

Forests, Water and People

Drinking water supply and forest lands in Rhode Island

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 Rhode Island. 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).

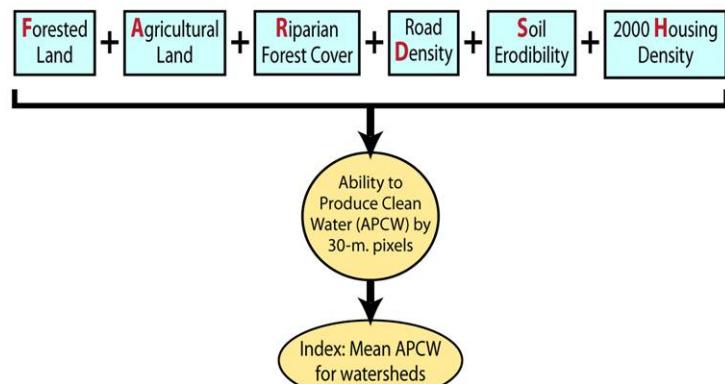


Photo by Michael Land.

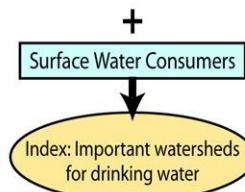
"Water, in all its uses and permutations, is by far the most valuable commodity that comes from the forest land that we manage, assist others to manage, and/or regulate."
Policy Statement, National Association of State Foresters

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.

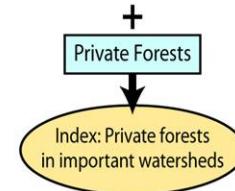
Step 1: Calculate ability to produce clean water.



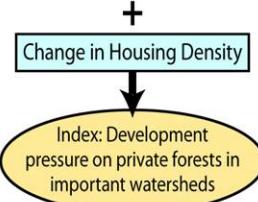
Step 2: Add data on drinking water consumers.



Step 3: Add data on private forest land.



Step 4: Add data on change in housing density.



Rhode Island Results

Highlights

- Despite its small size, all five of Rhode Island's watersheds scored well in each step of the analysis due to its large percent of privately owned forest (89 percent), watersheds serving more than one million surface drinking water consumers total, and significant development pressure.
- The watershed with the highest ability to produce clean water (step 1), Pawcatuck-Wood watershed, is in the southern portion of Rhode Island.
- In the ability of watersheds to provide drinking water to the most people (step 2), the Blackstone and Narragansett watersheds scored the highest. Approximately 1.3 million people depend on surface drinking water from Rhode Island's watersheds.
- In the ability of watersheds to provide drinking water on private lands (step 3), most of Rhode Island scored well because the State has nearly 90 percent privately owned forest land. Again, the two highest scoring watersheds are the Blackstone and Narragansett watersheds.
- Many of the same areas of Rhode Island 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 highest scoring watersheds were the Blackstone, Pawcatuck-Wood, and Narragansett watersheds. These watersheds averaged in the top one percent of the study area's watersheds. All of Rhode Island scored high in step 4.

Table 1. Watershed results for Rhode Island

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)
Blackstone	01090003	8 of 10	264,074	67 %	17 %	36 of 40	4 of 540
Pawcatuck-Wood	01090005	9 of 10	16,764	69 %	19 %	35 of 40	8 of 540
Narragansett	01090004	7 of 10	640,603	58 %	16 %	34 of 40	10 of 540
Quinebaug	01100001	8 of 10	35,501	69 %	16 %	33 of 40	19 of 540
Cape Cod	01090002	7 of 10	341,429	43 %	11 %	31 of 40	50 of 540

Average or total value for all watersheds listed in Table 1

Mean APCW for watersheds:	7.8	of 10
Important watersheds for drinking water composite score:	16.4	of 20
Private forests in important watersheds composite score:	24.8	of 30
Development pressure on private forests in important watersheds composite score:	33.8	of 40
Forested Land (acres):	1,674,282.8	
Private Forest (acres):	1,482,092.3	
Private Forest Land under Development Pressure by 2030 (acres):	295,271.7	
(% private forest land):	19.9%	

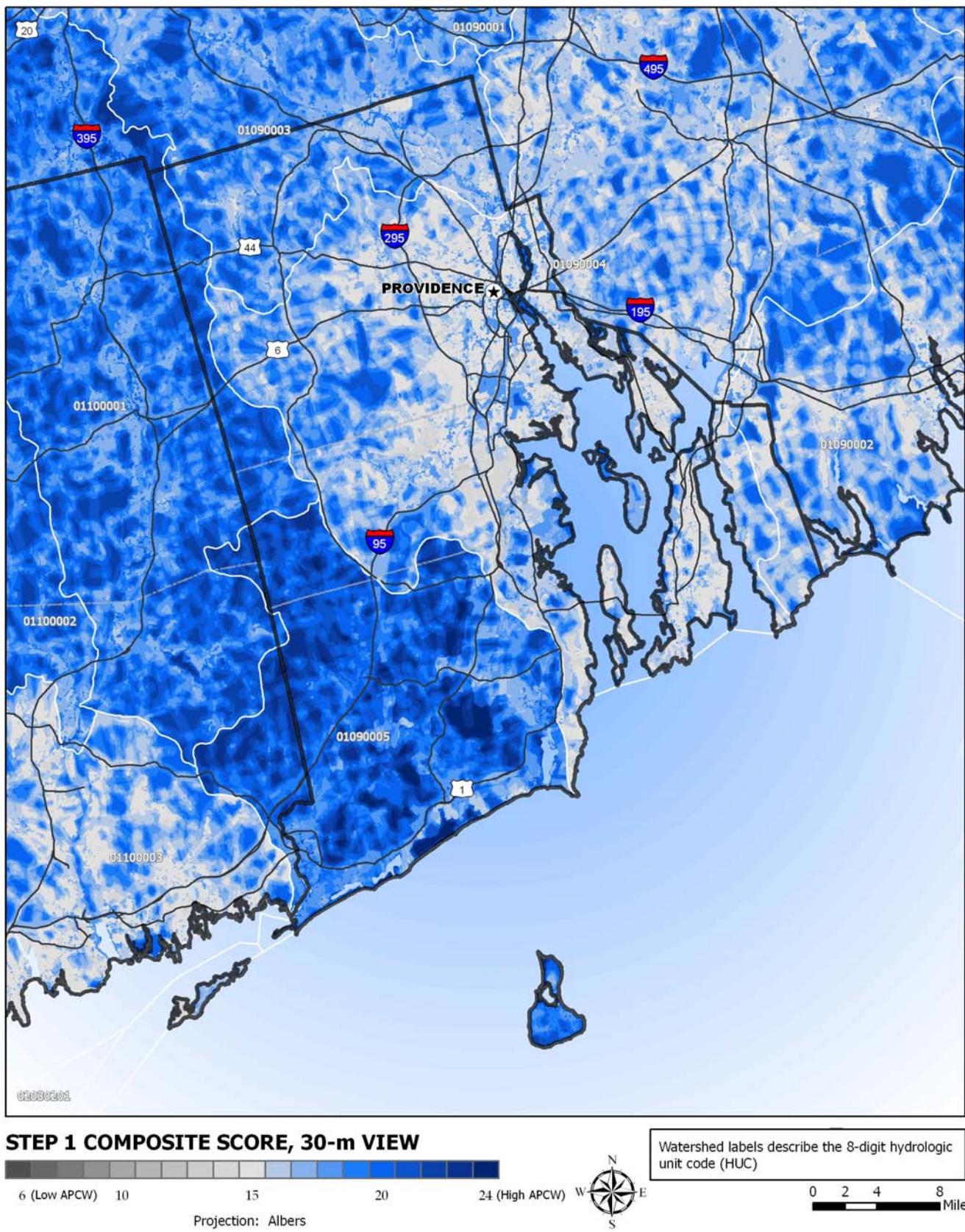
Note: If a watershed fell partially in Rhode Island, the whole watershed was considered for this project. State results reflect the total acreage for all watersheds that impact that State (this may account for a higher acreage figure than if only lands within State boundaries were considered).

Maps

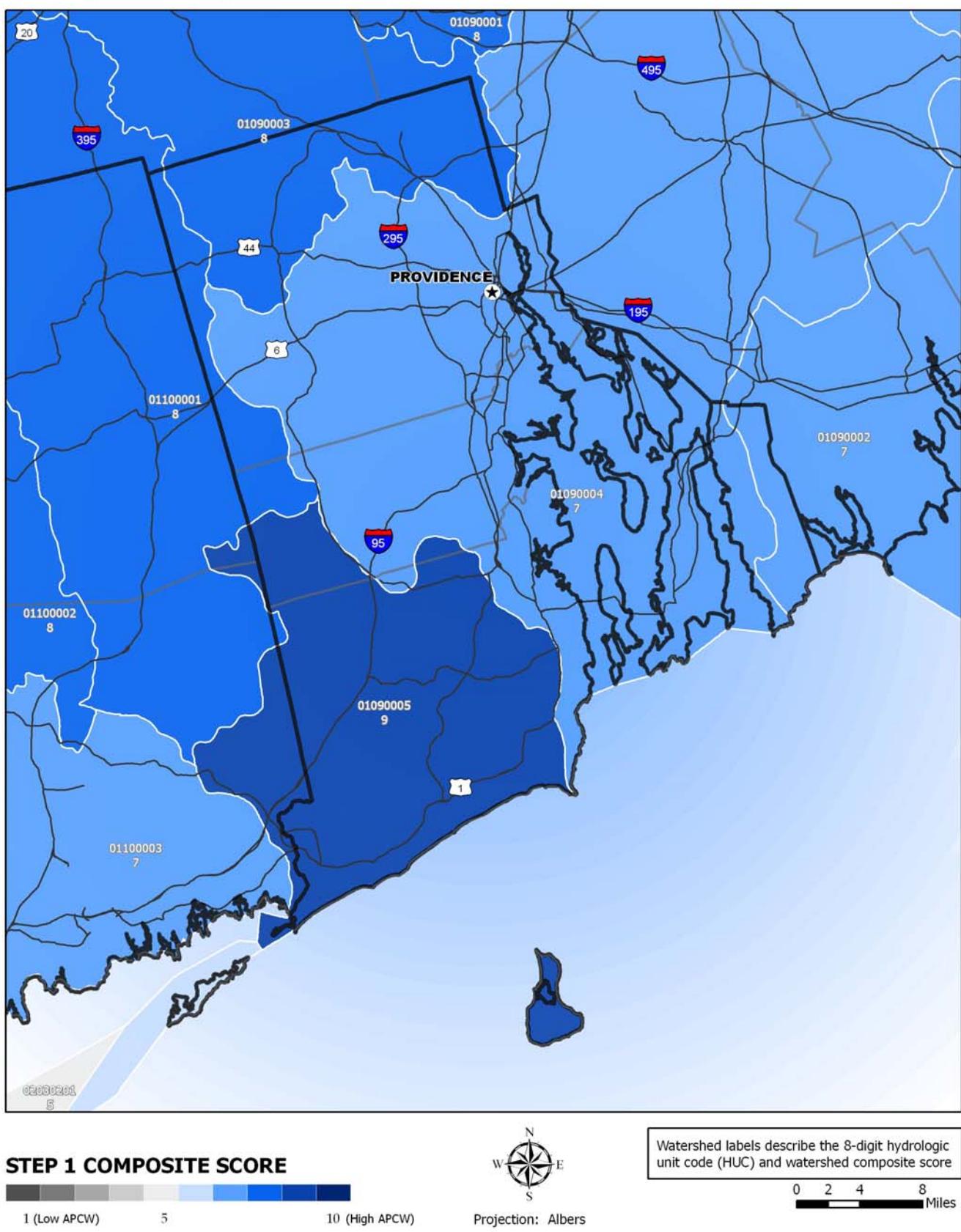
The following maps depict the results of each step in the Forests, Water and People analysis. Each watershed is labeled with the eight-digit HUC and the watershed composite score for the analysis step. (Note: the APCW, 30-m. pixel view does not have a watershed score)

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

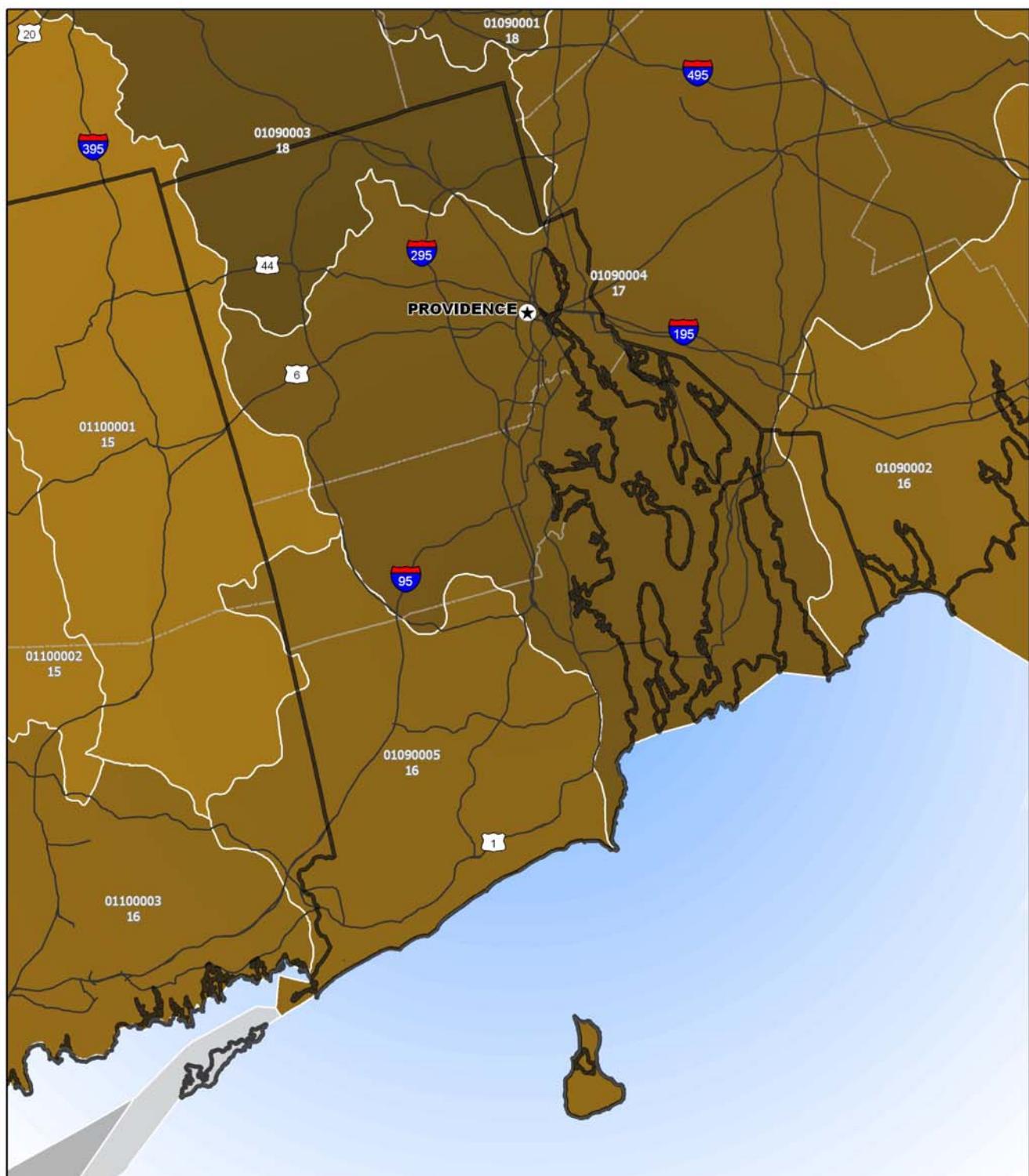
Ability to Produce Clean Water (APCW) (Step 1), 30-m View - Rhode Island



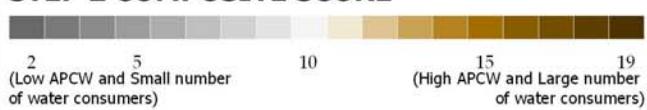
Mean Ability to Produce Clean Water (APCW) by Watershed (Step 1, Continued) - Rhode Island



Importance of watersheds for drinking water supply (Step 2) - Rhode Island



STEP 2 COMPOSITE SCORE

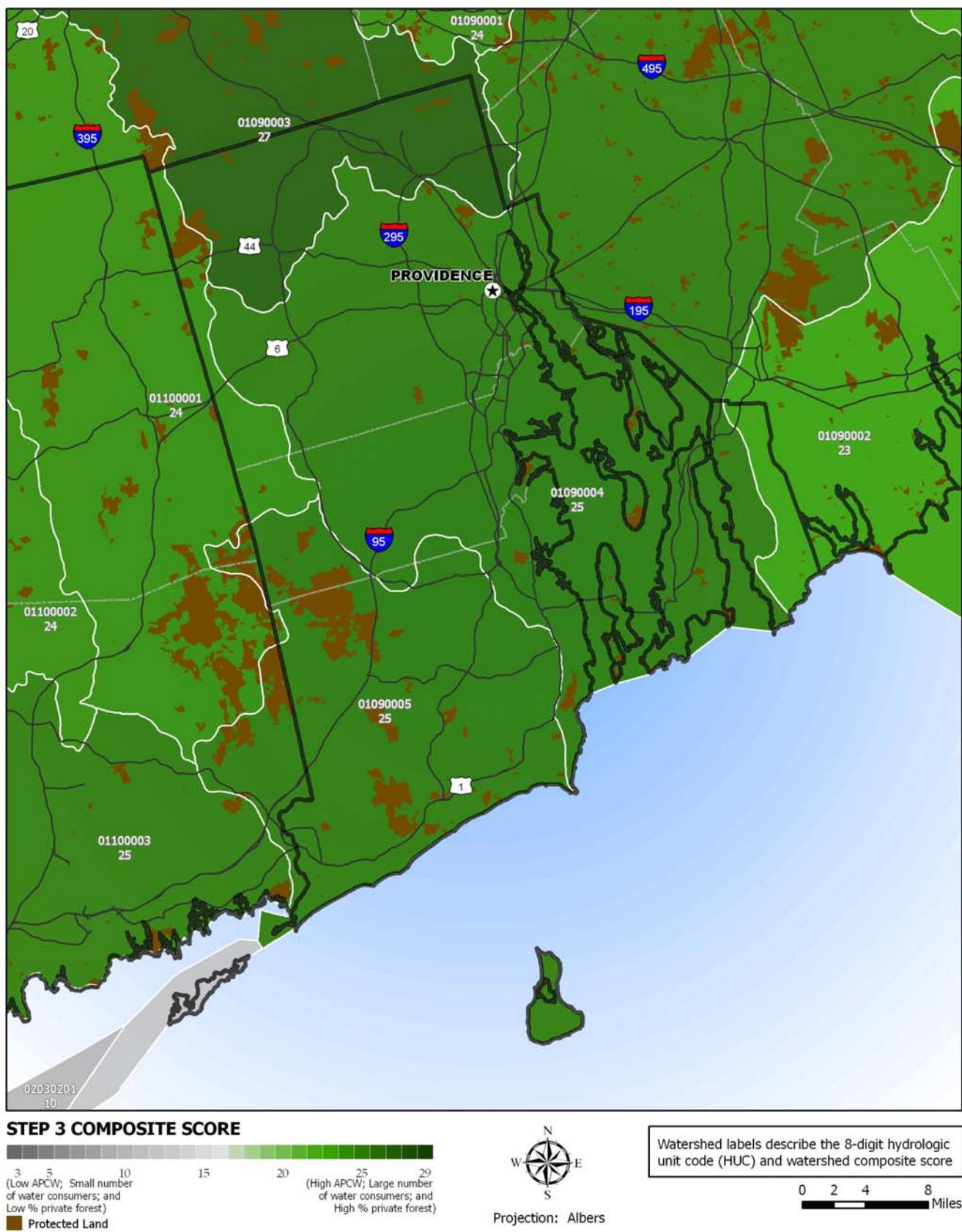


Projection: Albers

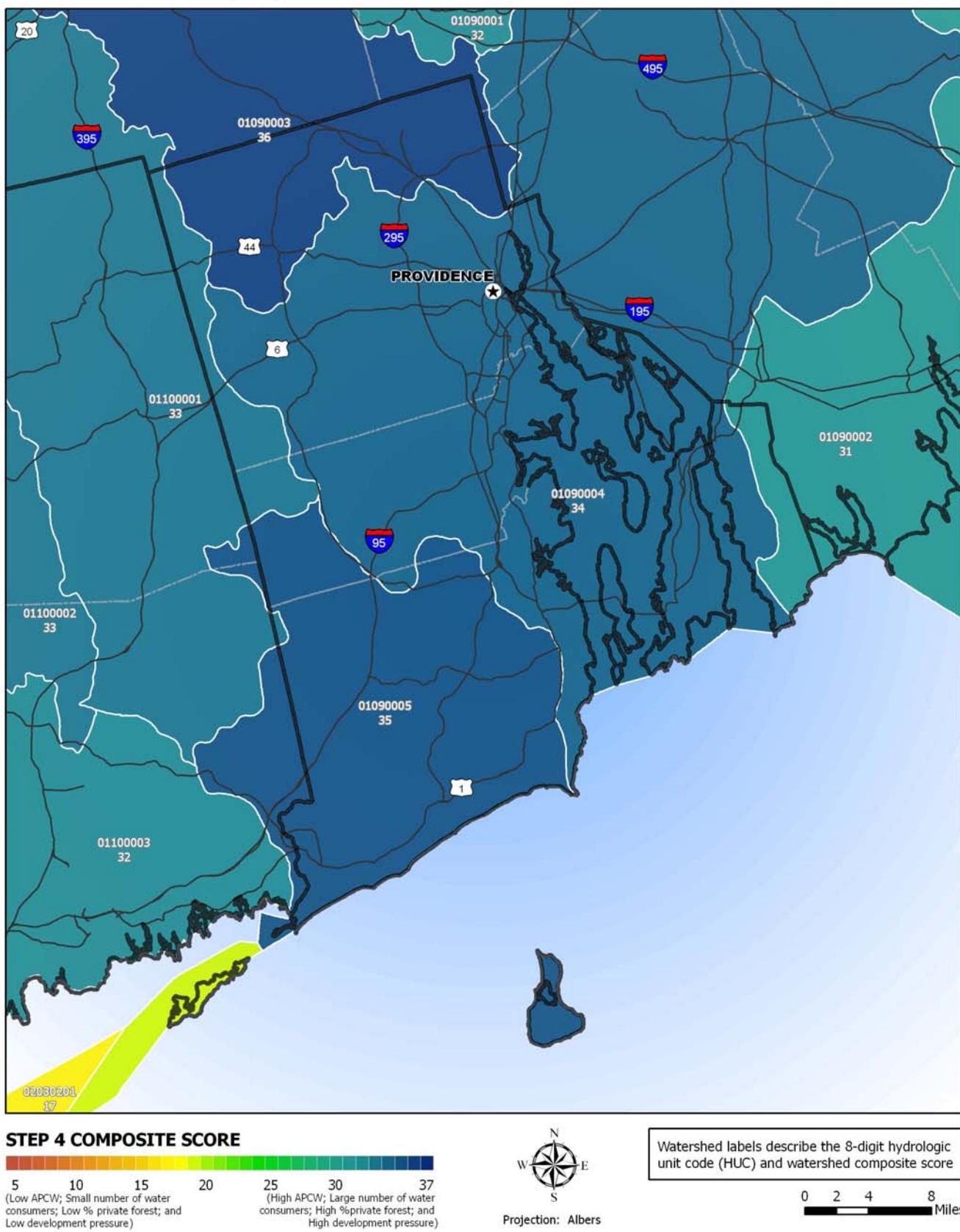
Watershed labels describe the 8-digit hydrologic unit code (HUC) and watershed composite score

0 2 4 8 Miles

Importance of watersheds and private forest for drinking water supply (Step 3) - Rhode Island



Development pressure on private forests in drinking water supply watersheds (Step 4) - Rhode Island



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

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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