished flows (they may dry up), including one-third of all headwater streams. This translates into a reduction of habitat. Seventy percent of large rivers have diminished maximum flow (smaller floods) that decreases the amount of water delivered to their floodplains. One third have year-round inflated flows due to artificial controls; this inundates the periodic wet-dry cycle so the rivers function more like lakes.



Full sized map at
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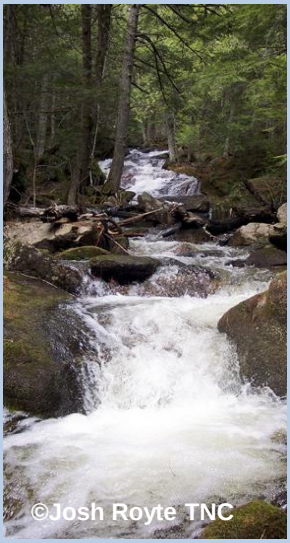


Impacts in the Riparian Zone

Intact Riparian Zones: Riparian areas, the dynamic zone flanking all streams and rivers, are important for stream function and habitat. Currently, conversion of this key natural habitat is twice that of securement from development: 27 percent of riparian areas are converted and only 14 percent are secured. Moderate to severe impacts in the riparian zone are present in roughly one-quarter of the region, especially low-lying and coastal areas.

Biotic Integrity

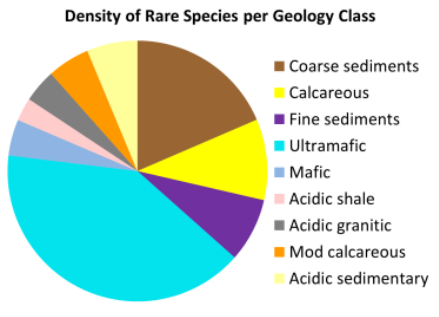
The good news: The majority of the region's watersheds still retain 95-100 of their native fish species, and 30 percent have five or fewer non-indigenous species.

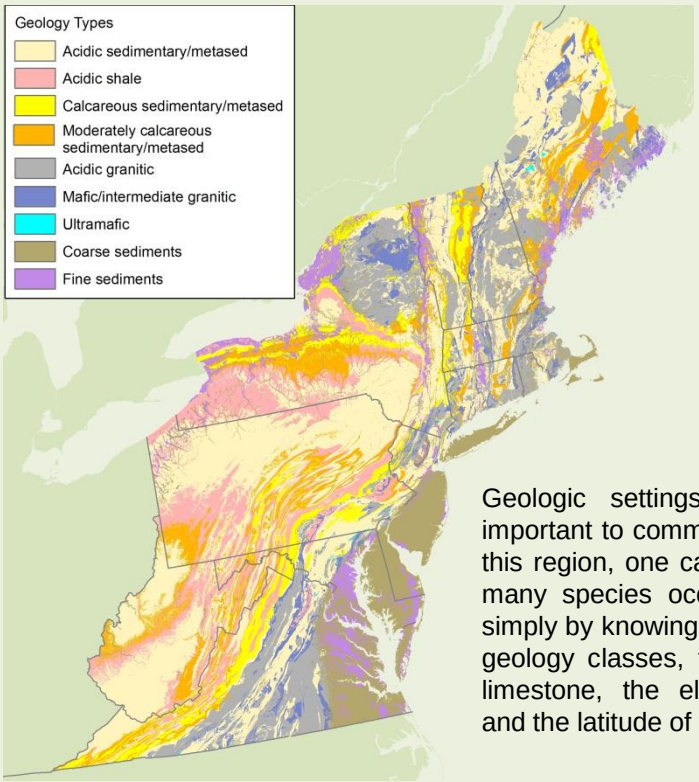
The bad news: Five percent of the region's watersheds have lost 5 to 50 percent of their native fish species, and 45 percent have 10 or more non-indigenous species. The range of native brook trout, a species that prefers cold, high-quality streams, has been reduced by 60 percent.

UNIQUE HABITATS - Extending Conservation to All Habitats

The rich biodiversity of the Northeast is largely associated with unique habitats that reflect the complex geologic history and varied landscape of the region. The Northeast is one of the few places in North America where one can find coastal beaches, alpine summits, limestone valleys, silt-rich floodplains, and sandstone ridges, in relatively close proximity. Within a landscape dominated by forests, these unique habitats typically occur as patches of contrasting elements, each with its own suite of plant and animal species.

Unique Habitats and Rare Species: Eleven unique habitats - from sandy pine barrens to limestone glades - support over 2,700 endemic rare species. Four geologic settings have much higher densities of rare species than would be expected based on the extent of the habitat: coarse sediments, calcareous bedrock (limestone), fine sediments and ultramafic serpentine.





Geologic settings are equally important to common species. In this region, one can predict how many species occur in a state simply by knowing the number of geology classes, the amount of limestone, the elevation range and the latitude of the state.

Calcareous Limestone

Coarse Sediment Sand Barren

Ultramafic Serpentine Barren

Acidic Shale

Underlying data developed by The Nature Conservancy's Eastern Science Office with support from the Northeast Association of Fish and Wildlife Agencies.

Fact sheet supported by Sweet Water Trust
www.sweetwatertrust.org

For the full report and large maps go to:

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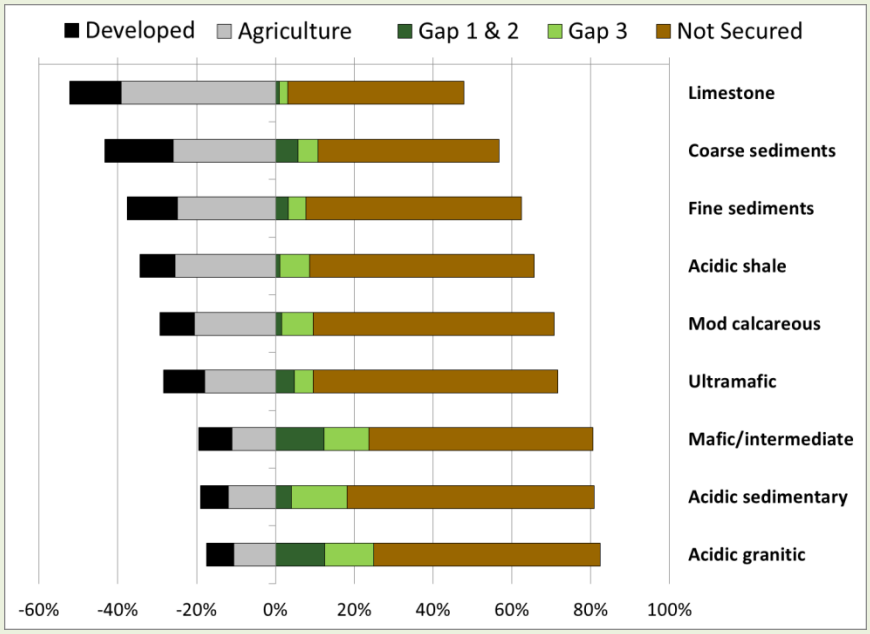
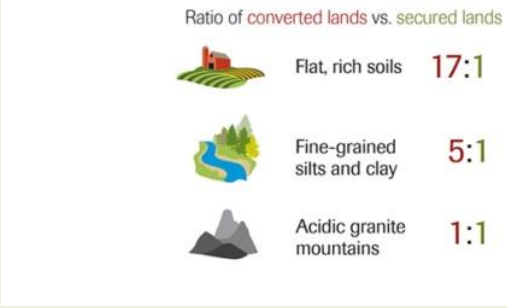
* The term "Northeast" and all statistics refer to the 13 New England and Mid-Atlantic states.

Conversion vs. Securement



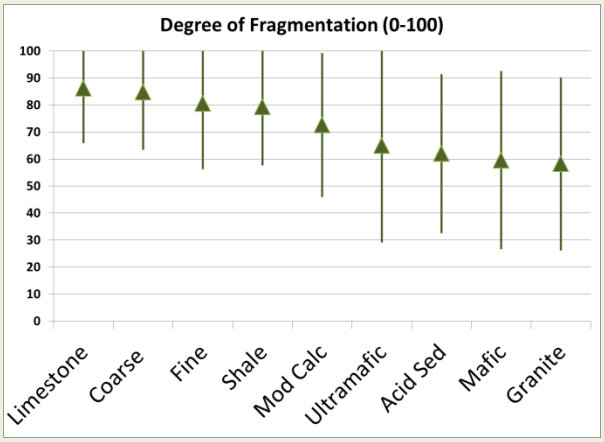
Many of these unique habitats are highly valued by people as well as by flora and fauna. For instance, rich, productive limestone soils are prized for agriculture. The chart on the left shows that of all the acres of limestone in the region, 39 percent are converted to agriculture and 13 percent to development. Only three percent are secured against conversion and only one percent is secured for nature: that's 51 acres converted for every one secured for nature. In contrast, the acidic granite settings that underlie our mountains are 25 percent secured and only 18 percent converted.

Mixed Results Across Elevations and Habitats



The **ratio of conversion to securement** (C to S) or securement for nature (C to SN) reveals the settings with the largest discrepancies in conservation:

	C to S	C to SN
Limestone valleys, wetlands and glades	17:1	51:1
Silt floodplains and clayplains	5:1	11:1
Shale barrens and slopes	4:1	30:1
Coarse sand barrens and dunes	4:1	8:1
Soft sedimentary valleys and hills	3:1	19:1
Serpentine outcrops	3:1	6:1



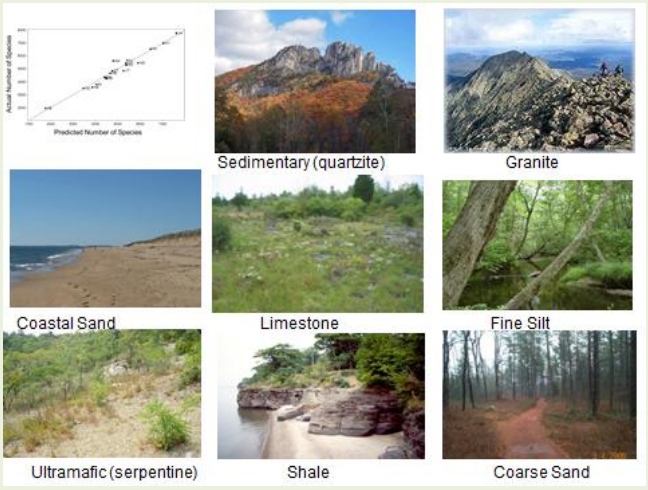
Fragmentation and Connectivity: Fragmentation is pervasive at lower elevations across all geology classes. Even the least fragmented setting, granite, retains only 43 percent of its natural connectedness. Three settings show over an 80 percent loss of connectedness: limestone, coarse-grained sand and fine-grained silt. These settings also have the highest densities of rare species and the most conversion. The latter two also have the least amount of habitat securement. **Conservation action is urgently needed in these unique habitats.**

See full report at **http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/stateofnature**

RESILIENT SITES - Strongholds for Nature in a Changing Climate

Conserving the Stage: Climate change is creating an increasingly dynamic natural world: shifting species distributions and rearranging habitats. Consequently, conservationists need a way to identify important areas that does not assume that the locations of existing plants and animals will stay the same. Rather than trying to protect diversity one species at a time, the key is to protect the different "stages" upon which the drama of nature unfolds. In the American Northeast and adjacent parts of Canada, the stages consists of recognizable geological settings like coastal sands, limestone valleys, granite summits, or silt floodplains, that each support a distinct set of species. Conserving a range of geophysical settings offers an approach to conservation that protects a diversity of plants and animals under both current and future climates.

Settings and Stages The number of plants and animals in each Northeastern State is correlated with the number of geology types, the amount of limestone, the latitude, and range of elevation in the state. These geophysical factors form *settings* that support different species.

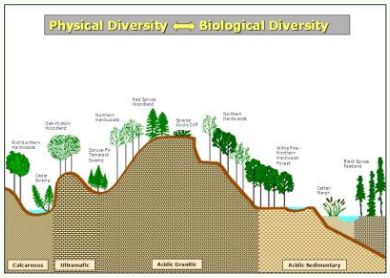


Typical **geophysical settings** of the Northeast and Mid-Atlantic

Natural Strongholds Lasting conservation depends on identifying places where the effects of climate change are buffered by the natural properties of the site. Conserving these places is vital to maintaining a diversity of species and natural processes regardless of changes in the climate.

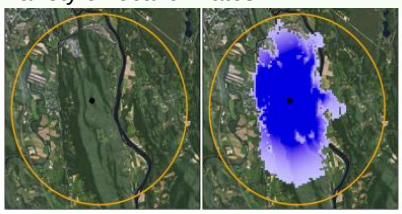
Natural strongholds are places where the direct effects of climate change are moderated by **complex** topography and **permeable** natural cover, and where the current landscape contains **high quality biodiversity** features.

In these sites, species can find areas of suitable moisture and temperature within their local neighborhood. This allows resident species to persist longer, and helps ensure that changes in the composition and structure of the communities will be more gradual.



GEOPHYSICAL SETTINGS (STAGES)
are unique combination of geology, elevation, and landforms.

COMPLEX LANDSCAPES
create "micro-climates" that buffer change by providing species with a variety of local climates .



PERMEABLE LANDSCAPES
offset the development, roads, and agriculture that create resistance to natural movements. Maintaining a connected area (BLUE REGION above) in which species can move and processes can rearrange, ensures that the area can adjust to climate change.

Underlying data developed by The Nature Conservancy's Eastern Science Office with support from the Northeast Association of Fish and Wildlife Agencies.

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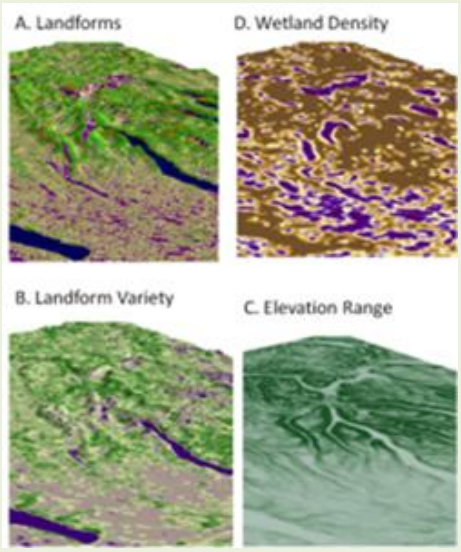
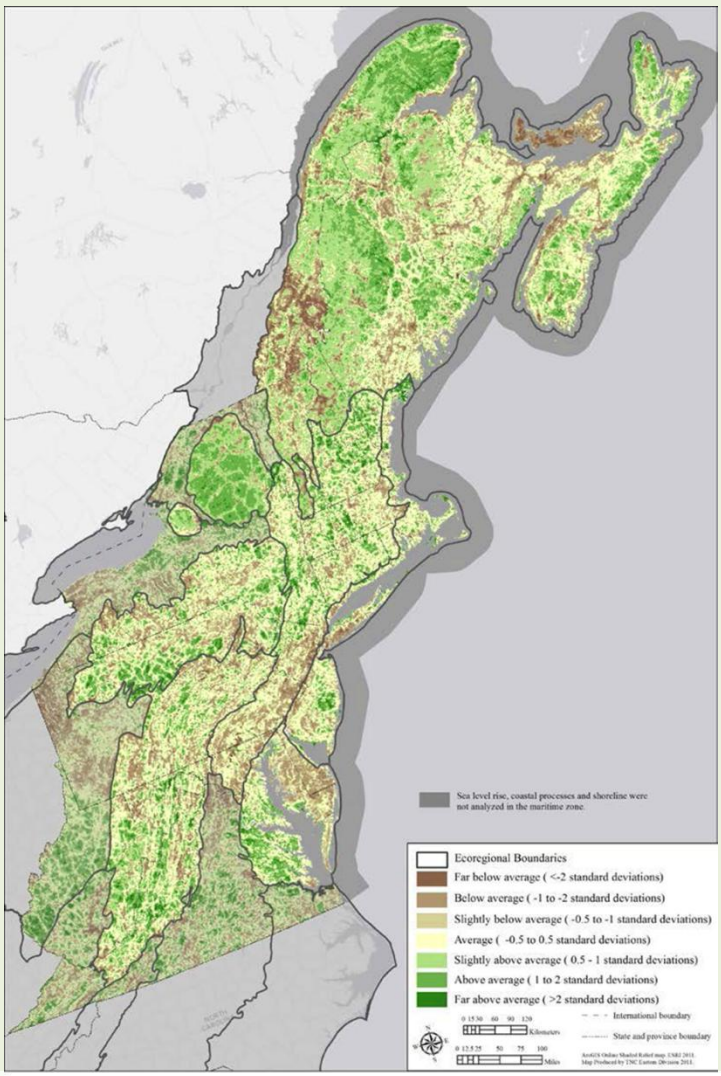
Flat and Fragmented OR Complex and Connected



Complex Landscapes: are places that have a variety of small, connected, local climates creating a wide range of climate options for the species within. In essence, complex topography and elevation gradients break the regional climate into a wide array of "micro-climates," buffering the inhabitants from direct effects of change.

Permeable Landscapes: are places that allow species to move and disperse, and processes like fire or water movement to occur unimpeded. This facilitates the adjustments necessary for the natural world to stay balanced with the climate. Permeable landscapes have an abundance of connected natural cover.

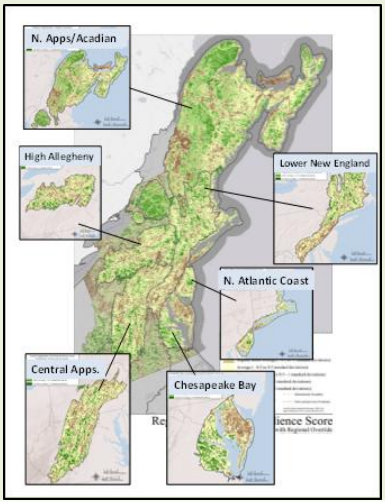
Resilient Sites. With a changing climate, many places will see degradation and species loss, but some places will retain high quality habitat and continue to support a diverse array of plants and animals. Sites that have both **complex** topography and **permeable** land cover offer the possibility of lasting conservation.



Resilient Sites. The map shows areas that are both complex and permeable with respect to one of the 30 geophysical settings (stages) evaluated. A dark green color indicates that the area has high estimated resilience relative to its setting type and relative to the ecoregion it falls within. Brown indicates areas vulnerable to climate change.

Permanent conservation of the resilient areas should be prioritized to ensure they can continue to provide habitat for species.

Ecoregions: The map is a composite of six ecoregion maps. Grey areas were not fully assessed (e.g. the coastal zone).



For more information and full sized maps see the full report.

All maps, numbers, and statements in these fact sheet are based on:

M.G. Anderson and A. Olivero Sheldon. 2011. *Conservation Status of Fish, Wildlife, and Natural Habitats in the Northeast Landscape: Implementation of the Northeast Monitoring Framework*. The Nature Conservancy, Eastern Conservation Science. 289 pp.

Full Report and all maps are available at:
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Note: The data underlying these fact sheets were developed for all thirteen Northeast states of New England and the Mid-Atlantic. However, many of the maps and lists of priority sites in these summaries focus on New England and New York State because the focus of Sweet Water Trust, the fact sheet's sponsor, is the Northern Appalachian region.

SWEET WATER TRUST is a grant-making foundation that supports the conservation of wildland habitat for native flora and fauna, with natural processes allowed to continue unimpeded and the land's long-term protection ensured through perpetual restrictions. Since its establishment in 1991, Sweet Water has been actively involved in the protection of wilderness in New England and the Adirondacks, focusing in recent years on the expansive forests of the Northern Appalachians, including Canada. To date, Sweet Water Trust has been instrumental in the protection of more than 418,000 acres in the Northeast. **www.sweetwatertrust.org**

THE NATURE CONSERVANCY'S mission is to protect the lands and waters upon which all life depends.**www.nature.org**

Special thanks to the State Natural Heritage Programs for sharing information on rare species and communities in the region. We are grateful to the NY Natural Heritage Program, the NH Natural Heritage Program, and The Maine Natural Areas program for use of their photos.