

# Forests, Water and People

## Drinking water supply and forest lands in New York

USDA Forest Service  
Northeastern Area  
State and Private Forestry



### Project Description

In the Northeast and Midwest United States, forests are critically important to the supply of clean drinking water. Protecting and managing forests in source watersheds is an essential part of future strategies for providing clean safe drinking water that citizens can afford. The Forests, Water and People analysis identified private forests that are most important for drinking water supply and most in need of protection from development pressure. This fact sheet gives the results of the analysis for the State of New York. For more detailed description of methods, and results for the Northeast and Midwest United States, see the [full report](#).

### The Process

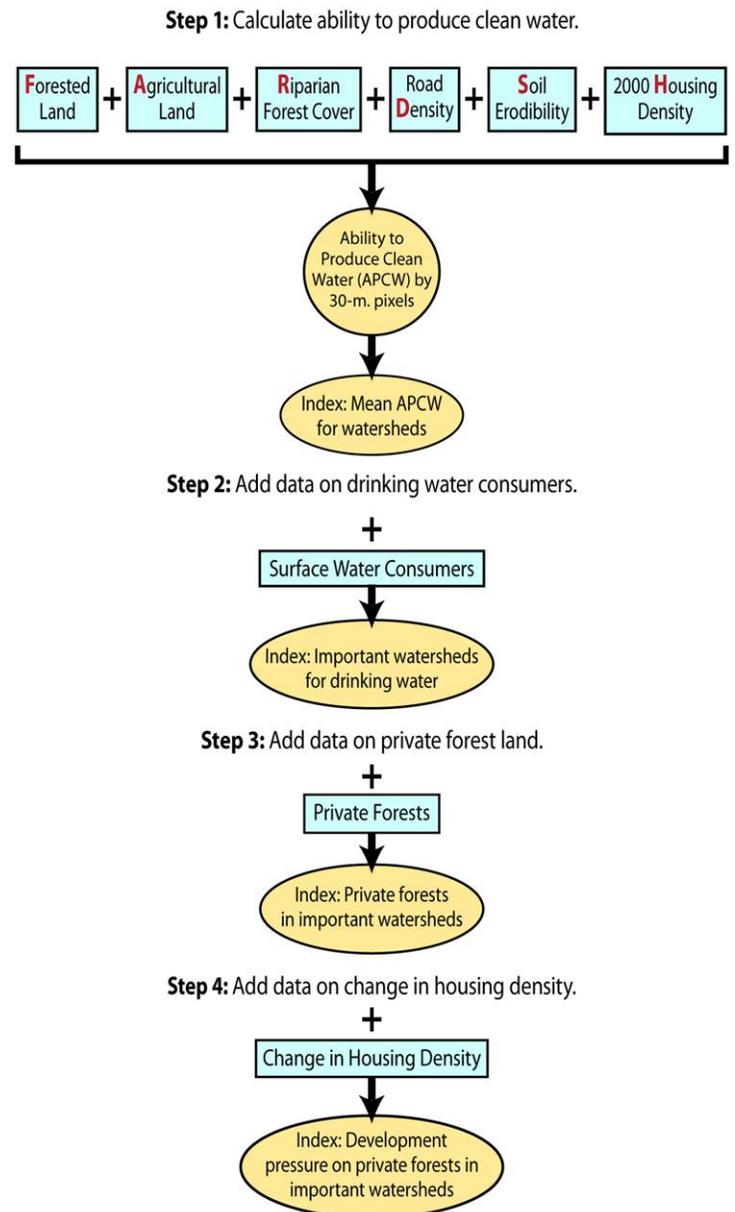
Through a 4 step GIS-based overlay analysis, four indices were developed for each watershed (see Figure 1).



Photo by Michael Land.

*"Water, in all its uses and permutations, is by far the most valuable commodity that comes from the forest land that we manage, assist others to manage, and/or regulate."*  
Policy Statement, National Association of State Foresters

**Figure 1.** Nine layers of GIS data (boxes) were combined in stepwise fashion, to produce four indices (ovals) of watershed importance for drinking water supplies and the need for private forest management to protect those supplies.



## New York Results

### Highlights

- With its large forested areas, population centers, and largely privately owned New York City watershed lands east and west of the Hudson River, New York ranked very well in each step of the analysis, the southern portion ranked very high in steps 2, 3 and 4.
- The highest ability to produce clean water (step 1) was in the northeastern portion of New York, in and near the Adirondacks. Five watersheds: Sacandaga; Ausable; Raquette; St. Regis; and Upper Hudson scored the highest possible score for this step.
- In the ability of watersheds to provide drinking water to the most people (step 2), the East Branch Delaware watershed scored the highest; all of southern New York ranked well in this step.
- In the ability of watersheds to provide drinking water on private lands (step 3), most of New York scored high because the State has 81 percent privately owned forest land. The East Branch Delaware watershed scored highest in the entire study area in this step; the Upper Delaware watershed also scored very high.
- Many of the same areas of southern New York scored well in step 4, which ranked watersheds based on their development pressure and land ownership status (private lands ranked higher because they are subject to conversion). The two highest scoring watersheds are the Middle Delaware-Mongaup-Brodhead and Lower Hudson watersheds. These two watersheds averaged in the top one percent of the study area's watersheds.

**Table 1.** Watershed results for New York

Watershed Name	Hydrologic Unit Code	Mean APCW for watersheds	Surface drinking water consumers	% private forest in watershed	% watershed with housing density increase	Index: Development pressure on private forests important for drinking water supply	
						Score (Step 4)	Rank (Step 4)
Middle Delaware-Mongaup-Brodhead	02040104	9 of 10	708,183	69 %	11 %	36 of 40	4 of 540
Lower Hudson	02030101	8 of 10	1,079,846	61 %	10 %	35 of 40	8 of 540
Winooski	02010003	8 of 10	142,074	65 %	13 %	34 of 40	10 of 540
Rondout	02020007	7 of 10	623,891	62 %	11 %	34 of 40	10 of 540
Middle Hudson	02020006	8 of 10	2,769,134	64 %	7 %	34 of 40	10 of 540
Hudson-Wappinger	02020008	8 of 10	171,022	66 %	9 %	33 of 40	19 of 540
Housatonic	01100005	8 of 10	479,036	65 %	8 %	33 of 40	19 of 540
East Branch Delaware	02040102	9 of 10	1,738,133	75 %	1 %	32 of 40	34 of 540
Upper Delaware	02040101	8 of 10	1,265,024	78 %	2 %	32 of 40	34 of 540
Hackensack-Passaic	02030103	8 of 10	1,552,792	34 %	10 %	32 of 40	34 of 540
Schoharie	02020005	8 of 10	395,613	66 %	4 %	32 of 40	34 of 540
Saugatuck	01100006	7 of 10	424,719	54 %	7 %	32 of 40	34 of 540
Lamoille	02010005	8 of 10	22,057	64 %	17 %	31 of 40	50 of 540
Sandy Hook-Staten Island	02030104	6 of 10	325,325	24 %	13 %	29 of 40	76 of 540
Bronx	02030102	7 of 10	107,574	25 %	11 %	29 of 40	76 of 540
Hudson-Hoosic	02020003	7 of 10	172,918	58 %	6 %	29 of 40	76 of 540
Irondequoit-Ninemile	04140101	5 of 10	345,935	42 %	7 %	28 of 40	88 of 540
Great Chazy-Saranac	02010006	9 of 10	29,576	53 %	2 %	27 of 40	109 of 540
Lake George	02010001	7 of 10	51,491	64 %	3 %	27 of 40	109 of 540
Oneida	04140202	7 of 10	51,800	60 %	3 %	27 of 40	109 of 540
Chemung	02050105	7 of 10	74,950	63 %	3 %	27 of 40	109 of 540
Seneca	04140201	5 of 10	568,685	40 %	5 %	26 of 40	126 of 540
Otter	02010002	7 of 10	21,901	47 %	9 %	26 of 40	126 of 540
Sacandaga	02020002	10 of 10	38,691	41 %	2 %	26 of 40	126 of 540
Mohawk	02020004	7 of 10	282,251	47 %	3 %	26 of 40	126 of 540
Ausable	02010004	10 of 10	14,242	59 %	2 %	26 of 40	126 of 540
Upper Susquehanna	02050101	7 of 10	77,412	68 %	2 %	25 of 40	148 of 540
Grass	04150304	9 of 10	6,379	77 %	0 %	24 of 40	169 of 540
Raquette	04150305	10 of 10	17,025	59 %	0 %	24 of 40	169 of 540
English-Salmon	04150307	8 of 10	13,000	69 %	2 %	24 of 40	169 of 540
Chautauqua-Conneaut	04120101	6 of 10	21,357	51 %	5 %	24 of 40	169 of 540
Niagara	04120104	3 of 10	720,965	30 %	4 %	23 of 40	199 of 540
Lower Genesee	04130003	4 of 10	127,473	31 %	5 %	23 of 40	199 of 540

Watershed Name	Hydrologic Unit Code	Mean APCW for watersheds	Surface drinking water consumers	% private forest in watershed	% watershed with housing density increase	Index: Development pressure on private forests important for drinking water supply	
						Score (Step 4)	Rank (Step 4)
Upper Allegheny	05010001	8 of 10	38,425	67 %	1 %	23 of 40	199 of 540
Salmon-Sandy	04140102	8 of 10	520	63 %	3 %	23 of 40	199 of 540
Black	04150101	9 of 10	36,296	47 %	1 %	23 of 40	199 of 540
Indian	04150303	8 of 10	4,500	67 %	1 %	23 of 40	199 of 540
French	05010004	7 of 10	9,023	55 %	3 %	22 of 40	229 of 540
St. Regis	04150306	10 of 10	0	76 %	0 %	22 of 40	229 of 540
Upper Hudson	02020001	10 of 10	100	52 %	1 %	22 of 40	229 of 540
Oswego	04140203	7 of 10	0	59 %	6 %	22 of 40	229 of 540
Oswegatchie	04150302	9 of 10	6,277	56 %	1 %	22 of 40	229 of 540
Tioga	02050104	6 of 10	18,168	59 %	2 %	21 of 40	264 of 540
Owego-Wappasening	02050103	7 of 10	0	65 %	3 %	21 of 40	264 of 540
Upper Genesee	04130002	6 of 10	20,098	54 %	1 %	21 of 40	264 of 540
Chenango	02050102	7 of 10	4,000	60 %	2 %	21 of 40	264 of 540
Cattaraugus	04120102	6 of 10	8,085	55 %	2 %	21 of 40	264 of 540
Upper St. Lawrence	04150301	6 of 10	0	45 %	5 %	20 of 40	289 of 540
Conewango	05010002	6 of 10	10,299	58 %	1 %	20 of 40	289 of 540
Southern Long Island	02030202	6 of 10	2,500	26 %	7 %	19 of 40	320 of 540
Buffalo-Eighteenmile	04120103	5 of 10	0	43 %	3 %	18 of 40	337 of 540
Northern Long Island	02030201	5 of 10	0	22 %	8 %	17 of 40	352 of 540
Chaumont-Perch	04150102	4 of 10	0	36 %	3 %	15 of 40	394 of 540
Oak Orchard-Twelvemile	04130001	2 of 10	0	22 %	6 %	13 of 40	427 of 540

### **Average or total value for all watersheds listed in Table 1**

Mean APCW for watersheds:	7.2	of 10
Important watersheds for drinking water composite score:	12.9	of 20
Private forests in important watersheds composite score:	20.6	of 30
Development pressure on private forests in important watersheds composite score:	25.5	of 40
Forested Land (acres):	26,408,037.6	
Private Forest (acres):	21,513,197.3	
Private Forest Land under Development Pressure by 2030 (acres):	1,001,710.5	
(% private forest land):	4.7%	

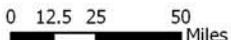
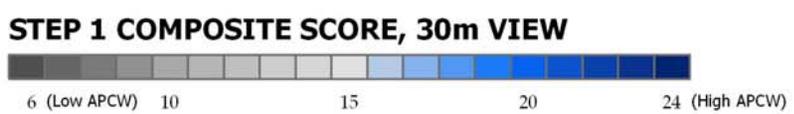
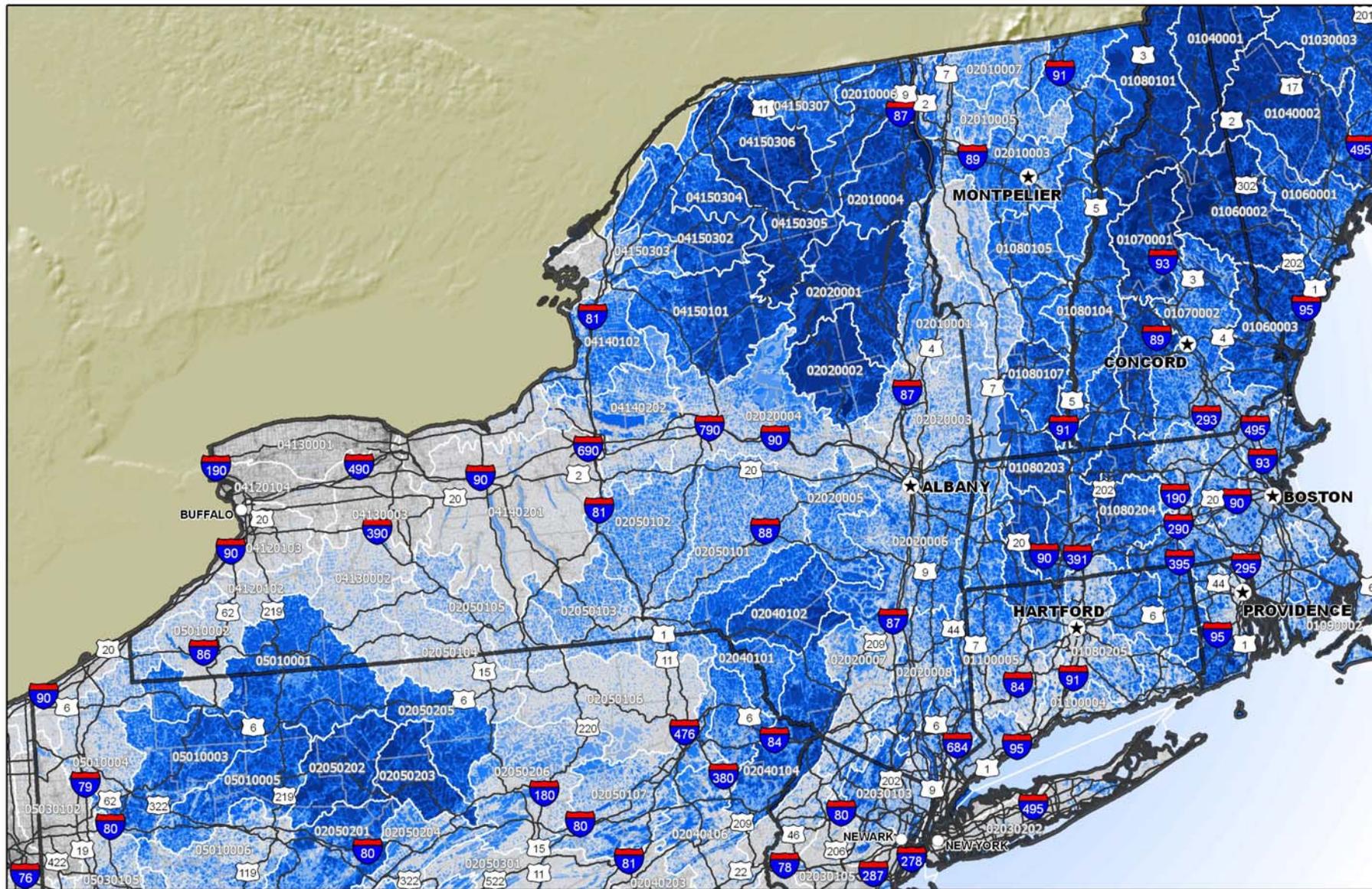
Note: If a watershed fell partially in New York, the whole watershed was considered for this project. State results reflect the total acreage for all watersheds that impact that State (this may account for a higher acreage figure than if only lands within State boundaries were considered).

### **Maps**

The following maps depict the results of each step in the Forests, Water and People analysis. Each watershed is labeled with the eight-digit HUC and the watershed composite score for the analysis step. (Note: the APCW, 30-m. pixel view does not have a watershed score)

All of the maps were produced by Rebecca Whitney Lilja, Office of Knowledge Management, Northeastern Area State and Private Forestry.

# Step 1 - Ability to Produce Clean Water, 30m View - New York

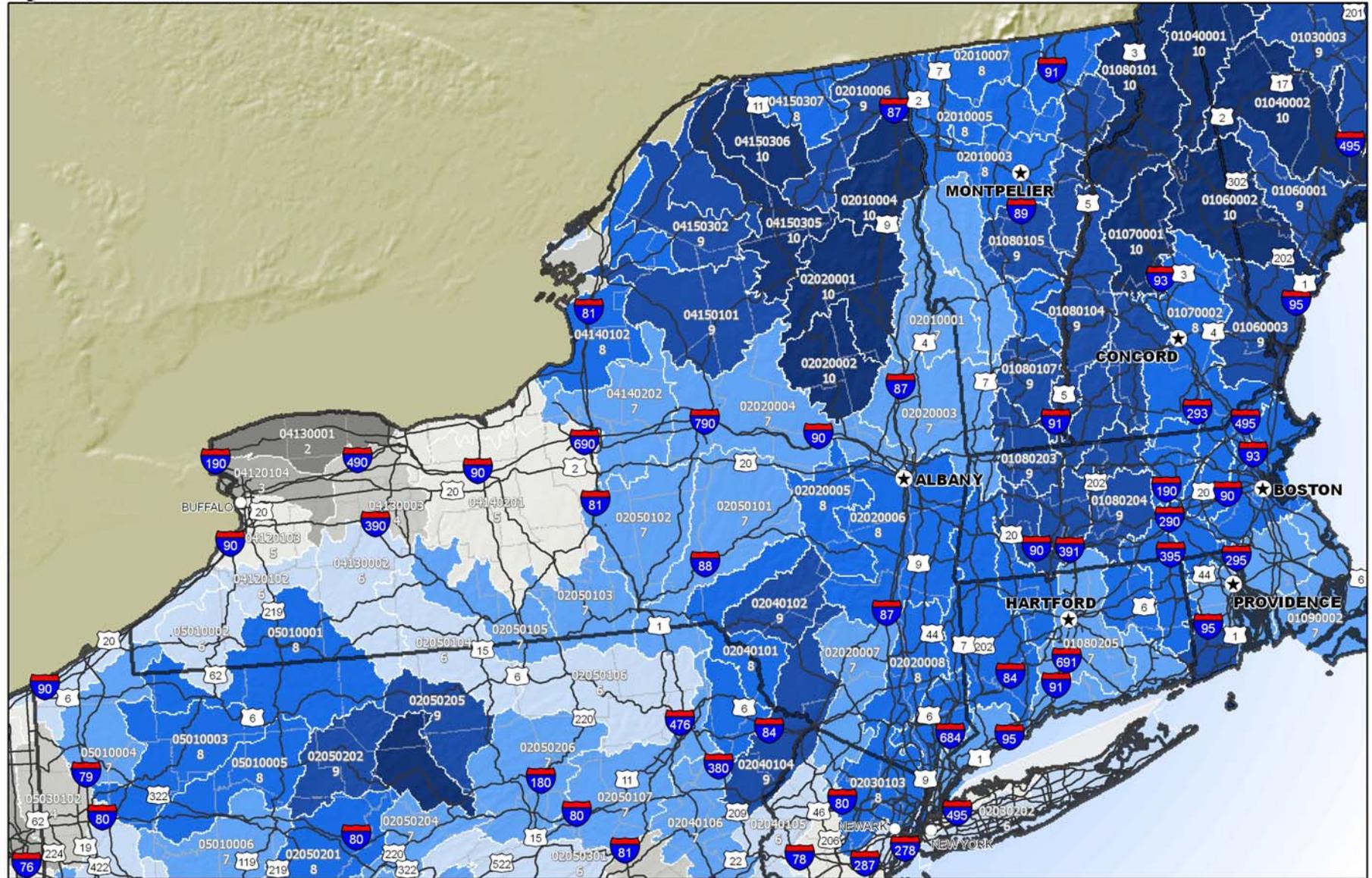


Projection: Albers

Watershed labels describe the 8-digit hydrologic unit code (HUC)

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# Step 1 (Continued) - Mean Ability to Produce Clean Water by Watershed - New York



## STEP 1 COMPOSITE SCORE



1 (Low APCW)

5

10 (High APCW)



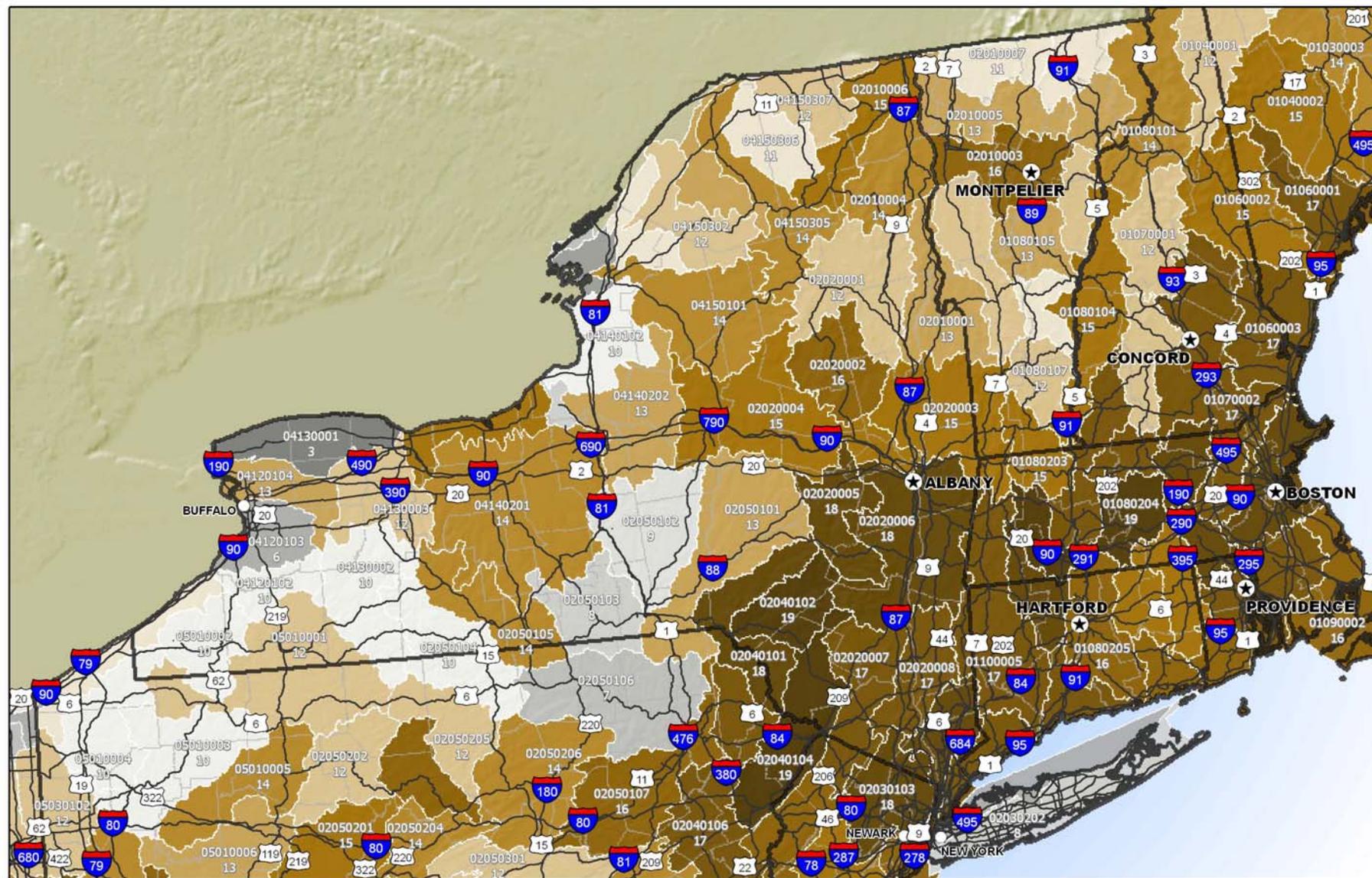
0 12.5 25 50 Miles

Projection: Albers

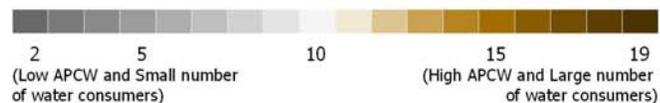
Watershed labels describe the 8-digit hydrologic unit code (HUC) and watershed composite score

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# Step 2 - Importance of watersheds for drinking water supply - New York



## STEP 2 COMPOSITE SCORE

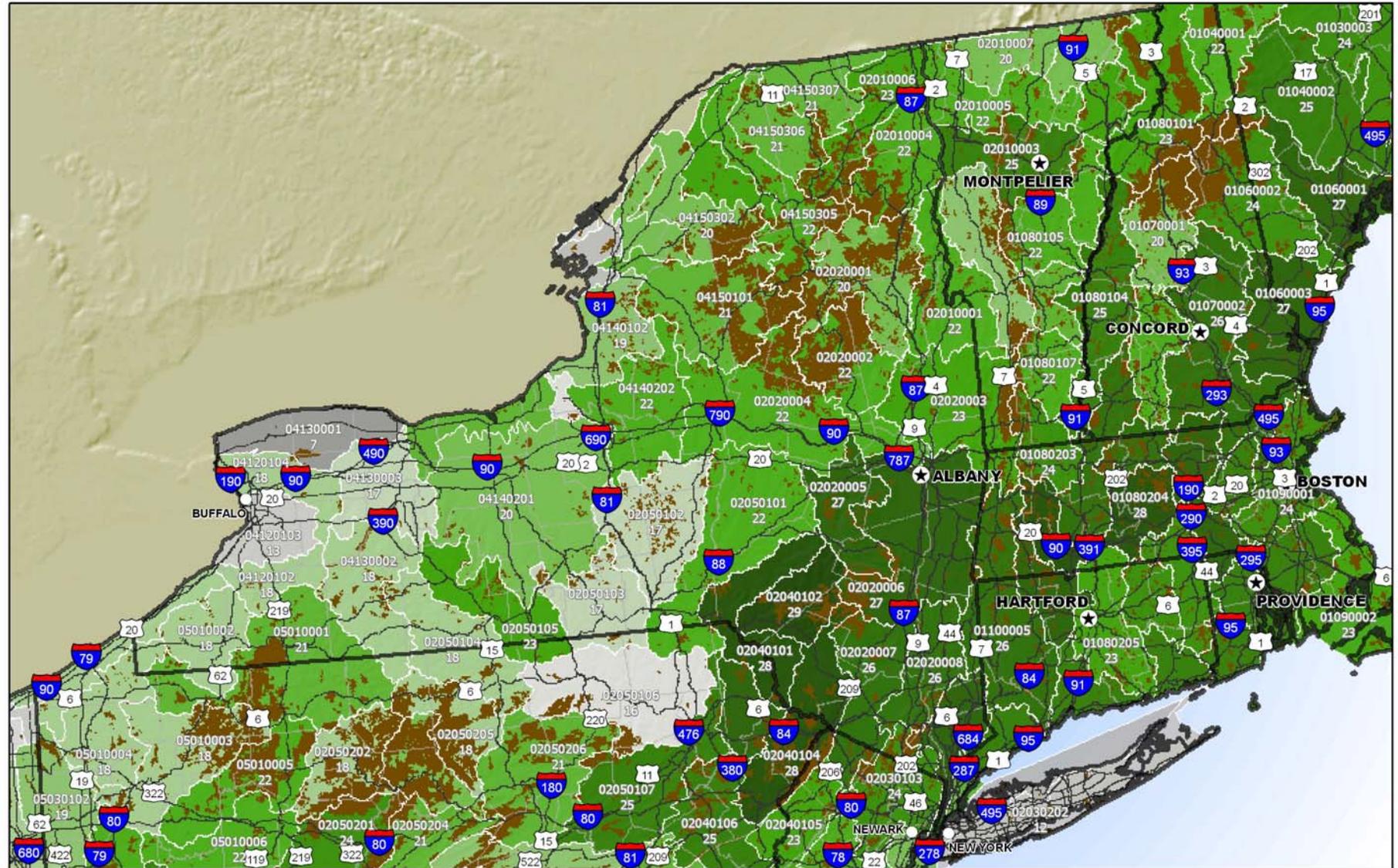


Projection: Albers

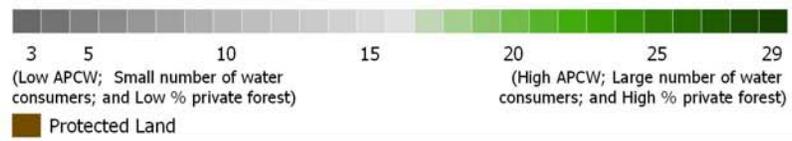
Watershed labels describe the 8-digit hydrologic unit code (HUC) and watershed composite score

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# Step 3: Importance of watersheds and private forest for drinking water supply New York

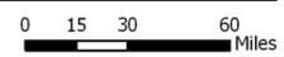


## STEP 3 COMPOSITE SCORE



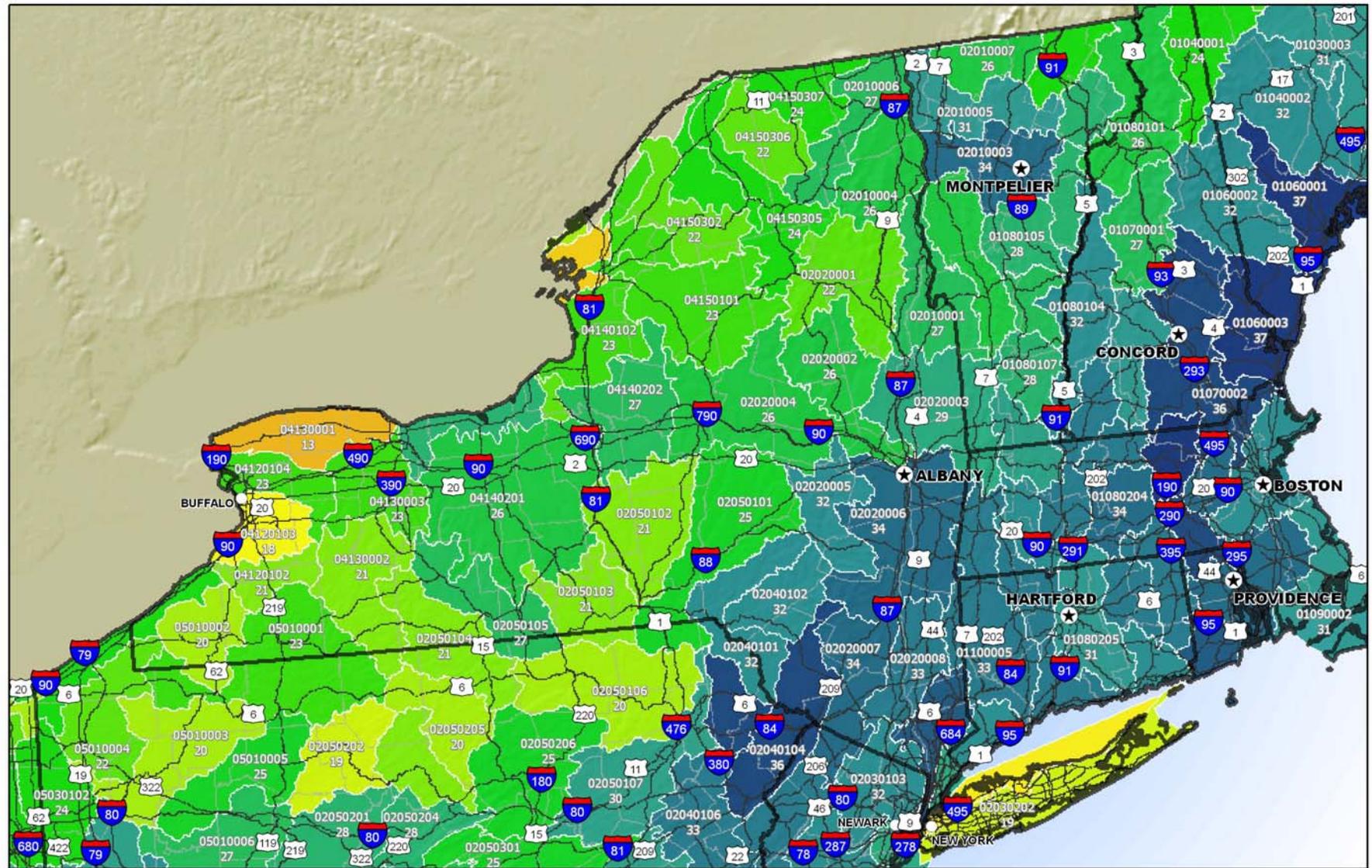
Projection: Albers

Watershed labels describe the 8-digit hydrologic unit code (HUC) and watershed composite score



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# Step 4: Development pressure on private forests in drinking water supply watersheds - New York



## STEP 4 COMPOSITE SCORE

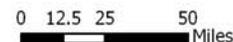


(Low APCW; Small number of water consumers; Low % private forest; and Low development pressure)

(High APCW; Large number of water consumers; High % private forest; and High development pressure)



Projection: Albers



Watershed labels describe the 8-digit hydrologic unit code (HUC) and watershed composite score

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## References

**Table 2.** Datasets used in the Forests, Water and People Analysis

Attribute	Dataset	Source*
Forest land	1992 National Landcover Dataset	U.S. Geological Survey 1999
Agricultural land by watershed	1992 National Landcover Dataset	U.S. Geological Survey 1999
Riparian forest cover by watershed	1:100,000-scale National Hydrography Dataset, buffered to 30 meters	Hatfield 2005
Road density	2002 Bureau of Transportation Statistics (BTS) Roads	U.S. Department of Transportation 2002
Soil erodibility	STATSGO Soil Dataset, kffact	Miller and White 1998
Housing density by watershed	Housing density in 2000	Theobald 2004
Surface drinking water consumers per unit area	Public Drinking Water System (PWS) Consumers by eight-digit HUC; City Drinking water consumers for New York City, Philadelphia, St. Louis, St. Paul, and Washington DC	U.S. Environmental Protection Agency 2005
Private forest by watershed	Protected Areas Database, Version 4; Wisconsin Stewardship Data	Conservation Biology Institute 2006; U.S. Geological Survey, Upper Midwest Environmental Sciences Center 2005
Development pressure per unit area	Housing density in 2000 and 2030	Theobald 2004

\*Note: See the [full report](#) for complete reference citations.

## Watershed Resources

**Northeastern Area Watershed**— <http://www.na.fs.fed.us/watershed>

**Forest-to-Faucet Partnership**—<http://www.wetpartnership.org/index.html>

**Trust for Public Land Source Water Stewardship Project**—<http://www.tpl.org/>

**Forests on the Edge**—<http://www.fs.fed.us/openspace/fote/index.html>

**American Water Works Association—Professional and Technical Resources**—<http://www.awwa.org/Resources/index.cfm?&navItemNumber=1416>

**Source Water Collaborative**—<http://www.protectdrinkingwater.org/>

**Environmental Protection Agency—Surf Your Watershed**—<http://cfpub.epa.gov/surf/locate/index.cfm>

**Environmental Protection Agency—Safe Drinking Water Information System**—[http://www.epa.gov/enviro/html/sdwis/sdwis\\_ov.html](http://www.epa.gov/enviro/html/sdwis/sdwis_ov.html)

This project was a collaborative effort between the Northeastern Area and Dr. Paul K. Barten, Associate Professor, University of Massachusetts-Amherst and Co-director of the Forest-to-Faucet Partnership.

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