Forests, Water and People

Drinking water supply and forest lands in Illinois

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 Illinois. 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).

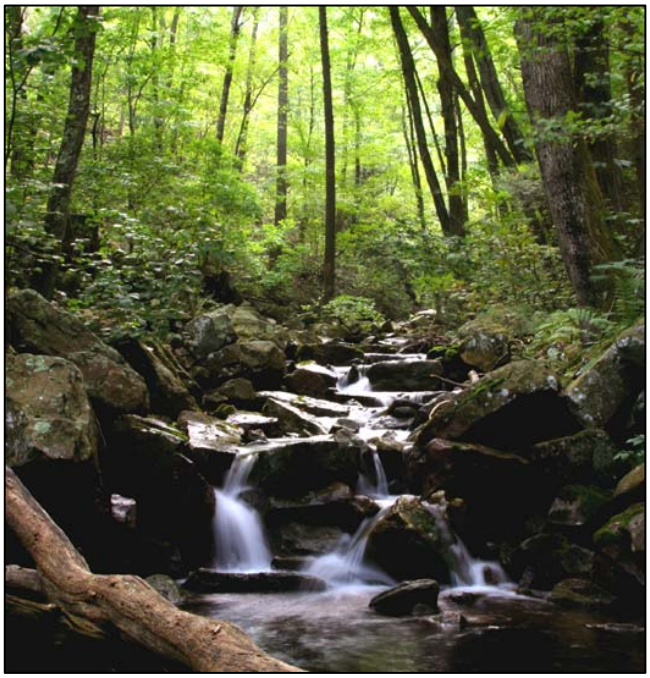
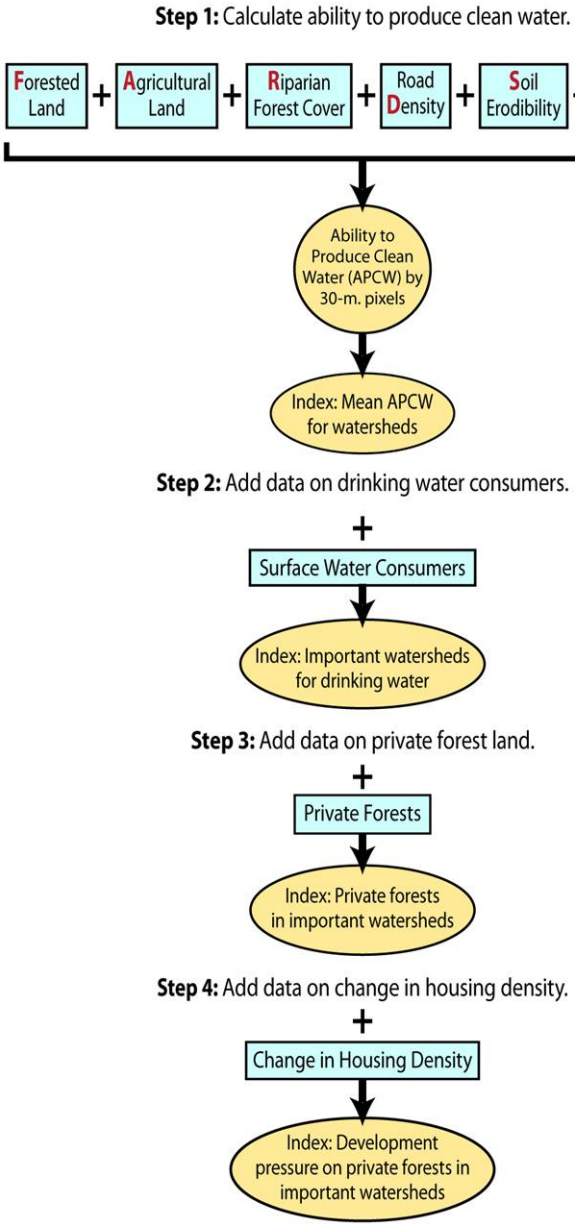


Photo by Michael Land.

"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.*



Illinois Results

Highlights

- Illinois' watersheds did not rank high overall in this analysis due to several factors: large portions of the State, especially in the north, rely primarily on ground water (wells) for their drinking water supply (this analysis focused on surface water supplies only); and a large component of Illinois' land use is agriculture, not forest. However, several watersheds did rank well in their ability to provide surface drinking water supply and having private forests on important watersheds; and for having high-quality watersheds under development pressure.
- Due to Illinois high percent agriculture, the State's highest ranking watersheds in their ability to produce clean water are located in the southern part of the state. The highest ranking watersheds in step 1 are the Lower Des Moines, Bear-Wyaconda, Lower Mississippi-Memphis, and Lower Ohio-Bay watersheds.
- Illinois ranked low average in the ability of its watersheds to provide drinking water because a large portion of its population is served by ground water (wells). The watersheds supplying drinking water to the largest populations are the Cahokia-Joachim, Copperas-Duck, and Lower Illinois-Senachwine Lake watersheds.
- Although there is a low percent of forested land statewide, approximately 90 percent of forested lands are privately owned and therefore subject to development. The Cahokia-Joachim, Upper Mississippi-Girardeau, and Lower Des Moines watersheds ranked highest in step 3.
- Since there is a low percent of forested land statewide, only 4 percent of private forestlands on high-quality watershed areas are subject to development pressure by 2030. However, the Cahokia-Joachim and Peruque-Piasa watersheds ranked in the top 23 percent of all the region's watersheds because these watersheds are at high risk for development and also provide high-quality drinking water to a large population.

Table 1. Watershed results for Illinois

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)
Cahokia-Joachim	07140101	5 of 10	218,742	35 %	7 %	26 of 40	126 of 540
Peruque-Piasa	07110009	2 of 10	61,528	24 %	18 %	24 of 40	169 of 540
Upper Mississippi-Cape Girardeau	07140105	5 of 10	62,067	35 %	3 %	21 of 40	264 of 540
Copperas-Duck	07080101	3 of 10	244,854	16 %	4 %	20 of 40	289 of 540
Upper Fox	07120006	1 of 10	94,487	17 %	17 %	20 of 40	289 of 540
Pike-Root	04040002	1 of 10	28,456	13 %	12 %	20 of 40	289 of 540
Lower Des Moines	07100009	6 of 10	82,686	27 %	1 %	19 of 40	320 of 540
The Sny	07110004	4 of 10	64,443	29 %	1 %	18 of 40	337 of 540
Lower Fox	07120007	1 of 10	155,000	7 %	9 %	18 of 40	337 of 540
Lower Illinois-Senachwine Lake	07130001	3 of 10	162,939	13 %	1 %	17 of 40	352 of 540
Lower Ohio	05140206	4 of 10	5,400	26 %	3 %	17 of 40	352 of 540
Bear-Wyaconda	07110001	6 of 10	31,667	28 %	0 %	17 of 40	352 of 540
Little Calumet-Galien	04040001	3 of 10	0	31 %	11 %	17 of 40	352 of 540
Lower Mississippi-Memphis	08010100	6 of 10	0	33 %	4 %	17 of 40	352 of 540
Lower Ohio-Bay	05140203	6 of 10	3,462	37 %	1 %	17 of 40	352 of 540
Saline	05140204	4 of 10	23,819	27 %	1 %	17 of 40	352 of 540
Middle Wabash-Busseron	05120111	4 of 10	9,077	21 %	3 %	16 of 40	380 of 540
Big Muddy	07140106	3 of 10	49,240	26 %	2 %	16 of 40	380 of 540
Kankakee	07120001	3 of 10	43,789	10 %	7 %	16 of 40	380 of 540
La Moine	07130010	5 of 10	16,725	22 %	0 %	14 of 40	407 of 540
Sugar	07090004	1 of 10	0	12 %	14 %	14 of 40	407 of 540
Lower Illinois-Lake Chautauqua	07130003	3 of 10	14,738	21 %	1 %	14 of 40	407 of 540
Chicago	07120003	2 of 10	0	11 %	11 %	14 of 40	407 of 540
Upper Rock	07090001	1 of 10	0	10 %	19 %	14 of 40	407 of 540
Shoal	07140203	2 of 10	20,424	16 %	1 %	13 of 40	427 of 540
Mackinaw	07130004	2 of 10	66,000	6 %	1 %	13 of 40	427 of 540
Apple-Plum	07060005	5 of 10	0	23 %	1 %	13 of 40	427 of 540
Upper Sangamon	07130006	2 of 10	83,885	4 %	1 %	13 of 40	427 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)
Lower Sangamon	07130008	4 of 10	1,050	11 %	2 %	13 of 40	427 of 540
Middle Wabash-Little Vermilion	05120108	3 of 10	0	16 %	5 %	13 of 40	427 of 540
South Fork Sangamon	07130007	1 of 10	145,427	5 %	2 %	13 of 40	427 of 540
Des Plaines	07120004	1 of 10	0	10 %	17 %	13 of 40	427 of 540
Macoupin	07130012	3 of 10	11,852	15 %	0 %	12 of 40	442 of 540
Lower Illinois	07130011	3 of 10	28,847	22 %	0 %	12 of 40	442 of 540
Middle Kaskaskia	07140202	1 of 10	40,201	18 %	1 %	12 of 40	442 of 540
Vermilion	05120109	2 of 10	39,502	5 %	2 %	11 of 40	454 of 540
Cache	07140108	4 of 10	0	23 %	1 %	11 of 40	454 of 540
Kishwaukee	07090006	1 of 10	0	7 %	7 %	11 of 40	454 of 540
Little Wabash	05120114	1 of 10	59,422	16 %	1 %	11 of 40	454 of 540
Lower Kaskaskia	07140204	1 of 10	13,067	15 %	2 %	11 of 40	454 of 540
Spoon	07130005	4 of 10	0	14 %	0 %	10 of 40	465 of 540
Flint-Henderson	07080104	4 of 10	0	16 %	1 %	10 of 40	465 of 540
Embarras	05120112	2 of 10	15,500	13 %	1 %	10 of 40	465 of 540
Vermilion	07130002	2 of 10	30,917	2 %	1 %	10 of 40	465 of 540
Lower Wabash	05120113	1 of 10	1,058	15 %	3 %	10 of 40	465 of 540
Pecatonica	07090003	1 of 10	0	10 %	3 %	9 of 40	484 of 540
Upper Illinois	07120005	2 of 10	0	8 %	2 %	9 of 40	484 of 540
Lower Rock	07090005	2 of 10	0	9 %	3 %	9 of 40	484 of 540
Iroquois	07120002	3 of 10	0	4 %	1 %	8 of 40	498 of 540
Upper Kaskaskia	07140201	1 of 10	5,900	8 %	1 %	7 of 40	511 of 540
Skillet	05120115	1 of 10	1,424	17 %	0 %	7 of 40	511 of 540
Salt	07130009	2 of 10	0	3 %	1 %	7 of 40	511 of 540
Green	07090007	2 of 10	0	6 %	1 %	7 of 40	511 of 540

Average or total value for all watersheds listed in Table 1

Mean APCW for watersheds:	2.7	of 10
Important watersheds for drinking water composite score:	6.4	of 20
Private forests in important watersheds composite score:	9.6	of 30
Development pressure on private forests in important watersheds composite score:	13.8	of 40
Forested Land (acres):	9,033,414.8	
Private Forest (acres):	8,130,813.4	
Private Forest Land under Development Pressure by 2030 (acres):	325,089.3	
(% private forest land):	4.0%	

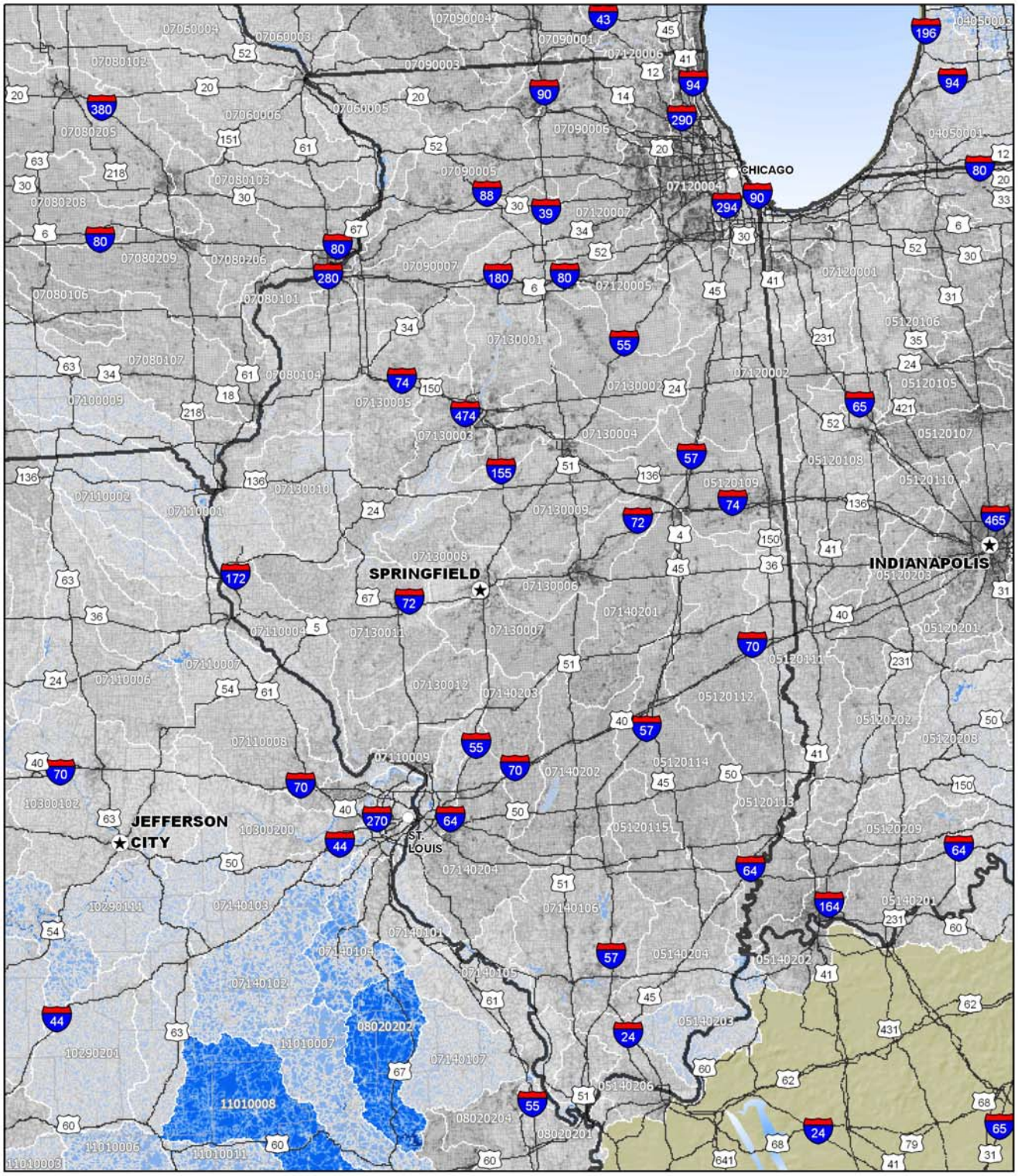
Note: If a watershed fell partially in Illinois, the whole watershed was considered for this project. State results reflect the total acreage for all watersheds that impact that State (this may account for a higher acreage figure than if only lands within State boundaries were considered).

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 - Illinois



STEP 1 COMPOSITE SCORE, 30-m VIEW

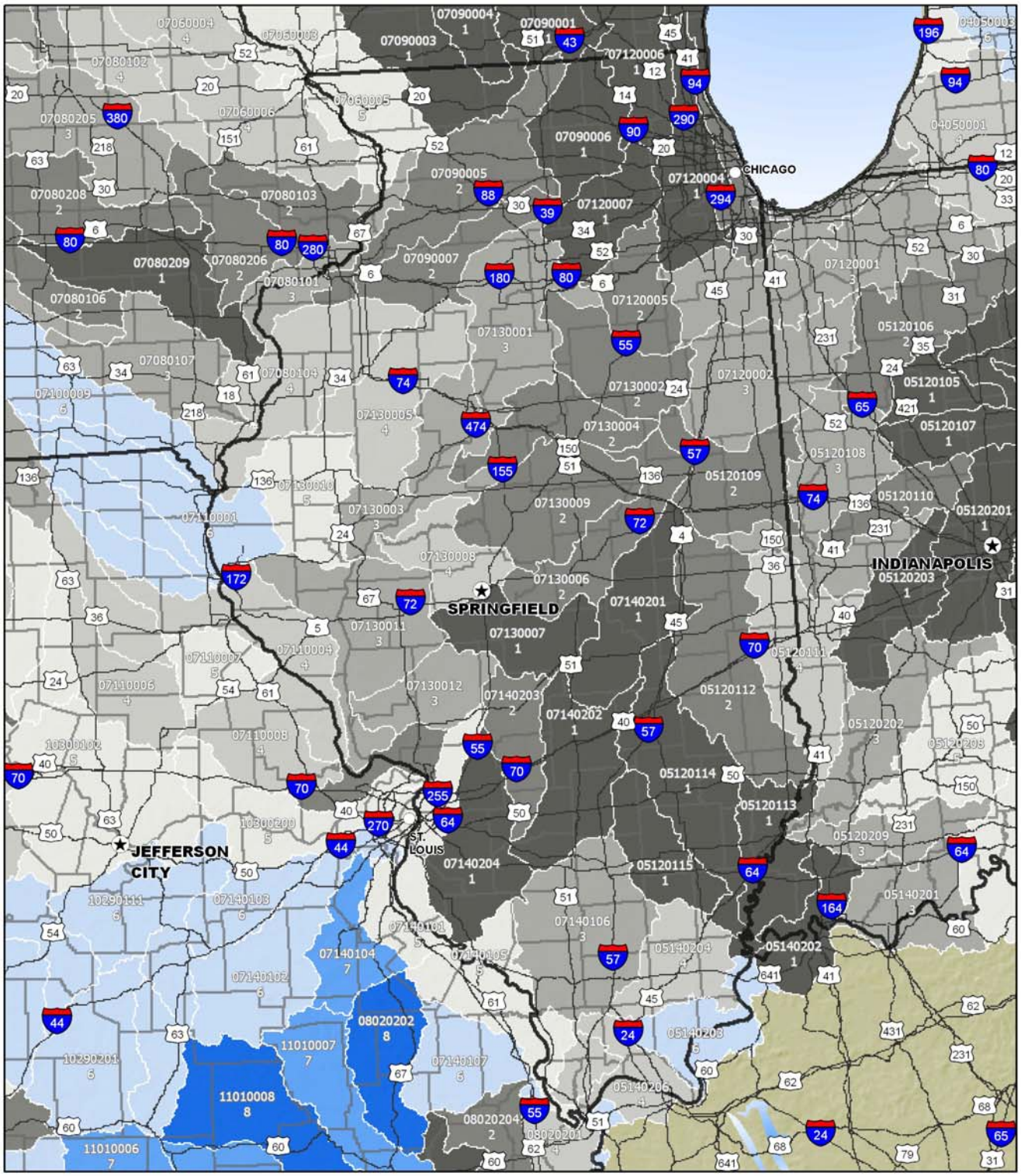
6 (Low APCW) 10 15 20 24 (High APCW)

Projection: Albers

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

0 15 30 60 Miles

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



STEP 1 COMPOSITE SCORE

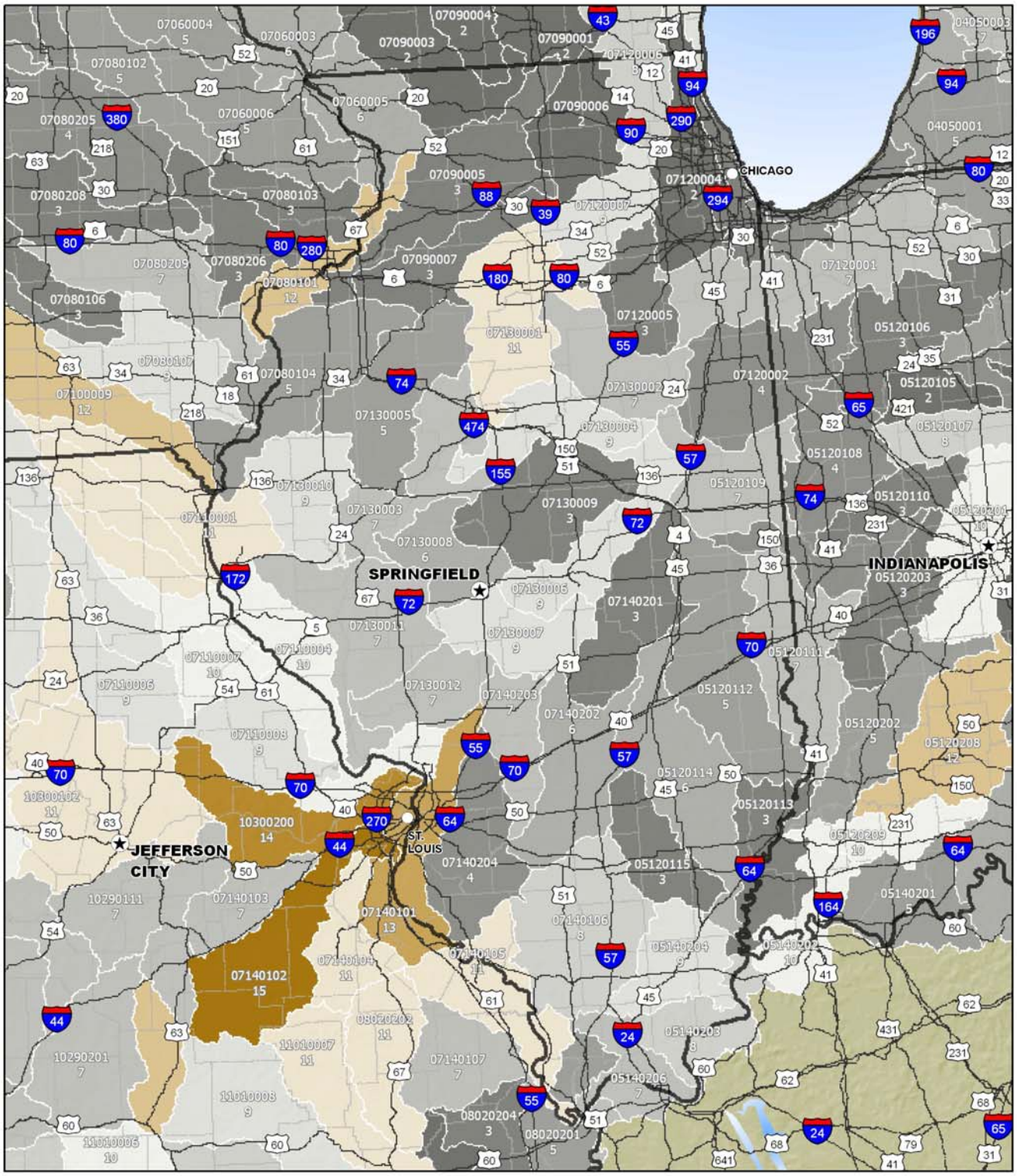
1 (Low APCW) 5 10 (High APCW)

Projection: Albers

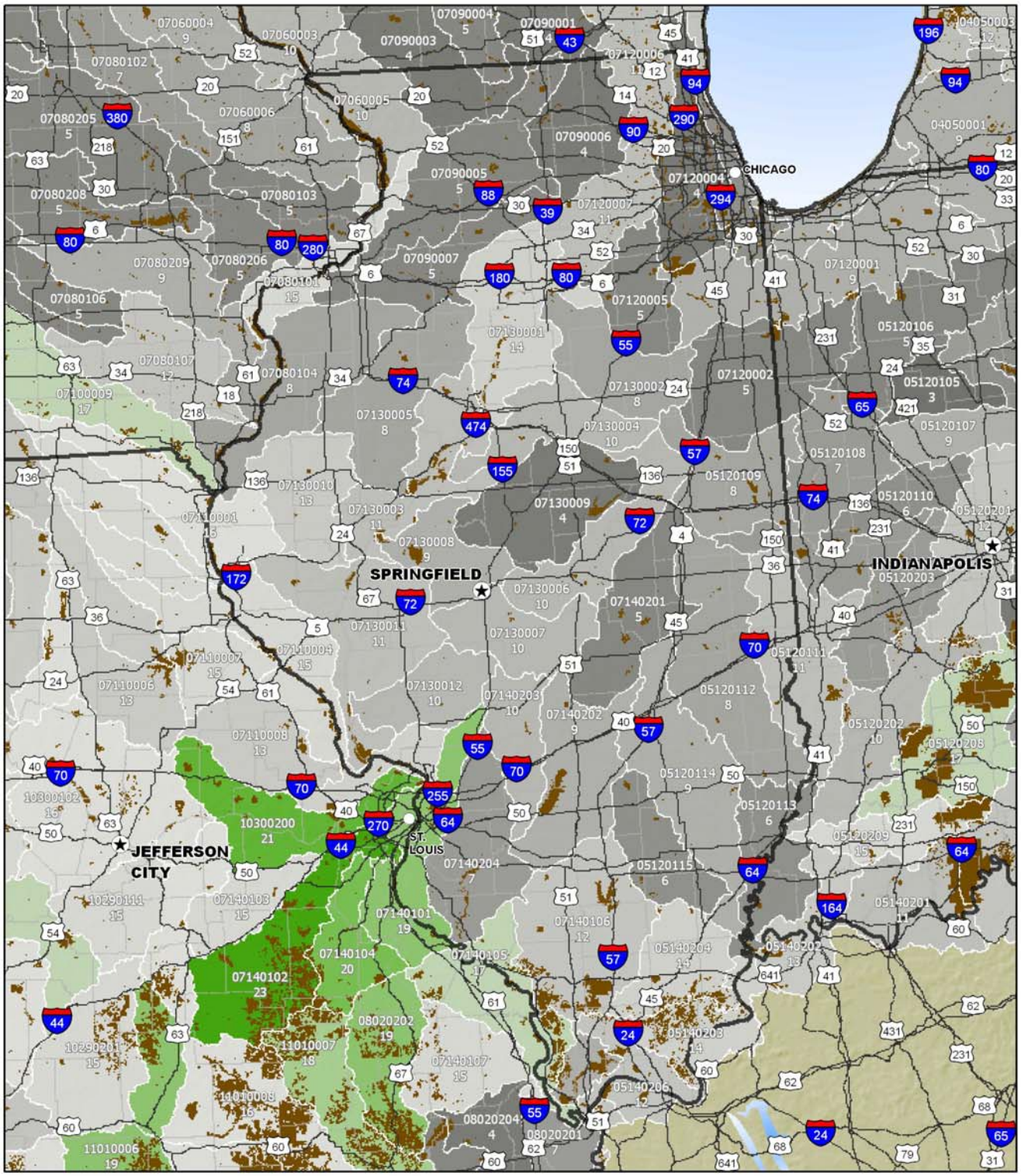
Watershed labels describe the 8-digit hydrologic unit code (HUC) and watershed composite score

0 15 30 60 Miles

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



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



STEP 3 COMPOSITE SCORE

3 5 10 15 20 25 29

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

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

Protected Land

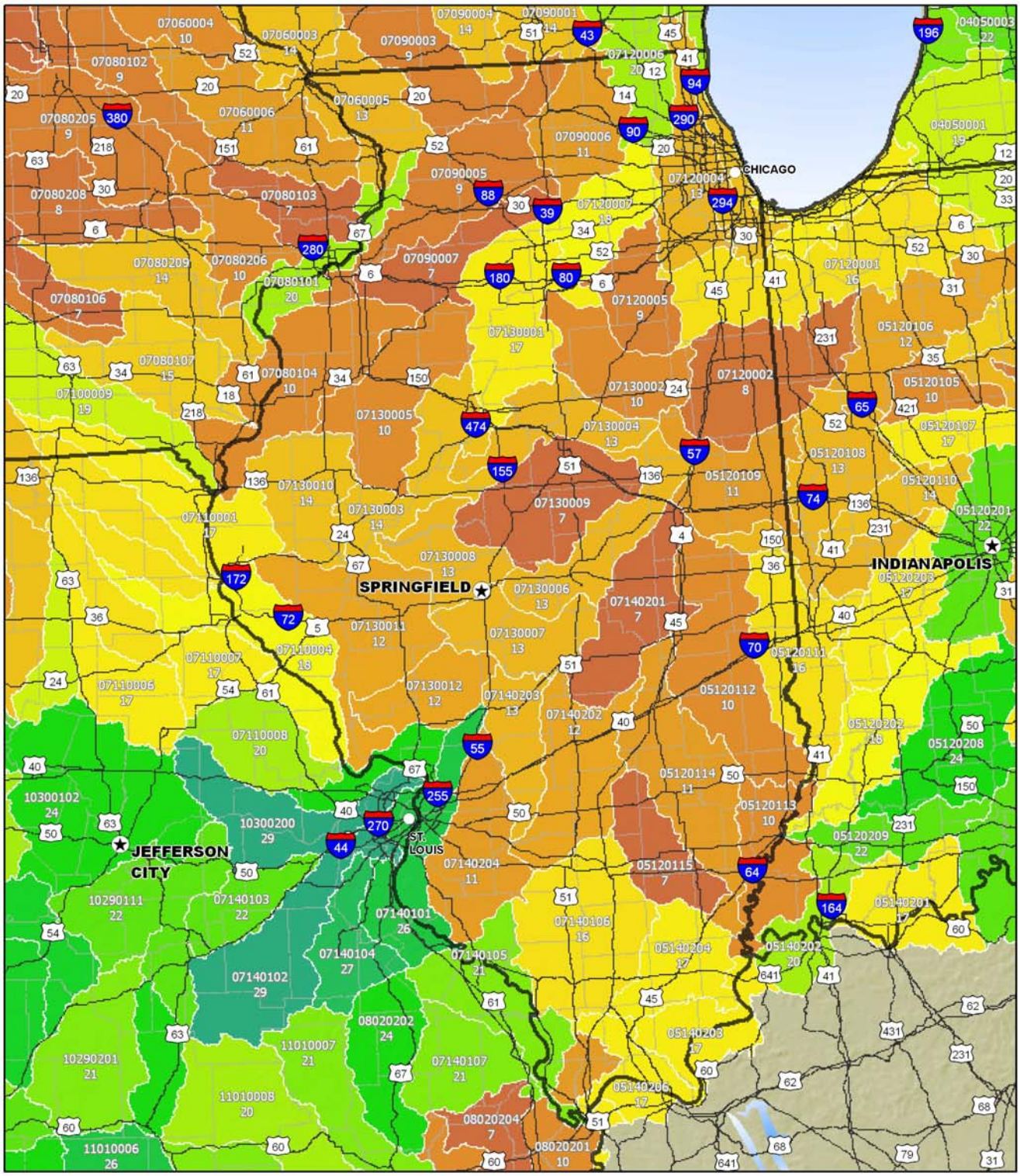
N W E S

Projection: Albers

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

0 15 30 60 Miles

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



STEP 4 COMPOSITE SCORE

5 10 15 20 25 30 37

(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)

N W E S

Projection: Albers

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

0 15 30 60 Miles

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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