The Nature Conservancy
Protecting nature. Preserving life.™

Conservation Status of Habitats and Species in the Northeast and Mid Atlantic Region

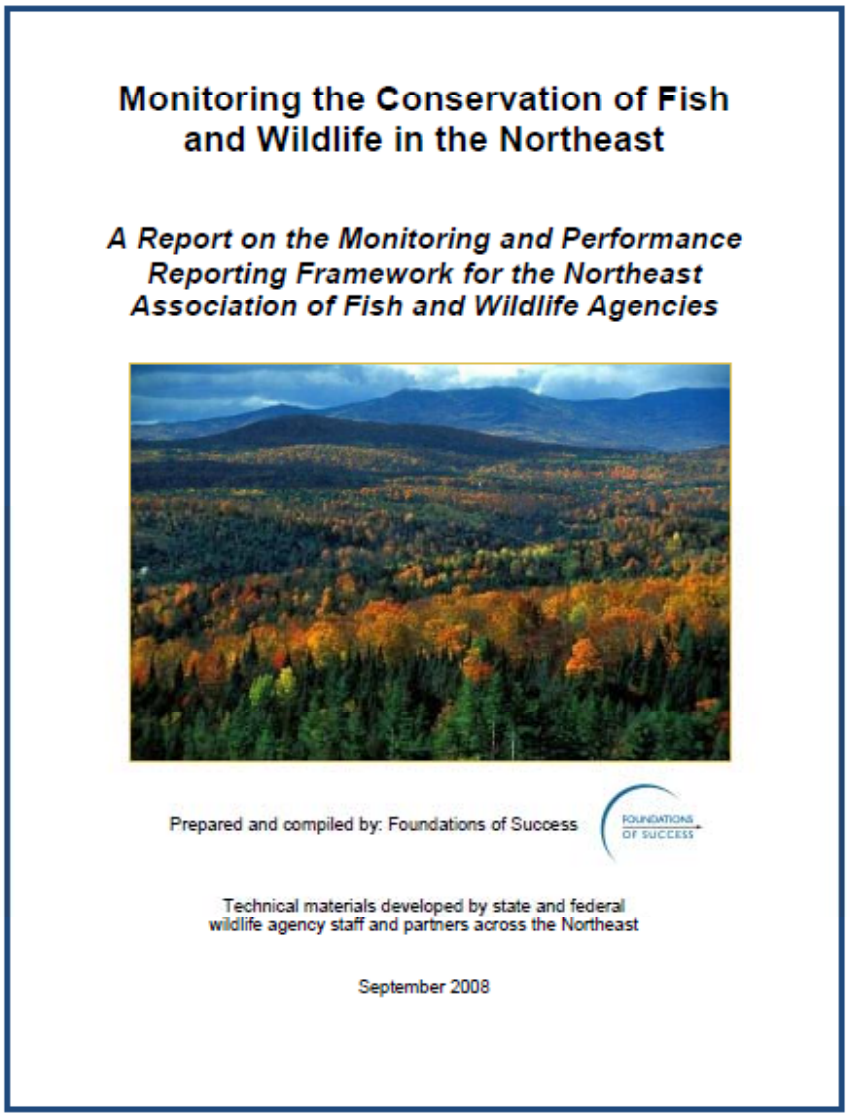
Mark Anderson and
Arlene Olivero Sheldon





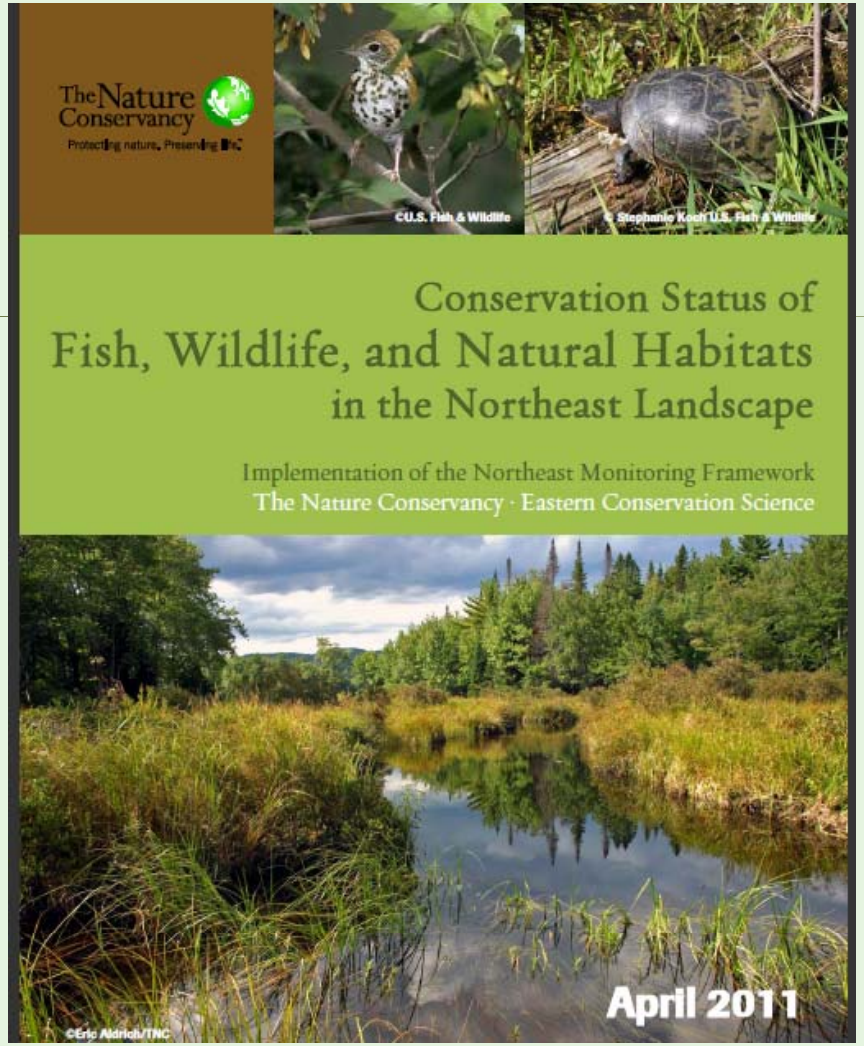



Project Overview



- Guiding Document
- Advisory Committee
- Habitats & Species
  - Forest
  - Wetland
  - Unique habitats
  - Rivers and Streams
  - Lakes and Ponds
  - SGCN Species

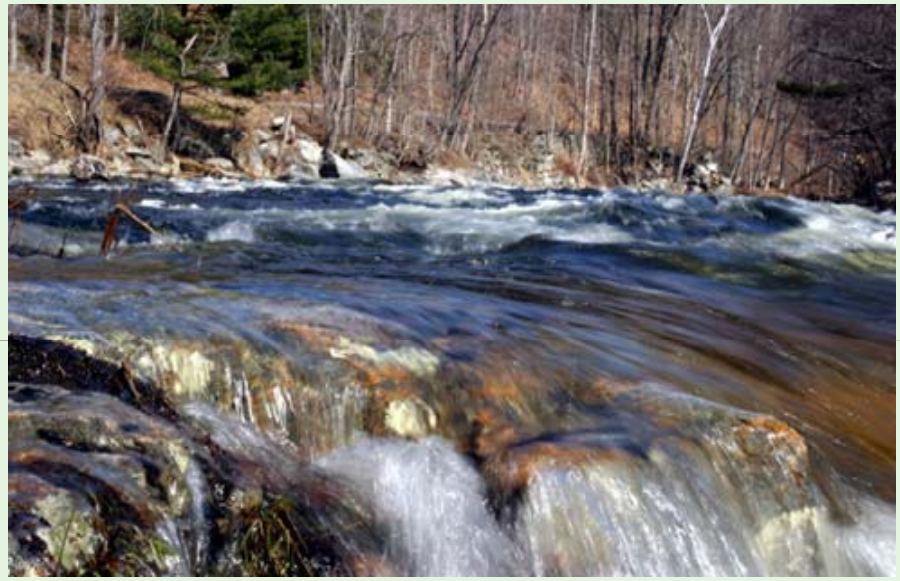
Advisory Committee

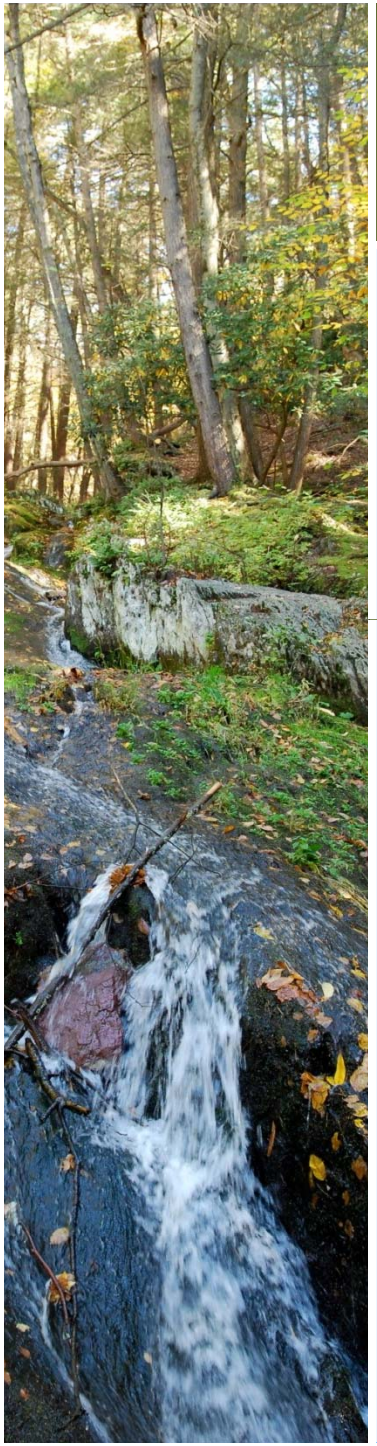


Representatives from every State

- Jenny Dickson and Rick Jacobson of CT DEP;
- Robert Coxe and Kevin Kalasz of DE DFW;
- John O'Leary and Thomas O'Shea of MA DFW;
- Glenn Therres, Lynn Davidson, Scott Stranko, and
- Dana L.Limpert of MD DNR;
- George Matula and Sandy Ritchie of ME DIFW;
- Jim Oehler, John Kanter, Matt Carpenter, Steve Fuller,
- and John Tash of NH DFG;
- Dave Jenkins, Kris Schantz, and Miriam Dunne of NJ DFW,
- Tracey Tomajer, Greg Edinger, Dan Rosenblatt,
- and Erin White of NY DEC;
- Dan Brauning and Lisa Williams of PA GC,
- Dave Day of PA FBC,
- Jeffrey Wagner of PA WPC/NHP;
- Jon Kart and Rod Wentworth of VT DFW; Gary Foster of
- WV CNR; Becky Gwynn of VA DGIF,
- Dave Tilton, Genevieve Pullis LaRouche, Ron Essig,
- and Ken Sprankle of USFWS;
- Don Faber-Langendoen of NatureServe,
- Dan Lambert of American Bird Conservancy,
- Dave Chadwick of the AFWA, Mary Anne Theising of USEPA,
- James McKenna of USGS.

Streams and Rivers

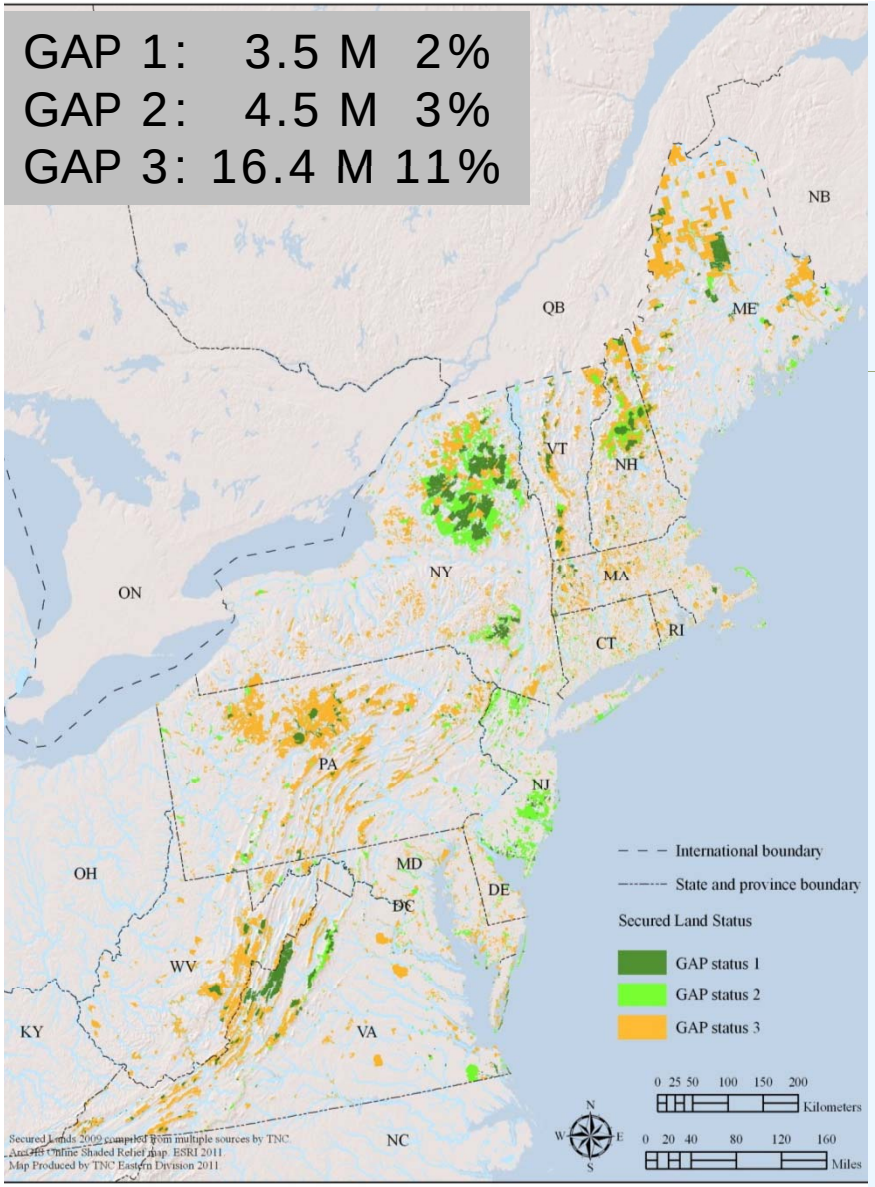




Stream and Rives Evaluated Status Metrics

1. Riparian Secured Land
2. Riparian Land Cover Conversion
3. Impervious Surfaces
4. Fragmentation by Dams and Culverts: Type and Density
5. Fragmentation by Dams: Connected Network Length
6. Flow Alteration
7. Brook Trout Status
8. Wadeable Stream IBI
9. Nonindigenous Species
10. Fish Fuanal Intactness

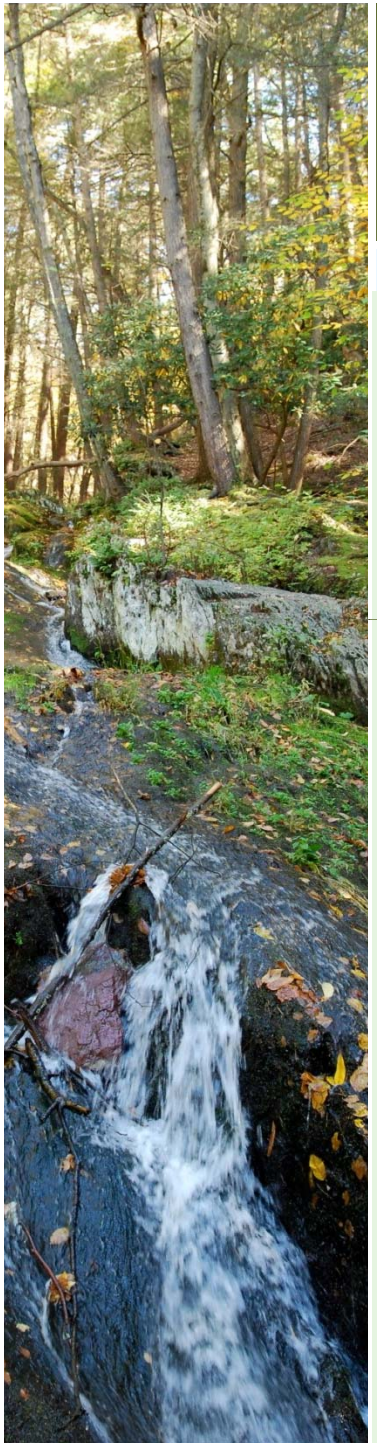
Secured Areas: Data Set



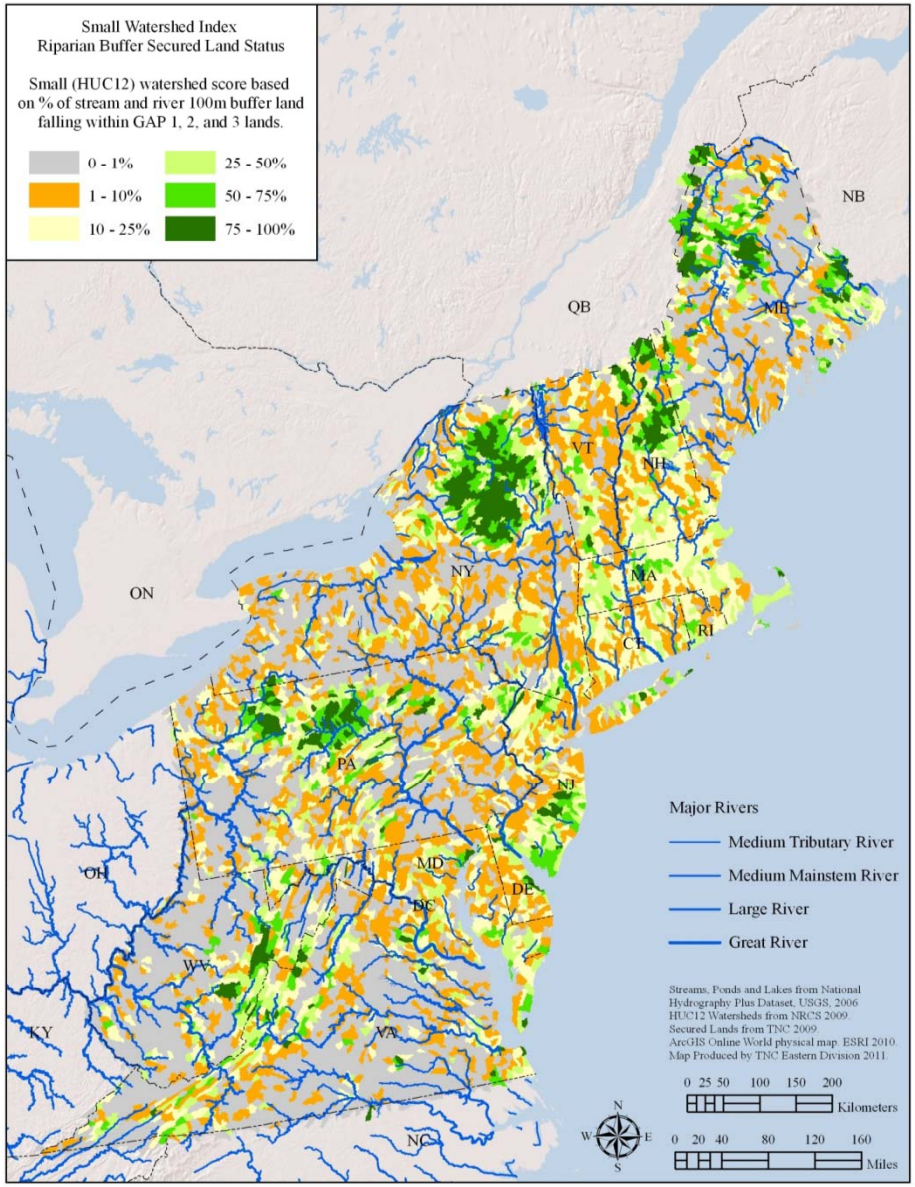
Secured Lands:
GAP status 1-3
An area with permanent securement against conversion to development

Protected:
GAP status 1 or 2
a secured area intended for biodiversity or nature conservation (Wildlands ?)

Secured for multiple uses:
GAP status 3
A secured area intended for multiple uses such as forest management and recreation (Woodlands?)



Secured Riparian Land



Riparian areas are important for stream function and habitat.

14 percent of this area is secured for biodiversity or multiple uses

Area measured: 100 m zone flanking all streams and rivers

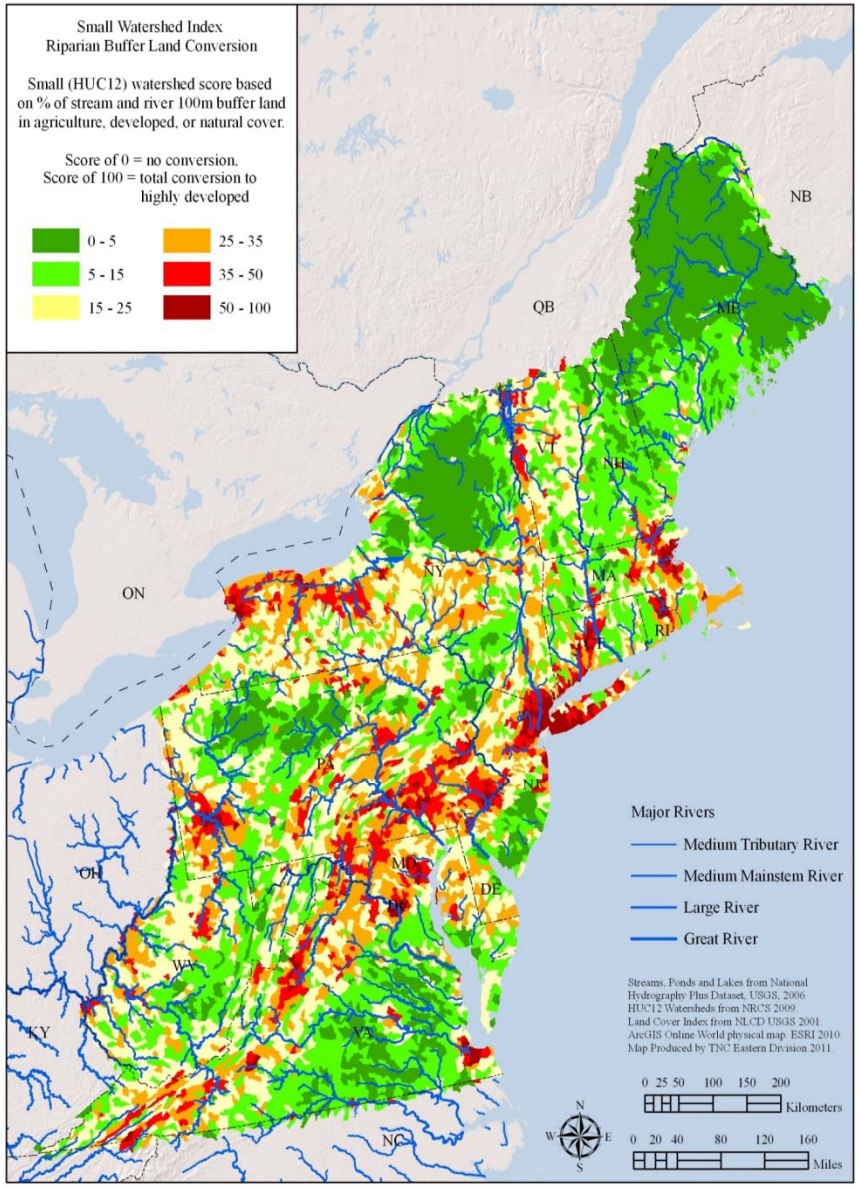
Riparian Conversion to Development or Agriculture

27 percent of the riparian area is converted to development or agriculture.

Watershed results showed concentrations of highly impacted watersheds near the coast and in lower elevations where development and agriculture were more prevalent

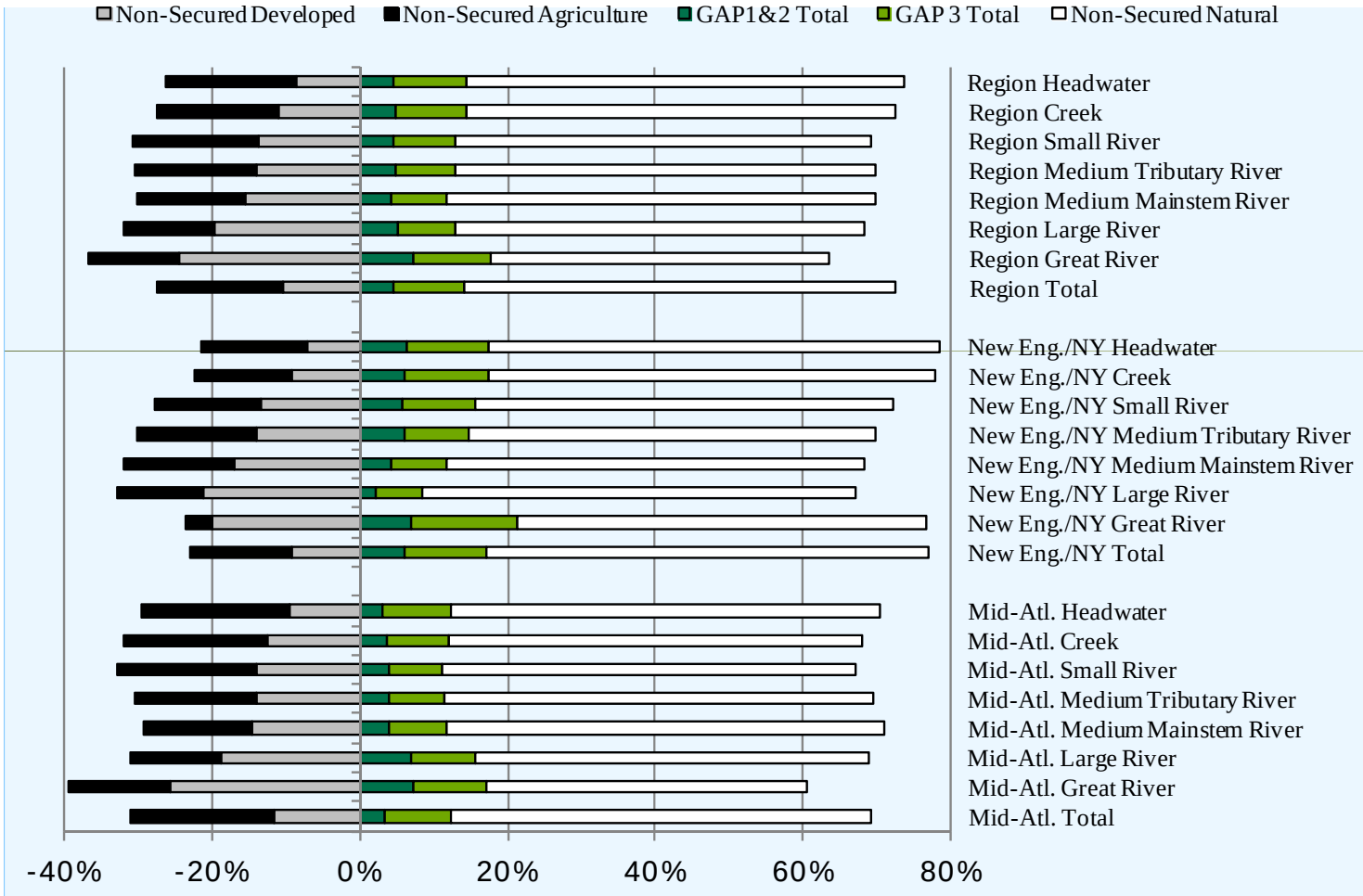
In a small HUC12 watershed Index of Riparian Development, we weighted the effect of high intensity development twice as much as of agriculture:

*Impact = 0.5 * % agriculture + 0.75* % low intensity development+ 1.0* % high intensity development.*



Percent conversion to agriculture or development compared with the current securement status of riparian area

Area to the left of the "0" axis indicates acreage of non secured land converted to development or agriculture, to the right is remaining natural area and secured land.



Conversion always exceeding securement for all sizes of streams and rivers, and ranging from 1.8 times higher in headwater streams, to 2.6 times higher in medium mainstem rivers.

Conversion exceeds securement 2:1

27% is converted to development or agriculture and 14% is secured.

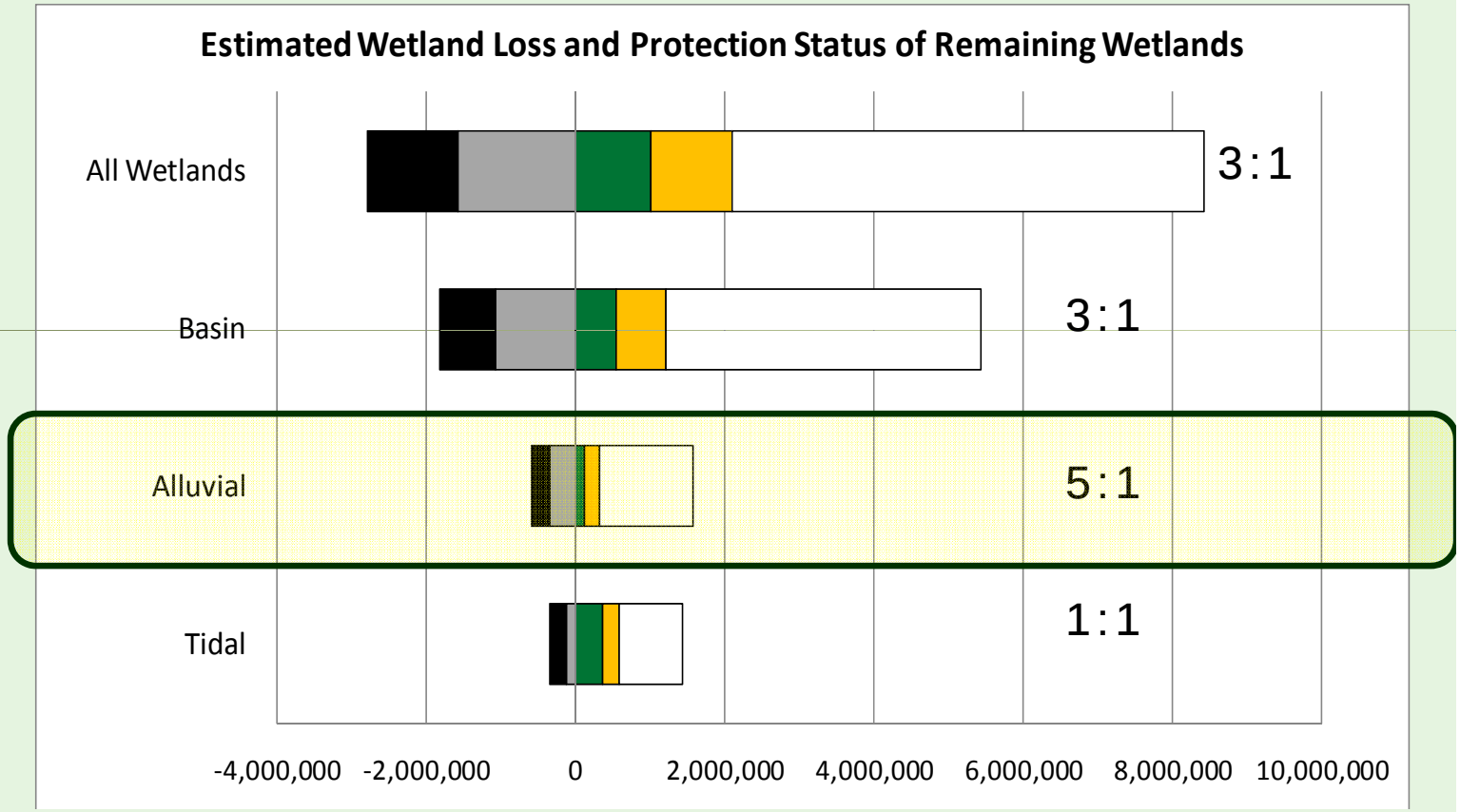
Subregion Results:

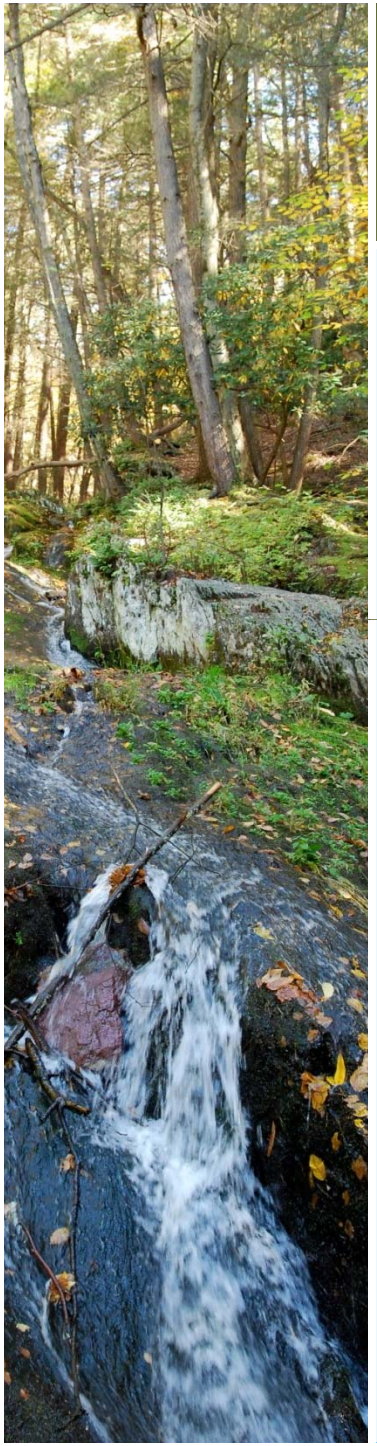
Midatlantic 2.5:1

New England/NY 1.3: 1

Wetland Conversion vs. Securement

Floodplains are most converted and least secured wetland type





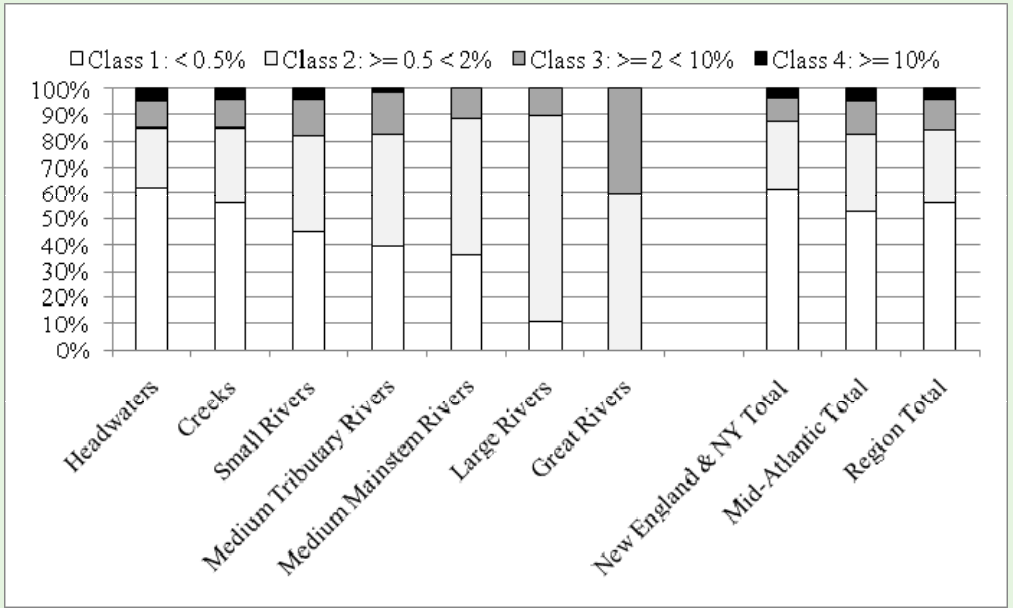
Impervious Surfaces

Region had 15% of stream and river miles in moderately to highly impacted class; Midatlantic had 17%; New England/NY had 13%

The percent of undisturbed stream miles decreased with increasing stream size

We measured Cumulative Upstream Impervious Surfaces from the NLCD and used 4 impact categories guided by the thresholds found in King and Baker (2010).

- Class 1: Undisturbed: 0 < 0.5 percent impervious.
- Class 2: Low impacts: 0.5-2 percent impervious.
- Class 3: Moderately impacted: >=2-10 percent impervious.
- Class 4: Highly impacted: >=10 percent impervious.



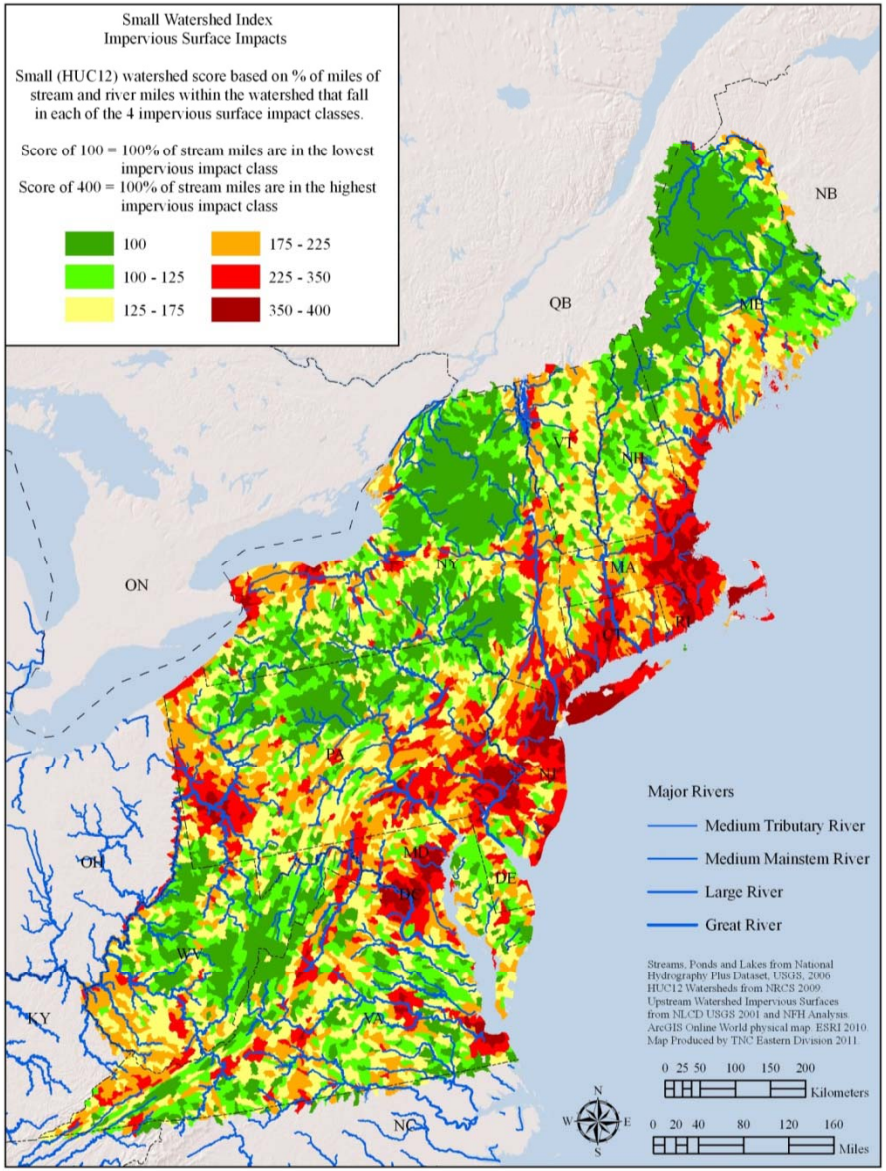
Upstream Impervious Surface Impact for each HUC12 Watershed

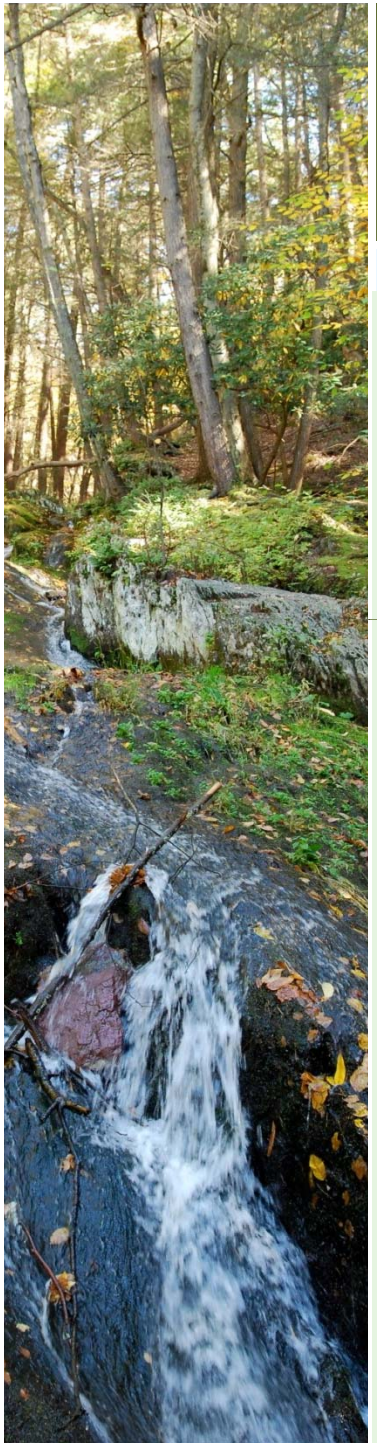
Watershed Results showed concentrations of highly impacted watersheds near the coast and within the urban and suburban fringe of existing cities.

For each small watershed, we calculated the miles of streams and rivers in each impact category and then summed them using the following weighting scheme:

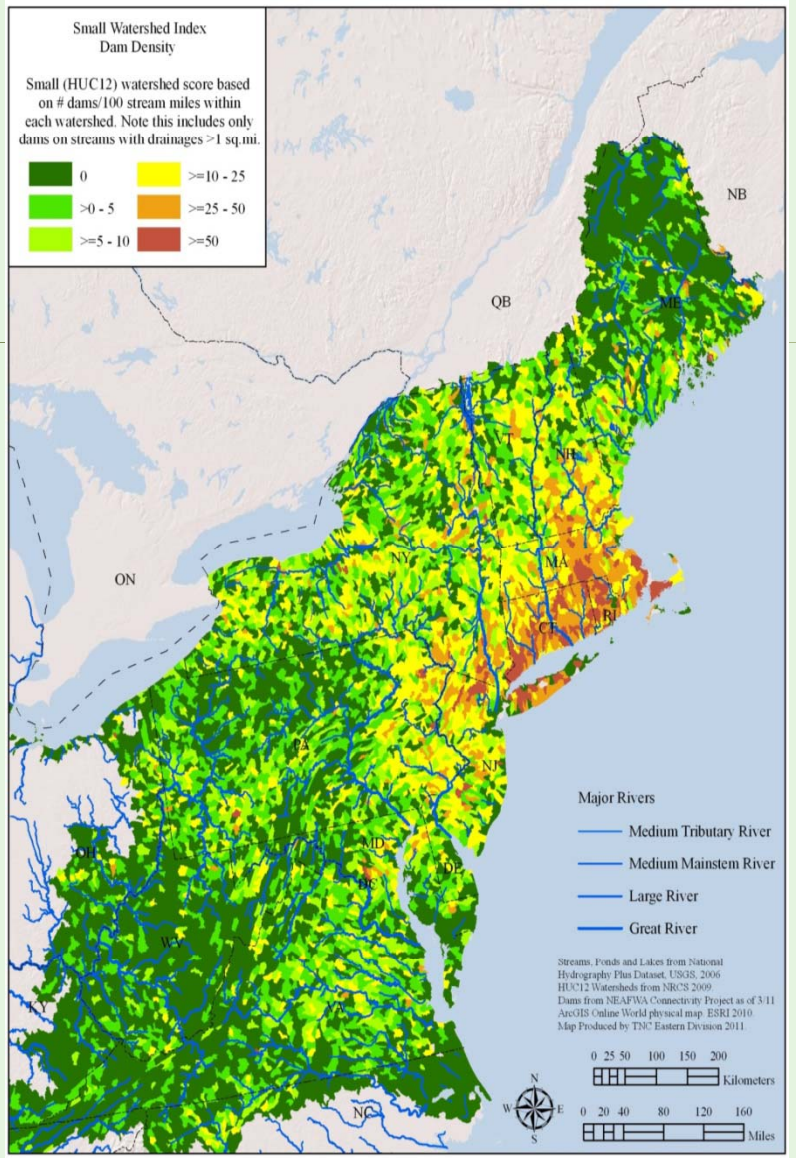
Impact score = 1* (%Class 1) + 2* (%Class 2) + 3* (% Class 3) + 4* (%Class 4).

Watershed scores ranged from 400 for a watershed where all stream and river miles were in the high impact class to a low of 100 where all streams and river miles were in the undisturbed class





Rivers: Fragmentation

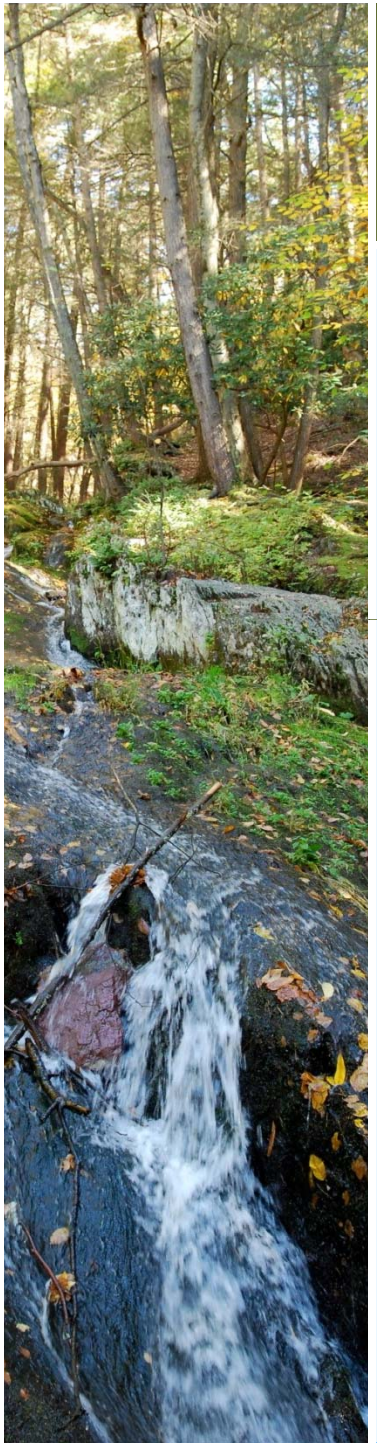


Dams: 14,034

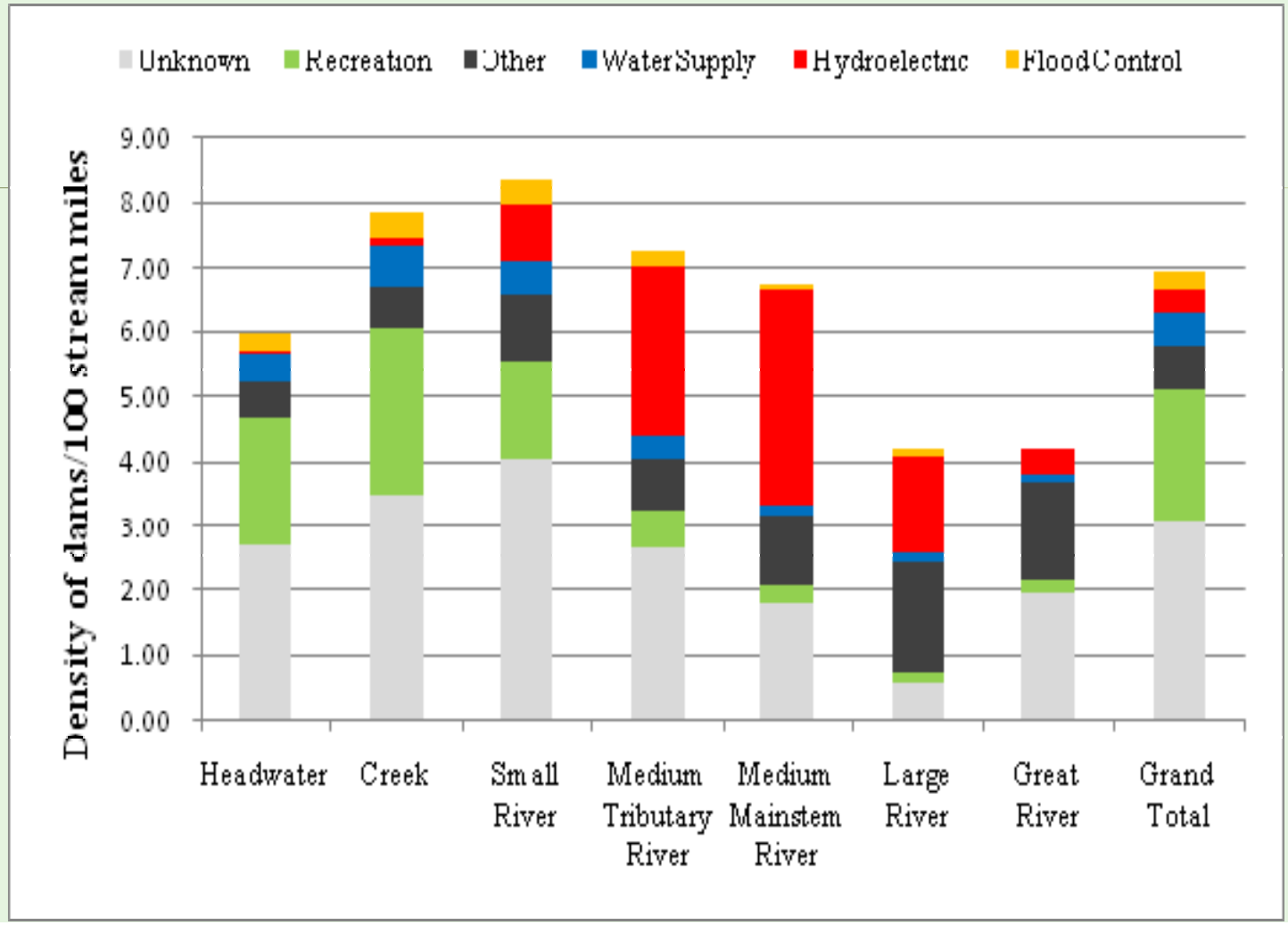
Road Crossings on headwaters: 102,580

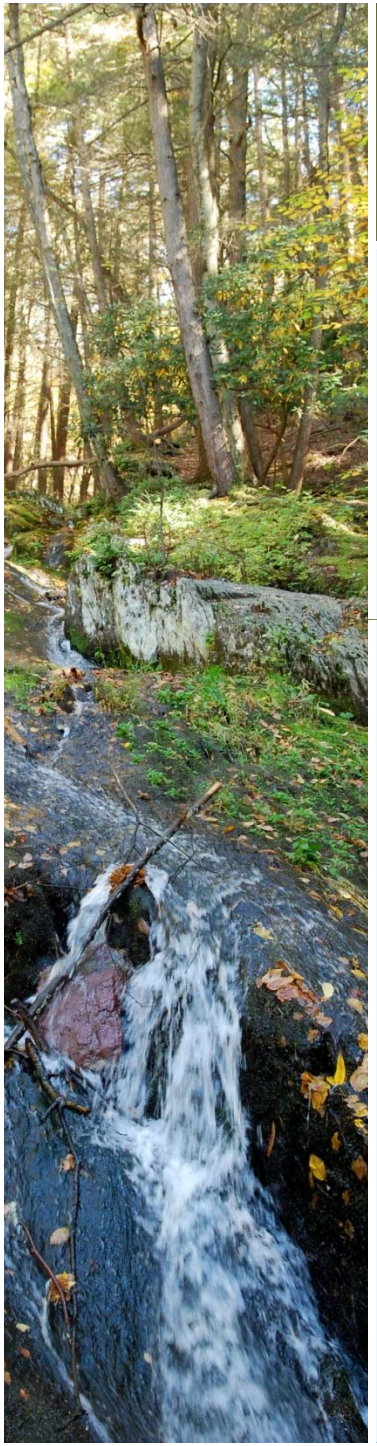
Average Dam Density = 7 dams per 100 miles of stream

Average Road Crossing Density = 106 road crossings per 100 miles of stream

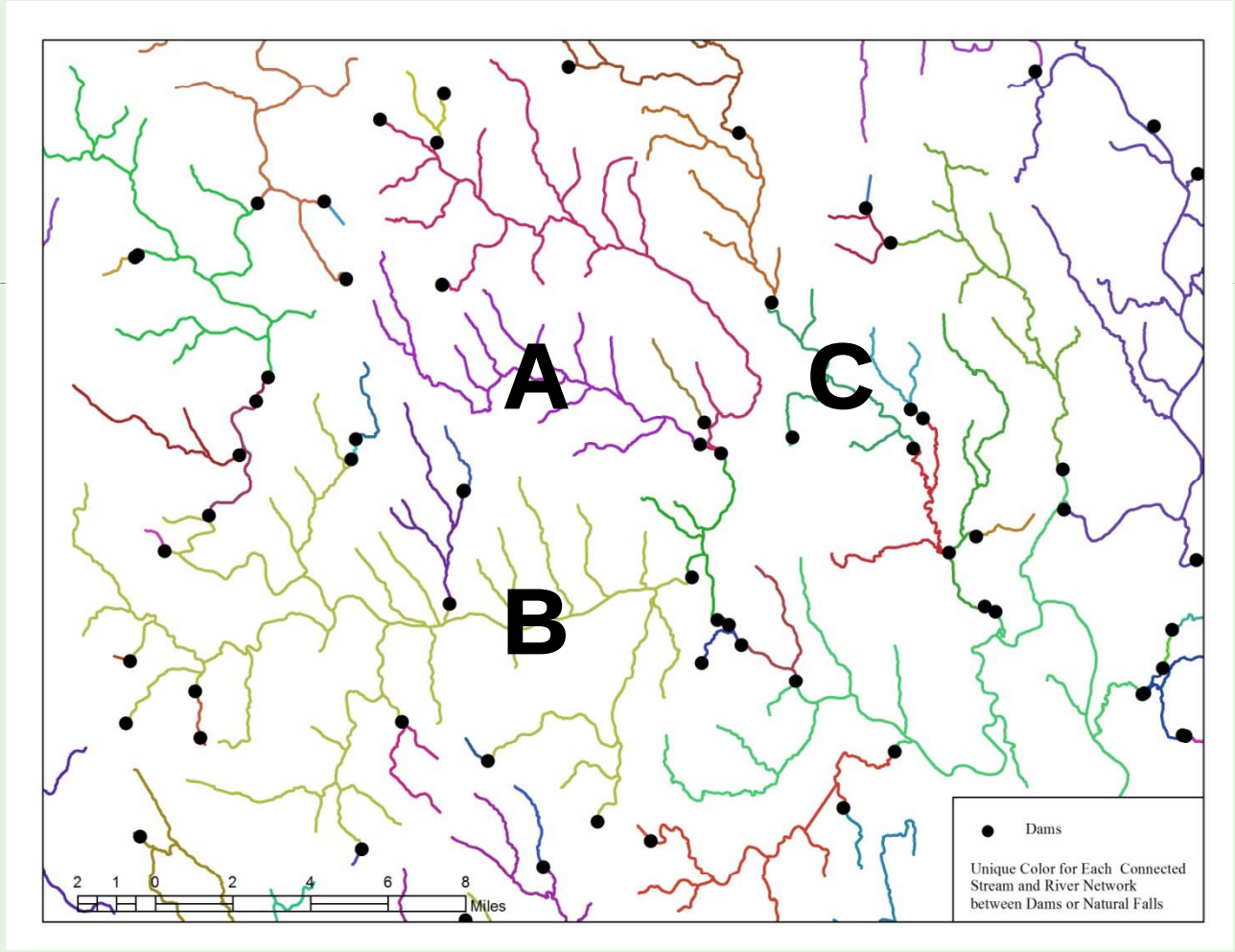


Density of dams by primary purpose and river size class





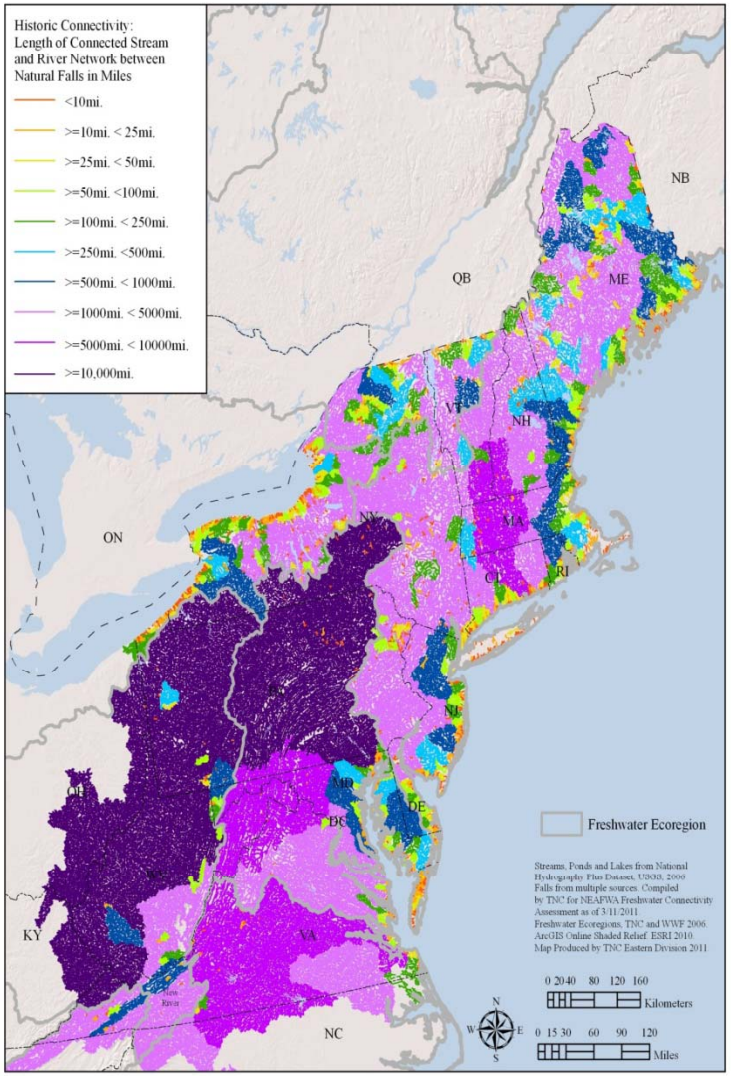
Connected Networks: set of streams that are bounded by fragmenting features (dams, waterfalls) and/or the topmost extend of headwater streams.



A= medium sized, B = large size, C = small size

Connected Networks

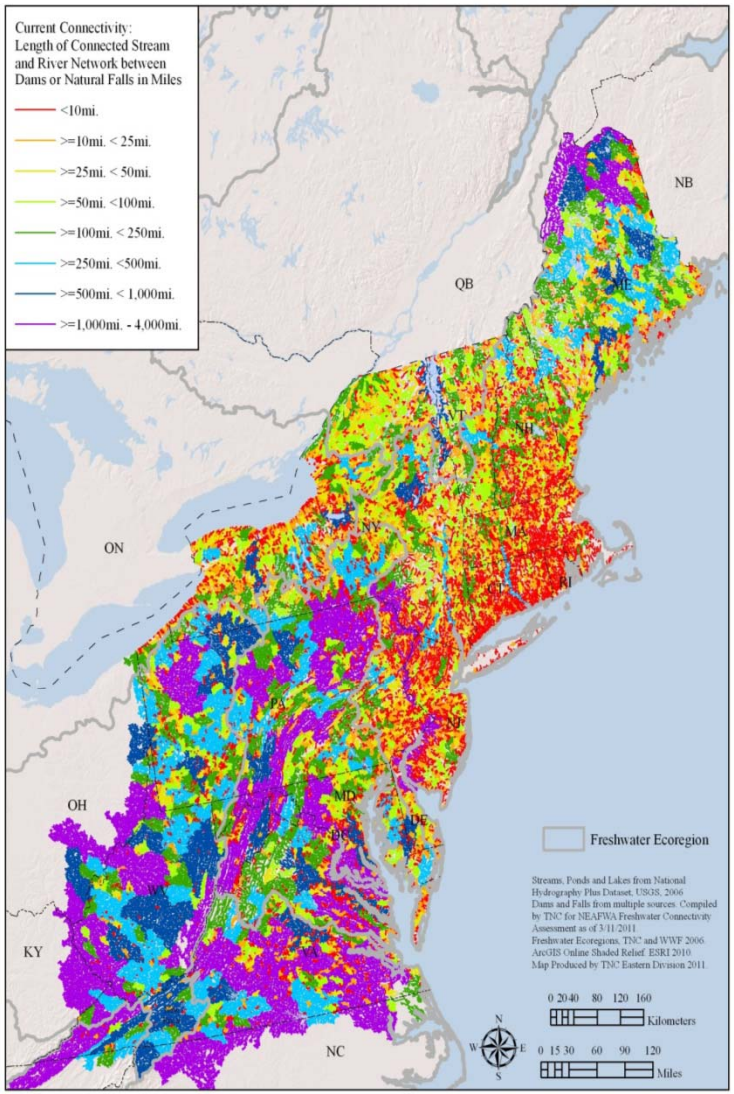
Original State: falls only



Original = 41% in networks over 5,000 miles long
Current = 0 %

Original = 3% in networks 1-25 miles long
Current = 23 %

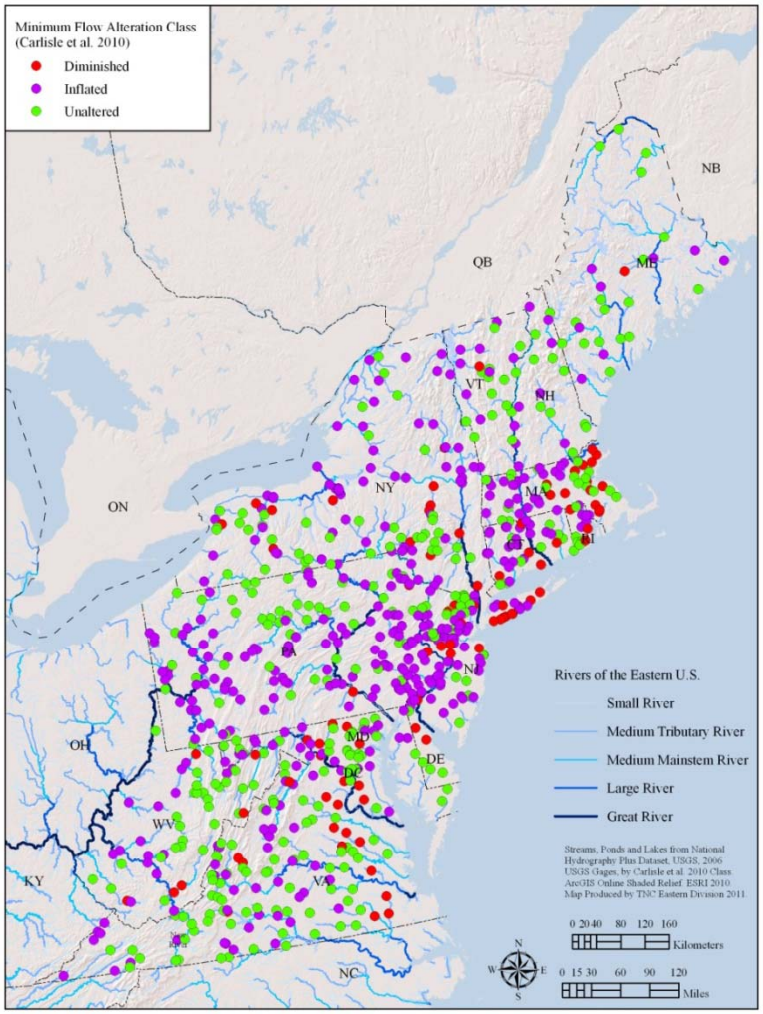
Current State: falls and dams



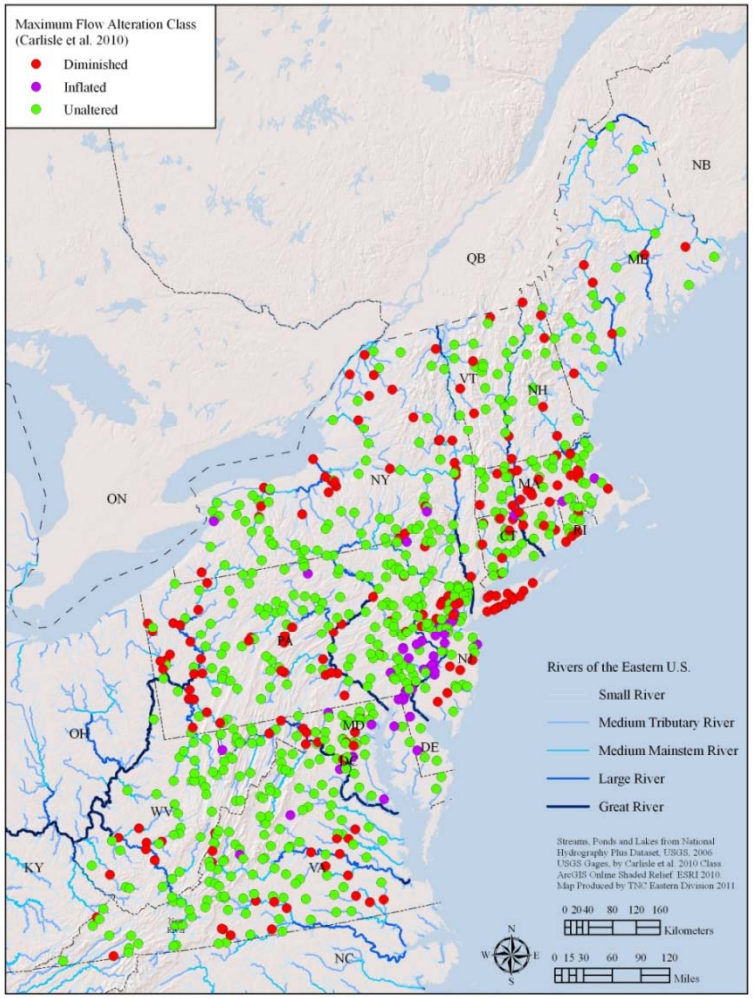
Changes in Flow Magnitude

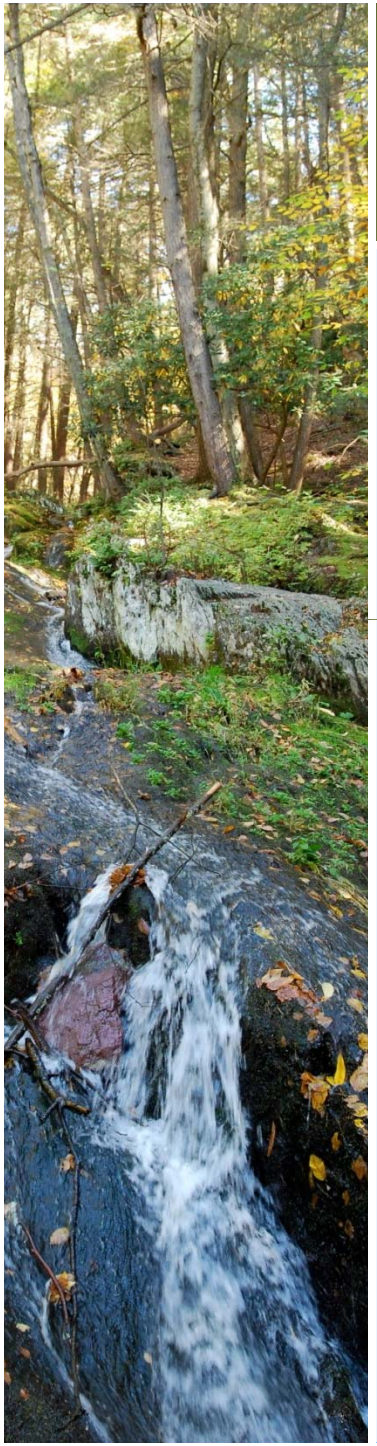
Gage Data provided by Carlisle, D. M., Wolock, D.M., and Meador, M.R. 2010. Alteration of stream flow magnitudes and potential ecological consequences: a multiregional assessment. Frontiers in Ecology and the Environment. Doi: 10.1890/100053

Maximum Flows:
Inflated or Diminished



Minimum Flows:
Inflated or Diminished



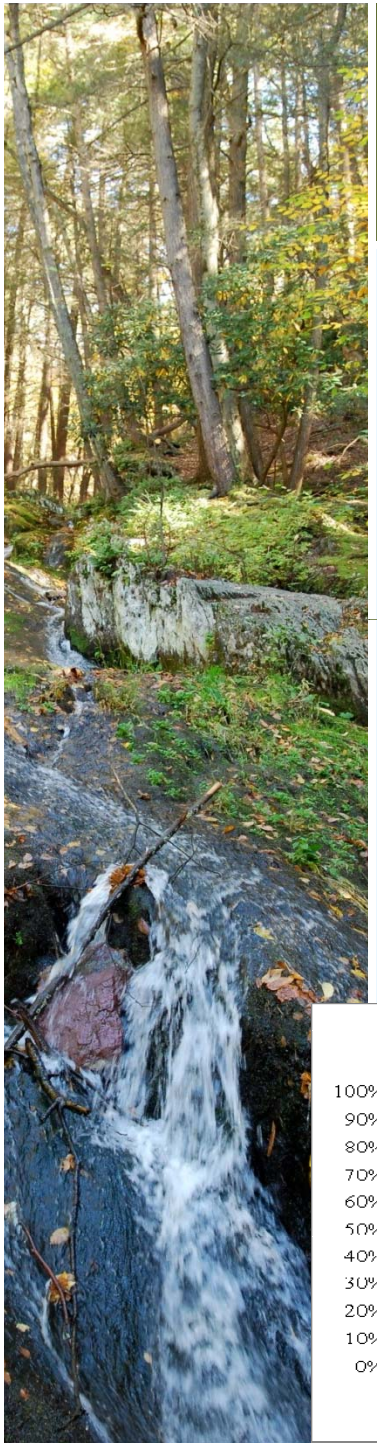


Combinations of flow alteration most likely to results in impaired fish communities were highlighted

- **61 percent of the region's sampled streams and rivers had flow regimes that are altered enough to result in biotic impacts.**

- One-third of all sampled headwater streams have diminished minimum flow (they dry up), that translates into a reduction of habitat.

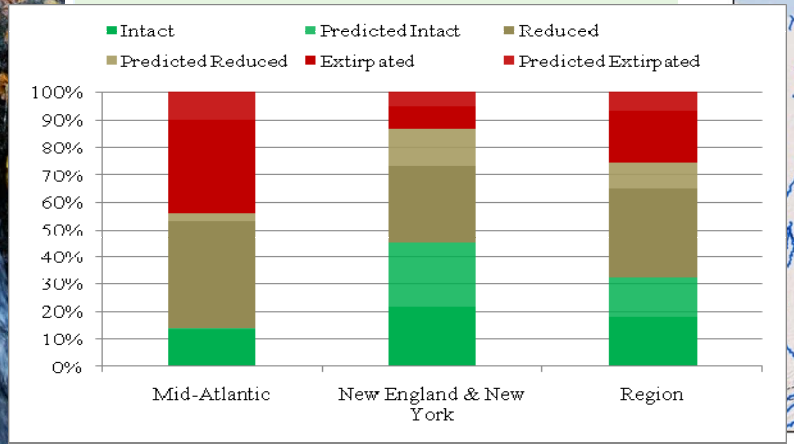
- Seventy percent of the large rivers sampled have reduced maximum flow (smaller floods) that decreases the amount of nutrient laden water delivered to their floodplains.

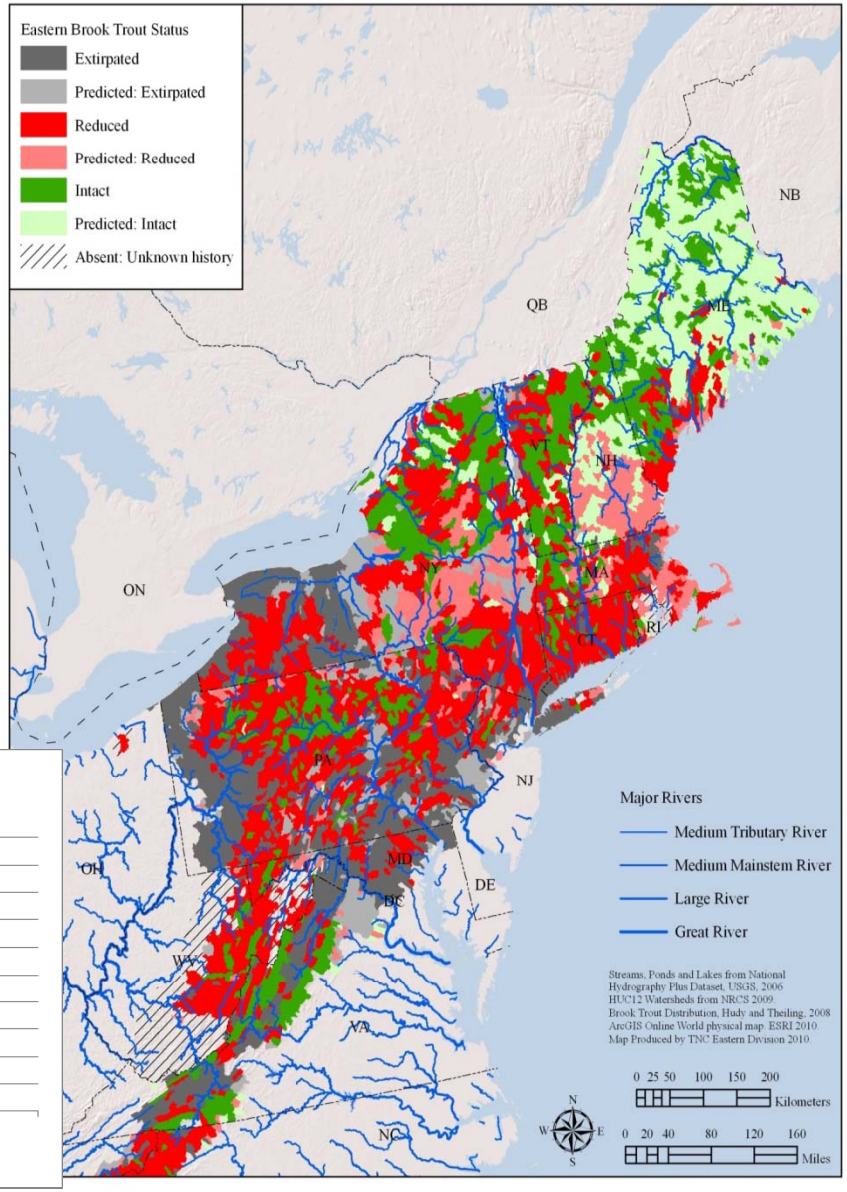


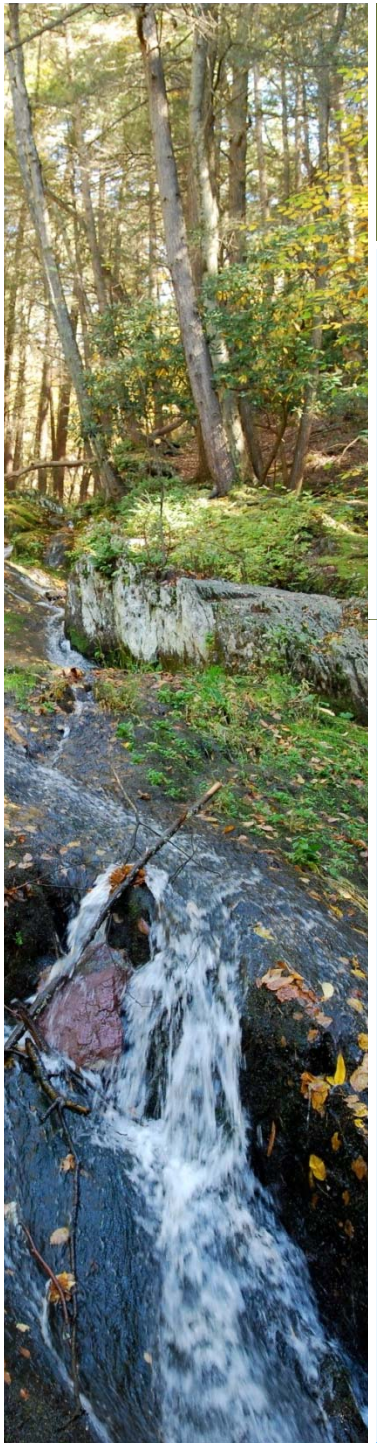
Brook Trout Status

Brook trout are thought to be extirpated in 26 percent of their historic regional range and reduced in 42 percent of their historic range.

There have been higher levels of extirpation in the Mid-Atlantic (44 percent) than in New England and New York (14%).



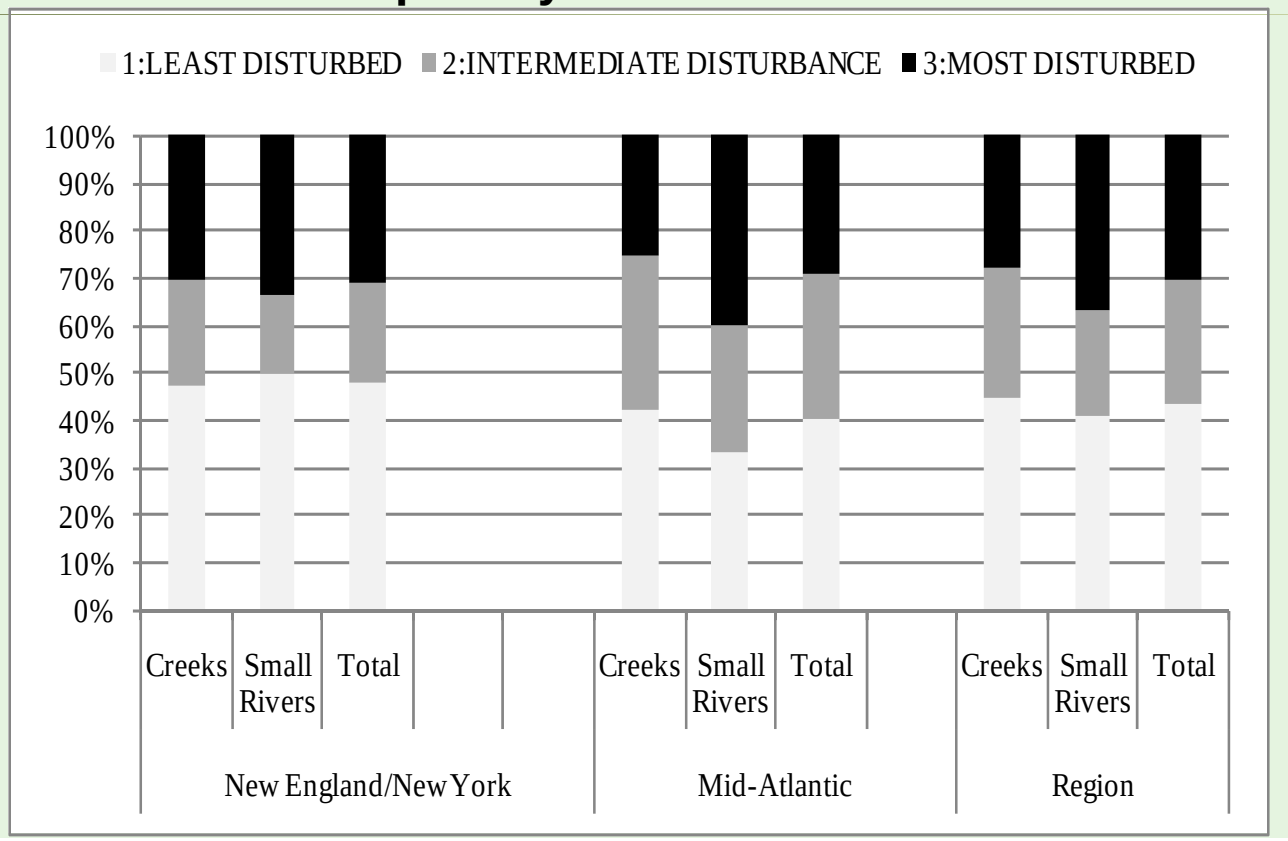


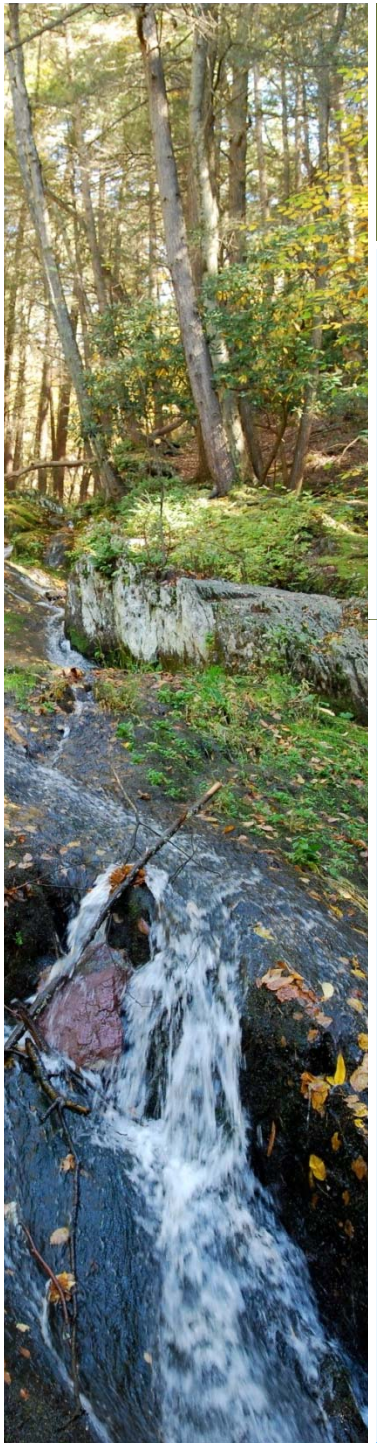


IBI: EPA Wadeable Stream Assessment (EPA 2006)

Results indicated 44 percent in the undisturbed class, 26 percent in the intermediate disturbance class and 30 percent in the most disturbed class. Mid-Atlantic wadeable streams appeared slightly less intact than those of New England/NY.

Percentage of the region's EPA wadeable stream samples by benthic IBI class.



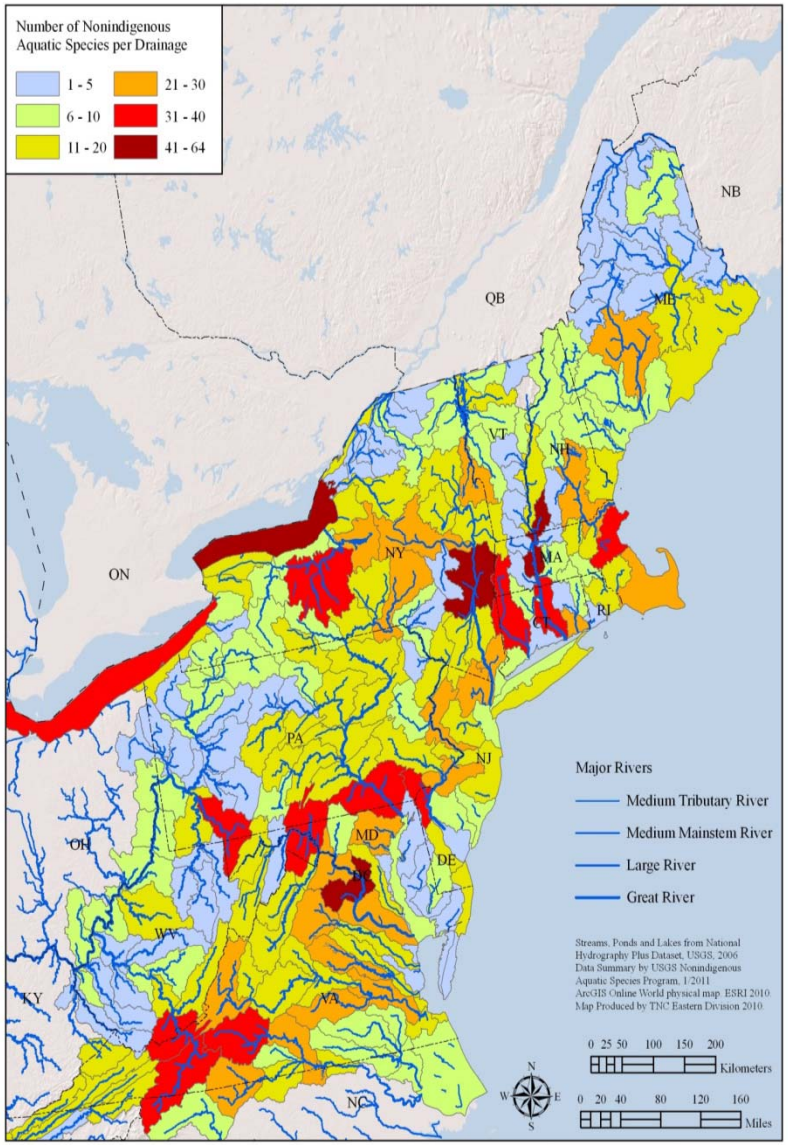


Non-Indigenous Aquatic Species

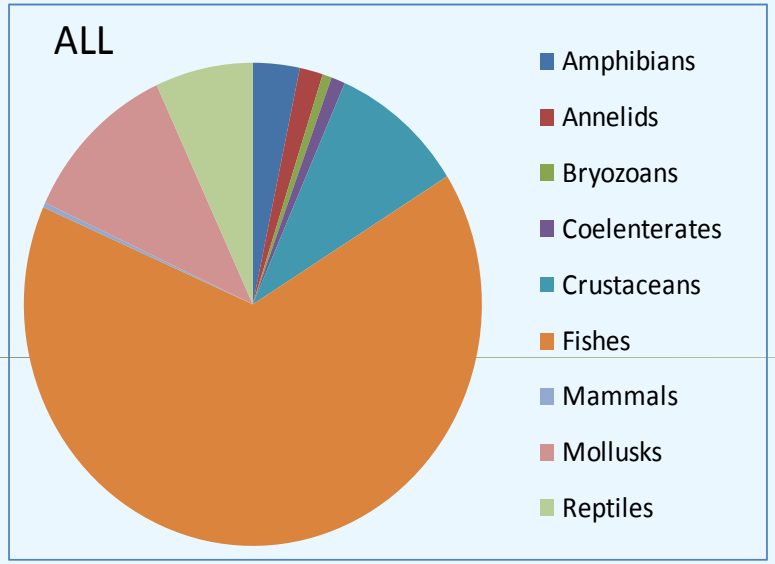
USGS Non-indigenous Aquatic Species program (http://nas.er.usgs.gov/queries/)

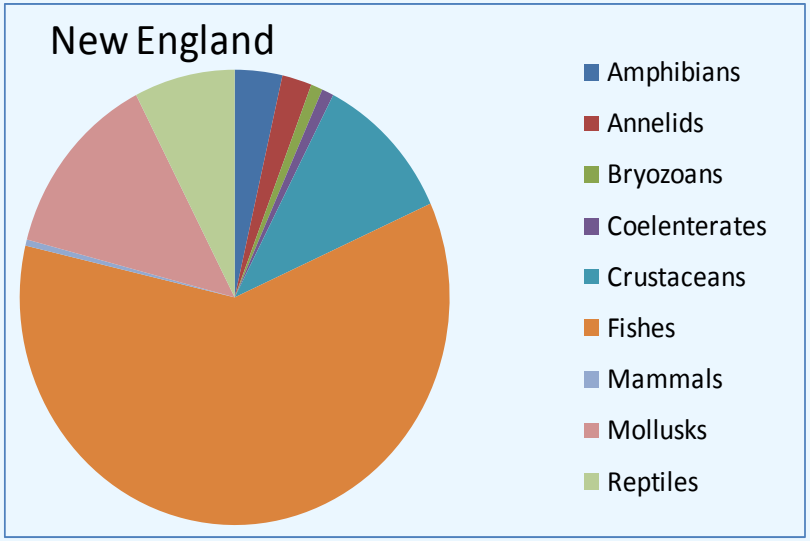
Over 300 non-indigenous aquatic species occur in the region. Summarized by HUC8 watershed the maximum number in a given watershed is 64.

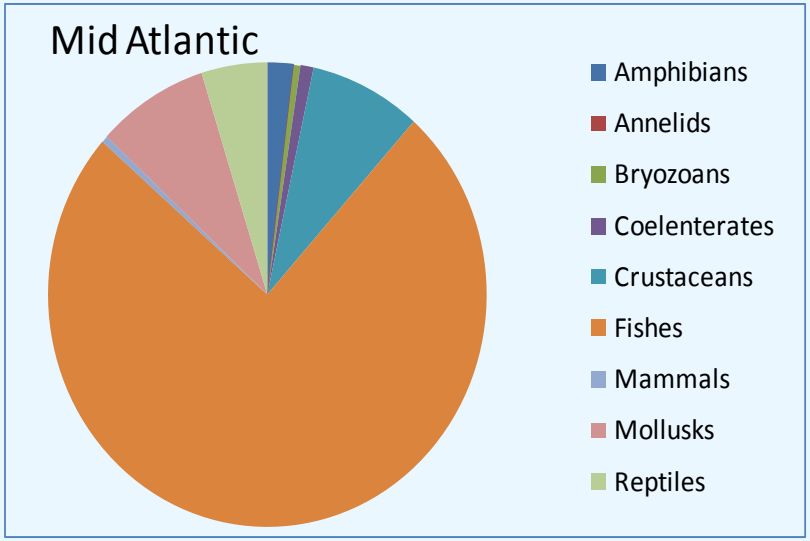
Non-indigenous aquatic species (NAS) are individuals or populations of a species that enters an aquatic ecosystem outside of its historic or native range. They may be vertebrates, invertebrates, plants, or diseases.



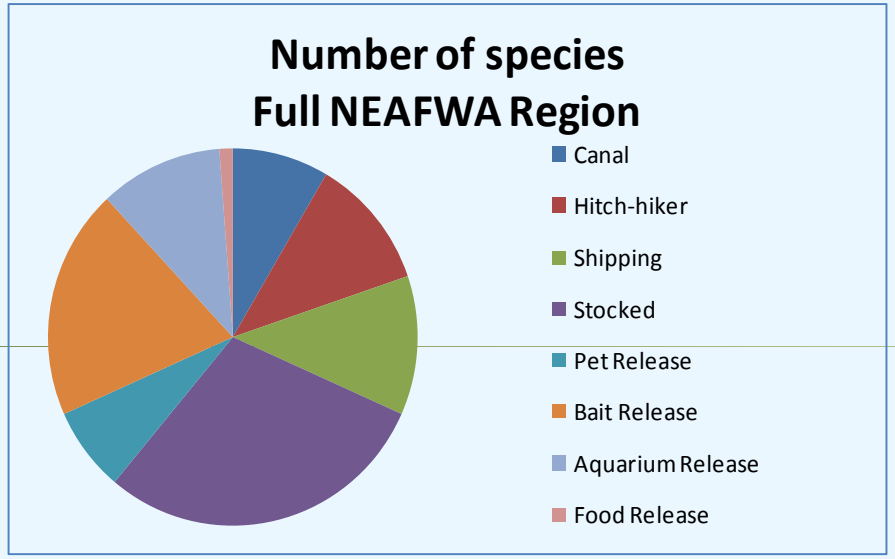
Non-indigenous Aquatic Species
Major taxonomic group

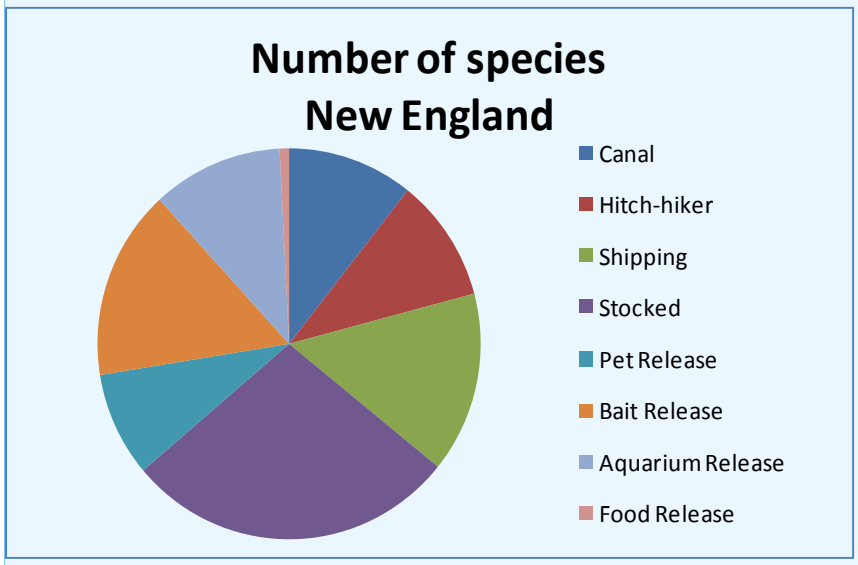


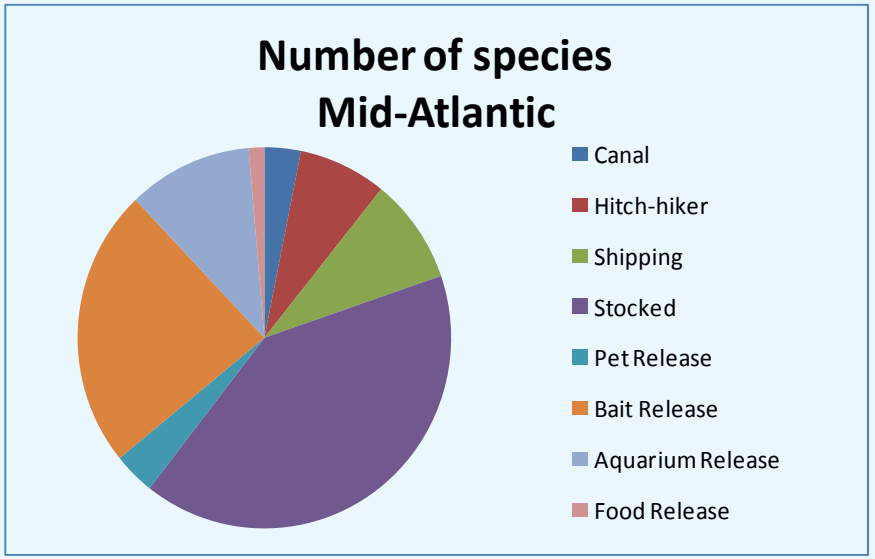


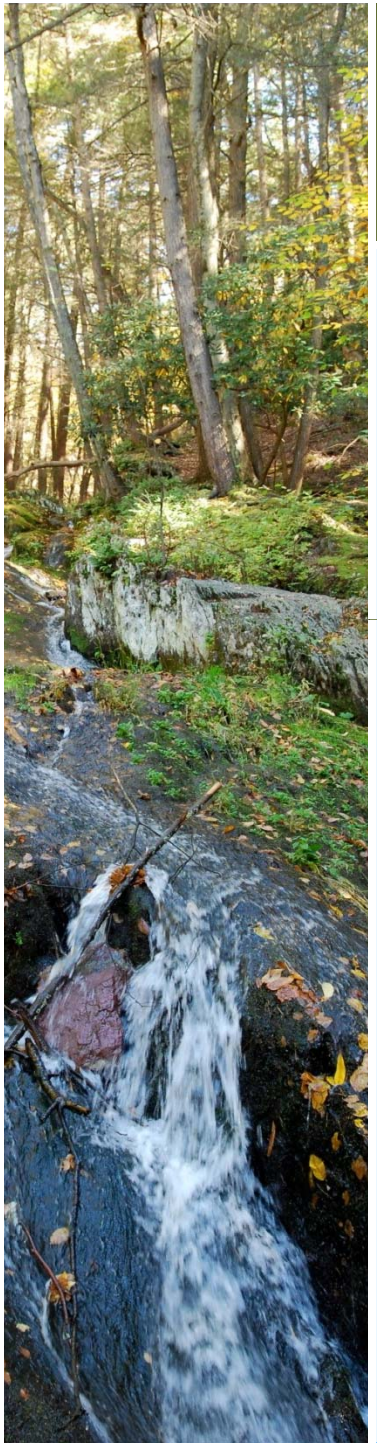


Non-indigenous Aquatic Species
Major Pathway







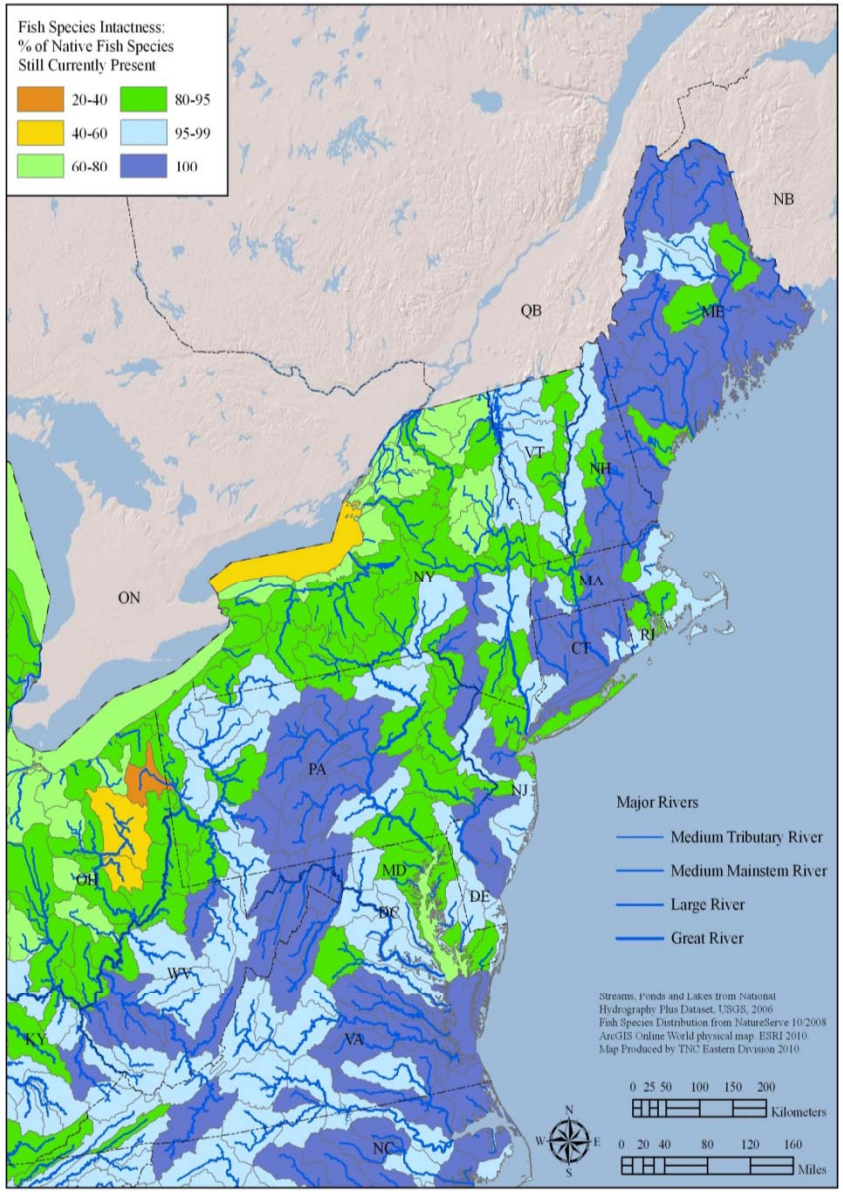


Fish Faunal Intactness: HUC8

Results for this region indicated that the majority of the northeast watersheds still had 95-100% of their native fish species present.

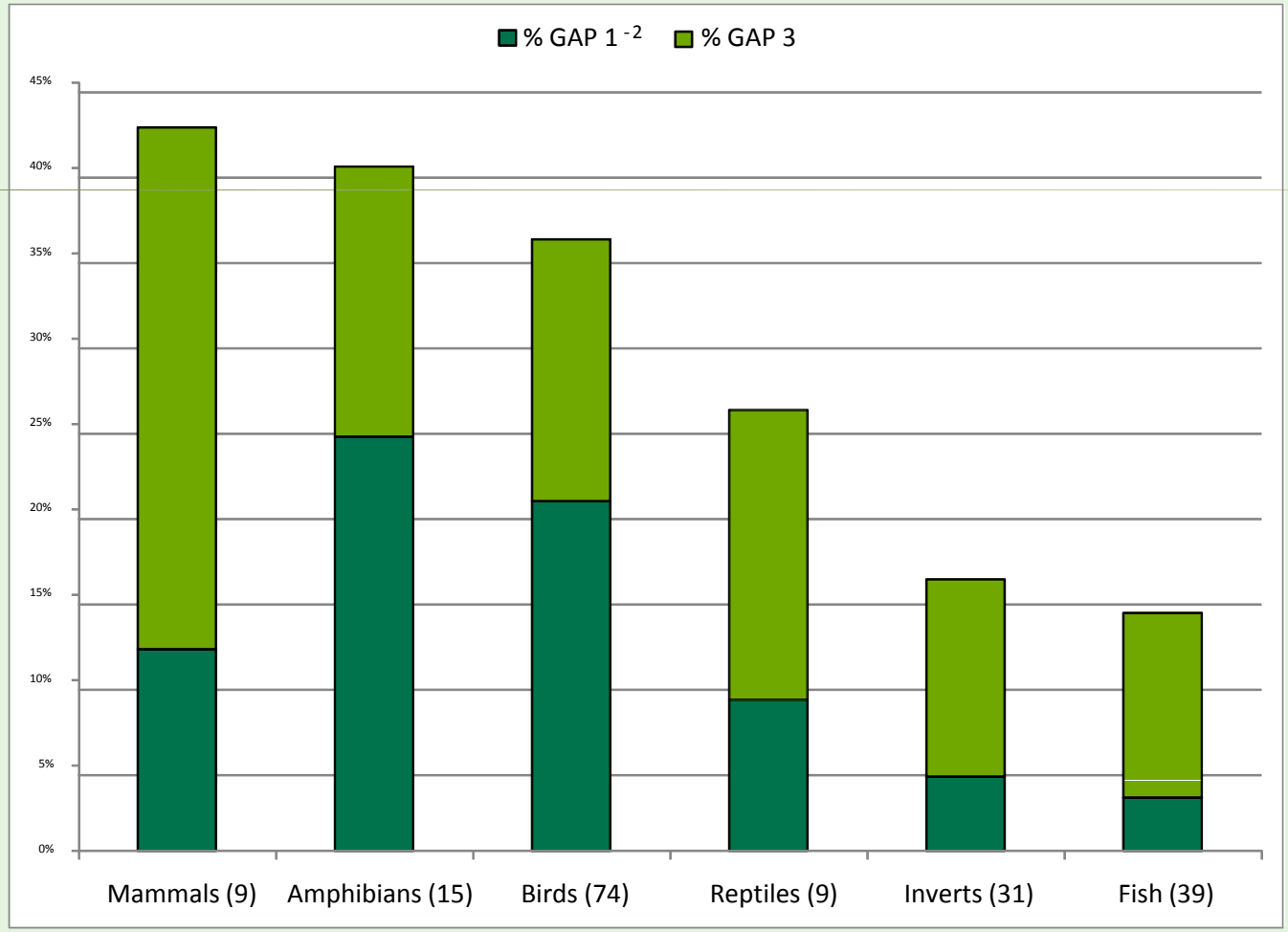
The EPA indicator of Fish Faunal Intactness compares the current fish faunal composition of those watersheds with their historical composition.

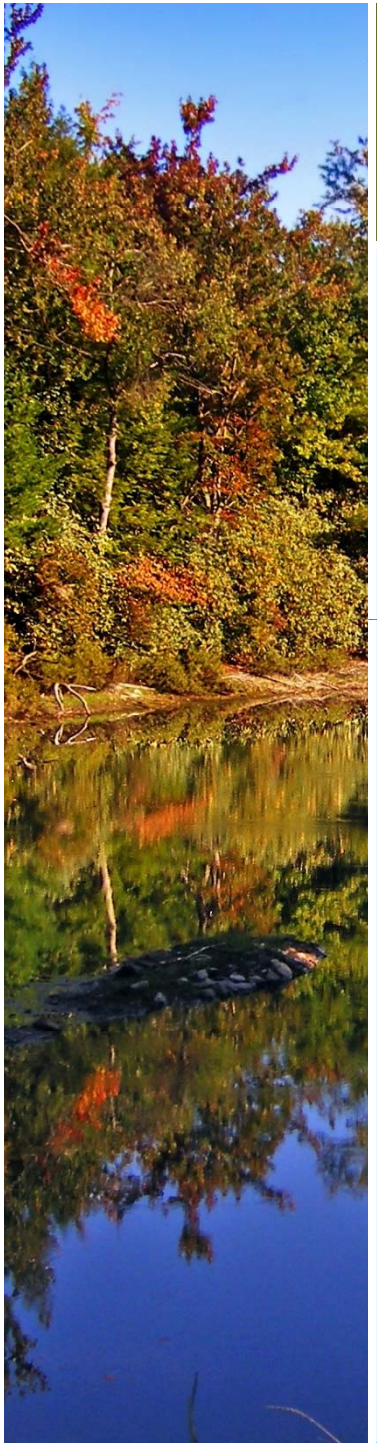
It is important to note that this indicator does not reflect declines in the populations of native species; it can only highlight where there has been a **total extirpation** of a species from a watershed.



Secured Land For Species of Greatest Conservation Concern

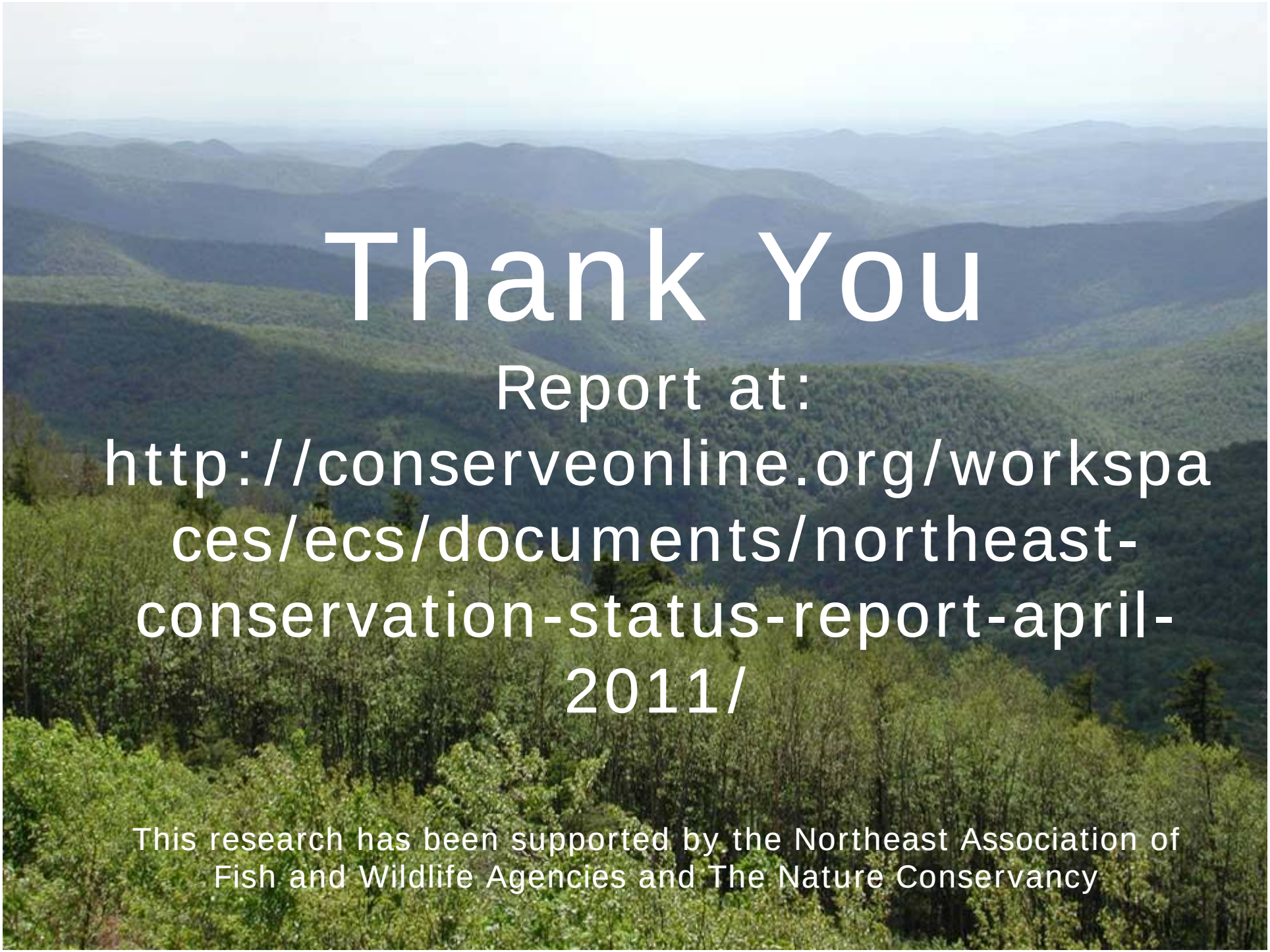
Percentage of all species occurrences within each taxonomic group that are located secured land in the Northeast and Mid-Atlantic states. The number of individual species per group is given in parenthesis.





Intended Uses of the Report

- Standardized baseline information on condition and conservation status
- Measures that are easy to interpret, clear, transparent
- Focus conservation and protection efforts
- Alllow states and regions to measure progress into the future
- Climate change resilience


Thank You
Report at:
http://conserveonline.org/workspaces/ecs/documents/northeast-conservation-status-report-april-2011/
This research has been supported by the Northeast Association of Fish and Wildlife Agencies and The Nature Conservancy